The Newsletter of
Lubbock Lake Landmark

LUBBOCK LAKE
NATIONAL HISTORIC
LANDMARK

Notes from the ...Field

Time and Water

By Scott Trevey, Historic Maintenance Supervisor
Deborah Bigness, Manager of Site Operations

Figure 1. Early Siberian Elm, circa 1930s

For thousands of years, across hundreds of generations, people have come to Lubbock Lake. The migrations of herd animals, the ancient bison and mammoth or the modern bison, always led hunter/gatherer cultures to this dependable source of water on the Southern High Plains.

Even in the worst time of drought, 6,500 to 4,500 years ago, water remained at Lubbock Lake. In a semi-arid, prairie environment where surface water is relatively rare, the waters of Lubbock Lake enabled life to thrive. Permanent settlement of the region did not occur until the 19th century, in part, because until the technology of the windmill made accessing the vast Ogallala aquifer possible, the land could not support large groups and sedentary peoples. Whether it is on the surface, or underneath us, life on the Southern High Plains is still dependent on water.

The landscape here at the Lubbock Lake Landmark is a cultural landscape. Rainfall is a natural source of water to plant and animal life here on the Southern High Plains, but also, the numerous underground water sources. Underground springs are like sponges. Once they are filled to saturation, they spring forth water. Vegetation responds to these natural occurrences. As a result, this landscape flourishes with a rich diversity of native grasses, forbs, and trees.

Continued on page 3

Inside this Issue.....

A Memorial

This edition of *Notes from the Field* is dedicated to the memory Dr. Jane Holden Kelly.
1928—2016

Jane Holden Kelly, daughter of Dr. William Curry Holden, followed in her father's footsteps, and was an innovator in her own right as one of the first women in North America to enter the field of archaeology with a career spanning seven decades.

Time and Water ~ continued from page 1

Without human occupation, the landscape here would be untouched, meaning a virgin landscape. It would still evolve with elemental factors that come as a result of changing seasons. Wind, drought, rain, snow, ice, fire, and grazing are natural disturbances that have sculpted the landscapes that are here. Native Americans learned generations ago that they could manipulate vegetation communities within this landscape in ways that would benefit their livelihood. By burning the natural vegetation, they realized they could increase/decrease a variety of plant species. Sometimes undesirable brush and wooded areas could be opened up, and, therefore, managed by fire. Medicinal plant communities could be encouraged by timely applications of fire.

Vegetation responses to natural fires and human applied fires not only manipulated plant species, but also encouraged a more desirable forage for grazing animals like bison. As these fires sculpted these landscapes across the Plains, they kept water dependent species like mesquite at a minimum. Mesquite has a deep penetrable tap root that can go to great lengths to find deep water sources, such as springs.

Over the years, as Anglo settlement came into the area, modern technology came with them, and old technology of the Native peoples was left behind. Windmills, irrigation, and non-native plant species began filtering into the landscape of the Southern High Plains at a high rate of production. By the mid 1930s, irrigation from the Ogallala aquifer had increased to a point that the citizens of Lubbock County noticed many of the natural springs around the area, including those at Lubbock Lake, were no longer active. At the same time, non-native weeds were taking over cultivated fields and mesquite was becoming more noticeable across vast native rangelands.

During the late 1930s, volunteers from the Fire Department in Lubbock planted a number of Siberian Elm (Figure 1) trees around the perimeters of Lubbock Lake as a beautification project. The trees took root and did very well. Sometime later, Salt Cedar was discovered to help combat erosion problems. It took root at the Landmark, and also has done very well. These two non-native species absorbed such large amounts of water that they diminished the supply and negatively impacted native plant communities.

Until the Landmark staff took over operations for the Lubbock Lake Landmark, little vegetation land management had been done. For the last 15 years, these two non-native species have been a target for management/eradication. During wet years and dry years, mechanical removal treatments of these two species have not waivered (Figure 2). All of the work is being done in a way that does not disturb the archaeological resources. Mechanical methods along with the reintroduction of prescribed fire are tools currently being used to eliminate these water craving species.

