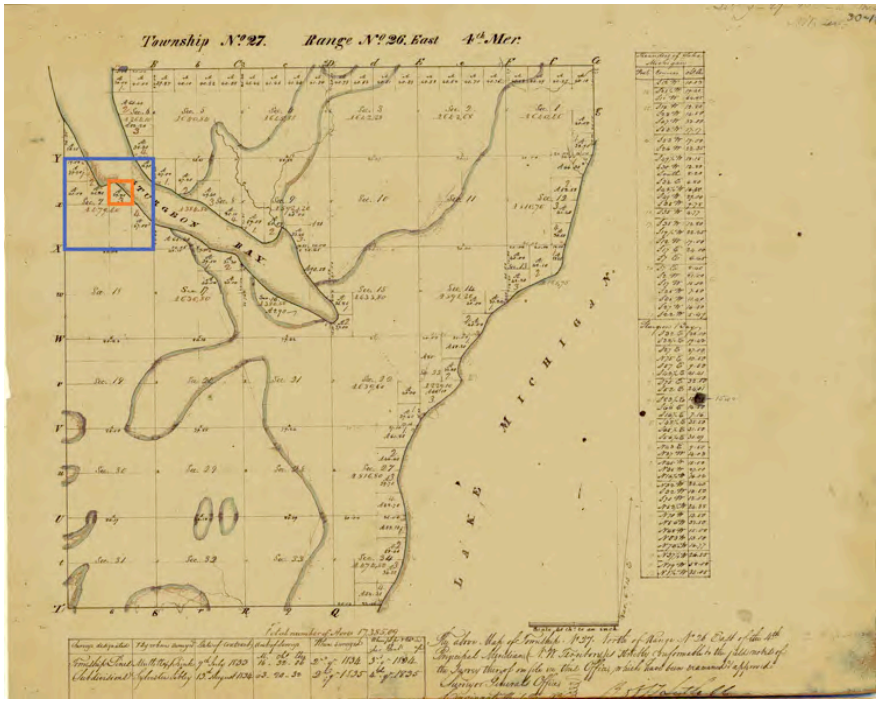
Thank you for the opportunity to speak today.

My name is Laurel Hauser. I represent the 7th Ward of Sturgeon Bay on the City Council and I am a member of the Sturgeon Bay Waterfront Redevelopment Authority.

I would like to provide testimony about the Government Land Office Survey also called the Public Land Survey, and its record of this area from the original survey done in April and May of 1835 by Sylvester Sibley. I will provide information regarding its relevance to determining the Ordinary High Water Mark.



Parcel 92 is located within government lot 3 (shown as the small orange square) within Section 7 (the blue square) of Township 27North Range 26East.

The GLO Survey offers some important information for your consideration. Specifically, **first**, that the subject area was not a swamp at the time and an OHWM can be firmly delineated; and **second**, the GLO Survey offers an easily defined and located meander line which is an approximation of the shoreline in 1835, but it is not as appropriate as later, more precise local surveys showing the shoreline such as the 1873 and 1888 Bay View Plats.

The GLO survey is normally consulted by the DNR when setting an Ordinary High Water Mark.

It was consulted by then DNR employee Heidi Kennedy, Waterway and Wetland Policy Coordinator, when she performed her work to establish an Ordinary High Water Mark Concurrence on the adjacent parcel 100.

She said in her testimony that the DNR looked at the original government survey and that the DNR reviews all available source for historical maps or documents of a site to determine where the shoreline was or used to be.

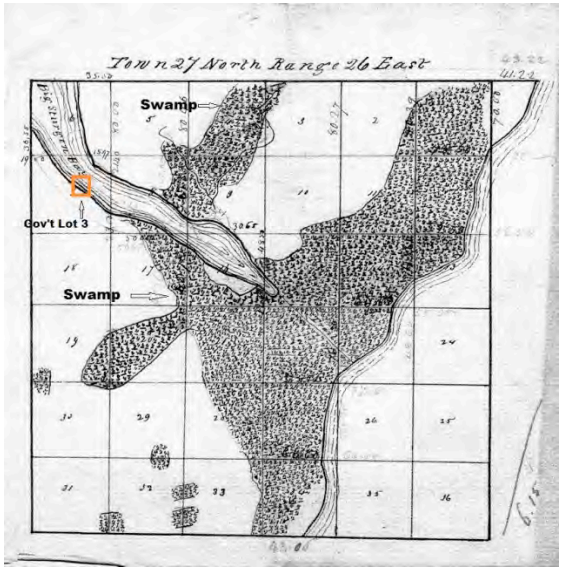
Q Okay. Do you recall whether you looked at the original U.S. Government Land Survey, the Sibley survey, we call it?
A Oh, yes, we did look at the original government survey.
Q Okay. And do you recall specifically for what purpose you would have reviewed that document?
A We review all available sources for historical maps or documents of a site to determine where the shoreline was or used to be.

Parcel 92 is located within government lot 3 (shown as the small orange square) within Section 7 of Township 27North Range 26East.

