BASIC LAW OF WATER BOUNDARIES

Introduction

Natural barriers have formed ownership boundaries since our earliest history. Natural features such as rivers, lakes and oceans have become important legal boundary monuments.

The rights and privileges conferred upon owners of land bounded by water take many forms and have given rise to the use of special terms to describe various legal aspects of water boundaries.

A riparian owner is one who owns property along the bank of a watercourse, including a lake, and whose boundary is the water in that course or lake.

The word riparian has as its root the Latin "ripa" meaning river bank.

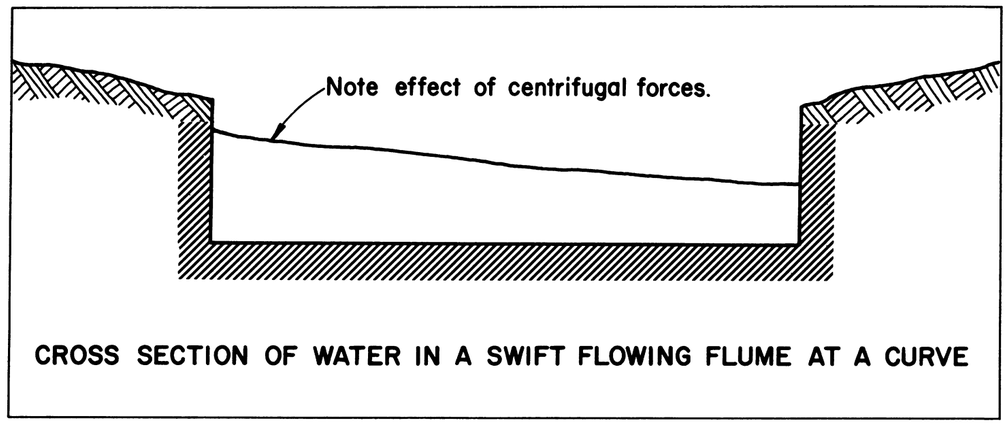
A littoral owner is one who owns land abutting a sea or ocean where the tide regularly rises and falls. Littoral is derived from the Latin "litus" meaning seashore or coast. In common usage the word riparian is often used instead of littoral to include seashore boundaries as well as inland water boundaries.

The word accretion is derived from the Latin "accrescere" which means to grow or to increase. Accretion is the gradual and imperceptible addition of soil by gradual deposition through the operation of natural causes, to that already in possession of the owner. It is the gradual intrusion of the dry land area into the water area. Accretion is formed by the washing up of sand, silt or soil so as to form firm ground, called alluvion. The term alluvion is more generally applied to the deposit itself while the term accretion usually denotes the act; however, in common practice, the two terms have been used more or less interchangeably.

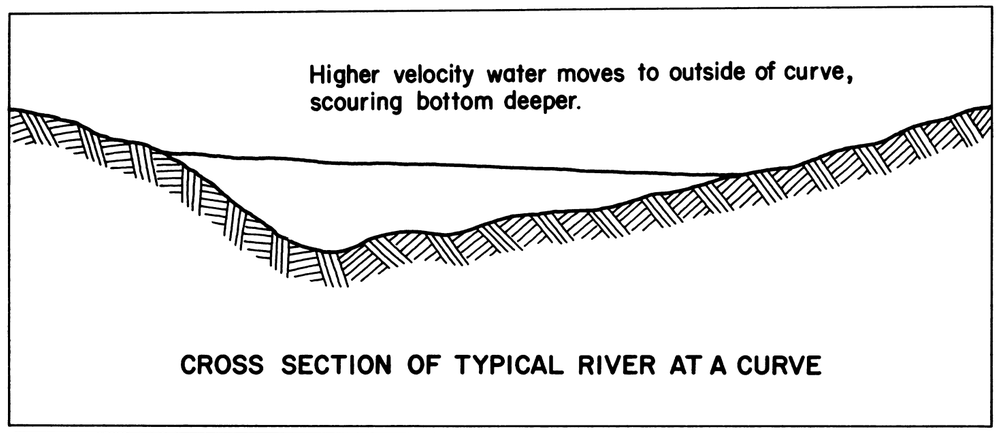
Reliction is dry land formed by the withdrawal of water from the shores of a river, lake or sea. For example: a twin channel stream in which one channel degrades sufficiently to cause the gradual withdrawal of water from the other channel until it becomes a waterless relic. The process of the water withdrawal is termed dereliction.

The word erosion is derived from the Latin prefix "e" meaning out and "rodere" meaning to gnaw. Erosion is the direct opposite of accretion. It is the gradual eating or gnawing away of soil by the operation of water so that the water encroaches upon an area that was dry land prior to the erosion.

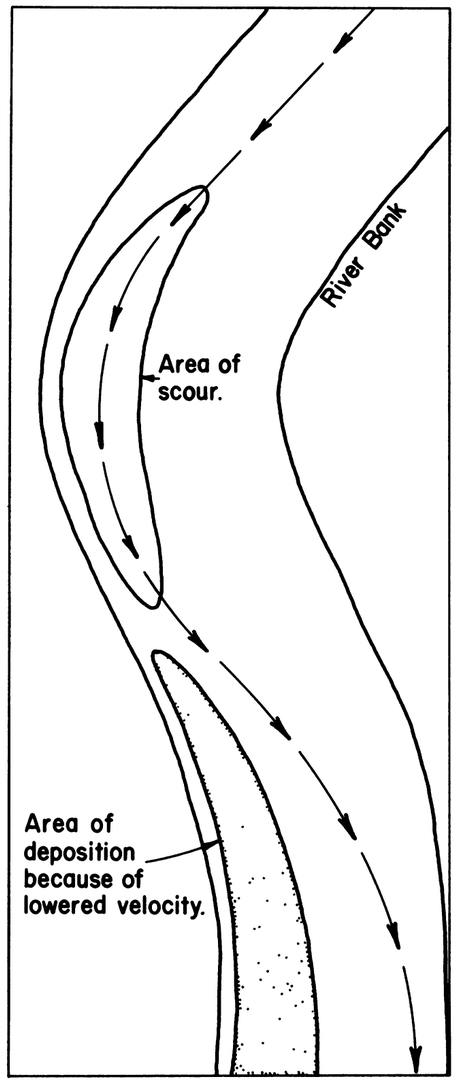
Avulsion is the sudden and perceptible action of water which causes the removal of a considerable quantity of soil from the land of one owner and its deposit upon or annexation to the dry land of another. This may be a sudden or rapid change in the course and channel of a river or the sudden creation of a completely new channel. It is distinguished from accretion and erosion by the time element. Avulsion is sudden; accretion, reliction and erosion are gradual.



CROSS SECTION OF WATER IN A SWIFT FLOWING FLUME AT A CURVE



CROSS SECTION OF TYPICAL RIVER AT A CURVE



Historical Development

From the earliest times in England, the common law vested title to and control over navigable waters in the Crown and in the Parliament. A distinction was made between title and control. Ownership of the underwater soil, similar to ownership of dry land, was regarded as a proprietary right and was vested in the Crown. But the right to control both land and water was deemed a public right. Thus the Crown could and did convey the soil under water so as to give private rights therein, but the dominion and control over the waters, in the interest of navigation and commerce for the benefit of all the subjects of the kingdom, could be exercised only by Parliament.

The one clear right of the public in the use of water was for travel. In medieval England, the general public exerted few other demands for water use. Water was sufficiently plentiful so that there were few conflicts concerning its use. Where there was conflict with the public right of navigation the right of navigation prevailed and was recognized under medieval common law.

The original source of land titles in England is a grant from the Crown. Most titles to land on the English seashore date as far back as the grants of King John, whose reign ended in 1216. In those early days in England, the initial grants of coastal lands presented no great problems, so it is not surprising that the grants were imprecise and incomplete, particularly in their lack of description of the seaward boundary. As might have been expected, the grantee of land along the coast came to look upon his property as extending down into the sea. Either the Crown acquiesced in that view or there were matters more pressing and interesting to the Crown than the use of the barren seacoasts. No challenge was made to the private use and occupancy of the tidelands until the latter part of the sixteenth century. Until then it just never occurred to the Crown, or anyone else for that matter, to be specific about seacoast boundaries in conveyances.

In 1568-69 Thomas Digges, a mathematician, engineer, astronomer and lawyer, wrote a short treatise asserting that the tidelands had not been included in grants of the seacoasts by the Crown. This thesis was the basis for a few legal actions brought by the Crown, over a considerable period of time, without success until 1632. Digges' thesis appeared again in 1670 in the now classic treatise by Sir Matthew Hale, De Juris Maris. The impact of this treatise was such that the burden of proof was placed upon the subject to show that his land extended to the low water mark.

That was the state of development of English law at the time England was colonizing the eastern coastline of North America. After the American Revolution, the Thirteen Original Colonies became sovereign states, and as successors to the Crown, became vested with title to all lands within their boundaries over which the tide ebbed and flowed and to the beds of inland navigable waters (1).

With the adoption of the Federal Constitution, the states ceded to the United States certain powers, one of which was the right to regulate interstate commerce and with it the accompanying right to control navigation. The new states retained the boundaries they had as independent sovereigns. No title to the tidelands or to the land submerged by navigable water was thereby conferred upon the United States Government. The individual states owned their tidelands and exercised authority over the lands and the waters beyond the tidelands extending to the state boundaries. In all respects, the state succeeded to all the rights and powers of the Crown and of Parliament in the matter of navigable waters and the soil under them (2).

New states entering the Union, subsequent to the adoption of the Constitution, were admitted on an equal footing with the original states and therefore acquired the same right in submersible and submerged lands (3). However, each state has dealt with this matter according to its own views of justice and policy. A study of the laws of the original states shows that there is no universal or uniform law on the subject. Great caution is therefore necessary in applying precedents in one state to cases arising in another.

Navigable Waters

Under English common law, all streams over which the tide ebbed and flowed were deemed navigable and the beds thereof were owned by the Crown. All streams or bodies of water which were not affected by tide were nonnavigable and the adjacent landowners held title to the center of the stream or lake. This test for the determination of navigability was not adapted to the conditions of this country where many large rivers and other bodies of water were susceptible of being used as highways of commerce. Hence, this common law test in the great majority of states has been either repudiated or modified. The common law doctrine has been uniformly rejected by the Supreme Court of the United States. It has ruled that streams that are navigable in fact are navigable in law regardless of the presence or absence of a tide (4). However, the rule of law that the landowners adjacent to nonnavigable water hold title to the center of the water was carried over to the Federal law (5) and has been adopted by the majority of the states. 43 USC 931 reads as follows:

> All navigable rivers within the territory occupied by the public lands, shall remain and be deemed public highways; and, in all cases where the opposite banks of any streams not navigable belong to different persons, the stream and the bed thereof shall become common to both.

Controlling Law

Questions regarding passage of title from the United States to the patentee must be resolved by the laws of the Federal Government whether in State or Federal courts. Once it is determined that title has passed, the property, like other property in the state, is subject to state legislation. The state legislation must be consistent with the admission that the title passed and vested according to the laws of the United States (6).

The grants from the Government of lands bounded by streams and other waters, without any reservation or restriction of terms, are to be construed, as to their effect, according to the law of the state in which the lands lie (7).

Accreted Land Ownership

The general legal principles concerning water boundaries and the ownership of accretion was settled at common law in England (8) before the United States gained its independence. The general rules concerning accretion are still followed in the United States with some modifications to fit special circumstances. The general rule is that ownership of accreted land inures to the upland riparian or littoral owner while avulsive action does not work a boundary or an ownership change.

BASIC LAW OF WATER BOUNDARIES

After a boundary has been moved by accretion, reliction or erosion, an avulsion may occur. The moment of the avulsion determines the location of the ownership boundaries. If the stream is navigable, the state owned the stream bed prior to the avulsion and remains the owner after the avulsion. The abutting proprietors owned to the stream banks before the avulsion, and they still own to the stream banks after the avulsion. The land positioned under the water after the avulsion is still owned by the person who owned it prior to the avulsion, but he cannot close the new channel to navigation. If the stream is nonnavigable, the owners on each side of the stream own to the center of the stream before the avulsion and they continue to own to the center of the dry stream bed after the avulsion. It depends on local law as to the method of determing the center, or thread, of the stream.

Ownership of the dry land area formed, or caused by reliction is determined on the same principles as those used in determining the ownership of accreted land. This general rule is followed in the United States by the Federal Government (9) and the majority of the individual states (10).

The Constitution of the State of Washington contains the following provision: Article XVII, Paragraph 1, "The State of Washington asserts its ownership to the beds and shores of all navigable waters in the state up to and including the line of ordinary high tide in waters where the tide ebbs and flows, and up to and including the line of ordinary high water within the banks of all navigable rivers and lakes: provided, that this section shall not be construed so as to debar any person from asserting his claim to vested rights in the courts of the state."

In 1966, this provision was interpreted by the Washington State Supreme Court to give the State ownership of all accreted land fronting unpatented littoral upland that was in place at the date of statehood, November 11, 1889, and to give the State ownership of all littoral land that was formed by accretion since November 11, 1889 (11). In the case before the court, the original patent was issued prior to the admission of Washington as a state. The U.S. Supreme Court accepted an appeal and ruled that Federal law applied in this case. Therefore, the upland littoral owner was declared to be the owner of all the accretion fronting the patented ocean front lots (12).

Despite the existance of Article XVII of the State Constitution, Washington courts have recognized the majority common law rule of accretion for stream front property owners (13).

By state law, Louisiana claims all accretions in the Gulf of Mexico.

Accretion After Survey, Before Patent

It is possible for accretion to form in front of surveyed lots before the land is entered for settlement and claim. The general rule is that such accretion passes to the patentee although the patent describes the land according to the official survey plat (14).

An exception to this general rule is recognized if a substantial amount of accretion has built up prior to entry for patent. In cases of substantial accretion between survey and entry for patent, the United States retains title to the accretion outside the meander line as unsurveyed land (15).

Re-emerged Lands

Another legal problem to be considered is that of re-emerging lands. If a river slowly erodes the riparian lots along a shore line until the remote lots (which originally were not riparian) become riparian and then the river reverses the process and accretion is built up, replacing the previously eroded riparian lots, these lands are termed re-emerged. Under the Federal common law, the re-emerged lots reacquire all their former rights, the same as though they had never been eroded (16).

Most states follow the Federal Rule (17). However, some state courts hold that when the land is lost by erosion, the boundary lines and property ownership are extinguished. The remote owner then becomes a riparian owner and future accretion attaches to the once remote land (18).

Lands that re-emerge by accretion to the opposite bank of the stream do not regain their identity even though they may occupy the same geographical position they held before the stream moved (19).

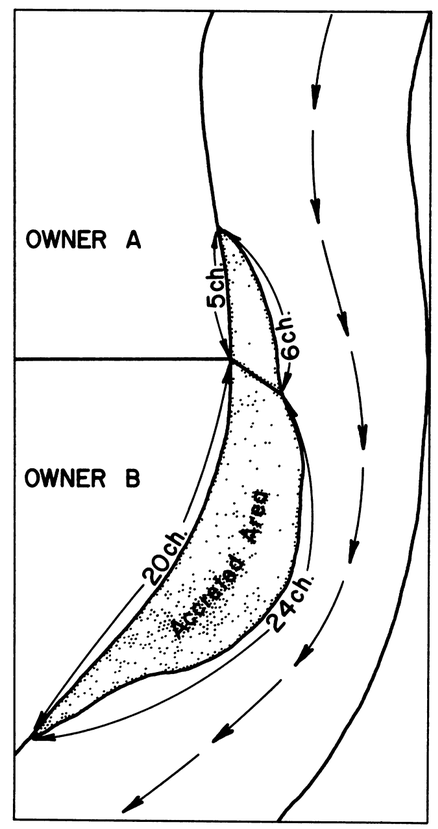
Apportioning the Accretion By Survey

In dividing the accretion among the various riparian owners on the same side of the body of water, the objective is to do so with equity and justice to each owner. Two primary factors must be considered in making the equitable distribution. The first is that the owners shall have an equal share, in proportion to their lands, of the area of the newly formed land; the other is to secure to each an access to the water with an equal share of the new waterline in proportion to his share on the old line of the water (20).

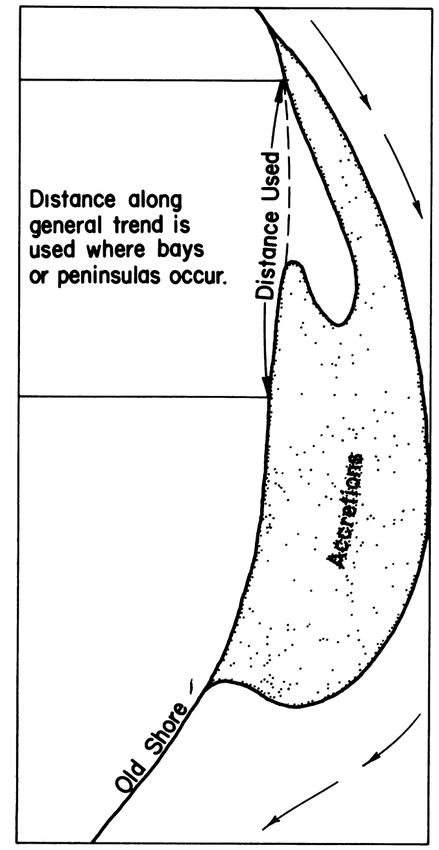
All courts that have been called upon to decide the ownership and division of accretion have subscribed to the doctrine of equity and justice. The four basic methods formulated to achieve equity and justice among the various claimants are:

1. The proportionate shoreline method (21).
2. The perpendicular method (22); also used in the broad sense to include radial lines on curves.
3. The prolongation of the property line method (23).
4. The proportionate acreage method (24).

The method used by the Federal Government, wherever possible, and by a majority of the states, is the proportionate shoreline method. This method is outlined in Johnston v. Jones and recommended by the Manual of Surveying Instructions, 1973, sections 7-58 to 7-67. This method, stated briefly, is to apportion the new frontage along the water boundary in the same ratio as that along the line of the old water boundary.

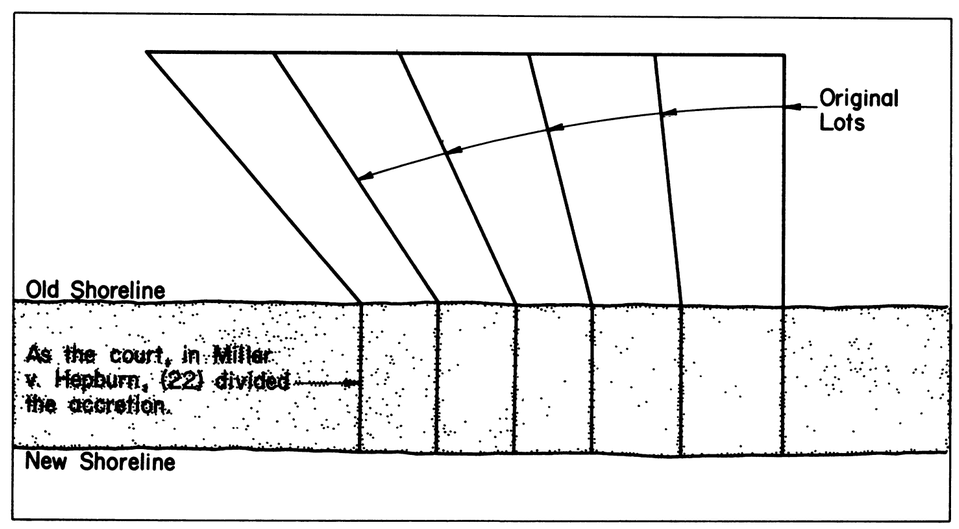


Certain modifications may be required under particular circumstances where peninsulas or bays would make strict apportionment inequitable.

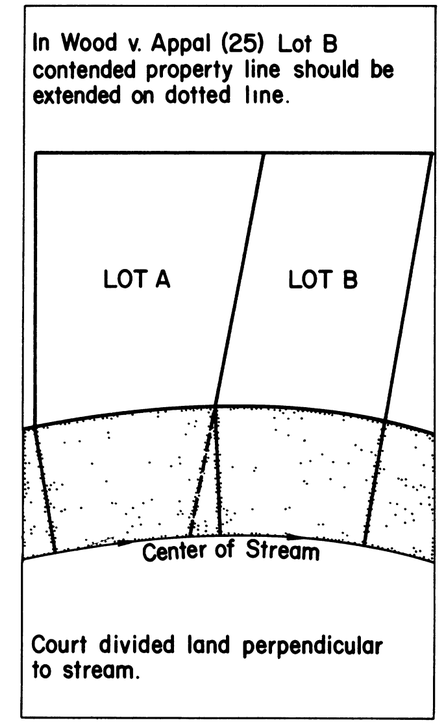


A beginning and ending point for apportionment may have to be established by one of the other methods before the affected land can be apportioned.

The second preference is the perpendicular method whereby a line is drawn from the boundary termination point on the original shoreline perpendicular to the thread of the stream or the new shoreline, depending on the ownership of the land under the water.



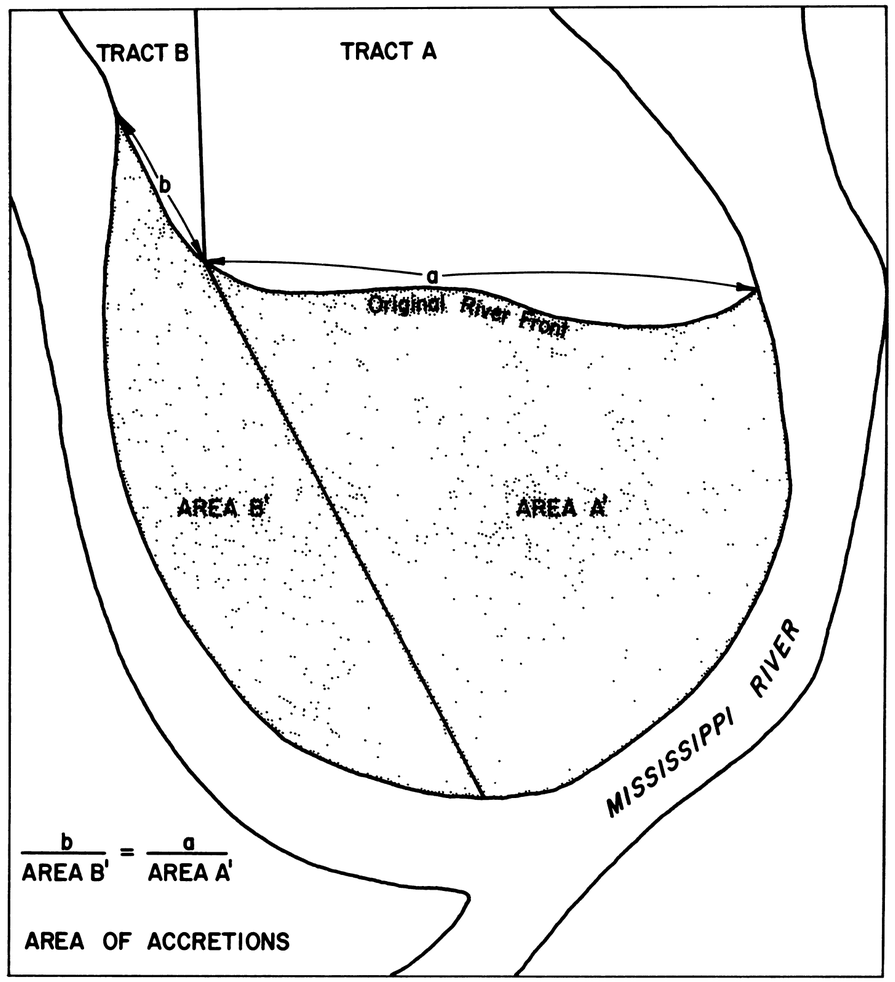
In the absence of accretion, the perpendicular method is preferred to divide the stream bed when the riparian owners own the stream bed also (25).



The prolongation of the property line method is simply to prolong the property lines until they reach the edge of the water. This method is rarely used.

The proportionate acreage method has been used in Louisiana. This method is used where the accreted land is more valuable than the waterfront. In this method contiguous riparian owners each take their proportionate share of the accreted land based on the total extent of their front lines, related to the total quantity of accreted land to be divided.

BASIC LAW OF WATER BOUNDARIES



If the owners are on opposite sides of the boundary water and the water dries up, the point of contact between the properties is the new boundary (26).

Other methods of division have been used in special situations. See Clark, On Surveying and Boundaries or Brown, Boundary Control and Legal Principles or other texts on boundaries.

The Meander Line

One problem related to water boundaries is the precision of the survey delineating the water boundary. If the meander line is reasonably close to the actual edge of the water being meandered, the edge or center of the water, as is applicable, is the true boundary (27). The meander line does not need to follow the waterline exactly. If small tracts of land of little value at the time of survey lie between the meander and the edge of the water, title to such land will pass to the upland owner with the patent to the fractional section (28).

The patent usually conveys title to the actual water line and not to the meander line; the meander line is determined as a matter of surveying convenience.

There are two exceptions to this, however:

1. If, at the time of survey, there was a substantial amount of land between the survey line and the actual shore because of fraud or gross error in the survey, the meander line will be treated as the true boundary.

2. If a substantial amount of land was formed by accretion between the survey line and the actual shore during the period between the survey and the time of entry, the meander line will be treated as the true boundary.

The key phrase in the application of these exceptions is "substantial amount of land."

It has been adjudicated that title to land between the meander line and water edge passed to the patentee of the adjacent upland by reason of the patent without express description in the following situations:

1. The upland owner claimed about 271 acres with about 98 acres of the total lying between the meander line and the water edge. The meander line was about 4000 feet long with about 1200 feet maximum distance between the meander line and the water edge (29).

2. The upland owner claimed about 320 acres with about 112 acres of the total lying between the meander line and the water edge (30).

In cases where the upland owner gains title to the land between the meander line and the edge of the water, he becomes a riparian owner with all the rights and burdens that accompany riparian ownership.

Omitted Land

If a meander line is mistakenly run, whether through fraud, gross error or the erroneous assumption of the existence of a body of water where there is no such body of water, riparian rights do not attach because the condition upon which they depend does not exist. In such cases the meander line becomes a fixed boundary. If the meander line borders a swamp instead of a body of water it may be used as a fixed boundary (31).

Upon the discovery of fraud or gross error it is within the power of the Land Department of the United States to deal with the area which was excluded from the survey, to cause it to be surveyed and to lawfully dispose of it. In order for the land outside the meander line to be considered omitted, it must be substantial in comparison with the adjacent platted lots.

It has been adjudicated that land was omitted in the following situations:

1. From about 770 acres claimed, about 600 acres were outside the meander line (32).

2. About 280 acres were outside the meander line (33).

3. A lake of about 800 acres was meandered to show about 1800 acres. In some places the edge of the water was more than one half mile from the meander line (34).

4. In a township where about 21,800 acres were being claimed, about 8,000 acres had been excluded by meander lines (35).

5. With a meander line about 1,635 feet long and a total claim of about 53 acres, about 40 acres were outside the meander line (36).

6. No lake existed but meander lines excluded an area of about 850 acres (37).

7. From about 133 acres claimed, about 85 acres were outside the meander line (38).

8. Two tracts were outside the meander line, one at least 160 acres and the other more than 200 acres (39).

9. Two lakes were meandered as one, leaving about 415 acres between them within the confines of the meander line (40).

10. From about 435 acres claimed, about 320 acres were outside the meander line (41).

Omitted Land Administrative Procedure

Anyone desiring a survey of omitted public land must make application with the BLM office for the state in which the lands are situated (42).

Notice by the applicant, including government agencies, of intention to apply for the survey of an island or other land omitted from the original survey must be served on the adjacent land owners. Notice must also be served on the Attorney General and the Secretary of State for the state in which the land is situated. The notice is required at least 30 days prior to the date of application for the survey. Service may be by registered mail or in person, evidence of which may consist of the registry return receipt or signed acknowledgment of service. A copy of each notice, with proof of service thereof, must be filed with the application. Failure to obtain evidence of service may be explained (43).

If these and certain other application formalities are followed by the survey applicant (44), and the application for survey is approved, the costs of the survey will be borne by the Government (45).

In surveying the omitted land the Government need not give formal notice to the adjacent landowners. The applicant has already given notice of the application for survey and a survey in itself is not an eviction of the person in possession (46).

After the survey has been approved in the manner normal for any original survey, the manager of the land office is instructed to prepare the public notice for printing in the Federal Register (47). The survey plat is not considered officially filed in the land office until the announced date published in the Federal Register (48).

Omitted land remains Public Domain and can be surveyed in any manner prescribed by Congress.

Unsurveyed Islands

Whether the United States may hold islands as unsurveyed public domain, subject to survey and sale or other disposition under the public land laws and regulations, or whether ownership is controlled by state laws, depends upon the date of formation of the island.

If the island was in existence, separate and distinct from the opposing mainland and above the mean high-water elevation of a meandered body of either navigable or non-navigable water on the date of that state's admission into the Union, then it may be held as public lands of the United States even though the United States may have parted with its title to the opposing mainland (49). That is because such an island was not a part of the bed of those waters and therefore its title remained in the United States after admission of the state. It would therefore be subject to survey and disposal when so identified. However, the Land Department may refuse to survey islands considered insignificant (50). If the Land Department refuses to survey the island, no citizen can overrule the action of the Land Department (51).

If the island has formed since the date of statehood by the depositing of materials, either by man or nature, or has been uncovered by the lowering of the mean, high-water elevation of the body of water, then it may not be held as public domain (52). Its ownership would then rest in the state and be governed by state laws through the state's inherent sovereign rights to the beds of navigable waters.

Islands have been claimed as public domain and surveyed in navigable streams (53), navigable lakes (54), nonnavigable streams (55) and tide water (56).

Swamp and Overflowed Lands

The ownership of subdivisions or lots affects the treatment of water boundaries. Under the terms and provisions of the "Swamp Lands Acts," the swamp and overflowed lands within their borders pass to half the public land states upon identification by public land surveys and approval of selection lists as requested (43 U.S.C., section 981 et seq.).

The "Swamp Lands Acts" provide for grants to the several states to aid in reclamation of the swamp and overflowed public lands within their borders.

BASIC LAW OF WATER BOUNDARIES

To bring land within the definition of the several swamp-land granting acts, the greater part of any quarter-quarter section or any lot must have been so swampy or subject to overflow during the planting, growing or harvesting season, in the majority of years at or near the date of the grant, as to be unfit for cultivation in any staple crop of the region in which it is located unless some artificial means of reclamation were provided.

Surveys covering or relating to swamp and overflowed lands require a knowledge of the provisions of the swamp-land granting acts. These acts had reference to only a specific state or two, or to the public land states in existence at the time of their passage. No state admitted after the passage of the Act of March 12, 1860 acquired any rights under these acts.

The swamp-land grants took effect in praesenti, that is, they took effect on the dates of the passage of the acts. Title to the lands, however, remained inchoate (incomplete) until the lands were identified by the public land surveys. The states then used the survey information in making lists of the lands selected as being within the swamp-land definiiton. These lists, when approved as required (43 U.S.C., sec. 981 et seq.), conveyed title to the states.

The states have been allowed optional methods of preparing lists of the subdivisions to be identified within the meaning of the various acts granting swamp lands.

In Alabama, Indiana, Louisiana, Michigan, Minnesota (except lands within Indian reservations), Mississippi, Ohio and Wisconsin, the swamp- land lists are based upon the survey field-note record.

In California, the swamp-land selections are based upon the representations of the survey plat.

In Florida, Illinois, Iowa, Missouri and Oregon, and within the Indian Reservations in Minnesota, the swamp-land lists are based upon investigations and reports by representatives of the state and of the Bureau of Land Management. These representatives utilize survey information in preparing their reports.

The fifteen public land states which did not receive swamp and overflowed lands under the acts granting such lands are: Alaska, Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, Utah, Washington and Wyoming.

The following table shows the acts and the date of their passage. It also shows the public land states receiving grants under the terms of each act.

ACTS	STATES
Louisiana Swamp Land Act of March 2, 1849 (9 Stat. 352)	Louisiana
Swamp Lands Act of September 28, 1850 (9 Stat. 519)	Alabama *Arkansas California Florida Illinois Indiana Iowa Michigan Mississippi Missouri Ohio Wisconsin
Swamp Lands Act of March 12, 1860 (12 Stat. 3)	Minnesota Oregon

*Under the terms of the Act of April 29, 1898 (the Arkansas Swamp Lands Compromise Act), Arkansas relinquished all right, title and interest to the remaining unappropriated swamp and overflowed lands within its boundaries (43 U.S.C. sec. 987).

Because the swamp-land grants took effect at the date of passage of the acts, lands subject to seasonal overflow or were too wet for farming at that date were granted to the state.

At the time of the original surveys, little or no effort was made to distinguish between different types of wetlands as swamps, marshes, or bogs. If land was not suitable for cultivation, it was called swamp, marsh, bog, or overflowed, according to the surveyor's preference. Because the surveyor was not ordinarily trained in the soil sciences, no great weight should be placed on the names applied in the original record.

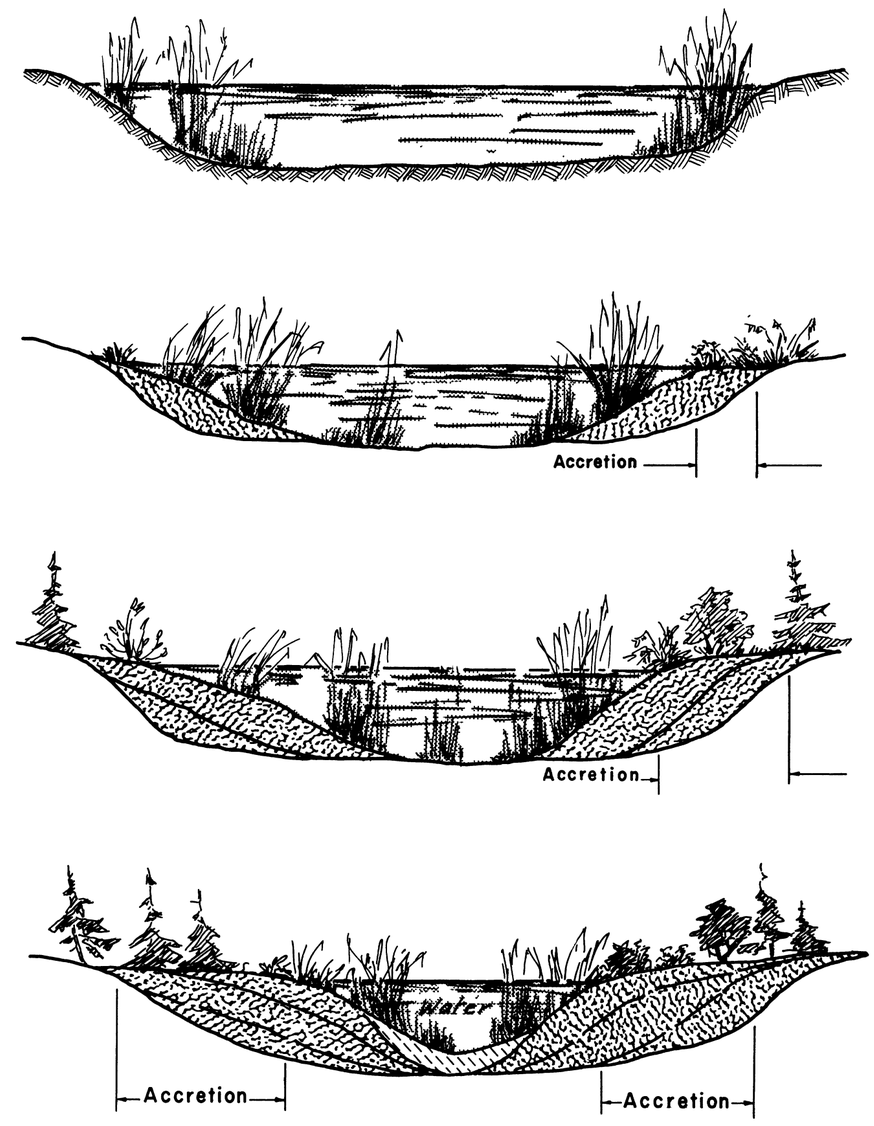
The present day Cadastral Surveyor confronted with a swamp land situation is potentially faced with a more complex determination. He must determine the margin between uplands, wetlands, and (probably) open water, as those conditions existed in 1850 or 1860. Artificial drainage systems, diversion ditches, dams and pumping of ground water may have changed the character of the land from that which existed at the passage of the swamp-land act. He may need to distinguish between accretion and bog under formation.

MARSH

MARSH DESCRIPTION AND FORMATION.

A marsh is the direct result of poor drainage, evaporation and other losses combined. Marsh vegetation is composed chiefly of grasses and grasslike plants. The land below a desert spring is a marsh. In BLM (Cadastral) usage, the word marsh is generally used to designate salt marshes.

SWAMP EVOLUTION



SWAMP DESCRIPTION AND FORMATION.

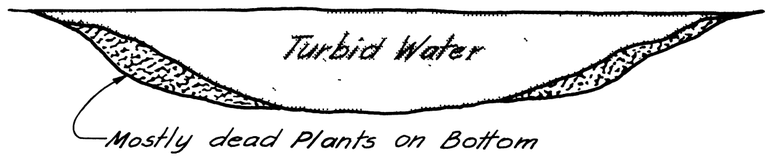
Swamps do not have floating mats of vegetation which help distinguish them from bogs and muskegs. The water may be somewhat aerated such that fallen vegetation decays and falls to the bottom. Some silting normally occurs, which mixes with the vegetation falling to the bottom. As this process continues, land is formed.

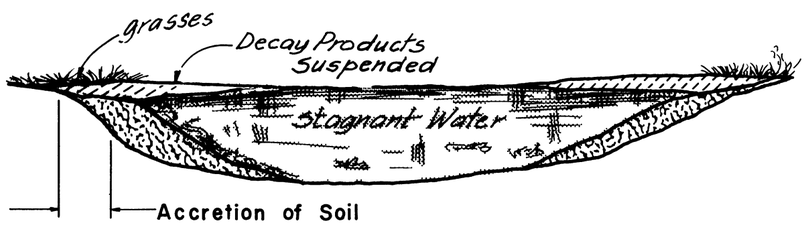
The formation of land is from the bottom upward and the resulting soil is composed of inorganic as well as organic materials. The distinguishing characteristic of swamps is formation of soil from the bottom upward, sometimes with successive layers of organic, inorganic, and decay deposits.

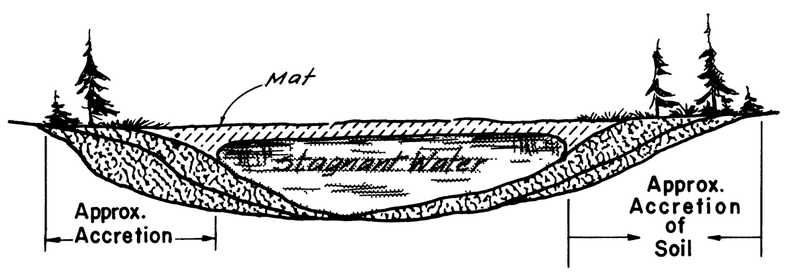
BASIC LAW OF WATER BOUNDARIES

BOG EVOLUTION

CONDITION AT SPRING THAW

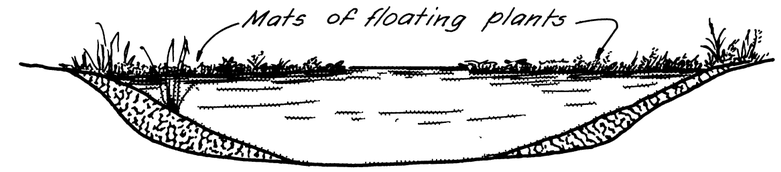






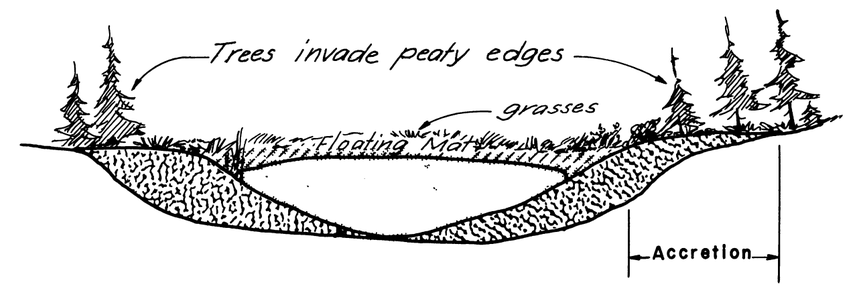
1st STAGE

CONDITION AT LATE SUMMER

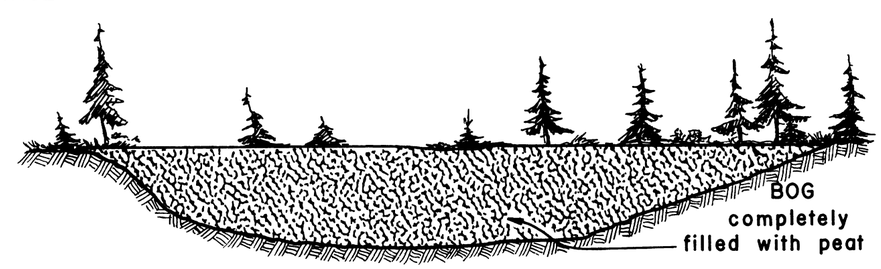


2nd STAGE

3rd STAGE



FINAL STAGE



BOG DESCRIPTION AND FORMATION.

A shallow, low lying, virtually undrained body of water, where vegetation on the bottom accumulates because conditions such as temperatures do not promote complete decay. A bog forms from a shallow pothole lake or a very slow flowing, almost stagnant stream.

Aquatic plants begin to grow along the margins of the water. These die and begin filling in the bottom. Because of the stagnation, no silting takes place; all of the build-up is of organic material. Water lillies or water hyacinths begin to invade the surface of the water. They catch floating materials and hold them in place. The surface plants decay and new growth slowly forms a solid mat on the surface of the water. Mosses, sedges, etc., begin to take hold in the surface mat, while some decaying materials settle to the bottom. Eventually, the lake is completely covered with the boggy, matted material. In time, the whole lake will fill in with compacted, partly decayed plants and become a peat bog. The build-up of decaying plants could continue until the bog is even higher than the nearby surrounding upland. Bogs are characterized by a build-up of organic material which occurs upward from the bottom as well as out over the top of a body of stagnant water.

The precise distinction between different conditions involves determination of many factors, including acidity and oxygen content, all of which fall within the science of Limnology.

BASIC LAW OF WATER BOUNDARIES

(1) Shiveley v. Bowlby
152 U.S. 1 (1894)

(2) Martin v. Waddell
41 U.S. (16 Pet.) 410 (1842)

(3) Pollard v. Hagan
44 U.S. (3 How.) 212 (1845)

(4) The Daniel Ball v. U.S.
77 U.S. (10 Wall.) 557 (1870)

(5) John P. Hoel
13 L.D. 588 (1891)
U.S. v. Otley
127 F. 2d. 988 (1942)

(6) Wilcox v. Jackson
38 U.S. (13 Pet.) 498 (1839)

(7) Hardin v. Jordan
140 U.S. 371 (1891)
Herron v. Choctaw and Chickasaw Nations
288 F. 2d. 830 (1956)

(8) King v. Yarborough
3 Barn & C. 91

(9) New Orleans v. United States
35 U.S. (10 Pet.) 662 (1836)
County of St. Clair v. Lovingston
90 U.S. (23 Wall.) 46 (1874)
Arkansas v. Tennessee
246 U.S. 158 (1918)

(10) Mulray v. Norton
3 N.E. 581 (1885)

(11) Hughes v. Washington
410 P. 2d. 20 (1966)

(12) Hughes v. Washington
385 U.S. 1000 (1967)

(13) Spinning v. Pugh
118 P. 635 (1911)
Harper v. Holston
205 P. 1062 (1922)
Ghione v. State
175 P. 2d. 955 (1946)

(14) Jefferies v. East Omaha Land Co.
134 U.S. 178 (1889)
U.S. v. Eleven Thousand Nine Hundred Ninety Three and Thirty Two One Hundredths Acres of Land
116 F. Supp. 671 (1953)

(15) Yuma Reclamation Project
46 L.D. 461 (1918)
R. M. Stricker
50 L.D. 357 (1924)
Wittmayer v. United States
118 F. 2d. 808 (1941)
Madison v. Bassart
59 I.D. 415 (1947)

(16) First National Bank of Decatur, Nebr. v. United States
59 F. 2d. 367 (1932)
Towl v. Kelley and Blankenship
54 I.D. 455 (1934)

(17) Allard v. Curran
168 N. W. 671 (1918)
Baumhart v. McClure
153 N.E. 211 (1926)
Hunzicker v. Kleeden
17 P. 2d. 384 (1932)

(18) Wells v. Bailey
10 A. 565 (1887)
Peuker v. Canter
63 P. 617 (1901)
Yearsley v. Gipple
175 N.W. 641 (1919)

(19) Rex Baker
58 I.D. 242 (1942)
Edwin J. Keyser
61 I.D. 327 (1954)
Beaver v. United States
350 F. 2d. 4 (1965)

(20) Deerfield v. Arms
17 Pick. (Mass.) 41 (1835)

(21) Deerfield v. Arms
17 Pick. (Mass.) 41 (1835)
Johnston v. Jones
66 U.S. (1 Black) 109 (1862)
Doebbeling v. Hall
274 S.W. 1049 (1925)
Sharp V. Womack
93 S.W. 2d. 712 (1936)
Merryman v. Goins
124 P. 2d. 729 (1942)

(22) Miller v. Hepburn
71 Ky. (8 Bush) 326 (1871)

(23) Hubbard v. Manwell
14 A. 693 (1888)
Stoner v. Rice
22 N.E. 968 (1889)
Cramer v. Perine
167 N.E. 213 (1929)

(24) Akard v. City of Shreveport
200 So. 14 (1941)
Jones v. Hogue
129 So. 2d. 194 (1960)

(25) Wood v. Appal
63 Pa. 210 (1869)
Ferris v. Bentley
124 N.W. 1003 (1910)

(26) Buse v. Russell
86 Mo. 209 (1885)
State v. Johnson
179 S.E. 2d. 371 (1971)

(27) Railroad Co. v. Schurmeir
74 U.S. (7 Wall) 273 (1868)

(28) Arthur Savard
50 L.D. 381 (1924)

(29) United States v. Lane
260 U.S. 662 (1923)

(30) United States v. Zager
256 F. Supp. 396 (1966)

(31) Niles v. Cedar Point Club
175 U.S. 300 (1899)
Pacific Livestock Co. v. Armack
30 L.D. 521 (1901)

(32) Horne v. Smith
159 U.S. 40 (1895)

(33) John McClennon
29 L.D. 514 (1900)

(34) Securities Land and Inv. Co. v. Burns
193 U.S. 167 (1904)

(35) Chapman and Dewey Lbr. Co. v. St. Francis Levee District
232 U.S. 186 (1914)

(36) Producers Oil Co. v. Hanzen
238 U.S. 325 (1915)

(37) Lee Wilson Co. v. United States
245 U.S. 24 (1917)

(38) Jeems Bayou Fishing and Hunting Club v. United States
260 U.S. 561 (1923)

(39) Hatcher v. Palmer
49 L.D. 452 (1923)

(40) Rust Owen Lumber Co.
50 L.D. 678 (1924)

(41) Walton v. United States
415 F. 2d. 121 (1969)

(42) 43 CFR 9185.1-1(b) (1972)

(43) 43 CFR 9185.2-2(a) (1972)

(44) 43 CFR 9185.2-2(b)(c)(d) (1972)

(45) 43 CFR 9185.2-2(e) (1972)

(46) Keene v. Heirs of Daniel Clark
35 U.S. (10 Pet) 292 (1836)

(47) 43 CFR 1813.1-2(b) (1972)

(48) 4 L.D. 202 (1885)
45 L.D. 648 (1917)

(49) Emma S. Peterson
39 L.D. 566 (1911)

(50) Frank Chapman
6 L.D. 583 (1888)
Grand Rapids and Indiana R.R. v. Butler
159 U.S. 87 (1895)
John C. Christiansen
25 L.D. 413 (1897)
Archie G. Palmer
27 L.D. 380 (1898)

(51) Whitaker v. McBride
197 U.S. 510 (1905)

(52) L.F. Scott
14 L.D. 433 (1892)

(53) Scott v. Lattig
227 U.S. 229 (1913)

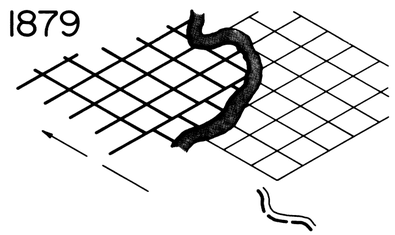
(54) Benjamin E. Peterman
14 L.D. 115 (1892)
Patrick Brazil
17 L.D. 326 (1893)

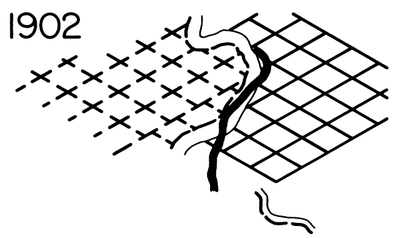
(55) Group 84, Nebraska
Letter 1606475 "E" EGH (3-23-38)

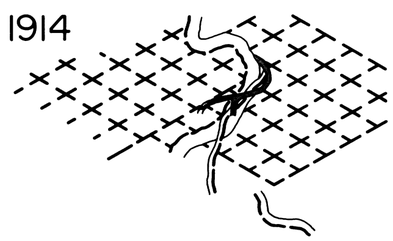
(56) United States v. Mission Rock Co.
189 U.S. 391 (1903)

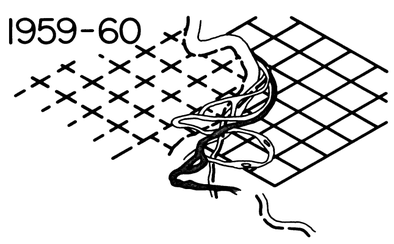
DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.