Figure 2. Mechanical methods enable the historic maintenance crew to control invasive plant species.

Today, the underground water source is growing as a result of good land management practices. With that, native trees like hackberry, willow, plum, and western soapberry are returning. How deep will the current Lubbock Lake get? Only time and management will tell.

Recent Work at Tahoka Lake

By Dr. Stance Hurst, Regional Research Manager

Tahoka Lake Area 41LY52 site is situated along the western side of Tahoka Lake, one of only 40 salinas located on the Llano Estacado (Southern High Plains). Landmark crews have been conducting investigations at Tahoka Lake since 2001, and have recorded 24 archaeological areas. Many of the places around Tahoka Lake are buried by recent wind-blown sediments, and a longtime objective is conducting subsurface testing to identify buried cultural materials.

Figure 1 . The research crew sets up the site.

The research team in the 2015 field season began testing a terrace that overlooks the salina. This terrace was targeted for subsurface testing due to its prominent position on the landscape and hearthstones and flaked stone from past occupations were found eroding out below the terrace's sediment deposits (Figure 1).

The field crew began by excavating a series of shovel-tests to determine the vertical distribution of cultural objects. Cultural objects were found in all five 10cm levels in each of the shovel-tests. This finding indicated the area was an intensively occupied place and additional excavation was needed to explore the types of past occupations along the terrace (Figure 2).

The research team in May opened up four 1m^2 units near the shovel-tests (Figure 3) to expose further the upper record of past hunter-gatherer occupations. Hearthstones and lithic material were found in all of the units, indicating camping activities within a dense occupation zone. No diagnostic artifacts were found this year, and objectives for next field season are to document further the remains of the campsite and recover datable material.

Figure 2. Landmark crew member taking notes at the site.

Figure 3. Clyde May and her great-granddaughter, Kylie, work with the crew.

Learning at the Landmark: An Education Intern's Journal

By Mikaela Young, Museum Education Intern

Swiss engineer Georges de Mestral invented Velcro after studying the cockleburs stuck to his dog's coat. The fibers in the leaves of the yucca plant can be used to make rope, cloth, and even paintbrushes. Firewood is measured in cords. These are just a few of the fun facts I have learned while being the Education Intern at the Lubbock Lake Landmark.

I have learned so much more than just interesting facts over the last year. A wide range of experiences has helped me to better understand the role of a museum educator. I have honed my skills developing and implementing programs for visiting school groups, outreach programs, summer programs, and special events. I have gained confidence in my own abilities to serve as tour guide and program facilitator.

2015 was a busy and exciting year! The weather proved to be a challenge for the end-of-the-year field trips scheduled in April and May when Lubbock received record rainfall. I learned the importance of flexibility as we had to develop alternative rain plans for many visits and to reschedule others. Outreach programming also was exciting because each experience was different from the next. One of my favorites was introducing archaeology to four year olds at a local learning center. Another was an all-day outreach program with World History students at Monterey High School. Both programs proved to be fun but challenging experiences to develop activities and select concepts to best fit the learning needs of the specific age groups.

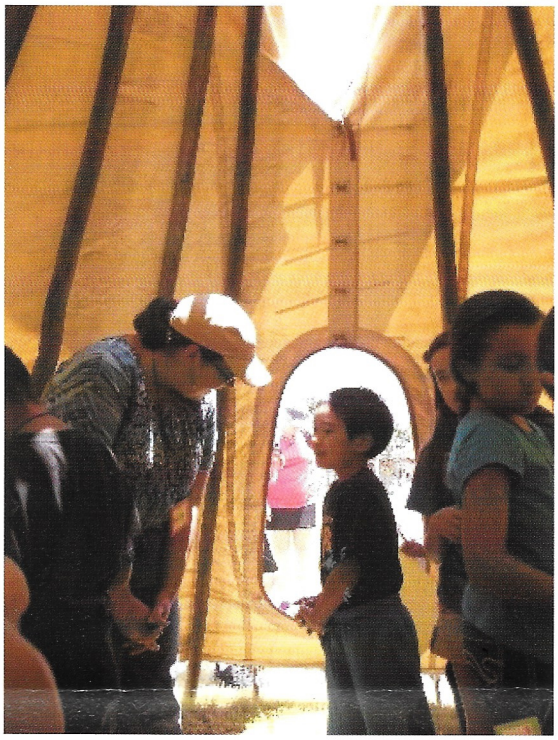


Figure 1. Mikaela and Akira Umeda talk about life in a Tipi during Pottery & Storytelling week.

