

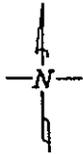
CERTIFICATE OF LOCATION OF GOVERNMENT CORNER

Witness Corner to the Meander Corner on the west shore of Milton Lake, common to Sections 2 and 11, Township 142 North, Range 26 West, of the Fifth Principal Meridian, Cass County, Minnesota.

December, 1997, Northern Lights Surveying and Mapping, Inc. set an aluminum rod with a stamped aluminum cap for a witness to the proportioned meander corner position measured between the section corner common to Sections 2, 3, 10, and 11, and a theoretical south quarter corner of Section 2, on the west shore of Milton Lake.

SKETCH OF REFERENCE TIES & EVIDENCE

T.142N., R.26W.

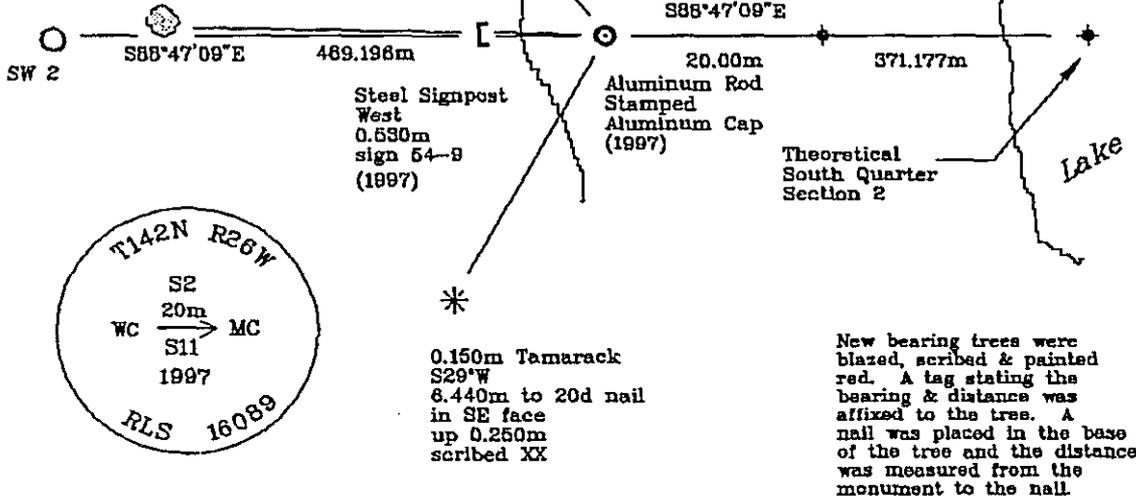


NOT TO SCALE

Bearings are Grid
North, Minnesota
Central Zone, measured
with a hand compass
adjusted to 3°
East declination.

0.100m Spruce
N38°W
4.830m to 20d nail
in SW face
up 0.250m
scribed XX
(1997)

0.130m Aspen
N88°W
20.536m to 20d nail
in South face
up 0.230m
scribed S2BT
(1997)



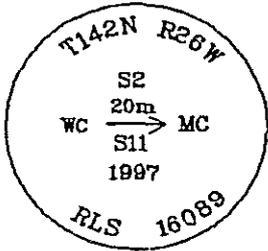
Steel Signpost
West
0.630m
sign 54-9
(1997)

Aluminum Rod
Stamped
Aluminum Cap
(1997)

Theoretical
South Quarter
Section 2

0.150m Tamarack
S29°W
6.440m to 20d nail
in SE face
up 0.250m
scribed XX

New bearing trees were
blazed, scribed & painted
red. A tag stating the
bearing & distance was
affixed to the tree. A
nail was placed in the base
of the tree and the distance
was measured from the
monument to the nail.



400503

Statement of evidence relative to this corner location is on the back of this page

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

LaVerne Leuelling 5-20-1998
LaVerne Leuelling Date

Registered Land Surveyor No. 16089
NORTHERN LIGHTS SURVEYING & MAPPING

OFFICE OF THE COUNTY RECORDER
County of Cass

I hereby certify that this document was filed in the Recorder's office.