History of Surveys

1855 R C Mathewson surveyed the Second Standard Parallel South, through range 22 east, the subdivision lines of sections 4, 5, and 6 as well as the meanders of the right bank of the Colorado River in T 9 S, R 22 E, San Bernardino Meridian, California There is no plat of the Mathewson work and no patents were ever issued based on that survey

1879 W F Benson resurveyed the Second Standard Parallel, subdivided both townships and meandered the right bank of the Colorado River as shown on the plats approved May 22, 1879 See figures 1 and 2

The Benson notes indicate that he established the corners along the standard parallel as standard corners for T 9 S, but do not indicate the method used to establish the corners referring to T 8 S We infer from the Benson plats that the corners were set 80 chains in departure westerly from the line between sections 35 and 36

1902 John A Barry surveyed T 1 N, R 23 W, Gila and Salt River Meridian, Arizona, and meandered the left bank of the Colorado River as shown on the plat approved November 3, 1903, figure 3

1960 R C Yundt executed a limited dependent resurvey of T 1 N, R 23 W, Gila and Salt River Meridian, with later corrections The resurvey was accepted on January 11, 1962, after the resurveys in T 8 and 9 S, R 22 E, SBM, were executed

Reasons for Request of this Survey

The Colorado River is a navigable stream forming the boundary between the states of Arizona and California. California was admitted to the union in 1850 and Arizona in 1912.

In the period between 1850 and 1935 the Colorado River changed position up to 5 or 6 miles, through the process of accretion, sometimes reversing its course and eroding the accreted lands. Sometimes the river reverted to an old channel or cut a new one through an avulsive action. The Laguna Dam above Yuma was placed in operation for irrigation purposes in 1909. The Hoover Dam was closed in 1935, controlling the river. During the period 1909-1935 the river made many wide meander loops. In places man-made cut-offs were dug to re-channel the river and reduce the damage by erosion. These "cut-offs" were artifical avulsive actions.

Property ownership became confused. Land that was in Arizona one year might be in California the next, or vice-versa. Land surveys became lost. Eroded lands re-emerged and property lines were lost.

The States of Arizona and California were faced with an impossible administrative situation. In some cases lands were being taxed by both states - or taxed by neither. Without a stable state boundary, police protection and law enforcement were difficult because of doubt concerning which state had jurisdiction. In 1953 the legislatures of each state passed statutes establishing a Colorado River Boundary Commission. These commissions worked jointly to determine and recommend a solution to the problem.

The Boundary Commission studies determined the history of the river's changes. Figure 4 is a sketch from these studies showing the relative positions of the public land surveys, the approximate position of the river in 1914, 1930 and 1960. The river had meandered back and forth through the area but it's most northerly migration was apparently the approximate channels of 1914 and 1930. No avulsive changes in the vicinity affect the accreted lands discussed in this case.

In 1954 and 1955 the two State Boundary Commissions agreed that the state boundary in this area should be in the middle of the then present channel of the Colorado River. The description of the boundary reads in part:

> "Point No 13, which is vertically below the center of the center span of the highway bridge across the Colorado River at Ehrenberg, Arizona (U S. Highway 60-70), thence down the Colorado River midway between the shore lines on the right and left banks to
>
> Point No. 14, which is the center of the Cibola Bridge midway between abutments, thence down the Colorado River midway between the shore lines on the right and left banks, ignoring future channelization by the U S Bureau of Reclamation to
>
> Point No 15, which lies on the centerline of the Colorado River approximately 8400 feet northward of the center of the overflow section of Imperial Dam, thence on a straight line to "

The Boundary Commissions resolved other disagreements and the compact was approved in 1966.

On September 30, 1959, the Bureau of Reclamation requested the dependent resurvey and survey of accretions attached to sections 3, 4, and 5, T. 9 S., R. 22 E., and section 35, T. 8 S., R. 22 E.

Special Instructions

Procedure for resurvey and survey of the accreted lands was agreed upon by the United States Attorney General, the Solicitor's office, the Bureau of Reclamation and the Bureau of Land Management on March 24, 1960.

On March 25, 1960, Supplemental Special Instructions for Group 459, California, were prepared, providing for the necessary retracements, resurvey, subdivision of sections and survey of accretions to sections 3, 4 and 5, T. 9 S., R. 22 E., and section 35, T. 8 S., R. 22 E., SBM. The field work was assigned.

Conditions Found on the Ground

T. 8 S., R. 22 E., is located in Riverside County, California. T. 9 S., R. 22 E., is in Imperial County, California. County surveyors had performed extensive resurveys and corner perpetuation along the standard parallel and in the sections in T. 8 S., restoring the Benson surveys. Land ownership, occupation and construction of irrigation works were all based on the county surveyors monuments.

The standard parallel and section lines were retraced, resurveyed and necessary section subdivisional lines surveyed. Where required, 1/16 section corners were established. No evidence remained of the original 1879 survey monuments. The county surveyor monuments were accepted wherever they had been established, in accordance with the principles outlined in sections 5-42 and 6-28 of the Manual of Surveying Instructions, 1973.

Figure 5 illustrates the 1879 survey record performed by Benson, and the ownership status of lands on both sides of the record meanders in both states. Most of the unpatented lands and the accretion to sections 3, 4 and 5 were being occupied and farmed in trespass.

Preliminary Statement of the Problem

Of primary concern when surveying accretions to public lands is the method of dividing the accretion and determining the extent of the accretions. The government can survey the public land itself in any way it deems fit, within the constraints of Acts of Congress and regulations of the Department of the Interior. If all of the land fronting on an old meander line is vacant public lands then the survey of the accretion can easily proceed in the normal rectangular manner, extending the section and lot lines, similar to a completion survey. If the ownership is mixed, the lines of division between private and public lands must be determined and then a method of either lots, or tracts, or a combination of both, may be utilized to survey and plat the accretion to the public lands.

This survey involved laws concerning riparian rights and water boundaries, including accretion, avulsion, land reemergence and methods of equitably dividing accretion. Land reemergence in this survey had to be treated according to California law.

The common law, subscribed to by the Civil Code (statutes) of California, is that lands which were originally riparian retain their riparian right. As the once eroded lands reappear through accretion they regain their identity and the remote tracts stop at their original boundaries. If and when the originally riparian tracts fully reappear they regain their identity and are entitled to any accretions.

DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.

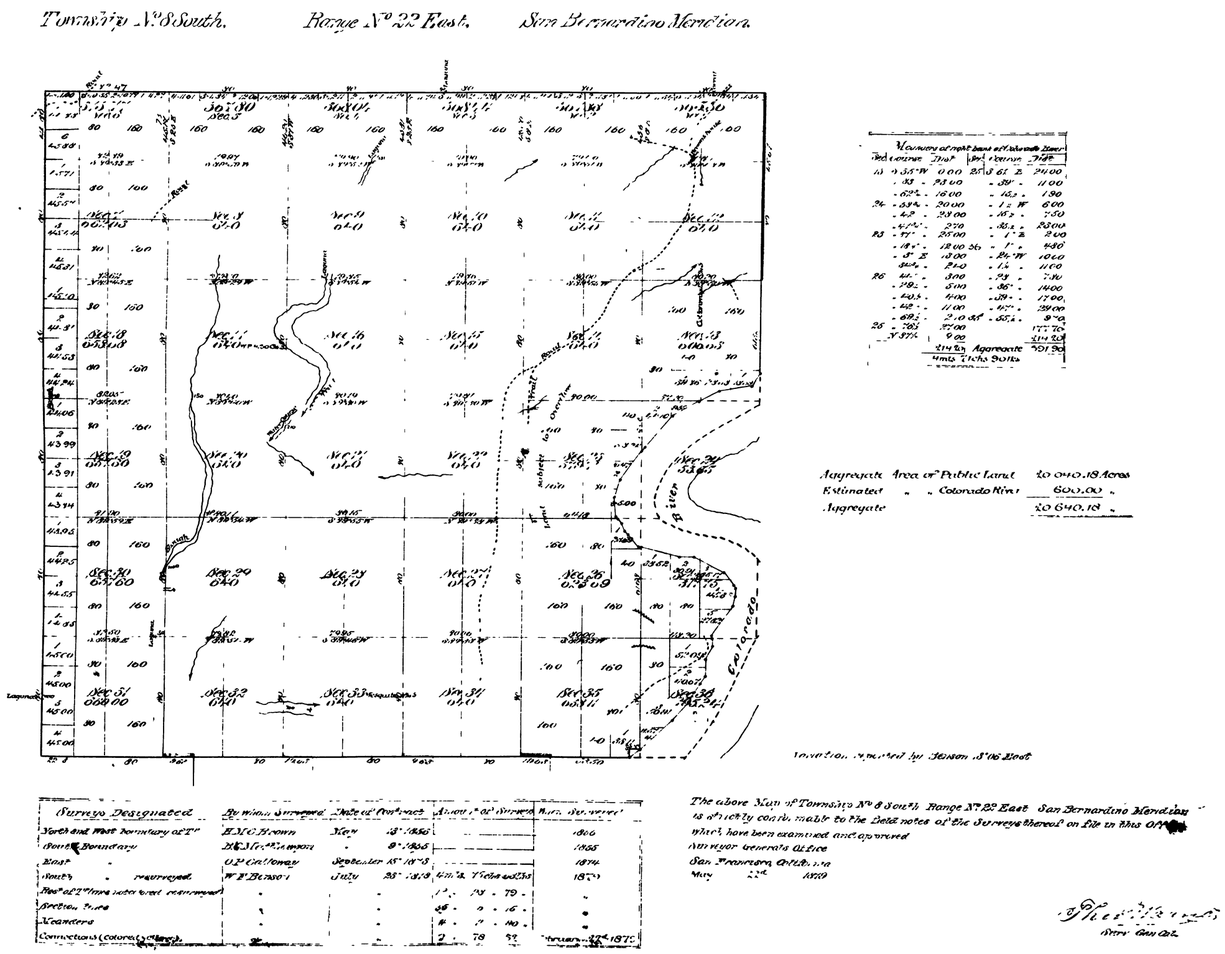


Figure 1 - Original Plat - California

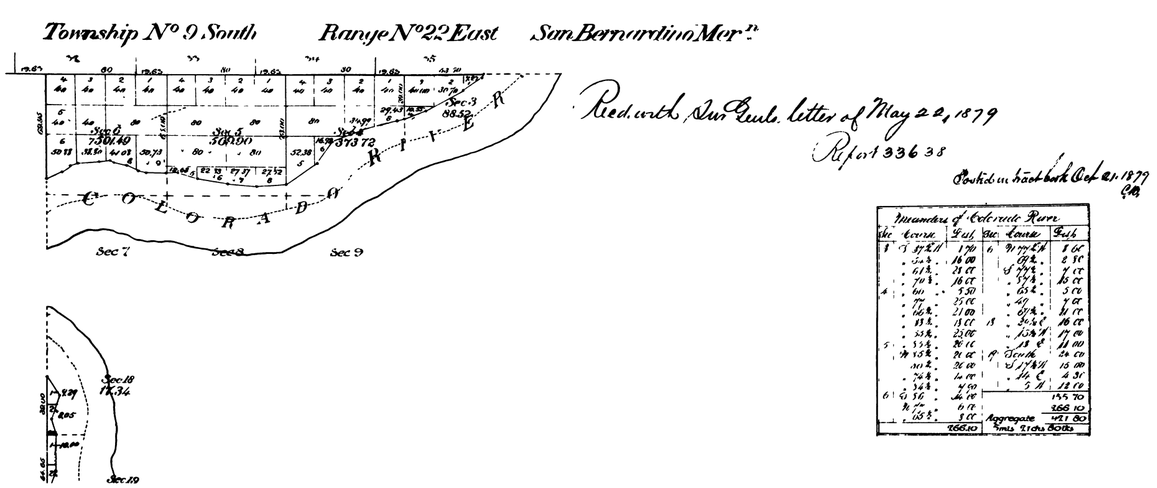


Figure 2 - Original Plat - California

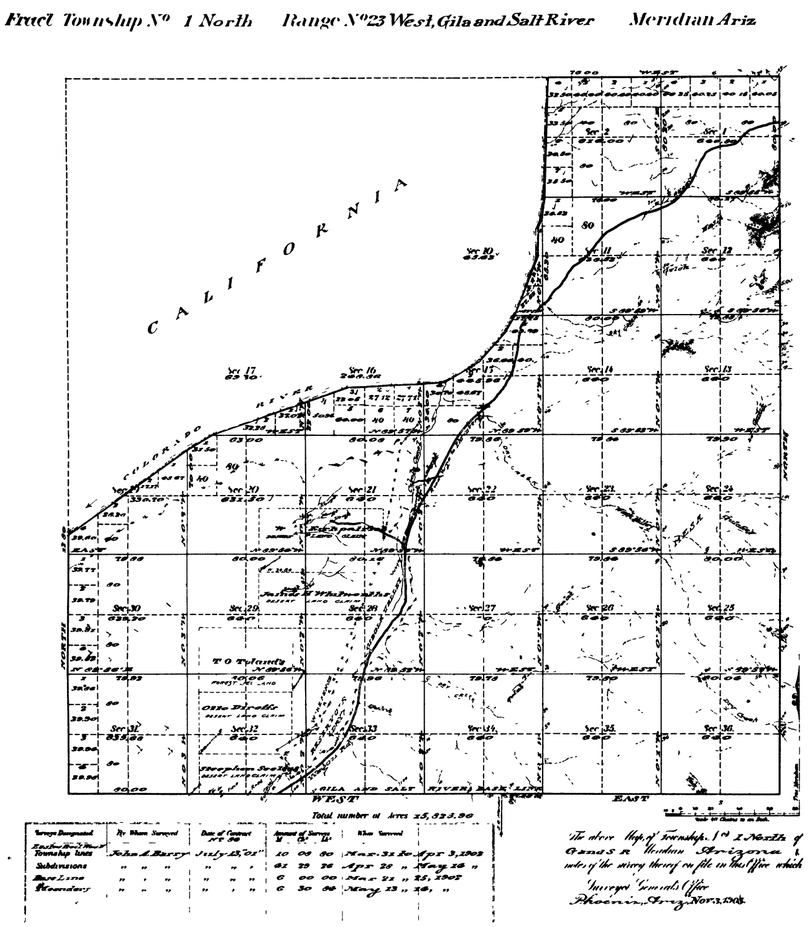


Figure 3 - Original Plat - Arizona

DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.

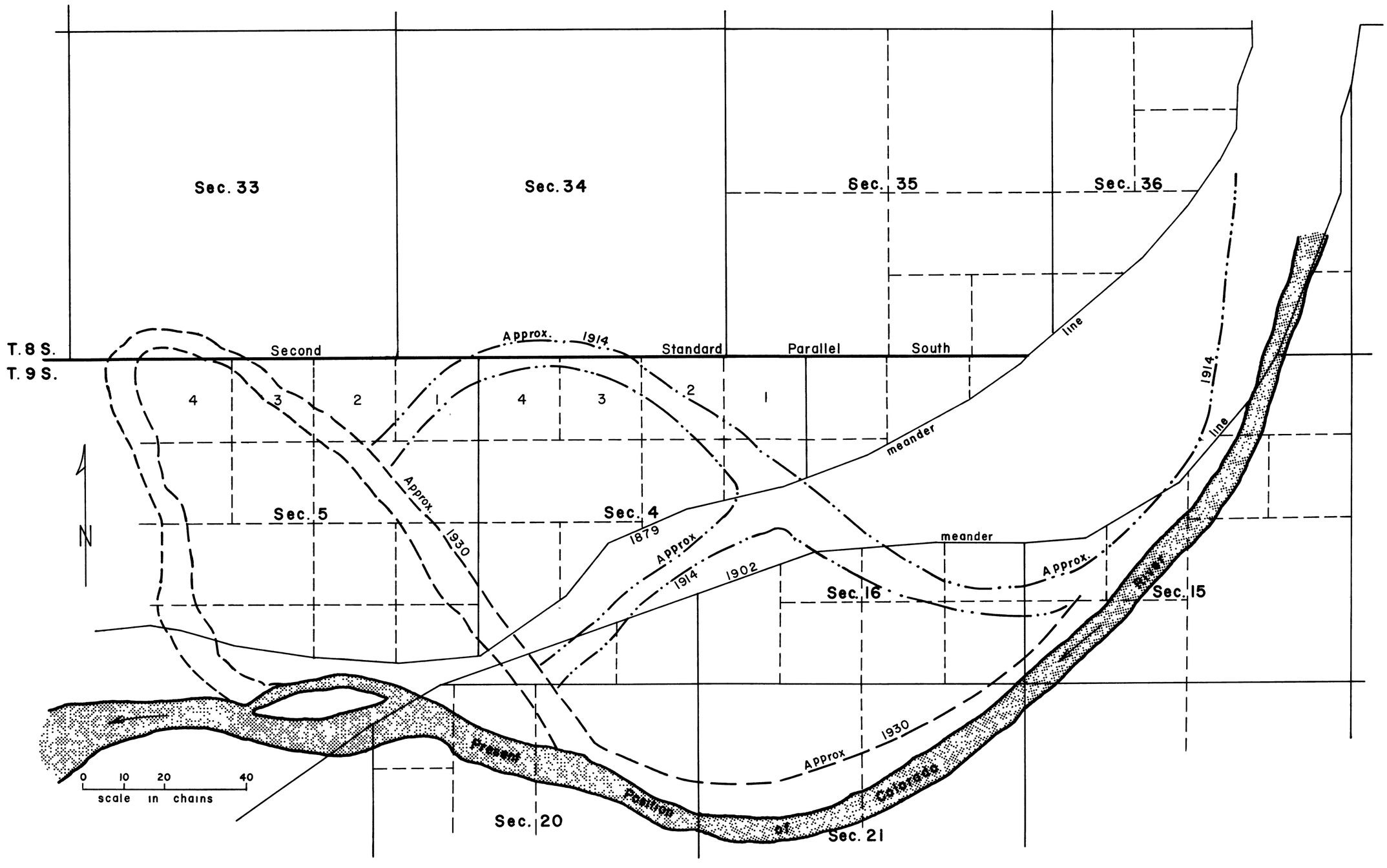


Figure 4 - History of River Position

DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.

Even though public lands are involved, each state determines for itself questions relating to loss of land by erosion, submergence or avulsion. It also determines questions concerning acquisition of land by accretion. Since California, by statute, subscribes to the common law, the lands involved in this case fall under that principle. If Arizona does not have a statute or court decision to the contrary the common law would apply to Arizona reemerged lands.

Another matter to be considered was that of dividing the accretion. The well established principle is to divide the accretion along the new bank in proportion to the frontage held along the former bank. The accretion extends for several miles up and down stream from the lands to be surveyed. There is no definite point where the old meander line meets the new meander line as a basis for apportionment.

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

3-88 and 3-90	Subdivision of fractional sections
3-115 to 3-120	Meandering and navigability
5-42	Restoration of corner monuments
5-43	Angle points of non-riparian lines
5-45	One point control
7-46 to 7-67	Water boundaries

Legal Constraints

1. The amount of accretion would necessarily be determined from historical records of the river bank monuments.

2. The California-Arizona state line was fixed by the boundary compact.

3. Sections 4 and 5 were at one time almost entirely eroded away but regained their full identity and rights upon reemerging, and are entitled to the accretions thereto. Some of the lands in T. 1 N., R. 23 W., in Arizona, reemerged but on the opposite bank and would not regain their identity by so doing.

4. The accretion would be divided by a line perpendicular to the present channel of the river.

Auxiliary Topic

Determination of the California-Arizona boundary line by a Boundary Commission is described in a report by the Colorado River Boundary Commission of California, 1963:

RETRACEMENT OF THE BOUNDARY

In its report to the joint commissions of November 2, 1953, the joint legal subcommittee reported in part as follows:

"The effect upon the boundaries of a state, where such boundaries are fixed by the middle of the main channel of a river, by changes in that channel through processes of accretion and avulsion is dependent upon the gradualness or suddenness of the change; when the course of the river and its channel changes gradually, the boundary follows the channel, but if the river suddenly changes its course or deserts its natural channel, the boundary remains where it was before, that is, in the middle of the altered or deserted riverbed. The boundary of a state along a river is not changed by a sudden change of the channel so as to cut an island off from the mainland. In fixing the boundary along a main navigable channel which has been left dry by avulsion, all that is required is such certainty as is reasonable as a practical matter, having regard to the circumstances. See 49 Am, Jr. Sec. 21, page 242, citing Arkansas v. Tennessee, 269 U.S. 1520, 70 L. ed. 206, 46 S. Ct. 31.

"Where the boundaries between states are, by prescription or treaty, found in running water, accretion, no matter to which side it adds ground, leaves the boundary still the center of the channel. Nebraska v. Iowa, 143 U.S. 359, 36 L. ed. 186, 12 S. Ct. 396."

On the assumption that the foregoing doctrine was intended to be applied to the Colorado River portion of California's easterly boundary when Article XII of the original California State Constitution was drafted and adopted, an earnest effort was made to retrace the boundary since 1850 and determine its present location after giving effect to avulsions and artificial changes which have taken place in the interim. To facilitate this study, maps prepared from the earliest surveys to 1935 were reproduced at the scale of the commissions' base maps and applied as overlays from one end of the common boundary to the other. Except for the artificial cutoffs, it has not been possible to arrive at a precise determination as to when the apparent change occurred, nor as to the specific causes therefor in most cases. Some of the loops migrated slowly downstream; others, undoubtedly, were cut off suddenly at the neck, but only in two instances has it been possible to pinpoint the change as to time and exact cause.

It is well known that after Hoover Dam was closed, enormous quantities of silt that previously had been carried to downstream destinations were trapped above the dam and deposited in Lake Mead. The comparatively clear water then proceeded to pick up silt, a large amount in the upper end of the Mohave reach. This unquestionably had a tendency to increase the meandering of the river, but the extent thereof has not been clearly demonstrable. The effects of closing Davis and Parker Dams were similar as applied to the reaches below them, but again the degree of change has been found to be unascertainable. Imperial Dam has trapped a large quantity of silt, the direct effect being a raising of the bed of the river. What the result has been on meandering cannot be determined.

For these reasons the joint commissions reached the conclusion that the determination of the location of the boundary by retracement was infeasible.

BASES FOR LOCATION OF THE BOUNDARY

The two commissions concluded that the main objective of the boundary determination was to so locate the boundary as to serve to the best advantage from a practical administrative point of view.

A study was made of the possible use of the survey made of the Colorado River Valley by the United States Geological Survey in 1902-03 as a basis for the location of the interstate boundary. The selection of this survey was based on the fact that it was the nearest in point of time to the admission of Arizona to the Union (1912); it was made only a few years before the completion of the first major dam across the river (Laguna Dam, 1909), and it was authentic. It was discovered, however, that in many places the river at that time was in a substantially different location from its present one. Transfers of property from the jurisdiction of one state to another would be extensive, and administrative problems would be multiplied.

For similar reasons surveys made immediately prior to the closing of Hoover Dam were rejected as a basis for the location of the boundary.

It was decided that at all bridge crossings and at all dams the boundary should be located midway between the abutments of the structures. Thus, easily marked and visible locations of the boundary would be available at a number of points, and at the same time existing arrangements as to division of ownership and maintenance costs, and of jurisdiction, would not be disturbed. Included in this category are the following:

1. Railway bridge, Atchison, Topeka & Santa Fe Railway, Topock.

2. Highway bridge (U.S. 66), Topock.

3. Pacific Gas & Electric bridge, Topock.

4. Parker Dam.

5. Headgate Rock Dam, U.S. Indian Service.

6. Highway bridge at Parker.

7. Palo Verde Weir, U.S. Bureau of Reclamation.

8. Highway bridge, U.S. 60 and 70, Ehrenberg.

9. Cibola bridge.

10. Imperial Dam, U.S. Bureau of Reclamation.

11. Laguna Dam, U.S. Bureau of Reclamation.

12. New highway bridge, U.S. 80, Yuma.

It was next decided that where the river was confined between stable canyon walls and where the likelihood of meandering was extremely remote, the boundary should be located midway between the banks. This would leave the boundary in very close conformance with where it had been in the past, and thus minimize disturbance of prior arrangements and understandings and preserve them for the future.

A decision was then reached with reference to artificial cutoffs that had been made in the past and which were definitely planned for the future. As to these, where the commissions were reasonably assured that the cutoffs or artifical channels ultimately would be stable, it was agreed that the boundary should follow the middle of such cutoffs or channels. Many of the latter have been in existence for some length of time; property owners and local governments have become accustomed to them. No material disruption is likely to occur with the boundary so located.

It was agreed that the location of the northernmost point of the boundary common to Arizona and California should be the southernmost point of the California-Nevada boundary as previously agreed upon by the latter two states.

As to the reaches of the river between the bridges and dams not included in stable canyons, full consideration was given to having the boundary follow the middle of the river channel as it continued to meander. Such a solution would solve many problems in existence now confronting property owners and municipal, county, state, federal, and other agencies. However, if the river continues to meander over the years to come, the same situations could arise in the future, and, if so, would again require attention and correction. For this reason the majority view of the commission was to locate the boundary along the present course of the stream, with but few exceptions, and at the same time fix the boundary to the face of the earth by having its turning points described in such a manner that their geodetic locations could be determined and fixed. This latter solution would solve the present problems stemming from an indefinite boundary location, and would prevent their recurrence in the future.

DESCRIPTION OF PROPOSED BOUNDARY

The commissions of the States of California and Arizona have held numerous hearings and have gathered a great amount of information. The Joint Summary Report on Arizona-California Boundary was submitted on December 27, 1954. This was followed by Report of Colorado River Boundary Commission on March 31, 1955.

In both of these reports the two commissions recommended a boundary which, in general, followed the existing center of the Colorado River. The one notable exception was in the so-called "Yuma Island area." Here it was recommended that the boundary follow the channel of the river as it existed prior to the avulsive change of June 7 and 8, 1920.

The California Legislature rejected the boundary as proposed by the 1954 and 1955 commission reports. Vigorous objections appear to have been raised by the Legislature to the suggested boundary line in the "Yuma Island area," and, as a result, future study by the commissions centered on this area.

Further reports were submitted by the California Colorado River Boundary Commission on January 30, 1957, and on April 15, 1958.

In the meantime Senate Constitutional Amendment No. 13 was approved by the California electorate on November 6, 1956. The people of Arizona approved a similar amendment to that state's constitution.

These amendements provide for mutually acceptable changes in the California-Arizona boundary.

Since the last report was submitted on April 15, 1958, the two commissions have held joint meetings on April 23, 1958, November 20, 1959, February 27, 1961, and February 16, 1963. It was at this last meeting that the two commissions agreed to recommend the boundary as now proposed in the Yuma Island area.

The advantages of this line are briefly as follows:

a. It follows approximately the location of a channel known to have existed in 1874 as surveyed by the U.S. General Land Office.

b. Much of the land lying south of this line is patented in Arizona, and taxes have been paid to Arizona for a number of years.

c. Most of the land lying to the north of the proposed boundary within the old 1920 channel loop is owned by the federal government and none of it is patented.

d. Old Highway 80 bridge would lie wholly in Arizona, giving that state access to its portion of the island.

e. Indian lands in California would not be affected except that the overpass over the Southern Pacific Railway and part of the road through the Indian School will lie in Arizona.

Below the old Highway 80 bridge, the proposed line again follows the center of the existing river to the Mexican boundary.

The so-called "pie-shaped piece" containing some 3,000 acres would be recognized as lying wholly in Arizona, but that state has administered this piece of land for many years, and part of it is incorporated in the City of Yuma.

California has acquiesced in Arizona's exercise of jurisdiction over the "pie-shaped" area for many years without protest. It seems apparent that California would have little likelihood of successful litigation concerning the area, aside from practical matters of administration making it prudent for the area to be within Arizona.

DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.

PENDING LEGISLATIVE STATUS IN CALIFORNIA LEGISLATURE

During the 1961 General Session of the California Legislature, State Senators Shaw and Backstrand introduced Senate Concurrent Resolution No. 34, calling for State Senate approval of the proposed boundary line between California and Arizona, as recommended by the two states' Colorado River Boundary Commissions following their last joint meeting in Las Vegas, Nevada, on February 27, 1961. The resolution, aside from calling for general approval of the proposed boundary line, made specific reference to the Cibola Valley area where a new channel is to be constructed by the Bureau of Reclamation, and the Yuma Island area where the compromise proposes to follow the approximate 1874 meander line. The Yuma Island area has been the only remaining subject boundary segment in dispute, with sole opposition being registered from Imperial County. The California State Senate adopted Senate Concurrent Resolution No. 34 on or about May 25, 1961, and sent the resolution to the Assembly for action.

Assembly Concurrent Resolution No. 71, introduced by Assemblymen Cologne, Dills, and Beaver on March 15, 1961, contained the same language as Senate Concurrent Resolution No. 34. This bill was referred to Assembly Committee on Rules, and subsequently assigned to the California Interstate Cooperation Committee, chaired by Assemblyman Dills, for interim study. Senate Bill No. 446 was submitted by Senators Nisbet and Backstrand on Febraury 4, 1963. This bill contains a form of compact between Arizona and California.

WORK TO BE COMPLETED

A compact between Arizona and California has been executed by the boundary commission of the States of Arizona and California respectively, and has been submitted to the Governor and to the State Legislature for the purpose of their approval.

When this approval has been given, it will be necessary to enter into a contract with the United States Coast and Geodetic Survey, who will make a detailed survey, locating the principal 34 points by longitude and latitude to the nearest 0.001 second (about 0.1 foot).

An additional 200 points will be located from aerial photographs, and their geodetic positions calculated to the nearest 0.01 second (about 1 foot). The Coast and Geodetic Survey estimates that the total cost of this work will be about $100,000. One-third of this cost will be paid by each state, and one-third will be paid by the federal government.

In addition, it will be necessary for the Federal Bureau of Land Management to restore a few section corners in the Yuma area. The cost of this work is not known but should be no more than $5,000, one-half probably to be paid for by each state.

The total contract cost to the State of California should not exceed $40,000. Once these surveys are completed, it will be possible to retrace the entire length of the boundary with accuracy at any future time, regardless of any future meandering of the Colorado River.

As a result of the construction of the various dams and control structures, any great meandering of the river below Davis Dam is considered to be quite unlikely.

Solution

The lines between sections 3 and 4, 4 and 5, and the southerly portion between sections 5 and 6 were restored at record bearing and distance from the north.

The original (1879) meander line of the right bank was retraced and adjusted by the broken boundary (compass rule) method between the restored meander corners. The adjusted angle points of the original meander line, fronting on public lands, were monumented, fixing the line. Section 5 was subdivided in accordance with the Manual of Surveying Instructions, 1973, sections 3-88 to 3-90. The present right bank of the Colorado River was meandered to the extent necessary to determine the limits of the land accreted to the public lands. These resurveys, surveys and meanders are illustrated in figure 6.

Lot I, section 35, was originally riparian and is vacant public land. Lot 4, section 36 is patented State of California school land. A line was surveyed normal to the medial line of the present channel of the river, (the state boundary) S. 71°30′ E., from the original meander corner of sections 35 and 36. This line created the division of accretion between the patented and public lands. Similarly a division line was surveyed from the SMC on the original (adjusted) meander line between Lots 7 and 8, section 5. This dividing line was run S. 22°00′ W., perpendicular to the medial line of the river and state boundary.

DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.

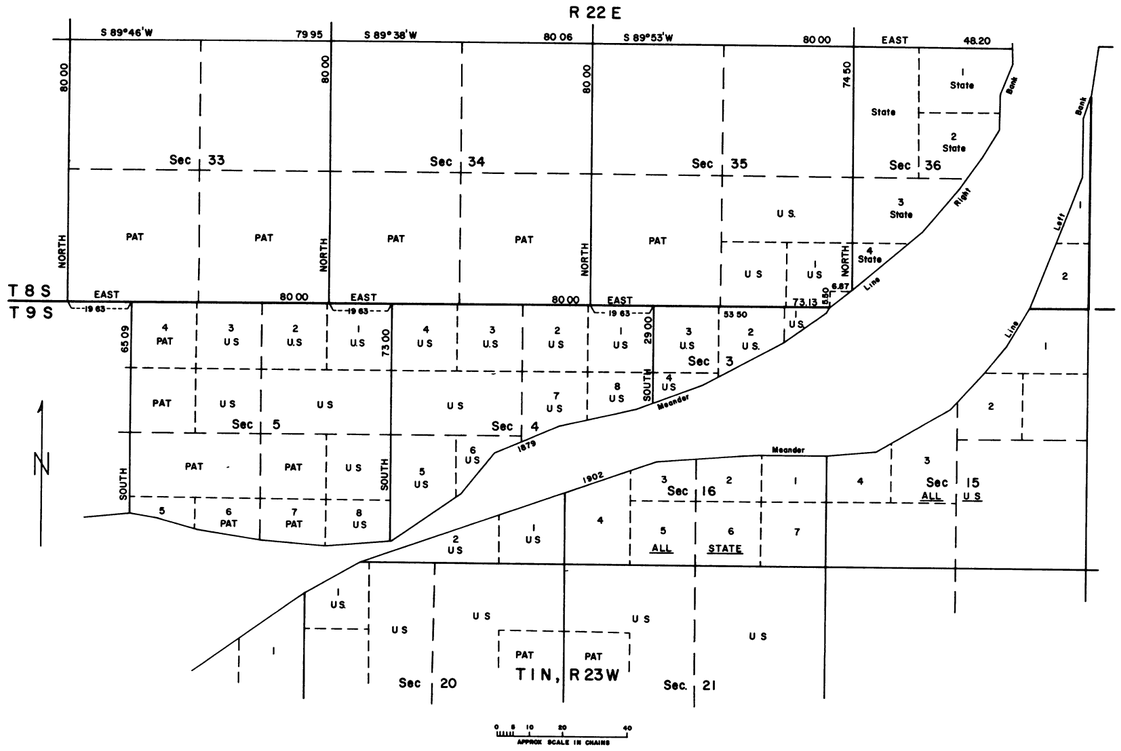


Figure 5 - Record Surveys and Status

The standard parallel was extended East from the meander corner of sections 3 and 35 to an intersection with the division of accretion line, where a closing corner of sections 3 and 35 was established. The standard parallel was extended East, into the accretion to section 36, an additional 2.23 chains to a theoretical corner of sections 2 and 3, 80 chains in departure, east of the corner of section 3 and 4. From this theoretical point a line was run South, to an intersection with the division of accretion line, where a closing corner of sections 2 and 3 was established. This line was then surveyed South, between sections 2 and 3, to the new meander of the right bank, with a ¼ section corner established at 40 chains in latitude from the theoretical corner of sections 2 and 3.

The line between sections 3 and 4 was extended South, to a total of 80 chains, and a corner of sections 3, 4, 9 and 10 was established. The line between sections 3 and 10 was surveyed East to the new meander line, where a meander corner was established. The ¼ section corner was established at 40 chains.

The line between sections 9 and 10 was surveyed due South to a meander corner on the present right bank.

The line between sections 4 and 5 was extended due South a total of 80 chains and the corner of sections 4, 5, 8 and 9 established. The line between sections 4 and 9 was run "random and true" with a ¼ section corner at midpoint.

The line between sections 8 and 9 was run due South to a meander corner on the right bank. The line between sections 5 and 8 was run due West to a meander corner.

The meanders of the present right bank were surveyed and written in the normal manner from the division of accretion line between sections 2 and 36, to the SMC on the division line in section 5.

Ties were made across the river to meander corners in T. 1 N., R. 23 W., in Arizona.

The plats were prepared for both townships. The accreted land was lotted into forty acre lots with the areas shown to 1/100 th acres. The accretion to section 35 lying north of the standard parallel was not lotted in a normal manner. The triangular parcel was designated Lot 2, section 35 instead of being broken into two smaller size lots in sections 35 and 36. There is no accretion to section 36 in this lot so no useful purpose would have been accomplished in the extra division.

The plats of survey were accepted on May 19, 1961 and are illustrated in figures 7 and 8.

The title to accretions defined in this survey was contested. A United States Court of Appeals affirmed the reemerged lands as accretions as shown in this survey; R.A. Beaver, et al v. United States of America, 350 F. 2d 4. (1965)

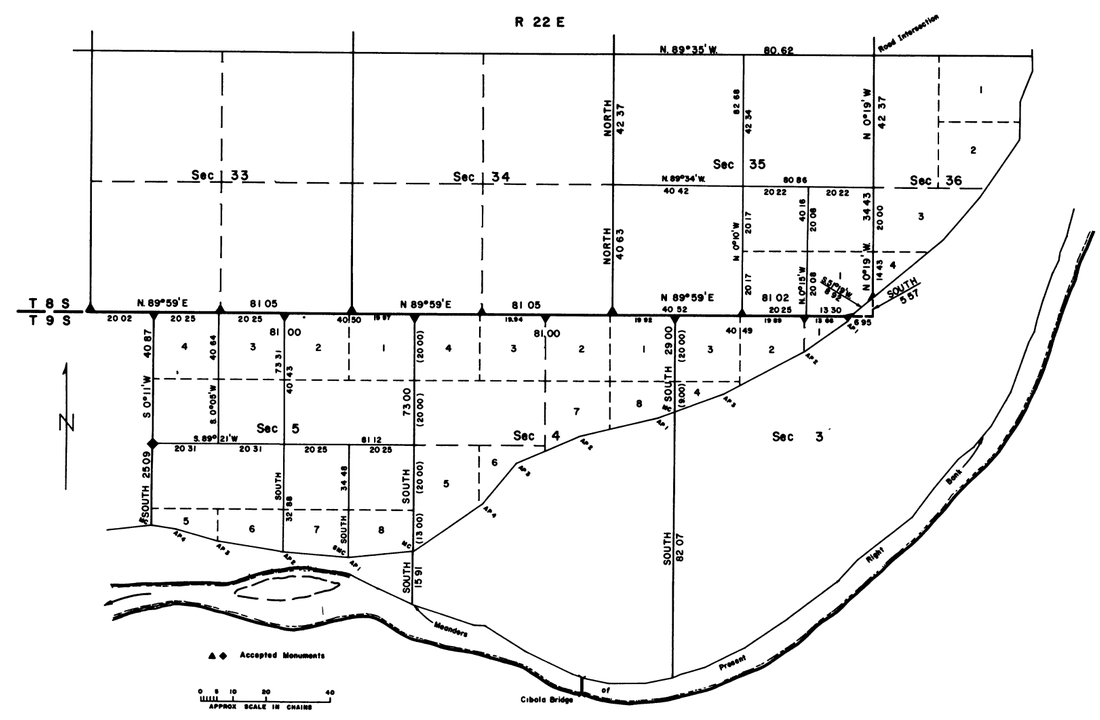


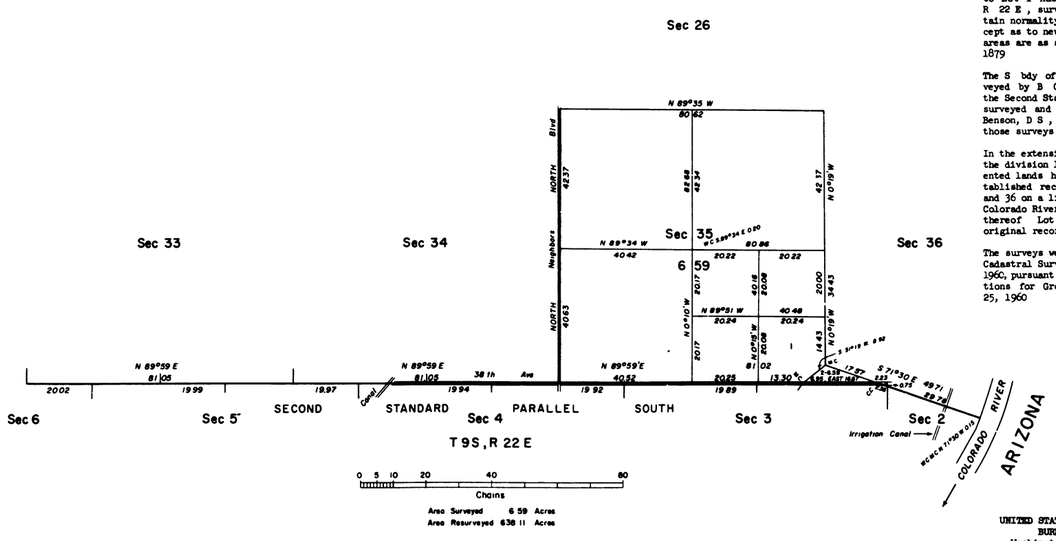
Figure 6 - Dependent Resurvey and Subdivisions

DIVISION OF COLORADO RIVER ACCRETIONS

T. 9 S., R. 22 E., S. B. M.

TOWNSHIP 8 SOUTH, RANGE 22 EAST OF THE SAN BERNARDINO MERIDIAN, CALIFORNIA.

DEPENDENT RESURVEY AND SURVEY OF ACCRETION



This plat represents the limited dependent resurvey of the south boundary and the dependent resurvey of sec 35, designed to restore the lines and corners thereof in their original positions according to the best available evidence of the original surveys, the limited subdivision of sec 35, and, the survey of a portion of the accretion lands attached to Lot 1, sec 35, which said Lot 1 is public land In this latter survey, a part of the area accreted to Lot 1 has been included within T 9 S , R 22 E , surveyed at this same time, to maintain normality of sectional subdivisions Except as to new Lot 2, sec 35, the lottings and areas are as shown on the plat approved May 22, 1879

The S bdy of the township was originally surveyed by B C Matthevson, D S , in 1855, as the Second Standard Parallel South. It was resurveyed and the township subdivided by W F Benson, D S , in 1879 The official plat of those surveys was approved May 22, 1879

In the extension survey of the accretion lands, the division line between the public and patented lands has been extended from the reestablished record meander corner of secs 35 and 36 on a line normal to the center of the Colorado River and to the mean high water line thereof Lot 1, sec 35, is limited to the original record meander line of 1879

The surveys were executed by Cadastral Surveyor, from March 31 to April 27, 1960, pursuant to supplemental special instructions for Group 459, California, dated March 25, 1960

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D C May 19, 1961

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted

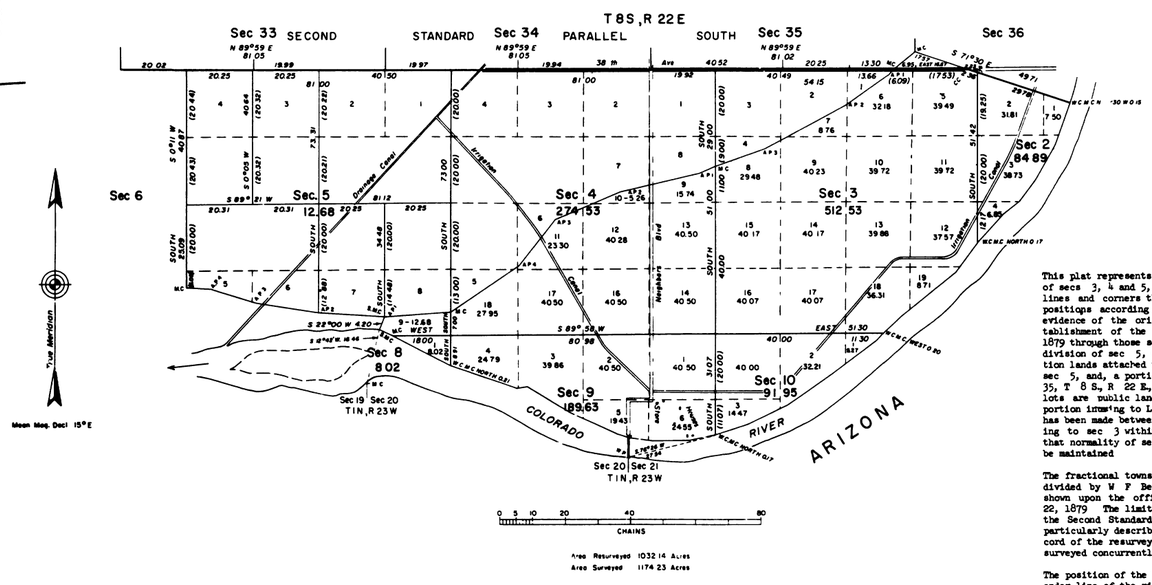
For the Director

Cadastral Engineering Staff Officer

Figure 7 - Accepted Plat

TOWNSHIP 9 SOUTH, RANGE 22 EAST OF THE SAN BERNARDINO MERIDIAN, CALIFORNIA.