Figure 2. Students hit the trail on a Prairie Adventure.

Summer was dedicated to the Landmark's six-week *Amazing Summer Adventures* program for children ages 5 to 10 (Figure 1). This year's themes were Explore! Navigate! Communicate!, Pottery & Storytelling, Bio-Mimicry, Predators of the Plains, Archaeology in Action, and Radical Reptiles. It was another opportunity for me to sharpen my skills researching topics, writing lesson plans, and inspiring students each day.

This year, I am most proud of the Prairie Adventures Program. Charlotte Lee Stockton (Landmark Graduate Student Assistant) and I worked together to develop a hands-on workshop to introduce environmental literacy to elementary aged children on the autism spectrum. We developed curriculum to utilize the native grassland prairie and trails at the Lubbock Lake Landmark, created pre-visit materials to share with families, and devised evaluations to assess the success of the program (Figure 2).

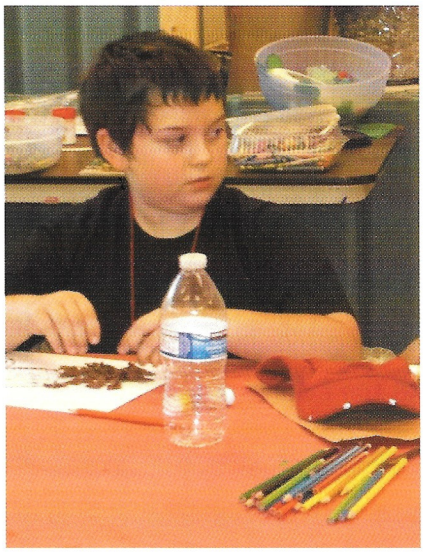
Continued on page 6.

Learning at the Landmark ~ continued from page 5

I attended two conferences this year. At the Informal Science Education Association of Texas Conference in February, I met informal science educators from across the state and gathered science-based programming ideas. At the Mountain-Plains Museum Association (MPMA) Annual Conference in Wichita, Kansas in September, I participated in the "Invest in Your Career" track for emerging museum professionals and gathered tips on resume building and interviews. Charlotte and I also presented a poster about the Prairie Adventures Program (Figure 3) and were awarded second place in the MPMA student poster competition!

Figure 3. Mikaela and the Landmark's Graduate student assistant, Charlotte Stockton (left) present "Environmental Literacy on the Southern High Plains" in the poster competition at the annual MPMA conference.

The lessons, knowledge, and experiences that I have gained through this internship have been invaluable and I will take this with me to my next museum home. Thank you to all the staff at the Lubbock Lake Landmark for being a part of this experience. Special thanks to Susan Rowe for her guidance and support and to Charlotte Lee Stockton for all of her help and dedication this year!



Amazing Summer Adventures are so much fun with outstanding students like Sage Sedberry

Amazing Summer Adventures...on the long hike.

Continuing Investigations at 4JK Locality 5

By Dallas C. Ward, Research Aide and Crew Chief

Historic investigations for the 2015 field season at 4JK Locality 5 build on previous field seasons (2009 and 2013). The site is representative of two distinctive and formative periods of regional heritage, that of the Buffalo Hunters era and the Open-range Ranching era. The site is located on the extreme edge of the Caprock in southwestern Garza County and has three distinctive architectural features present (Figures 1-3).

The site is bisected by a modern arroyo separating Features I and II from Feature III to the west. To the north of Feature I and southwest of Feature III are two other modern arroyos that made access to the site very difficult. Built this past field season, two small foot bridges now allow easier access to this site's architectural features.