Time: 2:00 P. M. Date: June 1st, 1998
Recorder Claudine Taylor

By K. J. [Signature] Deputy

DOCUMENT NO. 400503

Statement of Evidence

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Witness Corner to the Meander Corner on the west shore of Milton Lake, common to Sections 2 and 11, Township 142 North, Range 26 West, of the Fifth Principal Meridian, Cass County, Minnesota.

1871; General Land Office (G.L.O.) survey notes; Deputy Surveyor E.W. Griffin set a wooden post for the meander corner and referenced it with the following:

4" Tamarack (0.102m)	4" Tamarack (0.102m)
N08°E	S28°W
20 Links (4.023m)	13 Links (2.615m)

Said records are on file with the Secretary of State, St. Paul, Minnesota; copies of these records are on file with the Cass County Surveyor's Office, Walker, Minnesota.

June, 1979; United States Department of Agriculture-Forest Service (U.S.D.A.-F.S.) T.142N., R.26W. Field Book #2, p.60; U.S.D.A.-F.S. crew of Krause and Hayes searched a general area of a fence line extended from the west sixteenth area. They found many Tamarack logs under one foot of swamp grass at the edge of the lake, but no other evidence was found.

June 1987: LaVerne Leuelling of Northern Lights Surveying & Mapping made several trips to Milton Lake looking for evidence of the GLO or subsequent surveys. As with Krause & Hayes, a line of metal fence posts was found extending out to the western edge of the 150' floating mat on the west shore of Milton Lake. None of the numerous logs that were investigated produced any scribing or squared posts. The fence line extended only to the west edge of the driveway and did not seem to indicate an old occupation line along the section line. Photos from the late 1930s indicated that the shore of the lake could vacillate by the full 150 feet taken up by the floating mat.

July 18, 1987; Northern Lights Surveying and Mapping, Inc. crew of Smith, Foster, and Gerving set a 1.219m long, 0.051m diameter galvanized steel pipe with a 0.083m diameter stamped brass cap for the meander corner, at the proportioned meander corner position measured between the section corner common to Sections 2, 3, 10, and 11, and the meander corner on the east shore of Milton Lake common to Sections 2 and 11, 0.152m below the grade of a road. The crew established the following references:

0.254m Oak	0.285m Oak	0.119 Maple
N78°W	N51°W	S37°W
11.510m to 20d nail	15.456m to 20d nail	11.144m to 20d nail
in south face	in NE face	in west face
up 0.250m	up 0.280m	up 0.270m
scribed S2BT	scribed S2BT	scribed S11BT

Note: Subsequent calculation determined a different position for this meander corner. The above monument and ties were left as a Point-on-Line (P.O.L.)

Northern Lights Surveying and Mapping, Inc. Slater Township Field Book #3, p.49.

December 11, 1987; Northern Lights Surveying and Mapping, Inc. crew of Foster and Carlson set an aluminum rod with a stamped aluminum cap for a witness to the proportioned meander corner position measured between the section corner common to Sections 2, 3, 10, and 11, and a theoretical south quarter corner of Section 2, on the west shore of Milton Lake.

The following references were established:

0.150m Tamarack	0.130m Aspen	0.100m Spruce	Steel Signpost
S29°W	N88°W	N38°W	West
8.440m to 20d nail	20.536m to 20d nail	4.830m to 20d nail	0.530m
in SE face	in South face	in SW face	sign 54-9
up 0.250m	up 0.230m	up 0.250m	
scribed XX	scribed S2BT	scribed XX	

Northern Lights Surveying and Mapping, Inc. Slater Township Field Book #4, p. 41.

Coordinates:

Cass County North

Northing = 67,500.192 meters
Easting = 173,413.491 meters

State Plane Coordinate System
Minnesota Central Zone
NAD 83

Northing = 337,494.564 meters
Easting = 823,541.097 meters

Latitude = 47°08'10.52984" North
Longitude = 93°56'22.89268" West

Statement of Evidence

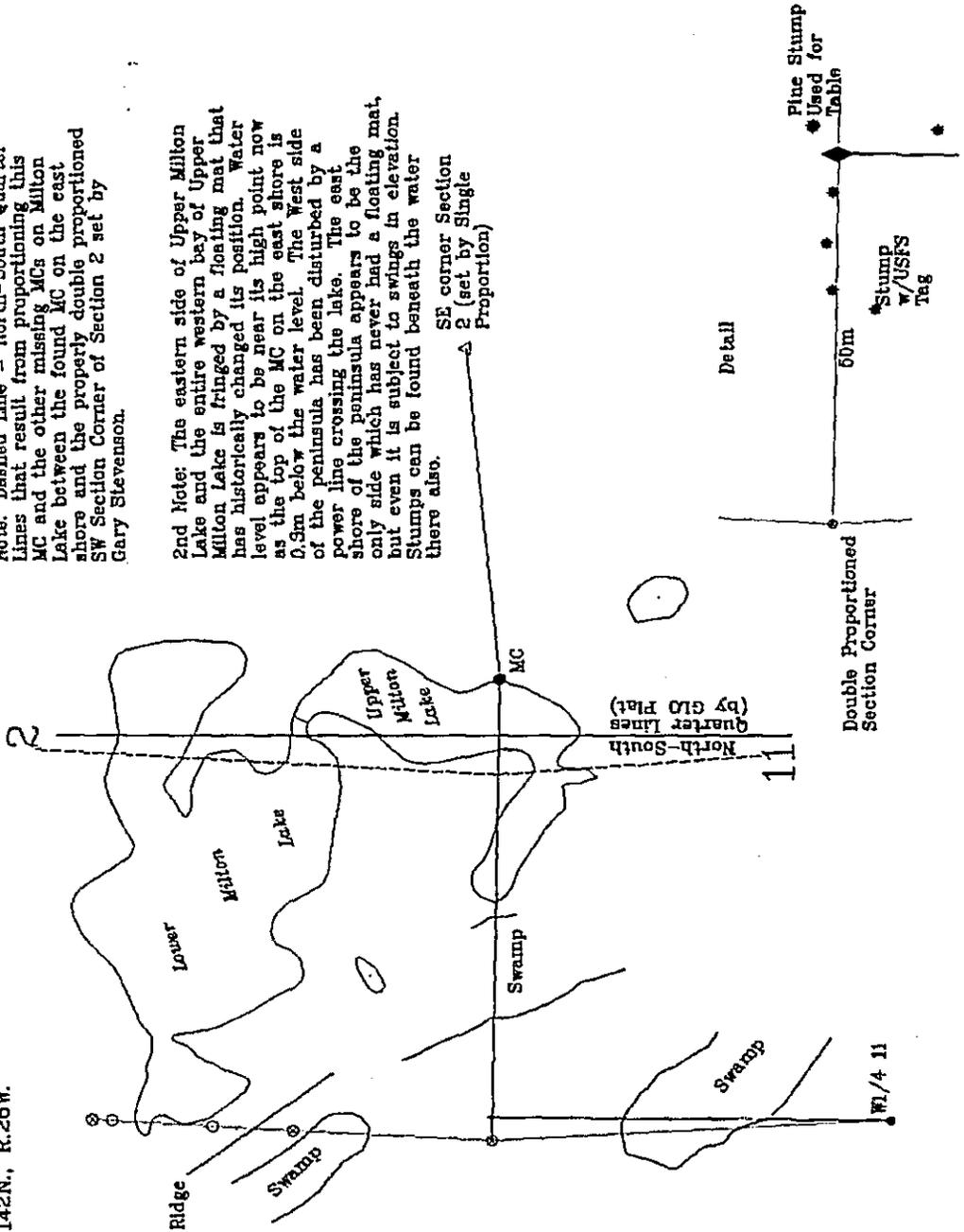
Witness Corner to the Meander Corner on the west shore of Milton Lake, common to Sections 2 and 11, Township 142 North, Range 26 West, of the Fifth Principal Meridian, Cass County, Minnesota

Note: Dashed line = North-South Quarter Lines that result from proportioning this MC and the other missing MCs on Milton Lake between the found MC on the east shore and the properly double proportioned SW Section Corner of Section 2 set by Gary Stevenson.

2nd Note: The eastern side of Upper Milton Lake and the entire western bay of Upper Milton Lake is fringed by a floating mat that has historically changed its position. Water level appears to be near its high point now as the top of the MC on the east shore is 0.9m below the water level. The West side of the peninsula has been disturbed by a power line crossing the lake. The east shore of the peninsula appears to be the only side which has never had a floating mat, but even it is subject to swings in elevation. Stumps can be found beneath the water there also.

