Meanders—What They Do

1-51 From early times, from 1804 at least, surveyors were directed to meander rivers so that the course of the navigable rivers could be shown and settlers would not have to pay for the river bed area. When the meander appeared on a tract of land bordering on a meandered river, the meander served to "close" the survey of the tract. (When a tract is "closed" it means that the perimeter can be mathematically checked for mistakes in measurement and that the area can be calculated.) From the plats of surveys returned for adjacent townships, the land office staff could begin to compile a map showing the main rivers.

An entryman who settled on a meandered tract would only find monuments on the river or lake where the section lines intersected the bank. The angle points on the meanders were not monumented but a table of the courses was required to appear on the township plats as early as 1831.

To the very early entryman, the meanders probably meant that they were the extent of his holdings. Since the meander courses were not marked on the ground, the entryman could well assume that the patent went to the bank of the water body wherever it happened to be. We will see that later court decisions confirmed that meaning, such that the entryman would get full title to the "water's edge" without any assumption on the settler's part.

Meanders—Manual Requirements Before 1902

1-52 Instructions from the office to the field surveyors concerning the meandering process were pretty sketchy. It is very possible that the process and techniques of meandering were expected to be part of the skills of a surveyor hired to do these public surveys and thus there was no perceived necessity for detailed instructions. After all, the meandering of rivers and lakes was practiced in England long before our country was founded—surveying was a skill brought over from the "Old Country" like shipbuilding and silversmithing.
In 1815, Edward Tiffin, Surveyor General of Ohio, issued instructions for meandering: "In meandering Rivers you will take the bearings according to the true meridian of the River and note the distance on any course when the River intersects the section lines, and the calculation of the contents of the fractions [fractional sections] are to be made by the tables of Difference of Latitude and Departure, and returned on your plats; but the quantity of contents of whole sections ..." Tiffin no doubt expected his deputy surveyors to understand how to do the work he defined.

In 1831 the Surveyors General received the following meandering instructions to be placed in the contracts for survey work: "The courses and distances of the meanders of navigable streams are to be truly delineated, and also represented by figures on the plat opposite the delineation, wherever it is practicable to do so; and where the same are too numerous to admit of their exhibition by figures on the plat, in that mode, the same are required to be exhibited in a detached tabular form, either on the face of the plat, or connected therewith, as may be found most expedient. The width of all water courses, rivers, creeks, &c., is to be represented in figures on the plat." And later on, "... All lakes or ponds of sufficient magnitude to justify such expense are to be meandered and platted agreeably to courses and distances, which are also to be exhibited by figures..."

In 1833 the instructions cleared up how the banks were to be named. Some previous instructions had required that cardinal directions from the main trend of rivers be used to describe the banks, such as the "northwest bank". The Instructions for Ohio, Indiana and Michigan stated that, "...the terms 'Right bank' or 'Left bank' will be used, in all cases, thus— suppose yourself standing at the head of the river, looking downstream; then that bank of the stream on your right hand is to be called and referred to in your field notes, as the 'Right bank' and that on your left hand as the 'Left bank.'"

Early instructions furnished no specific directions as to how the surveyor was to pick the point to place meander corners or angle points on the bank.

Early manuals required that nonnavigable rivers be meandered on only one bank. Any resulting confusion was cleared up by the 1890 Manual of Surveying Instructions which directed deputies to meander both banks of non-navigable streams greater than three chains in average width, in addition to navigable rivers.

Meanders—Manual Requirements After 1902

1-53 The U. S. Supreme Court Decision in Railroad v. Schurmeir (to be discussed later) was handed down in 1868. The Court defined "meanders" and their purpose in that decision. No federal Manual of Surveying Instructions quoted that Decision until the 1902 Manual was issued.
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Some uncertainty was dispelled by the additional statement in the 1902 Manual as follows: "The general rule is well set forth (10 Iowa 549) by saying that in a navigable stream, as in the Des Moines River in Iowa, high-water mark is the boundary line. When by action of the water the river bed changes, high-water mark changes and ownership of adjoining land changes with it. The location of the meander lines does not affect the question." [Emphasis added.]

