

Defending the Southern Plains: An Analysis on the Evolution of
the Wichita Tribes' Fortifications, ca. 1450-1811

By: Emilee Hart

Introduction

Before colonial intervention, Native American tribes dominated the Southern Plains and competed with each other for necessary resources, forcing tribes to become creative in defending themselves. This thesis will examine the unique fortification methods used by one tribe, the Wichita, to defend and protect themselves from outsiders, whether Native tribes or Europeans. With the knowledge that we have, we can conclude that the Wichita were the only Native people on the southern Plains to construct fortification complexes prior to, and after, European contact. While archaeologists have long suspected the presence of fortifications at Wichita sites, only recently have they begun to systematically address these structures to gain a comprehensive idea of what they consisted of.

With data gathered by staff archaeologists at the Oklahoma Archeological Survey (OAS), I will conduct a comparative analysis of fortification images obtained through remote sensing techniques. More specifically, I will examine data found at the 16th-century Duncan (34WA2) and Edwards I (34BK2) archaeological sites (ca. 1450-1550); the early 18th-century Bryson-Paddock (34KA5) and Deer Creek (34KA3) sites (ca. 1700-1757); and the late 18th- and early 19th-century Longest site (34JF1) (ca. 1757-1811). Each of these sites can be seen on the map of the Wichita sites in Oklahoma in Figure 1.

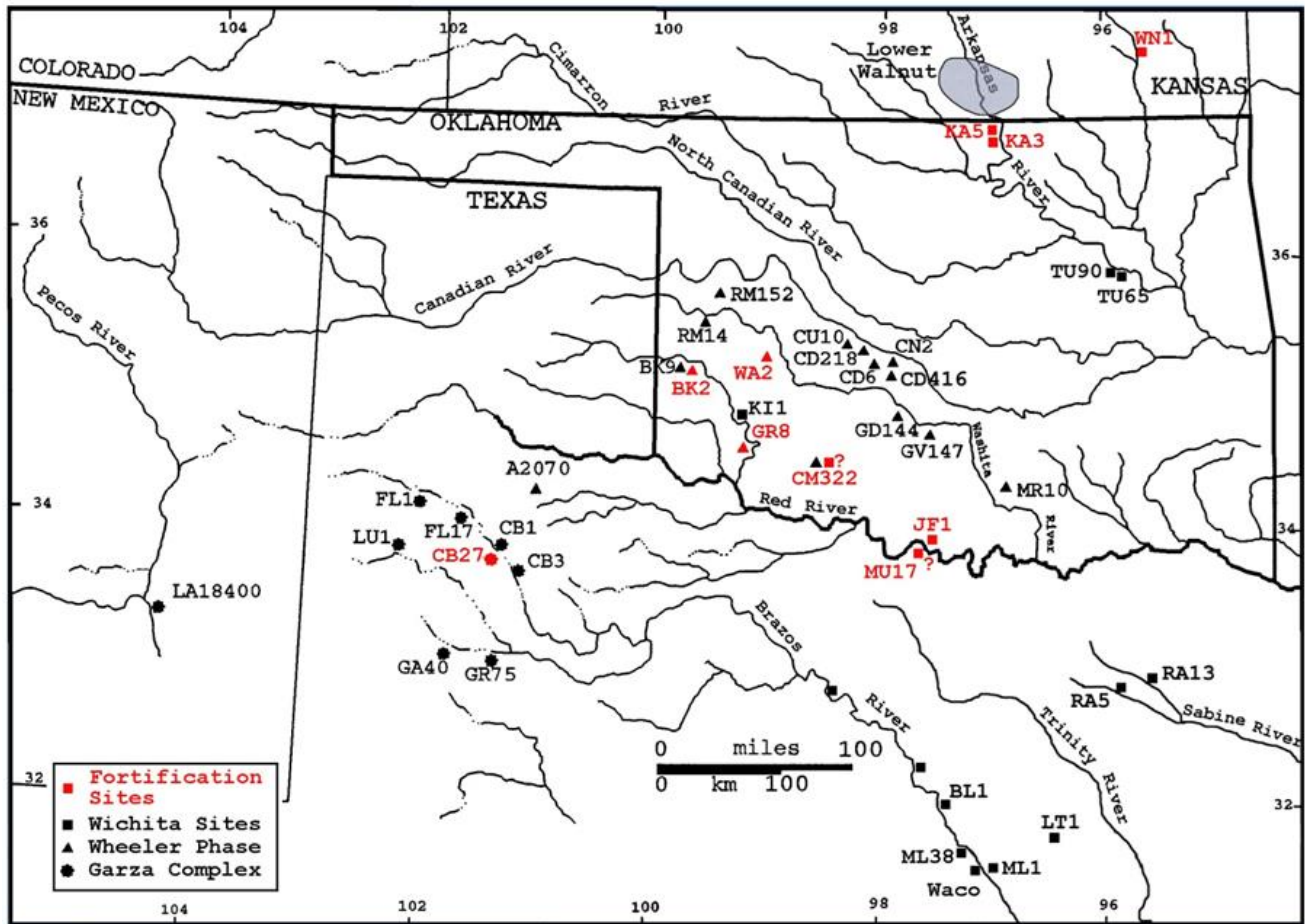


Figure 1: Map of the Wichita site locations (Drass, Perkins, and Vehik, 2015)

Subsurface images gathered by the OAS involved using remote sensing equipment such as magnetometers and ground penetrating radar. With these images, I will look for associated features (entryways, subterranean refuges, encircling ditches) and how they changed over a 350-year period, spanning the Pre-Columbian to Colonial eras. I will also use historical documentation of the Wichita relations to compare the threats they faced to the dates of the fortifications previously stated. I will be using the hypothesis that the fortifications built and used by the Wichita became larger as the population coalesced into densely populated villages caused by an increase in more violent threats and diseases introduced by the Europeans. Essentially, I

intend to foster a better understanding of the use of these fortifications and how they helped the Wichita survive in their rapidly changing social environment between the 15th to 19th centuries.

I will first briefly discuss the subtribes that comprised the people we know today as the Wichita. Then I will explain the methods revolving around the use of remote sensing equipment to gather the data for this thesis. After presenting the findings, including images from each archaeological site, I propose several proposals for why Wichita fortifications changed over time.

The Wichita and Their Fortifications

In 1541, Spanish explorers first identified a Plains Caddoan people as distinct from the nearby Apache because of their painted faces and bodies but also because of their large communities (Drass and Baugh, 1997: 198). This one nation is actually a broad term that describes the Wichita tribes, a linguistic kin to the Caddos, who are composed of five subtribes that speak the same Caddoan language: The Taovaya, Tawakoni, Iscani, Waco, and Wichita (Smith, 2000: xiii; Drass, Perkins, and Vehik, 2015: 3). Spanish expeditions led by Coronado in 1541 and Oñate in 1601 showed the location of these Wichita villages in southern Kansas in addition to the villages found along the Central Redbed Plains region from northern Oklahoma to southern Oklahoma (Drass, Perkins, and Vehik, 2015: 21; Bell, 1982: 366). The Wichita people were able to prosper in this area because of the many rivers that bisected the prairie in the west and the woodlands in the east. These rivers allowed the Wichita to travel and have easy access to trade, which was integral to gaining power once the Europeans came (Smith, 2000: 3). The Wichita would arrange themselves in multiple independent villages with each one headed by a chief chosen by a council of warriors for his ability to lead and his physical prowess (Smith, 2000: 4).

The Wichita had a farming and hunting lifestyle that focused around bison hunting. As the Wichita men hunted animals, the women concentrated on farming and growing crops such as corn, squash, beans, pumpkins, and melons allowing the Wichita to avoid periods of starvation often associated with hunting and gathering tribes (Smith, 2000: 3-4). Essentially, if the men could not provide food through hunting, the Wichita were able to rely on the crops and vice versa. The Wichita also practiced a semi-sedentary lifestyle that allowed them to move closer to bison territory during parts of the year. During the spring and the summer, the Wichita lived in fixed, well-built round houses that were a framework of poles covered with grass near their farms (Smith, 2000: 4). Then, in the fall, the Wichita would move out west for the annual winter bison hunt living in portable tepees made out of skins (Smith, 2000: 4). However, this annual hunt became more difficult as other Native tribes and Europeans moved in on this territory.

Trade in the Wichita villages increased with the introduction of items brought by the French traders in the east. Before European contact, the Wichita mainly traded items with tribes in the Southwest. This can be shown with the earlier Duncan and Edwards I sites that contained items such as pottery, obsidian, turquoise, and Olivella shell beads which are commonly associated with the Southwest (Drass, Perkins, and Vehik, 2015: 21). The most prized trade items brought by the French were firearms, glass beads, ornaments, and utensils with the Wichita using natural resources to provide other basic subsistence items (Bell, 1982: 370). Hunting for the Wichita became more important, not for subsistence, but rather to obtain more products for trade because of the increased demand for fur and other animal products once the Europeans came (Bell, 1982: 371). By the early eighteenth century, horses were prominent on the plains, which increased the range of trade on the plains (Drass, Perkins, and Vehik, 2015: 24-25). This increased mobility brought the Comanche and the Cheyenne down into the trade market in the

southern Plains increasing potential conflict and raids in the area (Drass, Perkins, and Vehik, 2015: 24-25).

