Faunal Excavation Bias in the Clovis Archaeological Record: Preliminary Results from the American Southwest

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Abstract

The Clovis people of Pleistocene North America are often interpreted as big game hunters who almost exclusively targeted large Pleistocene mammals. Such large mammals (especially mammoths and bison) are common at Clovis kill sites across the continent. This study reviews the published faunal remains of different Clovis kill sites in the American Southwest, as well as the excavation methods discussed in those publications. Results of this study show few sites with any taxa smaller than Pleistocene megafauna. There are also limited discussions in original publications (particularly the older publications) of excavation methods, with no indication of screening ever conducted before the 1960s. This suggests that the remains of many smaller taxa could have been lost due to imprecise excavation techniques. Thus, the interpretation of Clovis people as mainly big game hunters is at least potentially erroneous.

Introduction

The Late Pleistocene Clovis culture of North America has been studied extensively for almost the last century (e.g., Haury et al. 1953, 1959; Haynes and Huckell 2007; Hemmings and Haynes 1969; Howard 1935; Huckell et al. 2008; M. Sánchez et al. 2014; Ugan and Byers 2007). Researchers have documented Clovis sites across the contiguous United States, southern Canada, and through Mexico. Roughly a dozen of these sites (many in western North America) are associated with large Pleistocene mammals (Grayson and Meltzer 2015; Surovell and Waguespack 2008). This study reviews excavation techniques documented for Clovis archaeological sites. The focus here is on Clovis sites in the American Southwest with associated faunal remains (Figure 1). The American Southwest consists of the deserts of Arizona and New Mexico, southern portions of Colorado, Utah, and Nevada, southeastern California, western Texas, and the Mexican states of Chihuahua, Sonora, Baja California, and Baja California Sur (Plog 2008:13).

This study reviews how excavation techniques have changed for Clovis sites over the last 60 years, specifically using Clovis sites in the American Southwest. It is based on a previous study of Clovis site excavation in the Southwest (Hartley 2016), and on the previously published data of others. The hypothesis here is that excavation and recording practices have improved in the last 60 years, and that these changes are reflected in the faunal diversity recorded at Clovis sites. Older studies of Clovis kill sites would record mostly (if not exclusively) the larger taxa, with smaller taxa being missed during excavation. This bias could lead to a misinterpretation of Clovis subsistence patterns (i.e., Clovis as big game hunters).