SE corner Section 2 (set by Single Proportion)

Sketch of Sections 1, 2, 11, and 12 T.142N., R.26W.



Statement of Evidence

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Witness Corner to the Meander Corner on the west shore of Milton Lake, common to Sections 2 and 11, Township 142 North, Range 28 West, of the Fifth Principal Meridian, Cass County, Minnesota.

In 1987, Gary Stevenson set the corner common to sections 2, 3, 10, & 11 by double proportionate means. During 1997, while Northern Lights was attempting to locate the north-south quarter lines in sections 2 & 11, we had the opportunity to search again at this corner and to look for any evidence that we could find along the section line between 2 & 11. We especially focussed upon Milton Lake. The original GLO notes called for an 18" White Pine BT plus 3 Maple BTs at the section corner. When we found little evidence of pines in the vicinity of Mr. Stevenson's mathematical corner, we moved approximately 20 to 50 meters to the east where we found several along a westerly facing slope. We mapped 8 of these pine stumps, although none of them had any scribing or blazing as most were in bad shape and had been burnt. The most easterly of these stumps seemed to fit the GLO feature calls better than other locations, although there was nothing special about its appearance. The following table was prepared using that pine stump as if it were the original GLO BT.

Distances are from the southwest corner of section 2

	GLO	Stevenson	Stump Corner
Going East			
Swamp	12.60ch	13.4ch	11.0ch
Swamp	20.00ch	Disturbed by road	
West Shore	22.75ch	22.75ch	20.8ch
West Peninsula	33.00ch	33.7ch	31.2ch
East Peninsula	38.60ch	41.3ch	38.8ch
East Shore	60.60ch	48.7ch	48.2ch
(MC is in 5' of Water)			
Single Proportion			
SE Section 2	80.02ch	83.70ch	81.24ch
Going West			
Swamp	24.00ch	21.3ch	23.7ch
S1/4 3	40.00ch	23.7ch	41.05ch
Going South			
Swamp	8.5ch	11.7ch	12.9ch
Swamp	13.5ch	17.5ch	18.5ch
W1/4 11	South	S3°03'17"W	S0°25'38"W
	40.00ch	40.38ch	40.28ch
Going North			
Swamp	17.00ch	14.0ch	14.9ch
Birch Ridge	22.00ch	24.0ch	22.5ch
Lake	28.52ch	34.4ch	27.5ch
Lake	38.00ch	35.9ch	35.9ch
NW Section 2	N0°09'W	N3°20'E	N1°39'E
	82.50ch	83.12ch	83.06ch

Note: The mapping from which this table was made came for USDA, Forest Service Ortho-photos. The positional tolerance should be consider to be aroun 15 to 20 meters.

In the process of analyzing the section line between sections 2 & 11, it was obvious that using the MC on the east shore of Milton Lake to control the east-west position of the SE corner of section 2 was going to create an even larger kink than Stevenson had produced with his double proportioned SW corner of section 2. We therefore prepared the following table to see how close the GLO north-south lines were to cardinal directions. These measurements are made between corners that appear to be traceable to GLO evidence.

	SW 27--NW 3	SW 28--NW 2	SW 25--NW 1	SE 25--NE 1
GLO	402.72ch	402.30ch	402.18ch	400.00ch
Modern	N0°05'E 413.18ch	North 405.38ch	N0°04'E 402.86ch	N0°09'E 401.39ch
Measurement				

From the above, we conclude that the corners on the north & south town lines had a good longitudinal relationship to each other in the GLO survey, but we also conclude that the distances shown in the GLO notes are very suspect. Below are listed several corners with "good" histories and their relation to the above "cardinal" lines.

MC 27 28	0.23ch W	W1/4 28	0.28ch W	W1/4 25	1.91ch W	E1/4 25	0.82ch W
W1/4 15	0.44ch W	SW 23	0.55ch W	W1/4 24	2.56ch W	WCNE 24	1.88ch W
W1/4 10	2.20ch W	W1/4 23	1.18ch W	SW 13	3.47ch W		
SW 3	2.07ch W	SW 14	0.85ch W	MC 14 13	3.30ch W		
		MC 10 11	3.47ch W	MC 14 13	4.01ch W		
		W1/4 11	2.93ch W				
* Stevenson Position		SW 2*	4.90ch W				
Pine Stump Position		SW 2	2.45ch W				

Analysis

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Witness Corner to the Meander Corner on the west shore of Milton Lake, common to Sections 2 and 11, Township 142 North, Range 26 West, of the Fifth Principal Meridian, Cass County, Minnesota.