Archaeologists do not know the exact instigator for the Wichita to build their fortifications as no other Plains tribe has evidence of having their own. They first appear during the Late Prehistoric period around 1450 AD and extend to the Colonial period around 1811 AD (Drass, Perkins, and Vehik, 2015: 22). While there was violence prior to 1450, the warfare was generally minor, less frequent, and probably resulted in few deaths (Drass, Perkins, and Vehik, 2015: 22). The increase in intertribal conflicts after 1450 were likely caused by tribes wanting to gain control over the Plains and obtain more territory for bison hunting (Drass, Perkins, and Vehik, 2015: 24). The Wichita tribes were precariously placed because multiple enemy tribes who would raid their villages for trade items and slaves surrounded them in addition to the Spanish coming in from the west and the French in the east. By 1500 in southern Kansas, archaeological evidence shows that Wichita villagers coalesced (population consolidation). This coalescence into one area can be indicative of an increased need for defense.

As time went on, hostile relations with other tribes seemingly developed in all directions: “from the northeast came the Osages, bearing French-supplied firearms, while recently mounted Apaches and Comanches descended upon the Wichitas from the west and northwest” (Smith, 2000: 16). All three of these tribes would attack the Wichita to obtain slaves, trade items, and also horses, a prized possession on the plains during the 17th century. Some later fortifications could have also been used for protecting trade items and as possible trade centers near the rivers once the French established themselves as trading partners in the east (Drass, Perkins, and Vehik, 2015: 24). By consolidating into a smaller area, the Wichita were able to successfully defend

themselves but this also required them to build larger fortifications that could protect a larger population.

Since these Wichita communities were located in an area prone to violence, they needed a way to defend themselves when other tribes would try to invade their villages. To counteract these attacks, the Wichita built their villages around massive fortifications allowing individuals to run inside for protection (Bell, 1982: 367). These fortifications have fascinated Plains archaeologists because of how these structures increased in size and became more advanced throughout their existence adapting to different perceived threats.

In 1830, Jean Louis Berlandier claimed that large fortifications on the Southern Plains were only found in tribes that were all from the same nation: The Huecos, the Tahuacanos, and the Tahuaiasses (Drass, Perkins, and Vehik, 2015: 3). Today, archaeologists have analyzed these different sites across Oklahoma finding that they range from the earliest fortification occupied around 1450, to the latest, occupied until 1811 (Drass, Perkins, and Vehik, 2015: 22-24). This distinguishing feature commonly associated with the Wichita villages is essentially a large circular ditch that, in earlier conceptions, measured 50 m in diameter and in later conceptions, measured up to 150 m in diameter (Drass and Baugh, 1997: 192). The two sites I will be analyzing that exemplify the smaller fortifications are the Duncan (34WA2) and Edwards I (34BK2) sites. Excavations of the later fortifications, Bryson-Paddock (34KA5) and Deer Creek (34KA3), show that these fortifications go from covering an area of 4-5 hectares to 13 hectares and then continue to grow up to covering 14-16 hectares (Bell, 1982: 366). Prior to the work conducted by the Oklahoma Archeological Survey, no fortification was ever extensively excavated on the southern Plains (Drass, Perkins, and Vehik, 2015: 2). What I will be analyzing is the images that the Oklahoma Archeological Survey was able to gather over the years to see

how these fortifications changed, why the Wichita changed them, and when this change occurred.

These Wichita villages did not consist of just fortifications to protect the inhabitants; they also included many other features that contributed to their lifestyle. In addition to the fortifications, there were also other features such as low mounds and shallow depressions that show the remains of what may have been houses, storage or refuse pits, burials, postholes, and midden areas (Bell, 1982: 366). Excavations reveal varying structures: “(1) a round or circular structure similar to the historic Wichita grass house; (2) an oval-shaped structure also used as a living area or covered arbor similar to those noted for the historic Wichita; and (3) a larger circular structure believed to be a community or specialized village feature” (Bell, 1982: 367). Besides the structures associated with the fortifications, the other structures in these Wichita villages will not be analyzed in the images gathered by the Oklahoma Archeological Survey in this thesis.

Methods

Because no recorded accounts exist for the earliest fortifications, and because excavations can permanently destroy the structures under examination, archaeologists use remote sensing methods to examine these fortifications and plan if excavations are seen as necessary. The resulting images can assist in planning for possible excavations to reveal what the entire structure entails (Bell, 1982: 366).

Essentially, ground-based remote sensing consists of “the use of non-destructive techniques, such as ground-penetrating radar and magnetometry, to find and map subsurface features” (Renfrew and Braun, 2015: 89). Each device associated with remote sensing operates at ground level and measures the physical properties that have been created or changed through

natural processes or human activity (Johnsen, 2006: 20). These techniques work on archaeological sites because of how people have altered the natural formation process. Remote sensing techniques work on archaeological sites because it is able to differentiate the soils that are physically and naturally changing over time from the changes that occur because of anthropometric activity (Johnsen, 2006: 17-18). As soil is displaced and replaced, the magnetics change from the surrounding soil and the remote sensing equipment is able to notice these changes and create an image for archaeologists to analyze. More advancements have been made in this technology in order to provide a clearer image and to manage and protect certain cultural resources while also maneuvering around construction, agriculture, and other land-use patterns in the United States (Johnsen, 2006: 19). Remote sensing provides the least invasive process to gain knowledge of what the archaeological site may contain in order to plan a possible excavation.

As more advancements are made on this technology, remote sensing becomes the more preferred method associated with North American archaeology. The Standards and Guidelines for archaeology and historic preservation states that, "Where possible, use of quantitative methods [remote sensing] is important because it can produce an estimate, whose reliability may be assessed, of the kinds of historic properties that may be present in the studied area" (Johnsen, 2006: 27). By definition, archaeogeophysical methodology is quantitative because remote sensing allows a more precise measurement that cannot be obscured by subjective observation and the results obtained could be repeated because none of the features were affected by excavating them (Johnsen, 2006: 27). These methods are generally preferred because of the laws established that mandate the consideration of damaging historic properties when conducting invasive land activities. Excavating sites first instead of using remote sensing to plan could permanently damage an important cultural aspect of a historic site. This law intending to protect

these important historic properties is written in Section 106 of the National Historic Preservation Act of 1966 stating that:

The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking. (Johnsen, 2006: 18)

Two of the remote sensing methods that were used to gather information on the Wichita fortifications was Ground Penetrating Radar (GPR) and a type of magnetometer called a gradiometer. GPR is a type of geophysical method of remote sensing that can “map the spatial extent of near-surface objects and archaeological features or changes in soil media and ultimately produce images of those materials” (Johnsen, 2006: 136). These GPR systems are generally easy to use and consists of “surface antennas, a radar system to produce pulses, a computer to process and save the data, a video monitor, a keyboard, and a power source” allowing for data to be processed on a laptop in the field (Johnsen, 2006: 132). The GPR collects its data by attaching the radar to a low trolley and as you pace the area you want to measure, the antenna is then dragged along the ground sending and receiving multiple pulses per second that can be processed as images that can easily be interpreted (Renfrew and Braun, 2015: 89). All of the reflections that the GPR collects are combined into a three-dimensional dataset that can essentially be sliced to

show estimated depth in the ground and the shape/location of subsurface features (Renfrew and Braun, 2015: 89-90). This method has been widely accepted as a quick and accurate way to locate many archaeological buried features in addition to locating artifacts closer to the surface (Johnsen, 2006: 131). This method is also beneficial because, with new advancements in the technology, the data gathered from the GPR could be collected in one day and accessed while still in the field allowing for archaeologists to plan excavations sooner in order to confirm that the features in the images is what is actually there (Johnsen, 2006: 132).

The other remote sensing method that we used was a magnetometer called a gradiometer. This method provided the clearest images for us that we were able to use to help identify important aspects of the subsurface features. This method can reveal features such as “pits, ditches, hearths, kilns, or entire settlement complexes and their associated roads, trackways, or cemeteries” (Renfrew and Braun, 2015: 91). The fluxgate instruments associated with magnetometers consist of two sensors that are attached to each end of a tube measuring the local magnetic field strength (Renfrew and Braun, 2015: 91). This instrument is then carried, and as the person holding the instrument paces an established grid, usually around 0.5-1.0 meters apart, the information is logged and could be processed later (Renfrew and Braun, 2015: 91). In order to cover more area, two of these instruments could be used at the same time across the grid (Renfrew and Braun, 2015: 91).