Figure 1. A half –dugout on the edge of the Caprock

Figure 2. Second half-dugout with adjoining walls exposed.

Two of the three features are half-dugouts (Features I and III; Figures 1 and 2); while the third (Feature II; Figure 3) appears to be a staging area where locally procured sandstone blocks were shaped to construct the dugout walls. The two features are made up of sandstone blocks shaped into rectangular and square forms.

Excavations during the 2015 field season focused on Feature III (Figure 2) to delineate the boundaries of the structure as well as locate the floor. When excavations ended in 2013, eight courses of stone were uncovered and by the end of the 2015 field season an additional two courses of stone were revealed (total 10 courses). The floor was not yet located.

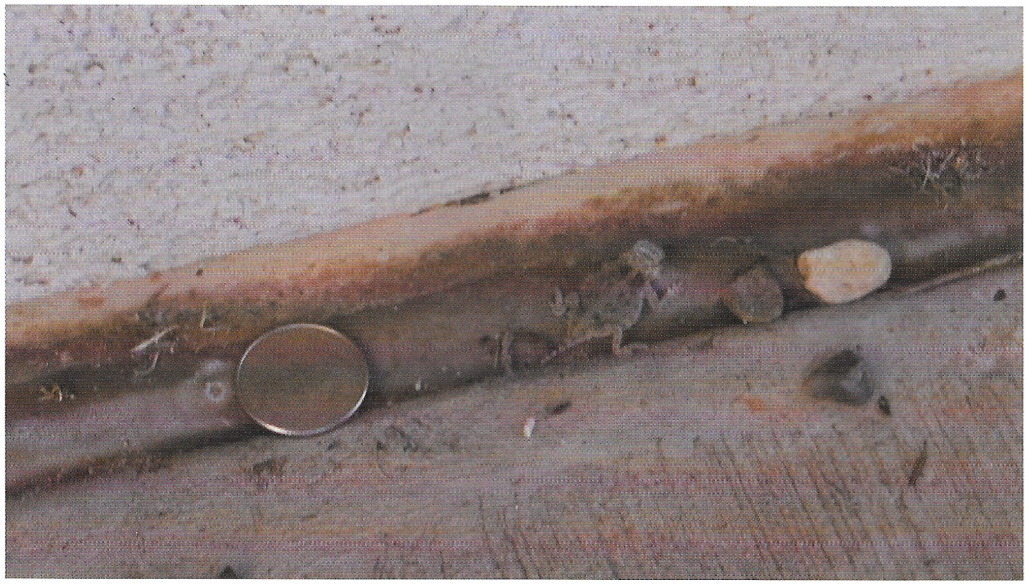
Over 600 objects have been collected from survey and excavation at 4JK Locality 5. Diagnostic artifacts indicate a date range of the late 1870s to late 1880s and include Buffalo Hunter and early cattle ranching related objects. A large portion of the cartridge assemblage includes the 50-90 Sharps, a popular round used by Buffalo Hunters. Cowboy related objects include spur parts and horse shoes. A J-H-L connected branding iron is registered to James H. Lindsey, one of the first known cattle ranchers in the region during the open-range period. The site is used as a Buffalo Hunter's camp at the time of its original construction and then repurposed as a line camp for Lindsey's ranching outfit.

Figure 3. Sandstone staging area

Posing for the camera, American Kestral nestlings, part of Natural Research Management ongoing research

Tarantula hiking the trail.

A Collared lizard enjoying the hot Texas sun.



Texas Horned Lizard come in all sizes here at the Landmark; this baby is the size of a quarter.

Dating the Whiskey Flats site with a Glass Bead and Bison Ear Bone

By Dr. Stance Hurst, Regional Research Manager

Research at Whiskey Flats is uncovering an incredible record of a Comanche-age occupation along Mustang Draw near Stanton, Texas. The Landmark research crew began work at Whiskey Flats in 2013 by excavating a series of backhoe trenches to document the stratigraphy across Mustang Draw. A large modern bison and horse bone bed that extends at least 53 meters (58 yards) was uncovered. A possible related campsite also was located on a small terrace to the north within 30 meters (32 yards) of the bone bed. The research team began excavating the campsite in 2014, and continued this work in the 2015 field season (Figure 1). A major question of how the campsite was related to the bison and horse bed was answered this past field season by the discovery of a glass bead and a radiocarbon-age from a bison ear bone..