As a general rule, meander lines do not define fixed ownership boundaries, although some exceptions will be discussed later.

The 1902 Manual quoted the Railroad v. Schurmeir decision as follows: "Meander lines are run in surveying fractional portions of the public lands bordering on navigable rivers, not as boundaries of the tract, but for the purpose of defining the sinuosities of the banks of the stream, and as the means of ascertaining the quantity of land in the fraction subject to sale, which is to paid for by the purchaser. In preparing the official plat from the field notes, the meander line is represented as the border line of the stream, and shows to a demonstration that the water-course, and not the meander line as actually run on the land, is the boundary."

The word "bank" was defined in the 1902 Manual by quoting another case (14 Penn. St. 59) as, "...a bank is defined as the continuous margin where vegetation ceases, and the shore is the sandy space between it and the low water mark." The bank definition is now known as the "ordinary high water mark."

Because the term meandering had been applied (in the 1800’s) to some irregular boundaries along the foot of unsurveyable mountainous land, the 1902 Manual also cleared up that point by stating that such an irregular line is really a strict, or fixed, boundary and not an ambulatory meander which follows a stream or lake shore.

The 1930 Manual echoed most of the language about meanders found in the 1902 Manual. It also added a definition of the ordinary high water mark except that the term "mean high water elevation" was used instead of ordinary high water mark. Subsequent papers written by Arthur Kidder, who prepared the 1930 Manual, state that no difference in terms was intended.

Most of the language from the 1930 Manual about meandering was carried forward into the 1947 and 1973 Manuals without substantial change in language or meaning.
Meanders—What Really Went On in the Field

1-54 For the most part nobody will ever know just what was done during those old meander surveys. The field notes and the location of the meander corners that can be found in their original position give us the best indication of how the work was done. Surveyors rarely wrote up a description of their methods in any detail other than the field notes, unfortunately.

Observations of what was reported and comparisons with the conditions found on the ground indicate that there were wide variations between different surveyors' treatment of meanders.

I have examined survey work done in the 1800's where the courses of the meanders were only one to three chains in length and followed the banks very closely, even through what must have been very thick brush. I have also tried to retrace meander lines where one or more courses, which were run at about the same time period, where the meanders were one-half mile in length and did not seem to fit anything imaginable on the ground. No doubt everything in between is possible.

Dates that various parts of the General Land Office surveys were conducted offer clues as to how the meandering was actually accomplished in the field. Some work was done in such a careful manner but in such a short time that it is difficult to understand how it was possible.

At the other extreme I have checked work done so rapidly and so poorly that bearings and distances were very probably guessed at and then adjusted to fit the meander corner locations. The adjustment could have been done graphically rather than by numerical computation. There have been accusations that the work was entirely made up in the office.

It is my personal opinion that distances were ordinarily obtained by pacing and the bearings obtained from magnetic compass readings. The field results of this type of work are believed to have been adjusted to fit the meander corners within the allowable tolerances. Use of stadia for measuring distances in open country is entirely within the realm of probability as well because it was an approved method at one time.

Placement of recovered meander corners gives us an excellent record of what the old time surveyors considered to be the banks of rivers. The usual position where meander corners are found is at the top of the slope leading down to the water's edge, sometimes hundreds of feet above the water.

Two possible reasons for this placement are apparent.
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1) Entrymen were interested in farm land and did not want to pay for anything they could not use. The General Land Office evidently agreed that settlers should not be required to pay for non-arable areas because the general policy was to promote the land sales. The slopes down to the river were considered useless for farming, therefore worthless—something a settler should not have to pay for.

2) Visibility from angle point to angle point along the tops of the banks is generally better than down in the brush along the actual margin of the water. If stadia methods were to be used for measuring distances, the added ease would confirm the choice.

Meanders— the Effect They Have Today

1-55 As we shall see later, the meander lines today are only a record of what conditions along the river or lake may have been at the time of the original survey. Usually the real boundary is where the ordinary high water mark is located at present—not at the surveyed meander line.

That position as shown by the original survey record is still useful and necessary in determination of amount of river movement and for the location of base lands for apportionment of accretions.

