

Abstract

During the fall of 2002 I was retained by the District Attorneys Office in Bradley County Tennessee to locate the state line in Copperhill, Tennessee for a venue determination in an assault case. The previous summer there had been an altercation behind a local bar and there was a question as to whether the assault occurred in the State of Tennessee or Georgia. The town of Copperhill is in the extreme southeast corner of Tennessee and is best known for strip mining activities that took place in the late 19th and early 20th centuries. After the mines shut down the area looked like a moonscape for decades but has since turned into a thriving mountain community. The establishment of the state line in this area was both challenging and educational for many reasons. The actual location of the state line has been a source of debate for almost 175 years. The original surveyor ran the first line approximately 4500 feet south of the record location, the 35th parallel, as defined by astronomic means. Since that time several attempts have been made to reestablish the line. The survey offered an excellent opportunity to use GIS along with GPS to gather and analyze evidence to help pinpoint the most likely location of the line as originally staked. GIS allowed me to gather evidence from several sources and compare the data in an interactive environment. The survey also offered a rare opportunity for me to document and illustrate for my students, the importance of using evidence, other than measurements, to locate a line as originally established. One of the most difficult principles to convey to surveying students is the simple fact that it is not a surveyor's prime directive to replace boundaries by using measurements, but rather to find boundaries and then measure them. This more often than not requires the surveyor to recreate history and with tools such as GPS and GIS this process can be both efficient and professionally rewarding. I call the guiding principle I adhere to when doing a retracement survey the Doctrine of Conspicuous Use. The doctrine is best illustrated by the following court decision:

It has been declared that all the rules of law adopted for guidance in locating boundary lines have been to the end that the steps of the surveyor who originally projected the lines on the ground may be retraced as nearly as possible;¹ furthermore, that in determining the location of a survey, the fundamental principle is that it is to be located where the surveyor ran it. Any call, it has been said, may be disregarded, in order to ascertain the footsteps of the surveyor in establishing the boundary of the tract attempted to be marked out on the land; and, **the conditions and circumstances surrounding the location should be taken into consideration to determine the surveyors intent.** (emphasis added)²

The real challenge was to recreate the original survey and take into consideration the site conditions as they existed in 1818. Utilizing GIS made this process almost intuitive.

The Doctrine of Conspicuous Use

The Doctrine of Conspicuous Use is based on the fact no matter what we do there is always evidence of our actions. This is why it is so important for surveyors to understand the importance of evidence other than measurements, especially historical evidence. "History is the foundation of all the surveyor's responsibilities....A history of surveying and knowledge of the early customs and practices surrounding land use and ownership of

land help to clarify complexities of land laws and to explain why surveyors must do as they do.”³

A mere 15 years ago using D.N.A. in criminal court proceedings was only theory. Today D.N.A. is considered one of the most reliable forms of evidence. Two of the most valuable technological tools a surveyor has today are G.P.S. and G.I.S. Global Positioning allows evidence to be gathered and analyzed within an absolute geographical framework. Geographical Information Science allows this evidence along with data from other sources, both quantitative and qualitative, to aid in recreating the footsteps of the original surveyor. The Doctrine of Conspicuous Use is closely related to the mathematical concept to Chaos Theory. Chaos Theory is defined as seemingly random events that actually work together in an intricate pattern. Discovering and analyzing intricate patterns is at the heart of all boundary resolutions.

History of the line

On June 1, 1818, James Camak, mathematician on the part of the State of Georgia and James Gaines, mathematician on the part of the State of Tennessee began a survey to mark the line between the two states. The survey began at a stone, two feet tall, that supposedly marked the corner of the states of Georgia and Alabama and on the 35th parallel, the southern boundary of the state of Tennessee. The stone was described as being “one mile and twenty-eight poles from the south bank of the Tennessee River, due south from near the center of the old Indian town of Nick jack”.⁴ Only 26 days later the survey party ended their task atop Unicoe Mountain, 110 miles east of the point of beginning.

On July 13 1818 James Camak, along with appointed representatives of both states, met in Milledgeville Georgia to certify the survey as correct.⁵ Eight years later, after new observations for latitude had been taken Camak ran the line again and discovered his original line was almost one mile south of the true 35th parallel in several places.⁶ On March 29, 1923, after years of disagreement over the line, Georgia agreed with the line, as originally ran by Camak in 1818, and was the true boundary between the states.^{7 8}

According to the field notes the line was run by compass and chain and trees were blazed at each mile along the way. Although the blazed trees have long since disappeared many other topographical features described in the notes still exist as evidence to the lines true location. For the purpose of our discussion the portion of the notes from Sugar Creek east will be our focus.

A portion of the field notes of James Camak as obtained from the State Archives of Georgia (copied verbatim)

“...Crossing Sugar Creek at 30 chains, 41 miles to a Red Oak, 42 miles to a Post Oak, 43 miles to a Posy Oak, 44 mile to a Black Oak, 25 chains to a branch, crossing 5 times in 5 chains. June 12th 45 milke to a Pine, 46 miles to a Pine, 13 chains to a Big Cannasauga, 47 miles to a Beach in the bottom, 48 mile to a black oak, 31 chains to Federal Road, leaving mCnear 1-1/4 miles on the N. Tuesday the 16th of June Cloudy waiting to take the Latitude. Proceeded on the line 49 miles to an ash crossing.