The remote sensing methods used for gathering images of the fortifications at each site was different. At the Edwards I site, in 1980, archaeologists used a proton magnetic survey for a partial image of the fortification site; however, the image was not as good of quality as the other images that were gathered more recently. The OAS measured the Duncan site in December 2015. There, they used a gradiometer, which provided the clearest images. These images had little

obstructions and consisted of the entire fortification and even different features that were not found at other sites. The advancements in technology since the Edwards I analysis can be shown with how clearer and detailed the Duncan image is. At the Bryson-Paddock site, the OAS used a gradiometer, electrical resistivity, and ground penetrating radar. Deer Creek was the most recent site to be analyzed. There, we used both a gradiometer and ground penetrating radar in February 2016. We also have an aerial photo that was taken in 1963 of the circular ditch. Lastly was the Longest site. There, archaeologists used a gradiometer and ground penetrating radar. However, this image is not as clear as the image obtained from the Duncan site. Overall, the most informative method used was the gradiometer, which was able to show where openings were and the approximate size of the fortification.

Findings

The images produced from remote sensing can assist archaeologists in making preliminary analyses of the structure and function of different Wichita fortifications. Archaeologists speculate that these fortifications were built as a defense mechanism against raids. Resource competition was a major instigator for raids on the Wichita by enemy tribes. One source of food that tribes would compete for on the plains were bison. In the 16th century, Spanish explorers described some nomadic groups as the Apache and the Wichita in the Texas panhandle and western Oklahoma who would hunt and process bison in the same area causing competition between the two groups (Drass and Baugh, 1997: 198). Then, in the 17th century, the increase in threats from different tribes forced the Wichita to move east and trade with the French in order to gain firearms that would level the playing field (Drass and Baugh, 1997: 197). The Wichita were the last to trade with the French making the other tribes more advanced in the offensive tactics (Drass, Perkins, and Vehik, 2015: 25). As the Wichita gained a trading

relationship with the French, they were able to obtain more firearms but the threats still increased and they needed to find a way to adapt their fortifications to these threats.

Fortification complexes, such as Bryson-Paddock and Deer Creek, built after 1700, are notably larger than the ones built earlier indicating an adaptation to more conflict for the Wichita tribes. In addition to increased conflict, this increase in size also came around the same time the use of horses and European trade was prevalent for the Plains Indians increasing their mobility so the tribes can travel farther but also allowing threatening tribes to move into Wichita territory causing conflicts and disrupting trade (Drass, Perkins, and Vehik, 2015: 24-25). While the Wichita may have had horses from trading and raiding, gun distribution was unequal amongst the Plains Indians. The Osage were still attacking from the northeast and the Wichita needed to adapt their defenses as population size declined due to diseases and populations beginning to coalesce (Drass, Perkins, and Vehik, 2015: 25). In order to counteract the advances made by the Osages, in the 1750s, the Wichita shifted to trading centers closer to the Red River in southern Oklahoma that allowed them more access and they were able to avoid the Osages (Bell, 1982: 377). The Wichita also both raided and traded with the Apache and the Comanche in order to have more items to use for trade with the French and establishing the relationship as “middlemen” with the Europeans and other tribes (Drass, Perkins, and Vehik, 2015: 25). Despite their new role in the Plains, their population loss still forced them to move into more compact and densely populated villages that were close in proximity to each other (Smith, 2000: 16). The increase in population density required larger fortifications with a higher capacity to protect all the Wichita villagers when they were under attack.

Over the years, the OAS used remote sensing to gather images of these fortifications. The oldest fortifications were Duncan (34WA2) and Edwards (34BK2) found in Washita County and

Beckham County. These fortifications were the smallest fortifications in western Oklahoma. They were occupied around the same time, 1450. The next fortifications were Bryson-Paddock (34KA5) and Deer Creek (34KA3), both in Kay County. These fortifications are larger than the early fortifications and have moved towards north central Oklahoma. The estimated occupation for these fortifications is 1680-1756. The most recent fortification is the Longest site (34JF1) occupied 1757-1811. This site had the largest and most complex fortification. Table 1 exhibits this information chronologically.

Table 1: Summary of Sites and Fortification Sizes

Site Number	Site Name	County	Estimated Occupation Dates (AD)	Fortification Size
34WA5	Duncan	Washita	1450-1550	40-50 m diameter
34BK2	Edwards I	Beckham	1450-1550	40-50 m diameter
34KA5	Bryson-Paddock	Kay	1680-1756	~80 m diameter
34KA3	Deer Creek	Kay	1680-1756	~90 m diameter
34JF1	Longest	Jefferson	1757-1811	~150 m diameter

The Oklahoma Archeological Survey (OAS) measured the Duncan site (34WA2) in December 2015 using a gradiometer. The results in Figure 2 show that the approximate diameter of the enclosure is measured around 45 to 50 m (each square representing a 20 m x 20 m unit). There are openings at the north side and the south side of the enclosure and attached to the north side opening, is a baffled entryway forming a corridor. Figure 3 is a centralized image of the south side opening. The opening is less than 2.5 meters wide with evidence of anthropogenic activities angled outward from the entrance. This is evident in Figure 2 as gray lines that are slightly darker than the surrounding soil magnetics and in Figure 3 as the dotted

lines in the upper right image. The gradiometer also picked up several small pits or hearths, which is more evident in Figure 4. These pits or hearths are mostly located outside of the enclosure with one located in the southwest portion of the enclosure. The Duncan site, occupied at around 1450, is smaller than the other fortifications that were occupied at later dates. This fortification is also located in western Oklahoma prior to the displacement of the Wichita by the Apache who were in intense competition for bison hunting territory.