Figure 1. Measuring the location of an artifact.

Figure 2. Blue glass bead

A blue glass bead was found in the campsite excavation (Figure 2). Glass beads were a common trade item and finding this bead provides the first diagnostic artifact for the campsite (diagnostic artifacts are objects associated with only a particular archaeological time period). This glass bead exhibited cuts that could only be made by a machine and not by hand. Glass beads of this style were a common trade item of the Comanche and indicates the campsite was a Comanche-age site dating in the 1800s.

A bison ear bone comes from the bone bed exposed in one of the trenches in 2013. The ear bone is the most dense bone in bison and provides the most reliable radiocarbon bone dates. Bone is a difficult material to date due to more recent carbon infiltrating pores within the bone and causing radiocarbon ages to be younger than the actual age of when the animal died.

The ear bone was sent to the Rafter radiocarbon lab in New Zealand for a date, and yielded an age of ~1750s A.D. This age correlated with the Comanche-age glass bead, and supports Whiskey Flats as a Comanche bison and horse kill and processing area. These new findings provide a time frame for the site, but much more remains to learn about this historic bison and horse kill site in future field seasons.

Exploring the Animals of the Pleistocene: Pronghorns Past and Present

By John Moretti, Research Assistant and Senior Crew Chief

Figure 1. A pronghorn horn-core tip from the early Pleistocene.

Excavations at Roland Springs Ranch Locality 1 (RSR-1) and Macy Locality 100 (Macy 100) continued during the summer of 2015. These on-going, long-term efforts explore past animals and environments on the Southern Plains. At RSR-1, near Snyder, Texas, an ancient stream channel contains the remains of animals from the early Pleistocene (~2.6 to 2 million years ago). Stream deposits at Macy 100 document the latest Pleistocene (11,700 – 11,000 B.P.) on the southeastern edge of the Southern High Plains near Post, Texas. The Pleistocene, commonly known as the Ice Age, immediately preceded the current time period. During the Pleistocene, enormous glaciers moved across northern North America, mammoths and other giant beasts were abundant, and towards the end, humans first migrated into this continent. Occurring in time as bookends to the events of the Pleistocene, RSR-1 and Macy 100 provide important perspectives on the development of the modern regional flora and fauna.

The animal remains from both RSR-1 and Macy 100 include a wide range of creatures, many of which would appear exotic to the modern observer. Among these exotics are Columbian mammoths (not the woolly kind), large camels, small horses, and giant land tortoises. Such animals clearly now are absent from North America, yet alongside these megafauna existed ancestors, and other relatives, of species that remain today. The bones recovered from RSR-1, Macy 100, and Lubbock Lake provide points of data on past animals that allow the lineages of modern animals to be traced backwards and studied.

Connecting the dots between the past and the present requires collecting clues from sedimentary deposits. Among the new clues collected in summer 2015 was the tip of a horn from an extinct pronghorn at RSR-1. This small bone (Figure 1), discovered by paleontologist-in-training Taten Roland, links the ancient past of RSR-1 to a modern inhabitant of the grasslands of the Southern Plains.

Living pronghorn are the sole surviving member of the family Antilocapridae. These animals resemble antelope of the African savanna and are commonly called antelopes. Pronghorn are related only distantly to true antelope (family Bovidae). Despite the similarity in external appearance, pronghorn are unique, native North American mammals. In contrast, antelope originated in Africa and only one species, the singular saiga, has ever inhabited North America. In addition to their distinct geographical presence, pronghorns are differentiated from antelope by a variety of physical features. As implied by their common name, the horn of this animal is one of its most distinctive physical qualities.