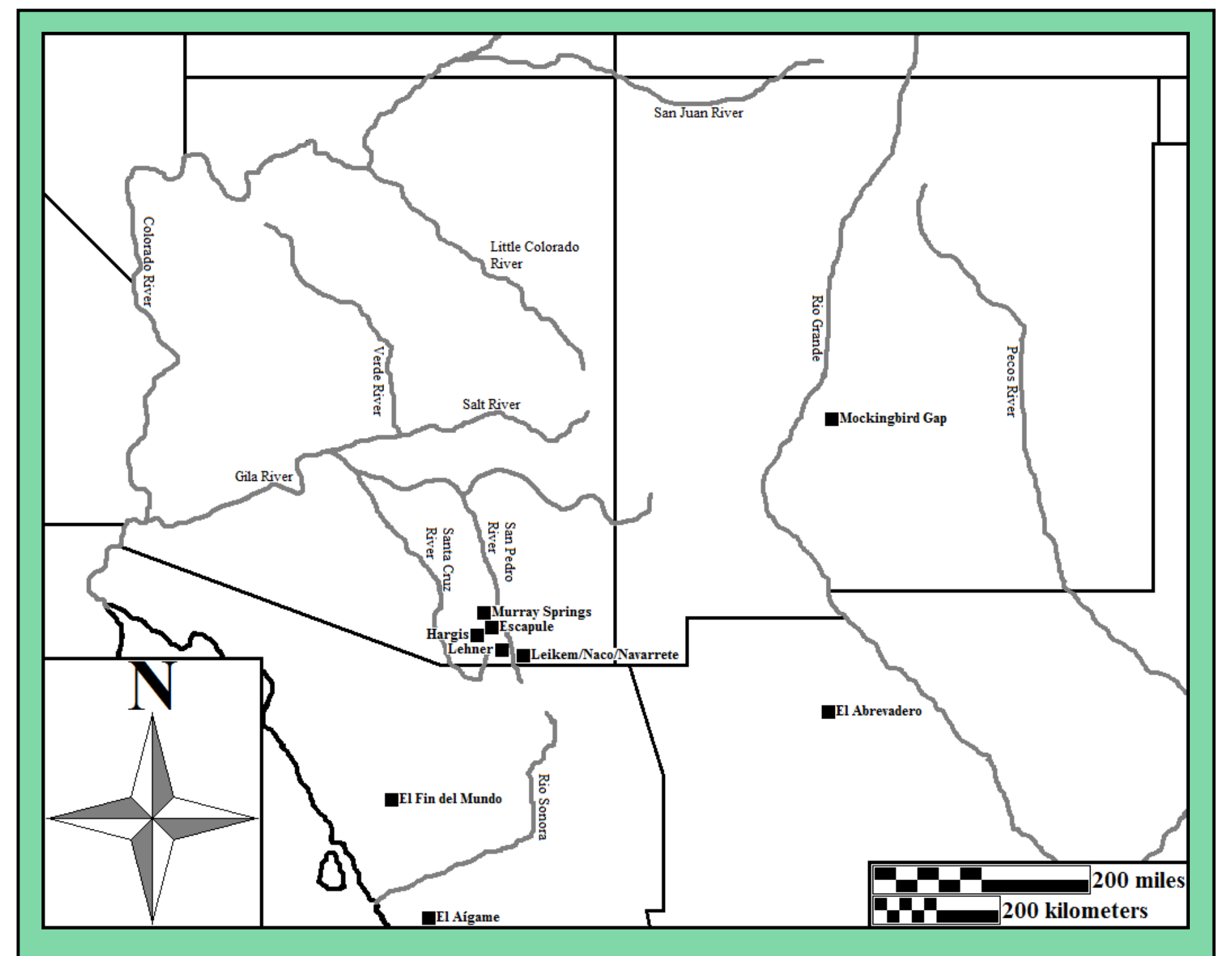

Figure 1 Locations of Clovis kill sites (for this study) in the American Southwest (from Hartley 2016:2).

Background

Clovis

Clovis tools are named for Clovis, New Mexico, outside of which Clovis artifacts were first described (Howard 1935). Clovis hunters lived in the contiguous United States, southern Canada, and Mexico from 13,400 to 12,800 cal. years BP (Ferring 1995; Fiedel 2004; Fiedel and Kuzmin 2010; O'Brien et al. 2014; M. Sánchez et al. 2014; Stanford 2005). Clovis hunters made stone projectile points with a flat or concave base that were fluted on each face a third to halfway from the base to the tip (Stanford 2005:289). Clovis people are interpreted as big game hunters (see Meltzer 2009, 255-261), but they may have also utilized small game and wild plants (Cannon and Meltzer 2004, 2008; Waguespack 2005). Most Southwest Clovis sites are present in the San Pedro Valley of Arizona (Haury et al. 1953, 1959; Haynes and Huckell 2007; Hemmings and Haynes 1969; Huckell 1981; Johnson and Haynes 1967; Waters 1983). Clovis in the Southwest was replaced by later Paleoindian and Archaic cultures after the Pleistocene (Gaines 2006; Rapp and Hill 2006; Reid and Doyel 1986; Reid and Whittlesey 1997).

