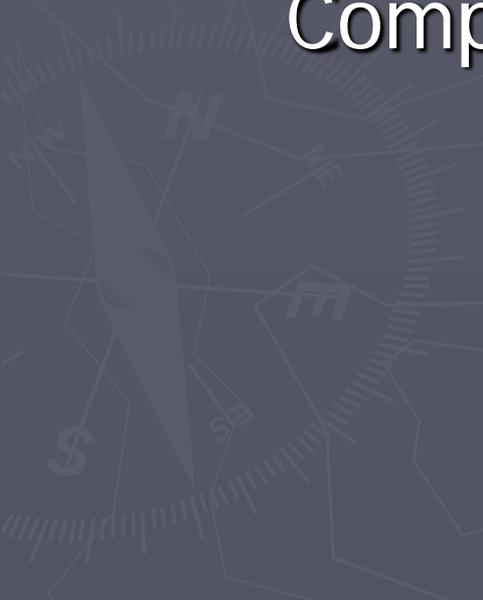




Center of Section

Computed or Monumented Position
Review and Commentary





Center of Section

- Center of section defined by law for more than 200 years
- Computed position vs monumented position
- Examine the state laws and federal rules
- Ongoing controversy – Surveyors don't agree
- Discuss the controversy
- Provide Commentary and Discussion



The Controversy

Topic of disagreement within the surveying community for decades.

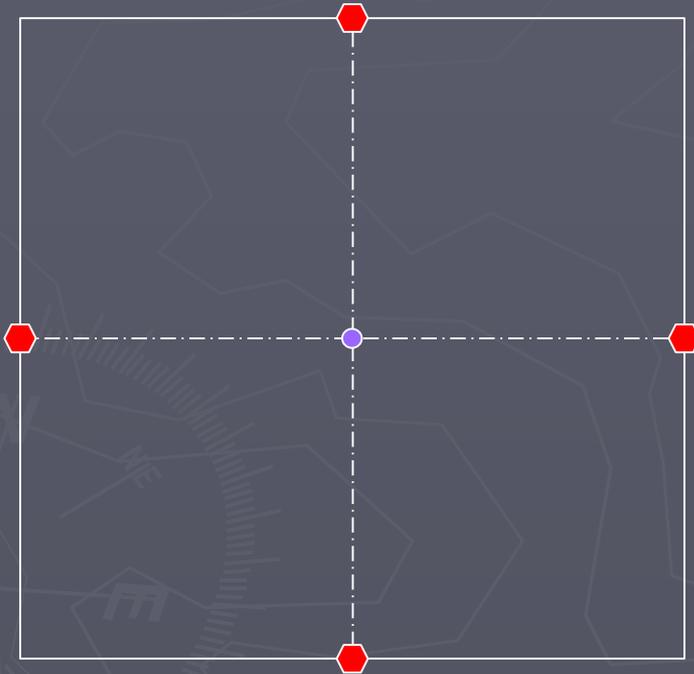
- One point of view:

Compute mathematical center according to federal rules regardless of any existing evidence. Sometimes referred to as the “Legal Center”.

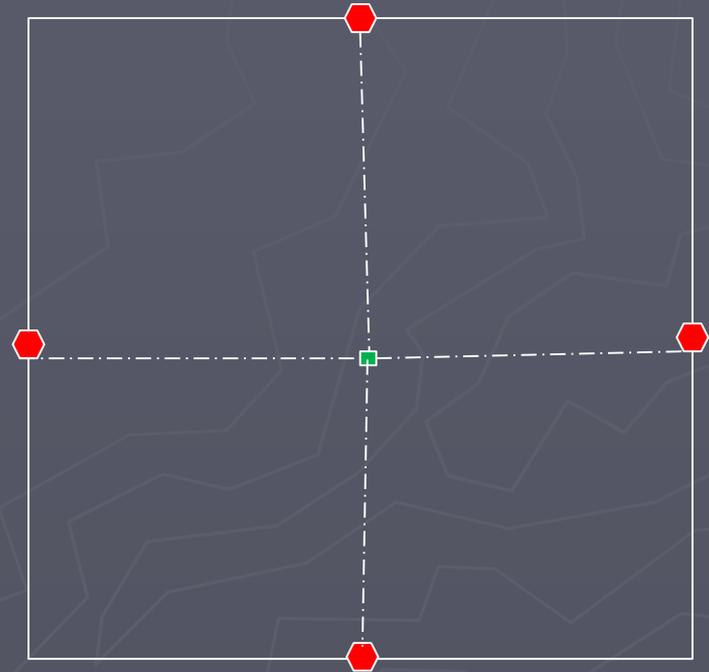
- Another point of view:

Determination based on retracement of prior surveys and evidence. Belief that federal rules were previously applied and land owners have bona fide rights to lines based on the monumented and accepted center.