DEPENDENT RESURVEY AND SURVEY OF ACCRETION



This plat represents the dependent resurvey of secs 3, 4 and 5, designed to restore the lines and corners thereof in their original positions according to the best available evidence of the original surveys, the reestablishment of the record meander line of 1879 through those sections, the limited subdivision of sec 5, and the survey of accretion lands attached to secs 3 and 4, Lot 8, sec 5, and, a portion inuring to Lot 1, sec 35, T 8 S, R 22 E, which said sections and lots are public lands In respect to that portion inuring to Lot 1, sec 35, no division has been made between it and that part inuring to sec 3 within the township in order that normality of sectional subdivisions may be maintained

The fractional township was originally subdivided by W F Benson, D S , in 1879, as shown upon the official plat approved May 22, 1879 The limited dependent resurvey of the Second Standard Parallel South is more particularly described in the official record of the resurvey of T 8 S , R 22 E , surveyed concurrently with this work

The position of the 1879 original record meander line of the right bank of the Colorado River is shown by an irregular line with numbered angle points this line has been marked as a fixed and limiting boundary with the directions and lengths of the several courses adjusted to the record of the original survey In the extension survey of the accreted area, division lines between public and patented lands have been extended from the reestablished record meander corner of secs. 35 and 36, T 8 S , R 22 E , and the special meander corner of the E 1/16 sec line of sec 5, on lines respectively normal to the center of the Colorado River and to the mean high water line thereof Except as to new subdivisions as shown hereon, the lottings and areas are as shown upon the plat approved May 22, 1879

The surveys were executed by Cadastral Surveyor, from March 31 to April 27, 1960, pursuant to supplemental special instructions for Group 459, California, dated March 25, 1960

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D C May 19, 1961

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted

For the Director

Cadastral Engineering Staff Officer

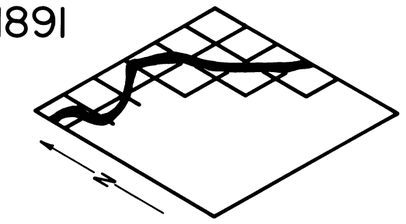
Figure 8 - Accepted Plat

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

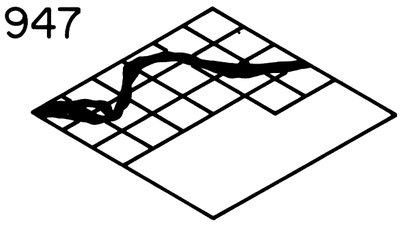
T. 27 N., R. 56 E., PRINCIPAL MERIDIAN, MONTANA

Frac. Township No. 27 North Range No. 56 East of the Principal Meridian Montana

1891



1947



History of Surveys

1891 James M. and Rodney W Page surveyed the north boundary and a portion of the subdivisional lines of T 27 N, R. 56 E, Principal Meridian, Montana, as shown on the plat approved February 9, 1893. See figure 1

1947 Andrew Nelson dependently resurveyed the north boundary and a portion of the subdivisional lines His plat was accepted July 20, 1949. See figure 2

Other surveys affecting the township were performed by A.W Mahon, W B Kimmell and Ranney Y Lyman but do not affect this portion of the survey.

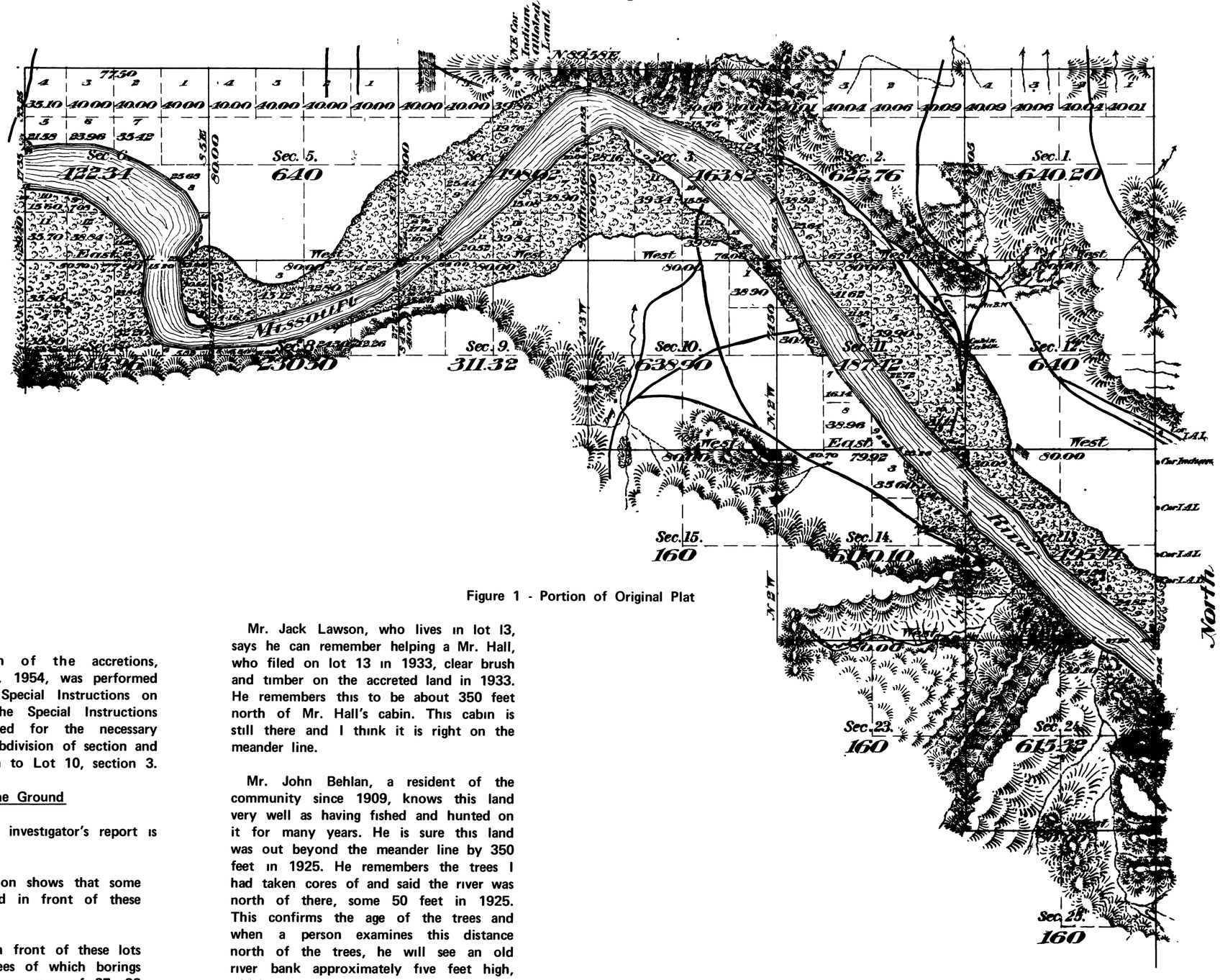


Figure 1 - Portion of Original Plat

Reasons for Request of this Survey

The Nelson plat shows an area of accretion to sections 3, 10 and 11, which was not surveyed in 1947.

An application in 1954 for homestead entry filed on Lot 10, section 3 precipitated this survey.

The field report on the entry confirmed the substantial accretion to Lot 10, as indicated on the 1947 survey. On October 26, 1954, the State Supervisor (Montana State Director) requested a survey of the accreted land attached to Lot 10.

Special Instructions

An investigation of the accretions, completed November 3, 1954, was performed prior to issuance of Special Instructions on November 5, 1954. The Special Instructions for Group 480 called for the necessary dependent resurveys, subdivision of section and survey of the accretion to Lot 10, section 3.

Conditions Found on the Ground

A portion of the investigator's report is quoted as follows:

"...The investigation shows that some accretion had formed in front of these lots by 1920.

About 300 feet in front of these lots are a number of trees of which borings were taken. These trees were of 27, 32 and 31 years of age. In front of Lot 6, section 3, there are many stumps which were cut in the last year. I counted four of these and the count was 26, 33, 34 and 40 years of age. There are some larger trees very near the old meander line. In fact I could not see much difference in the sizes of the trees on either side of the meander line. Where I presumed the old meander line was [the ground] is covered with a thick growth of trees and brush. Part of the accretion land has been cleaned and the land next to the water is still lower and is covered with a dense growth of willows. This, they say, is submerged during high water.

Mr. Jack Lawson, who lives in lot 13, says he can remember helping a Mr. Hall, who filed on lot 13 in 1933, clear brush and timber on the accreted land in 1933. He remembers this to be about 350 feet north of Mr. Hall's cabin. This cabin is still there and I think it is right on the meander line.

Mr. John Behlan, a resident of the community since 1909, knows this land very well as having fished and hunted on it for many years. He is sure this land was out beyond the meander line by 350 feet in 1925. He remembers the trees I had taken cores of and said the river was north of there, some 50 feet in 1925. This confirms the age of the trees and when a person examines this distance north of the trees, he will see an old river bank approximately five feet high, which shows the river may have been there for a number of years.

Mr. Jesse L. Hall of Culbertson, son of the Hall who homesteaded on Lot 13, stated the same as above. He remembers the river north of these same trees at the time his father moved there, for it was his job to dip water out of the river.

From the above evidence that I have gathered, we can come to the conclusions that the accretion formed onto these lots was by the slow process of relliction [addition] to the right bank of the river. Evidence gathered shows that by 1920 this accretion was out about 350 feet from the meander line. The river apparently was at this point for quite a number of years, for the accretion beyond this point is rather new. There is no trees on this new accretion and from evidence gathered not over 15 years of age. The question arises as to whether it is considered a substantial amount of accretion. If it is not, the Government could not claim the land under the Madison vs. Basart [59 ID 415] decision. This would also naturally depend on when the lots bordering the accretion land were filed on, which dates I do not have at this time."

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

T. 27 N., R. 56 E., PRINCIPAL MERIDIAN, MONTANA

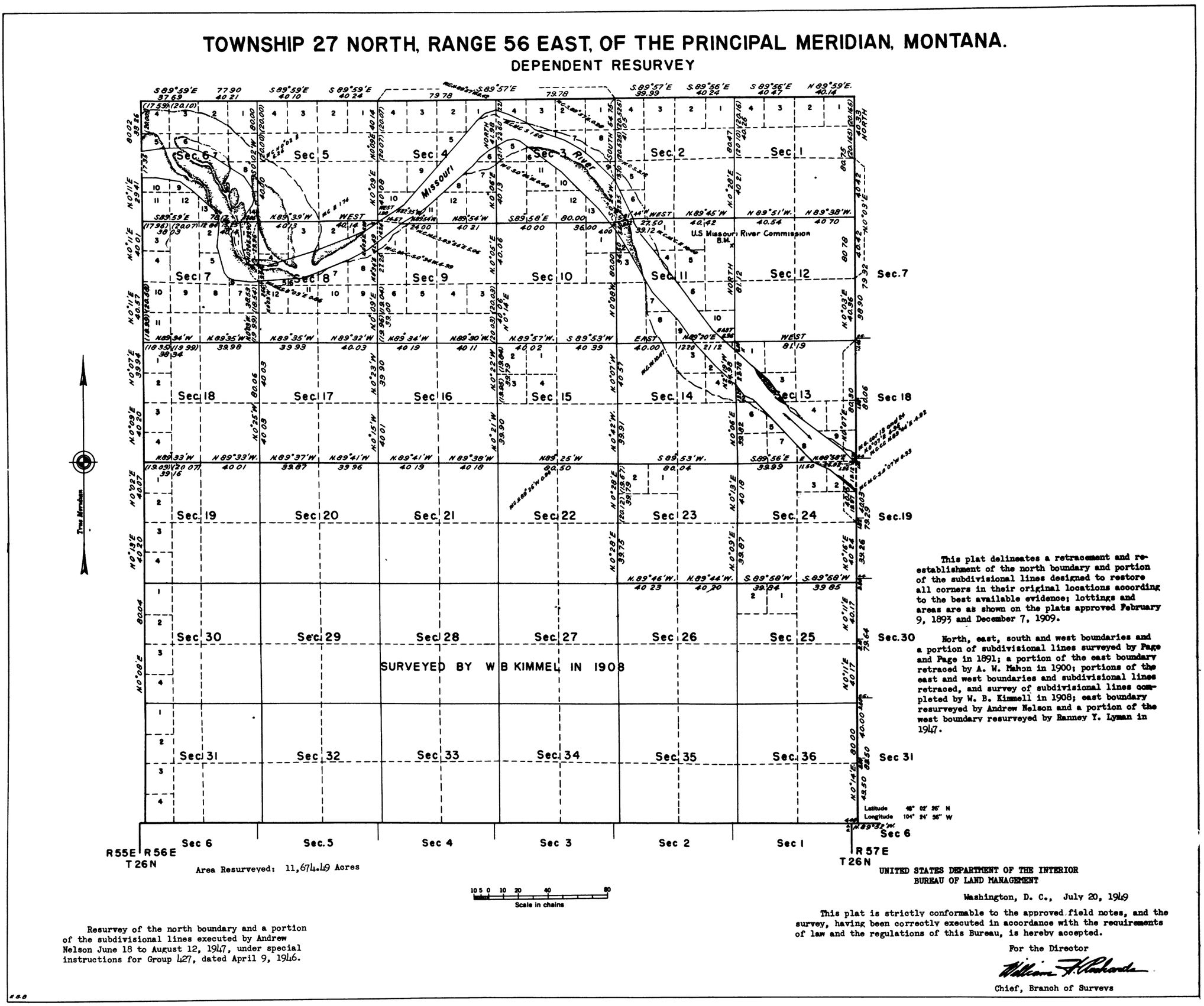


Figure 2 - Dependent Resurvey in 1947

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

T. 27 N., R. 56 E., PRINCIPAL MERIDIAN, MONTANA

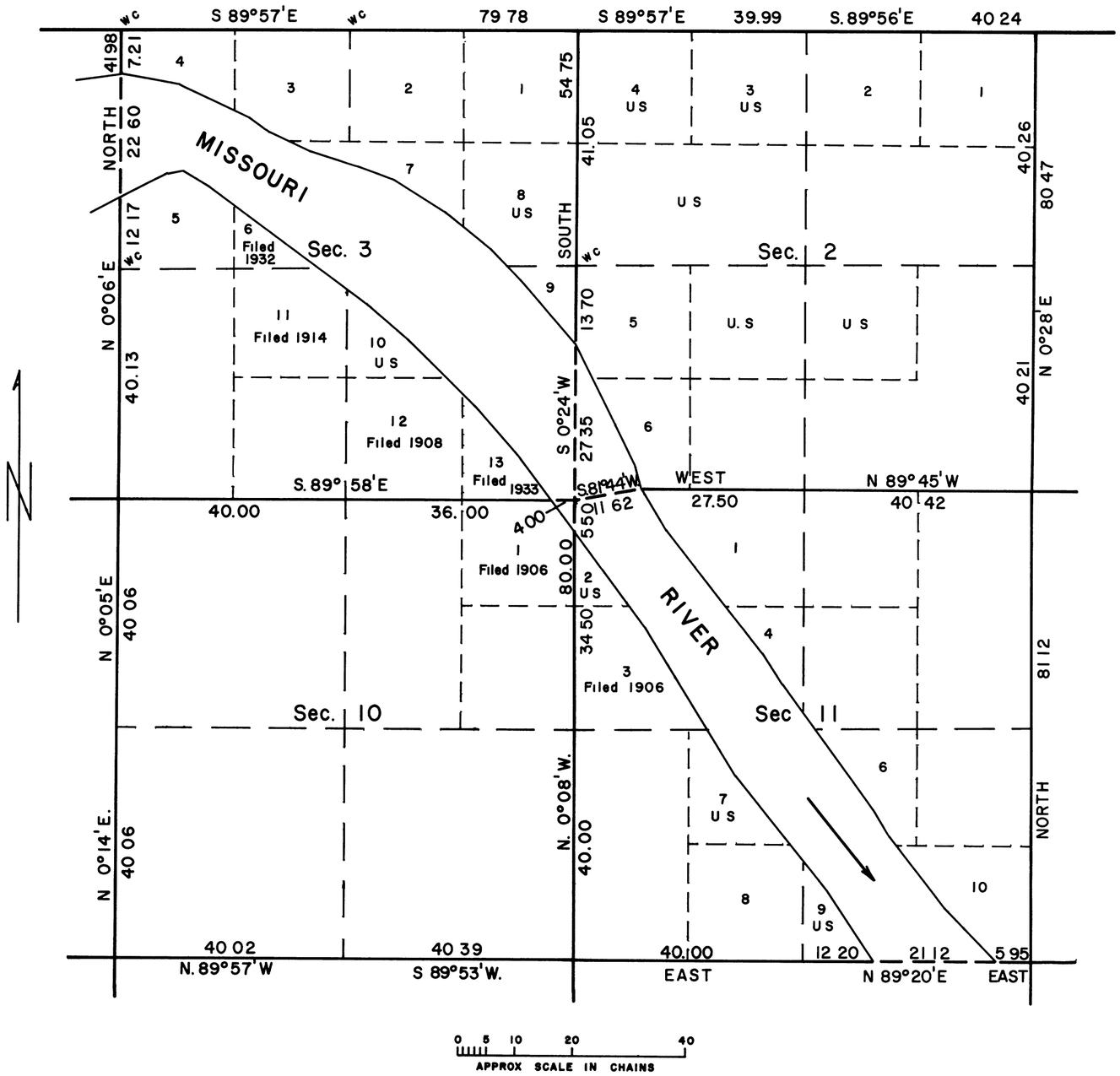


Figure 3 - Survey Records and Status

1891 RECORD MEANDERS

From M.C. Secs. 11 & 14, upstream

Right Bank	Left Bank
N. 35° W., 15.00	N. 45° W., 14.00
N. 39° W., 26.00	N. 39° W., 15.00
N. 30½° W., 30.00	N. 31° W., 5.00
N. 33½° W., 11.00	N. 37° W., 27.00
N. 34½° W., 7.89 to MC Secs. 10&11	N. 25° W., 5.00
	N. 39° W., 27.00
N. 36° W., 6.80 to MC Secs. 3&10	N. 31° W., 8.27 to MC Secs. 2&11
N. 37° W., 9.30	N. 15° W., 3.70
N. 43½° W., 12.00	N. 27° W., 25.80 to MC Secs. 2 & 3
N. 45½° W., 17.00	
N. 49½° W., 9.50	N. 41¾° W., 15.00
N. 54° W., 35.00	N. 43¼° W., 7.50
N. 75½° W., 4.70	N. 51½° W., 9.00
S. 80½° W., 2.50	N. 61¾° W., 13.00
S. 64° W., 7.30	N. 70½° W., 6.20
S. 60¾° W., 1.55 to MC Secs. 3 & 4	N. 74½° W., 8.60
	N. 65° W., 7.40
	N. 51½° W., 4.70
	N. 64° W., 13.00
	N. 79° W., 10.37 to MC Secs. 3 & 4

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

T. 27 N., R. 56 E., PRINCIPAL MERIDIAN, MONTANA

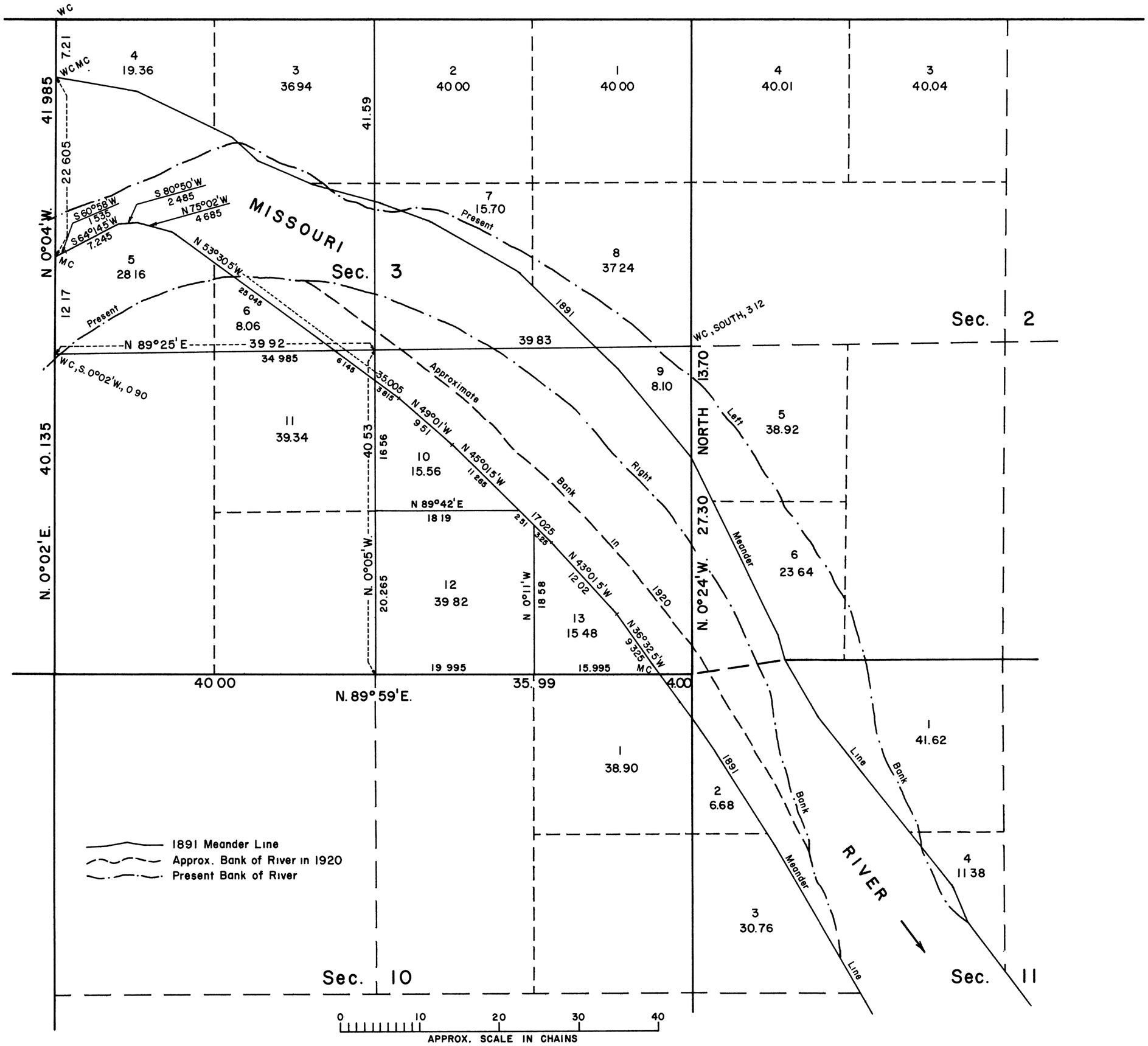


Figure 4 - Present Conditions and Resurvey Data

Figure 3 is a composite of the original and 1947 resurvey records, with land status added, on which any further survey work must be based. Eventually a portion of the boundaries of section 3 were resurveyed and the section subdivided to the extent shown in figure 4.

As part of this resurvey, the record meanders of the right bank, through section 3, were adjusted by the broken boundary method. The meanders of the present right bank were surveyed in accordance with section 3-119 of the Manual of Surveying Instructions, 1973. The witness ¼ section corner of sections 3 and 4, set in 1947, had been destroyed.

The line between Lots 10 and 12 of section 3 was run easterly on a mean bearing between the east-west centerline and the south boundary of the section. The line between Lots 12 and 13 was run on a mean bearing between the north-south centerline and a mean bearing of the south half of the east boundary. This procedure is in accordance with section 3-88 and 3-90 of the Manual of Surveying Instructions, 1973.

Figure 5 is a sketch indicating the original meander line, the present banks of the Missouri River and approximate position of the right bank in 1920, as indicated in the investigation report. The approximate area of accretion in 1920 is indicated in front of each original lot, except Lot 10. For example: Lot 6 was returned on the original plat as containing 8.06 acres. In 1920 approximately 4.4 acres of land had accreted to Lot 6.

The accretion to Lot 10, section 3 was surveyed according to the Special Instructions for Group 480.

A special meander corner was established at the intersection of the north-south centerline with the adjusted original meander line. Another special meander corner was established at the intersection of the line between Lots 10 and 12 with the adjusted original meander line. Angle points numbered 3 and 4, on the adjusted meander line, were permanently monumented, converting this portion to a fixed boundary. New meanders of the present right bank were surveyed.

Field surveys were made to locate the thread of the main channel of the river. Division-of-accretion lines were surveyed from the special meander corners, perpendicular to the thread of the main channel of the river, to the new meander line, where auxiliary meander corners were established. The entire accretion to Lot 10 was platted and designated Lot 14, the next higher number in section 3.

This survey was accepted on April 6, 1955. The plat is illustrated by figure 6.

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

T. 27 N., R. 56 E., PRINCIPAL MERIDIAN, MONTANA

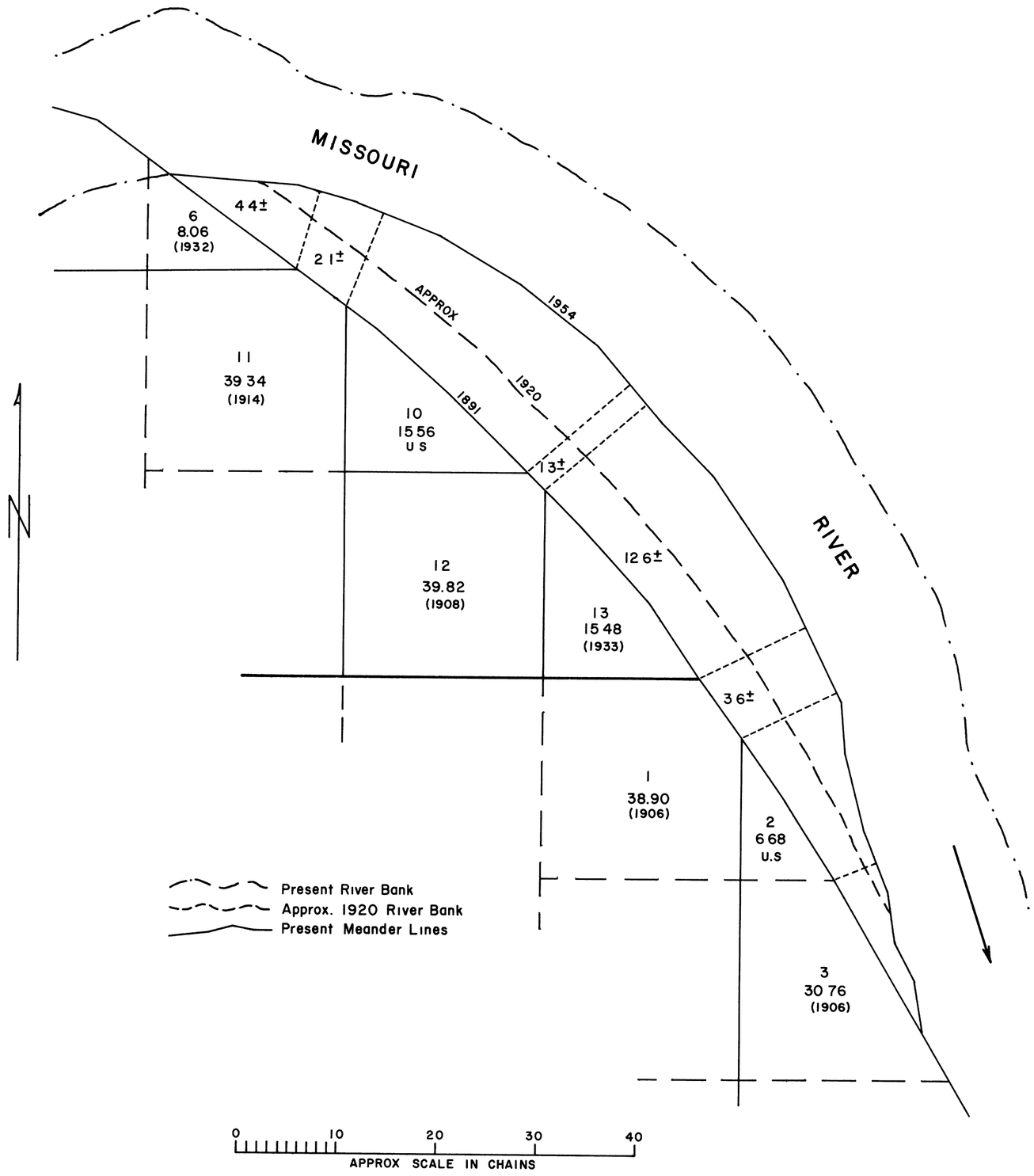


Figure 5 - Areas of Accretions

Preliminary Statement of the Problem

No serious problems were apparent in the restoration of corners of the original surveys. There were two problems which involved the accretions and which were to be solved.

The evidence shows that Page and Page properly meandered the Missouri River in 1891. The official resurvey made in 1947 revealed the approximate extent of accretion. The first problem is to fix the time and area of the accretions to Lot 10. The preliminary investigation indicated that 300 to 350 feet of accretion had built up by about 1920. The second problem concerns settling the question of what constitutes "SUBSTANTIAL" accretion. In the Madison vs. Basart decision, cited in the investigation report, more than a half mile of land had accreted prior to entry. That amount was quite clearly substantial.

There are no sharply drawn decisions which define the term "substantial accretion." It is, however, the duty of the Bureau to protect the public interest in the public lands. If substantial accretion has formed prior to entry, that accretion and all subsequent accretion has been held to be public lands subject to survey and disposal by the government. In the execution of these duties, someone must make the decision to either survey and claim the accretion, or decline to do so.

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

3-88 to 3-92	Subdivision of fractional sections
3-115 to 3-120	Meander Lines
5-43	Broken boundary adjustments
5-36	Irregular boundary adjustments
7-62 to 7-70	Accretions

Amended Information

On August 3, 1956, the State Supervisor requested investigation and survey of the accretions to the adjacent lots in section 3 and in sections 2 and 11. Because this second investigation was adjacent to the 1954 survey and investigation, the additional information gathered confirmed the 1954 information on the accretions to Lot 10.

As a result of the new information, the Bureau decided to claim the accretion to Lots 6, 11, 12 and 13 of section 3 as public lands. The file on this survey indicates concern in some quarters about this procedure. Nevertheless, Special Instructions were issued on August 9, 1956, for the survey of the accretions to Lots 6, 11, 12 and 13 of section 3.

Final Statement of the Problem

The Special Instructions required survey of the accretions. The original boundaries of the lots had to be established and compared to the present position of the river bank. Where adjacent ownership lines meet the original meanders, a line must be established to divide the ownership of the accretions. Any accretions to patented land which may be public lands must also be identified.

Solution

The field work, in effect, was a continuation of the 1954 survey concerning Lot 10 only. The area accreted to Lot 6 was designated Lot 16; the accretion to Lot 11 was designated Lot 15; accretions to Lot 12 was designated Lot 17. The area in front of Lot 13 extended into section 2 and was designated Tract 37. The division-of-accretion lines were all run normal to the thread of the main channel of the river. All angle points along the adjusted original meander line were monumented and numbered in sequence. A sketch of the completed field work is shown in figure 4 and figure 7.

The surveys under Group 489 were platted and transmitted to the Washington Office for review and acceptance.

Washington Office review of the returns prompted the memorandum from the Cadastral Engineering Staff officer (Chief, Division of Cadastral Surveys) shown in figure 8.

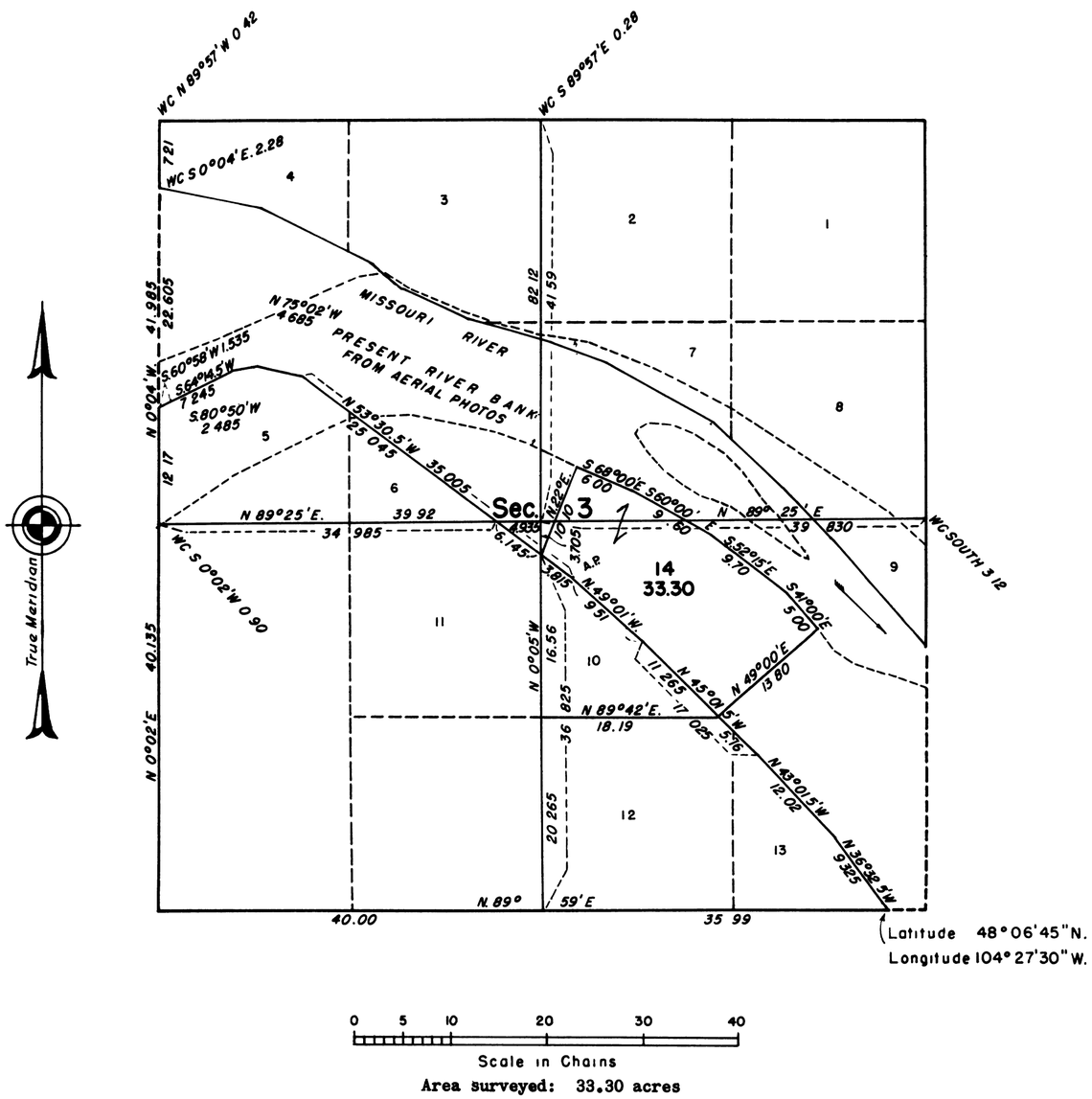
The survey was not rejected by the memorandum in figure 8 but more conclusive evidence was requested. No evidence was produced in 1957 and the new survey remains unapproved. The monuments have been removed from the ground.

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

T. 27 N., R. 56 E., PRINCIPAL MERIDIAN, MONTANA

TOWNSHIP 27 NORTH, RANGE 56 EAST OF THE PRINCIPAL MERIDIAN, MONTANA

DEPENDENT RESURVEY and SURVEY of ACCRETION



Area surveyed: 33.30 acres

Figure 6 - Accepted Accretion Survey

IN REPLY REFER TO

5 04b

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON D C 20240

July 31, 1958

C
O
P
Y

Memorandum

To Area Administrator, Area 3, Denver

From Director

Subject Status of land included in survey executed under Group 489 Montana

We have received your memorandum, 5 04b, of April 30 transmitting final returns of the survey of accretion areas fronting on and attaching to lots 6, 11, 12 and 13, sec 3, T 27 N , R 56 E , Principal Meridian, Montana

Before accretion areas attaching to and lying in front of privately owned lands can be considered public land of the United States it must be determined that they formed and were of substantial size at the date the privately owned lands were entered and patented See R N Stricker, et al, 50 L D 357, decided April 2, 1924 and Wittmayer v United States, 118 Fed 2d, 808

According to our records lot 6 was entered 1-23-32, lot 11, 12-11-14, lot 12, 5-29-08, and lot 13, 10-12-33 Lot 6 was patented 10-1-36, lot 11, 11-25-18, lot 12, 9-24-08, and lot 13, 8-4-39 In the report dated November 3, 1954 of the investigation of the accretion area it is stated

"From the above evidence that I have gathered, we can come to the conclusions that the accretion formed onto these lots was by the slow process of reliction to the right bank of the river Evidence gathered shows that by 1920 this accretion was out about 350 feet from the meander line The river apparently was at this point for quite a number of years, for the accretion beyond this point is rather new There is no trees on this new accretion and from evidence gathered not over 15 years of age "

The investigation did not determine conditions prior to 1920 It is possible, since lot 11 was entered in 1914 and lot 12 in 1908, that at those dates there was no area formed by accretion existing in front of the two lots With respect to lot 6, entered in 1932 and lot 13 in 1933, it is apparent from the report that at those dates the accretion areas existing in front of the lots were narrow strips approximately 350 feet wide This is based on the statement in the report that the accretion area at the date of the investigation in 1954 beyond the 350 foot line was "* * not over 15 years of age "

Based upon the many court decisions and decisions by the Department with respect to the ownership of accretion areas, this office does not believe that we can claim the present accretion area in front of lots 6, 11, 12 and 13 as public land The accretion area in front of these lots, based upon the report of the investigation, does not appear to be of sufficient size and extent at the dates the lots were entered to warrant that action In fact, as previously stated, no evidence has been submitted to show that there was any accretion in front of lots 11 and 12 at the dates those lots were entered

It was proper to survey the accretion area in front of lot 10, sec 3 as represented by plat accepted April 6, 1955 as lot 10 was at that date public land of the United States It should also be realized that if the entire accretion area in sec 3 is public land it would not be necessary to determine the boundaries of the particular areas attaching to each lot of the original survey

It is possible your office may have other facts with respect to the conditions on the ground than indicated by the report of the investigation as the basis for considering that the accretion areas are public lands belonging to the United States and subject to survey It is requested that you submit a justification as to the reasons for considering the accretion areas as public land Our records do not show that the owners of the lots had been advised that we are claiming the accretion areas attaching to those lots Of course this should be done if it is decided to assert a claim to the accretion areas

We will withhold action on the case awaiting your statement as the basis for claiming the land as public land subject to survey

For the Director

(signed)Earl G Harrington
Cadastral Engineering Staff Officer

Figure 8 - Washington Office Memorandum

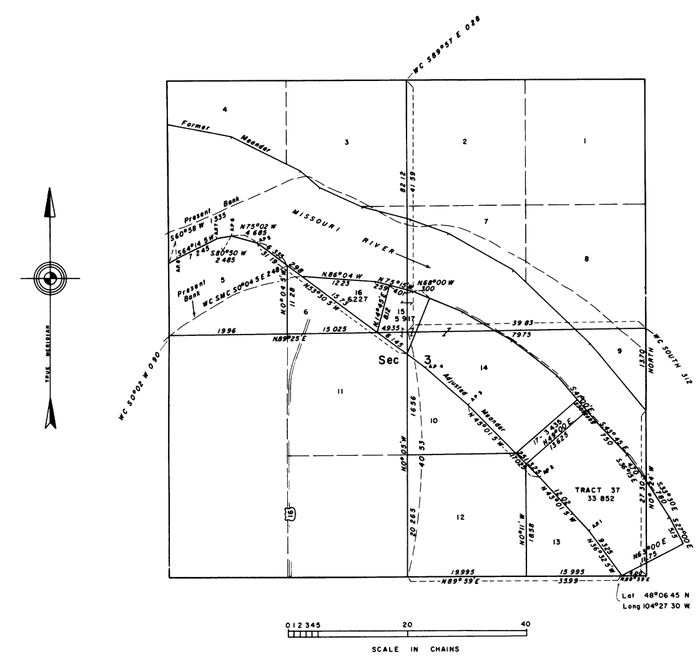
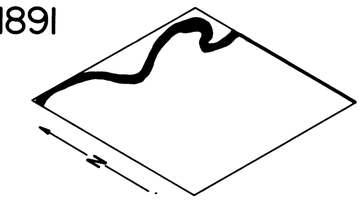


Figure 7 - Unapproved Survey of Accretions

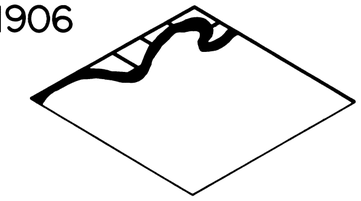
OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

T. 27 N., R. 54 E., PRINCIPAL MERIDIAN, MONTANA

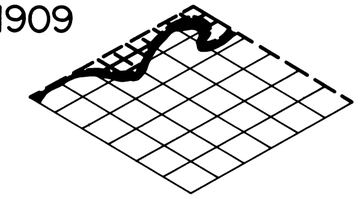
1891



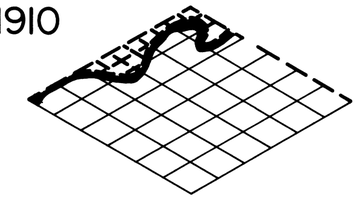
1906



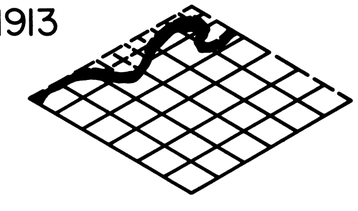
1909



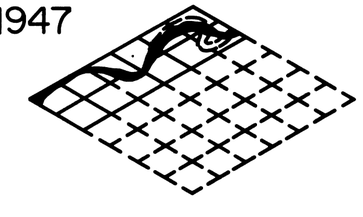
1910



1913



1947



Township No. 27 North Range No. 54 East of the Principal Meridian, Montana.

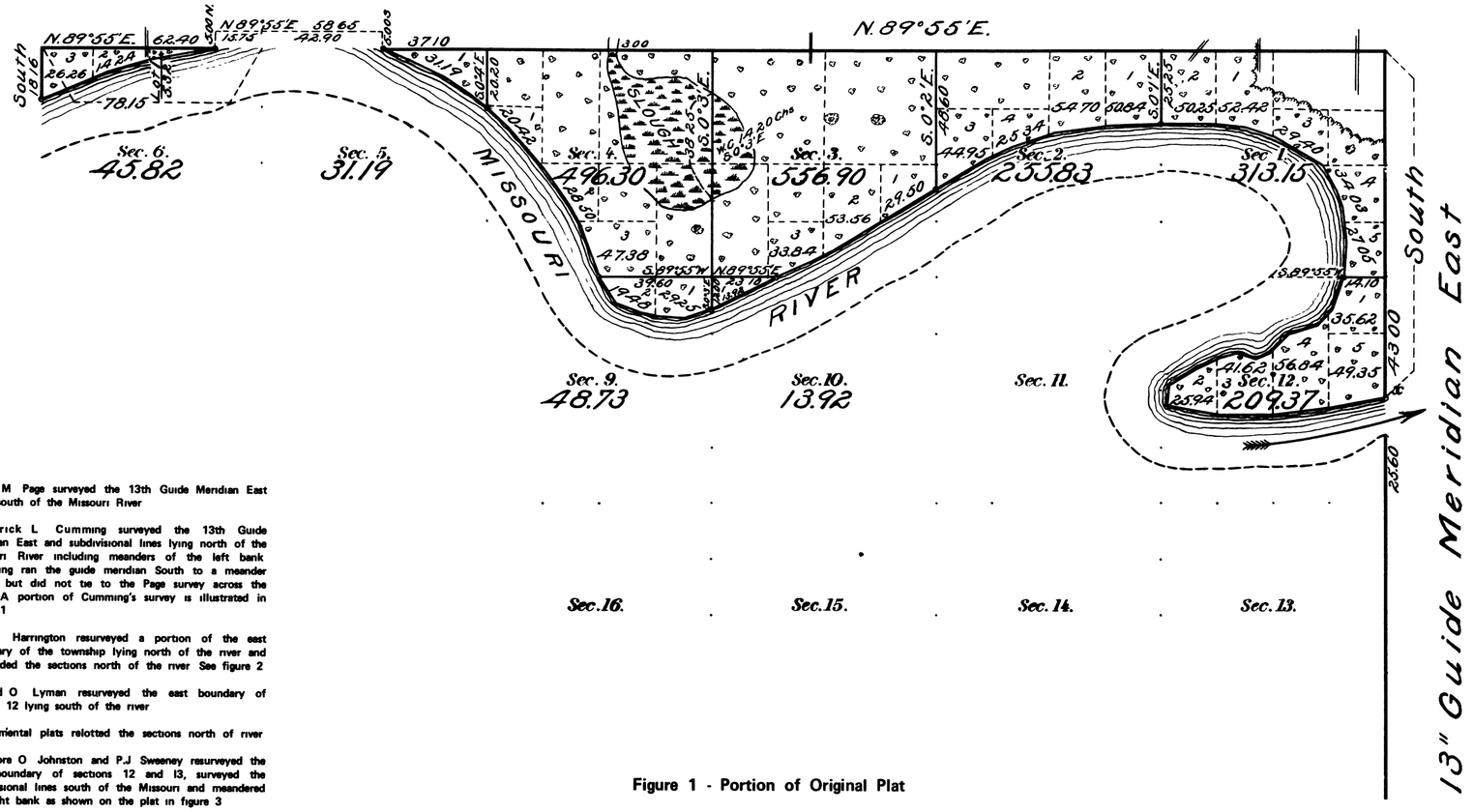


Figure 1 - Portion of Original Plat

History of Surveys

1891	James M Page surveyed the 13th Guide Meridian East lying south of the Missouri River
1906	Frederick L Cumming surveyed the 13th Guide Meridian East and subdivisional lines lying north of the Missouri River including meanders of the left bank Cumming ran the guide meridian South to a meander corner but did not tie to the Page survey across the river A portion of Cumming's survey is illustrated in figure 1
1909	Guy P Harrington resurveyed a portion of the east boundary of the township lying north of the river and subdivided the sections north of the river See figure 2
1910	Edward O Lyman resurveyed the east boundary of section 12 lying south of the river
1911 & 1913	Supplemental plats relotted the sections north of river
1913	Theodore O Johnston and P.J Sweeney resurveyed the east boundary of sections 12 and 13, surveyed the subdivisional lines south of the Missouri and meandered the right bank as shown on the plat in figure 3
1947	Ranney Y Lyman resurveyed the north two tiers of sections as part of the Missouri Basin Surveys for the Bureau of Reclamation. Lyman made direct ties across the river, providing a correlation of the previously unconnected work See figure 4 which shows the possible accretion to the right bank in sections 11 and 12.