In a few situations the meander line has been held to be the actual boundary: Where fraud in the survey has been proven and in cases where large areas of upland have been omitted from the survey. These situations are special exceptions to the meander line as an ambulatory boundary and are not at all a common occurrence. They are covered in more detail in Chapter 7, Boundary Problems and Disputes.

CASE STUDY Follows

First National Bank of Decatur v. United States,
59 F.2d 367 (1932)

1-A.01 The First National Bank became owner of SW/4, NW/4 and E/2 SE/4 of section 33, T. 25 N., R. 10 E, 6th P.M., Nebraska which had been an Indian allotment. The land was near the Missouri River and mostly on very steep terrain. Section 33 is shown on the sketch made from the 1867 original survey.
This was a situation where land was not originally riparian but had been eroded by the river after the 1867 survey. By 1887 the river had restored the eroded land and the bank was claiming the accretions.

It is important to understand that before any survey is approved and filed there was no legal description of the land in existence. The sections at that location were actually created by the survey and filing process. We study this case because it illustrates that the original government surveys create the sections and boundaries, and do not merely identify them. It also shows that river movements that occurred before the survey have no effect on ownerships.

1-A.02 The bank claimed that about 20 years after the survey the Missouri River moved westward, up against the hills, until a part of its land had been washed away. Subsequently, and prior to 1896, the river changed again and moved eastward, returning approximately to its original location. When the river returned it left the topography nearly as it had been at the time of the 1867 original survey.

1-A.03 The bank claimed that when the river encroached on the land it became riparian and that, in the State of Nebraska, "Once riparian, always riparian" is the rule of decisions.

1-A.04 The selection of the allotment for these lands took place in 1900, about 33 years after the original survey.

1-A.05 The lower court found that:

"In the granting of the allotments aforesaid to individual members of the Omaha Tribe of Indians, the said allotments were made according to the said plat of 1867, and every trust patent and the fee patents issued thereafter
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Reduced portion of GLO Plat of 1929 resurvey and accretion survey.

respectively contained a description of the land allotted according to the subdivision [of the plat] and recited the number of acres disclosed in said survey."

1-A.06 The lower court also declared that the Indian titles could not be impaired by state legislation and that the bank only owned what the allotment stated (no accretions).

1-A.07 On appeal, this decision states that there was no need to look at whether Nebraska legislation controls.

The Appeals Court stated: "Title to the land was initiated when the individual Indian made selection of and filed upon his allotment. When the patent issued it related back to the inception of title and no farther."

Patents are defined in the next chapter. For now, consider a patent as a deed from the government granting title to land.

1-A.08 The appellate decision also states:
"At that time the lands selected, filed upon, and later patented to the allottee were not riparian lands, and they have never been riparian lands since the time of their selection by the allottee. What the character of these lands may have been, whether riparian or otherwise, prior to their selection and original entry by the allottees, is a closed book and cannot be inquired into. If this were not the rule owners might be divested of their property, and titles might be challenged and clouded by proof of geological and topographical changes and formations reaching back to antediluvian periods or prehistoric times...

"The patents of the lands to which defendant has title describe the lands allotted according to the subdivisions thereof so platted, and recite the number of acres...

"...The government survey creates and does not merely identify sections, subdivision, and boundaries, and this survey, the government plat, and the government patent are not open to challenge by collateral attack."

1-A.09 The important principles here are as follows:

1) From the time of the survey in 1867 until 1900 when the allotment was made, the government owned the land and owned the rights to accretions.

2) At the time of the selection the aliquot parts were not invaded by the river; the allottee received all the acreage he selected.

3) River changes prior to the original survey and prior to the first patent by the government have no effect on the titles.

4) Congress gave full authority to the Secretary of the Interior to make judgment calls on surveying the public lands and as to what lands are to be surveyed, for so long as the law is observed. Collateral attack would be an attempt to nullify the action of the Secretary in making the original survey that is not provided for by law.

1-A.10 This area is immediately upstream from the site of Wilson v. Omaha Indian Tribe, 442 U.S. 653, another important river litigation.
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United States v. Cowlishaw et al., 202 Fed 317 (1913)

1-B.01 This was a suit to quiet title to some lands that were claimed to be school lands held by the State of Oregon. This case helped to clarify the importance of the completion of surveys of the public lands. Filing the survey in the land office was to be of primary importance.