Two Basic Methods for Determining Center of Section



**Center Established At
Mathematical Intersection**



**Found Monument Held
For Center of Section**



Basic Facts Regarding the Center of Section

- Center of section to be established per methods described in federal rules.
- Establishing the center is a private boundary matter.
- Private surveyor establishes/retraces center and subdivides section.
- County Surveyor's responsibility limited to maintenance of USPLS corners actually set on exterior boundary of sections during original survey* (section and quarter corners)
- County Surveyor does not arbitrarily subdivide sections and/or establish or retrace private property boundaries.
- County Surveyor only subdivides sections when necessary to perform surveys of county property or interests.
- County Surveyor may compute/accept centers for GIS parcel mapping.

Federal Law

Land Ordinance of 1785

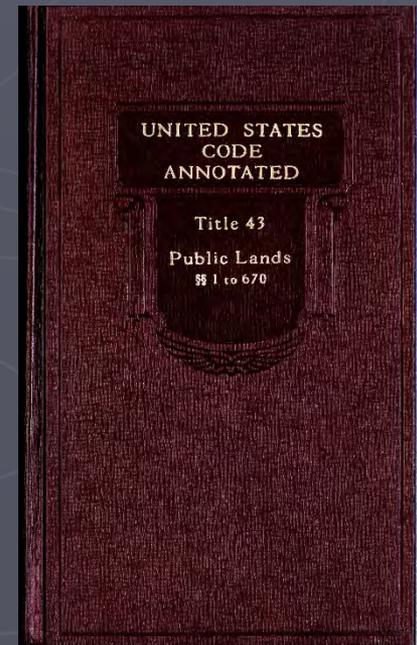
Beginning of U.S. Government's policies for disposal of land. Other Acts followed.

Land Act of Feb. 11, 1805 provisions written in Title 43 of the U.S. Code

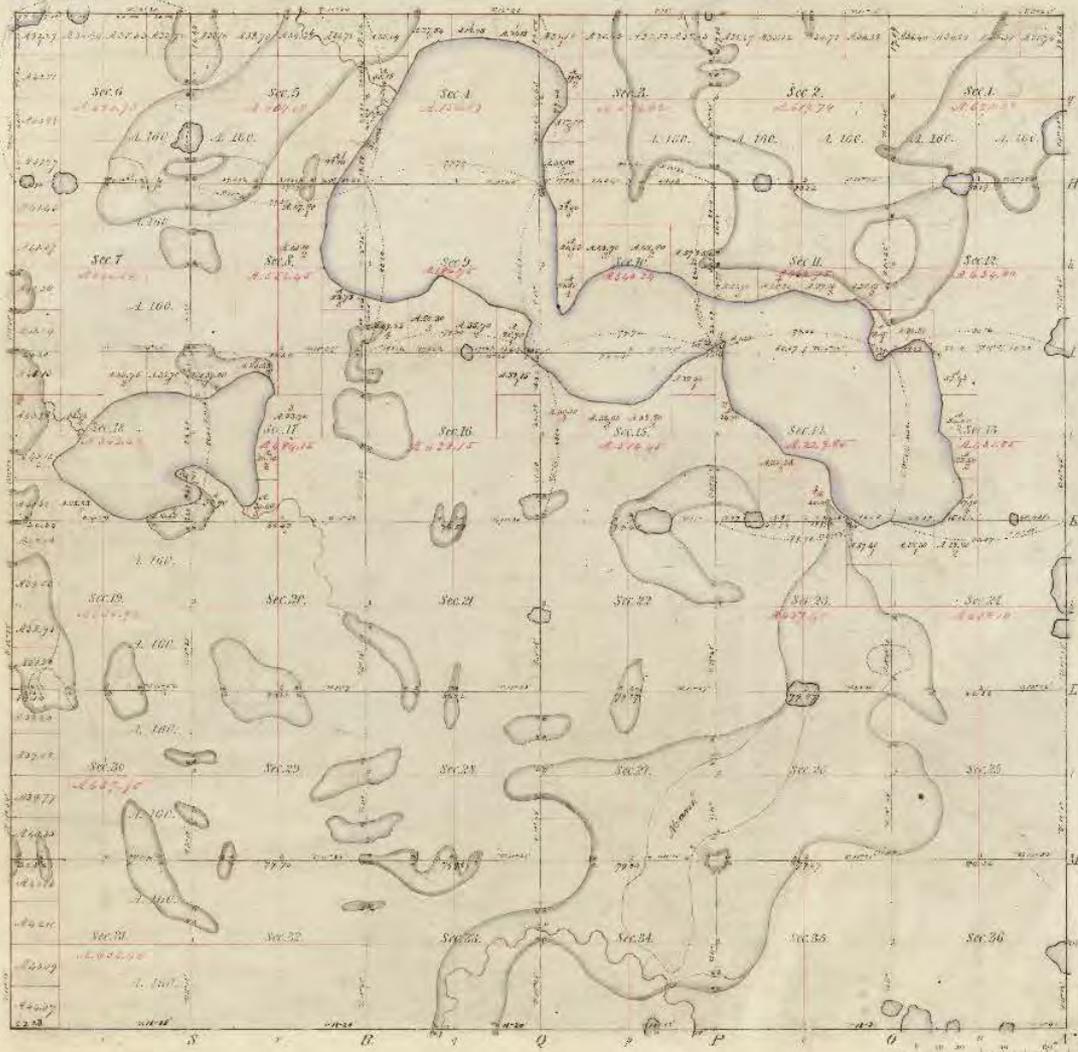
Relevant parts pertaining to Section Subdivision:

"the corners of half- and quarter-sections, not marked on the surveys, shall be placed as nearly as possible equidistant from two corners which stand on the same line"

- *"not marked on the surveys"* means monuments not set.
- *"shall be placed"* means a physical monument.
- *"as nearly as possible"* acknowledges that it won't be perfect.



Township N^o 32 N, Range N^o 25 West 4th Mer.



Mensures of Acres			
Tract	Course	Dist	Course
Section 1	1.100	1.100	1.100
Section 2	1.100	1.100	1.100
Section 3	1.100	1.100	1.100
Section 4	1.100	1.100	1.100
Section 5	1.100	1.100	1.100
Section 6	1.100	1.100	1.100
Section 7	1.100	1.100	1.100
Section 8	1.100	1.100	1.100
Section 9	1.100	1.100	1.100
Section 10	1.100	1.100	1.100
Section 11	1.100	1.100	1.100
Section 12	1.100	1.100	1.100
Section 13	1.100	1.100	1.100
Section 14	1.100	1.100	1.100
Section 15	1.100	1.100	1.100
Section 16	1.100	1.100	1.100
Section 17	1.100	1.100	1.100
Section 18	1.100	1.100	1.100
Section 19	1.100	1.100	1.100
Section 20	1.100	1.100	1.100
Section 21	1.100	1.100	1.100
Section 22	1.100	1.100	1.100
Section 23	1.100	1.100	1.100
Section 24	1.100	1.100	1.100
Section 25	1.100	1.100	1.100
Section 26	1.100	1.100	1.100
Section 27	1.100	1.100	1.100
Section 28	1.100	1.100	1.100
Section 29	1.100	1.100	1.100
Section 30	1.100	1.100	1.100
Section 31	1.100	1.100	1.100
Section 32	1.100	1.100	1.100
Section 33	1.100	1.100	1.100
Section 34	1.100	1.100	1.100
Section 35	1.100	1.100	1.100
Section 36	1.100	1.100	1.100

Total number of Acres 3541.24

Survey designated	By whom surveyed	Date of survey	Amount of survey	When surveyed	Should be and is in the Sec. 60, 61, 62
Township lines	Wm. H. Smith	1854	36	1854	
Subdivisions	Wm. H. Smith	1854	3505.24	1854	

The above map of Township N^o 32 North, of Range N^o 25 West 4th Mer. Principal Northern Wisconsin Territory is hereby confirmed to the field notes of the survey thereof on file in this Office which have been examined and approved.
 Surveyor General's Office.
 Dubuque, W. April 18th 1854.
 Geo. H. Jones, Surveyor General.

Title 43 of the U.S. Code

Relevant parts pertaining to Section Subdivision (continued):

“the boundary lines which have not been actually run and marked shall be ascertained, by running straight lines from the established corners to the opposite corresponding corners”

This statement describes how to set a monument for the center of section

- *“run and marked”* means field surveyed and monuments set in the ground.
- *“running straight lines”* means work is being done in the field.

Consider that this was written in the early 1800's.

Would it make sense to follow up the monumenting of section and quarter corners with a computed position for the center of section?

New land owners needed monuments to know where their land boundaries are.

Title 43 of the U.S. Code

Relevant parts pertaining to Section Subdivision (continued):

“in those portions of the fractional townships where no such opposite corresponding corners have been or can be fixed, the boundary lines shall be ascertained by running from the established corners due north and south or east and west lines, as the case may be, to the watercourse . . .”

This statement describes how to set a monument for the quarter line or center of a fractional section.

- *“running a line... to the watercourse”* means field work.
- Instructions for subdividing regular and fractional sections are clear.
- Language in the U.S. Code stating *“run and marked”* and *“placed as nearly as possible”* indicates lines run in the field and monuments set to the best of one’s ability.

Township N^o 30N. Range N^o 20 West 4th Mer.

Sec. 32

Sec. 33

Sec. 34

Sec. 35

Sec. 36

Sec. 31

Sec. 32



Sec. 6
2662.22

Sec. 5
2672.55

Sec. 4
2700.23

Sec. 3
2730.00

Sec. 2
2671.29

Sec. 1
2509.93

Sec. 7
2520.44

Sec. 8
80.80

Sec. 9
79.11

Sec. 10
80.36

Sec. 11
2553.41

Sec. 12
2603.8

Sec. 18
2602.85

Sec. 17
80.10

Sec. 16
77.02

Sec. 15
2510.75

Sec. 14
2522.53

Sec. 19
2602.10

Sec. 20
79.27

Sec. 21
2553.17

Sec. 22
2553.17

Sec. 30

Sec. 29

Sec. 28

LAKE

State Law

Minnesota Statutes, Section 389.04 – Rules for Surveys:

“In subdividing townships, sections or parts of sections, as established by the United States survey thereof, and in restoring lost or obliterated government corners, the county surveyor shall follow the rules established by or pursuant to acts of congress, and all such surveys shall be made in strict conformity to the original survey made by the United States [emphasis added].”