Supplemental Plat of Fractional Township No. 27 North Range No. 54 East of the Principal Meridian, Montana.

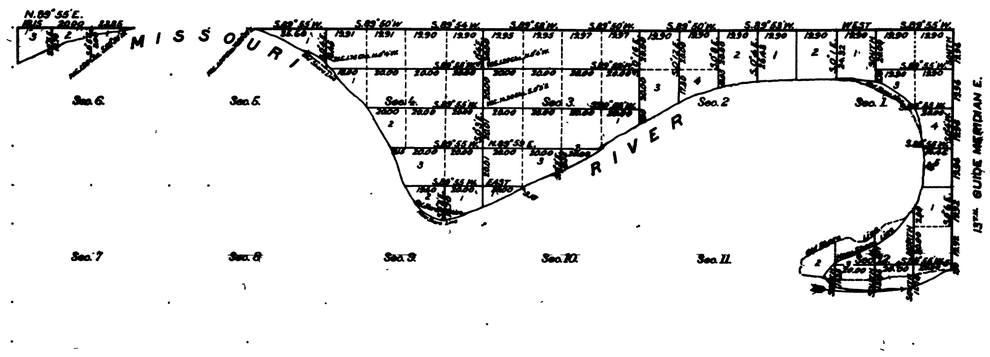


Figure 2 - 1909 Subdivisions

Reasons for Request of this Survey

In June 1954 the District Range Manager at Miles City, Montana, made inquiry about the possible accretion in sections 11 and 12 and subsequently requested that a determination and survey be made of the area.

Figure 5 is a composite of the official survey records and shows the land status at the time of the survey. Entry to Lot 1, section 11 and Lot 12, section 12 was filed in 1933. Entry to Lots 13 and 14, section 12, was filed in the land office in December, 1920. The 1947 resurvey by Lyman shows only the approximate present location of the river.

OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

T. 27 N., R. 54 E., PRINCIPAL MERIDIAN, MONTANA

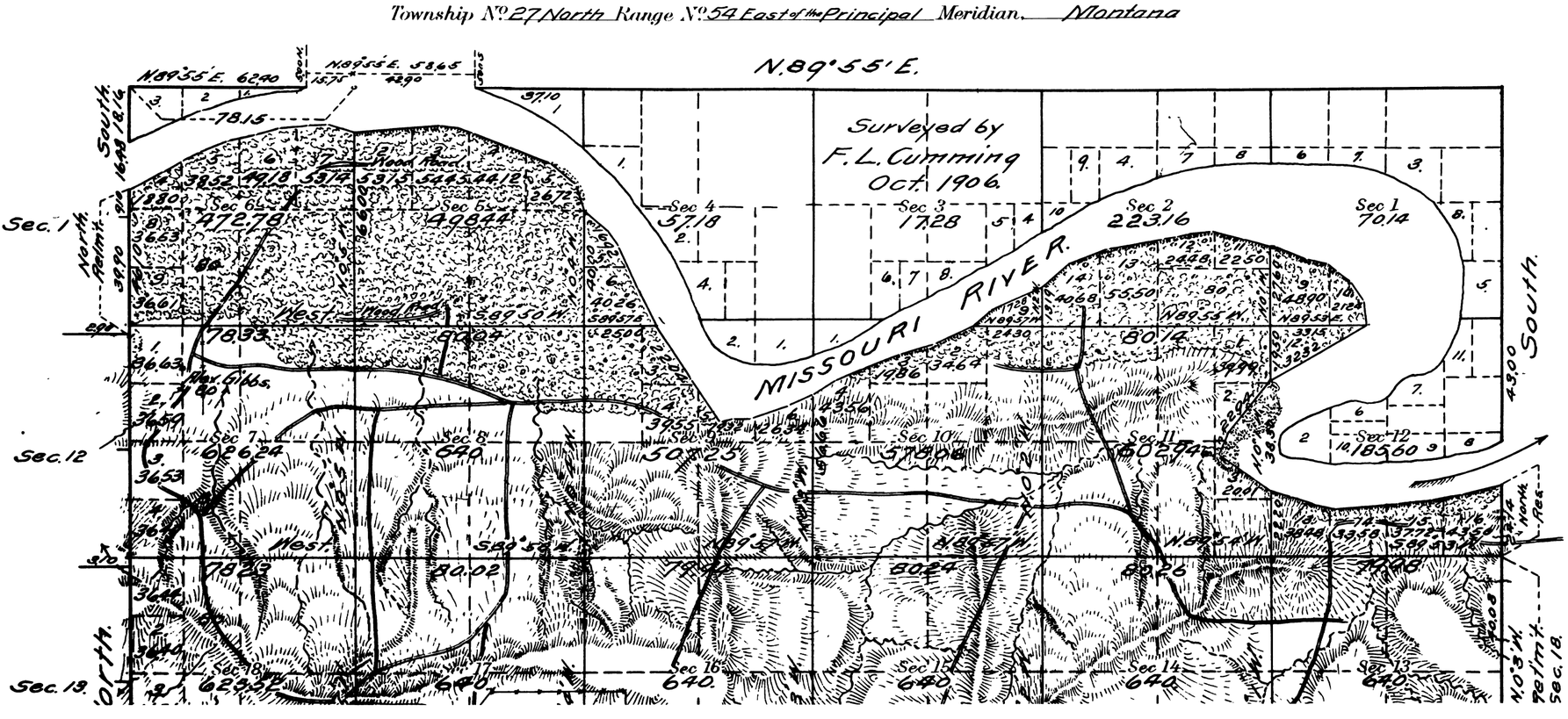


Figure 3 - Portion of 1913 Plat

TOWNSHIP Nº 27 NORTH, RANGE Nº 54 EAST, OF THE PRINCIPAL MERIDIAN, MONTANA.
DEPENDENT RESURVEY

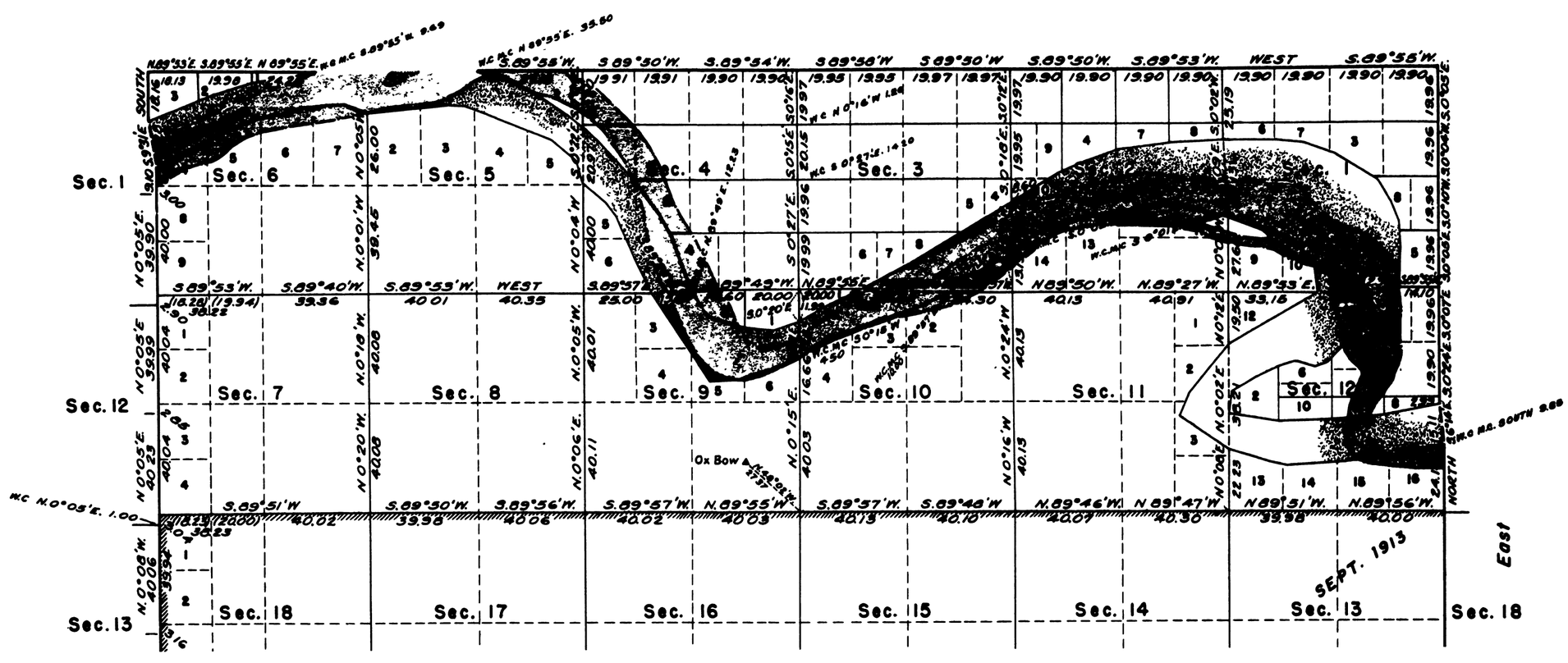


Figure 4 - Portion of 1947 Resurvey Plat

OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

T. 27 N., R. 54 E., PRINCIPAL MERIDIAN, MONTANA

Special Instructions

Special Instructions for Group 477, Montana were prepared on August 26, 1954, providing for an investigation of the area and for survey of any land determined to be accretion. The investigation was to consider the fundamental law of riparian rights and water boundaries.

Washington Office approval of the Special Instructions was given predicated on proper further examination on the ground for the purpose of determining any avulsive changes in the river.

Conditions Found on the Ground

The surveyor assigned to Group 477 made local inquiries. He contacted the owner of Lot 1, section 11 and Lots 12, 13 and 14 of section 12. The owner of Lot 1, section 11 and Lot 12, section 12 stated that there was a considerable amount of accretion in front of his land prior to his filing on these lots in 1933. He also stated that the accretion, at that time, extended out some 10 to 20 chains from his land and contained trees and brush. An increment borer was used on live trees and ring counts made on sawed stumps in the area. The trees were from 23 to 44 years of age.

The owner of Lots 13 and 14, section 12 stated that when he filed on his lots in 1920 the river was actually up against the lots and may have even eroded them to some extent. This was verified again by ring count of the trees in front of Lots 13 and 14. None of the trees were more than about 20 years of age.

Three other persons residing in the vicinity since 1894, 1901 and 1908, respectively, corroborated these statements.

The three also stated that at no time was there an avulsive cut by the river through the "peninsula" of land in section 12 along the left bank. This statement was confirmed by the fact that all of the accreted land sloped uniformly to the east and southeast, with no evidence of the escarpment or channel bank that may be evident after an avulsive cut.

The 1909 Harrington plat, see figure 2, also indicates that erosion of the peninsula was already underway three years after the original survey.

Preliminary Statement of the Problem

A report of the conditions found during the investigation ruled out any possibility of avulsion and the report was approved. The surveyor was instructed to proceed with the resurveys and retracements necessary and to determine the division of the accreted lands.

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

3-80, 3-88 and 3-90	Subdivision of fractional sections
5-43	Broken boundaries
7-47 to 7-50	Navigability
7-57 to 7-59	Partition lines
7-62 to 7-67	Apportionment of accretion
7-68 to 7-70	Accretion prior to entry

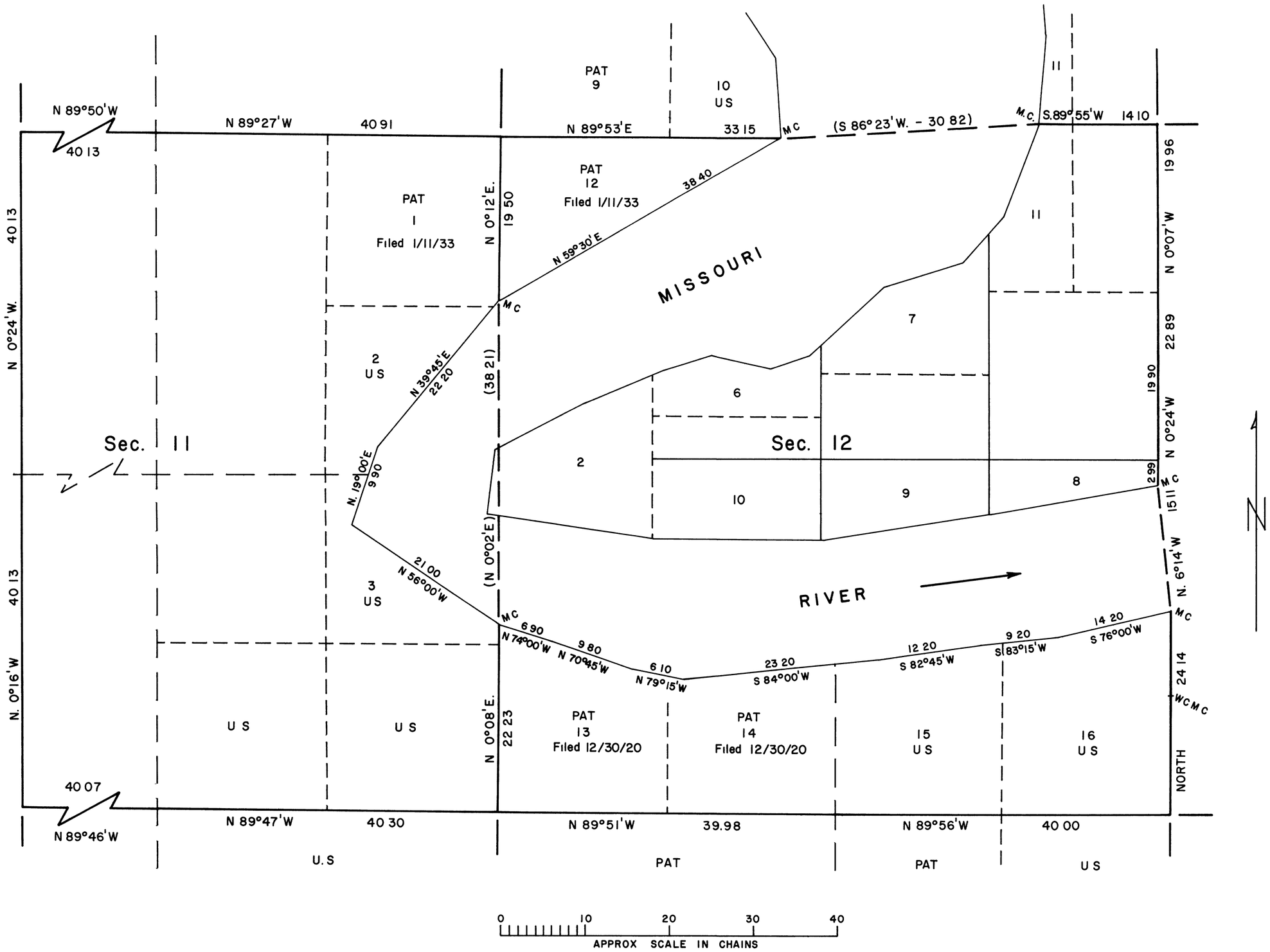
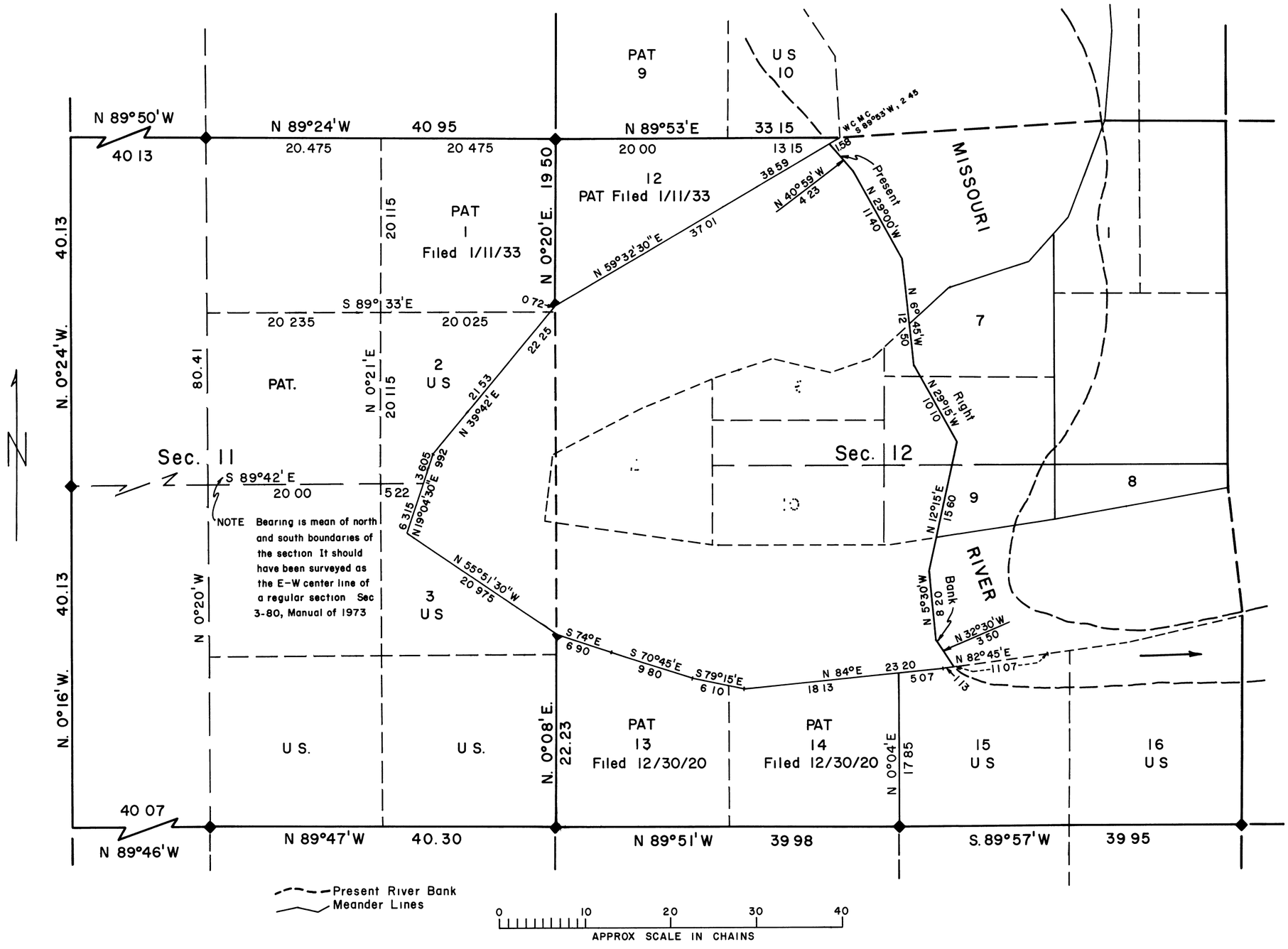


Figure 5 - Composite of Plats with Status

OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

T. 27 N., R. 54 E., PRINCIPAL MERIDIAN, MONTANA



NOTE Bearing is mean of north and south boundaries of the section It should have been surveyed as the E-W center line of a regular section Sec 3-80, Manual of 1973

Figure 6 - Existing Conditions and Dependent Resurvey

Legal Constraints

Before establishing survey procedures for creating divisions of accreted lands a legal opinion is usually necessary. Individual states may not follow the general rule. Montana was known to follow the Common Law which agreed with the Federal law on accretions.

Amended Information

The west ½ mile between sections 12 and 13 was resurveyed, as was the west ½ mile between sections 2 and 11, and the northerly portion of the line between sections 11 and 12. The line between sections 1 and 12, west of the river was also resurveyed. The right bank of the river was found to be eroded and a witness meander corner was required. The record meander courses through sections 11 and 12 were retraced and adjusted by the broken boundary method. The meander corner of sections 7 and 12 on the east boundary and right bank of the river fell in the present channel and was inaccessible. The record meander courses were run from the southerly meander corner between sections 11 and 12, thence along the original right bank to an intersection with the present right bank. The present right bank was meandered to an intersection with the original meander line in front of Lot 12, section 12. The new meanders were run according to sections 3-115 to 3-120 of the Manual of Surveying Instructions, 1973.

The N-S centerline of section 12, the centerlines of section 11 and centerlines of the "NE¼" of section 11 were surveyed in accordance with section 3-88 of the Manual of Surveying Instructions, 1973.

Upon completion of the resurveys, surveys and new meanders the apportionment of accretion could be determined. The data accumulated to that point is illustrated in figure 6, and was the basis for determining the procedure.

It had been established during the investigation that all of the area lying between the original meander line and the present right bank was accretion to the right bank. Thus the presumably "re-emerged" lands in Lots 2, 6 and 10, etc., of section 12 were not re-emerged lands under the Montana and Federal law.

Final Statement of the Problem

Now that the boundaries of the accretions are known, the next step is to determine the ownership of the accretions and, following that, to fix the division lines between the ownerships. The partition lines are normally run according to sections 7-58 and 7-66, Manual of Surveying Instructions, 1973. (Rule: divide the new frontage in proportion to the old frontage.) Modifications of this rule must be considered when coves, peninsulas and varying conditions, or conflict with state laws, make the method inequitable or impractical.

OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

T. 27 N., R. 54 E., PRINCIPAL MERIDIAN, MONTANA

Solution

Using the land owner's own statement concerning the accretion, the accretion in front of Lot 1, section 11 and Lot 12, section 12 was built up prior to the owner's entry and was therefore public land because the accretion inures to the upland owner. Inasmuch as the amount of accretions was considered substantial, title to the accretions did not pass with the patent in 1933.

As shown by physical evidence and by testimony, the accretion in front of Lots 13 and 14, section 12, was built up after patent was issued and therefore the accretion belonged to the entryman as the upland owner. With the ownerships resolved it only remained to fix the division lines of the apportionment.

The present meander of the right bank is quite uniform, with no deep indentations or protrusions. A division based on apportionment of frontage was adopted because there were no inequities caused thereby nor were other modifying circumstances present.

In order to calculate the new and old frontage, special meander corners were established and monumented at the intersection of the N-S centerline of section 12, the E-W centerline of section 11 and the E-W centerline of NE¼ of section 11 with the original and adjusted original meander line.

Angle points were monumented along the original (adjusted) meander line fronting on public lands. The angle points in front of patented lands were determined but not monumented.

An auxiliary meander corner was established at both ends of the new meanders of the right bank, at the intersection with the original meander line.

The total lineal measurement between auxiliary meander corners on the original meander line was 137.285 chains. The total distance measured along the new meander line was 65.53 chains. The length of the new meanders was divided by the length of the corresponding original meanders giving a ratio of 0.477328. The length of each "segment" of the original meanders was then multiplied by this ratio to determine the pro-rata share for each owner along the new meander line. For example: Lot 15, section 12 had a remaining original meander frontage of 6.20 chains. It's proportionate share of the new meander is then (6.20 chains) (0.477328) = 2.96 chains.

The accretion in front of both lot 1, section 11 and lot 12, section 12, all public lands, was surveyed as Tract 37 for purposes of simplicity but the apportionment was based on the frontage of both lots, 37.73 chains.

The public land accretion in front of Public Domain was surveyed as separate tract Nos. 38, 39 and 40. Tract corners were monumented along the new meander line but the "angle points" along the meander line were not monumented.

The division lines of the tracts were surveyed from the appropriate meander corner or special meander corner, to the tract corner monumented on the new meander line. The tracts were given an acreage on the plat. The accretions to patented land in front of lots 13 and 14, section 12 were not assigned an acreage because the Bureau lacks authority to survey private lands, except when such survey may be incidental to surveys of public lands.

The plat of this survey was accepted in April 1955 and is shown in figure 7.

There is a calculated error of closure amounting to 37 links in departure and 9 links in latitude in the original record values for the meanders in front of lots 13 through 16, section 12. Adjusted meanders should have been used as a basis for reestablishment of the meanders along lots 13, 14 and 15, instead of the record measurements. Because the latitudinal error is small, there is little difference in the resulting locations caused by the procedural mistake.

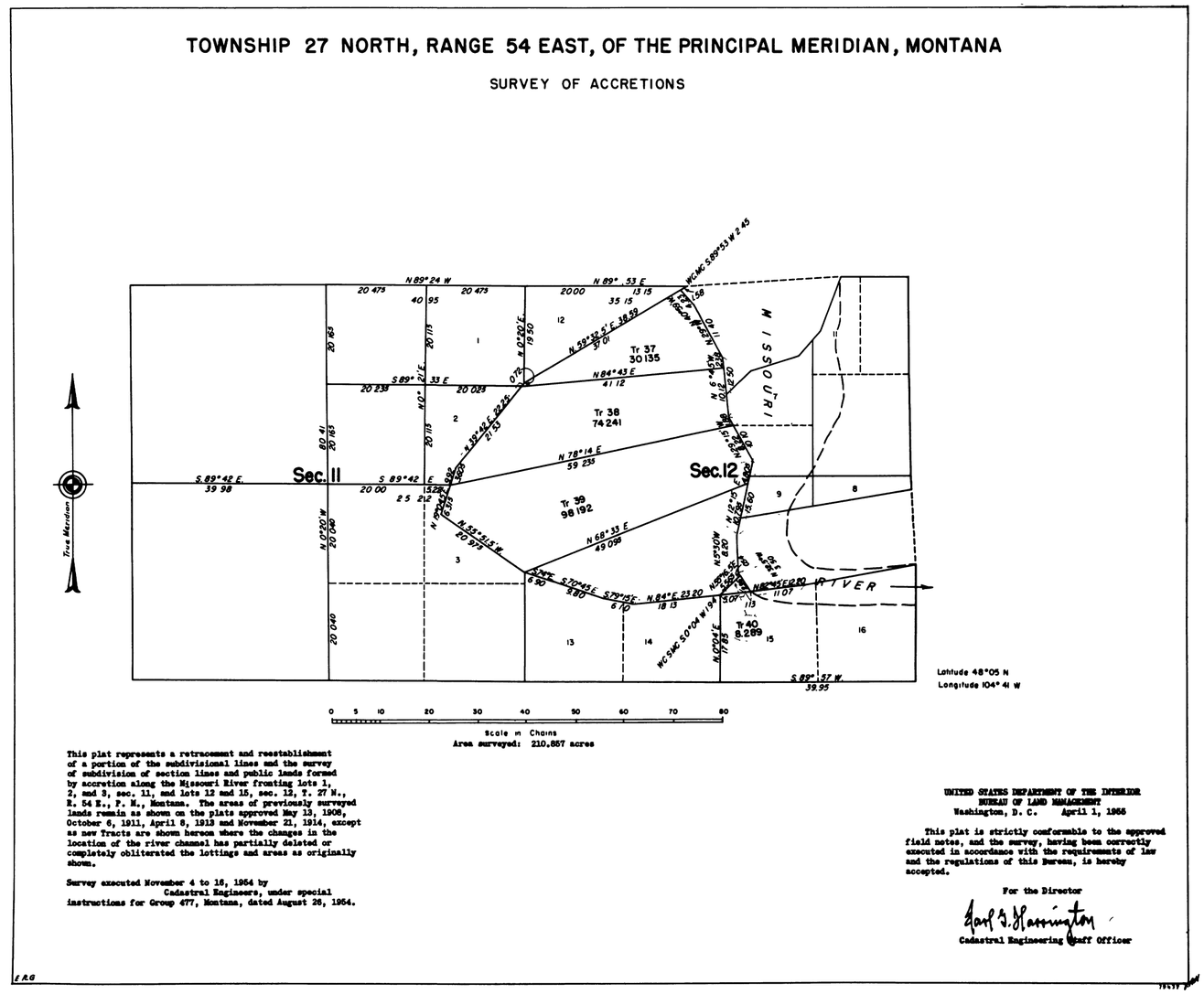
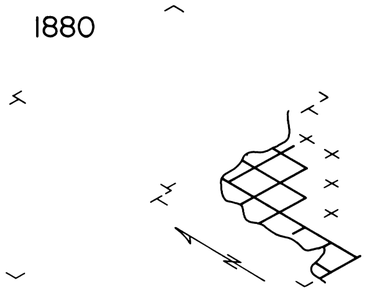


Figure 7 - Accepted Plat

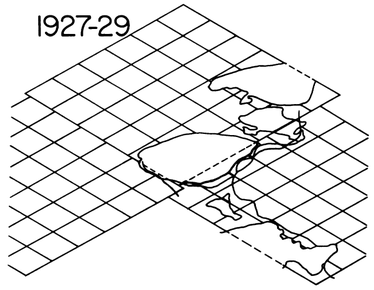
RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

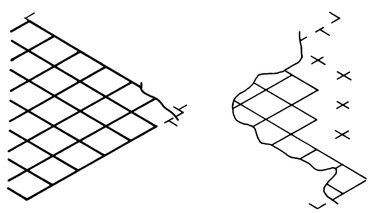
1880



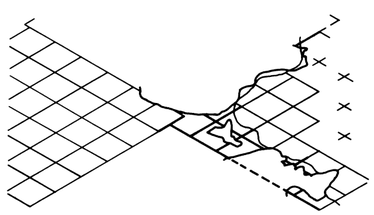
1927-29



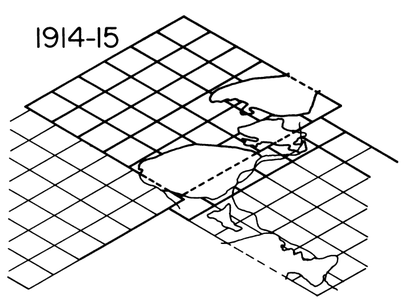
1881



1887



1914-15



History of Surveys

1880 M L McCall and J H Chitwood surveyed portions of Township 35 S, Ranges 24 and 25 E, bordering on "Warner Lake" but did not meander the lake The plats indicate a very large body of water

1881 Laban H Wheeler surveyed a portion of the East boundary and subdivisional lines of T 34 S, R 24 E. Sections 25 and 36 were fractional along the westerly shore of "Warner Lake," which was not meandered

1887 John H Neal surveyed the south boundary and a portion of the east boundary of section 36, T. 34 S, R 24 E, and meandered "Warner Lake" in sections 25 and 36, He surveyed the West boundary, T 35 S, R 25 E., extended the subdivisional lines and meandered "Warner Lake" in sections 1 thru 6 Neal also meandered "Mugwump Lake" in sections 7, 8 and 18, as well as others This established "Warner Lake" as being a chain of separate lakes

1914-1915 Fred Mensch retraced and resurveyed the South and West boundaries of T 34 S., R 25 E, subdivided the township and meandered "Warner Lake"

Mensch also extended the line between sections 2 and 3 in T 35 S, R 25 E, and surveyed new meanders of "Warner Lake," returning areas on the relicted lands between his meanders and those surveyed by Neal in 1887

1927-1929 Otto L Draper extended the lines of sections 2 thru 6, completing section 2, and surveyed new meanders of Flagstaff Lake in sections 3 thru 6, T 35 S, R 25 E Draper extended the north boundary of section 6, 10 00 chains easterly from the Neal meander corner of sections 6 and 31 but did not survey new meanders in section 31 In this manner the Neal meander corner became an angle point in the north boundary of section 6 but remained a meander corner referring to section 31 only

DIAGRAM
to accompany
SPECIAL INSTRUCTIONS
dated August 25, 1948
GROUP 287, OREGON.
Partial Dependent Resurvey Tps. 34 S., Rs 24, 25, and 26 E., and T. 35 S, R. 25 E., W M

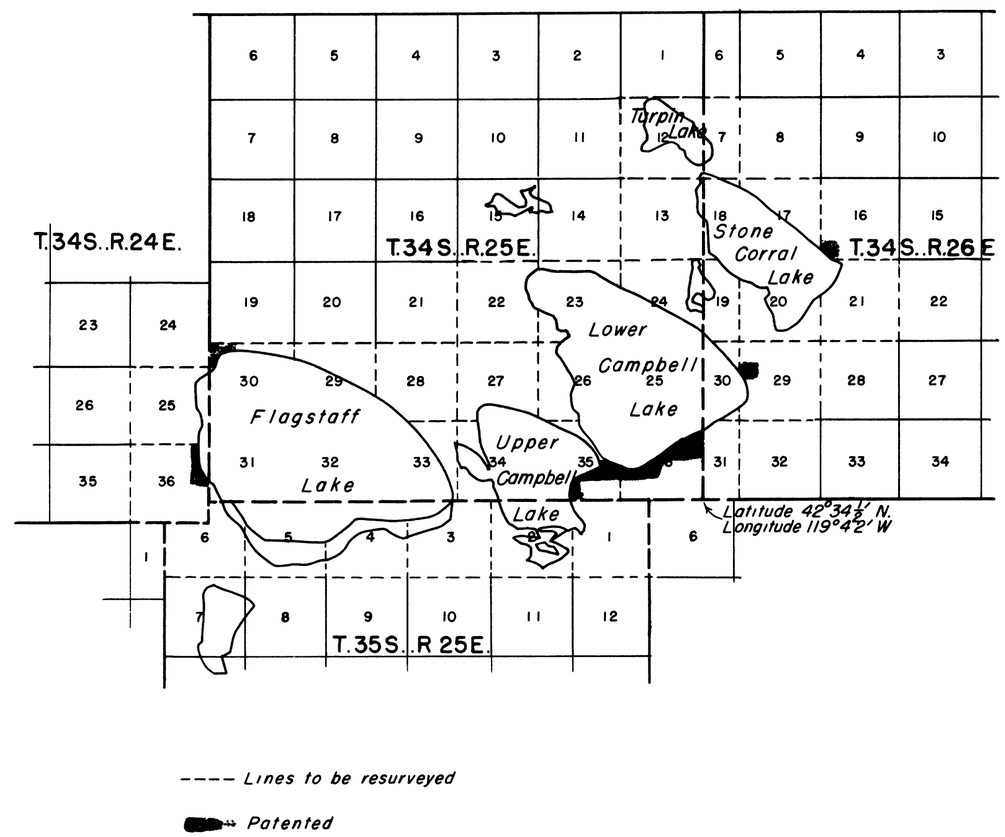


Figure 1 -

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

Reasons for Request of this Survey

As a result of an investigation by the Government, the following decision was forwarded to the State of Oregon:

DECISION

Ownership of the beds of certain lands in southeastern Oregon	:	B. L. M. 2034928 Report of Investigation dated October 20, 1947

Lakes held to be non-navigable and title to the lake beds in front of the shore lands owned by the Government is in the United States. Survey authorized of the portions of the lake beds owned by the Government.

The Under Secretary of the Interior on April 4, 1947 advised the Governor of the State of Oregon concerning the claim of the United States to the beds of North Campbell, Turpin, Stone Corral and Flagstaff Lakes in Ts. 34 S., Rs. 25 and 26 E., Willamette Meridian, Oregon and to other lake beds in southeastern Oregon as follows·

"It is the responsibility of the Department of the Interior to consider and determine what are public lands; what lands have been surveyed; what lands are to be surveyed; and what have been disposed of, Kirwan v. Murphy (189 U S 35).

This Department proposes to have an investigation made of the four lakes involved, and probably other lakes in southeastern Oregon, in which the United States may have an interest, and if it is found that the lakes were not navigable when Oregon was admitted into the Union in 1859, it will assume jurisdiction over the portions of the lake beds considered public land of the United States."

The present ownership of the beds of these lakes is dependent upon ownership of the shore lands as bordering thereon and upon whether the lakes were navigable or non-navigable in 1859 when Oregon was admitted into the Union. It is a well settled principle of law that the United States owns the portions of the beds of non-navigable lakes in front of the subdivisions which are still public lands (U. S. v. Oregon, 295 U.S. 1).

By memorandum dated May 19, 1947 the Regional Administrator, Region I, was authorized to have an investigation made to determine whether North Campbell, Turpin, Stone Corral and Flagstaff Lakes and other lakes in southeastern Oregon in which the Government may have an interest, were non-navigable in 1859 when that State was admitted into the Union, as a basis for further action.

The report of the field investigation dated October 20, 1947 made by Regional Cadastral Engineer Ganong has been received and considered. This report shows that the lakes examined are not navigable at the present time and were shallow bodies of water in 1859 when Oregon was admitted into the Union and were non-navigable at that date This office concurs in the recommendation made by the examiner that

"Guano Lake in T 39 S , R 27 E , and the lakes of Warner Valley, as follows· Stone Corral, Turpin, Lower Campbell, Flagstaff, Mugwump, Jones, Anderson, Hart, Crump, and Pelican, in Ts. 34, 35, 36, 37, 38, and 39 S , Rs 24, 25, and 26 E., W.M Oregon, be considered non-navigable lakes, * * * ".

It is therefore held that these lakes were non-navigable in 1859 when Oregon was admitted into the Union and that title to the portions of the lake beds in front of the shore subdivisions owned by the United States is still in the Government.

The portions of the lake beds considered public land of the United States will be surveyed by this office. Based upon an inspection of the records it appears that the Government still owns at least 60 percent of the total shore line of the lakes and that the portion of the lake beds belonging to the United States amounts to over 11,000 acres.

A copy of this Decision is being forwarded to the Governor of the State of Oregon in order that the State of Oregon may be fully advised of the contemplated action,

/s/ Tho C. Havell

Assistant Director

Official copy of "E"
3/15/48,bh

This survey was executed in consequence of the above decision.

Special Instructions

Special Instructions for Group 287, Oregon, were prepared on August 25, 1948, providing for the dependent resurvey of those lines adjoining five lakes in Tps. 34 S., Rs. 24, 25 and 26 E., and T. 35 S., R. 25 E. One of the lakes was Flagstaff Lake, the subject of this discussion. The adjoining township and section lines were to be dependently resurveyed and remonumented where necessary. In those sections containing patented land bordering on the meander line, the necessary section subdivisional lines were to be surveyed and the meander lines resurveyed to define the boundary between patented and public lands.

It was anticipated that the lakes contained some shallow water. The sections within the lake beds were to be completed by protractions based on the resurvey data. That portion of each lake bed fronting on patented land belonged to the patentee. In each case, the protection of the rights of the patentee was required.

Lot 4, section 30, T. 34 S., R. 25 E. was patented in 1927. Section 36, T. 34 S., R. 24 E. had been granted to the State of Oregon and was still state owned. The diagram accompanying the Special Instructions is shown in figure 1.

Assignment Instructions

On September 10, 1948 the work under Group 287 was assigned to Norman D. Price and Thomas A. Tillman, cadastral engineers. Field work began on September 17, 1948.

Conditions Found on the Ground

No resurvey problems were encountered. Most of the corners had been monumented with brass-capped iron posts in 1914-1915 and 1927-1929 by Mensch and Draper. The few missing corners were restored by proportionate measurement, or in the case of missing meander corners, at record bearing and distance. After the dependent resurvey was completed, the record meanders were retraced in sections 30 and 36. The misclosures were adjusted by the broken boundary method, but the angle points were not monumented because the meander line was riparian.

The line between Lots 3 and 4, section 30 (the N. and S. centerline of the NW¼) was run southerly on a mean bearing to an intersection with the adjusted meander line and a special meander corner established and monumented.

It was apparently unnecessary but section 36 was subdivided and a special meander corner established at the intersection of the adjusted meander line and the East and West centerline of the NE¼. The point was monumented.

Flagstaff Lake was completely dry and a crop of wheat had been raised on the lake bed during the 1948 season. Blank lines were extended across the lake bed, "completing" the survey of the south and west boundaries of T. 34 S., R. 25 E. These lines formed, in part, the basis for protraction surveys of the lake.

The lake bed was cross sectioned to determine the position of a thalweg, if any. The lake bed was found to be flat. After a uniform slope to an elevation of about 6 feet below the meander line there was no variation in the lake bed exceeding one half foot. There was no way of determining where the last water stood in the lake bed as it dried up.

Preliminary Statement of the Problem

The problem to be solved, after all field data was returned, was how to determine the division lines between the relicted land accruing to Lot 4 in section 30, Lots 1 and 2 in section 36 and the public lands within the lake bed.

Regulations

Sections 7-51 to 7-67 of the Manual of Surveying Instructions, 1973, and the court decisions cited therein govern the procedure in this case.

Legal Constraints

The division of the lake bed must be equitable to all of the riparian land owners. The United States normally owns the beds of all non-navigable bodies of water until such time that title to the riparian uplands passes. Further, when the United States issues a patent to a riparian lot it also passes title to the bed of the lake or stream fronting on that lot as far as the United States is concerned. Most states, including Oregon, subscribe to this basic principle. The courts do not always agree on the method of dividing the beds of non-navigable lakes between the riparian owners. Five basic methods have been devised to achieve an equitable division:

1. The pie method
2. The long lake method
3. The apportionment method
4. The Colonial method
5. Extension of the section and section subdivisional lines

Intermingled riparian ownership can be very complex. No one method will be equitable in all situations. Some reasonable combination of two or three methods may be needed to accomplish an equitable division.

All factors must be considered to determine an equitable division method. The order of exposure of the relicted area may be a determining factor. After most of the reliction had occurred did a main channel remain? If so, was it near the middle of the lake or near one shore? Is the shore line reasonably regular, or are there deep bays or long peninsulas?

When the method for division is selected, that method should be logically and mathematically computed and capable of reconstruction.

Auxiliary Topic No. 1

The Pie Method

If a lake is round, or nearly so, the geographic center of the lake (radius point) is determined. From any meander corner or special meander corner a line is run to the center of the lake. This results in wedges, or "pie shaped" areas of land accruing to the patented uplands , or fractional lots. A "pie method" division of Flagstaff Lake is illustrated (approximately) in figure 2.

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

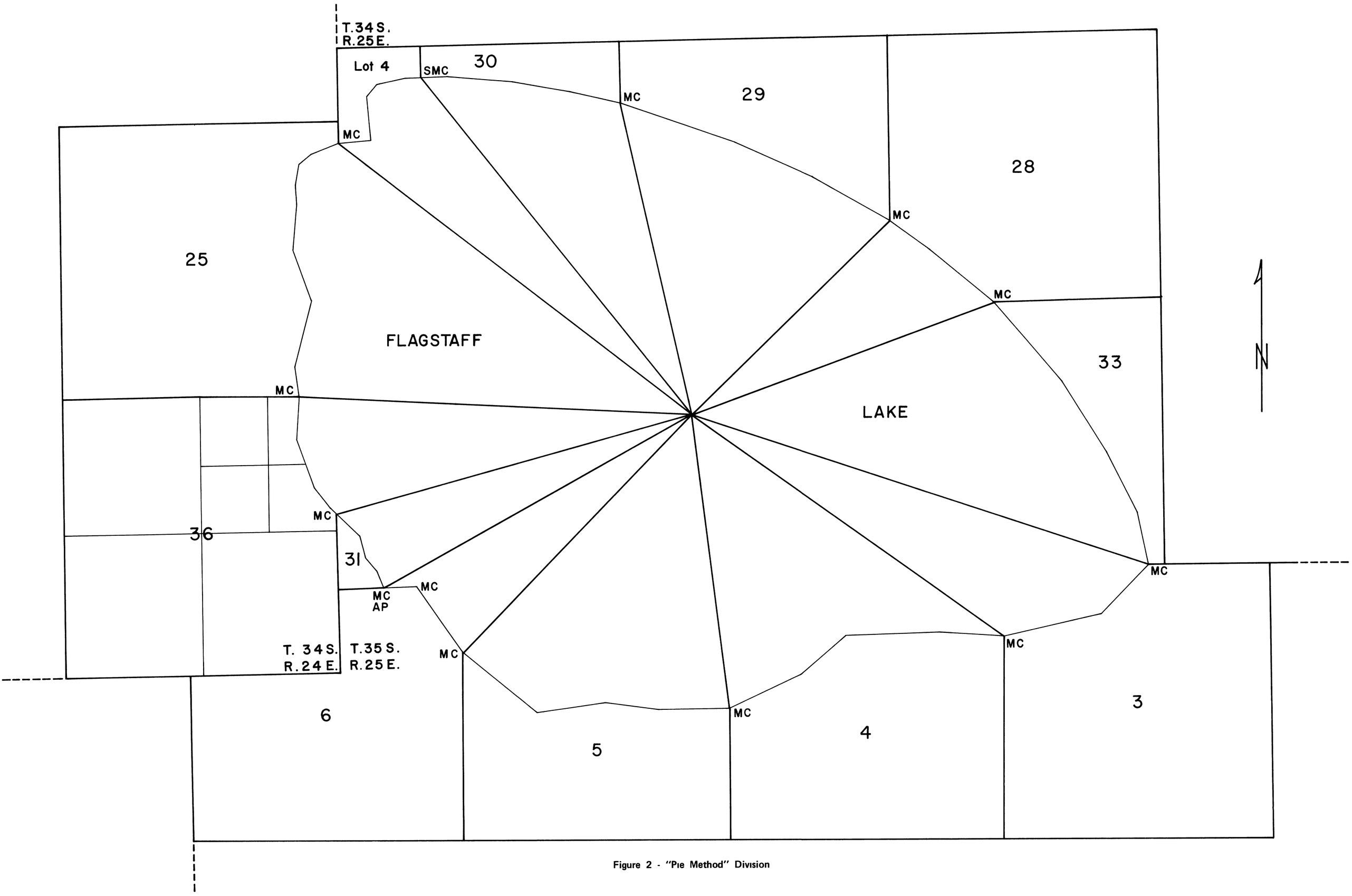


Figure 2 - "Pie Method" Division

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

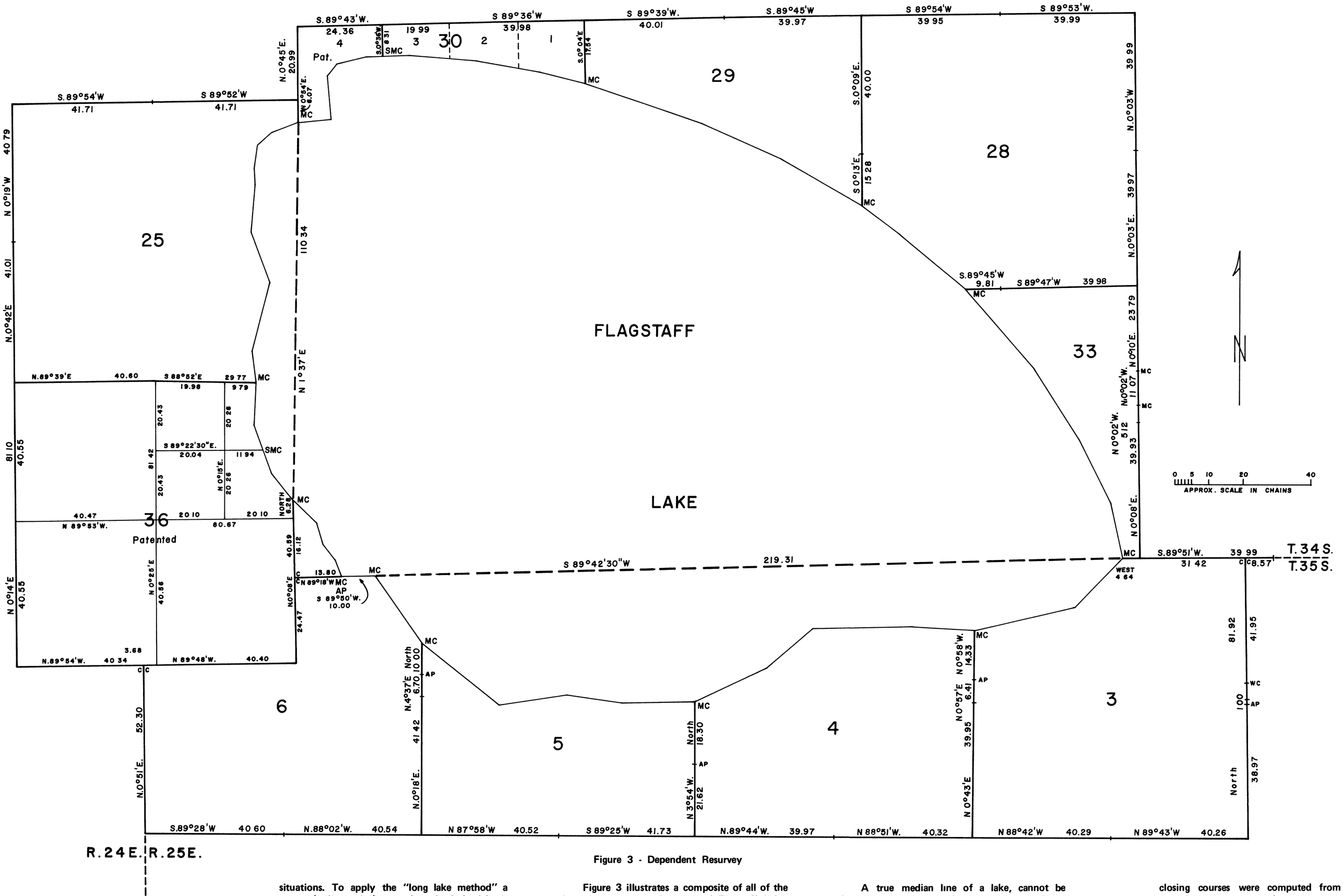


Figure 3 - Dependent Resurvey

Auxiliary Topic No. 2

The Long Lake Method

When a lake is longer than its width or otherwise not round, the "pie method" would result in large inequities and even impossible situations. To apply the "long lake method" a center (radius point) at each end of the lake is determined. A medial line is then determined between these "end points." Lands at each end of the lake are divided by the pie method. The remaining division lines are then drawn perpendicular to the medial line to each meander or special meander corner on the shore line. The most difficult problem involves the determination of the "end points" and the "medial line."