According to the General Land Office plat, there was no physical monument at the 1/4 corner common to sections 2 & 11. The midpoint of the line between sections 2 & 11, was shown as falling 1.53 chains to the east of the east side of the peninsula in Milton Lake. At the beginning of this survey, we inherited a certified Meander Corner on the east side of Milton Lake which had been set at the location of a recovered scribed post and inherited a double proportioned & certified corner at the corner common to sections 2,3,10 & 11. The Meander Corner was one of the four corners used to determine the location of the section corner. When we calculated the 3 missing MCs on Milton Lake and the 1/4 corner common to sections 2 & 11 using these 2 corners, it was quickly seen that the missing Meander Corners were as much as 80 meters from the shoreline. Worst still, the 1/4 corner fell on land. As a consequence, the north-south quarter line in both sections 2 & 11, were several degrees off of cardinal. In section 2, the use of this north-south quarter line resulted in a trespass onto federal land, although one would not have predicted this by looking at the GLO plat.

In trying to resolve this apparent inequity, we have reviewed the original notes for the entire township, have utilized historical aerial photography, utilized all modern survey measurements that we could reasonably tie into our coordinate system, and have made the usual field searches for evidence. We have also kept in mind that our authority as Registered Land Surveyors is limited and that we can not act in place of the courts or administrative authority. This is not to say that we are unwilling to push the limits of conventional methods of restoring missing GLO corners where collateral evidence is at variance with a mathematical solution and where such usage does not conflict with other recorded survey work.

Our conclusions regarding the line between sections 2 & 11 are not wholly satisfactory to us, but represent the full exercise of our authority. We have set the Southeast corner of section 2 by single proportionate measurement between the Northeast corner of section 2 and the Southeast corner of section 11 instead of by 3-way control. This was done because the usual method resulted in a position that did not agree with the GLO feature calls along 3 section lines. One can check Entry A11-1 of the "Public Lands Surveying, A Casebook" written by the Bureau of Land Management for an example of the same solution being used in exactly the same situation. We have accepted the double proportioned section corner at the Southwest corner of section 2 since we do not have sufficient ground evidence to say that it should not have been set "lost". The corner was set accurately using a standard survey methodology. Our "evidence" for another location is circumstantial.

We have, however, rejected the straight mathematical solution for re-establishing the missing meander corners on the section line common to Sections 2 and 11. Using Entry A4-2 of the aforementioned BLM case book as a general guide, we have placed the 1/4 corner back into the lake where the G.L.O. plat showed it and used it (instead of the existing M.C. on the east shore of Milton Lake), to proportion the missing meander corners. With Stevenson's section corners as the other controlling corners, the proportioned meander corners fell much closer to the existing shoreline of the lake. Indeed, the corners generally fell within one chain of the shoreline of Milton Lake instead of within three chains as would result from a classic proportioning. As Milton Lake is fringed by a floating mat and as it has historically fluctuated in size, one chain is smaller than the range on natural liability of the lake size. The resultant quarter corner position lay within two meters of its G.L.O. running notes position from the east shore (as determined by the earlier mentioned orthophoto position).

The exact methodology which we used is as follows. We determined a theoretical mean bearing for the north-south quarter lines in Sections 2 and 11. As the east line of both Sections 2 and 11 was a two-mile straight line, the north-south quarter line bearings were different solely because of the west lines of the two sections. In Section 2, an inverse was made from the northwest section corner to Stevenson's double-proportioned section corner. The resultant mean bearing was extended southerly from the existing north quarter of Section 2 until it theoretically intersected the south line of the section. In Section 11, the inverse from the Stevenson corner to the meander corner on Grave Lake was utilized to calculate the mean bearing of the north-south quarter line. That mean bearing was projected north from the existing south quarter of Section 11 to its intersection with the south line of Sections 2. The two intersection points were approximately 10 meters apart. The midpoint between the two theoretical positions was declared the quarter corner position.