Connasauga at eight. Sticks crossing it again at 11. Crossing the same again at 15. 2 Sticks lay out tonight without anything to eat or any covering on a bed of rocks. June the 17th, Cloudy rainy morning. Run on the line 50 miles to a Black Oak, 30 chains to the top of the mountain, 51 miles to a Spanish Oak, 34 chains to the 2nd crossing of the Conneseauga running S.W., crossing it again at 55 chains running N.W. crossing it again at 75 chains running S.W., 52 miles to a White Oak, crossing the Conneseauga again at 30 chains running S.W., 53 miles to a Hickory oa a mountain named Hogback Mountain, 78 chains to Connasauaga again running N.W. then on leaving Ellacensatown 2 miles to the S. 54 miles to a Beach in a cane brake crossing the W. fork at one chain and the E. fork at ten chains58 miles to a Chestnut crossing a small creek at the foot of Bullfrog Mountain at 47 chains...61 miles to a White oak on the E side then crossing Wochboe Creek at 62 chains running N,E. Waters of Ammoy River ...68 to a Black Oak then 21 Chains to a large Creek of Ammoy River to the left 69 to a Post Oak crossing Ammoy at 20 chains 60 yds. Wide running to left....”

Research

Polk County is a small, rural county in the southeast corner of Tennessee. A large portion of the county is National Forest, therefore revenues from property taxes must be obtained from a relatively small portion of the county. Due to financial constraints the land records process is far from automated, therefore research can be quite a task. I decided to take the time to go through the deed records, page by page, stopping at the year 1818. Doing research in this manner led to the discovery of two key plats that allowed me to form an initial hypothesis concerning the location of the original state line. The first document was a plat, dated 1904, I unearthed folded within a deed book. The plat was entitled “Riverside Addition” and was prepared by John Williams, a surveyor that practiced in the Copperhill area in late 19th and early 20th centuries. Williams is credited with surveying the town of Copperhill and has an excellent reputation. This plat show the state line crossing the Ocoee River just north of the assault site and continuing through Copperhill on a bearing of North 88 degrees East.⁹ The second plat, dated 1908, also appears to have been prepared by Williams and shows the state line and the westerly portion of Copperhill. These plats are critical for several reasons. First, the streets and blocks and lots shown on the plat match amazingly close to the current site conditions. The second, more subtle reason is the fact the state line was shown at all. James Camak discovered his error is 1826 but by that time his original line had been used and accepted. In order for Williams to show the line on his survey either he fabricated its location or there was evidence in existence in 1904 that led him to show the line where he did. I talked with several of the older residents of the area and they all independently confirmed the location of the state line on the Williams plat. One business owner told me his father had built the building at the corner of Tocca and Grand in 1929 and at that time the state line bisected the west line of the lot, just as shown on the Williams plat.

An often overlooked source of survey information is the genealogy pages on the web. The history of most families along with the land they lived and died on is forever intertwined. I have found that most individuals that trace their family trees are excellent researchers and are very willing to share their knowledge and skills. I have found valuable information on the genealogy pages on several occasions. It was through these

pages that I discovered the history behind the McNair home in Old Fort, a key reference in the surveyor's description of the state line survey. David McNair was of Scottish descent and married Delilah Vann, a Cherokee woman from a prominent Indian family. McNair was an 1812 war hero that settled on the Conasauga River and ran a very profitable trading post and portage. Many travelers to the area mentioned the hospitality of the McNair's in their journals as early as 1816.¹⁰ When Camak came through in 1818 he measured 1-1/4 miles up the Old Federal road to the McNair home. The foundation of this house still exists and lies within feet of the gravesite of David and Delilah McNair the prominent landmark lies 200' west of Highway 411 in Old Fort Tennessee. Remnants of the Old Federal Road can still be seen just west of the house site near the Conasauga River. There are photos from the 1920's that show family members and local historians at the gravesite and the original brick home can be seen only a few yards away in the background.¹¹

Another valuable source of data is the many map sites on the Internet. One of the most helpful was the website of the U.S. Corps of Topographical Engineers. During the Civil War the topographical mappers for the U.S. Army did an outstanding job of mapping and documenting local features. Some of the most useful information I obtained from these maps was simply a chronological record of place names that could be used to help track and identify features called for in the original notes. All the data I gathered was placed in a GIS system for ease of retrieval and analysis. The maps were georeferenced using easily identifiable topography. The maps could then be overlaid and screened for research and comparison. Qualitative data such as photos, descriptions and history/genealogy pages were hyperlinked to the GIS data for ease of retrieval and analysis.