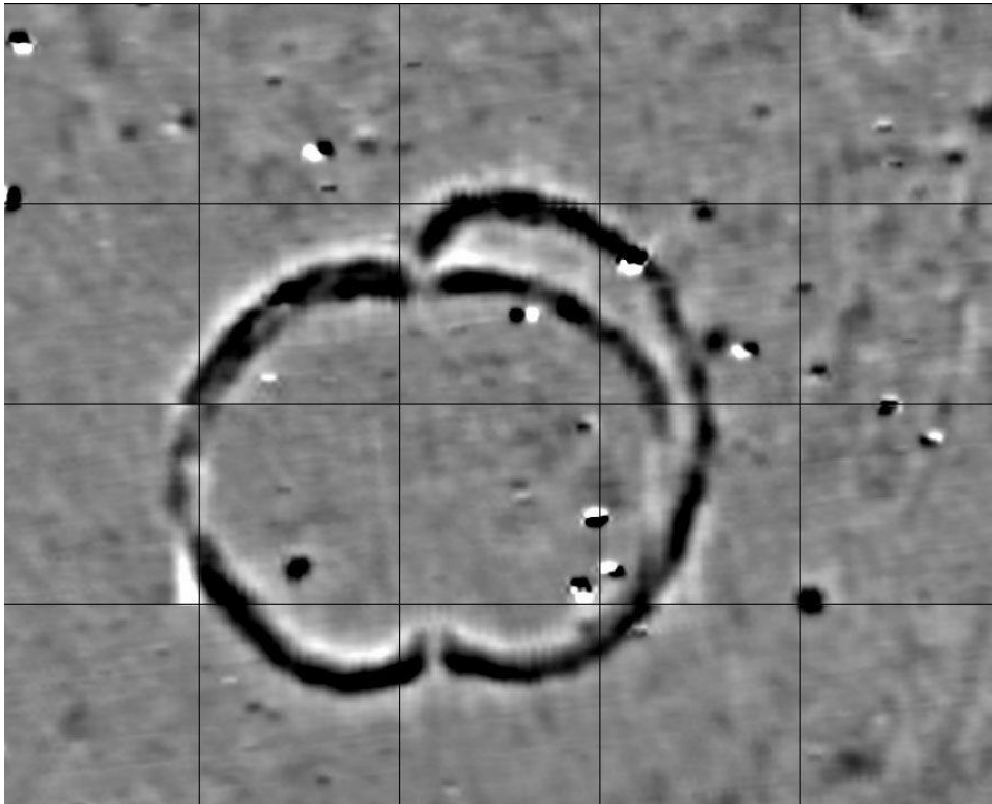


Figure 2: Duncan (34WA2) Fortification

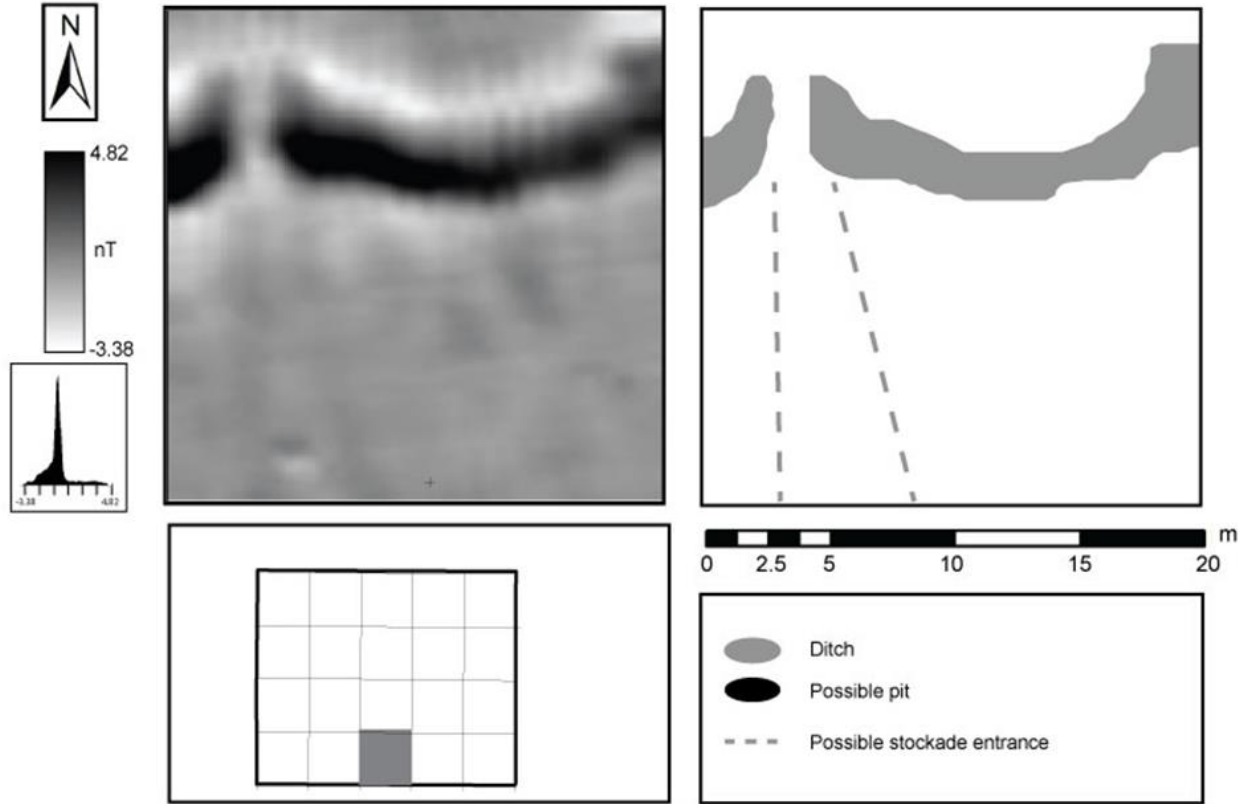


Figure 3: Duncan (34WA2) Southern Entryway

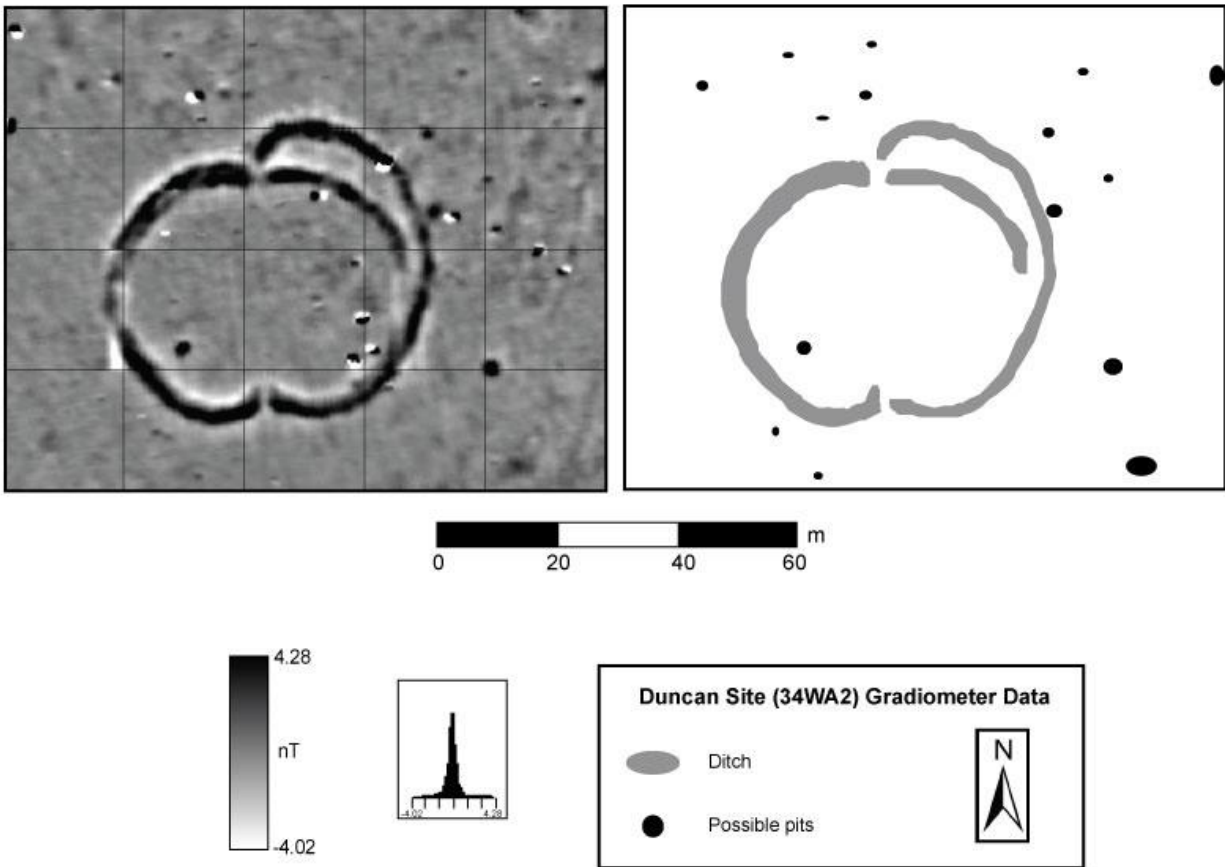


Figure 4: Duncan Enclosure Interpretations

The results obtained on the Edwards I site are not as good of quality because of the limited technology of the time. Regardless, the image shown in Figure 5 represents a partial image of a circular fortification. If this figure shows only half of the fortification, then the radius is about 25 meters making the diameter 50 meters. This site was likely occupied around 1450 and found in Beckham County, Oklahoma. Previous analysis of this image presented multiple post molds which were then interpreted as remains of logs that were placed as a stockade as the outline of the fortification (Drass and Baugh, 1997: 192). There were also no houses or other features identified on this image (Drass and Baugh, 1997: 192). The limited image obtained through earlier technology prohibits the level of analysis available at the other sites.