County Surveyor shall subdivide sections according to federal rules established by congress or federal rules pursuant to acts of congress.

- Rules established by acts of congress includes Title 43 U.S. Code 752.
- Rules pursuant to acts of congress includes rules in the BLM Manual of Surveying Instructions.

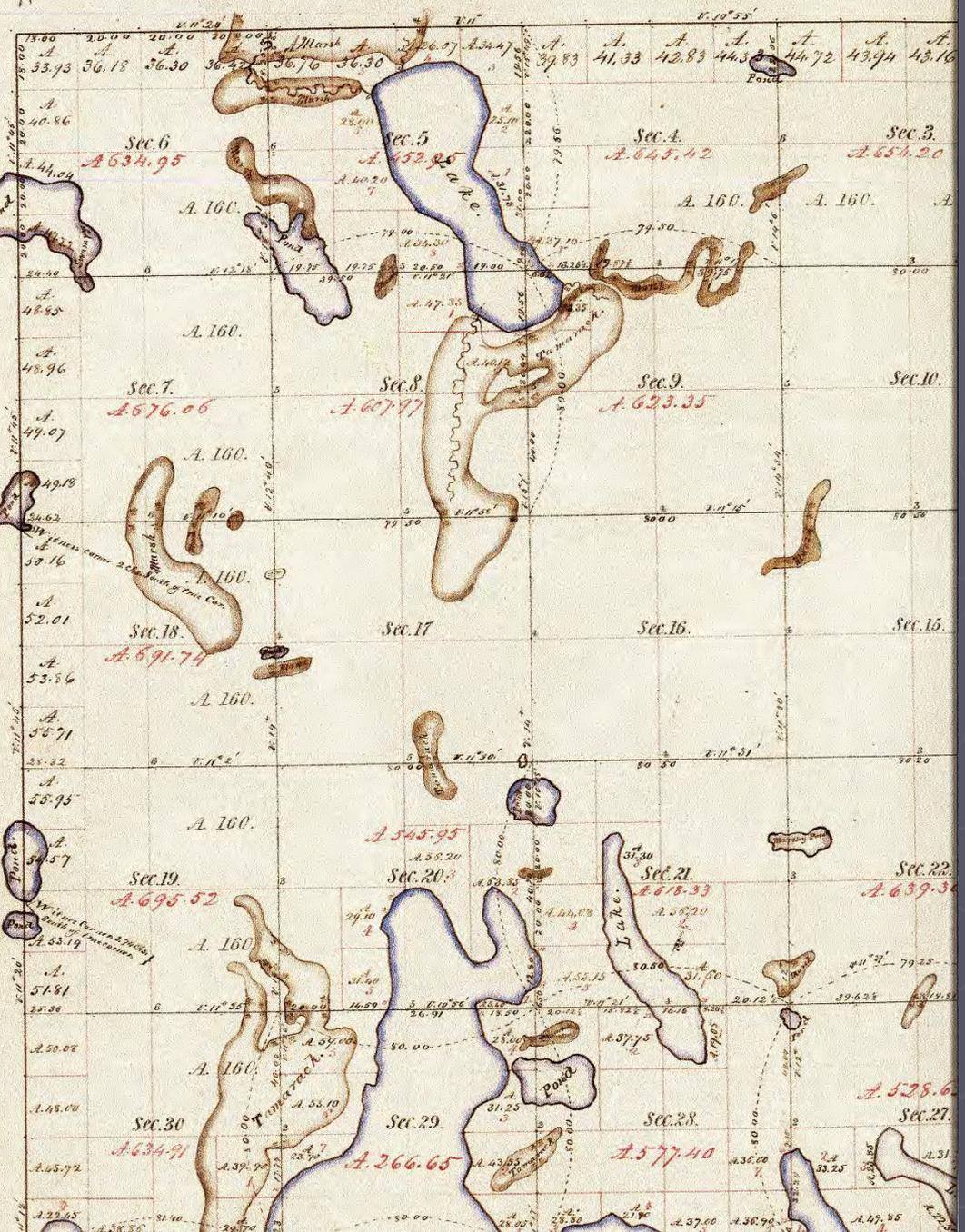
Statute gives the County Surveyor clear direction. It's only logical that the direction applies to all surveyors.

Minnesota Session Laws – 1875, Chapter 31 *Repealed in 1905*

Alternative method for establishing center of section

“In all sections on the northern or western boundary lines of townships, the surveyor, in making a subdivision of such sections, shall commence at the quarter section corner on the south or east boundary of the section, (as the case may be) and run a line to a point intersecting a direct line running from the quarter section corners east and west [or north and south as the case may be], at a point equi-distant from the said quarter section corners, and at said point of intersection he shall establish a post for a common center.”