The following is a detailed description of our reasoning. We hope that it sheds light on the issue. We found that Hayward and Griffin's work was quite erratic. The south and east town lines which were run by another survey seem to be performed to contract specifications and corners generally fell within 5 meters of their intended location. In contradistinction, the north town line appears quite crooked, with the northwest town corner being approximately 10 chains north of the northeast town corner despite the fact that the plat calls for the bearing of the town line to be S89°44'W. After comparing the most southerly known interior "good" corner to its counterpart on the north line, we have concluded that the longitudinal placement of the corners on the north town line were correct and that theoretically the north-south alignment of the township should be considered "good". We did notice a tendency of the corners on north-south section lines to fall west of the alignment determined by the town corners, with the greatest magnitude falling in the second tier of sections from the north. The north-south distances are very suspect, with some north-south columns differing by up to 10 chains from the record. Individual differences of approximately 5 chains are apparent between adjacent corners such as is the case between the 1/4 corner common to sections 23 and 24 and the meander corner on the north shore of Wilson Lake.

Analysis

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Witness Corner to the Meander Corner on the west shore of Milton Lake, common to Sections 2 and 11, Township 142 North, Range 26 West, of the Fifth Principal Meridian, Cass County, Minnesota.

In subdividing T.142N., R.26W., the G.L.O. deputy surveyor reported an unusually high number of stubbed lines to lakes. Even where the distances across lakes were made, it was usually by poorly constructed triangulation or by meander line connections. In a couple of occasions, they stated that they ran across the ice, but they didn't take advantage of this very often. East-west section lines appear to have problems in both alignment and distance.

Having given the negatives about Hayward and Griffin, we should be fair and state that their line notes were complete and indicate that they traversed along every line. Due to the fact that most of the lakes are fringed by floating mats and to the general nature of the surveys, the calls were probably accurate to the nearest chain, but they do give a good idea as to where they passed.

After looking at the information and numbers we concluded that they probably divided the work and one surveyed from the north while the other worked from the south. As they moved away from their respective town line, it appears that they both drifted to the west as they approached the center of the job. Because the north town line was sloppily run, and because they didn't check between each other across Graves Lake or Wilson Lake (and probably other lakes as well), the north-south discrepancy was not discovered. Because of these problems, proportioning is dangerous in this township.

In our corner research efforts, we used the above analysis and found stumps of the correct vintage, species, and size at the southwest corner of section 2, the east quarter of section 11 and the southeast corner of section 11. In each case, these (if accepted as a G.L.O. bearing tree), produced corners which fit collateral evidence better than proportioned corners. In the case of the east quarter of section 11 and the southeast corner of section 11, they produced a "good" match of the distance between the two corners. Unfortunately, because of the overall distance problems, it resulted in a very short distance between the east quarter of section 11 and the northeast corner of section 11. Since these stumps could not be proven to be G.L.O. (or from subsequent surveys), and since they were distorting in the aggregate, we rejected them.

At the southwest corner of section 2, we liked the location of one pine stump and the one lying approximately 10 meters south of it. It produced a good check on swamp calls in four directions and matched the distances to two of the four shoreline intersections in Upper Milton Lake. The fit was within 10 meters on the east shore of the peninsula (which is the most stable shore in the lake) and on the west side of the lake. From this analysis, we concluded that the distance across the east bay of Upper Milton Lake was poorly meandered in the G.L.O. survey. It was reported as being five chains longer than the measured distance between the east shore of the peninsula and the found post at the east meander corner.

This one error of five chains would have resulted in an easterly shift in the proportioned position of the southwest corner of section two of approximately 50 meters, and would have moved the quarter corner common to sections 2 and 11 into the water where the G.L.O. plat shows it. The other possibility is that the found post is not an original G.L.O. survey monument, but that it was set in the 1890's or 1930's by someone else. Alternatively, it could have been an original G.L.O. monument which had come loose from its moorings. At any rate, the corner now sits in four feet of water, while other shorelines appear to be roughly where they were at the time of the 1872 survey.

We believe that some sort of error, approximately five chains in length, exists in the east bay of Milton Lake, and furthermore believe that the error was incorporated into the proportioned corner at the southwest of Section 2. Our positioning of the theoretical quarter corner and meander corners equitably accounts for this error and supports the original survey plat subdivisions.