Figure 3 illustrates a composite of all of the dependent resurvey data around Flagstaff Lake. The latest record meander courses are shown on page D5-8.

A median line may be defined as a line which is at all time equidistant from the nearest point on opposite banks of the lake or river.

A true median line of a lake, cannot be determined on an unadjusted traverse or figure without a resultant buildup of error. For purposes of this discussion, the exterior meanders of the lake were adjusted by the broken boundary method and the median line determined in the following manner:

1. Based on the dependent resurvey data, closing courses were computed from meander corner to meander corner or to special meander corner. This resulted in thirteen courses.

2. These courses misclosed by 2 links in latitude and 16 links in departure, therefore they were in turn adjusted to a mathematical closure.

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

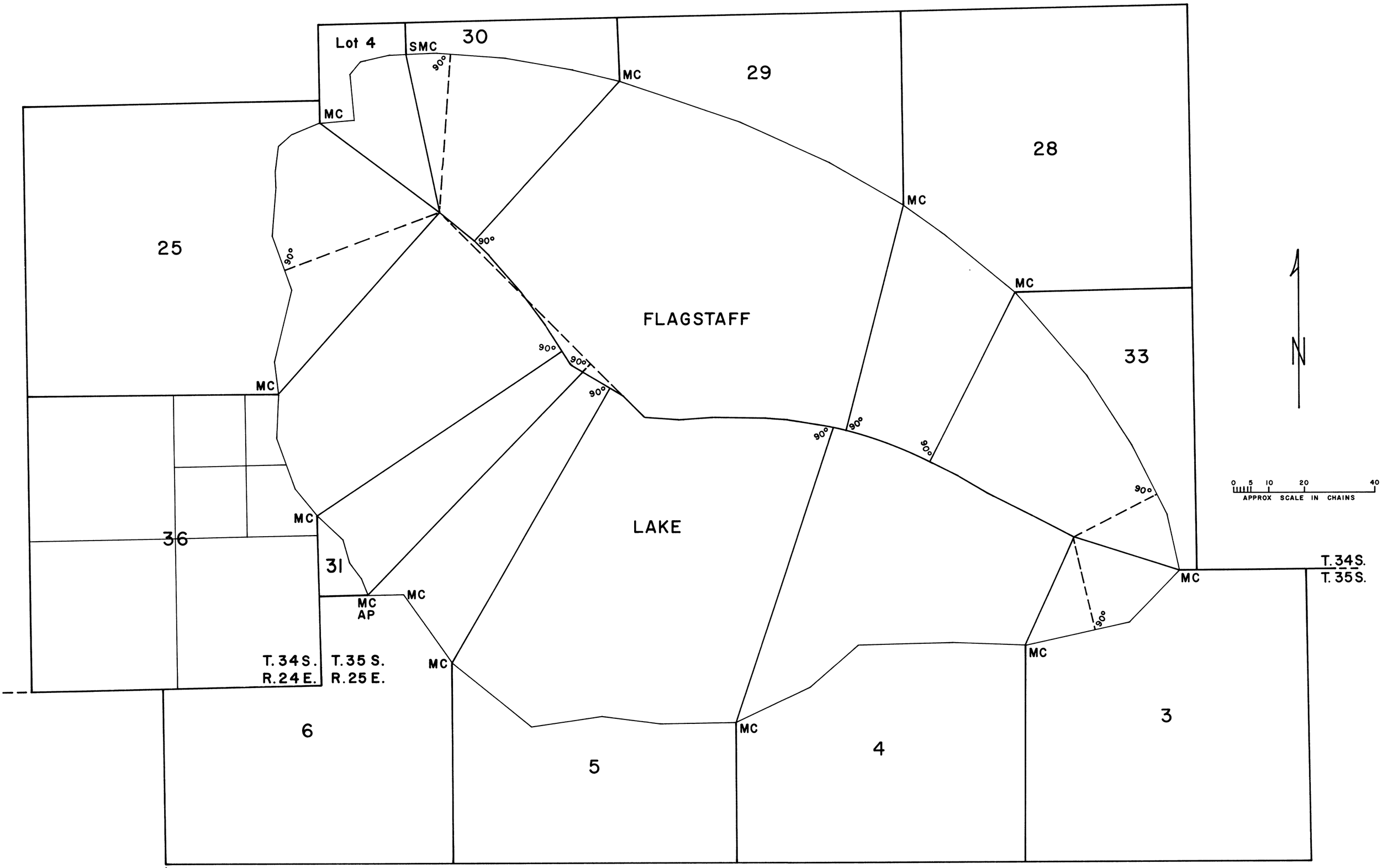


Figure 4 - "Long Lake Method" Division

3. Using these adjusted courses held as fixed, the latest record meander courses were adjusted to them. All data for the basis of computations appear in figure 3, which provides a mathematically closed figure.

4. Coordinates were assigned to each angle point of the meanders and formed the basis of the median line determination.

5. The "end points" used in the discussion were held as the same points which were used on the accepted plat. These points are arbitrary to some extent. They are radius points of circles which are tangent to the meander lines. They fit within the "ends" of the lake bed. A mathematical median line was then calculated for this topic discussion. It is equidistant between the meander line on opposing shores from end point to end point.

It is not always possible to draw a line perpendicular to the median line toward a meander corner on the shore if the median line has sharp deflections. No point on the true median line exists where a normal can be constructed to the meander corner of section 31 on the north boundary of section 6, for instance.

Figure 4 illustrates a "long lake method" of division of the bed of Flagstaff Lake. The line dividing areas accrued to sections 6 and 31 is drawn normal to an arbitrary "straightening" of the medial line. This illustrates one of the problems with the method.

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

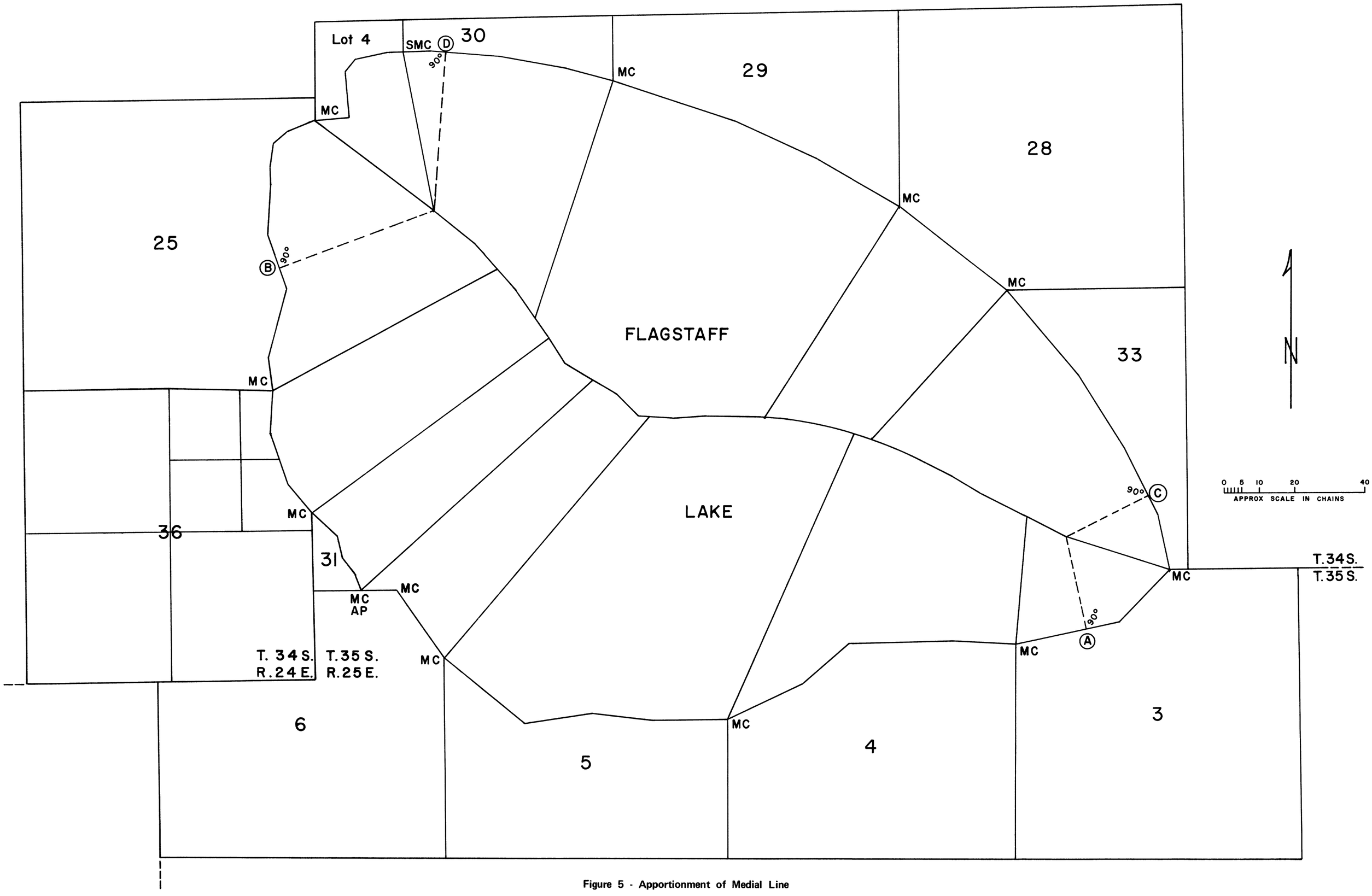


Figure 5 - Apportionment of Medial Line

Auxiliary Topic No. 3

The Apportionment Method

As was seen in the accretion cases, a preferred method of division is to apportion each owner new shore line frontage in ratio to his old shore line frontage. To apply this method to Flagstaff Lake the "new shore line" is the medial line between end points. The "old shore line" is that portion of frontage outside the "ends" of the lake, or where the end radius becomes tangent to the meander line.

Figure 5 illustrates an apportionment of the medial line, based on the length of old shore line between points A and B, and between points C and D. The old shoreline length for section 6 is from the MC of sections 5 and 6 to the MC AP between sections 6 and 31. This occurs because Draper extended the north boundary of section 6 in 1929 but did not extend the south boundary of section 31 even though they are a common line. He did not run new meanders for section 31.

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

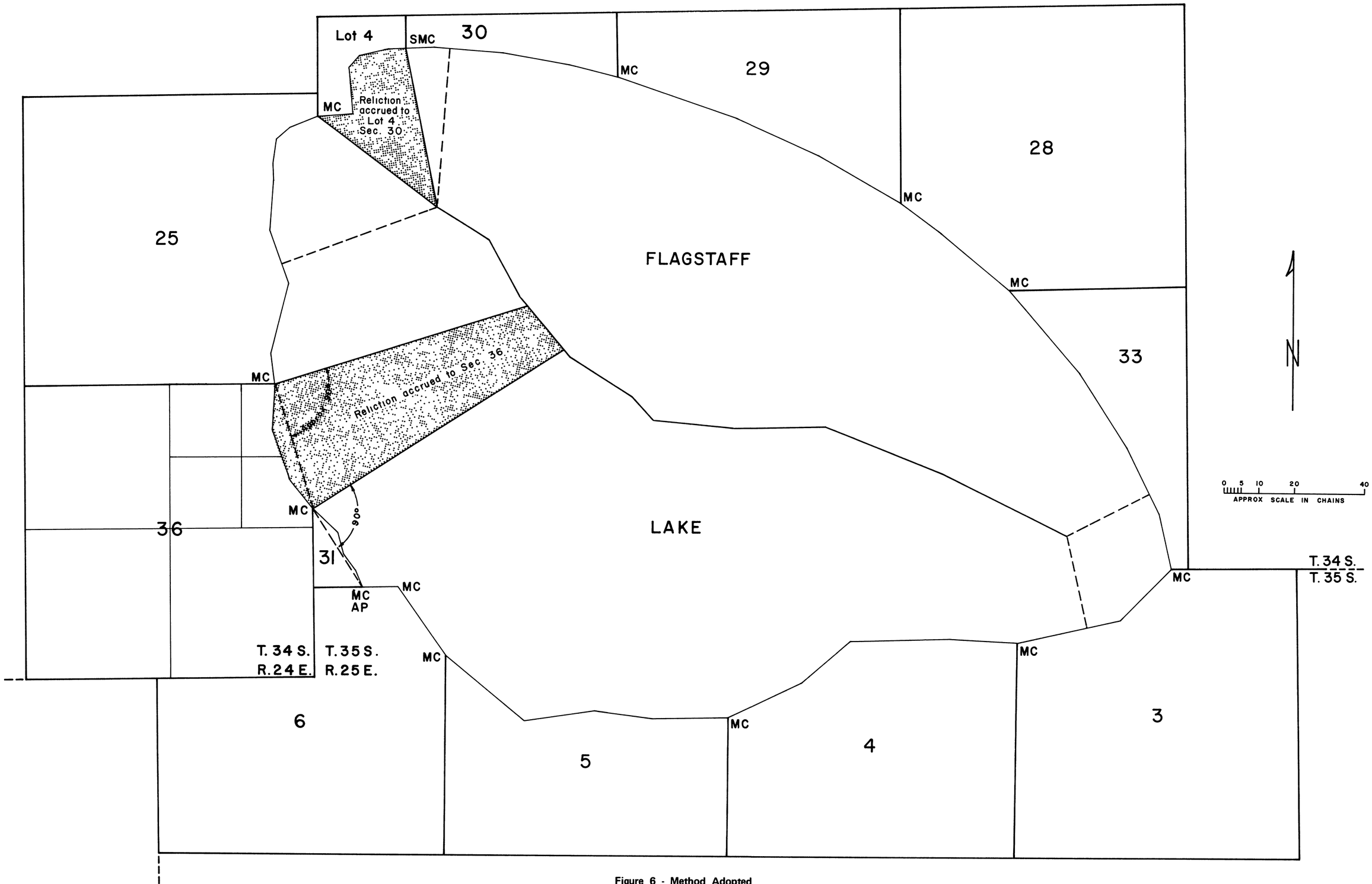


Figure 6 - Method Adopted

Auxiliary Topic No. 4

The Colonial Method

Basically, the method draws the division lines normal to the old shore line and terminates them at an intersection with the medial line. If the shore line deflects at the meander corner or is irregular, as are the meanders of Flagstaff Lake, a special procedure is necessary. Straight lines are drawn from meander corner to meander corner of the affected upland ownership to form an angle at the MC. The division line of the relicted area is then bisector of the total angle thus created at the meander corner.

Final Statement of the Problem

The problem to be solved is selection of an equitable method or combination of methods of dividing the reliction accruing to the patented riparian lots so that the remaining public lands can be subdivided by protraction.

Solution

Figure 6 illustrates the division used in this survey. It is primarily a variation of the "colonial method" with the medial line determined by the "long lake" method.

The medial line was determined by scaled approximation to reduce the number of courses. The end points are nearly the same as in the previous illustrations.

The plats were prepared with a protracted completion survey of each township. The protractions were based on the dependent resurveys and "blank" township line completions. Fractional lots were protracted abutting the relicted lands accruing to the patented riparian lots.

Portions of the plats accepted January 11, 1950 are illustrated in figure 7.

RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

LATEST RECORD MEANDERS OF THE PERIMETER OF FLAGSTAFF LAKE

NEAL - 1887, T. 34 S., R. 24 E.
From MC secs. 25 and 26, in sec. 25

N. 8° 00' W., 9.00 chs.

N. 14° 00' E., 20.00

N. 20° 00' W., 16.00

N. 4° 00' E., 13.00

N. 5° 00' W., 5.00

N. 8° 00' E., 7.00

N. 51° 00' E., 5.00

N. 70° 30' E., 7.70 to MC secs. 25 and 30

MENSCH - 1915, T. 34 S., R. 25 E.
From MC sec. 31 (AP for sec.6), in sec. 31

N. 21° 00' W., 5.00 chs.

N. 36° 00' W., 5.50

N. 13° 45' W., 6.30

N. 45° 30' W., 10.28 to MC secs. 31 and 36

From MC secs. 3 and 33, in sec. 33

N. 11° 45' W., 16.20 chs.

N. 25° 30' W., 20.00

N. 31° 15' W., 26.00

N. 40° 00' W., 31.00 to MC secs. 28 and 33

Thence in sec. 28

N. 49° 45' W., 25.00 chs.

N. 53° 00' W., 14.11 to MC secs. 28 and 29

Thence in sec. 29

N. 58° 30' W., 27.00 chs.

N. 64° 30' W., 25.00

N. 69° 30' W., 27.00

N. 71° 00' W., 9.60 to MC secs. 29 and 30

DRAPER - 1928, T. 35 S., R. 25 E.
From MC secs. 3 and 33, in sec. 3

S. 46° 30' W., 20.10 chs.

S. 80° 00' W., 30.00 to MC secs. 3 and 4

Thence in sec. 4

N. 86° 00' W., 19.00 chs.

S. 89° 00' W., 28.50

S. 50° 00' W., 18.00

S. 65° 00' W., 23.00 to MC secs. 4 and 5

Thence in sec. 5

West, 23,00 chs,

N. 82° 30' W., 15.50

S. 82° 00' W., 20.00

N. 50° W., 29.00 to MC secs. 5 and 6

Thence in sec. 6

N. 31° 30' W., 24.50 chs. to MC sec. 6 (only)

PRICE AND TILLMAN - 1948, T. 34 S., R. 24 E.
From MC secs. 31 and 36, in sec. 36

N. 37° 17' W., 10.004 chs.

N. 18° 45' W., (6.265 to SMC) 15.028

N. 3° 38' E., 11.944 to MC secs. 25 and 36

T. 34 S., R. 25 E.
From MC secs. 25 and 30, in sec. 30

N. 86° 54' E., 9.983 chs.

N. 4° 36' W., 13.022

N. 40° 22' E., 4.501

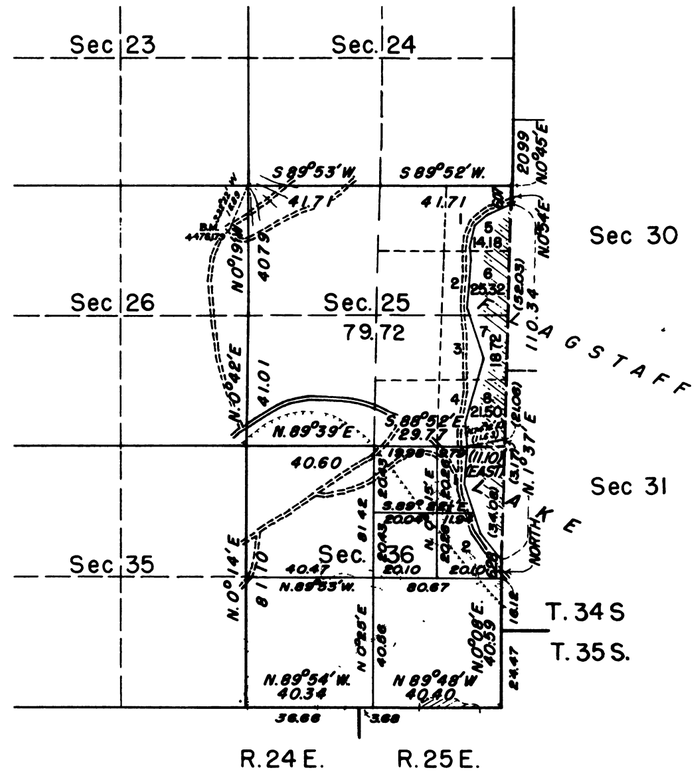
N. 77° 53' E., 8.588

N. 88° 24' E., (4.422 to SMC) 12.978

S. 84° 05' E., 19.961

S. 78° 49' E., 20.958

S. 75° 04' E., 11.475 to MC secs. 29 and 30



RELICTION OF FLAGSTAFF LAKE

T. 35 S., R. 25 E., W. M.

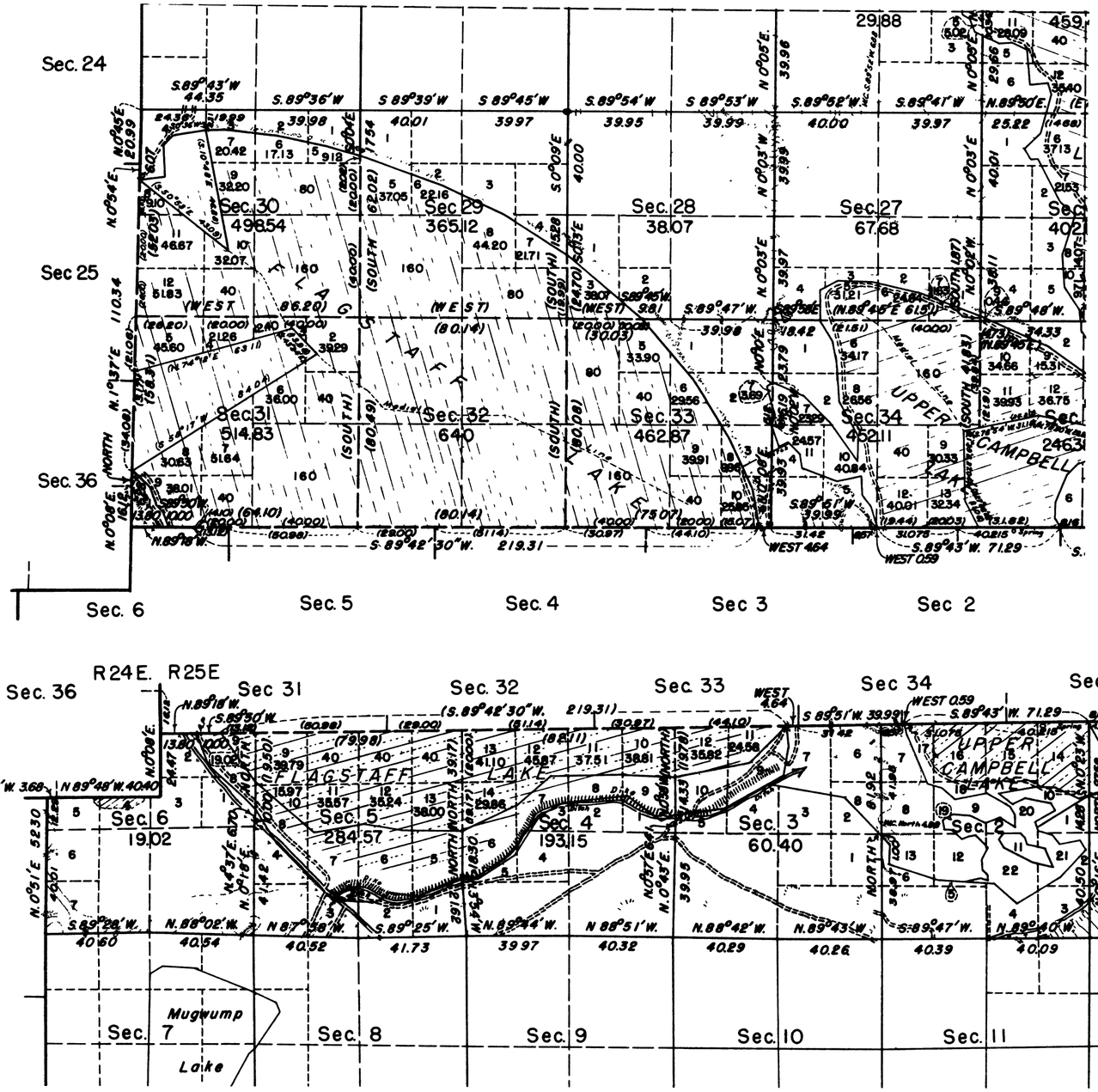
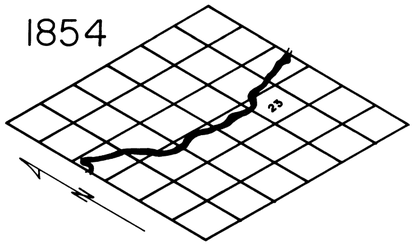


Figure 7 - Portions of Accepted Plats

(See facing page also)

NORTH SANTIAM RIVER AVULSION

T. 9 S. R. 1 E., W. M.



History of Surveys

1854 Harvey Gordon and John W Preston surveyed the subdivisional lines of T 9 S, R 1 E, and the meanders of the North Fork of the Santiam River See figure 1

Reasons for Request of this Survey

Lot 1, section 23, (the fractional NW¼ NW¼) is revested public lands from the O & C. Railroad and is in public ownership. Comparison of the record and present conditions shows the North Santiam River has changed its course in the past. It has moved northerly leaving most of the platted Lot 1 south of the present river channel. Valuable timber on Lot 1 has been logged by private parties. It appears possible, from the size of the stumps, that the river change was avulsive and that government-owned timber has been logged in trespass. The BLM District Manager requested an investigation and dependent resurvey to determine the extent of the apparent trespass.

Special Instructions

On March 28, 1967 Special Instructions for Group 630, Oregon, were prepared. They provided for the necessary dependent resurveys of section 23 and investigation to determine the conditions under which the North Santiam River changed to its present channel.

Conditions Found on the Ground

Figure 2 illustrates the recovered original corners and the part of the original survey record around section 23 pertinent to this survey. Figure 3 illustrates the present conditions after the dependent resurvey of the required section lines and restoration of the corner of sections 14, 15, 22 and 23. Examination on the ground showed that the river channel has shifted northerly about 14 chains. Within the area between the old channel and present channel the land is about 20 feet in elevation above the river and contains tree stumps up to 5 feet in diameter. A ring count determined the cut trees to have been as old as 115 years. No distinct position of the old river channel remains. The area between the record meanders is mostly made up of washed sand, gravel and rocks. If any substantial accretion or gradual change of the old channel occurred, it is not now evident. Because the change in the river could not have been by accretion, it must have been an avulsive change. The time of the avulsive change cannot be determined. The North Santiam River is a swift mountain stream with a history of flooding and avulsive changes in its lower reaches. The 1951 Geological Survey map shows the river in its present position.

Figure 1 - Original 1854 Plat

NORTH SANTIAM RIVER AVULSION

T. 9 S. R. 1 E., W. M.

RECORD MEANDERS

Right Bank - Upstream Sec. 22	Left Bank - Downstream Sec. 14
S. 80° E., 7.33	S. 79° 15' W., 12.00
N. 87° E., 7.00 to MC 22 & 23 Thence in Sec. 23	S. 57° 45' W., 2.65 to MC 14 & 23 Thence in Sec. 23
N. 81° E., 4.00	S. 84° 30' W., 5.92
N. 67° E., 2.70	S. 66° 30' W., 8.57
N. 36° 30' 3.65	S. 40° 15' W., 9.00
N. 15° 30' E., 7.00	S. 20° 15' W., 8.92
N. 32° 30' E., 6.65	S. 35° W., 2.74
N. 49° E., 5.60 to MC 14 & 23 Thence in Sec. 14	S. 70° 45' W., 7.00
	S. 83° 15' W., 2.86
N. 57° E., 3.50	S. 79° W., 1.20 to MC 22 & 23 Thence in Sec. 22
N. 64° E., 5.00	
N. 73° 45' E., 10.00	S. 79° W., 6.21
N. 84° E., 10.00	N. 80° W., 7.80

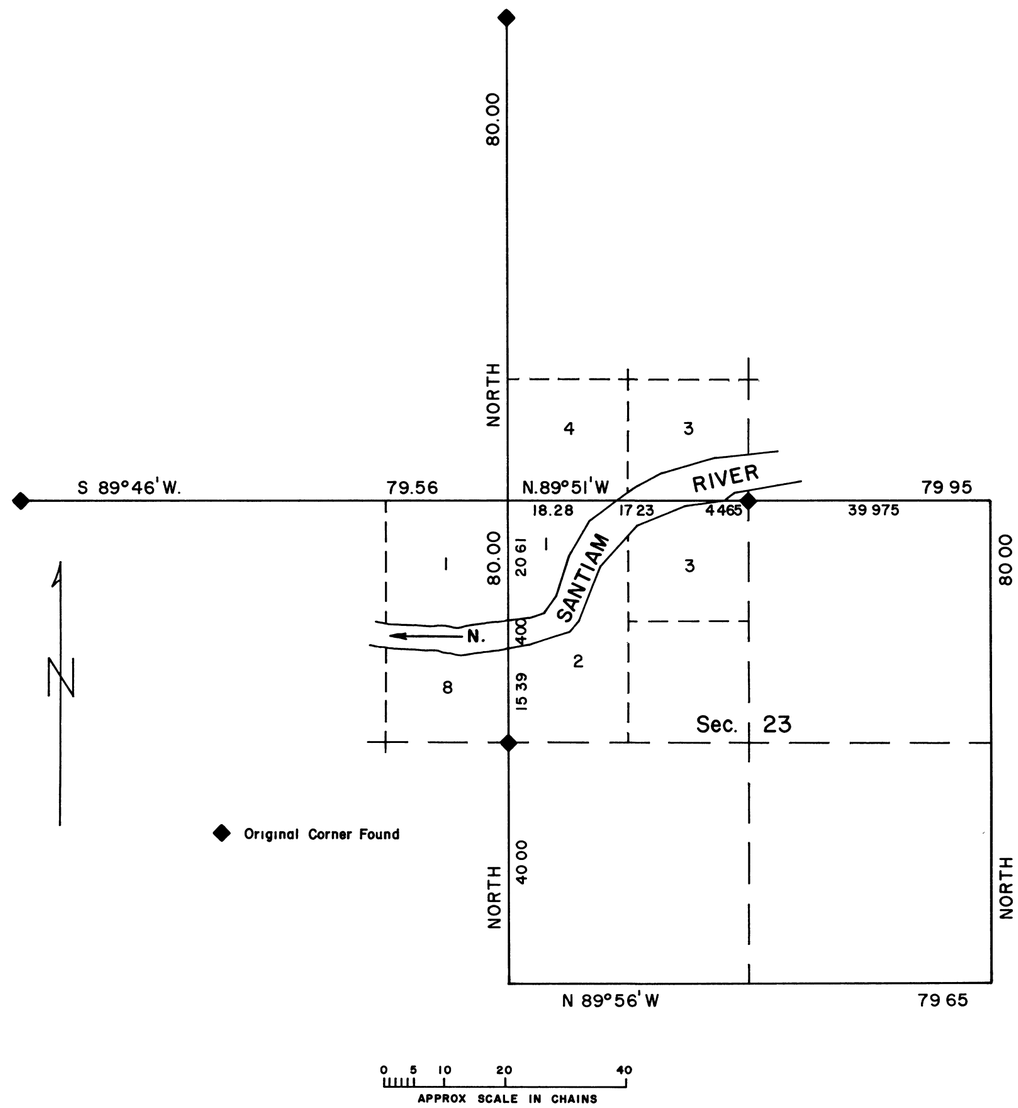


Figure 2 - Original Record and Corner Recovery

NORTH SANTIAM RIVER AVULSION

T. 9 S. R. 1 E., W. M.

Preliminary Statement of the Problem

The line along the middle of the stream channel as it was before the avulsive change divides the public lands from the surrounding privately owned land. This medial line must be determined and monumented.

Distinction must be made between the terms median and medial as applied to lines in water boundaries. A medial line refers to a particular line which must be determined by the consideration of various factors or the weighing of evidence, as well as the use of measurement or calculations. The determination of the center of the main channel by observations and consideration of past accretions determines the "medial line," as distinguished from the strict application of mathematical principles to determine a "median line" midway between meanders of river banks.

Regulations

Sections 7-51 to 7-56, 7-71 to 7-76 of the Manual of Surveying Instructions, 1973, outlines procedures to be followed in median line determinations.

Changes in Instructions

The surveyor assigned to Group 630 was instructed to survey and monument a median line midway between the meander lines along the left and right banks of the old channel. The Washington Office had advised as follows:

Presumably the North Santiam River is a meandered, unnavigable stream in this township. If investigation shows that the change affecting the public land lot was avulsive, the lot boundary would be fixed along the center of the abandoned channel. See third paragraph, Section 512, Manual of Surveying Instructions, 1947. Since there may have been erosive change in the river's position since the time of the original survey, this fixed boundary may not lie midway between the original meander lines.

No purpose will be served in restoring the original meander corners if they are not existent. An angle point should be established where each section line crosses the middle of the abandoned channel. If it makes no significant difference, the procedure described in the fourth paragraph of Section 503, Manual of Surveying Instructions, 1947, need not be used. Angle points should be established to mark the lot boundary along the middle of the old channel. There is no need to retrace the old meander lines. A traverse of the present banks need not be made unless you feel this is necessary to show topography.

Final Statement of the Problem

The problem is how to determine the median line and then mark and monument the boundary line between public and private lands.

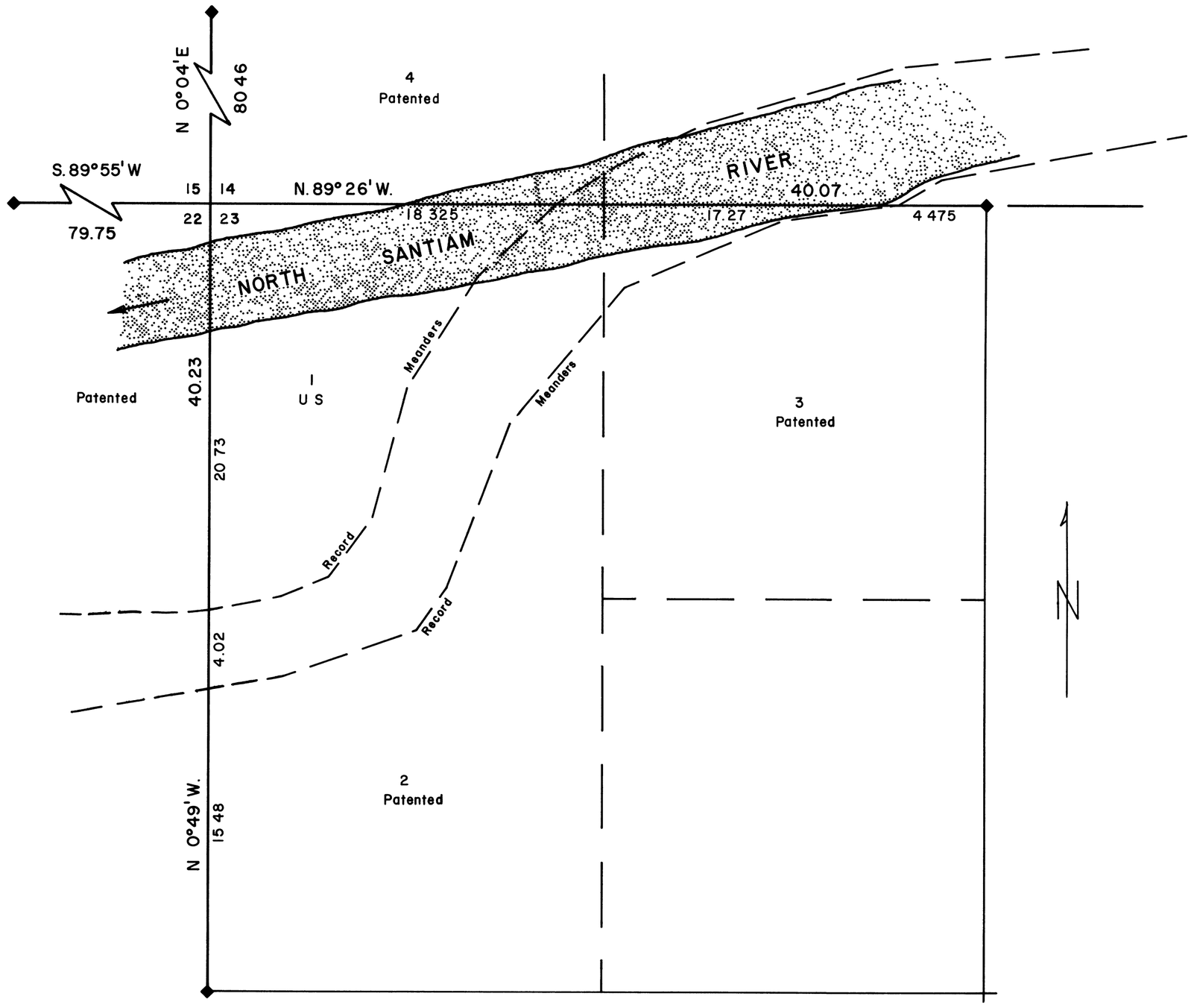


Figure 3 - Dependent Resurvey and Present Conditions

NORTH SANTIAM RIVER AVULSION

T. 9 S. R. 1 E., W. M.

Solution

The missing corner of sections 14, 15, 22 and 23 was restored by double proportionate measurement methods. A locally established point was found N. 79¾° E., 1.25 chains from the proportionate point. This local point was rejected.

The points for the record meander corners were reestablished by single proportionate measurement but were not monumented. Angle point No. 1 was established at midpoint between the restored record meander corners on the line between sections 22 and 23. (This angle point fell in a creek and a witness angle point was monumented.) The medial line was determined graphically from a scaled drawing between the adjusted record meanders of each bank. Each angle point on the medial line was consecutively numbered upstream and monumented. Angle point No. 8 fell in the present channel. The medial line intersected the line between sections 14 and 23 at angle point No. 9, which also fell in the present channel. Therefore the last two points could not be monumented.

The plat and field notes were submitted to the Washington Office for acceptance, with the medial line beginning at AP 1 and ending at AP 9. Lot 1 was redesignated lot 4 with a new acreage. The plat and field notes were returned with the following memorandum:

November 19, 1970

Memorandum

To: SD, Oregon

From: Chief, Division of Cadastral Survey

Subject: Final returns, T. 9 S., R. 1 E., Willamette Meridian, Oregon

The plat and field notes of a dependent resurvey of sec. 23 and the survey of the medial line of the old river channel of the North Santiam River in sec. 23, T. 9 S., R. 1 E., W.M., are being returned for modification under separate cover.

In order to protect the valid rights of the land owners in the SW¼ of sec. 14, it is recommended that the portion of the old river channel fronting on the patented lots 3 and 4, sec. 14, be segregated from the new area shown for lot 4, sec. 23. This may be done, without additional field work, by protracting a line from the point for the original meander cor. of secs. 14 and 23 on the west bank of the river to Angle Point No. 8 on the medial line of the old river channel. An appropriate call should be made in the field notes giving this calculated bearing and distance.

It is also recommended that the double edge arrows and protracted boundary line between lots 2 and 3, shown within the old river channel, be removed from the plat. This action precludes any adjudicative intention on our part.

For your information in future surveys of this type, you are advised that Wm. Ball of the Portland Service Center has derived a mathematical formula by which the medial line between meanders can be easily calculated.

/s/ Clark L. Gumm

The directed modifications were made and resubmitted. The plat was accepted on December 30, 1970 and is shown in figure 4.

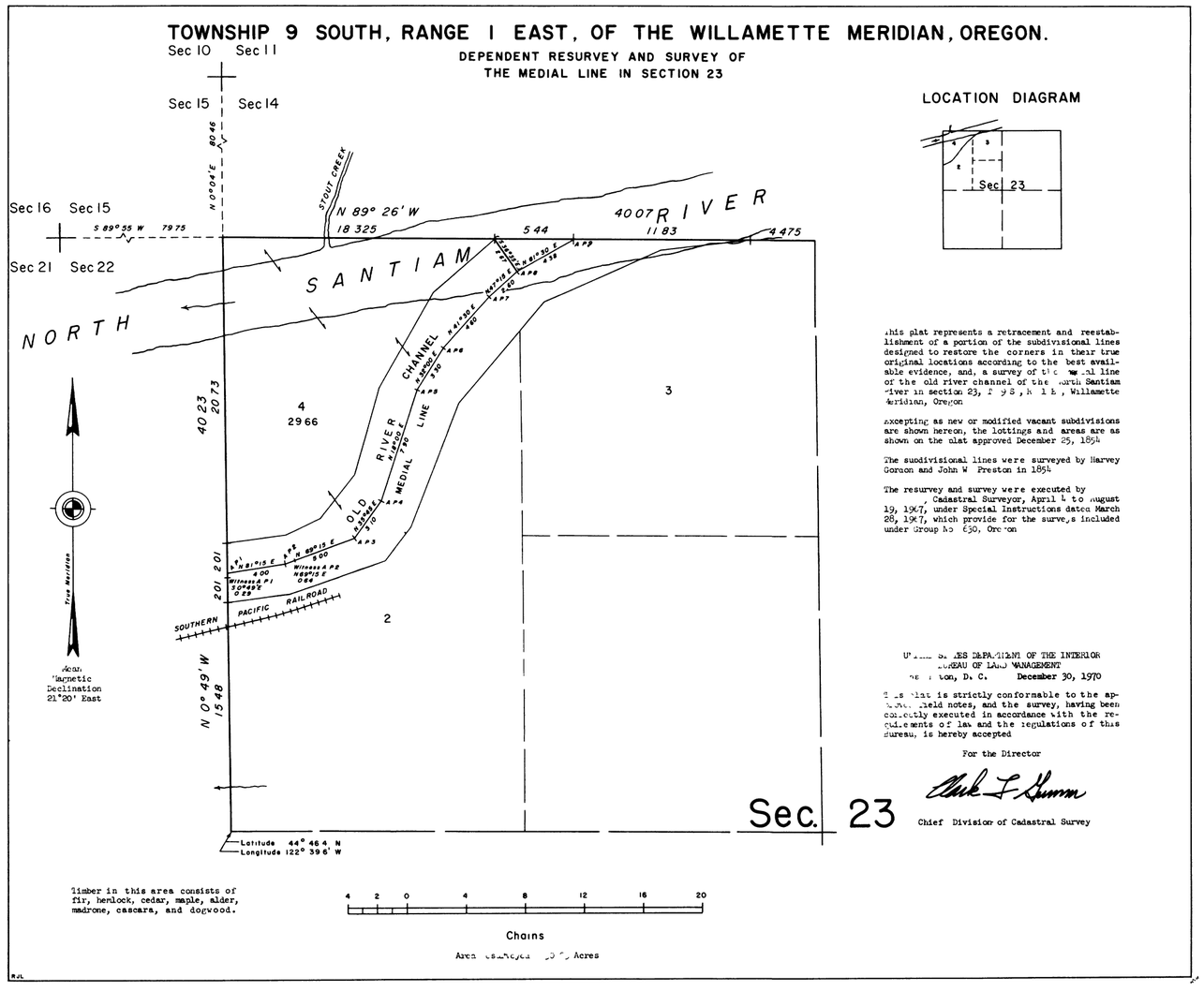


Figure 4 - Accepted Plat

Supplementary Topic - Medial Lines

A true median line is a line which is at all times equidistant between the lines on opposite banks. In this case the opposite banks are the adjusted record meanders of the abandoned channel. These meanders exercise complete control over the position of the median line.

The following discussion illustrates the method of median line determination using the methods developed by William E. Ball which are mentioned in the last paragraph of the Washington Office memorandum:

1. Adjust the record meanders by the broken boundary method. The meanders must be extended beyond the area of direct consideration to determine the median line. The record values of the meanders were used for extentions of the meanders.

2. Assign x and y coordinates to all points. In this case the ¼ section corner of sections 22 and 23 was assigned x = 210.00 chains, y = 100.00 chains.

3. Make a large-scale drawing of the situation. In this example a scale of 1" = 1.25 chains was used.

4. Using a draftsman's compass carefully plot the geometry of the median line as illustrated in figure 5. Assign an identifying number to every angle point and meander corner. Be sure the meanders of the banks extend beyond the area of consideration. Identify and label each situation, i.e., End Point, Parabolic Curve, Angle Point, Compound Curve, Reverse Curve, etc.