At the time of the GLO Survey, specific written instructions were provided to surveyors. United States Deputy Surveyor William Burt was specific in his instructions that field surveyors should provide notes on all prairies, swamps and marshes *(from Landscape Ecology vol. 11 no. 6 pp 363-381 (1996), p. 381)*. One of the prime purposes of the GLO Survey was to enable sale of the land. The character of the land is important to a prospective buyer.

Sylvester Sibley, the surveyor, notes entering and leaving swamps elsewhere in this township, <u>but does ***not*** note swampland anywhere in Section 7</u>, the area where Parcel 92 is found.

UW Professor David Mladenoff, who has published extensively on the GLO Survey, says that “if [field] notes are consistent with the sketch maps, it’s another reason for greater confidence”.



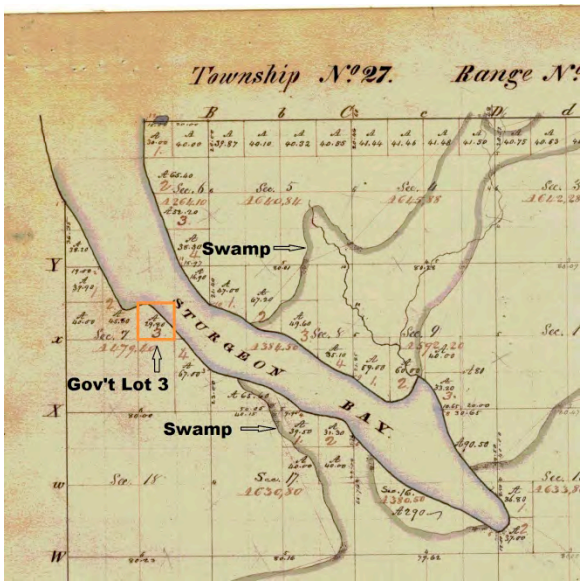
I will submit both Sibley’s sketch map and Sibley’s field notes showing no swamplands found in Section 7.

As a contrast, I will also submit Sibley’s field notes showing *other* Sections where swamps *are* found contacting Sturgeon Bay. The swamplands found in other sections are shown as shaded in this sketch map.

I will also submit Sibley's final survey of plat detail. Again, Parcel 92 is within government lot 3 (the orange square) within Section 7. The swamplands found in other sections, shaded in the sketch map, are shown in outline in this map.

The absence of swamps in Section 7 will be corroborated by another presentation discussing the U.S. War Department Engineers Lake Survey map of 1863.

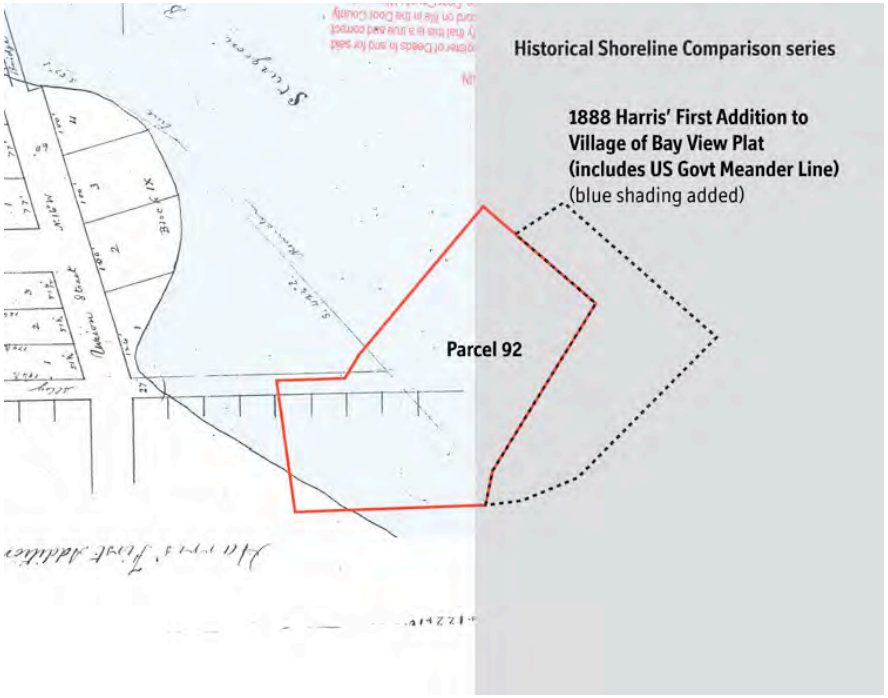
As you perform your duty to determine the Ordinary High Water Mark for Parcel 92, I think you can be confident that no swamps were in proximity to this parcel.



Sylvester Sibley's GLO Survey of this area contains an approximation of shoreline in 1835 using what is called a "meander line". The images show his notes of the compass bearing and length of this section of the meander as South 42.5 degrees East, and length 41.41 chains or 2,733.06 feet. The State Cartographer's website offers a description of the meander line: *"Whenever the surveyors encountered a lake or river of significant size along the section lines, they were to set a post at the shoreline. Once these meander posts were set on all the section lines that intersected the lake or river, the shoreline was surveyed by connecting the meander corners by tangential lines."*

When all the posts are set, the meander line results by connecting the collection of straight segments formed by the posts set at the water's edge. This creates a set of straight line segments, a zig-zag, that approximates the actual contour of the water's edge. This line can form a crude stand-in for a historic shoreline.