Pleistocene Megafauna

The Pleistocene megafauna were large Pleistocene mammals exceeding 45 kilograms (100 pounds) adult body mass (Anderson 1984; Martin 1984). Common megafauna in North America include (among others) mammoths, mastodons, gomphotheres, bison, camels, horses, giant ground sloths, glyptodonts, dire wolves, saber-toothed cats, short-faced bears, different kinds of deer and peccaries, and even modern humans (Bell et al. 2004; Geist 2005; Lucas et al. 1999; Martin 2005; Mead et al. 1986). Figure 2 shows examples of North American megafauna. Mammoths and bison are most common at Clovis archaeological sites, with other taxa (e.g., camels, horses, and gomphotheres) being far less common (M. Sánchez et al. 2014; Surovell and Waguespack 2008; Waguespack and Surovell 2003). Proboscideans (i.e., elephants) were preferred by Pleistocene hunter-gatherers in North America and elsewhere for their high meat yields and caloric returns (Feldhamer et al. 2007; Kelly 2013; Sukumar 2003). Hypotheses for the extinction of the megafauna (at roughly 12,800 cal. years BP) range from overkill (e.g., Martin 1994, 2005) to climate change (e.g., Grayson and Meltzer 2015) to other fringe hypotheses (comet, disease, solar flares, etc.).

Figure 2 Examples of Pleistocene animals in North America, including (from left to right and then from top to bottom) Merriam's teratorn (*Teratornis merriami*), saber-toothed cat (*Smilodon fatalis*), Mexican horse (*Equus conversidens*), Columbian mammoth (*Mammuthus columbi*), dire wolf (*Canis dirus*), ancient bison (*Bison antiquus*), Cuvier's gomphothere (*Cuvieronius hyodon*), short-faced bear (*Arctodus simus*), western camel (*Camelops hesternus*), American mastodon (*Mammut americanum*), Shasta ground sloth (*Nothrotheriops shanstensis*), and Aztlan rabbit (*Aztlanolagus agilis*).

Methods

This study reviews the available background literature on Clovis archaeological sites. The focus is on Clovis sites in the American Southwest with fossil remains of large mammals (Table 1). Sites with mammoth (either as the sole or most common taxon present) were reviewed in this study. I also reviewed the bison remains at Hargis (Arizona) and Mockingbird Gap (New Mexico) and the gomphothere at El Fin del Mundo (Sonora). There is also a mammoth at the Hartley site in northern New Mexico with a Clovis point (Huckell et al. 2016), but the mammoth is much older than the artifact (Muus 2017). A partial human cranium was found with Pleistocene mammal remains at Chinobampo in southern Sonora, but the association is unclear (M. Sánchez 2016).

I list the animals found at each site, including the taxon and minimum number of individuals (MNI). I also list the survey and excavation methods for each site as discussed in the available publications on those sites. The methods are divided by excavation date (where available), publication date, and the techniques discussed (screening, backhoe, etc.). The excavation techniques listed in Table 2 are those mentioned (or at least implied) in the original publications. Table 3 and Figure 3 further list the publication years and the taxa listed in these publications.

Table 1 Clovis Kill Sites in the American Southwest.

Site	Age (cal. years BP)	Sources
El Abrevadero, CH	~13,000	Aguilar and Chacón-Soria 2008; Chacón-Soria and Aguilar 2010
El Aígame, SO	Clovis	M. Sánchez 2010
El Fin del Mundo, SO	13,390±105	I. Sánchez 2018; M. Sánchez 2016; M. Sánchez et al. 2009, 2014
Escapule, AZ	~13,000	Ballenger 2010, 2015; Haynes and Huckell 2007; Hemmings 1970; Hemmings and Haynes 1969
Hargis, AZ	Clovis	Ballenger 2010, 2015; Haynes 1968; Lindsay and Tessman 1974
Lehner, AZ	13,177±45	Antevs 1959; Ballenger 2010, 2015; Haury 1956; Haury et al. 1959; Haynes 1982; Lance 1959; Mehringer and Haynes 1965
Leikem, AZ	~12,900	Ballenger 2009, 2010, 2015; Johnson and Haynes 1967
Mockingbird Gap, NM	13,096±177	Huckell 2009, 2015; Huckell et al. 2006, 2007, 2008; Weber 1997; Weber and Agogino 1997
Murray Springs, AZ	12,793±52	Agenbroad and Haynes 1975; Ballenger 2010, 2015; Haynes 1968, 1969; Haynes and Hemmings 1968; Haynes and Huckell 2007
Naco, AZ	~13,000	Ballenger 2009, 2010, 2015; Haury 1952; Haury et al. 1953
Navarrete, AZ	~12,900	Ballenger 2009, 2010, 2015; Huckell 1981