The pronged-horn is composed of a branching, annually shed keratin sheath over a permanent, solid bone core. The pronged-horn form and its development during the life of the animal are unique. The antlers of deer (family Cervidae) are composed of bone, are shed annually, and always have a branching pattern. The horns of goats, sheep, cows, bison, and antelope (family Bovidae) never branch, are never shed, and are composed of a keratin sheath over a solid bone core. The horns of giraffes, known as ossicones, form as isolated bony protrusions beneath the skin that eventually fuse onto the skull bones during development.

Continued on page 11

Exploring the animals ....continued from page 10.

Although teeth of extinct pronghorn already were known from RSR-1, this is the first horn-core found. Finding horn-cores is rare but important, as horn-core shape defines many extinct species of pronghorn. Three types (genera) of pronghorn are known from the Pleistocene of West Texas: *Capromeryx*, *Tetrameryx*, and *Stockoceros* (Figure 2). Each of these extinct forms differed from the living species (genus *Antilocapra*) in having four horn-cores rather than two. The pronghorn teeth from RSR-1 appear to be from *Capromeryx*. The horn-core tip also resembles *Capromeryx* but it is too fragmentary to be certain. These older species of *Capromeryx* would have been relatively large, near in size to the modern pronghorn, and had a small and large horn-core above each eye. The other Pleistocene pronghorns, *Tetrameryx* and *Stockoceros*, are both large, bigger than the modern pronghorn, and had four large horn-cores. Each of these horn-cores likely support their own horn-sheath, giving these animals a novel four-horned appearance in life (Figure 2).

Figure 2. Illustrations of three extinct pronghorn (from left to right): Capromeryx, Stockoceros, and Illingoceros (from Frick, 1937).

Large early Pleistocene forms of *Capromeryx* transition to small forms in the late Pleistocene. Small *Capromeryx,* found in late Pleistocene deposits at Lubbock Lake, are especially diminutive, reaching only about two feet in height and weighing only 22 pounds (Figure 3). This trend of decreasing body size, as well as other physical attributes, indicate that *Capromeryx* was not ancestral to the modern pronghorn; and neither were *Stockoceros* or *Tetrameryx*. The modern pronghorn is rarely known from the Pleistocene and its ancestry is, like many of the extinct species, not well understood.

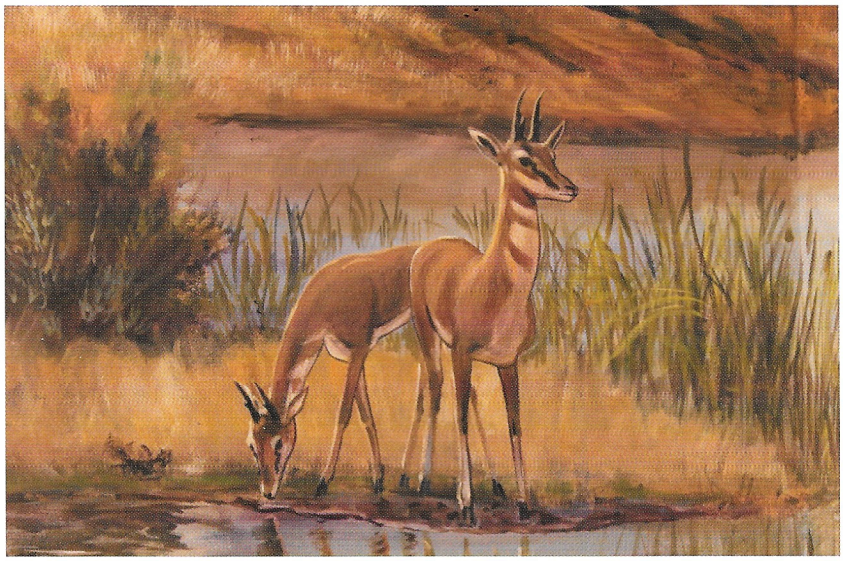


Figure 3. An illustration of a small, late Pleistocene species of Capromeryx.