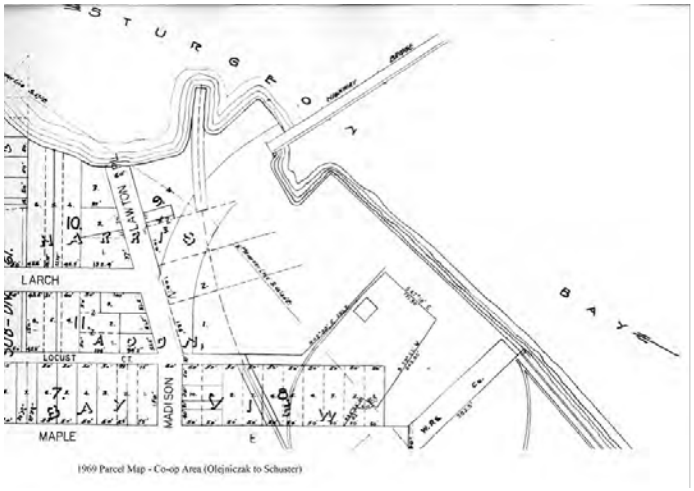
The meander line is shown on this 1888 Bay View plat - along with the mapped shoreline, more than 150 feet away.



Thankfully we have other, more precise historical representations of the Sturgeon Bay shoreline, such as the plat maps from 1873, 1885 and this one from 1888, which are local surveys which all map the shoreline itself. Details of these plat maps will be discussed by other speakers.

The Sibley Meander Line's metes and bounds can be located based on the perpetuation of survey corners over time and as replicated on plats and survey maps over time.

For example, it is perpetuated in this 1969 City plat.



Although the Meander Line can be located, it is an approximation of the shore at the time. Several later indicators of actual shoreline from plat maps, part of local plat surveys, are superior.

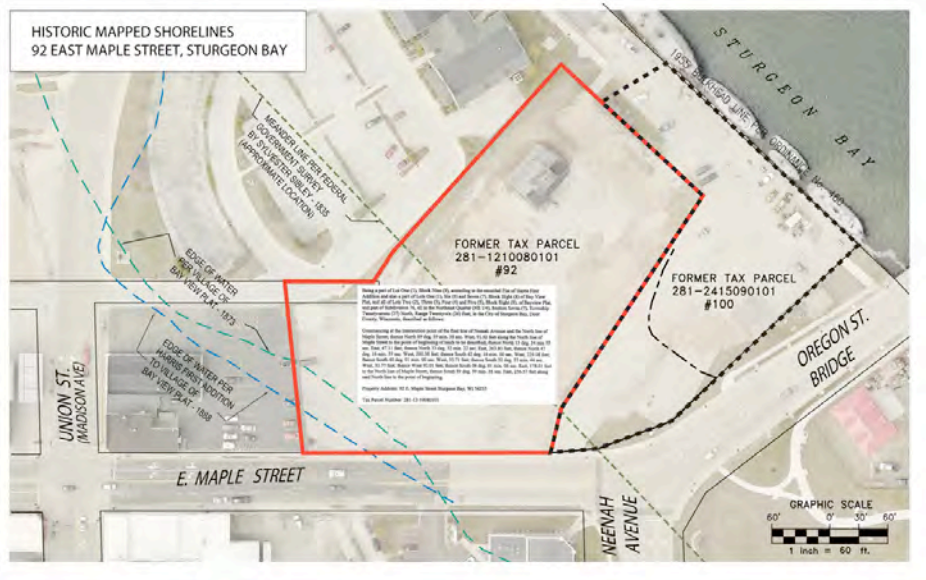
These actual shorelines, such as those mapped on the 1873 Bay View Plat and 1888 Harris' First Addition to Bay View Plat, are shown here together with the Meander Line in the context of a modern aerial photo and an outline of Parcel 92.

This map, based on Surveyor Don Chaput's map, shows that the actual historical shoreline was landward of the Meander Line in this area by more than 150 feet.

In conclusion, I have offered two data points relative to making an Ordinary High Water Mark determination.

First, based on the 1835 GLO Survey the subject area was not a swamp.