- Law applied to sections on the western and northern tiers of townships.
- In affect for 30 years – repealed in 1905.
- Minnesota Supreme Court, 1890 – Chan v Brandt found it in conflict with rules established by congress and therefore inoperative. More on that later.
- Surveyors should be aware when retracing sections subdivided during that timeframe.





Minnesota Case Law

It has been stated and/or implied by some surveyors, authors and seminar speakers that in the four Minnesota Supreme Court cases listed below the court has ruled that computation of the mathematical center of section is required vs holding a found monument in all situations.

- Chan v Brandt. (1890)
- Beardsley v Crane. (1890)
- Moser v Doffner. (1910)
- Lunz v Sandmeier's Estate. (1927)

Lets briefly review the cases and the court rulings and see if they address the issue...



Chan v Brandt. December 17, 1890

- Case centers around the location of the east-west quarter line of a section.
- West quarter corner fell in a pond and PLS set witness north of the pond.
- Defendant Brandt favored a center based on the repealed 1875 session law.
- Court ruled the session law conflicts with acts of congress and is inoperative.
- Court reiterated the proper method for section subdivision in accordance with acts of congress.

This case did not rule on the question of a computed center of section vs a found monument set using proper methods. It simply reiterated the federal rules and found the session law inoperative.



Beardsley v Crane. April 5, 1893

- Case about the dividing line between parcels; fence vs deed description.
- Line in question is the east-west quarter line in a fractional section.
- Fence was built based on erroneous survey that was accepted by land owners.
- Correct location of quarter line became known but owners agreed to fence.
- Subsequent owner did not agree with fence and wanted deed description held.
- Court ruled that extrinsic facts or parol evidence (testimony) cannot change premises described with distinct and definite boundaries (not ambiguous).

Although this case is not about section subdivision, the courts decision includes a statement regarding the proper method for fractional section subdivision.

Again, this case did not rule on the question of a computed center of section vs a found monument set using proper methods. It simply reiterated the federal rules.

Moser v Doffner. March 11, 1910

- Case about dividing line between two Govt. Lots, also the E-W quarter line.
- Plaintiff believes quarter line should run from post at center to existing fence.
- Defendant believes quarter line should run from East quarter corner to west quarter corner restored based on a PLS witness.
- Court agreed with plaintiff and ruled that quarter line runs from Smith's post at the center of section to the east end of Wilhelm's fence by practical location.
- Two justices dissented, writing that the true east-west quarter line has been and can be located on a line between the east and west quarter corners.

Contrary to the assertion by some that Minnesota case law favors the mathematical intersection of quarter lines, the court actually held a monument (Smith's post) found in place at the center of section.

Lunz v Sandmeier's Estate. September 30, 1927

- Case is about compensation for a fence built on a line between two parcels.
- Line is the north-south quarter line of section 4 which closes short on town line.
- 1872, surveyor Clark set a stone 2240 feet south of North quarter corner which was used by landowners as the center of section.
- 1902, surveyor Gove set a monument 42 feet west of Clark's stone.
- Plaintiff (Lunz) built fence on line to Clark's 1872 stone.
- Court wrote: "The government does not establish the center of sections. The center is the intersection of straight lines". Again citing 43 U.S. Code.

The court made note of surveying errors and that although a monument was set in a "surveylike manner" there is no definitely located center of section. The court clearly called for the need for a monument that can be definitely located.

Court's statement that "government does not establish the center of sections" clearly discounts the "record corner" theory that we'll discuss later.

The court threw out improperly set monuments and reiterated 43 U.S. Code but once again, this case did not make a ruling on the question of a computed center of section vs a found monument that was set using proper methods.

Summary of the Minnesota Supreme Court

- Chan v Brandt (1890): Ruled that an 1875 statute for a short-cut to setting center of section was “inoperative,” and simply recited Title 43, U.S. Code and the rules of the land department as proper method for establishing a center.
- Beardsley v Crane (1893): Court reiterated the federal rules for surveying a quarter line in a fractional section.
- Moser v Doffner (1910): Held a post from a prior survey for center of section.
- Lunz v Sandmeier’s Estate (1927): Court stated that government does not establish centers of section and recited Title 43, U.S. Code for proper method for setting a monument at the center.

The Minnesota Supreme Court has reaffirmed the federal method for subdividing sections. That however should not be misconstrued as condemnation of a monument that was set using proper methods, but which is not at the precise mathematical intersection of quarter lines. **The Supreme Court has never heard a case regarding a monument set using proper methods vs a computed position.**



The Big Debate

Surveying and Mapping magazine, 1981 - 1984.