1-B.02 On achievement of statehood, Oregon was granted school lands by 11 Stat. 383 (the Enabling Act) in 1859 as follows:

"That sections numbered sixteen and thirty six in every township of public lands in said state, and where either of said sections, or any part thereof, has been sold or otherwise disposed of, other lands equivalent thereto, and as contiguous as may be, shall be granted to said state for the use of schools."

1-B.03 The lands in question were surveyed in the field and approved by the Surveyor General of Oregon on June 2, 1903. The plat and field notes were sent to Washington, D.C. for approval and the plat was accepted January 31, 1906. On November 16, 1907 the GLO Commissioner directed the Surveyor General to file the plat in the local land office.

1-B.04 In 1905 the area, including section 16 in T. 3 S., R. 6 E., Willamette Meridian, Oregon was temporarily withdrawn from disposal for forestry purposes. (A withdrawal is an administrative action that restricts the disposal of public lands.) The withdrawal was effected by an order dated December 16, 1905. The withdrawal was made permanent and finally effective on January 25, 1907 by Presidential Proclamation.

1-B.05 No law prevented the state from selling the lands. It was granted for school purposes. Accordingly, the State of Oregon gave deeds to some of the defendants on January 9, 1907.

1-B.06 The United States claimed the lands were part of a 1905 forest reserve.

1-B.07 The chronology is thus:

- **Jun. 2, 1903** Survey and approval by Surveyor General
- **Dec. 16, 1905** Temporary withdrawal for forestry purposes.
- **Jan. 31, 1906** Acceptance of the plat by the Commissioner.
- **Jan. 9, 1907** State gave deeds to defendants.
- **Jan. 25, 1907** Proclamation withdrawing lands for forest reserve.
- **Nov. 16, 1907** Plats filed in local land office.

1-B.08 The defendants claimed that their deed was issued in the regular course of business and relied on the Enabling Act and their deeds from the
state. The appeal concerns the wording of the Enabling Act as to the time the grant becomes effective.

1-B.09 The Court said that the words "shall be granted" look to the future. The ruling cited a similar Nevada case which turned on the point that if the grant took effect as soon as the surveys were complete, then Congress would be deprived of the power to grant any land until the school lands were all identified.

The next question was whether the survey in the field was sufficient to identify the land subject to the grant. The Court ruled that the Secretary of Interior was given the power to survey the public lands. Further, the Secretary had issued orders that Surveyors General were not to file plats in the land office until the plats were examined and approved.

1-B.10 Held: "Public lands are not to be deemed surveyed or identified until approval of the plat of the survey and filing thereof by direction of the Commissioner of the General Land Office."

There was no survey or proper identification at the time of the withdrawal from entry. The state's patents issued after the survey but prior to approval were not valid so Cowlishaw and others lost the suit. The state would be able to acquire other land to replace the areas withdrawn.

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**Whitaker v. McBride, 197 U.S. 511 (1905)**

1-C.01 This case further defined the powers of the government to survey lands. Original government surveys were not to be subject to change to correct minor variations. It also illustrates the extent of government authority regarding original land surveys.

Ownership of an island in a nonnavigable river was variously claimed by a squatter on the island and by owners on both banks.

1-C.02 In 1897 Whitaker settled on an island in the Platte River that had never been surveyed, or segregated, as public lands in the original survey. Whitaker, who believed he had a right to a homestead patent, in accordance with standard practice, filed an application to have the island surveyed.

1-C.03 The government declined to survey it.

1-C.04 McBride sued Whitaker and Killgore to determine title to the island. Killgore owned riparian lots 6 and 7 while McBride owned riparian lot 8. The island in question lay in between the ownerships.
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1-C.05 There was testimony in the case that the government survey was faulty. One of the chainmen from the original surveyor's crew testified that "no meandered lines along the river were actually run by the surveyor, leaving us to understand that the meandered lines shown by the plat were traced thereon by the surveyor, not from any survey made, but according to his idea of the windings of the river gained from observation alone." Other testimony also established that there were uplands that were not meandered in the original survey as required.