Second, based on the 1873 Bay View Plat and 1888 Harris's First Addition to Bay View Plat, the shoreline at Parcel 92 at the time of these maps

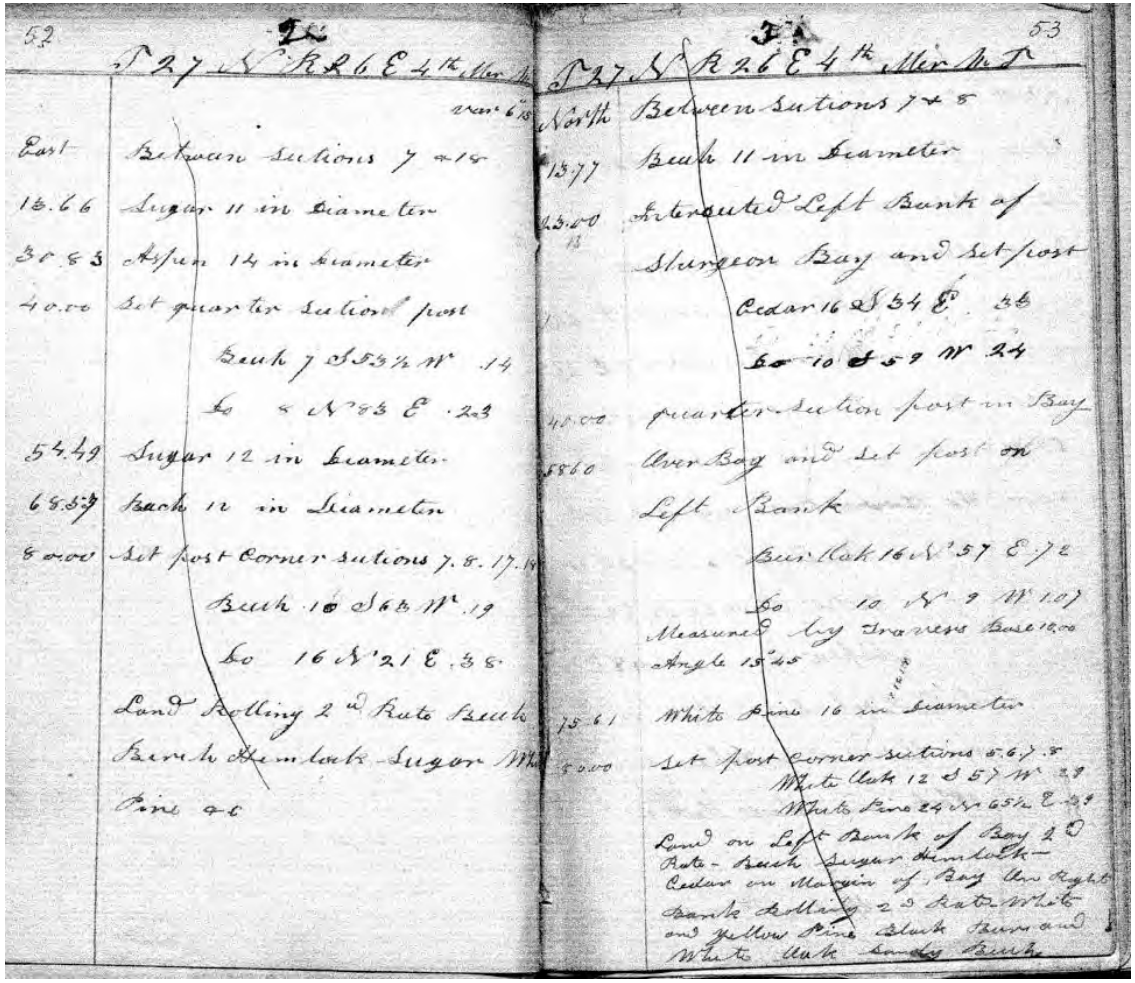


was landward of Sibley's Meander by more than 150 feet.

Thank you.

Sibley Maps and field notes source:
Content owner and sponsor
Wisconsin Board of Commissioners of Public Lands