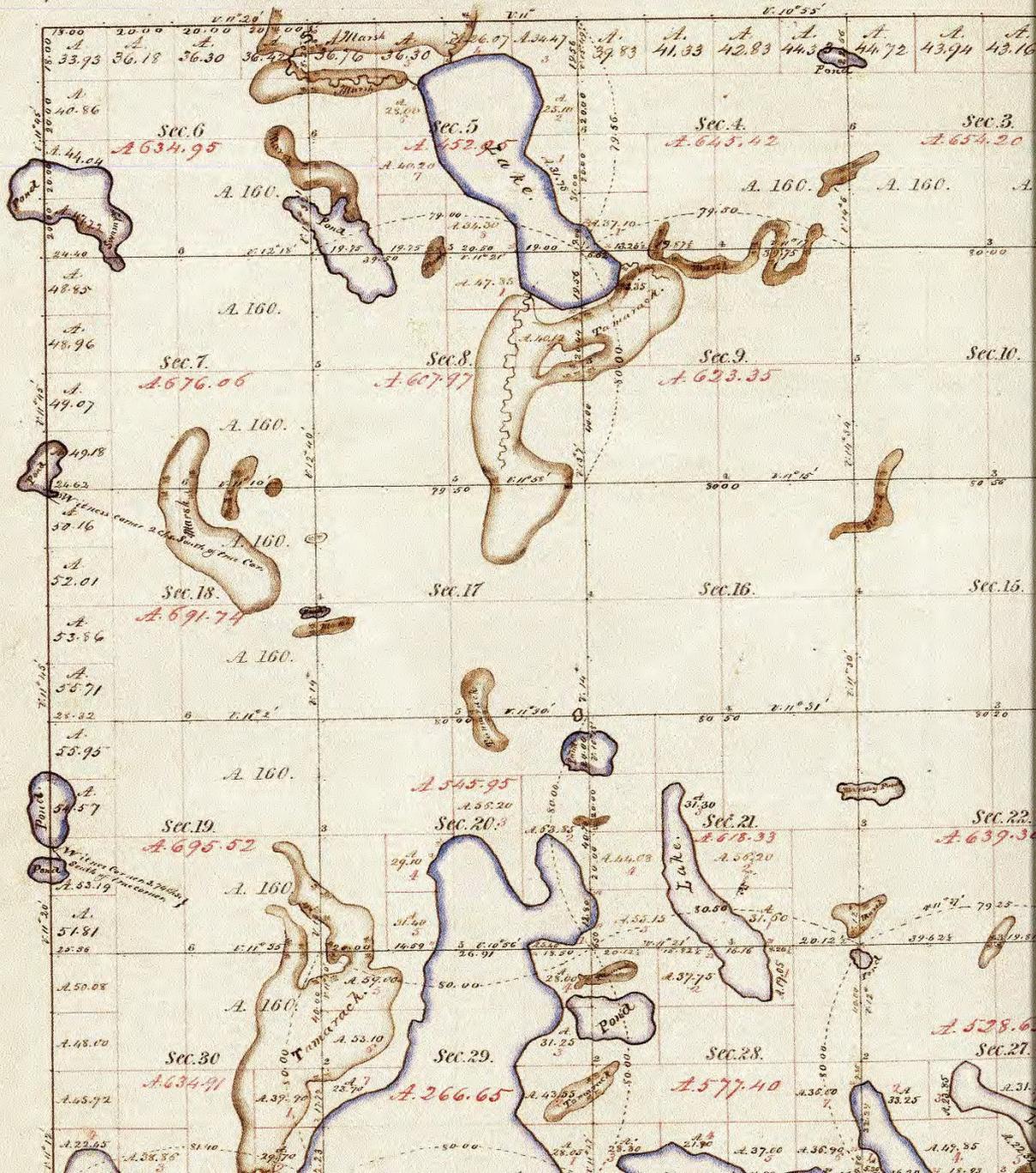
- John G. McEntyre, Ph.D., L.S., P.E., Professor at Purdue University
- Article started a debate over center of section.

McEntyre introduced the terms “record corners”, “record monuments” and “record lines”.

- Stated that for monuments and lines not set or marked in original survey, the points and lines drawn on the plat are “**record corners**”, “**record monuments**” and “**record lines**” and that their positions were fixed at the exact mathematical location of the points and lines on the plat.
- Stated that record corners, monuments and lines always hold over any other evidence, i.e. monuments set in the field.

McEntyre did not account for the fact that it was/is nearly impossible to survey and set those points to that theoretical degree of absolute precision (no error).

McEntyre refutes the concept of a retracement survey or following in the footsteps of the previous surveyor in regard to the center and other corners of aliquot parts.



The Big Debate (continued)

Numerous responses from other professionals offering rebuttal and commentary.