NORTH SANTIAM RIVER AVULSION

T. 9 S. R. 1 E., W. M.

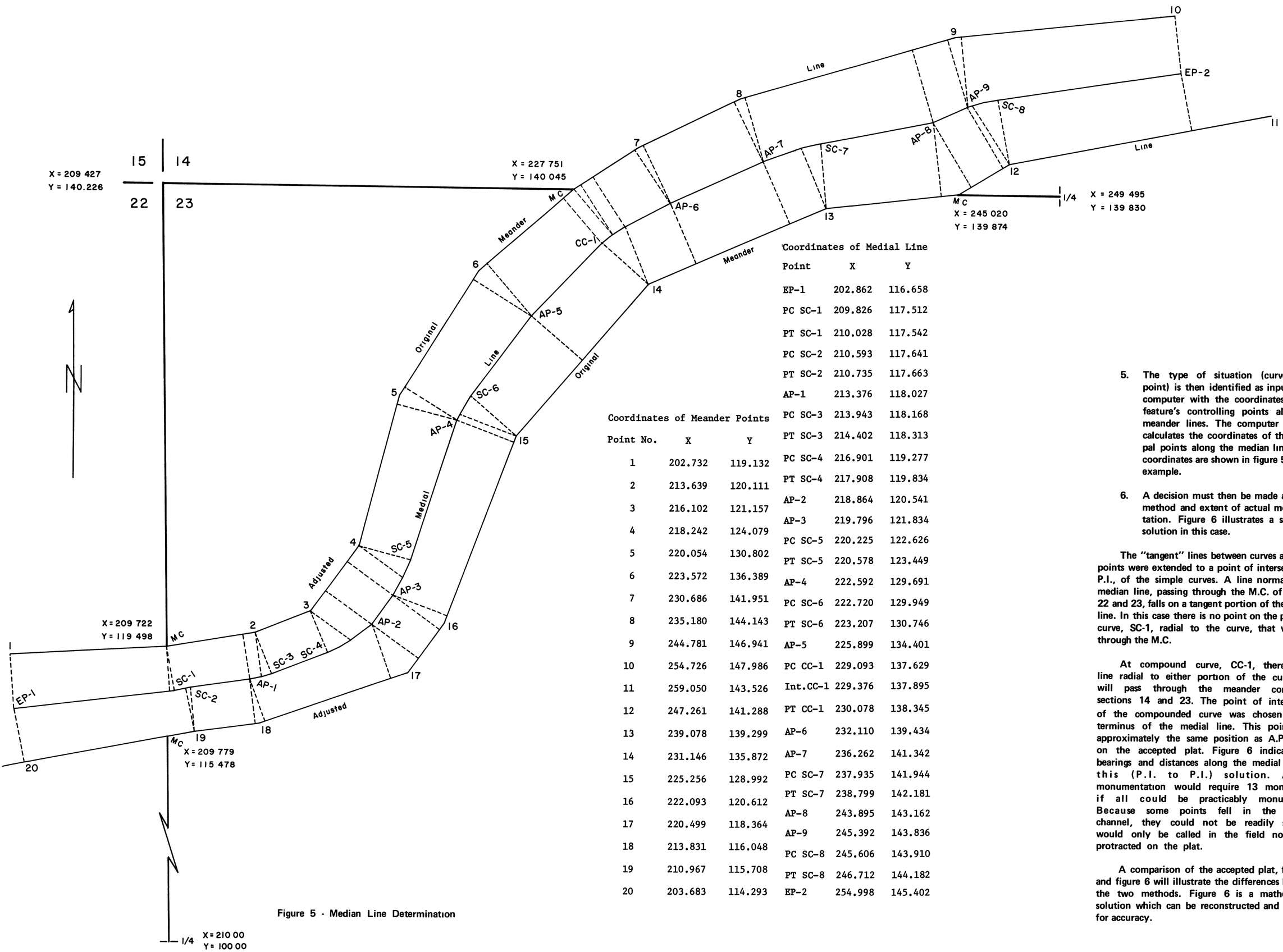


Figure 5 - Median Line Determination

Coordinates of Medial Line

Point	X	Y
EP-1	202.862	116.658
PC SC-1	209.826	117.512
PT SC-1	210.028	117.542
PC SC-2	210.593	117.641
PT SC-2	210.735	117.663
AP-1	213.376	118.027
PC SC-3	213.943	118.168
PT SC-3	214.402	118.313
PC SC-4	216.901	119.277
PT SC-4	217.908	119.834
AP-2	218.864	120.541
AP-3	219.796	121.834
PC SC-5	220.225	122.626
PT SC-5	220.578	123.449
AP-4	222.592	129.691
PC SC-6	222.720	129.949
PT SC-6	223.207	130.746
AP-5	225.899	134.401
PC CC-1	229.093	137.629
Int.CC-1	229.376	137.895
PT CC-1	230.078	138.345
AP-6	232.110	139.434
AP-7	236.262	141.342
PC SC-7	237.935	141.944
PT SC-7	238.799	142.181
AP-8	243.895	143.162
AP-9	245.392	143.836
PC SC-8	245.606	143.910
PT SC-8	246.712	144.182
EP-2	254.998	145.402

Coordinates of Meander Points

Point No.	X	Y
1	202.732	119.132
2	213.639	120.111
3	216.102	121.157
4	218.242	124.079
5	220.054	130.802
6	223.572	136.389
7	230.686	141.951
8	235.180	144.143
9	244.781	146.941
10	254.726	147.986
11	259.050	143.526
12	247.261	141.288
13	239.078	139.299
14	231.146	135.872
15	225.256	128.992
16	222.093	120.612
17	220.499	118.364
18	213.831	116.048
19	210.967	115.708
20	203.683	114.293

5. The type of situation (curve, angle point) is then identified as input to the computer with the coordinates of that feature's controlling points along the meander lines. The computer program calculates the coordinates of the principal points along the median line. These coordinates are shown in figure 5 for this example.

6. A decision must then be made as to the method and extent of actual monumentation. Figure 6 illustrates a suggested solution in this case.

The "tangent" lines between curves and angle points were extended to a point of intersection or P.I., of the simple curves. A line normal to the median line, passing through the M.C. of sections 22 and 23, falls on a tangent portion of the median line. In this case there is no point on the parabolic curve, SC-1, radial to the curve, that will pass through the M.C.

At compound curve, CC-1, there is no line radial to either portion of the curve that will pass through the meander corner of sections 14 and 23. The point of intersection of the compounded curve was chosen as the terminus of the medial line. This point is in approximately the same position as A.P. No. 8 on the accepted plat. Figure 6 indicates the bearings and distances along the medial line by this (P.I. to P.I.) solution. A full monumentation would require 13 monuments, if all could be practicably monumented. Because some points fell in the present channel, they could not be readily set and would only be called in the field notes and protracted on the plat.

A comparison of the accepted plat, figure 4, and figure 6 will illustrate the differences between the two methods. Figure 6 is a mathematical solution which can be reconstructed and checked for accuracy.

NORTH SANTIAM RIVER AVULSION

T. 9 S. R. 1 E., W. M.

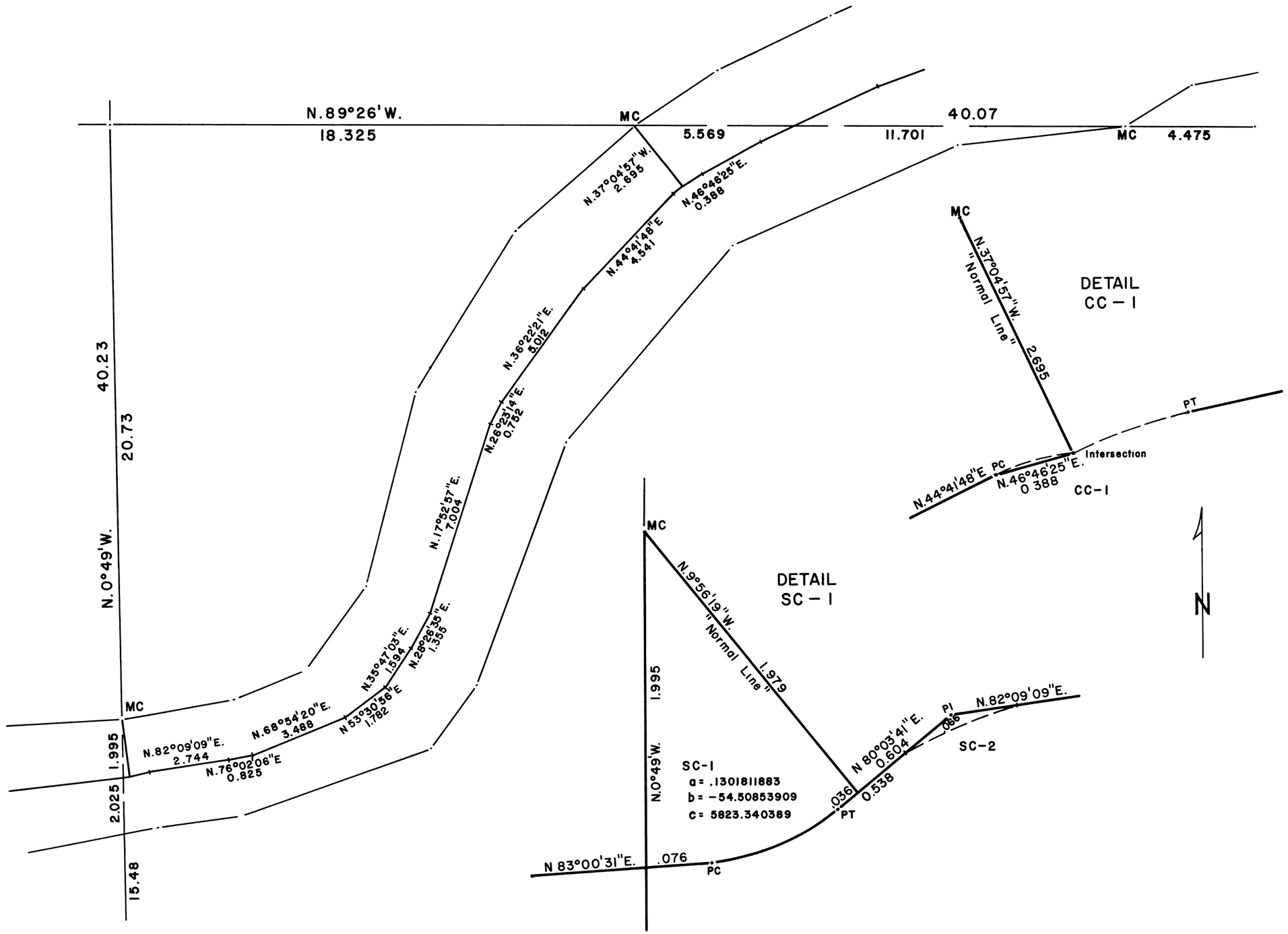
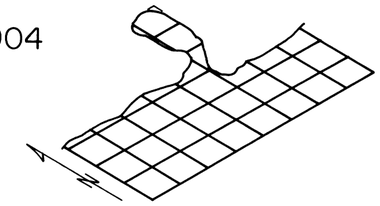


Figure 6 - Computed Medial Line

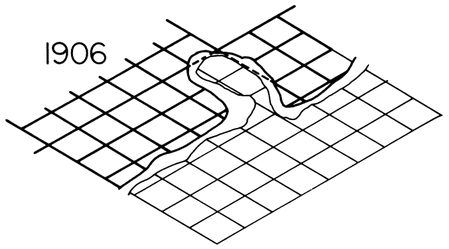
AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA

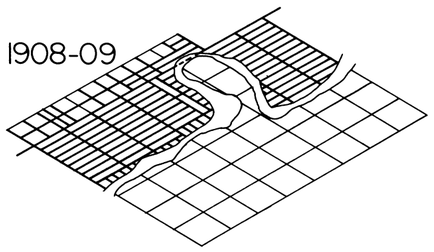
1904



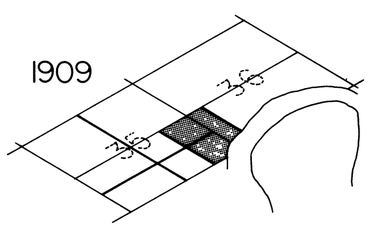
1906



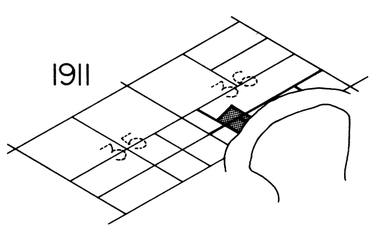
1908-09



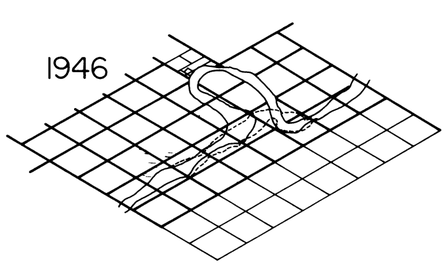
1909



1911



1946



History of Surveys

1904 James M Page surveyed portions of Township 27 N, Ranges 49 and 50 East of the Principal Meridian, Montana. The portions surveyed were all south of the Missouri River.

1906 Frederick L Cumming surveyed portions lying north of the river and within the Fort Peck Indian Reservation in Townships 27 North, Ranges 49 and 50 East plus Township 28 North, Range 49 East Cumming meandered the left bank of the river but did not tie across the river or connect to the surveys on the right bank. See figure 1.

1908-1909 Guy P Harrington surveyed allotments within the reservation. He ran allotment lines to the river at that time and did not adhere to the original Cumming meanders. See figure 2 for pertinent portions of his plats.

1909 Samuel P. Matthews surveyed the Chelsea Townsite, located in lot 1 and NE¼ SE¼, section 35, and the fractional W½ W½ SW¼ section 36, T. 28 N., R. 49 E This townsite was later revoked and does not have a direct effect upon this survey

1911 Samuel P Matthews surveyed the Great Northern Railway Reservoir Site within the fractional SW¼ of section 36, adjoining a portion of the easterly boundary of the Chelsea Townsite Matthews did not hold to the Cumming meander of the left bank, Matthews' monuments No. 3 and 4 were established on the left bank as it then existed The Reservoir Site was patented on October 28, 1913. See figure 3.

1946 A W Brown, M.J Lytle and William Teller surveyed a portion of the boundaries and subdivisional lines as part of the "Missouri Basin Project."

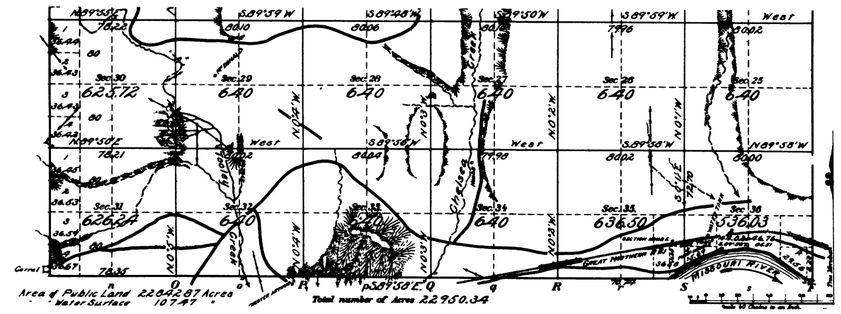
During the execution of these dependent resurveys ties were made across the river, but were described in the field notes and shown on the plats as section lines, connecting the Page and Cumming surveys

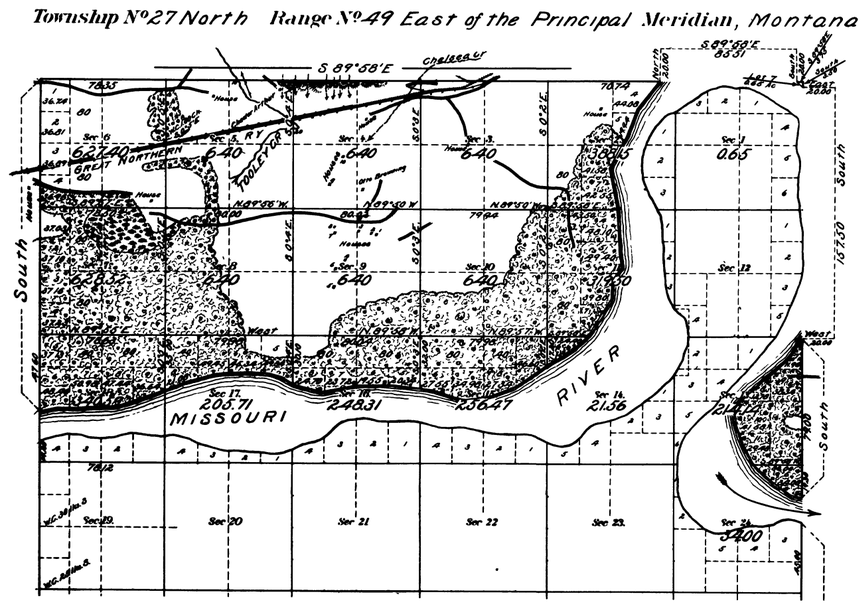
Pertinent portions of these surveys are illustrated in figure 4.

Numerous supplemental plats creating new lottings, but which have no direct bearing on this survey were also approved or accepted within these townships.

Reasons for Request of this Survey

The 1946 resurvey plat of T. 27 N., R. 49 E., revealed a grossly different position of the Missouri River relative to the original meanders. The change appeared to be avulsive; the river cut across the "ox-bow loop" in sections 1, 12 and 13. By memorandum dated November 5, 1953, the Bureau of Indian Affairs requested the BLM to make a resurvey and survey of the accreted lands and lands within the Missouri River owned by the Indians of the Fort Peck Reservation.





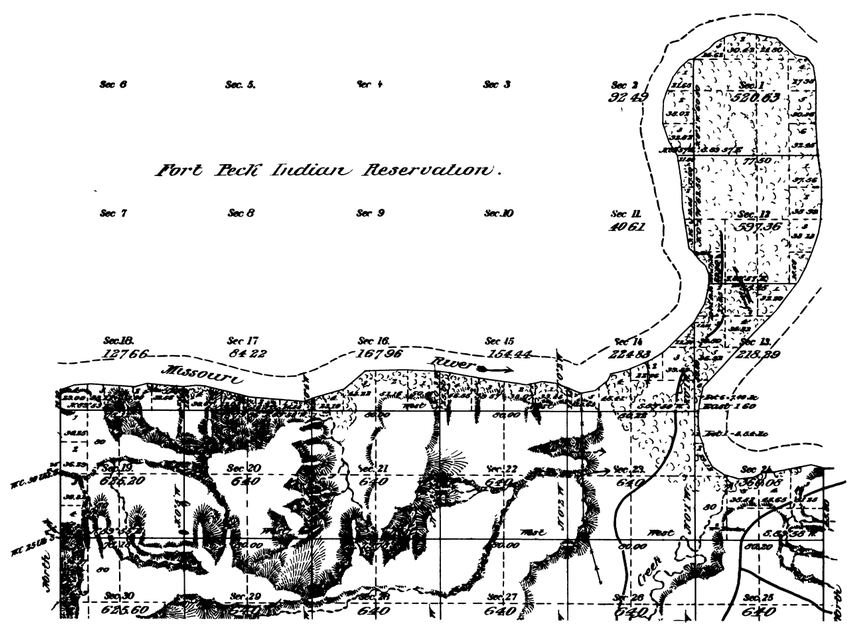
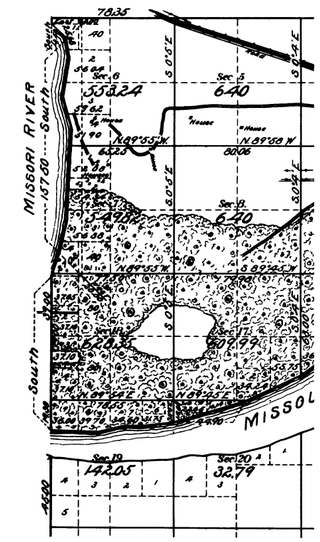


Figure 1 - Portions of Original 1904 and 1906 Plats



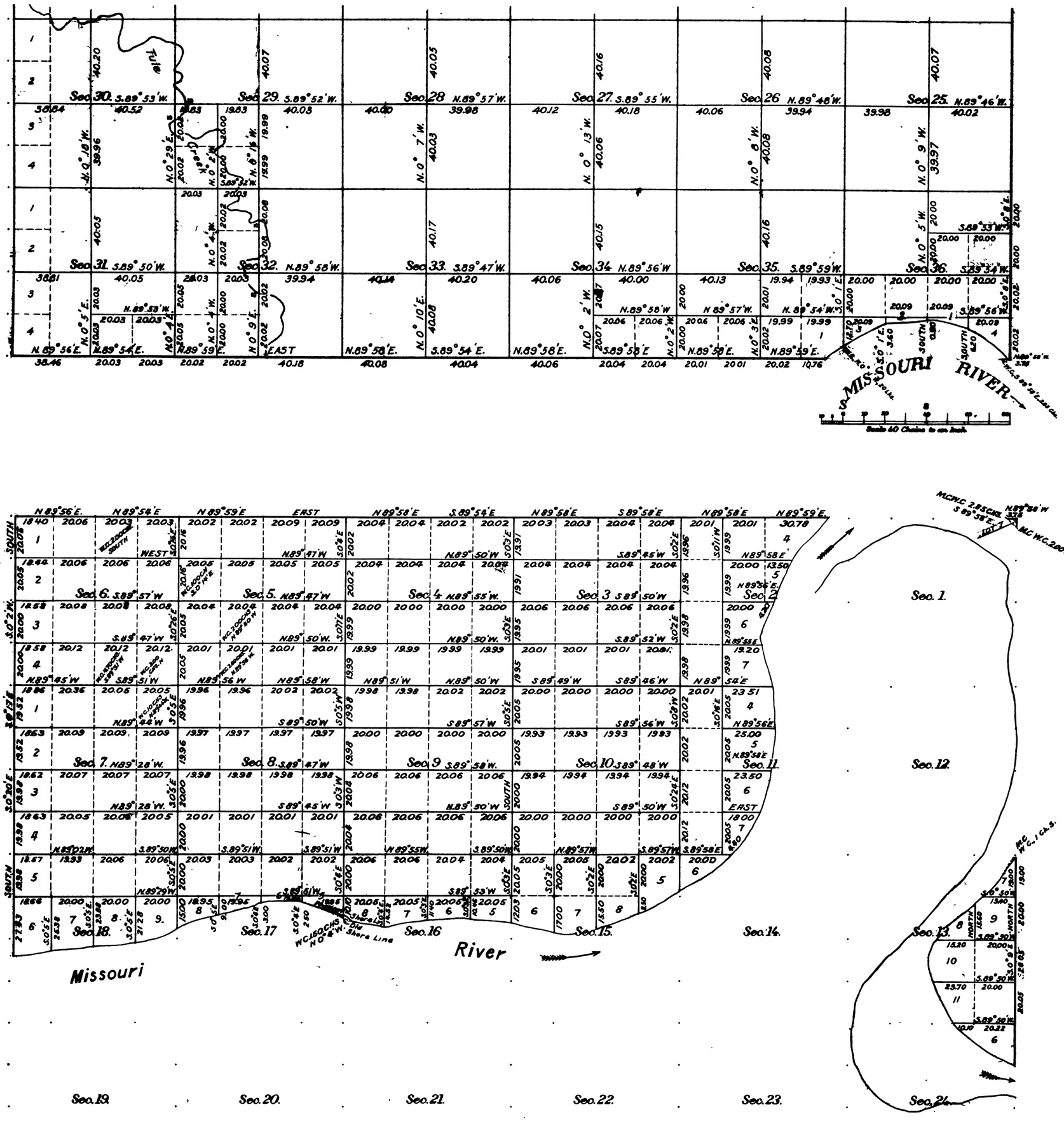
Special Instructions

Instructions for an investigation of possible changes issued on November 16, 1953 asked the following questions:

1. Was it an avulsive change?
2. If the change was avulsive, when did the river cut across the base of the ox-bow loop?
3. Did the entire flow of the river change to the new channel within one season, or did the old channel continue to carry a portion of the flow for a few years?
4. If the river, after its initial avulsion, continued to run in the old channel, when did it cease to use the old channel during normal low water stages?
5. Where are the approximate banks at the time of breakthrough? [Find the approximate size of the old channel when abandoned and the thalweg of the channel at the time of the avulsive change. Show the positions on maps or aerial photos.]
6. Had substantial accretion built up in front of lots on the left bank prior to their being allotted or filed on? (Almost all were dated April 1913.)
7. What was the extent of accretions at the time of the avulsive change?

AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA



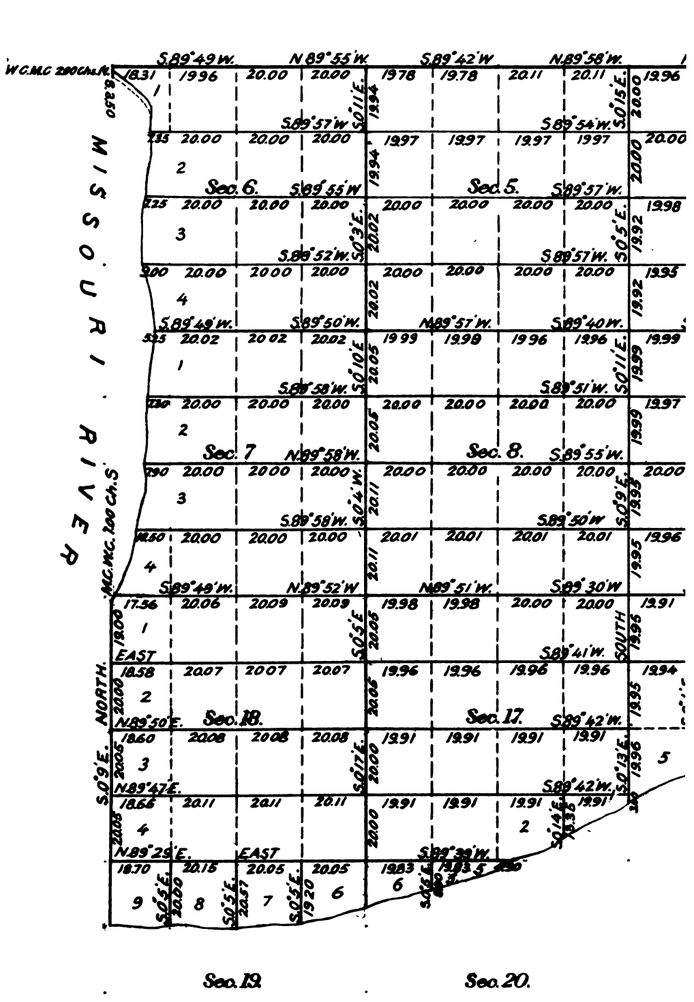


Figure 2 - 1908-1909 Harrington Subdivisions

AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA

Conditions Found on the Ground

Field examination showed that the change was made by an avulsive cut during the highwater period in the spring of 1916 according to statements of four residents.

The change, according to these sources, was sudden and was preceded by rapid erosion of the right bank in sections 1, 2 and 12 farther downstream from the "cut off" point. The river flowed through the abandoned channel during periods of high water only.

The field examination party determined the approximate 1916 left bank of the river as indicated in figure 5. It was not possible to determine the extent of any accretions which occurred between 1906 (the date of the Cumming meanders of the left bank) and 1913 (date of allotment filings along the left bank).

Preliminary Statement of the Problem

Once the river's change was known to be avulsive, it was necessary to determine the division-of-ownership line near midstream. Either the thalweg or the medial line method must be chosen and then employed, especially as it applies to Indian lands.

Application of the law of riparian ownership involves consideration of the State of Montana's ownership to the bed of the navigable river and the position of the river before the avulsive cut off as well as the rapid erosion of the downstream banks before and during the cut-off.

Regulations

The Bureau of Indian Affairs holds land of allottees in trust unless patent has been issued to the individual. The BIA, as trustee, must approve any actions affecting title to trust lands. The Tribal Council holds jurisdiction over lands belonging to the tribe and the Council's approval is also required by the BIA in matters affecting individual allotments.

This survey illustrates the application of the general provisions in sections 5-43, 7-46 to 7-53, and 7-57 to 7-76 of the Manual of Surveying Instructions, 1973.

Legal Constraints

A. The Fort Peck Indian Reservation was created by the Treaty of May 1, 1888, 25 Stat. 113. The boundaries of the Reservation are described as follows:

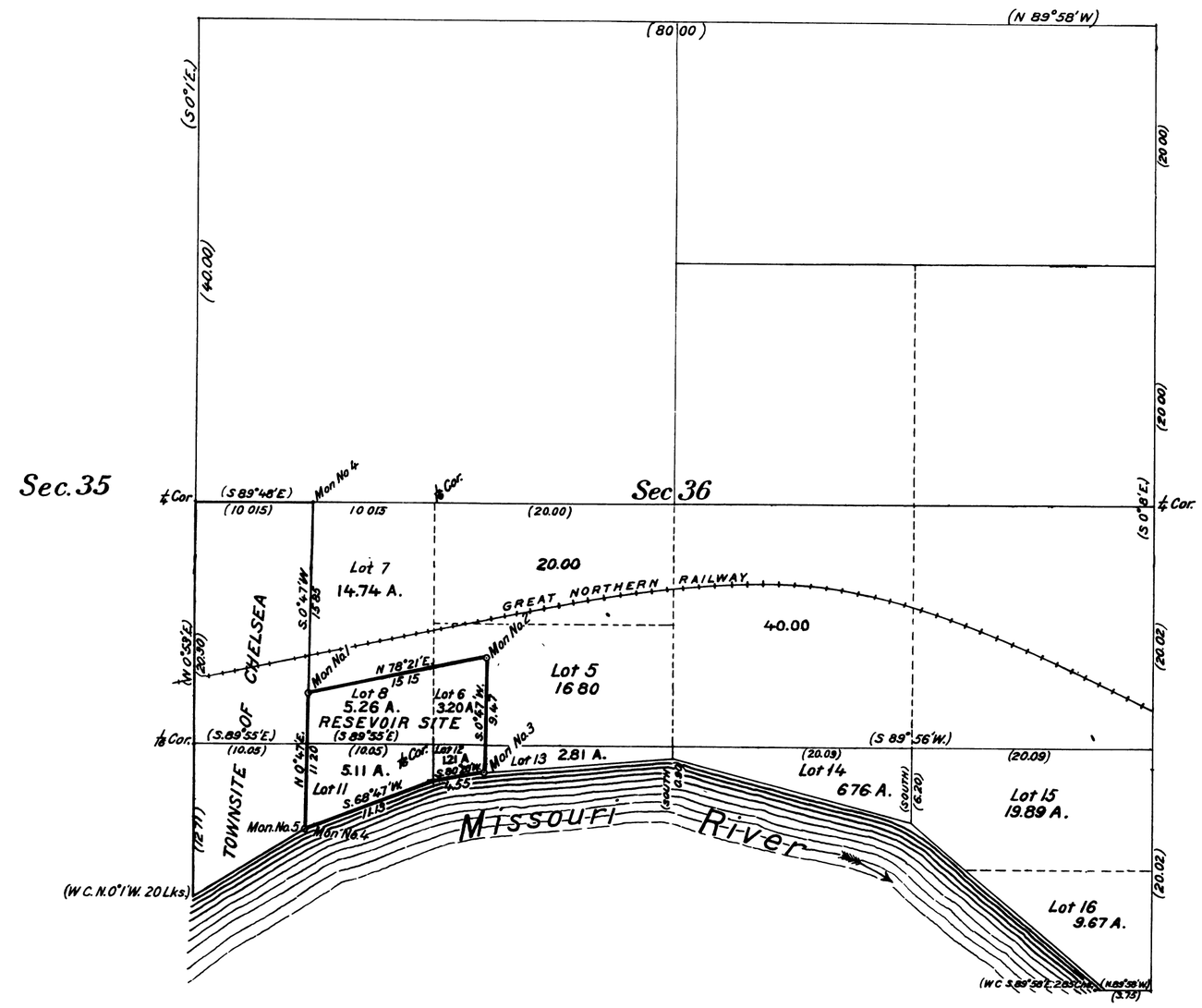
> It is hereby agreed that the separate reservation for the Indians now attached to and receiving rations at the Fort Peck Agency, Montana, shall be bounded as follows to wit:
>
> Beginning at a point in the middle of the main channel of the Missouri River opposite the mouth of Big Muddy Creek; thence up the Missouri River, in the middle of the main channel thereof, to a point opposite the mouth of Milk River, thence up the middle of the main channel of Milk River to Porcupine Creek; thence up Porcupine Creek, in the middle of the main channel, thereof, to a point forty miles due north in a direct line from the middle of the main channel of the Missouri River opposite the mouth of Milk River; thence due east to the middle of the main channel of big Muddy Creek; thence down said creek, in the middle of the main channel thereof, to the place of beginning. And said Indians shall have the right to take timber for building and fencing purposes and for fuel from the bottom lands on the right bank of the Missouri River opposite the reservation above described.
>
> Dated and signed at Fort Peck Agency, Montana, on the twenty-eighth day of December, eighteen hundred and eighty-six.

B. Montana was admitted to the Union by Presidential Proclamation on November 8, 1889, 26 Stat. 1551, in accordance with the enabling Act of February 22, 1889, 25 Stat. 676. Section 4 of the Act specifically excludes all lands within Indian Reservations from state jurisdiction.

C. The Missouri River is navigable in fact and navigable in law, in the reaches of the river here involved.

D. Montana is the owner of the beds of all navigable streams within its boundaries, unless there is an overriding ownership. In this situation the grant of the reservation precedes statehood so that the Indian Reservation boundary as "up the Missouri River, in the middle of the main channel thereof" implies the thalweg of the river as the boundary. The State of Montana never received title to the bed of the river left of the thalweg along the reservation boundary.

Supplemental Plat of Section 36 Township No. 28 North Range No. 49 East



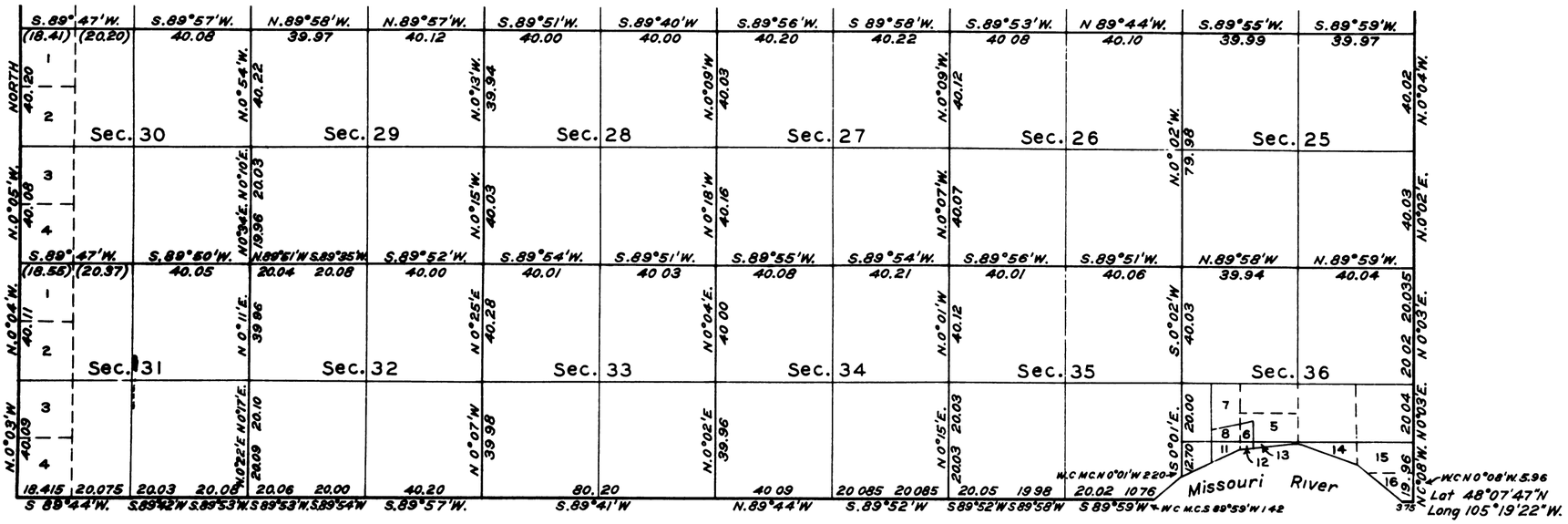
RESERVOIR SITE 14.78 ACRES.

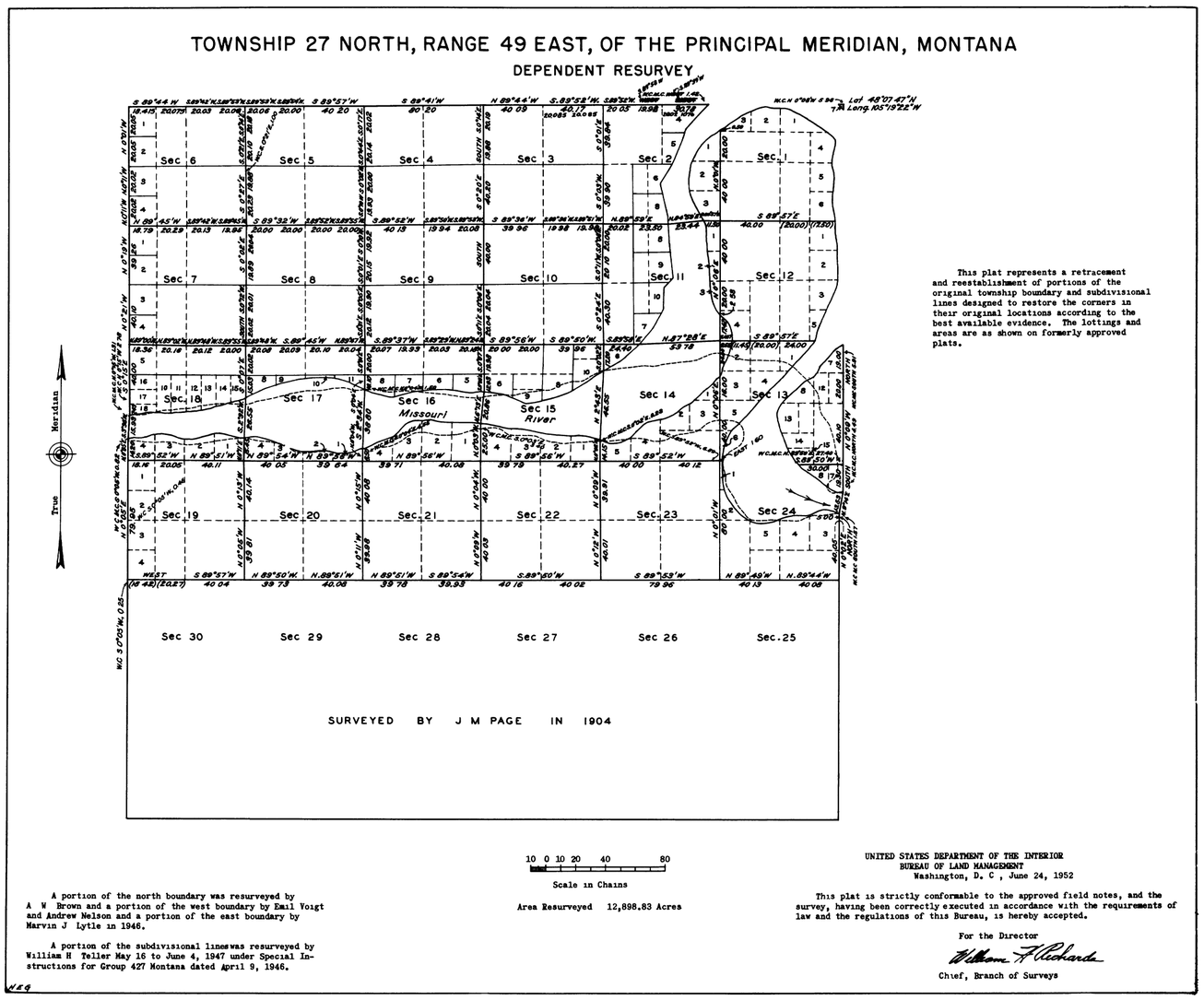
Surveyed June 20, 1911.

Figure 3 - Reservoir Site, 1911

AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA





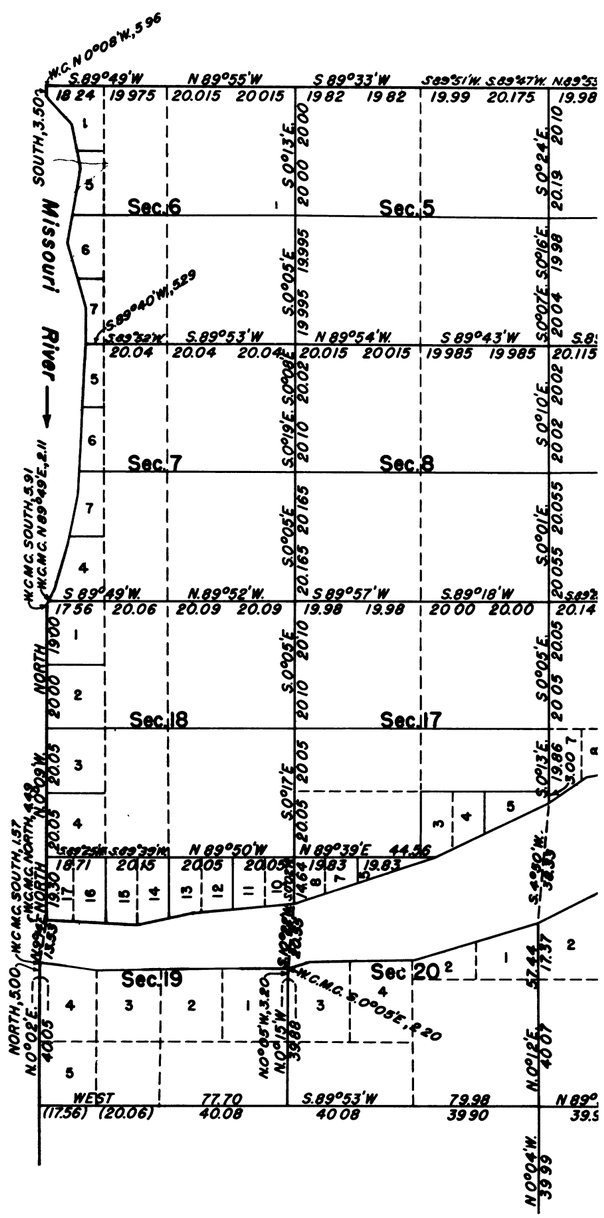


Figure 4 - 1946 Dependent Resurveys

AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA

Changes in Instructions

Special Instructions were issued April 5, 1954, providing for the necessary dependent resurveys, survey of the accretion and bed of the abandoned channel of the Missouri River in Tps. 27 and 28 N., R. 49 E., and T. 27 N., R. 50 E., of the Principal Meridian, Montana. The accretions concerned here are discussed below in Auxiliary Topic No. 1.

Figure 6 is a composite sketch showing the latest survey records on which the work was based. Control points as shown on figure 5 were recovered during the necessary retracements of the section and section subdivision (allotment) lines.

Final Statement of the Problem

The surveyor was to determine the thalweg of the abandoned channel which determined the boundary of the Indian Reservation according to the original treaty before statehood. Necessary divisional lines were to be determined between the lots fronting on the accretions and the abandoned channel.

All boundaries were to be established as they existed before the avulsive cut but boundaries of the State of Montana's ownership of the river bed were not to be monumented except as needed for this survey.