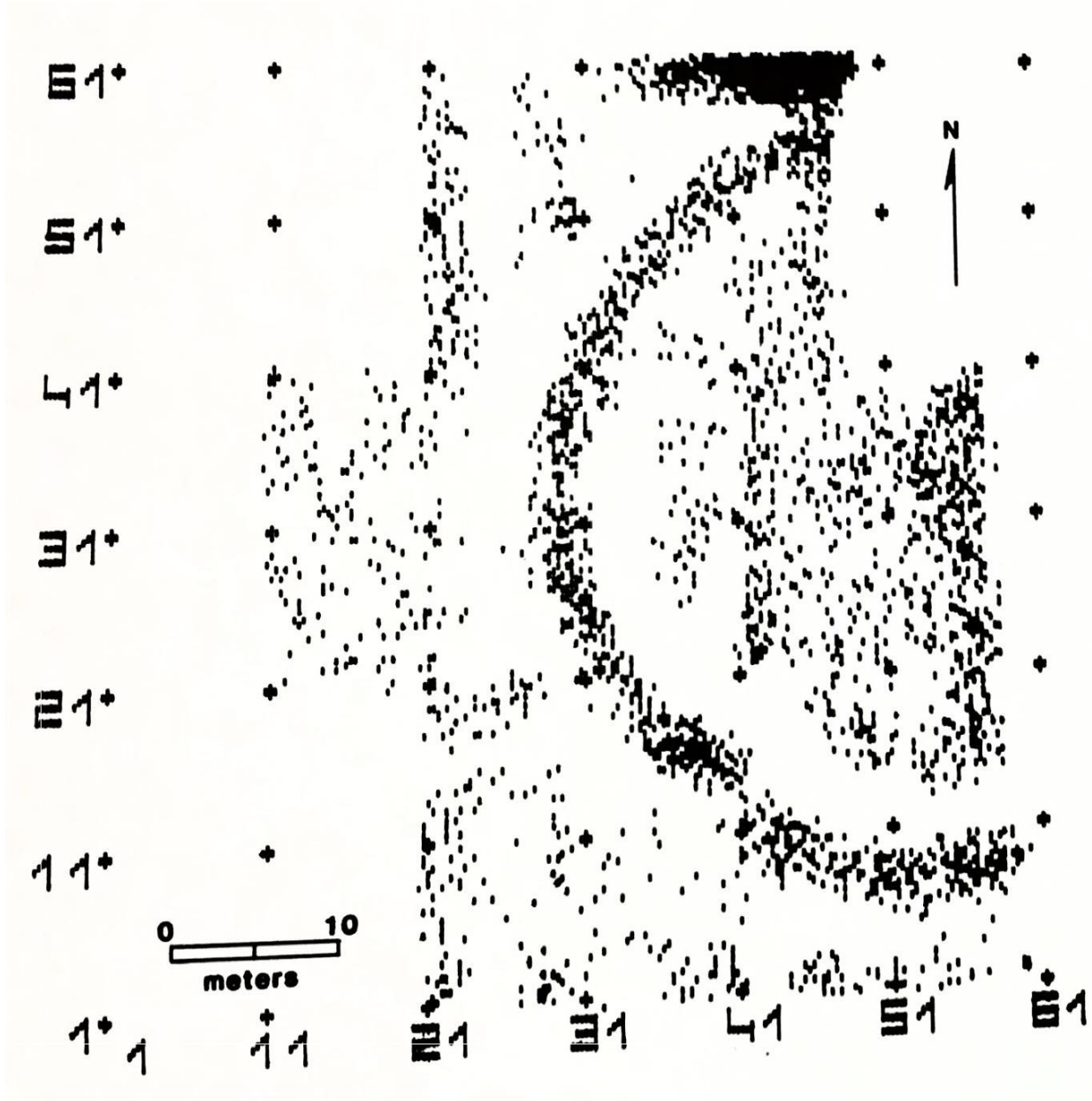


Figure 5: Magnetic Map of Edwards site based on proton magnetometer survey (Hofman, 1989)

Bryson-Paddock (34KA5) was occupied from 1680-1755 in what is now Kay County in northern Oklahoma. Figure 6 shows three outer ditches surrounding an inner subterranean structure. The three outer ditches are approximately 6 to 10 meters apart; the outer ditch is 160 meters at its widest part and the innermost fortification ditch is about 140 meters at its widest

part (Drass, Perkins, and Vehik, 2015: 13). The size of the circular ditch is approximately four to five hectares. This fortification is not as circular as Duncan is and does not show evidence of a baffled entryway. The ditches of this fortification are rounded at the bottom going from almost 3 meters at the top to less than 2 meters wide towards the bottom (Drass, Perkins, and Vehik, 2015: 12-13). This fortification is also located in north central Oklahoma indicating a movement to the east in the 17th century. The highest magnetic readings occur over filled ditches indicating that these ditches were likely filled with organic trash and soils while the inside of the circular ditch has the lowest magnetic readings which could be a result of anthropogenic activities of moving soils from the outside to the inside of the fortification (Drass, Perkins, and Vehik, 2015: 12). The soil that was thrown on the inside of the fortification was probably the earthen rampart that had a stockade on top of it. The following image of Bryson Paddock, Figure 7, shows a subterranean structure that is not evident in the previous images of fortifications from earlier sites. The Bryson-Paddock site is different from the earlier sites because of these subterranean features and a lack of a baffled entryway similar to the one found at the Duncan site. This subterranean feature was originally thought to be another ditch but archaeological excavations revealed that it is wider than the fortification ditches (about four to five meters across) (Drass, Perkins, and Vehik, 2015: 14). Earlier analysis showed that these were not just ditches; “In cross section its walls were vertical near the bottom and expanded only slightly toward the top. The floor of the feature was flat at 70-80 cm beneath the current, plowed surface and unplowed pasture. It was also filled with organic soil and trash from occupation, although few artifacts were found in the floor area. Two pits overlapped one edge of the ditch; obviously dug after the ditch had been filled. The trench had evidence of burning on the floor, intensively so in some excavation units. In addition, burned post or beam sections were encountered near the floor, and post molds were

found in the floor in all four excavated sections of the ditch” (Drass, Perkins, and Vehik, 2015: 14). The features found in the subterranean structure were not found in any of the other ditches and further excavation discovered an end on the southeast part of the ditch but no end was discovered up to 15 meters northwest of the ditch (Drass, Perkins, and Vehik, 2015: 14-15). Figure 8 then shows a possible entrance in the southeast side of the fortification. This eastern entryway of Bryson-Paddock is only around 150 meters away from a river (Drass, Perkins, and Vehik, 2015: 19-20).