- PLS instructions did not specify who could or could not subdivide sections.
- No statutory recognition of “professional” surveyor until 1919 or later.
- Concept of tolerance was built in with “nearly as possible” language.
- Nearly impossible to lay out “record corners/monuments/lines”.
- Previous monuments in the ground are best evidence.
- No Act or rule that allows subdivision without surveying it on the ground.
- Can’t be “record” or theoretical corners if rules say “as nearly as possible”.
- Not capable of setting theoretical corner, therefore work is approximate.
- McEntyre’s opinions = difference between theory and common sense.
- Having multiple conflicting center positions are not in the public’s interest.
- Un-subdivided section – theory applies.
- Previously subdivided section – common sense applies, follow footsteps.
- A center that has been established by proper methods should be held.
- McEntyre’s points are opinion only, not supported by authority.
- Reasonable to assume that designers of PLSS intended subdivision to follow the same scheme as the framework, monuments controlling, etc.

The Big Debate (continued)

McEntyre made statements indicating that procedures described in the BLM Manual of Surveying Instructions support his opinions and stated:

“...surveys attempting to establish these [subdivision] corners must stand on their own merit and are subordinate to the original corners as established by the original plat.”

Subordinate to a dot of ink on a piece of paper... Really?

McEntyre stated that all aliquot corners are record monuments precise of location and *“Persons who foolishly argue otherwise fail to understand the true meaning of the survey...”*

He also stated: *“The brilliant and practical professionals who designed our public land procedures, and those who followed them and refined these procedures, were too knowledgeable and experienced to require that the lines between opposite quarter corners be determined by field surveying.”*

How then were the lines and corners supposed to be marked on the ground?



Manual of Surveying Instruction, Bureau of Land Management, 2009

BLM Manual was written for federal surveyors working on federal land and does not necessarily apply once land has been patented by the federal government but it is a valuable reference regarding federal instructions.

There were previous versions of the BLM Manual beginning in 1855 with the most recent version being the 2009 version.

Ambiguity surrounding interpretation of previous manuals (possibly McEntyre) so BLM created a section titled “**Subdivision of Sections by Local Surveyors**”.

BLM Manual gives clear direction as they pass the torch to local surveyors.

Section 3-132 states, “The work of the local surveyor usually includes the subdivision of the section into the legal subdivisions shown upon the approved plat. In this capacity, the local surveyor is performing a function contemplated by law.”



Manual of Surveying Instruction, Bureau of Land Management, 2009

Section 3-137 states, *"when [an owner] has bona fide rights as to location... to certain legal subdivisions, [they have] rights... to the identical ground location as represented by the same subdivision upon the official plat, controlled by monuments on the ground."*

Land owners have bona fide rights to the land controlled by survey monuments which are intended to represent the subdivision on the official plat.

Section 3-137 also states, *"In marking the corners of subdivisions-of-section, the surveyor shall... run and mark the section centerlines... Thus will be produced **in the field** the figure represented upon the plat, as nearly as possible [emphasis added]..."*

"run and mark... in the field" means a physical monument in the field.

"as nearly as possible" acknowledges that it won't be perfect.



Manual of Surveying Instruction, Bureau of Land Management, 2009

Section 3-137 also states, *The law presupposes the fact taught by experience that measurements of lands cannot be repeated with absolute precision and that the work of no two surveyors will exactly agree [emphasis added].*"

This statement:

- acknowledges the nature of land surveying
- promotes the acceptance of the found monument in lieu of multiple corner positions, i.e. "pin cushion"





Manual of Surveying Instruction, Bureau of Land Management, 2009

Section 3-137 continues, *"The governing law, 43 U.S.C. 752(2), states that 'boundary lines which have not been actually run and marked shall be ascertained, by running straight lines from the established corners to the opposite corresponding corners'. The protracted position of the legal subdivision corner on the survey plat is merely the first step in fixing the position of a corner. **The corner position is fixed by the running and marking of the lines** [emphasis added]."*

Reference to "protracted" lines and positions is from the instructions for draftsman drawing the township plats.

1973 BLM Manual had a section titled "Subdivision by Protraction" (for draftsman) and another section titled "Subdivision by Survey" (for field survey).

Some readers of earlier manuals have apparently confused the process of drafting the plats with actual surveying on the ground and have applied the drafting instructions to surveys on the ground.



Manual of Surveying Instruction, Bureau of Land Management, 2009

Section 3-137 also states, "A decision to set aside previously fixed local survey legal subdivision corners must be supported by evidence that goes beyond mere demonstration of technical error, reasonable discrepancies between former and newer measurement, and less than strict adherence to restoration and subdivision rules. The law gives these activities repose. . . . It is unlawful for the surveyor to impair bona fide rights."

Measurement differences are expected.

Prior survey work should be retraced and analyzed before being disregarded.



Discussion Points...

- PLSS created to dispose of land and provide landowners with boundaries.
- If Government intended that the precise mathematical intersection is the only correct position then the PLSS creators intentionally developed a system that was impossible to monument in the field.
- Boundary lines would be in constant state of flux with each new survey and technological improvement.
- Land owners would have to wait 100 - 175 years for technology to catch up.

