Comments on Evidence for Hunting of Pronghorn Herds in Prehistory

Abstract
An article by Lyman (2007) in this journal provided an excellent summary of the Holocene paleoecological record of pronghorn in eastern Washington, but the discussion of hunting of herds and specifically of communal hunting prior to the written record does not capture the complexity of this issue. A bone assemblage numerically dominated by pronghorn does not alone provide adequate evidence for hunting herds of multiple animals. There needs to be a convergence of multiple lines of evidence, including indications of human-caused mortality, a single episode of bone deposition, and a single mortality event.

First, some terminology. For this paper, a herd is simply a collection of more than one individual that might be encountered during a hunt, as in a bachelor herd or nursery herd. The concept of herd as sometimes used for wildlife management (e.g., the Sublette pronghorn herd in Wyoming) is not what is meant here. Communal hunting is another term with several different possible meanings. While the historical record describes a continuum of methods for hunting pronghorn from single hunters to small cooperative groups to large groups of men, women and children working together (see Lubinski 1999, McCabe et al. 2004), the term communal hunting typically refers to the larger of such efforts.

When humans hunt herding animals like pronghorn, they could take a single individual or multiple individuals at a time, and deposit the skeletal remains at the same or different locations over a period of time. Thus, a given archaeological site could have a single individual (single kill) from a single solo encounter or solo selection from a herd, or multiple individuals from a single encounter (here termed a mass kill) or an accumulation of multiple single kills or mass kills over time. It is not a simple matter to distinguish a bone deposit representing a mass kill from an accumulation of single kills at a site, particularly if the single kills are closely spaced in time.

A number of lines of evidence have been explored to distinguish bone accumulations resulting from mass kills from accumulations of smaller kills (e.g., Klein 1978, Stiner 1990, Lubinski 1997, 2000a, Fenner 2009). None of these lines are by themselves sufficient for demonstrating a mass kill, but together multiple lines of evidence may provide a compelling interpretation. One line of evidence, employed by Lyman (2007:109), is the numerical dominance of a site bone assemblage (>50% of identified bones or bone fragments) by pronghorn. This is a reasonable expectation for mass kill sites, but more evidence is needed. I have suggested previously (Lubinski 1999, 2000b) that three broad criteria should be met to consider a bone accumulation a mass kill: (1) evidence of human-caused mortality, (2) evidence of a single episode of bone deposition, and (3) evidence for a single mortality event.

Human-caused mortality should not be assumed, as natural die-offs are known to occur,
such as the 1991 cliff fall of 150 pronghorn in Wyoming (Ottman 1992). Evidence for human-caused mortality could include direct evidence of cause of death, such as projectile points embedded in or closely associated with pronghorn bones. As these are rare occurrences, less direct evidence may need to be evaluated, such as association of bone and artifacts or features, butchery or hammerstone impact marks on bone, green bone fracture, and/or burning. Evidence against human involvement should also be considered, such as location under a cliff, carnivore bone damage, complete bones (not broken for marrow), and/or complete articulated skeletons (not butchered).

Evidence of a single episode of bone deposition would help to distinguish a single bone deposit (e.g., one kill event) from an accumulation of smaller deposits over time. Compelling evidence for a single episode might include conjoining or refitting bone fragments, bone weathering trends by elevation, and articulated skeletal elements (see Todd 1987, Todd and Rapson 1991). Less compelling evidence would include unimodal bone weathering (Kreutzer 1996), low proportions of bone weathering indicating positional instability (see Todd 1993), and a single geological stratum encasing the pronghorn bones.

Evidence for a single mortality event would help to distinguish a single event from an accumulation of smaller events. Such evidence could include a non-selective or catastrophic mortality profile (Kurtén 1953, Lyman 1987, Stiner 1990, Lubinski 2000a), or perhaps discrete age classes within a mortality profile (Voorhies 1969). A single event also means that the animals were killed in the same season, so estimates of season of death (e.g., from fawn tooth eruption or cementum increments) should be consistent or at least unimodal (see Lubinski and O’Brien 2001). Another consideration is whether variation in bone stable isotope ratios is consistent with one or more prey populations (Fenner 2008).

Nearly all of the above lines of evidence can be questioned, and all have more than one possible cause. This is one of the reasons why it is important to evaluate multiple lines. No site makes a compelling case for a mass kill unless multiple lines of evidence converge on this interpretation. Ideally, one would examine all available lines of evidence, establish the facts, and consider multiple working hypotheses (Chamberlin 1890) to account for these facts, including mass kills and accumulations of smaller kills. Then, as Mayr (1982:26) suggests for evolutionary biology, the provisionally accepted hypothesis would be that, “consistent with more, or more compelling, facts than competing hypotheses.”

Even if an archaeological site clearly represents a mass kill, it still may not be evidence of a communal kill, depending on one’s meaning of that term, and what number of animals is considered necessary to indicate a communal, as opposed to merely cooperative, venture. There is no obvious threshold number of animals expected at a communal kill location, since even large, historically-recorded communal hunts have resulted in none, one, to hundreds of killed animals (see Lubinski 1999 and references therein). However, if a site is a mass kill with a large number of animals, it is quite plausibly interpreted as a communal kill. Five individual animals has been suggested as a reasonable if arbitrary minimum for consideration of a possible mass kill site (Lubinski 1999).

Mass kills, communal hunting, and, “taking pronghorn herds comprising multiple individuals” (Lyman 2007:109) are ideas that all rely explicitly or implicitly on the concept of individual animals rather than bone fragments thereof. In paleozoology there is a measure called, “minimum number of individuals” or MNI (White 1953) which estimates a minimum based on repeating skeletal parts (e.g., two complete left patellae means at least two individual animals). Unfortunately, the relationship between bone fragments and MNI is not simple, and quantification by bone fragment counts has been shown to be less problematic for many paleozoology research domains (Grayson 1984, Lyman 2008). However, for this research topic, demonstration of multiple individual animals is necessary, and use of MNI or a similar measure is required.

The subject of pronghorn hunting is of national interest in current archaeological literature (e.g., Byers and Hill 2009, Fenner 2009, Hockett and Murphy 2009). While eastern Washington is at the periphery of the native range of pronghorn, communal hunting by Native Americans is suggested in historic accounts (e.g., Thwaites 1905:107, Ross 1998:272), and Lyman (2007:109) was right to consider this possibility. However, there is as yet insufficient evidence to demonstrate communal hunting in Washington archaeology. More thorough
evaluations of prehistoric pronghorn exploitation in Washington have to await detailed examination of extant faunal collections, and perhaps discovery of currently unknown sites.

**Literature Cited**


**Acknowledgments**

This article benefitted from comments by Lee Lyman, Editor Jeff Duda, and two anonymous reviewers, but all errors remain those of the author.


Received 20 October 2010
Accepted for publication 3 January 2011