Results and Discussion

Results

Some of the older excavations (such as at Lehner and Naco in the early 1950s) involved the use of a power shovel to remove overburden before excavating Clovis strata. There was some discussion the publications about the local stratigraphy, but there was no mention of screening (either wet or dry) of the sediments. Mostly megafauna or other large mammals were found at these sites. Smaller taxa (rodents rabbits, reptiles, birds, etc.) were listed in later publications (e.g., Ballenger 2015; Saunders and Baryshnikov 2009; see Figure 3), but there was no mention of how or when they were excavated. Screening of sediments was not performed until later excavations (such as at Murray Springs and Escapule in the late 1960s). Screening has been mentioned in publications from the 1960s onward. More detailed descriptions of each site are available in my previous work (Hartley 2016).

Discussion

Faunal diversity at sites such as Lehner and Naco may have been skewed toward larger taxa because of imprecise methodology during excavation. Screening especially was a major concern in this study. There is no indication from original publications of any screening of sediments in southwestern Clovis sites until the late 1960s. The bones of smaller taxa might have been missed during excavation because of the lack of screening. This lack of screening could have led to the erroneous impression of Clovis people being exclusively big game hunters.

Access to background literature was a major complication. Many older articles are available online, but other site reports (e.g., Huckell 1981; Johnson and Haynes 1967) are only available through special collections and are difficult to access. I was reliant on secondary sources that only provided a brief summary of methods and findings.

Table 2 Excavation Techniques at Clovis Kill Sites in the American Southwest.

	Date		Methods (Y/N)								
Site	Excavation	Publication	Backhoe	Map	Geology	Photo	Screen	Auger	Test Pit	Prospect	Lab
Naco, AZ	1951-1952	1952	N	Y	Y	Y	N	N	N	N	Y
		1953	N	Y	Y	Y	N	N	N	N	Y
Lehner, AZ	1955-1956	1956	Y	N	Y	N	N	N	N	N	N
		1959	Y	Y	Y	Y	N	N	N	N	Y
		1965	Y	N	Y	Y	N	N	N	N	Y
Leikem, AZ	1964	1967	Y	?	Y	?	?	?	?	?	?
Mockingbird Gap, NM	1966-1968, 2005-2007	1997	N	Y	Y	?	?	?	?	?	?
		2006	N	Y	Y	N	Y	Y	Y	Y	Y
		2007	N	Y	Y	N	Y	Y	Y	Y	Y
		2008	N	Y	Y	N	Y	Y	Y	Y	N
Escapule, AZ	1967	1969	N	Y	Y	Y	N	N	N	N	Y
Murray Springs, AZ	1967-1971	1969	N	N	Y	N	N	N	N	N	N
		2007	N	Y	Y	Y	Y	N	N	Y	Y
El Aígame, SO	1971-1991	2010	N	Y	Y	Y	N	N	Y	Y	Y
		2016	N	Y	Y	Y	N	N	Y	Y	Y
Hargis, AZ	?	1968	?	?	?	?	?	?	?	?	?
		1975	?	?	?	?	?	?	?	?	?
Navarrete, AZ	1973	1981	?	?	?	?	?	?	?	?	?
El Fin del Mundo, SO	2007	2009	N	N	Y	Y	N	N	Y	Y	Y
		2010	N	Y	Y	Y	Y	N	Y	Y	Y
		2014	N	Y	Y	Y	Y	N	N	Y	Y
		2016	N	Y	Y	Y	Y	N	Y	Y	Y
El Abrevadero, CH	2008-2009	2010	N	N	N	N	N	N	N	Y	Y

Note: The Methods columns refer to whether or not (Y/N) certain methods were mentioned in the original publication (where available). The Geology column refers to any geological analyses and profiles in the field. The prospect column refers to any survey beyond the main site. The Lab column refers to analysis of the bones themselves and to radiocarbon dating of the site.