Pronghorn history extended far beyond the Pleistocene of West Texas. The pronghorn family (Antilocapridae) first appeared in North America around 19 million years ago. Early members of this family were small and appear to have been uncommon. The pinnacle of pronghorn history occurred in association with the rise of increasingly open grasslands around 5-7 million years ago.

Modern pronghorn remain a Great Plains grassland animal. This grassland adaptation is exhibited in pronghorn teeth and limbs. The modern pronghorn is the second fastest land mammal on Earth, an ability derived from a legacy of living in open land where speed was the best defense against native cheetah-like cats (found at RSR-1).

Living pronghorn are unique, native North American representatives of an ancient and fascinating lineage. Studying clues discovered in the field from different localities spanning antiquity allow partial bone remains, such as the horn-core tip from RSR-1, to be pieced together into a historical narrative of the animals of the past and their relationship to their environment and modern relatives.

Exploration of Paleoindian Occupations along Spring Creek

By Dr. Stance Hurst, Regional Research Manager

A focus of the second part of the 2015 field season was to document sediments and search for early Paleoindian (~11,500-8,500 years ago) occupations along Spring Creek. The Landmark research crew since 2009 has been conducting survey and excavation along Spring Creek in deposits that date ~11,500-9,000 years old. A Clovis-age (~11,500-11,000 year old) projectile point found in 2014 indicates the earliest people in North America were at Spring Creek. The research team consisting of volunteers from Costa Rica, Arizona, California, and Texas have renewed excavation at Macy Locality 349 (Figure 1) and dug profiles to document ancient sediments along Spring Creek.

Figure 1. Field crew excavation at Macy Locality 349.

Figure 2. Bison bone bed at Macy Locality 349

Macy Locality 349 was first opened in 2010 and the crew encountered the remains of a bone pile from an ancient bison (*Bison antiquus*). A flake from resharpening a stone tool was found from within the bone bed. This flake suggested past hunter-gatherers were responsible for the bison's demise and it was not a natural death. A radiocarbon-age from nearby sediment suggests the bison may have died up to 10,000 years ago.

This past summer's objectives were to confirm if a Paleoindian hunter-gatherer group was responsible for killing the bison, and to document further the associated stratigraphic layers. No new artifacts were found this summer. The crew learned, however, that at least two bison comprise the bone bed rather than just one, and that bone was deposited in an erosional gully that slopes downward into Spring Creek (Figure 2). More of the bison bone bed remains, and the crew will return to the site next summer.

The field crew also excavated soil profiles to document sediments along Spring Creek. Soil profiles were dug into the banks of erosional areas to document the boundaries between soil and sedimentary layers and to collect samples for radiocarbon dating and environmental indicators such as snails and phytoliths. At Macy Locality 350, a profile over 2 meters in depth (more than 6 feet deep) was excavated (Figure 3) and the exposed sediments indicated a pond once was present within Spring Creek. These ponded sediments will be documented to trace the size of this ancient pond and locate its margins. Reconstructing the ancient pond will be important for predicting the location of Paleoindian occupations.

Figure 3. Cleaning a profile at Macy Locality 350.

The water table is rising in Area 6 of the Landmark! An unexpected field season in the fall.

By Lila Jones, Research Aide and Crew Chief

Summer excavations continued at Area 6 of the Landmark for its 9th consecutive season. The work continued within the Paleoindian bison bone bed of stratum 2. The 1970s and 1980s excavations had ceased when the water table rose and the area went underwater. When the water table dropped during the drought of the early 2000s, excavations resumed in 2007.

This summer's field work ended with a big find. After locating scattered extinct bison bones in the Plainview period bison kill (10,000 BP; substratum 2B cienega) throughout the season, a concentrated pile of bone was uncovered towards the end of July (Figure 1).