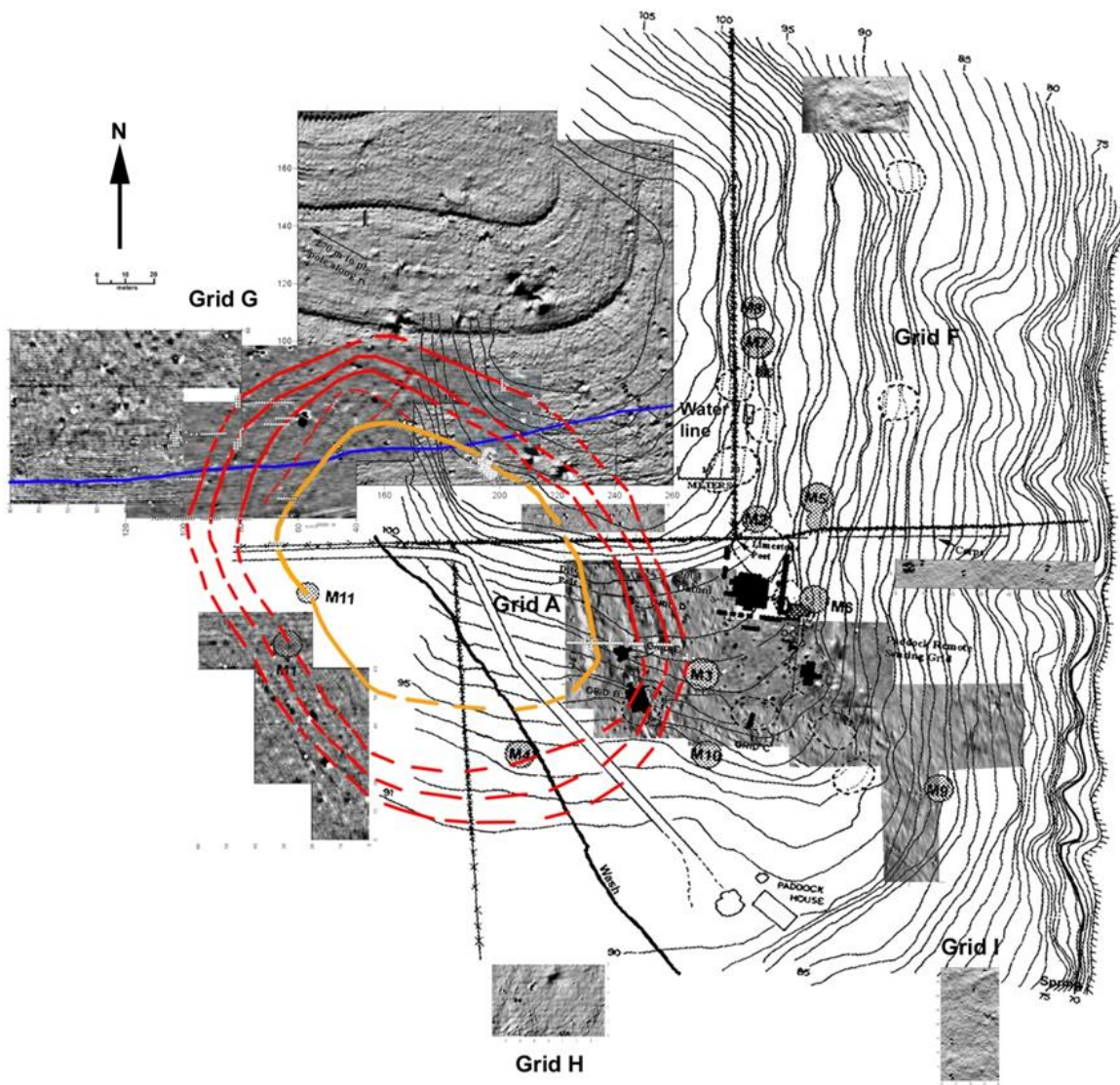


Figure 6: Bryson-Paddock

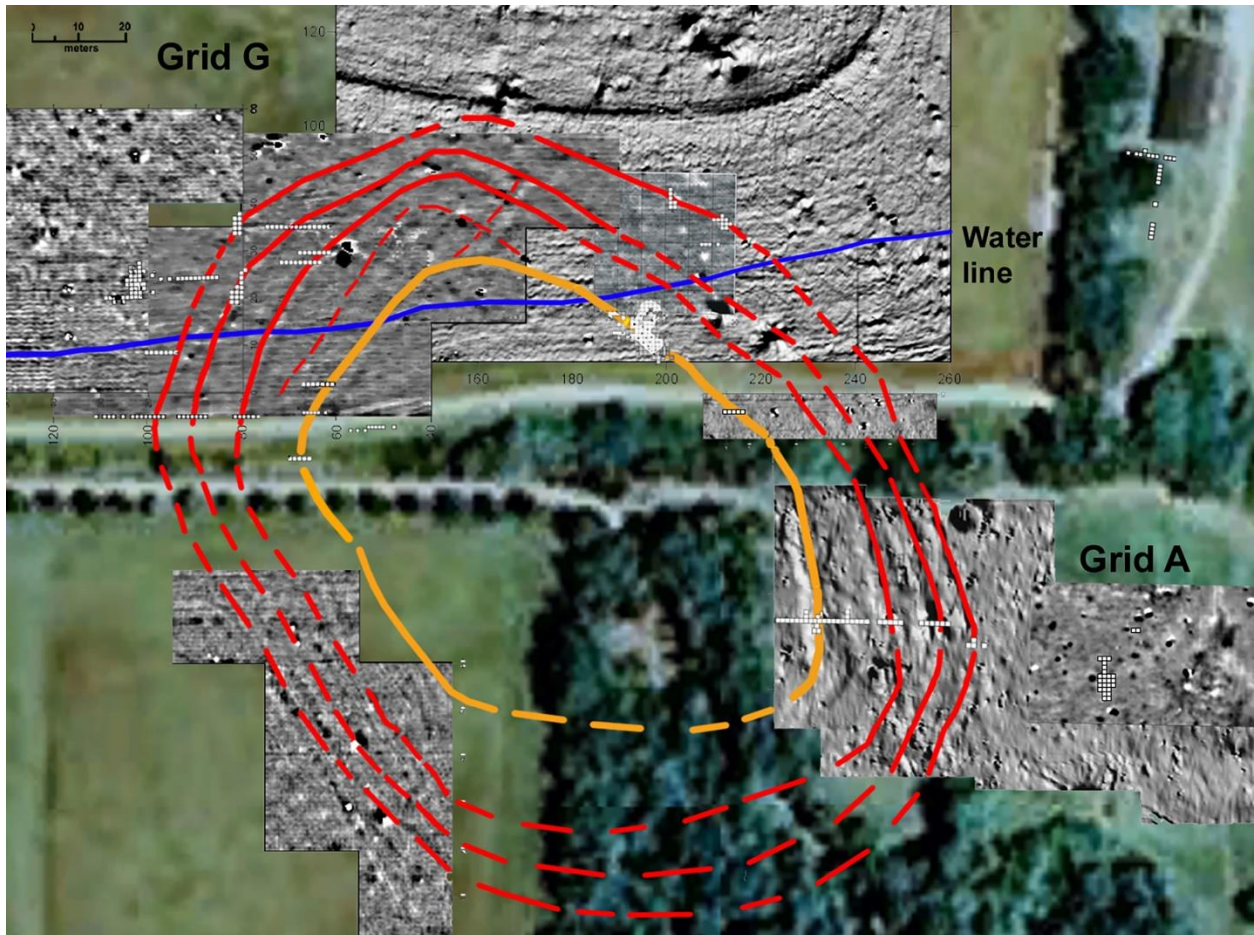


Figure 7: Map of Bryson-Paddock magnetic surveys with identified and projected fortification ditches (red) and subterranean shelter (in yellow). Dashed lines indicate unconfirmed ditch locations (Drass, Perkins, and Vehik, 2015)

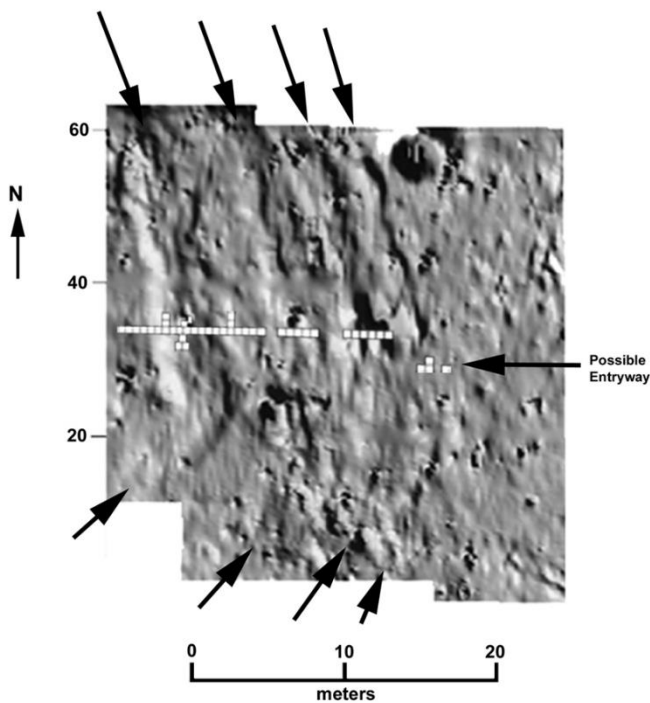


Figure 8: Magnetics on the southeast side of the Bryson-Paddock fortification. Arrows point to ditches and possible entryway (Drass, Perkins, and Vehik, 2015)

The Deer Creek site was occupied in Kay County around 1680 to 1755, approximately the same time as the Bryson Paddock site. These two sites were in closer proximity to each other than the Duncan and Edwards I sites which were also occupied around similar times. Figure 9 shows an aerial photo of the fortification from 1963. In this photo, the circular ditch can be seen (the arrow in the photo points to the ditch) as a ditch that appears to be more circular than the fortification found at Bryson-Paddock. The following figure, Figure 10, shows that the diameter could be around 90 meters. The results from the gradiometer however, do not show the complete fortification to get an exact size of it but it can be estimated to be around 13 hectares. There is also a trash mound within the fortification and near that trash mound is a group of possible pits. Surrounding the circular ditch are earthen ramparts. On the southeastern side of the fortification,

appears to be an entryway. Like the other fortifications, there are possible pits on the inside and the outside of the fortifications.



Figure 9: Aerial photo of Deer Creek taken in 1963

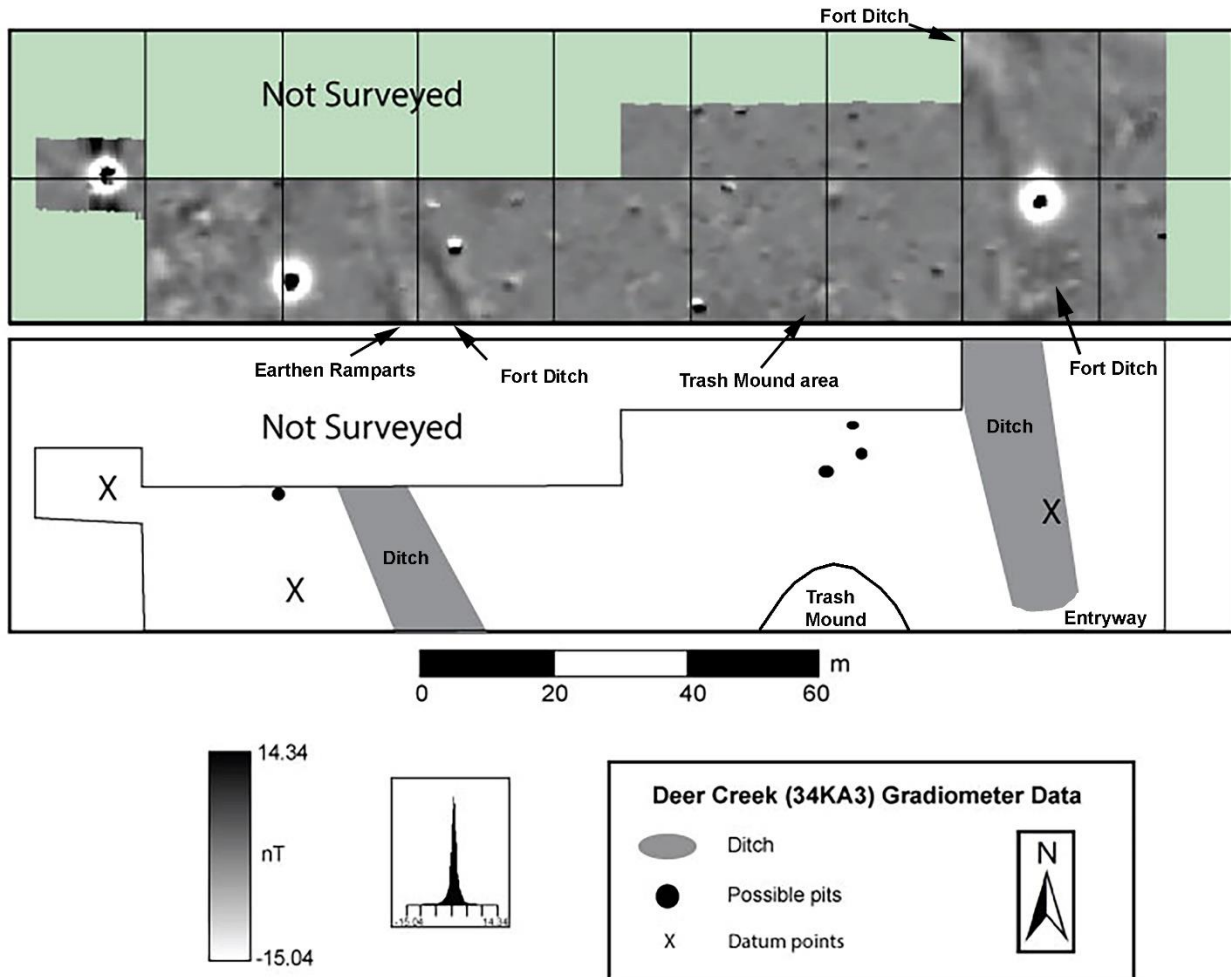


Figure 10: Deer Creek overall map

The Longest site (34JF1) was surveyed using a gradiometer and ground-penetrating radar. Figure 11 shows the data gathered from the gradiometer however, the image only shows about 30 meters of a curved edge of the fortification limiting the information to be gathered. While the image is not of the complete fortification, two dark gray ditches can be seen curving around in a possible circle. This fortification was occupied later than the others were, 1757-1811, and is located in southern Oklahoma in Jefferson County. This site is the largest fortification

covering about 14 to 16 hectares. The Longest site is located next to the Red River, which is the border of south Oklahoma, and north Texas.