Image map creation
Land Information and Computer Graphics Facility, UW-Madison



52

T 27 N R 26 E 4th Mer

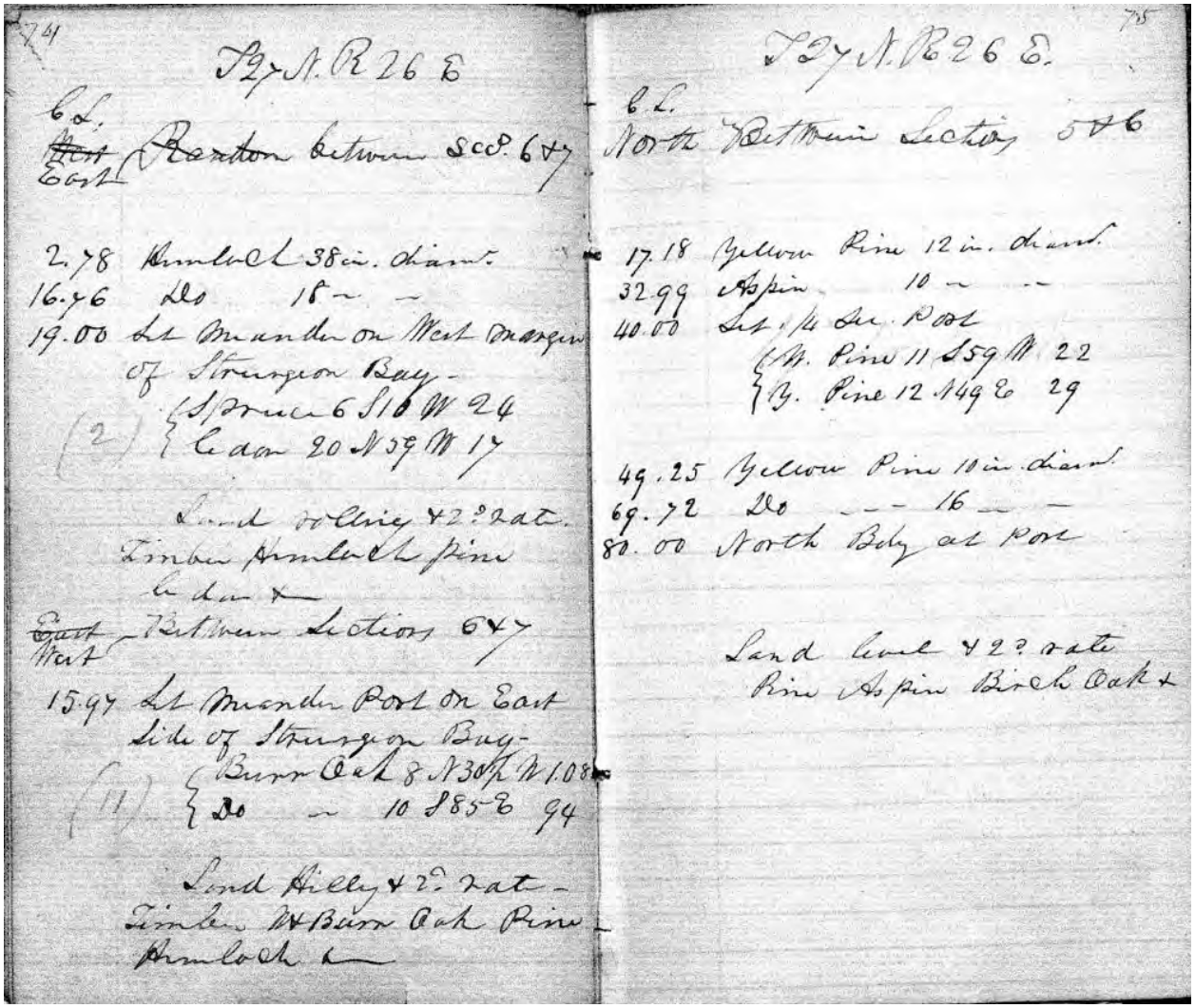
East
16.66 Sugar 11 in diameter
30.83 Aspen 14 in diameter
40.00 Set quarter section post
Beech 7 S 53½ W .14
do 4 N 83 E .23
54.49 Sugar 12 in diameter
68.89 Beech 12 in diameter
80.00 Set post corner sections 7. 8. 17. 18
Beech 10 S 66 W .19
do 16 N 21 E .38
Land Rolling 2nd Rate Beech Birch Hemlock Sugar Maple Pine &c

53

T 27 N R 26 E 4th Mer

North
13.77 Between sections 7 & 8
Beech 11 in diameter
43.00 Intersected Left Bank of Sturgeon Bay and set post
Cedar 16 S 34 E .36
do 10 S 59 W .24
40.00 quarter section post in Bay
58.60 Over Bay and set post on Left Bank
Bur Oak 16 N 57 E .72
do 10 N 9 W 1.07
Measured by Traverse Base 10.00
Angle 15°45
15.61 White Pine 16 in diameter
50.00 Set post corner sections 6. 7. 8
White Oak 12 S 57 W .29
White Pine 24 & 6½ E .39
Land on Left Bank of Bay 2d Rate - Beech Sugar Hemlock - Cedar on Margin of Bay On Right Bank Rolling 2d Rate White and Yellow Pine Black Birch and White Oak Sandy Loam

The parcel in question is located in Section 7.
No notations of Swamp between section 7 & section 18
No notation of Swamps between section 7 & section 8



T27 N. R26 E

6 L.
~~West~~ East Boundary between Secs. 6 & 7

2.78 Hemlock 38 in. diam.
16.76 do 18 " "
19.00 Lt Meander on West Margin of Sturgeon Bay -
(2) { Spruce 6 S 10 W 24
{ Cedar 20 N 39 W 17

Land rolling 2? rate.
Timber Hemlock Pine Cedar +
~~East~~ West Between Sections 6 & 7
15.97 Lt Meander Post on East Side of Sturgeon Bay -
(1) { Burr Oak 8 N 30 E 1.08
{ do " 10 S 85 E 94

Land Hilly 2? rate -
Timber Burr Oak Pine Hemlock +

735

T27 N. R26 E.