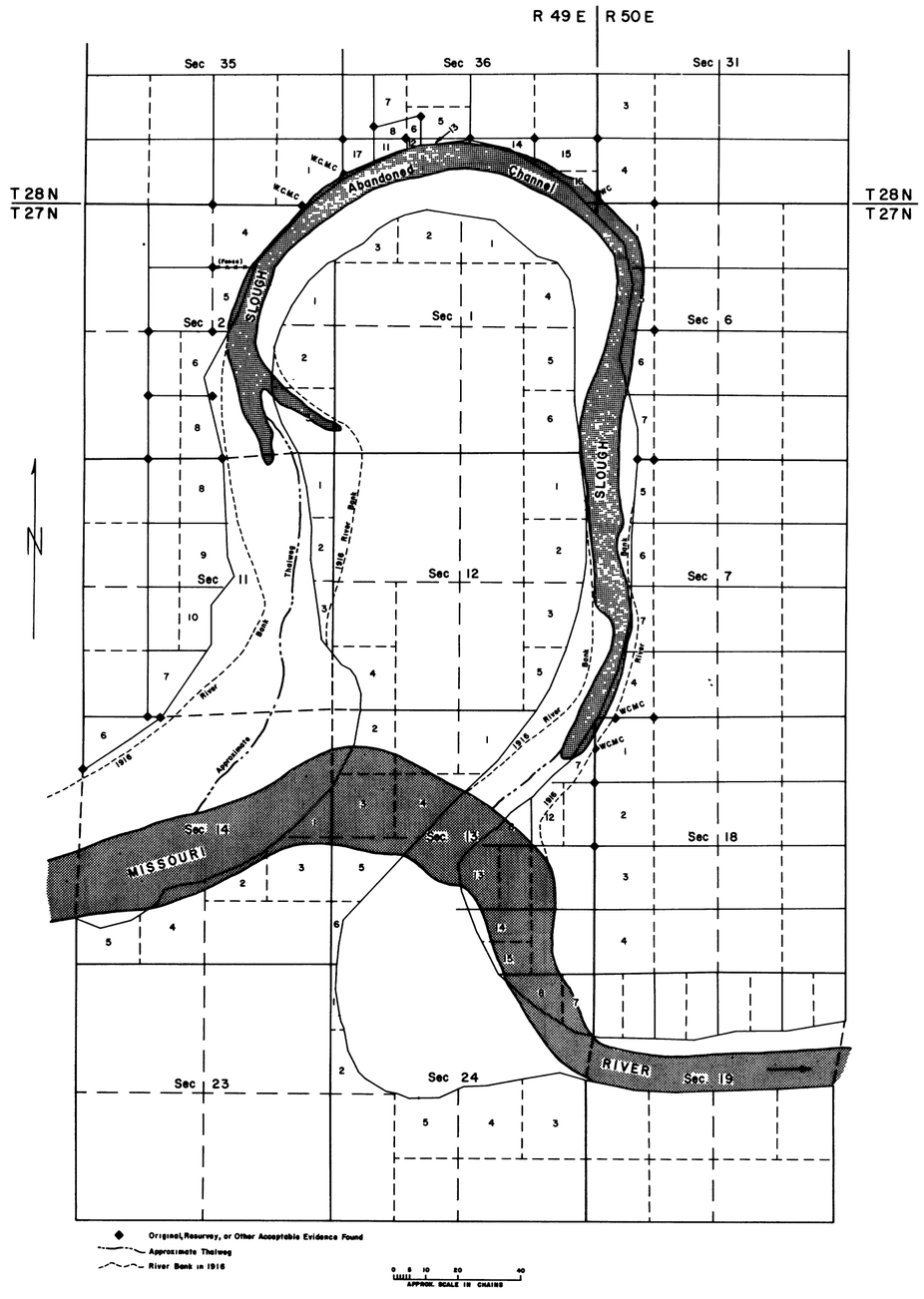


Figure 5 - Existing Conditions

1906 Meanders of Left Bank

From M.C. Secs. 14 and 15, in Sec. 14

N. 56° E., 18.00

N. 53½° E., 11.90 to MC Secs. 11&14, Thence in Sec. 11

N. 33¾° E., 27.00

N. 1° E., 12.00

N. 38° E., 11.00

N. 18° W., 6.00

N. 2° W., 31.00 to MC Secs. 2&11, Thence in Sec. 2

N. 12½° W., 26.00

N. 28° E., 22.00

N. 21½° E., 18.00

N. 42¾° E., 25.00 to MC Secs. 2&35, Thence in Sec. 35

N. 51¾° E., 11.80 to MC Secs. 35&36, Thence in Sec. 36

N. 62¼° E., 10.00

N. 67° E., 13.00

N. 82½° E., 19.00

S. 79¼° E., 13.00

S. 57¾° E., 21.60

S. 43¾° E., 7.90 to MC Secs. 1&36, Thence in Sec. 1

S. 47° E., 5.15 to MC Secs. 1&6, Thence in Sec. 6

S. 43° E., 12.90

S. 12° E., 13.00

S. 10° W., 23.00

S. 15° E., 23.00

S. 1° E., 9.40 to MC Secs. 6&7, Thence in Sec. 7

S. 4¾° E., 23.00

S. 0½° W., 25.30

S. 13¾° W., 16.50

S. 22° W., 16.40 to MC Secs. 7&18, Thence in Sec. 18

S. 46¼° W., 1.45 to MC Secs. 13&18, Thence in Sec. 13

S. 32° W., 15.30

S. 47¼° W., 4.30

S. 51½° W., 2.50

S. 42¾° W., 6.40

S. 45½° W., 2.30

S. 58¾° W., 4.50

S. 50° W., 3.70

S. 38° W., 6.00

S. 61° W., 3.00

S. 52° W., 10.00

S. 33° W., 4.00

S. 6° E., 9.00

S. 20° E., 14.00

S. 26½° E., 14.00 to MC Secs. 13&24, Thence in Sec. 24

S. 49½° E., 16.10

S. 59° E., 14.00

S. 75° E., 6.00 to MC Secs. 24&19

AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA

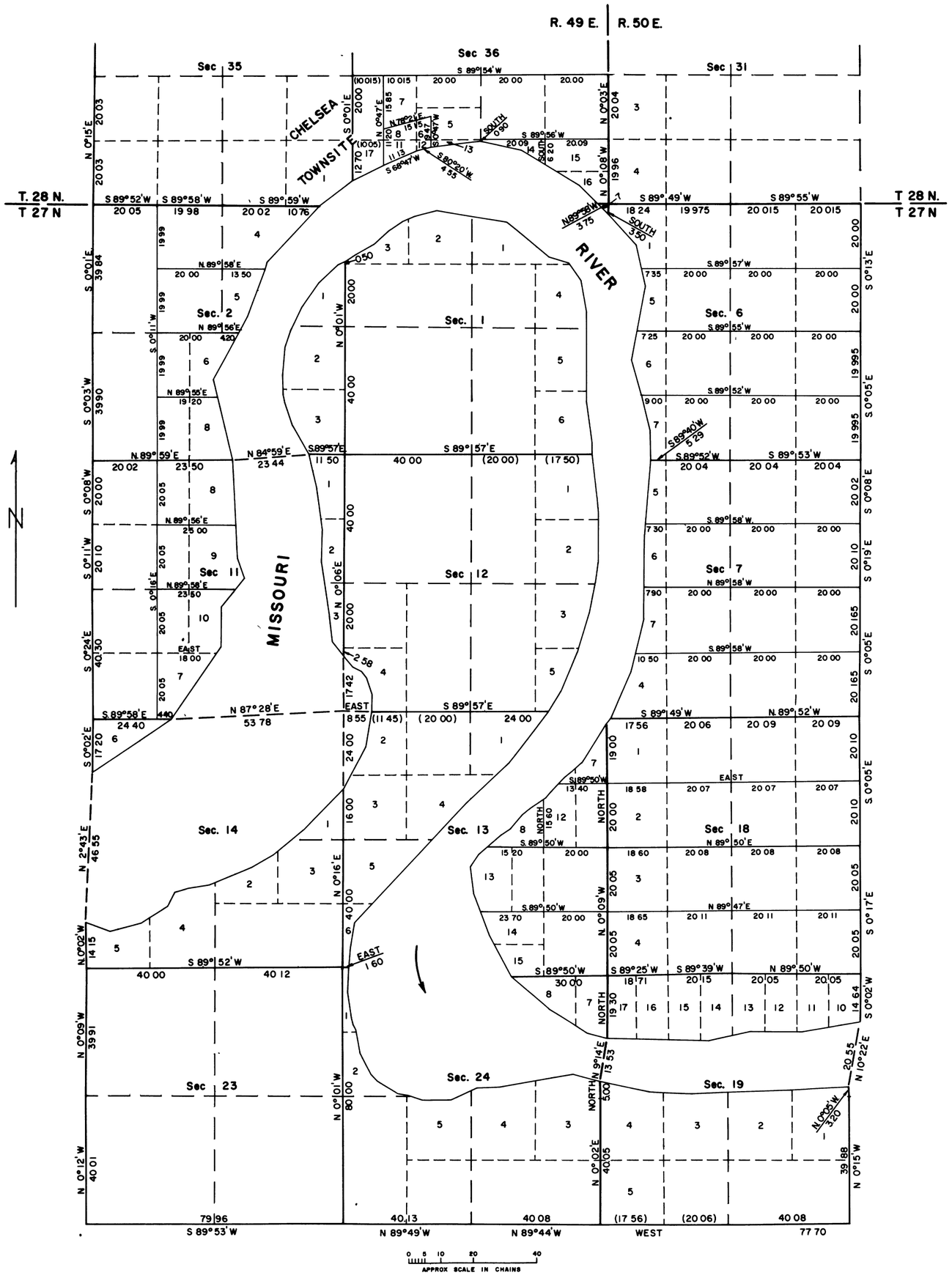


Figure 6 - Composite of Latest Survey Records

Solution

The original meander line of the left bank was retraced through sections 2, 11 and 14. Angle points were adjusted by the broken boundary method, between the meander corners reestablished in the 1946 resurvey. In section 13 the record meander courses were surveyed southwesterly from the meander corner of sections 13 and 18, with a witness angle point established on the 8th course on the left bank of the present channel.

Subdivisional (allotment) lines in section 2 were resurveyed from recovered corners. The N 1/16 section line was determined by a fence and was terminated at a special meander corner on the adjusted original meander line. The E-W center line of section 2 was extended to an SMC on the adjusted original meander line. The S 1/16 section line was terminated at an SMC on the adjusted original meander line. The allotment corner set in 1908 was not remonumented and was treated in the manner of an "off line" closing corner.

In section 11, the NW 1/16, CW 1/16 and SW 1/16 corners were restored by single proportion between the recovered W 1/16 section corners on the north and south boundaries of the section. The centerline and 1/16 section lines were then resurveyed on the record bearing, easterly to an intersection with the adjusted original meander line, where special meander corners were established.

In section 13, the north 1/16 section line was run on record bearing to an intersection with the record meander line. The east-west center section line was run S. 89° 50' W., 20.00 chains (the record) and the line between Lots 8 and 12 was run North (the record) to an intersection with the record meander line. Special meander corners were established at the intersections.

Lot 7, section 1, is entirely within the slough of the abandoned channel, and the record meander line coincides with the thalweg of the slough. No land accrued to that lot.

The next step was to determine the center, or thalweg, of the abandoned channel, which is the boundary of the reservation. The lowest part of the old channel, where dry, was surveyed. This was determined by examination, and where necessary by cross sections. This line was not a median line between the old meanders, or 1916 banks. This dry channel centerline was surveyed after monumenting each angle point, creating a fixed boundary. The center of the slough was adopted as the best evidence of the position of the main channel in 1916.

The present left bank of the river was meandered in front of Lot 6, section 14. An angle point was established at the intersection of the present left bank and the thalweg of the abandoned channel.

From each meander corner and special meander corner on the original meander line, partition of accretion (and bed of old channel) lines were surveyed on bearings perpendicular to the centerline of the old channel in front of the MC or SMC.

In sections 2, 11 and 14 each parcel was given a tract number, beginning with Tract 37 for the parcel attached to Lot 4, section 2 and ending with Tract 45 for the parcel in front of Lot 6, section 14. The parcels in front of Lots 7, 8 and 12, section 13, were designated with new lot numbers 16, 17 and 18, the next higher numbers in that section.

The reason for tract numbers in one place and lot numbers in another is discussed in Supplemental Topic No. 2 of this survey.

In section 36 the Great Northern Reservoir Site was patented land based on the supplemental plat shown in figure 3. Monuments No. 1 and 2 of this site were recovered. The west boundary of the parcel was resurveyed in a southerly direction along an old fence to the record distance and monument No. 4 was restored. From monument No. 2 the east boundary of the parcel was run southerly, parallel to the west boundary, the record distance to restore monument No. 3. The meander line between monuments 3 and 4 was restored by broken boundary proportion based on the supplemental plat. This procedure more than fully protected the rights of the patented Lots 6, 8, 11 and 12, section 36.

The original meander line was adjusted between the MC of sections 35 and 36, and the MC of sections 1 and 36. The 3rd, 4th and 5th angle points were established on that basis, with the 1st and 2nd angle points yielding to the monuments of the reservoir site.

The necessary section subdivision (allotment) lines were resurveyed or surveyed and special meander corners established at intersection with the meander line and each lot line.

Aerial photographs were utilized to determine the center of the slough and therefore the middle of the abandoned channel. The division lines were run from each MC or SMC, perpendicular to the middle of the channel in front of the MC or SMC. In front of Lot 16, section 36, the last course of the original meanders coincided with the middle of the slough. All of the accrued lands were given lot numbers.

Sections 6 and 7 were being farmed and many of the corners were lost. The missing allotment corners along the west 1/16 section lines were restored by single proportionate measurement between the recovered west 1/16 section corners.

The original meander line was restored by the broken boundary method of adjustment. The section subdivisional lines were run on record bearing, westerly to an intersection with the original meander line and special meander corners were established. Just as in section 36, T. 28 N., R. 49 E., all of these lines were terminal against the original meander line and were never extended across the river.

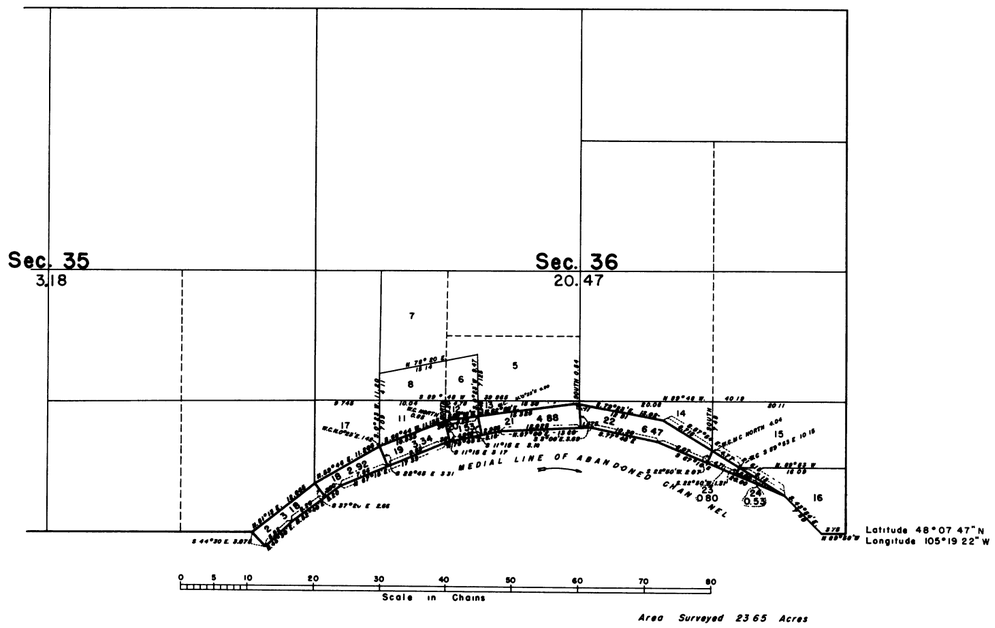
The thalweg and middle of the old channel was surveyed, with angle points creating a fixed boundary.

Division lines were surveyed perpendicular to the fixed boundary from each MC or SMC, to partition the land accrued to each lot. The original meander line in front of Lot 1, section 6, coincided with the middle of the abandoned channel and therefore became a fixed boundary, with no land accrued to that lot. All of the accrued parcels were given lot numbers referring to the sections to which the accrual took place.

The plats were accepted on December 13, 1954 and are illustrated in figure 7.

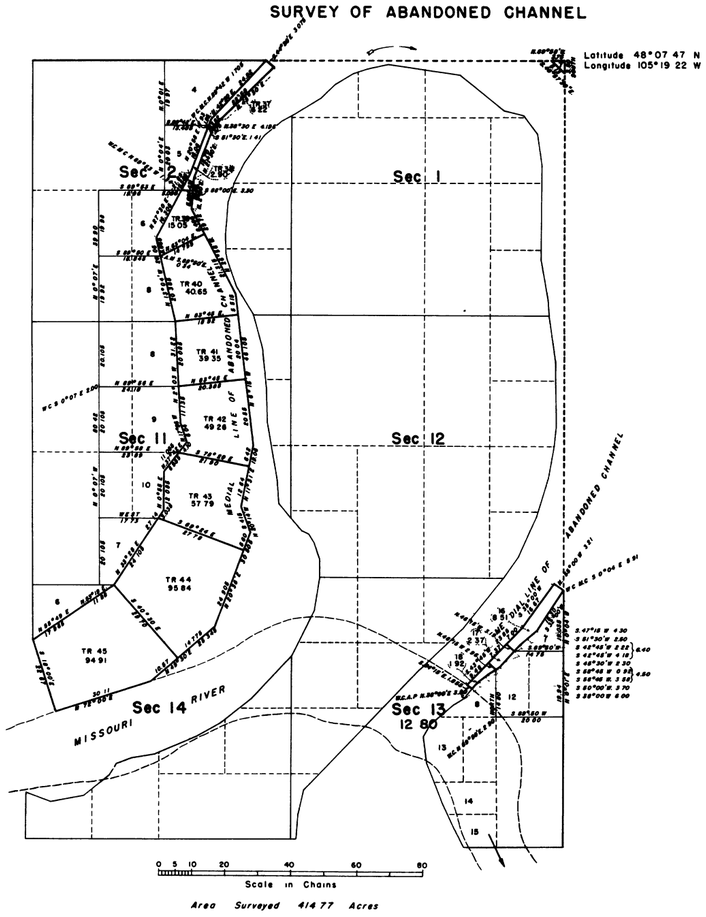
AVULSION ON THE MISSOURI RIVER

T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA



TOWNSHIP Nº 27 NORTH, RANGE Nº 49 EAST, OF THE PRINCIPAL MERIDIAN, MONTANA.

SURVEY OF ABANDONED CHANNEL



TOWNSHIP Nº 27 NORTH, RANGE Nº 50 EAST

SURVEY OF ABANDONED CHANNEL

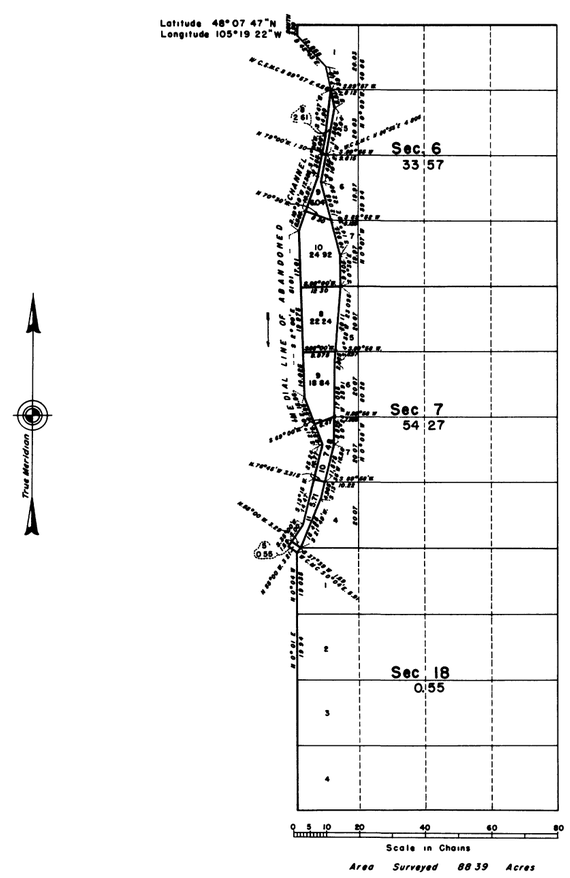


Figure 7 - Portions of Accepted Plats

Supplemental Topic No. 1

Ownership to Thalweg

Nearly 300 acres in sections 13 and 24 were formerly in the bed of the river. The present position of the river (below the cut off) does not define the ownership because the sudden changes of a river's course do not change ownership lines. If the center of the main channel of the river before avulsion was through the center of the 300 acres, then the Indians still own to that thalweg because they own the former left bank.

The surveyor can determine the location of the thalweg before the avulsion by physical evidence or by interviewing local witnesses.

Supplemental Topic No. 2

Identification of Accretion

The 1946 resurveys tied the two parts of the township together by making ties across the old channel, between sections 2 and 11, between 11 and 14 and between 14 and 15. These ties are shown on the accepted plats and indicated in the field notes as section lines.

By agreement with the Indian tribe, when the division line was established between ownerships of areas accruing to Lot 7, section 11, and to Lot 6, section 14, the accretions and the original bed of the river were not treated separately. A division line was established as normal to the medial line (see line between Tract 44 and Tract 45 on figure 7). The accruals to Lot 6 (Tract 44) were shown on preliminary plats as a new lot in section 11. W.O. corrected this situation which implied that the section line between sections 11 and 14 had a bearing of S. 40° 30. E., along that lot. The lot was changed to a tract number as shown and left the section line as shown on the 1946 plats.

Supplemental Topic No. 3

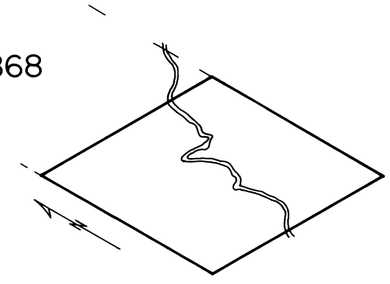
Boundary of Riparian Tract

Lots 6, 8, 11 and 12, section 36, were patented to the Great Northern Railroad and were riparian on the left bank of the river. Part of lots 11 and 12 had been eroded (about 1 chain) and at the instant of the avulsion the boundary of lots 11 and 12 became fixed at the then left bank. In this survey the meander line as surveyed by Matthews in 1911 was made the fixed boundary of lots 11 and 12. Lots 11 and 12 were "given" land in the bed of the abandoned channel. Lots 19 and 20 were surveyed as land accrued to lots 11 and 12, but lots 19 and 20 are actually tribal or reservation land and could have been surveyed as one lot instead of two. Lots 19 and 20 may be disposed of as the BIA deems fit.

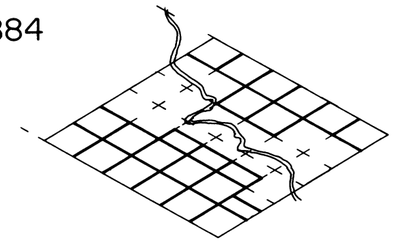
PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

T. 3 S., R. 1 E., PRINCIPAL MERIDIAN, MONTANA

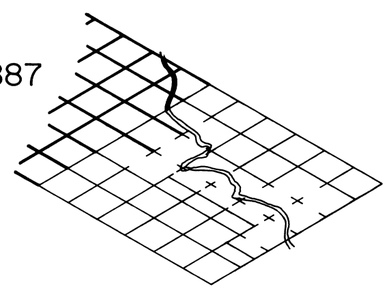
1868



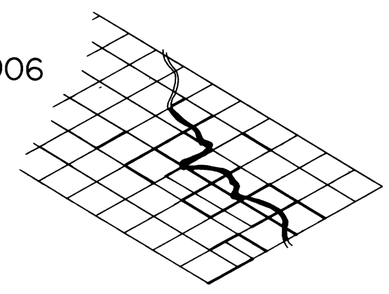
1884



1887



1906



History of Surveys

1868 Benjamin Marsh surveyed the north boundary of T 3 S, R 1 E, Principal Meridian, Montana

1884 Albert B Knight surveyed a portion of the subdivisional lines, figure 1

1887 Knight subdivided T 2 S, R 1 E, as shown on the plat approved April 24, 1890, figure 2

1906 William Dallas and Malcolm G Swan completed the subdivisional lines of T 3 S, R 1 E, retraced the line between sections 11 and 12 and the east half mile between sections 2 and 35 on the north boundary of the township, as shown on the plat approved April 15, 1909, figure 3

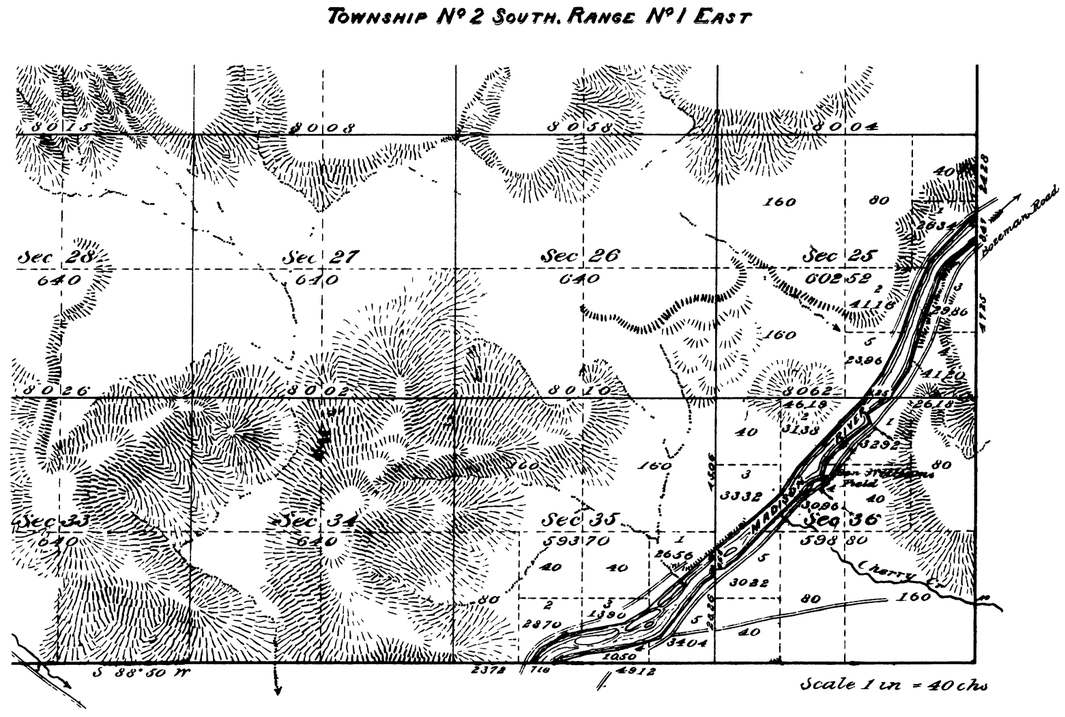


Figure 2 - Portion of 1887 Original Plat

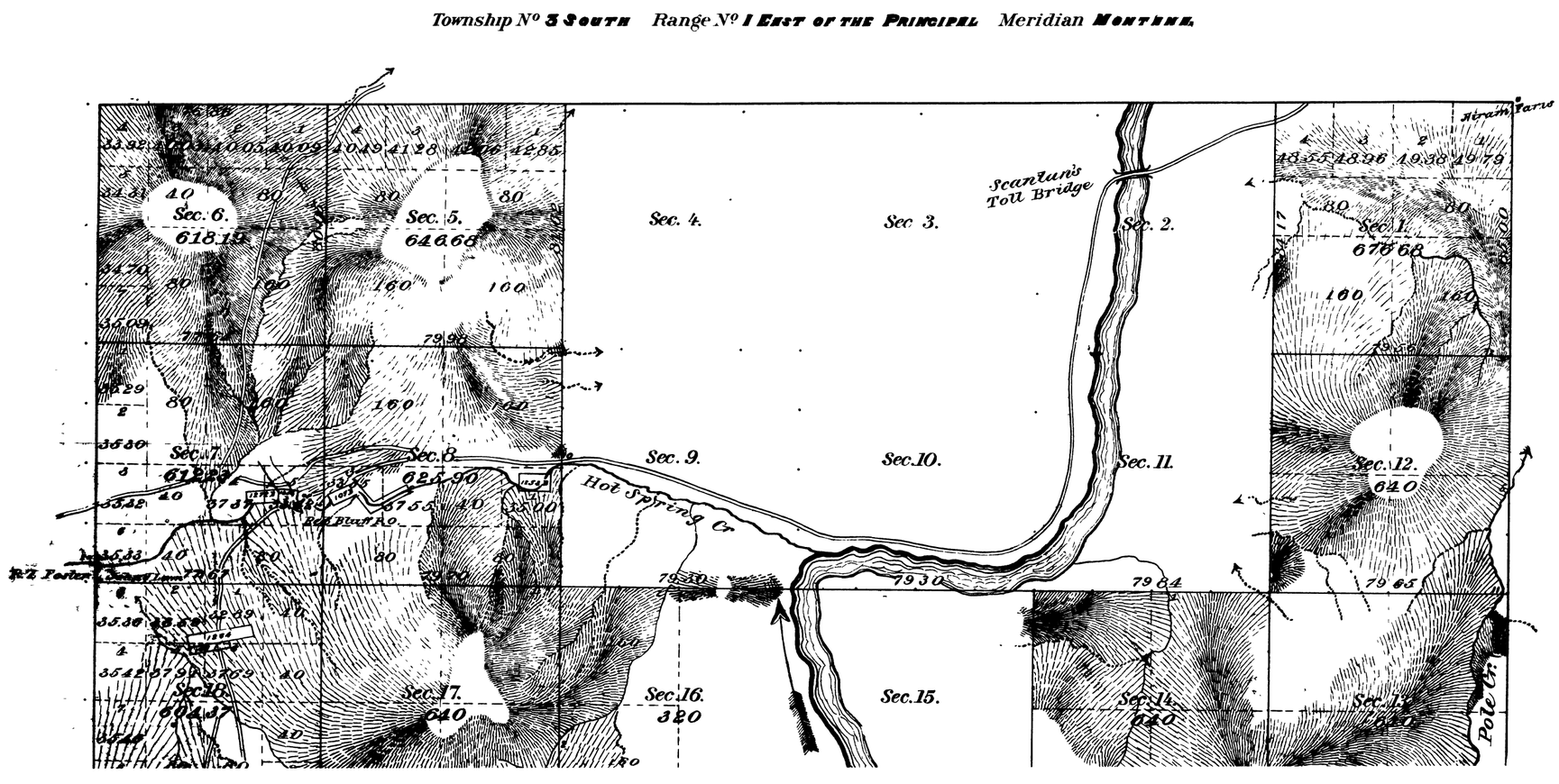


Figure 1 - Portion of Original 1884 Survey Plat

PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

T. 3 S., R. 1 E., PRINCIPAL MERIDIAN, MONTANA

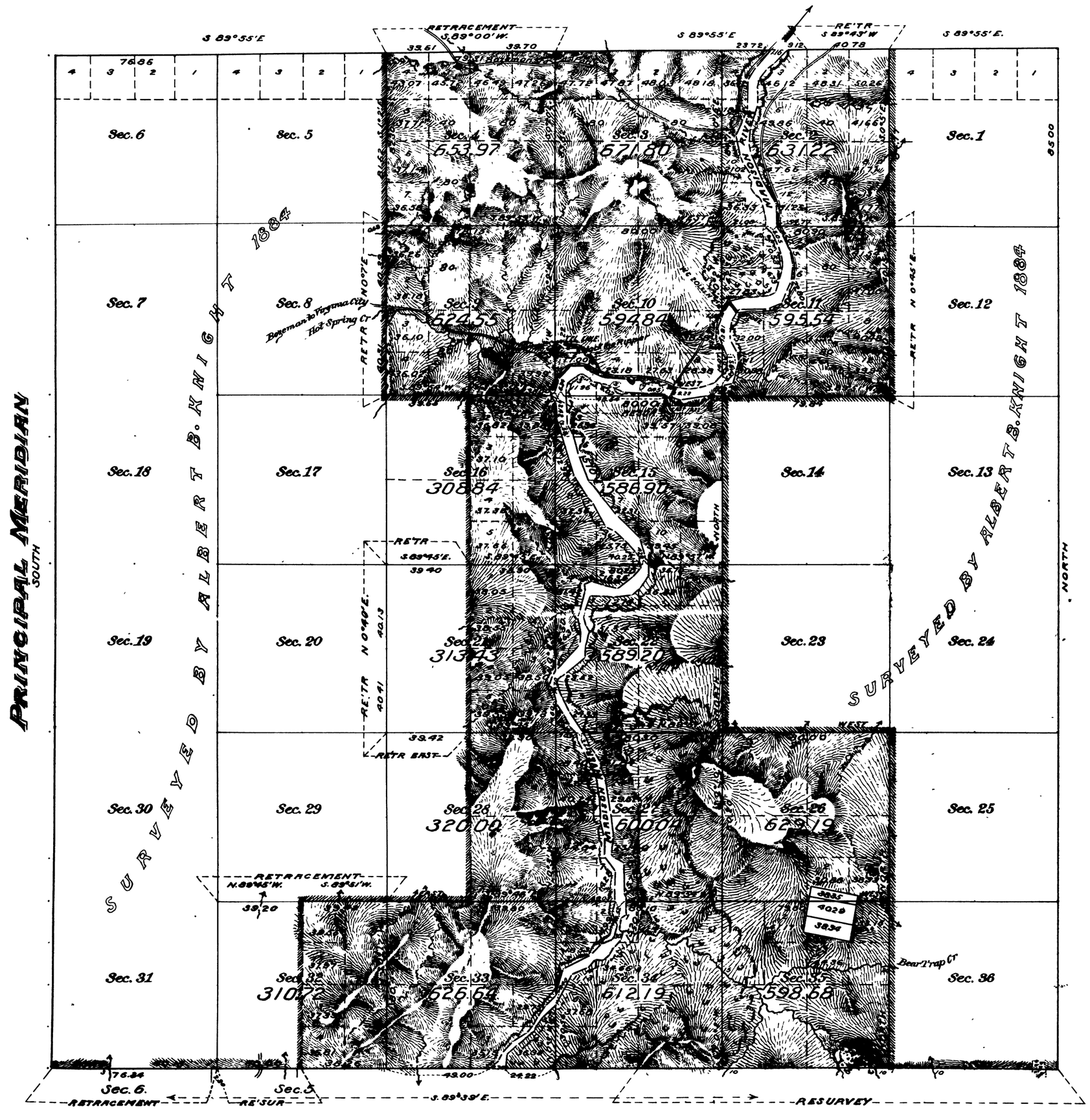


Figure 3 - 1906 Completion Survey

Reasons for Request of this Survey

The Dillon District Manager requested the resurvey for purposes of identifying the remaining public lands in sections 2 and 11. These lands had been withdrawn for a recreation site along the Madison River.

Special Instructions

On March 3, 1965, Special Instructions for Group 535, Montana, were prepared. They provided for the dependent resurvey and necessary subdivision of section lines to define the boundaries of the public lands in sections 2 and 11, T. 3 S., R. 1 E.(These instructions also provided for similar resurveys in a number of other townships.) Sections 2 and 11 were to be dependently resurveyed and subdivided by surveying the north and south centerline of section 11, the centerlines of section 2 and the centerlines of the northeast quarter of section 2. One-sixteenth section corners were to be established where required to delineate public lands.

The work was assigned to a cadastral surveyor on June 7, 1965.

Conditions Found on the Ground

Figure 4 is a composite sketch of the previous original surveys based on figures 1, 2 and 3. Figure 5 illustrates the land status as furnished to the surveyor, the original corners recovered and the retracement data between recovered corners. During the course of the retracements and corner search it was found that the Madison River was not wholly within the 1906 record meanders. The differences were comparatively small but were large enough to show that the record meanders were in error in representing the actual location of the river through sections 2 and 11. The record meander lines and actual river location are shown in figure 6. The river flows through a narrow canyon in section 11. In section 2 the river flows through a comparatively open "sage flat" in which some lateral movement could have taken place since 1906. There is no evidence to show that any substantial movement did occur.

Preliminary Statement of the Problem

The surveyor must determine where to restore the lost ¼ section corners and meander corners, where to establish the new corners controlling public lands, and where to establish special meander corners on the east and west centerline of section 2. Since only the north and south centerline of section 11 is to be surveyed within that section, no interior corners can be established on that line.

PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

T. 3 S., R. 1 E., PRINCIPAL MERIDIAN, MONTANA

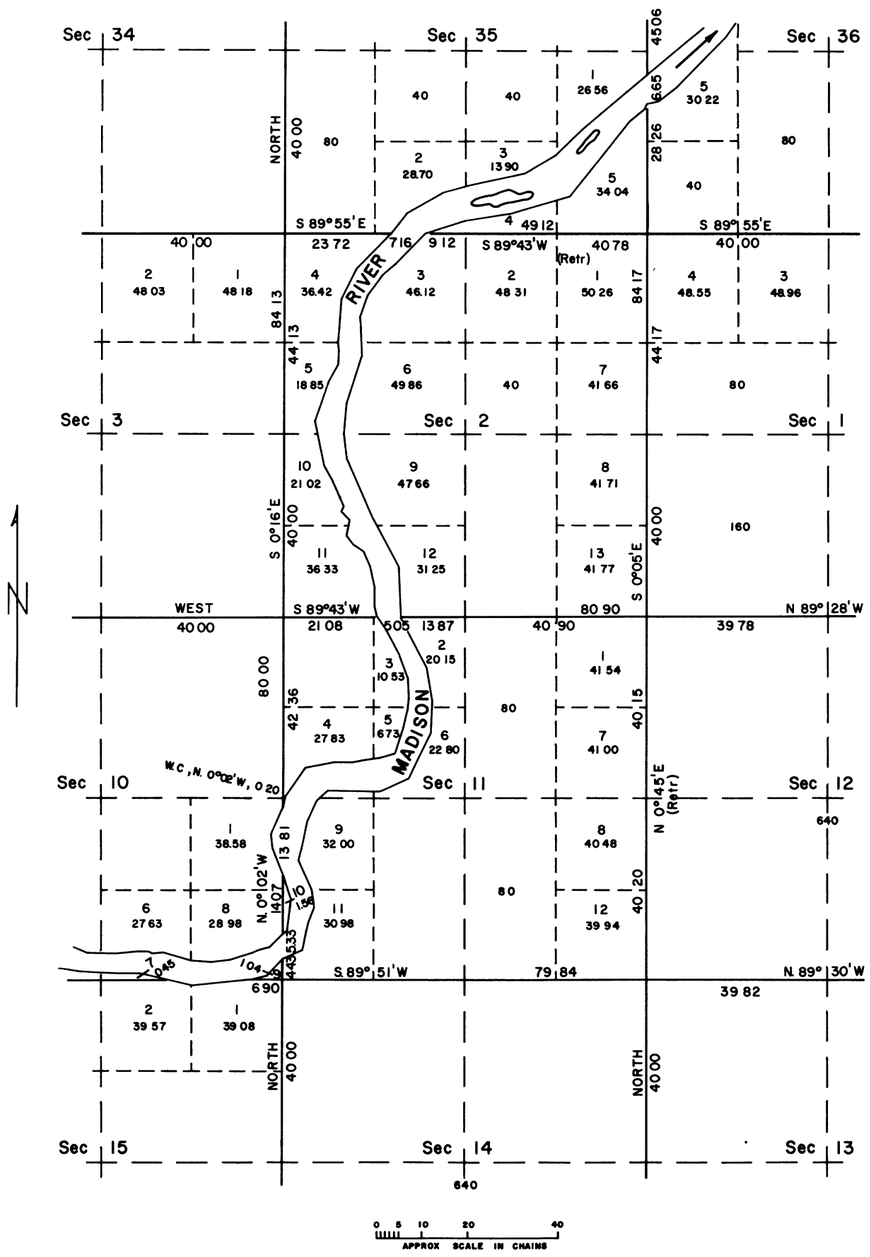


Figure 4 - Composite of Record Surveys

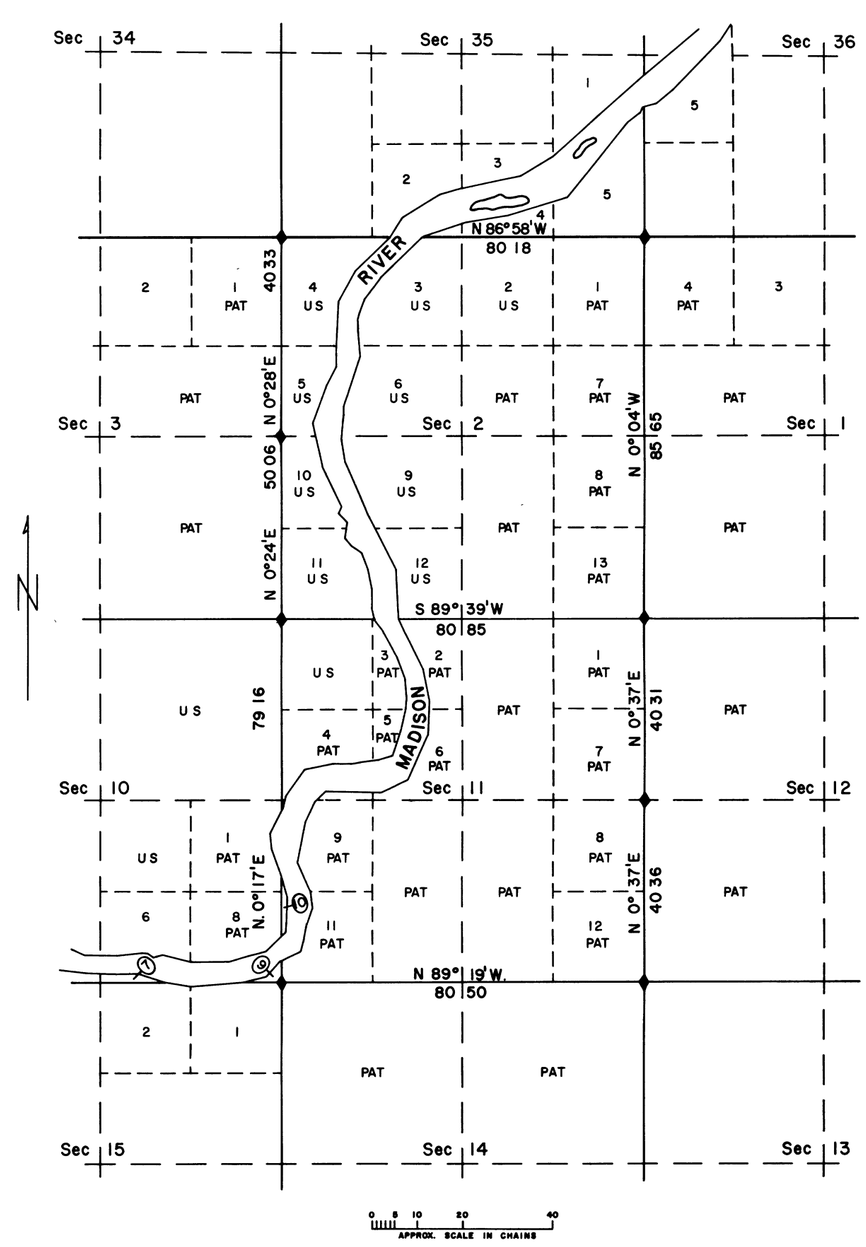


Figure 5 - Retracement Data and Status

PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

T. 3 S., R. 1 E., PRINCIPAL MERIDIAN, MONTANA

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

3-74 to 3-76	Subdivision of sections
3-85 to 3-92	Subdivision by survey
3-115 to 3-120	Meandering
5-30 to 5-33	Single proportionate measurement
5-36	Irregular township boundaries
5-40	Lost meander corners
7-8 to 7-15	Subdivision of sections
7-94	Remeandering
9-3 to 9-5	Legal significance of the plat

Legal Constraints

A dependent resurvey cannot infringe upon the bona fide rights of the owners of patented lands. The Government can survey or resurvey its own lands in any manner it deems fit providing that no prior rights are affected by such survey or resurvey.

Auxiliary Topic No. 1

Remeanders

Section 7-94 of the Manual of Surveying Instructions, 1973, refers to the practice of remeandering a body of water to show the true conditions at the time of subdivision of a section. If all of the land bordering on either one or both sides of a meandered stream or lake is vacant public land, a new meander line is run. This is done for the purpose of showing the actual conditions and as the basis for computing the areas of the vacant lots bordering on the meander line. Since the actual boundary is the mean high water line, no new meanders can be returned in front of patented lots although, in some instances, it may be necessary to remeander in front of patented lands for informative purposes. This informational meander does not constitute a remeander, however, and no areas are based upon it.

There are occasions in which only one riparian lot within a section is still vacant public land. New meanders of the mean high water line can be run for the remaining public lands and shown on the plat. They may not be run for the adjoining patented lands.

These restrictions create the situation in which a discontinuity is created between the new and record meanders. The "new" meander corner is also marked pertaining only to the public land side of the line. The field notes are written to show the record position for the meander corner as well as the new position. Usually the record position is not monumented on the ground.

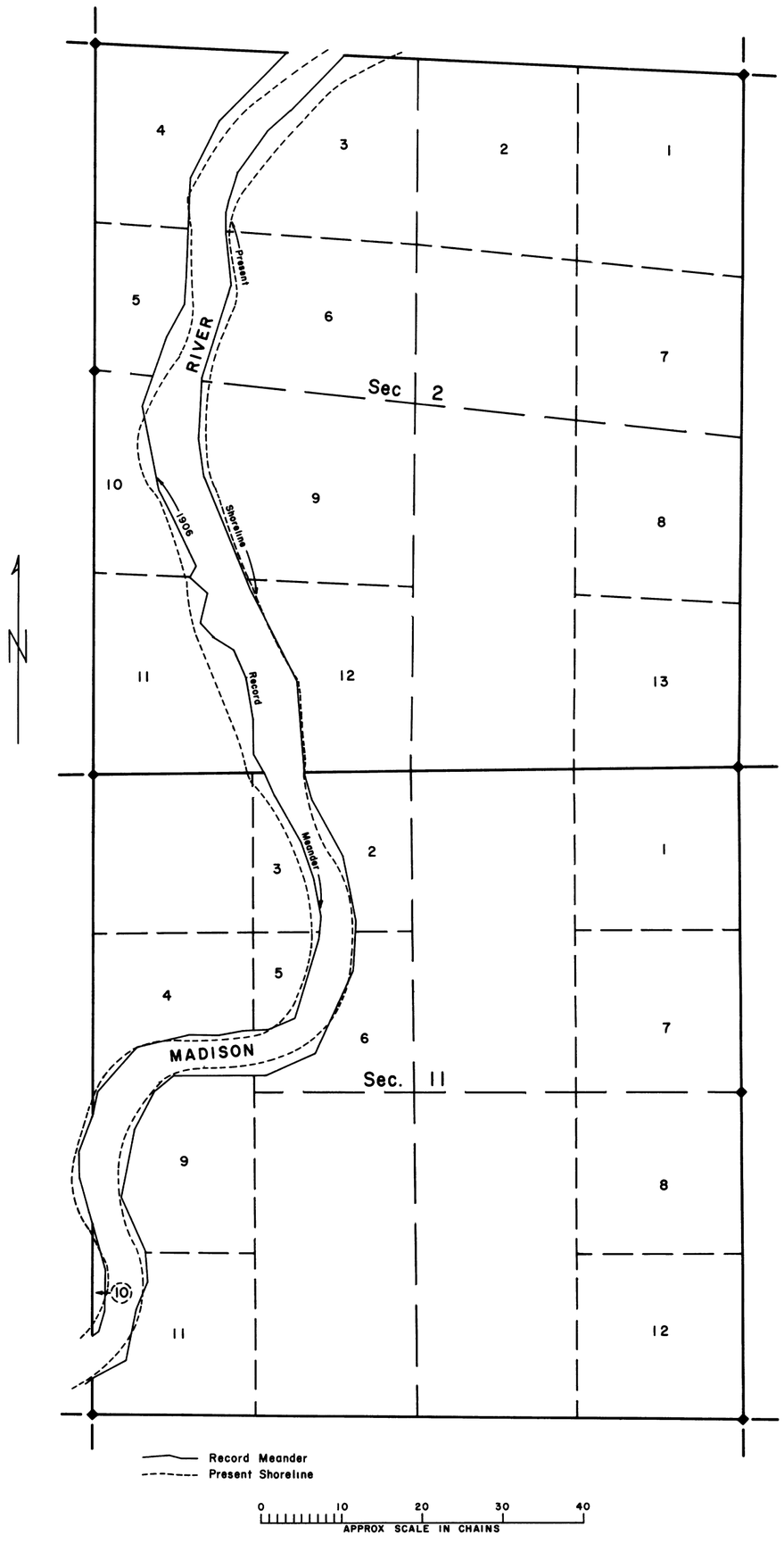


Figure 6 - Actual River Location

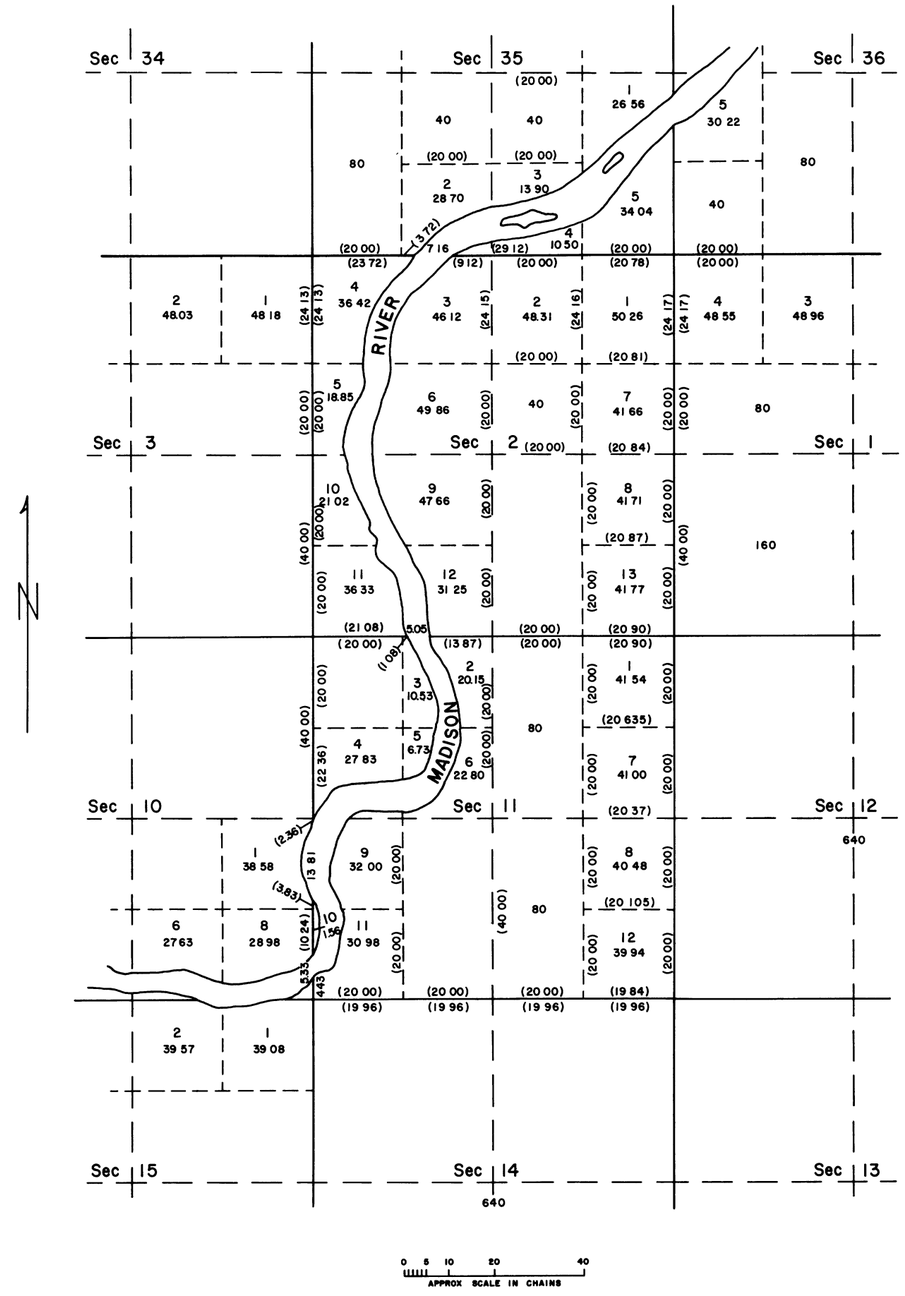


Figure 7 - Areas and Parenthetical Distances

PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

T. 3 S., R. 1 E., PRINCIPAL MERIDIAN, MONTANA

Auxiliary Topic No. 2

Irregular Boundaries

The north boundary of section 2 was surveyed as a straight line by Marsh in 1868. When Dallas and Swan retraced the east half mile in 1906 they returned it as S. 89° 43′ W., 40.78 chains, and lotted section 2 on that basis. The west half mile remained S. 89° 55′ E., 40 chains as returned by Marsh. The ¼ section corner is now lost and must be restored by an irregular boundary adjustment. Until the ¼ section corner is properly restored the position of the lost meander corners on that line cannot be restored.