Analysis

By carefully analyzing the original field notes and identifying the topographical features called for I was able to recreate the corridor that Camak must have traveled in 1818. Although the exact position is not obtainable from the notes alone, by retracing Camak's steps as closely as possible, I determined with a relatively high degree of certainty Camak's approach to the Ocoee River and the area in question. It would appear that by using Camak's notes that the location shown on the Williams plat of 1908 is the most likely area of crossing the Ocoee River. The assault in question occurred 18 feet inside the State of Georgia.

The critical step was to establish an approach corridor. Simply put this is the most likely route that Camak took as he approached the area of the Ocoee River in present day Copperhill. To establish this corridor some basic assumptions were made. Making these assumptions is analogous to the legal concept of "judicial notice".

1. Camak was attempting to establish a true east-west line.
2. The relative measurements between consecutive topographical features are more accurate than the overall measurements from the point of beginning.

3. The relative distance between east-west features allows limits to be placed on the width (north-south variation) of the approach corridor. In one example when Camak crossed the fork of the Conasauga he measured 9 chains between the forks. The nine chains have less of a chance for error than the total distance from the point of beginning. Also due to the fact the river diverges at a fairly substantial rate the zone that must contain the 9 chain distance is narrowly defined.
4. By using GIS and GPS to closely model the approach and exit routes to the area in question the actually crossing area can be determined with a greater degree of certainty.

Overlaying ancient maps with current survey data resolved several ambiguities. Often times the names of topographical features change over time. Camak calls for “Hogback Mountain”. This now appears to be Iron Mountain. The Ocoee River was once called the “Amoi” or “Ammoy”. The older maps also contained the location of several places that no longer exist, such as Indian villages.

The approach corridor could also be modeled in three dimensions, which proved to be a valuable asset. Features called for in the notes became easily identifiable when Digital Raster Graphic¹² files were overlaid on to Digital Elevation Models.¹³

Conclusion

Using GIS to gather and georeference all the data allowed me to analyze all evidence within a flexible, absolute geospatial framework. By overlaying maps and other data from different time periods allowed me to reconstruct and analyze the path of the original surveyor. Using GIS allowed me to fully utilize the topology (the mathematically explicit rules defining the linkages of geographical elements) contained within all the documents. Deeds can be linked to other data in both time and space. Being able to assign attributes to field and research data, then link and query the two, allowed me to see relationships that would have probably gone unnoticed. In many cases, mesne conveyances that may have created latent ambiguities can be more easily identified when placed within a geospatial environment. Also by utilizing GIS senior rights and title identity can be established and analyzed much quicker and with a higher degree of certainty. Called for monuments can be readily tracked through a series of conveyances utilizing GIS. Using GIS techniques allows a surveyor to use qualitative data more efficiently, which is a valuable tool given the fact measurement data falls at the bottom of the list when resolving conflicting document elements. Put another way - “So far as the laws of mathematics refer to reality, they are not certain, and so far as they are certain, they do not refer to reality”.¹⁴

¹ U.S. v. Champion Papers, Inc, D.C. Texas, 361 F. Supp. 481

² Sellman v. Schaff, 269 N.E. 2d60, 26 Ohio App. 2d 35,55 2d69 (1971)

³ Robillard, Wilson, Brown, 2002, Evidence and Procedures for Boundary Location 4th Edition, N.Y., John Wiley and Sons, Pg. 199

⁴ SAMSOG (Surveying and Mapping Society of Georgia) Manual

⁵ Drawing of State Line as recorded at the State Archives of Georgia

⁶ SAMSOG Manual

⁷ Drawing of State Line as recorded at the State Archives of Georgia

⁸ When I began my survey there was a 6" wide blue line painted through Copperhill that was marked as the state line. This line was about 100' south of the line I establish. It was marked by using a monument at the intersection of two major routes. The monument was marked as "S.L. 10 1941". The assumption was made that this was the line but that was incorrect. The monument had been set by the Georgia DOT in 1941 and it fell exactly at the intersection of two roads in the area. The monument was designated "SL 10 1941) based on it's proximity to the state line not because it was the state line. In the early 1960's Georgia Governor, Carl Sanders, tried to get the line moved but withdrew the case and asked that the line be marked. Governor Sanders is now a lawyer in private practice in Atlanta. I contacted him to ask if the line had been marked as he requested. He informed me to the best of his knowledge no monuments were set by the state of Georgia for the state line. Establishing the approach corridor also helped to show that the painted line, when projected, would extend almost one mile south of the multiple crossings of the Conaugauga.

⁹ Declinations 1818 5 to 6 degrees east, 1904 2 degrees east.

¹⁰ History of Polk County Tennessee, Polk County Historical Society

¹¹ ibid

¹² DRG (Digital Raster Graphics) files obtained from the USGS

¹³ DEM (Digital Elevation Models) obtained from the USGS

¹⁴ Albert Einstein

Websites:

U.S. Corps of Topographical Engineers - www.topogs.org/cwmaps.asp.html

3dem Visualization Software – www.visualizationsoftware.com/3dem/downloads.html

Genealogy maps – www.rootsweb.com/~usgenweb/maps/index.html

General map sites – www.davidrumsey.com