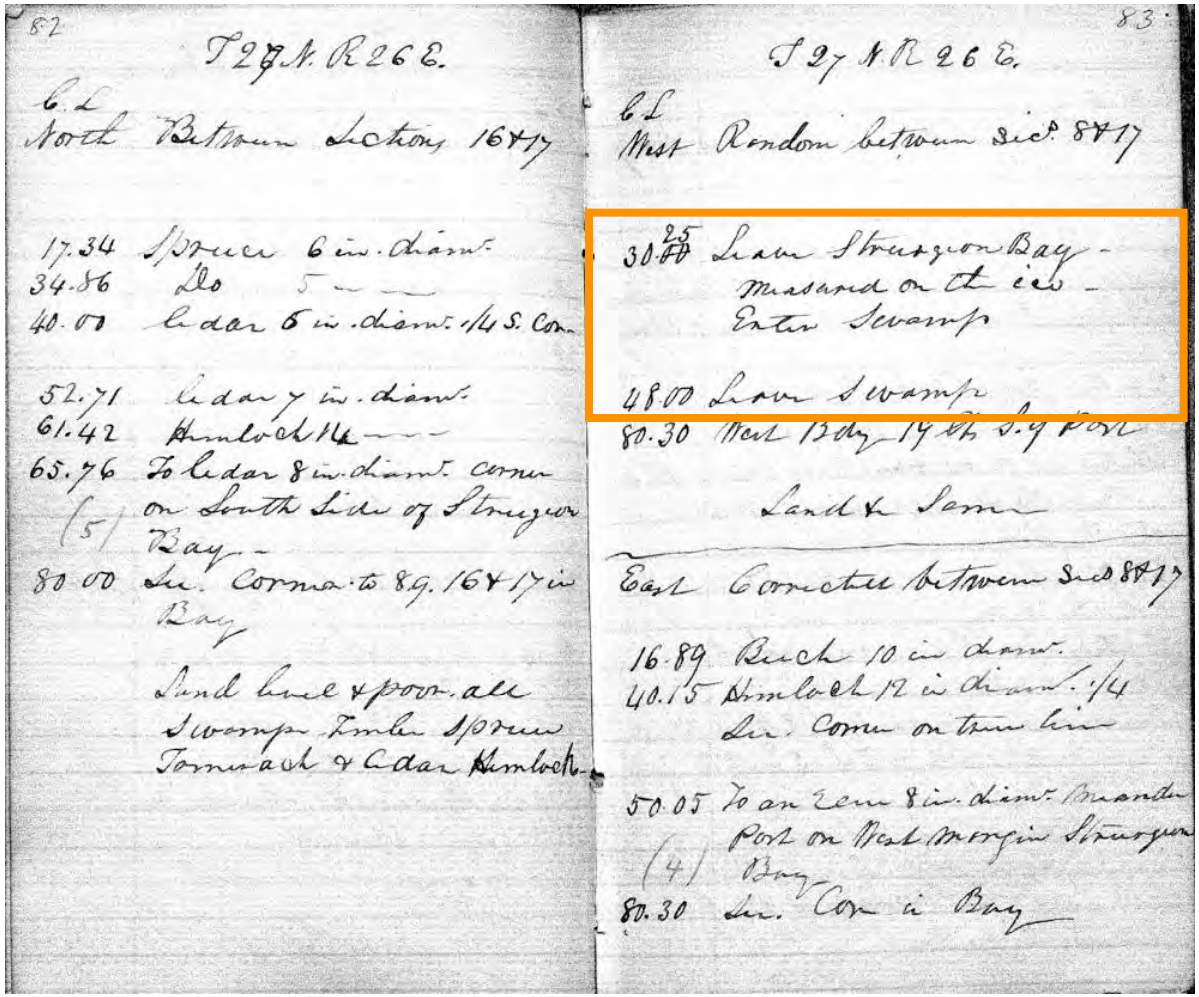
6 L.
North Between Sections 5 & 6

17.18 Yellow Pine 12 in. diam.
32.99 Aspin 10 " "
40.00 Lt 1/4 Sec. Post
{ W. Pine 11 S 59 W 22
{ Y. Pine 12 N 49 E 29

49.25 Yellow Pine 10 in. diam.
69.72 do " " 16 " "
80.00 North Bdy at Post

Land level 2? rate
Pine Aspin Birch Oak +

The parcel in question is located in Section 7.
No notation of Swamps between section 6 & section 7 (West segment, 19.00 chains)



82

T27N. R26E.

6 L
North Between Sections 16 & 17

17.34 Spruce 6 in. diam.
34.86 Do 5 — —
40.00 Cedar 6 in. diam. 1/4 S. Cor.

52.71 Cedar 7 in. diam.
61.42 Hemlock 14 — —
65.76 To Cedar 8 in. diam. Corner
(5) on South Side of Sturgeon
Bay —
80.00 Sec. Corner to Sec. 16 & 17 in
Bay

Sand level & poor. all
Swamp Timber Spruce
Tamarack & Cedar Hemlock

83

T27N R26E.

6 L
West Random between Sec. 8 & 17

30.25 Leave Sturgeon Bay —
Marsh on the ice —
Enter Swamp

48.00 Leave Swamp
80.30 West Bdy 14 lks S. of Post

Land & Some

East Connected between Sec 8 & 17

16.89 Birch 10 in diam.
40.15 Hemlock 12 in diam. 1/4
Sec. Corner on true line

50.05 To an Elm 8 in. diam. Meander
Post on West Margin Sturgeon
(4) Bay
80.30 Sec. Cor in Bay

In ***contrast*** from another part of Sturgeon Bay:
Swamp lands on the Bay as indicated between Section 8 and Section 17.