Discussion

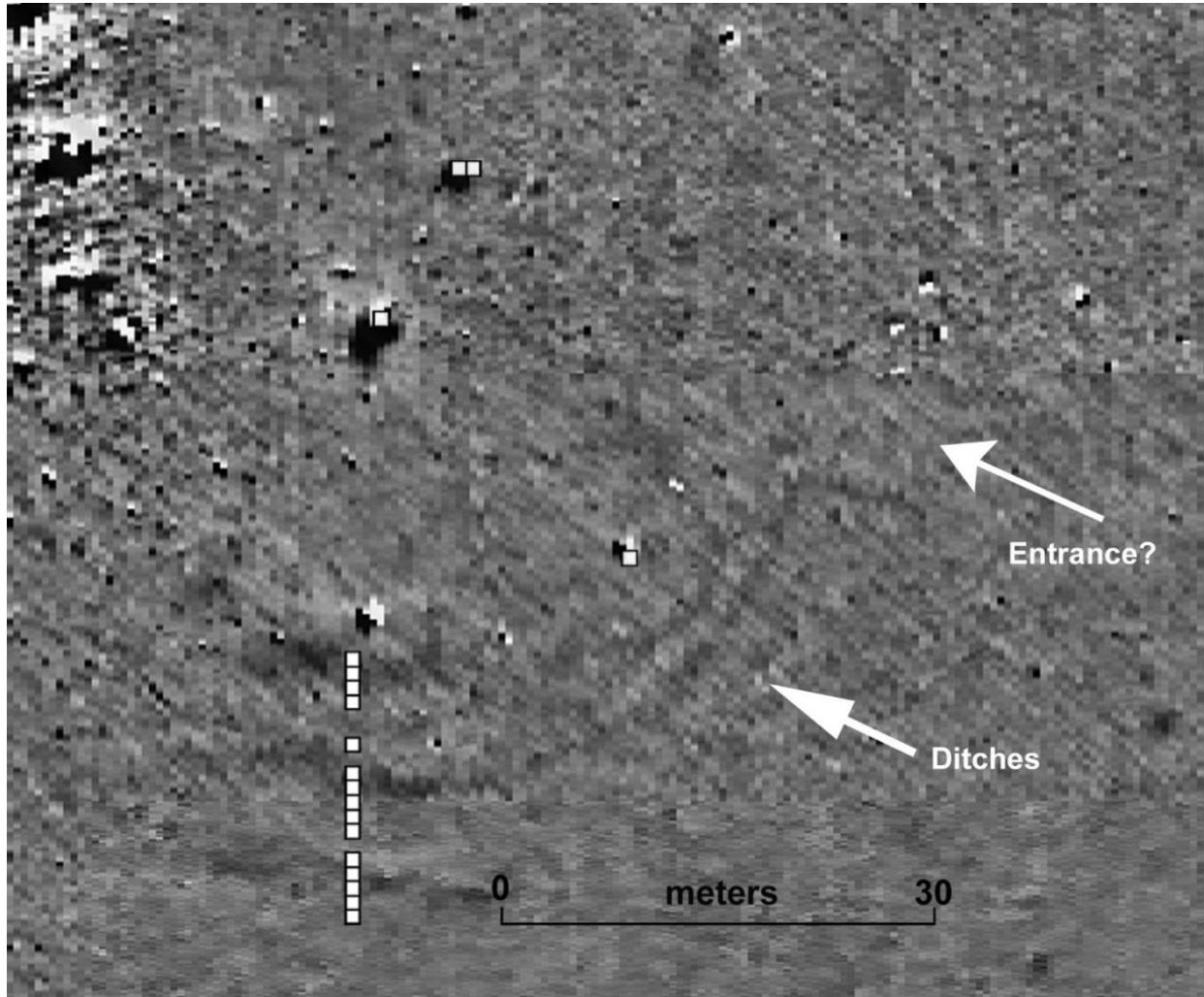


Figure 11: Longest Magnetics of SE fort area and possible entryway

The fortifications built and used by the Wichita tribes became larger as the population coalesced into densely populated villages because of an increase in more violent threats and epidemics caused by European diseases. This hypothesis is supported by the results gathered by the Oklahoma Archeological Survey over the years using remote sensing at the Wichita fortification sites in Oklahoma. The earliest fortifications found at the Duncan and Edwards I

sites were significantly smaller than the later fortifications found at the other sites. The approximate dates of these sites preclude Spanish explorers and French traders interacting with the Wichita. Once the Spanish came around the mid-1500s, these epidemics weakened the Wichita more-so than attacks or invasions from other tribes or the Europeans (Smith, 2000: 15). These diseases killed those who were unfortunate enough to be infected and decreased their reproduction rates to the extent that the tribes were forced to coalesce for better protection. These epidemics were so severe that they were known to reduce a tribe by almost 95%, which weakened the Wichita more than any other attacks or invasions (Smith, 2000: 16). While there were different features associated with these fortifications, they were mainly on the outside of the fortification allowing the Wichita people to utilize all of the interior space to protect them in cases of invasion and attacks. The decrease in population caused them to be more susceptible to threats and the small villages became harder to defend as the resource availability became scarcer. In the early 16th century, attacks from the Apache in the west initiated the Wichita coalescence (Drass, Perkins, and Vehik, 2015: 23-24). The sites, Duncan and Edwards I, had a significant amount of bison bones; about 87%-93% of animal bones were identified as bison remains indicating the prevalence of bison hunting and other usage of bison bones at the time (Drass and Baugh, 1997: 195). These smaller fortifications that contain a large amount of bison bones supports the theory that the population at these villages were smaller and bison hunting was easily accessible because of less competition. A large amount of materials was also found at these sites were from the Southwest such as pottery, obsidian, turquoise, and Olivella shell beads (Drass, Perkins, and Vehik, 2015: 21). The items coming from Southwestern tribes instead of the east like the later fortifications indicate that trading with the French was not prominent yet. These fortifications also superseded the subterranean structures found at Bryson-Paddock

indicating that fortifications evolved over time as threats increased. Figure 12 shows a representation of what the fortification at the Duncan site may have looked like in its prime with the stockade and the ditch surrounding it built. The baffled entry way is shown in the top right corner. During attacks, this entryway was closed off forcing intruders to enter the fortification in the south entrance. This entrance became narrower as the intruders go closer to the fortification forcing less people through and enabling the Wichita to be able to defend the fortification against the few people who could try to enter.

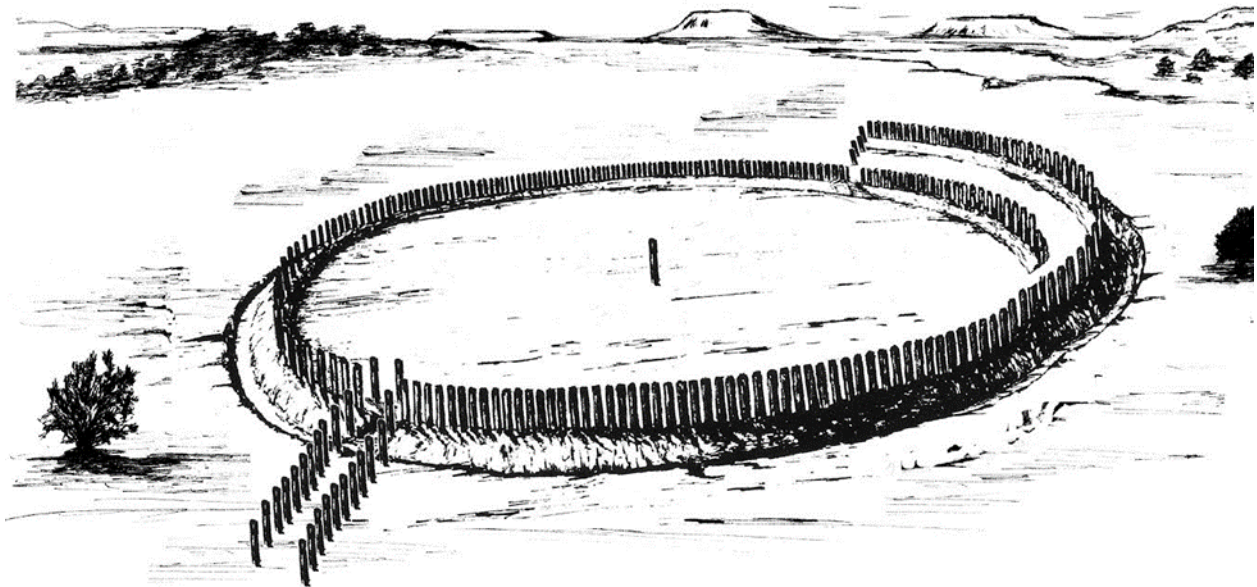


Figure 12: Representation of the Duncan fortification

The fortifications that followed the Duncan and Edwards I sites, show a major increase in size. The early fortifications were only about 50 meters in diameter whereas these fortifications increased to approximately 100 meters in diameter. The Wichita also moved their villages from