Table 3 Taxa Discovered by Year at Clovis Kill Sites in the American Southwest.

Site	Excavation Date	Publication Date	Taxa	MNI
Naco, AZ	1951-1952	1952	*Mammuthus columbi*	1
		1953	[no new taxa]	N/A
Lehner, AZ	1955-1956	1956	*Bison* sp. *Equus* sp. *Mammuthus columbi* *Tapirus* sp.	1 1 9 1
		1959	[no new taxa]	N/A
		1965	[no new taxa]	N/A
Leikem, AZ	1964	1967	*Mammuthus columbi*	2
Mockingbird Gap, NM	1966-1968, 2005-2007	1997	[no new taxa]	N/A
		2006	*Bison* sp.(?)	1
		2007	[no new taxa]	N/A
		2008	[no new taxa]	N/A
Escapule, AZ	1967	1969	*Mammuthus columbi*	1
Murray Springs, AZ	1967-1971	1969	*Bison antiquus* *Camelops* sp. *Canis dirus* *Canis* sp. Carnivora *Equus* sp. Lagomorpha *Mammuthus columbi* *Microtus* sp. *Neotoma* sp. *Platygonus* sp. Rodentia	12 3 1 3 1 2 1 4 2 1 1 2
		2007	[no new taxa]	N/A
El Aígame, SO	1971-1991, 2005	2010	*Bison* sp. *Mammuthus columbi*	1 1
		2016	[no new taxa]	N/A
Hargis, AZ	?	1975	*Bison antiquus*	1
Navarrete, AZ	1973	1981	*Mammuthus columbi*	1
El Fin del Mundo, SO	2007-2008, 2011-2012	2009	*Cuvieronius* sp.	2
		2010	[no new taxa]	N/A
		2014	[no new taxa]	N/A
		2016	[no new taxa]	N/A
El Abrevadero, CH	2008-2009	2010	*Bison* sp. *Camelops* sp. *Equus conversidens* *Kinosternon* sp. *Mammuthus columbi* Mylodontidae *Odocoileus* sp.	1 1 1 1 1 1 1

Note: This table only lists taxa found during excavation and described in the original Publications (or the closest source thereto). Other sources (e.g., Ballenger 2015; Sánchez et al. 2009) list further taxa but make no mention of how or when they were excavated. There were also other taxa of pre-Clovis age (e.g., Mead et al. 1979) which were not listed here due to a lack of any associated artifacts.