Parcel 92 is located in Section 7, where *no* swamps are indicated.

Appendix: Delcourt excerpt (Landscape Ecology vol. 11 no. 6 pp 363-381 (1996) p. 380) .

scape Ecology 8: 213–227.
Veatch, J.O. 1953. Soil Map of Michigan. Michigan State College Press, East Lansing, Michigan.
Veatch, J.O. 1959. Presettlement Forest Map of Michigan. Michigan Department of Resource Development, Michigan State University, East Lansing, Michigan.
White, C.A. 1983. A History of the Rectangular Survey System (Second Printing, 1991). United States Department of the Interior, Bureau of Land Management, Washington, D.C.
White, M.A. and Mladenoff, D.J. 1994. Old-growth forest landscape transitions from pre-European settlement to present. Landscape Ecology 9: 191–205.
Whitford, H.N. 1901. The genetic development of the forests of northern Michigan: a study in physiographic ecology. Botanical Gazette 31: 289–325.
Whitney, G.G. 1986. Relation of Michigan's presettlement pine forests to substrate and disturbance history. Ecology 67: 1548–1559.
Whitney, G.G. 1987. An ecological history of the Great Lakes Forest of Michigan. Journal of Ecology 75: 667–684.
Whitney, G.G. 1990. The history and status of the hemlock-hardwood forests of the Allegheny Plateau. Journal of Ecology 78: 443–458.
Whitney, G.G. 1995. From Coastal Wilderness to Fruited Plain: a History of Environmental Change in Temperate North America from 1500 to Present. Cambridge University Press, Cambridge.
Whitney, G., Ropack, S. and Outwater, C. 1995. Soil survey of Mackinac County, Michigan. U.S.D.A., Soil Conservation Service, U.S. Government Printing Office, Washington, D.C.
Williams, M. 1989. Americans and Their Forests, a Historical Geography. Cambridge University Press, Cambridge.

Appendix: Instructions to General Land Office Surveyors, A.D. 1833–1850

The following instructions, given to General Land Office Surveyors of the Michigan Territory that included the lands surveyed by Judge William A. Burt and his survey parties, are quoted from White (1983). These instructions provide insight about the spatial resolution of the surveys, accuracy of the plat maps, as well as selection of bearing, witness, and line trees used to document Township, Range, and Section lines and corners.

From his office in Cincinnati, Ohio, in 1833, Micajah T. Williams, Surveyor General of the United States, for the States of Ohio and Indiana, and the Territory of Michigan, published a document of "General Instructions To His Deputies". This is the set of detailed instructions used by William A. Burt during his first federal land surveys started in November, 1833.

Williams' instructions specified the blazing of four trees at section corners and at least two trees at quarter-section corners. No mention was made of surveyor preference of selection of available tree species, their presumed longevity or their diameter, only their physical proximity to the post set at each corner. However, the inscribing of bearing tree designations of letters and numbers on an ax blaze of the tree trunk would effectively require a minimum tree diameter of about 3 inches. These instructions state (White 1983, pp. 291–300):

"At all posts thus established for section or township corners, there shall be cut with a marking iron, on a bearing tree or some other tree, within each section, and as near as may be to the corner thereof [sic], *the number of such section: and over it the letter T, with the number of the township, and annexed thereto, the letter N or S as the township may be north or south of the Base Line; and above this, the letter R with the number of the Range, and annexed thereto, the letter E or W, as the range may lay east or west of the principal meridian; thus:*

R4E
T9N
36

The letters and numbers thus marked should be made in a regular chop, cut into such tree, and neatly squared off and faced, so as to be always readily distinguished from a mere blaze.

But at the quarter-section corners there are no numbers to be made: the [comer] *post is to be flattened on two opposite sides, and thus marked: '1-4S', to indicate that it is a quarter section post: and the nearest adjoining tree on each side of the sectional line, must be similarly marked."*

The survey teams were required to range widely in a belt transect, spanning the survey lines, and to map prominent geographic features such as lakes that lie completely within the interior of a section, not intersecting the regular line.

"All lines which you may survey, are to be marked in the following mannel; viz: all those trees which your line cuts, must have two notches made on each side of the tree, where the line cuts it; but no spot or blaze is to be made thereon. These are indifferently called 'station trees', 'line trees', or 'sight trees'. And all those trees on each side of the line, and within ten to fifteen links thereof [3.0 m, or 9.9 ft] *(or farther if the land should be thinly timbered) must be marked with two spots or blazes, diagonally or quartering towards the line; which blazing must be made so conspicuous, that the line may be readily found and traced."*

"... You are to enter in your Field Book, in a neat and distinct mannel; notes or minutes of the following objects:

1. The description, course and length of every line which you shall have run.

2. The name, and estimated diameters of all comer and bearing trees, and the courses [the direction or compass 'bearing'] *and distance of the bearing trees from their respective corners.*

3. The description of all mounds which you shall erect as corners in prairies, or places where there shall be no trees convenient for bearings.

4. The names and estimated diameters of all those trees which fall in your lines, called station or line trees, with their exact distances on the line.