western Oklahoma to north central Oklahoma, which correlates to the Apache moving in on Wichita territory in western Oklahoma in the 16th century. Both of these fortifications were built and used around 1680 to 1755 after their displacement from western Oklahoma. These extensive fortifications reflected the intertribal conflicts that could have been a result of the use of horses to increase mobility and the competition concerning the European trade market. The fortifications show that “this is a period of increasing social complexity, regional trade and economic development, and coalescence marked by increasing village size, territorialism, and construction of extensive defense features” (Drass, Perkins, and Vehik, 2015: 1). This introduction of European trade items especially horses and firearms expanded the potential for conflicts with other tribes. European trade materials were found at these sites differentiating it from the earlier fortifications. These items consisted of mostly different kinds of European manufactured guns and other household tools (Bell, 1982: 376). The existence of these materials shows the switch from trading with the Southwest to trading with the Europeans. By the 18th century, evidence shows that Wichita tribes moved to more compact and densely populated villages that were closer to each other. This can be seen in Kay County, Oklahoma where Deer Creek and Bryson-Paddock are much closer to each other than the Duncan and Edwards I fortifications. These later sites are also closer the French traders indicating and supporting that this was important to the Wichita tribes. The innermost ditch found to be a subterranean feature at Bryson-Paddock indicates an advancement in defense that the Wichita would use to shield themselves from attacks. In addition to being around four meters wide giving the inhabitants plenty of room to hide in, there was also evidence of a thick thatch roof because of the burned wood found and burned grass (Drass, Perkins, and Vehik, 2015: 15-16). The evidence of this subterranean feature at Bryson-Paddock has not been found at Deer Creek because no ditches have been excavated.

However, magnetics have picked up ditches measured to be four to five meters wide that could indicate a subterranean structure. Essentially, the main differences between these two fortifications and the earlier ones are an increase in size and a decrease in proximity of one another. The size increase supports the theory of the Wichita evolving the fortifications to adapt to an increase in population density and outside threats.

The latest site to be examined and the largest is the Longest site. Located in Jefferson County in south central Oklahoma near the Red River, the estimated size is 14-16 hectares, which is not a significant increase in size from Deer Creek. This could possibly indicate a population rate that was beginning to stabilize. However, there is little evidence to support this claim. In 1765, a Spanish soldier named Antonio Trevino was being held captive at the Longest site and was able to give a detailed description of what he saw:

[The fortress was] made of split logs, which the Indians have placed separate one from the other in order to make use of muskets, the weapons they use, through them. [It was] completely surrounded on the outside by an earthen rampart, close to more than a vara and a third in height, which serves hem as an entrenchment, and, about four paces to the east and west, a very deep trench made so that no one can come close to the fortress, on horseback. Inside there are four subterranean apartments occupying all of its circumference, into which all of the people who cannot help with the defense of the said settlement retreat in time of invasion. (Drass, Perkins, and Vehik, 2015: 4-5)

This account of the Longest site describes subterranean apartments similar to those found at the Bryson-Paddock site showing that this advancement in defense continued past the early 19th century. Their location next to the Red River also provided easy access to French trade concentrated in New Orleans (Bell, 1982: 366). This site was occupied around 1757-1811 and, at

this time, the Wichita became more of a “middle-man” between the Apache and Comanche and the Europeans trading items such as horses and bison products (Drass, Perkins, and Vehik, 2015: 25). The location at the Red River would definitely benefit the Wichita for trading purposes.

Colonel Diego Ortiz Parrilla led a Spanish expedition in 1759 that attacked the fortified Wichita village, which is known today as the Longest site. He observed that “one part of this village was the part which was fortified and that the other part was uninhabited; all the inhabitants having run to inside of the fort” (Drass and Baugh, 1997: 192). Ortiz noted that these inhabitants used this fortification when they were under attack from outside threats.

This steady increase in fortification size from the 15th century up until the early 19th century can be seen as indicative of a need for defending larger populations. The Wichita eventually moved away from the Longest site. As bison hunting became more prevalent on the Plains requiring the Wichita to be more mobile, fortifications inevitably became impractical. (Drass, Perkins, and Vehik, 2015: 24). In the 1830s, the Wichita abandoned their Red River Village (Longest site) and moved west towards Fort Sill and eventually to the Washita River where the highest density of Wichita people is located today (Bell, 1982: 378). The Wichita population was officially moved onto a reservation by the United States’ government in the 1850’s and no more fortifications were built (Drass, Perkins, and Vehik, 2015: 7).

Conclusions

The fortification images obtained by the Oklahoma Archeological Survey using remote sensing show that the fortifications increased in size and complexity over approximately 300 years. Beginning around 1450, these fortifications were only about 50 meters in diameter but by around 1750, these fortifications grew to encompass almost 16 hectares. The Wichita also applied new additions to their fortifications by adding interior subterranean structures and, in

some cases if not all, multiple fortification ditches and ramparts. Throughout the 300 years that these fortifications existed in Oklahoma, the Wichita encountered epidemics brought by the Europeans, increased violent threats from other tribes as a result of increased resource competition, and also the “middle-men” trading situation between other tribes and the French traders to the east. The population loss brought on by the epidemics and attacks caused the Wichita to coalesce into fewer villages, which created an increase in population density requiring the fortifications to become larger in order to compensate for the size of the population density. Moving their location east and closer to rivers enabled their intertribal trade with the French. By using remote sensing, we were able to gather information that could be interpreted by individuals analyzing the images. These images support the hypothesis and show how the Wichita tribes changed the structure of their fortification over time.

Further analyses of these fortifications could be done with archaeological excavations. With the remote sensing images, archaeologists could have enough information to plan ahead to prevent any irreversible damage that could be done. In addition, sites that were measured with limited technology such as Edwards I could be re-done with the technology that is available for remote sensing today. As more remote sensing is conducted, excavations can be planned to obtain concrete evidence of what is under the surface. Only Bryson-Paddock has been extensively excavated where archaeologists were able to decipher between fortifications and subterranean apartments. There is already an eyewitness account from a Spanish soldier that describes subterranean apartments at the Longest site. Moreover, excavations have shown that the Longest site does contain the subterranean structures mentioned in the historical account showing how closely it resembles the fortification at Bryson-Paddock. Excavations at the earlier

sites, Duncan and Edwards I, could show whether these subterranean structures were first created at Bryson-Paddock or whether they were always initial parts of the Wichita fortifications.

Acknowledgments

I would like to express gratitude to Dr. Richard Drass for providing the images used in this thesis and taking me to Kay County to see the Deer Creek site in person and to Dr. Scott W. Hammerstedt for explaining remote sensing to me. I would also like to especially thank Dr. Stephen Perkins for his advice on this thesis and guidance as I conducted research and finished the final draft. Lastly, I would like to acknowledge that without the research conducted by the Oklahoma Archeological Survey, this thesis would not be possible.

References Cited

- Bell, R. E. (1982). Pathways to plains prehistory: Anthropological perspectives of plains natives and their pasts. Duncan, Oklahoma: Cross Timbers Press.
- Drass, R. R., Perkins, S. M., & Vehik, S. C. (2015) Digging ditches: archaeological investigations of historically reported fortifications at bryson-paddock (34KA5) and other southern plains village sites.
- Drass, R. R., & Baugh, T. G. (1997). The wheeler phase and cultural continuity in the southern plains. *Plains Anthropologist*, 42(160), 183-204
- Johnson, J. K. (2006). Remote sensing in Archaeology: An explicitly north American perspective. Tuscaloosa, Alabama: The University of Alabama Press.
- Hofman, J. L. (1989) From clovis to comanchero: archeological overview of the southern great plains. Fayetteville, AR: Arkansas Archeological Survey.
- Renfrew, C. & Braun, P. (2015). *Archaeology essentials: Theories, methods, and practice* (third edition). New York: Thames & Hudson Inc.
- Smith, F. T. (2000) *The wichita indians: the traders and the southern plains, 1540-1845*. College Station: Texas A&M University Press