1-C.06 The great detail of unsurveyed islands depicted on the original plat shows that, in actuality, the surveyor must have done an excellent job.

1-C.07 Whitaker requested the General Land Office to survey the island several times. The GLO refused, saying that they had investigated the alleged island and disclaimed any interest in it. They also said they had no authority to survey islands in non-navigable streams where patents had been issued to upland owners on both sides of the stream. (We will see later that this policy changed.)

1-C.08 The Nebraska Supreme Court ruled that Whitaker was a trespasser and split the island between McBride and Killgore.

Part of the plat of T. 8 N., R. 15 W., 6th PM, Neb. showing the island in dispute.
1-C.09 Appeal taken to the U.S. Supreme Court on the question of why the surveys were not properly executed. The government was not a party to the suit.

It developed that the surveyor’s instructions were to ignore islands containing less than 21 acres. This particular island contained 22 acres.

1-C.10 The U.S. Supreme Court held: "The official surveys made by the government are not open to collateral attack in an action between private parties. They said,

"Possibly they may have been regarded as having no stability as tracts of land but as mere sandbars, which are frequently found in western waters, and are of temporary duration, existing here today and gone tomorrow. Be that as it may, there is nothing to indicate any fraud or mistake on the part of the surveyors. Doubtless this island of about twenty two acres was regarded as coming within their instructions, and very likely at the time of the survey did not contain twenty-one acres."

Riparian proprietors in Nebraska were held to own to the center of the channel of a stream. The land department was a riparian proprietor at the time and had the right to refuse to survey the island if it so chose.

Division of the island between McBride and Killgore was affirmed. Whitaker, the settler on the island, was out of luck.

END CASE STUDY

Variance Between Field Notes and the Plat

1-56 We have shown examples of the importance of the original survey and the plat, now let’s look at the importance of differences between the survey field notes and the corresponding plat.

The usual procedure that occurs in field surveying is that field information in the form of measurements are recorded in some sort of book for later reference in reporting the results of the survey.

1-57 In General Land Office practice, as well as the Bureau of Land Management practice, the notations made in the field are recorded in what is referred to as "field tablets". The field tablets are then taken into the office and used in preparation of "field notes". Field notes have been typed since the very early days of the typewriter—about 1900. They are very stylized, meaning that descriptions of monuments and procedures are worded in
prescribed manner. The aim of the field note preparation is to make the survey record totally complete and unambiguous.

Field surveyors prepared their own field notes— including typing by the hunt and peck system in the old days. Along with the field notes, surveyors prepared calculations of closures and areas, but sometimes these were actually done by draftsmen. On completion of the field notes, the surveyor would then prepare what is known as a sketch plat— in slang terms, a "dirty sheet". A sketch plat was required to be plotted to scale and have the notations necessary for the plat, but they need not have been calligraphic.

Field notes were copied in duplicate. One copy was for the land office upon approval and one copy was to be kept in Washington, D.C. Use of carbon paper in a typewriter reduced the chance of difference between the original and the duplicate. However, prior to the use of typewriters, field notes were hand written and the Washington office set was hand copied by the surveyor into a separate book. Thus, there were two handwritten copies that are sometimes different. There have been instances when the differences between the land office and the Washington set figured in litigation.

1-58 A draftsman would be given the field notes and the sketch plat and the draftsman would then draw up the plat proper. Presumably the surveyor would be consulted by the draftsman if inconsistencies appeared during the plat preparation. The usual state of affairs was that the surveyor was already sent back out in the field upon completion of his field notes work— thus unavailable for questions.

Next, the supervising surveyor, or an assistant of his, would study the field notes by the surveyor, the calculation sheets, the sketch plat and the draftsman’s plat for approval by the Surveyor General of the state or territory. The field notes and plat were then sent to Washington, D.C. for further review and final approval by the Surveyor General of the United States.

1-59 As humans, surveyors often make mistakes. Hopefully, systems for checking the work are of great utility in catching mistakes before they appear in the final record. Nevertheless they happen.

1-60 Review of the system would indicate that if, somehow, the field notes and the plat had contradictory information, the surveyor would be correct and the draftsman would be wrong.