5. The face of the country, whether level, rolling, broken, hilly, or mountainous.

6. The quality and character of the soil, and whether first, second, or third rate.

Delcourt excerpt (Landscape Ecology vol. 11 no. 6 pp 363-381 (1996) p. 381)

7. The several kinds of timber and undergrowth, with which the land may be covered, naming each kind of timber in the order in which it is most prevalent; and in prairie, the kind of grass or other herbage, which it produces.

8. All rivers, creeks and smaller streams of water, with their width, and the course they run where the lines of your survey intersect or cross them, and whether the current be rapid, sluggish, or otherwise ...

11. All lakes and ponds, with the description of banks surrounding them, and whether the water be deep or shallow, pure or stagnant.

12. The meanders of all lakes, navigable rivers, bayous, islands, and streams forming boundaries.

13. All prairies, swamps, and marshes

16. All towns and villages, Indian towns and wigwams, houses or cabins, fields or other improvements, sugar-tree groves, and sugar camps [for tapping maple syrup] ...

21. All travelled roads, and 'trails', with their courses, and denoting the places from, or to which they lead.

22. The tracks of tornados or hurricanes, commonly called 'windfall', or 'fallen timber', shewing the direction of the wind, as indicated by the fallen trees.

Wherever the section or township lines intersect lakes, streams of water, or islands, which are to be meandered [surveyed by offset lines], *posts are likewise to be established on the margin or banks thereof ... Should any lake or pond which you shall meander, be situated within any one section, so as not to be intersected by any of the lines thereof, you will run and measure a line very exactly, but without marking, from one of the corners, or one of the half mile posts, or other given point on one of the lines of said section, to the point on the margin of the lake at which you shall commence the meanders thereof. The true location of such lakes is necessary, in order to calculate the contents of the subdivisions of such sections."*

From his office in St. Louis, Missouri, on January 9, 1834, Elias T. Langham, U.S. Surveyor General of Illinois and Missouri, sent a written set of "General Instructions to Deputy Surveyors". These mandates differed regionally in methods for how bearing trees were to be selected (White 1983, pp. 301–312). This 1834 document mentioned that:

"you wil ascertain and state in your field notes, the course and distance from the several Section and Township corner posts, trees, and stones, to a tree in each Section for which they stand [witness] *as a corner ... Quarter-Section corners will be perpetuated by a post ... from which you will state in your field notes the course and distance of two of the most suitable trees in two different quarter-Sections for which you are establishing the corner ..."*

Further explanation of "suitable trees" was offered by William Pelham, Surveyor General of Arkansas at Little Rock. In the "General Instructions to Deputy Surveyors", published in 1843 (White 1983, page 333), Pelham admonished that:

"You will select for bearing trees those which are the soundest and most thrifty in appearance, and of the size and kinds of trees which experience teaches will be the most permanent and lasting."

In a letter dated July 14, 1849, from Detroit, Michigan, Surveyor General Lucius Lyon wrote to Guy H. Carleton, Deputy Surveyor, preparing to subdivide Townships 42 to 45 North of Ranges 12 and 13 West in Michigan's Upper Peninsula. Lyon noted (White 1983, page 357) that the General Instructions from his office were out of print. Carleton was referred to the May 28, 1846 set of printed instructions from the Surveyor General's Office at DuBuque. In all cases, Lyon wrote, there were to be at least two bearing trees noted at every corner. The 1846 surveyor document for Wisconsin and Iowa stated (White 1983, pages 341–343):

"Trees, employed either for the purpose of bearing or witness trees, are to be alive and healthy and not less than five inches [12.7 cm] *in diameter ... In subdividing any one township, you are to meander as hereinafter directed, any lake or lakes, pond or ponds, lying entirely within the boundaries thereof, of the area of forty acres* [16.2 ha] *and upwards, and which cannot be drained and are not likely to fill up, or from any cause to become dry."*

In 1850, Charles Noble, then Surveyor General for the States of Ohio, Indiana and Michigan, published from his Detroit, Michigan, office a 117-page document, listing "General Instructions to Deputy Surveyors", providing the contractual framework for the township subdivision of sections in the study area conducted by John A. Burt (William A. Burt's son) and William Ives in 1849–1850. Noble's 1850 instructions required the use of the survey instrument of "Burt's Improved Solar Compass", with measurements made without the use of the magnetic-needle compass (White 1983, page 361):

"At all township corners, and at all section corners on range, or township lines, four bearing trees are to be marked ..., one within each of the adjoining sections ..."

For the two bearing trees as quarter-Section corners,

"the nearest adjoining tree on each side of the sectional line, must be similarly marked."

The letters and numbers for Range, Township, and Section (White 1983, page 365)

"must be neatly and very distinctly cut into the wood of such tree with a good marking tool, the bark thereof having been first hewn or peeled off from a spot on the side facing the corner, large enough for that purpose, unless the tree be a beach [beech], *in which case its bark, if smooth, may remain on."*

The Field Notes were to include (White 1983, page 370)

"The names and estimated diameters of at least one or two of those trees which fall in your lines, called station or line trees, with their exact distances on the line, between every two corners."