Discussion Points (continued 1)

- Title 43, U.S. Code includes instructions for monumenting centers.
- Surveyor who first monuments the center according to the rules has complied with intent of Congress.
- Appears to be no reason, nor was it the intent of Congress to continue to apply the rules and repeatedly re-subdivide the section.
- McEntyre argues that legal centers are “record corners” created by the federal government and are “precise of location”.
- (1927) the Minnesota Supreme Court (Lunz v Sandmeier) government does not establish centers.
- McEntyre believed his theories were consistent with the BLM manual.
- 2009 BLM Manual contradicts McEntyre’s theories. Bob Dahl from the BLM stated: *“Thus, the final certain position of a protracted subdivision corner is that position which is marked in the field.”*



Discussion Points (continued 2)

- Developers of PLSS could not have anticipated current surveying technology.
- Intent was to lay out the corners and lines as accurately as possible using available technology. They would most likely laugh at the debate.
- Minnesota Supreme Court rulings took place between 1890 and 1927.
- Surveying technology was crude by today's standards.
- Asserting that court rulings support rejecting a properly set monument in favor of a mathematical position seems to be a stretch at best.
- Court would not prescribe a solution that was impossible to monument?
- Contrary is true. The courts stressed the importance of a properly located monument in the ground, not a computed position.
- Federal rules said how it should be done and courts reiterated. If surveyed correctly how can it be wrong if it's only off due to surveying precision?



Discussion Points (continued 3)

- Why would PLSS developers intend for exterior monuments to hold regardless of measurement error but not hold properly set center monuments?
- Why would the center of section be different than every other corner in land surveying where the original monument in the ground is king?
- Most surveyors agree (and the courts confirm) that original monuments hold for PLS corners and subdivision plat lot corners. Why then do we argue and make things up about centers of section or other subdivision corners?
- If center of section monuments can be disregarded in favor of mathematical intersections, since we now have the technology, why not re-compute the entire PLSS to the intended mathematical locations and move everybody's property corners and lines?
- Why not...? Because it's absurd.



Discussion Points (continued 4)

- McEntyre's theories would have made more sense if the Land Ordinance of 1785 would have been 1975 and if Title 43, U.S. Code and the Land Act of Feb. 11, 1805 would have been 175 years later.
- Electronic distance measurement devices (EDM's), small "computers" and coordinate geometry programs came into widespread use in 1970's.
- Advancements allowed surveyors to tie in multiple corners, create networks with modern day coordinates, perform mathematical computations, create line intersections, establish centers of section and subdivide sections.
- In McEntyre's defense, from 1970's forward, surveyors compute centers and no longer run lines.
- Just because we can compute centers does not mean we ignore existing evidence when performing a retracement survey.



Discussion Points (continued 5)

- In 1785, 1805 and the 1800's when PLS took place in Minnesota, surveying technology was crude.
- No simple task to create survey networks and compute section subdivisions based on known coordinates.
- Surveyors had to run and intersect the lines in the field and then monument the intersections.
- McEntyre's mathematical solution is an attempt to keep things structured but his argument falls apart when actual history is taken into consideration.
- Having one solution for every situation ignores the reality of the way things really were when the PLSS was created and the subsequent 175 years.
- McEntyre's methods work moving forward from the 1970's, but not during the first 175 years of the PLSS. What was really done in those first 175 years must be considered. "Follow the footsteps". McEntyre does not allow for that...

Conclusion

A stone monument set by a surveyor at the center of a regular section by intersecting the quarter lines with a compass and chain in 1884 (likely with offset lines and/or triangulation) is not suddenly wrong because modern technology now allows us to determine that it is not at the precise point of intersection of quarter lines. In this hypothetical example, the adjoining owners saw the stone monument set by proper methods, and they acknowledged the common corner of their shared boundary. Each owner knew what their deed said, and it all made sense. The stone monument at the center of section represented the original plat, marked their property boundary, and they all exercised their bona-fide rights. The law gives it repose.

The governing law, Title 43 U.S.C. states that *"boundary lines which have not been actually run and marked shall be ascertained, by running straight lines from the established corners to the opposite corresponding corners."* There is no reason to believe this isn't field work. The BLM Manual adds that "the protracted position of the legal subdivision corner on the survey plat is merely the first step in fixing the position of a corner. The corner position is fixed by the [local surveyor] running and marking of the lines."

Conclusion (continued)

Minnesota Statutes defer to the acts of congress, and federal law, regarding the center of section. Minnesota case law repeats the methods written in the U.S. Code. In *Moser v Doffner* (1910), the Minnesota Supreme Court ruled in favor of holding a post in place at the center of section. In *Lunz v Sandmeier* (1927), the court rejected 2 stone monuments near the center of section because the true center was not definitely located. Both cases reference the importance of the physical location of the corner on the ground. Knowledge of this *point on the ground* is what allows for order.

All that being said, there is no hard and fast rule for accepting a monument at the center of section. It is up to the licensed land surveyor to retrace prior surveys, analyze the evidence and exercise professional judgement on a case by case basis.

That's why our profession requires a license...

Questions and Discussion





Additional Questions or Comments:

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