1-61 Nevertheless, in government land office work that is not the way it works because of the special significance given the plat. See 43 U.S.C. 751, section 21.
An Indiana case, *Beaty v. Robertson*, 30 NE 706 (1892) pointed out control by the plat at an early date. The field notes in question in that suit showed clearly that the surveyor had started his measurement at the township line and ran east, between sections 6 and 7. At 40 chains he set the quarter corner post. At 80.30 chains he set the corner on an Indian Boundary. In effect, he had thrown the excess of the section in the east half of the section rather than the west half which would be against the township line, as required.

Someone in the land office had made a notation in the field notes that "This post should stand at 40 chains from the cor. to secs. 5, 6, 7 & 8 & of course is wrong. S.W."

The plat of the township placed the excess acreage in the west half of the section.

The opinion quoted an early California case, *Chapman v. Polack*, 11 Pac. Rep. 764 as follows: "From data furnished by the surveyor the plats are prepared. One of the objects of the manual and the law was to simplify the mode of disposing of the public lands, so that, without numbering patents with descriptive field-notes, the plats of the surveys should afford all necessary information to purchasers, and at the same time, afford a convenient and certain description by reference of the land conveyed; and these official plats are made the basis of all sales and selections of the public lands, and are solely referred to in the patents to show what lands are patented."

The Court concluded that someone in the land office had corrected the error of the surveyor and platted the land so that the excess was in the west half of the section and so held.

Quite a few of the differences were the result of mistakes in measurement as well as errors caused by the equipment available to the surveyor. There were outright fraudulent surveys as well.

States in the northern part of the United States had special problems. It was a distinct advantage for the surveyors to do the work during the winter because the lack of leaves allowed easier sighting and freedom from insects. Because the lakes and some streams were frozen, the lines could be run straight through without interruption or calculation. The water areas that
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appeared in the summer were quite often radically different from those that appeared on the plats.

**CASE STUDY FOLLOWS**

*Weaver v. Knudson, 127 N.W.2nd 217 (1964)*

1-D.01 We study this case to learn how the courts deal with the problems caused by erroneous surveys of meander lines. This dispute involved ownership of lakeshore frontage that had been included in the original survey but which was actually isolated from the main part of the lot area. Another owner was claiming the frontage as part of an adjacent lot.

1-D.02 Weaver had title to lot 7, section 15, T. 34 N., R. 8 E., 4th P.M., Wisconsin, as shown on the sketch at the right made by the Court from the original plat of the township. Note that the entire northern boundary of lot 7 is along a meandered lake.

1-D.03 Knutson and others had title to lot 6. They showed that in the southern part of lots 6 and 7 there was actually another lake that was not meandered called Long Lake. Knutson claimed the small triangular portion of the SW part of lot 7, which was separated by the intervening Long Lake, as attached to lot 6, as shown on the trial court’s sketch of the on-the-ground situation.

1-D.04 The Trial Court found for Knutson and construed the patent to include the isolated portion of lot 7 because it believed the government did not intend to convey the disputed area as part of lot 6. The court said that 43 U.S.C. 752 and 753 requires that the east and west boundary lines of the lot should have stopped at the shore line of Long Lake and the shore of Long Lake should have been the lot boundary.

1-D.05 The Appellate Court pointed out that while the section lines were surveyed in the field, the lot lines are administratively drawn in the General...
Land Office. In cadastral surveying this is called "protraction of the subdivisional lines".

1-D.06 Appellate Court continued, saying that the plat was clear and unambiguous on its face and it conveyed lot 7. In fact, it noted, that the patentees paid for more land than they received. Because Long Lake was navigable, the patentee did not receive the bed of the lake and the patent did not affect the state’s title. (More on this subject in the next chapter).

1-D.07 The intent of the Grantor is what would determine the outcome.

"The intent we search for," the Appellate Court said, "is the intent the government had at that time, not what it would have had if no mistake had been made."

1-D.08 The Court held that the disputed land was included in the boundaries of the lot lines of lot 7 and it did not matter that the two areas were separated by the intervening lake.

From the Court’s sketch of the on-the-ground situation.