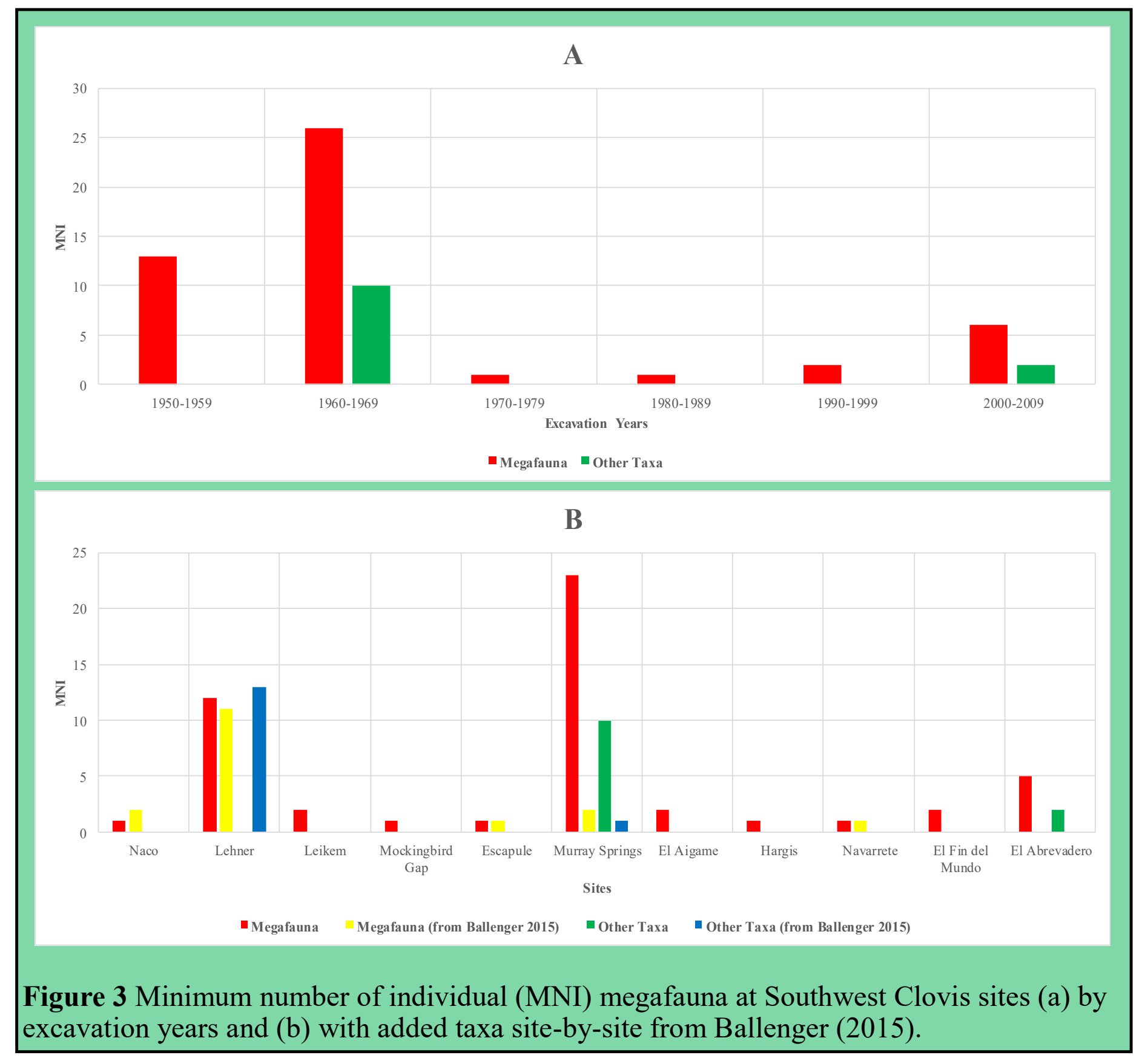

Figure 3 Minimum number of individual (MNI) megafauna at Southwest Clovis sites (a) by excavation years and (b) with added taxa site-by-site from Ballenger (2015).

Conclusions and Recommendations

Conclusions

Faunal diversity at Clovis sites varies, with older excavations having a few large taxa and more recent excavations having multiple large and small taxa. Columbian mammoths are common in the Southwest, ranging from one to over a dozen individual mammoths at a given kill site. Preliminary site reports often are not very precise in their discussions of methods or findings, while later reports are more detailed. Screening was not mentioned before the late 1960s, possibly meaning that many smaller artifacts and fossils (if at all present) could have been lost during excavation. Therefore, the interpretation that Clovis hunters were big game specialists is potentially erroneous. These conclusions are tentative because of limited access to the primary literature.

Recommendations

Access to further resources (through museums and libraries) would be recommended. It would also be useful to expand this study to include faunal sites from other regions of North America (Great Basin, Great Plains, eastern U.S., etc.) to see any comparable changes in excavation methodology. This could include Clovis sites and other later Paleoindian sites (to see if large game were still emphasized after the end of the Pleistocene). My previous research (Hartley 2013, 2014a, 2014b, 2015, 2017, 2018; Hartley et al. 2016) shows changes in faunal diversity in the Southwest, Great Plains, and Southeast. I could also expand this study to include paleontological sites from Clovis times (13,400-12,800 cal. years BP). It would be useful to compare precision of excavation techniques between archaeologists and paleontologists on sites (with or without artifacts) of comparable ages.

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