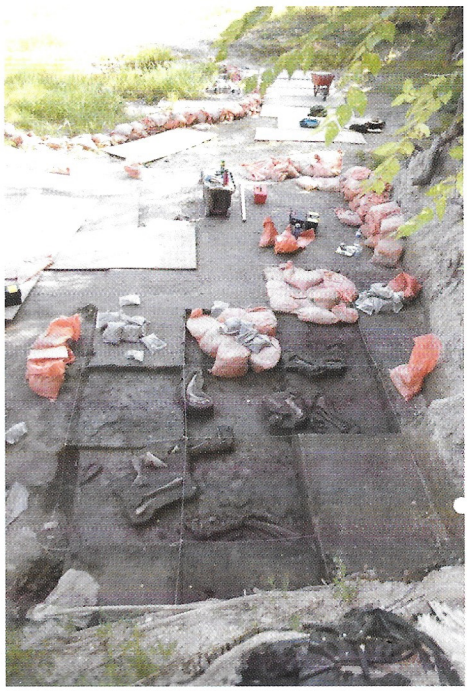


Figure 1. Scattered extinct bison bone excavated during the summer field season at Area 6.

A finding of this nature must be approached with great care. Documentation can become complicated because the bones overlap one another and maps become cluttered. And constant changes due to the rising and lowering of the water table cause the bone to crack from being repeatedly wet and then dry. These fractures make the bone unstable. Removing them safely without a plaster jacket is almost impossible as they become so fragile. In this type of situation, the paperwork intensifies and excavation must be approached with great patience. With the end of the field season near and seeing that time was running out to remove the pile safely, it was decided to put the efforts into protection of the exposed bone until next field season. They would be monitored until the next field season, when time would not be an issue in removing them.

Figure 2. Area 6 in November of 2015; the water level continues to rise.

The plan worked until October, when the rising water table threatened to flood Area 6 and with it, the exposed bones (Figure 2). On October 17th, Area 6 was opened for an unexpected fall field season. The goal was to remove all of the bone left exposed before the end of the year. Although as many people as possible were needed to make the work go faster, the bone was concentrated in a very small space, making it difficult for everyone to work at once. The more the small crew excavated, the more bones were uncovered. Ribs were common but also long bones, and articulated vertebrae, and lower fore and hind limbs. The entire time, the water continued to rise, to the point that it was filtering upwards from the bottom of the excavation units.

Continued on page 14

The water table is rising...continued from page 13

By mid-December (2 months later), all of the bone was recovered successfully (Figure 3). In total, 10 plaster jackets, three pedestals, and over 150 in situ bones were collected. As for future work in Area 6, it has been reclaimed by the rising water table and will be closed indefinitely, until the water table drops once again.

Figure 3. One of the last plaster jackets, used to stabilize the bone, to be removed in December; notice the water that was filtering upwards in the excavation unit.

National Bison Legacy Act Public Law 114-152, 114th Congress

Section 1. This Act may be cited as the "National Bison Legacy Act"

Celebrate National Bison Day, first Saturday of November!

Join us for the opening of our new exhibit:
Engaging Folsom (10,800-10,200 B.P.) Hunter-Gatherers with 3D Technologies

Lubbock Lake Landmark

Celebrates 80 years of Discovery

Dr. Jane Holden Kelley helped the Landmark celebrate 80 years of discovery as she shared stories of her father William Curry Holden. To a standing room only crowd, she told stories of a young Curry Holden, shared family antidotes and introduced the audience to her father, the visionary and Renaissance man.

The story of Dr. Holden and his relationship with the Landmark is currently on exhibit here in "Curry Holden – A Landmark Visionary." At every opportunity, Dr. Holden took community leaders and interested people out to what he call the "watering hole" or "old dig" to show them the "layer cake" deposits (stratigraphy) and to explain the long record and importance of the site. He conducted college field trips for anthropology and history classes. He was ceaseless in his efforts to educate people about the site. Dr. Holden laid the ground work for the stewardship of the Landmark today – 80 years later and still going strong.

Dr. Jane Holden Kelley with a picture of her father Dr. William Curry Holden.

Folks had many questions for Dr. Kelley during the reception that followed.

Dr. Kelley takes time to pose with some of the Landmark staff: Susan Rowe and Deborah Bigness and Landmark Director Dr. Eileen Johnson. photo courtesy of Dr. Kelley's daughter Megan