Section 5-36 places emphasis on township exteriors, but this same irregular boundary method of restoring a lost corner pertains to all section lines wherever the record reflects a change in bearing in an original survey, a later retracement, or a resurvey.

Final Statement of the Problem

The positions of the lost corners are to be restored in a manner which protects the rights of prior entrymen. Areas on the plats may be used to compute distances which are used as the basis for proportionments.

Solution

The ¼ section corner of sections 2 and 35, a common corner, was restored by the irregular boundary method.

The parenthetical distances were computed based on the areas of the various lots. These computed distances are shown in figure 7. They reveal that the north ¼ section corner of section 14 is not common with the south ¼ section corner of section 11.

The east 1/16 section corners of section 11 and 14 are likewise not common. The north ¼ section corner of section 14 was reestablished at midpoint with the south ¼ section corner of section 11 established by proportionate measurement based on the parenthetical distances. The E 1/16 section corners were not established on the ground because they did not control public lands.

The E 1/16 section corners of sections 2 and 35 were not common and their points were computed at proportionate positions controlled by the parenthetical distances. Only the E 1/16 section corner for section 2 was monumented.

The remaining ¼ section and 1/16 section corners were common and were restored or established where needed by single proportionate measurement. Proportionate positions were used for restorations of the lost meander corners on the left and right banks of the Madison River. The only restored meander corners which fell on the actual meander line were the meander corner between sections 2 and 11 on the right bank, and the meander corner of sections 10 and 11 on the right bank. These points were monumented and marked normally. All other proportionate positions fell either in the river or a considerable distance from the actual mean high water line, as indicated in figure 6.

Between sections 10 and 11 the remaining three proportionate positions for the record meander corners were monumented with witness meander corners.

The fractional west half of section 2 was all public lands. Both banks of the Madison River were remeandered through the section with new meander corners established on the north boundary of the section marked for section 2 only. A new meander corner, marked for section 2 only, was established on the left bank between sections 2 and 11. The proportionate position for the W 1/16 section corner fell in the river and was not established.

Lot 3, section 11, is a riparian lot. The NW¼ NW¼ of section 11, an unmeandered lot, is not riparian according to the original plat. The river is not in the position shown by the original survey, and the NW¼ NW¼ is actually invaded by the river bed. If the left bank is meandered, this once remote land would then become riparian according to any new survey. If the river began to accrete at this point, it would be reasonable to expect that Lot 3 would receive a smaller share of any such accretion because of the portion assigned to the once remote land. This is in violation of the principle that no survey or resurvey can impair the rights of the prior entryman. This situation is also contrary to the Federal Rule, holding that remote upland does not become riparian, but does regain its identity when it reemerges. Therefore Lot 3 was not remeandered.

Section 2 was subdivided by running the center lines normally, with the center N1/16 section corner established proportionately based on the parenthetical distances shown on figure 7. Special meander corners were established at the intersection of the East and West centerline with the new meander line. The center E1/16 section corner was established by proportionate measurements based on the parenthetical distances. The NE¼ was subdivided normally.

The north and south centerline of section 11 was surveyed on a straight line between the south ¼ section corner and the ¼ section corner of sections 2 and 11.

The plat was drafted with new lot numbers and new areas based on the new meander lines for the fractional lots in the west half of section 2. The plat, as shown in figure 8, was accepted on January 20, 1970.

TOWNSHIP 3 SOUTH, RANGE 1 EAST OF THE PRINCIPAL MERIDIAN, MONTANA.
DEPENDENT RESURVEY AND SUBDIVISION OF SECS 2 & 11

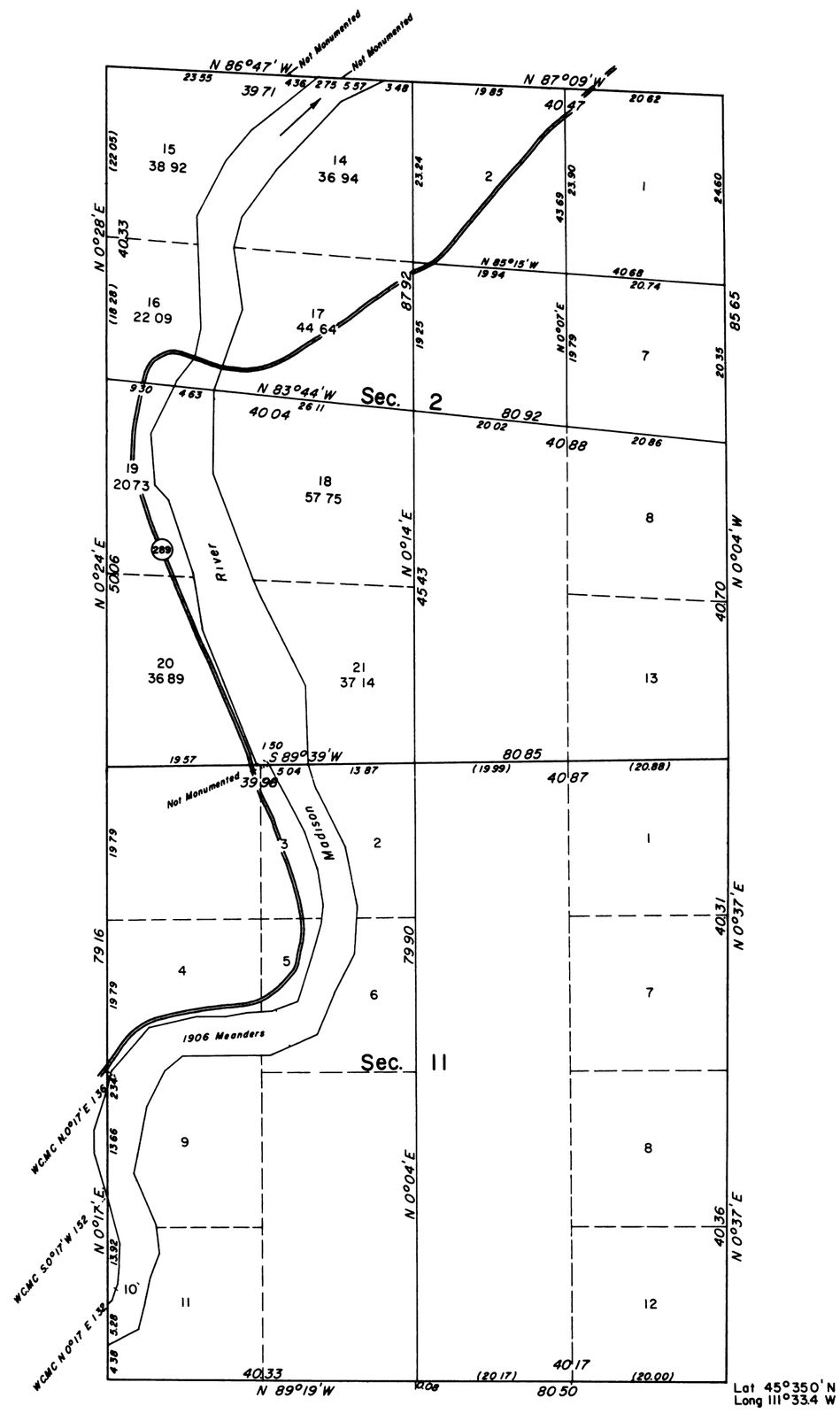
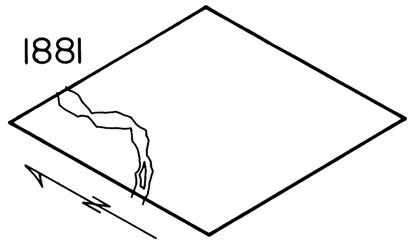


Figure 8 - Portions of Accepted Plat

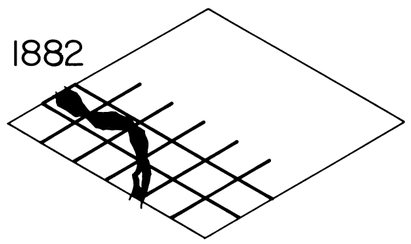
OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

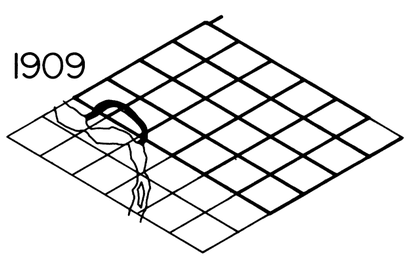
1881



1882



1909



History of Surveys

1881 James M and Rodney W Page surveyed the exterior boundaries of T 14 N, R 55 E, in August 1881

1882 Elmer C Towne surveyed most of the subdivisional lines in the west half of the township and the meanders of the Yellowstone River on December 4 and 5, 1882 Towne's survey is shown on the plat approved September 26, 1883, figure 1

1909 Lewellyn D Lyman retraced and resurveyed a portion of the exterior boundaries and subdivisional lines, completed subdivisional lines of the township and meandered the channel of the Yellowstone River in sections 4 and 9 as shown on the plat approved April 9, 1910, figure 2

1910 A supplemental plat showing the lotting of the unpatented S½ SW¼ of section 4 was approved on October 31, 1910

This discussion will be restricted to the resurvey problems involved in sections 4, 5, 8 and 9, and will be directed toward those encountered in section 5 Figure 3 is an enlarged sketch of these four sections as reflected by the field notes of the 1882 survey by Towne Figure 4 is an enlarged composite sketch of the 1882 and 1909 surveys which must be the basis of a resurvey

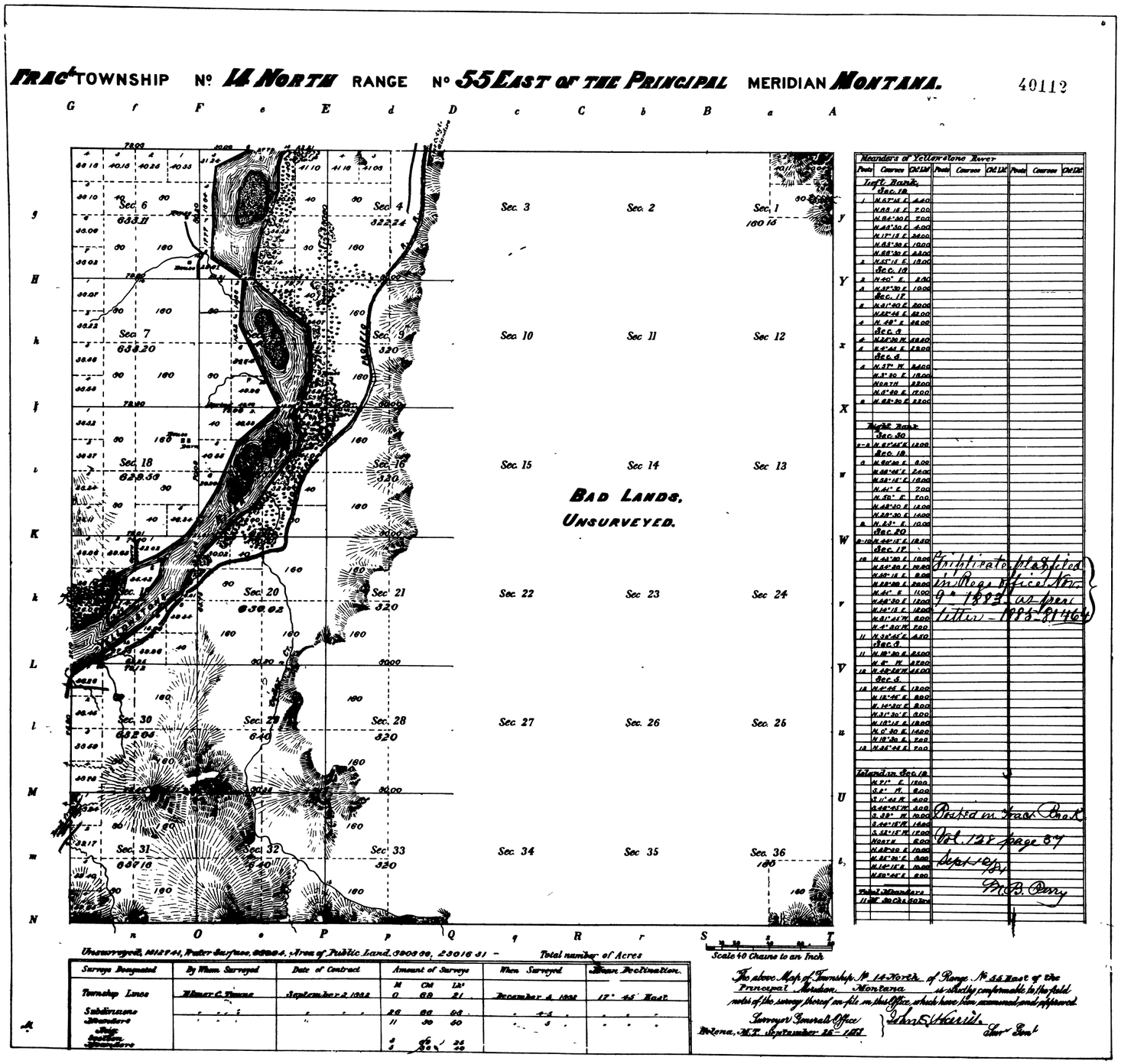


Figure 1 - Original 1882 Survey

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

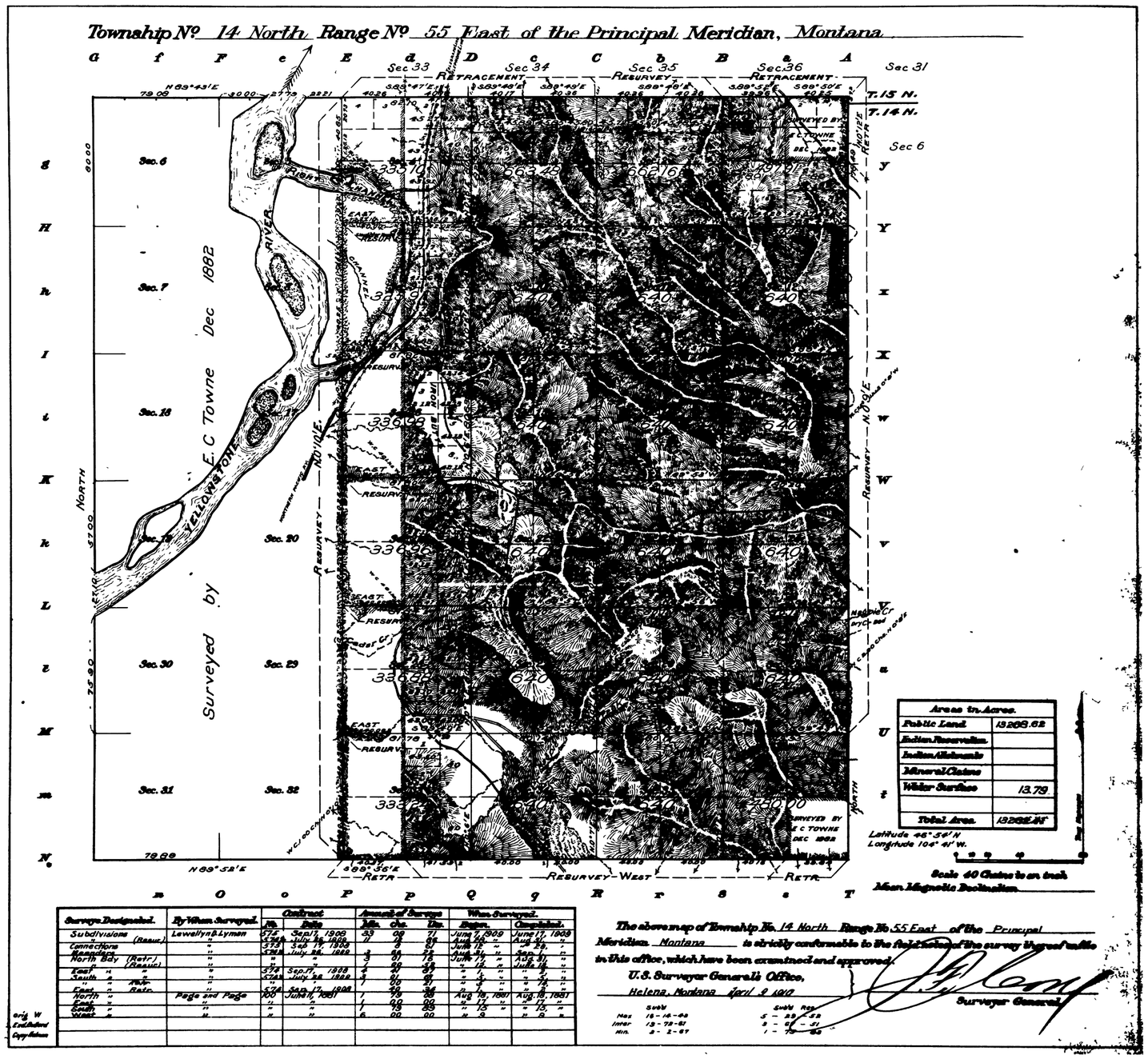


Figure 2 - 1909 Completion Survey

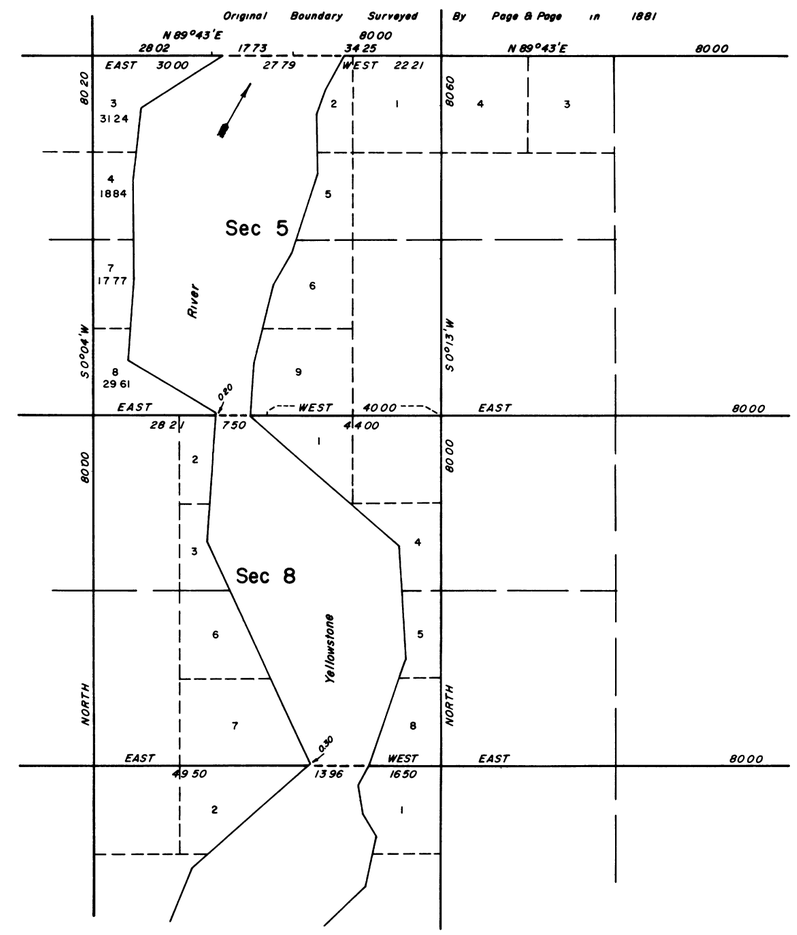


Figure 3 - 1882 Survey Record

Reasons for Request of this Survey

The resurvey of the remaining public lands in several townships was requested by the Grazing Division of the General Land Office to aid in identification and management of the public lands.

Special Instructions

Special Instructions for Group 389, Montana, were prepared on April 11, 1940. They provided for limited dependent resurveys in Tps. 12 N., Rs. 50 and 53 E.; Tps. 14, 15 and 16 N., R. 55 E., and T. 16 N., R. 56 E., Principal Meridian, Montana. The resurveys in T. 14 N., R. 55 E., were limited to the work necessary to identify public lands in the west two tiers of sections. The work was assigned to Ranney Y. Lyman, Associate Cadastral Engineer, on May 3, 1940. The work was to be performed in accordance with the Manual of Surveying Instructions, 1930.

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

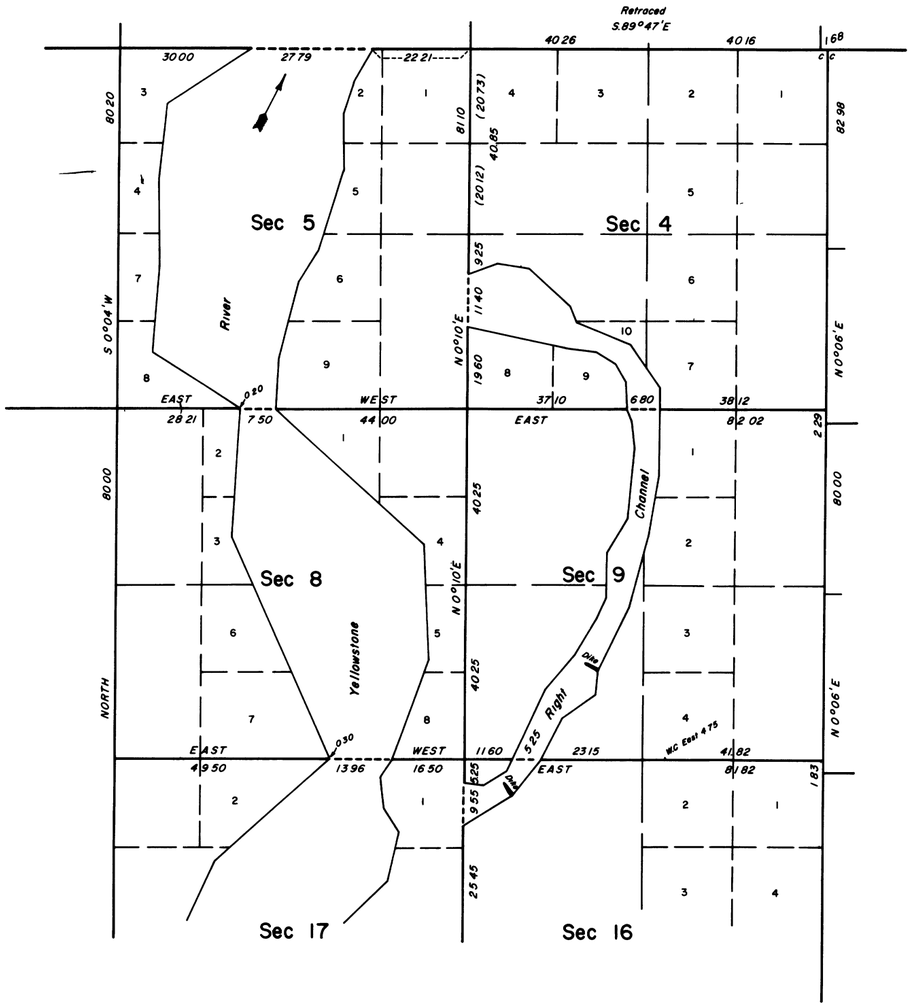


Figure 4 - Composite of Survey Records

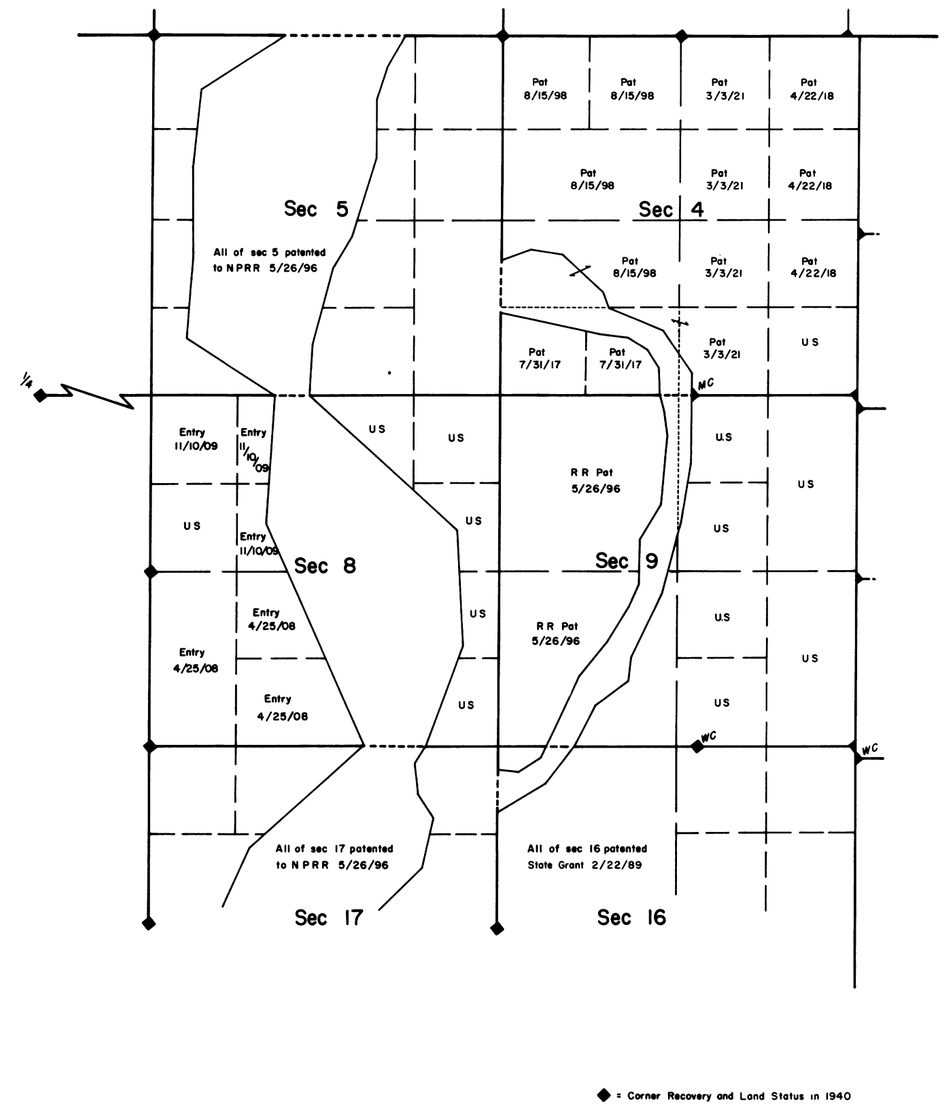


Figure 5 - Corner Recovery and Land Status

Conditions Found on the Ground

The original survey lines were retraced and corners of the 1882 and 1909 surveys were recovered as indicated in figure 5. Land status showing date of entry or patent in the four sections pertinent to this case is also shown in figure 5. Figure 6 shows the various channels of the Yellowstone River and topography as revealed by the retracements and aerial photographs taken in 1938.

It was found that the right channel of the river was in substantially the same position as when surveyed in 1909, and that water flowed through that channel during high water periods. The main channel of the river was considerably east of the position shown on the 1882 plat.

The original meander line of the left bank, through section 5, was grossly in error. The foot of a 40 foot high bluff was located about 14 to 18 chains east of the record meander line. In the NW¼ of section 8 the record meander was along the bench above the bluff and in the SW¼ of section 8 the meander line crossed the bottom lands. The record position of the meander corners between sections 8 and 17 fell in the river. The meander corners on the left bank, between sections 5 and 8 and the north boundary of section 5 were apparently correctly placed by the 1882 survey. There was no conclusive evidence to prove or disprove the correctness of the original left bank meanders in section 8, but an area of about 130 acres had accreted to that meander line as the river channel moved easterly. A small area of accretion had attached to the bluff at the southerly end of section 5.

Figure 7 is a portion of U.S. Geological Survey maps Hoyt (Montana, 1967) and Forest Park (Montana, 1967). Although the main and right channels of the river have changed to some degree, the conditions along the left bank and meander line remain substantially as they were in 1940.

Preliminary Statement of the Problem

The restoration of the section lines could be accomplished by dependent resurvey methods and all necessary corners restored without difficulty except that some proportioned points fell in the river.

An investigation was required to determine the answers to the following questions:

1. Was the 135 acres of land lying between lots 3, 4, 7 and 8, section 5, and the actual left bank of the river omitted from the original survey and was it, therefore, public land subject to survey?

2. Was the nearly 130 acres of bottom land that had accreted to lots 2, 3, 6 and 7, section 8 substantial prior to entry on those lots in 1908 and 1909 and was it, therefore, public land subject to survey?

3. Had any of the channel changes occurred due to avulsive action during a flood, and if so, when had the avulsion taken place?

Regulations

This survey illustrates the application of section 9185.2-2 of Title 43 of the Code of Federal Regulations and the following sections of the Manual of Surveying Instructions, 1973:

3-115 to 3-120	Meandering and rivers
5-40	Meander corners
5-43	Non-riparian meander lines
7-77 to 7-84	Erroneously omitted areas

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

Legal Constraints

The Yellowstone River is navigable in this reach. Montana subscribes to the Federal Common Law in reference to water boundaries.

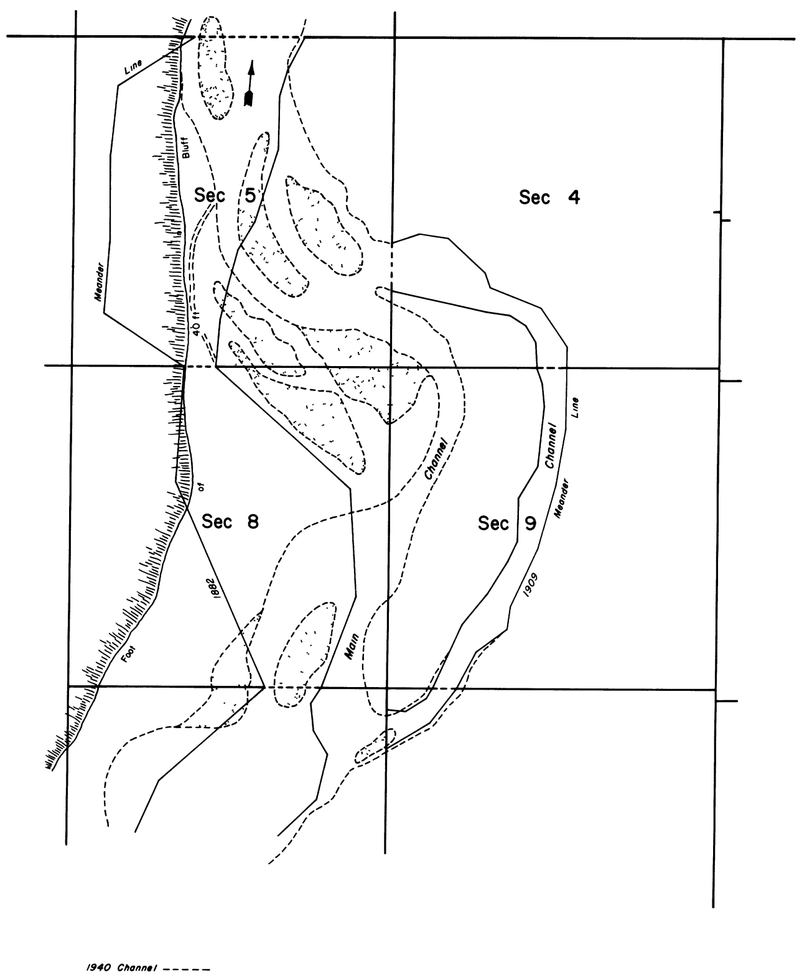


Figure 6 - Existing Conditions in 1940

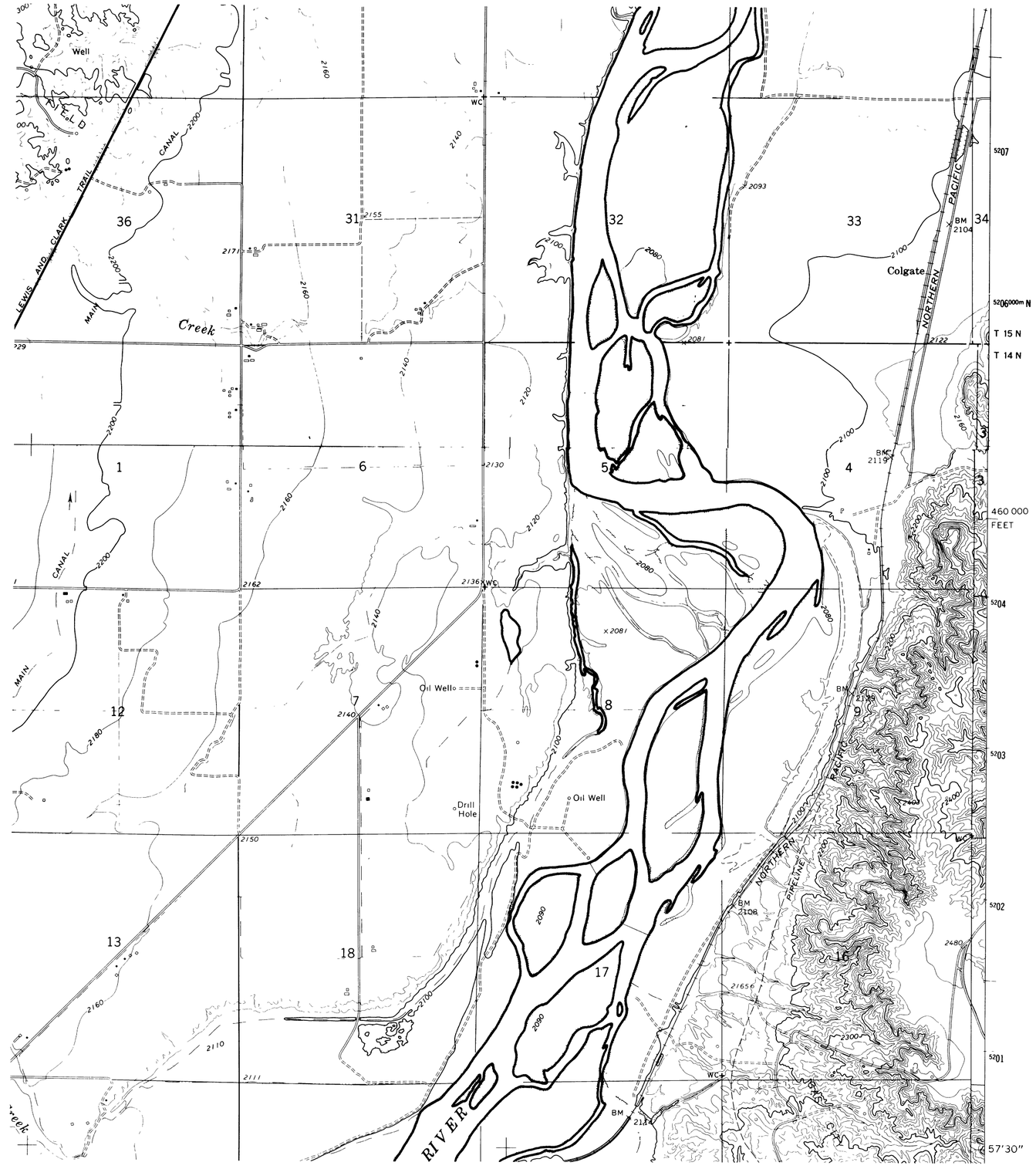
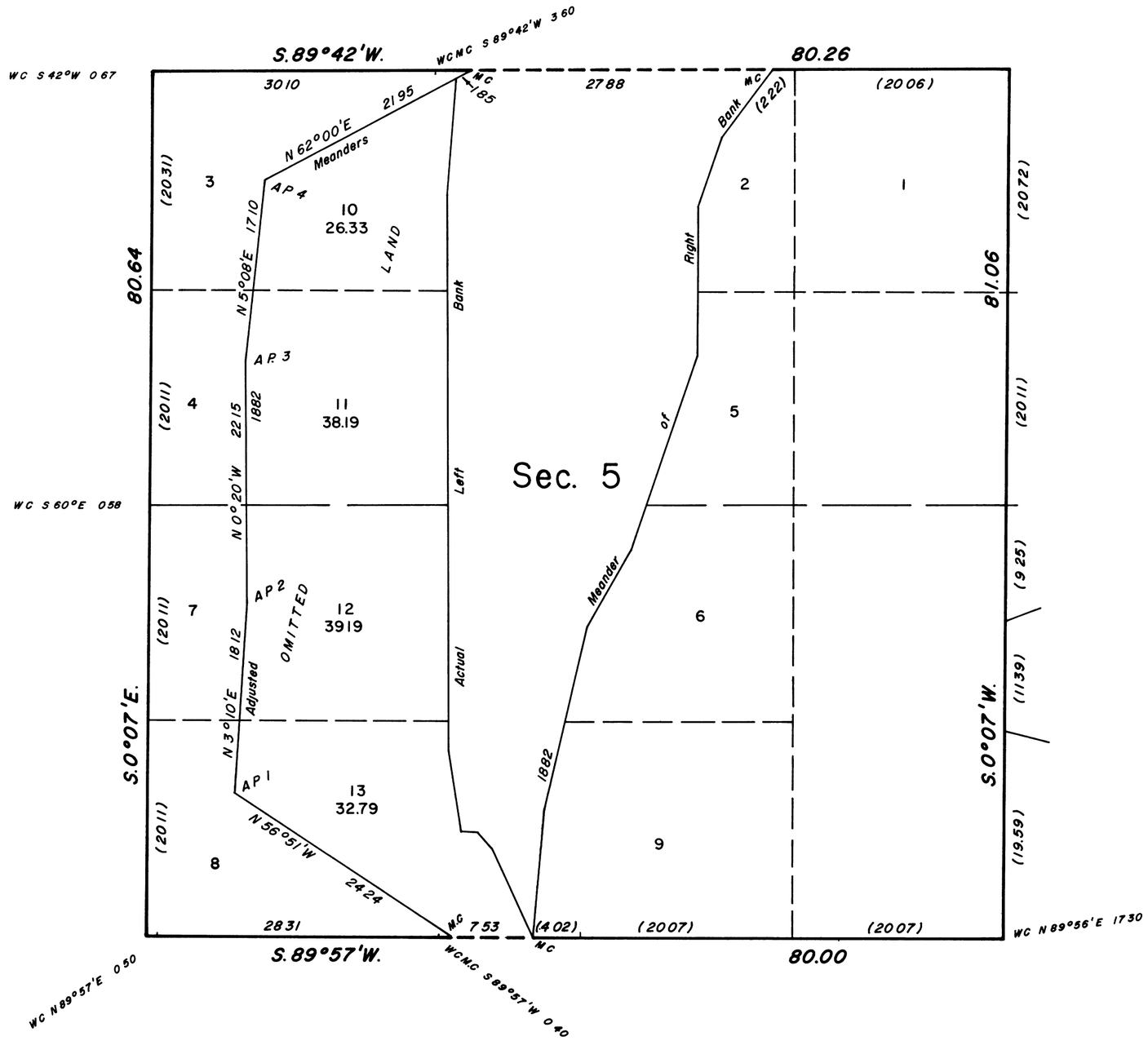


Figure 7 - Hoyt and Forest Park Quads, USGS

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA



MEANDERS OF LEFT BANK OF THE YELLOWSTONE RIVER

N 25°00'W	950
N 35°00'W	150
N 84°00'W	175
N 6°45'W	760
N 0°15'E	1060
N 1°00'W	4120
N 2°30'E	1064

Figure 8 - Omitted Lands in Section 5

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

Amended Information

Preliminary inspection of conditions in section 5 indicated that the 135 acres of land was omitted land and was, indeed, substantial. Supplemental Special Instructions prepared on June 22, 1944, provided for the survey of the omitted land in section 5 and the investigation and examination of the accretion in section 8 to determine whether or not the accretion was substantial prior to 1908.

The owners of adjoining Lots 3, 4, 7 and 8, section 5, and the appropriate State officials were notified by letter on June 23, 1944 that the Government intended to survey the omitted land in section 5.

Ranney Lyman was assigned to conduct the survey and investigation. His first report, dated June 3, 1945, disclosed the following information:

1. The only person still living who had personal knowledge of the area for an extended time was Nils Trangmoe, owner of Lots 3, 4, 7 and 8, section 5. Mr. Trangmoe homesteaded in section 6 in 1911 and purchased the lots from the Northern Pacific Railroad in 1914. His contract was for purchase of 244 acres, instead of 97.46 acres as shown on the official plat. He therefore knew at that time that there was well over 100 acres more land lying west of the river in section 5 than the plat called for. The only other land claimed by Mr. Trangmoe was an area of about 5 acres, in the bottom land below the bluff, at the south end of the section.

2. In 1911 Trangmoe helped build a fence in section 8. He had been familiar with the land west of the river since that year and stated that no material changes of the land in question had taken place since then. Trangmoe also stated that he was the only person still living who had knowledge of the area going back to that date.

3. In retracing the original meander line in section 8 from the meander corner of sections 5 and 8, the record courses were S. 4° 45′ W., 29.00 chains and S. 24° E., 56.30 chains. The first course followed near the top of a 40 foot high bank for about 15 chains. The angle point was 4 chains west of the top of the steep bank. On the second course the line crossed the top of the steep bank at 8.50 chains, descended into the low bottom and intersected the present bank of the river at 43 chains. The last 13 chains of the course was located in the present main channel. No part of the second course followed "even remotely, any vestige of a bank line."

Ranney Lyman meandered the present left bank of the river in section 8. The meander line intersected the line between sections 5 and 8 at the point for the record meander corner on the right bank. The bottom land area contained about 128 acres of accreted land and several old, completely filled channels were evident within the area. About half the area contained brush and cottonwood trees, none of which dated back as far as the original survey. The remaining half of the area was covered with forage grasses.

Ranney Lyman interviewed two other local residents but neither could give any positive statement concerning early day conditions of the area.

Ranney Lyman's report concluded:

> In view of Mr. Nils Trangmoe's positive statement that the river bottom on the left bank in section 8 has not changed materially since 1911, and the fact that there is no vestige of a bank line along the course of the original meander line across the low bottom, it may be properly assumed that the official plat of the original survey, did not truly represent the bank line at the time of the original survey. And it is quite certain that the area was in substantially in the same condition as at present, in 1908 and 1909, when the filings were made in section 8.
>
> I therefore recommend that a survey of the additional lands in section 8, along the left bank of the river be authorized.

Lyman's report was submitted to the Washington Office with a request for authorization to proceed with the survey of the accretion in section 8. The report did not convince the Washington Office that the land had accreted prior to 1908, but the survey was authorized provided Lyman could produce conclusive evidence of such accretion. Supplemental Special Instructions No. 2 dated June 26, 1945, provided for the survey of the accretions in front of Lots 2, 3, 6 and 7, section 8, on the condition that further evidence would clearly show that the accretion occurred prior to 1908, the earliest date of entry on those lots.

Ranney Lyman again interviewed Nils Trangmoe, on July 6, 1945, and made a second report, dated July 7, 1945. That report follows:

> I interviewed Mr. Nils Trangmoe, about noon, on July 6, 1945, at his home in section 6, and requested him to go with me to section 8, to give more specific testimony concerning the condition of lands bordering the left bank of the Yellowstone River, at the time of his earliest acquaintance with the locality. He agreed to go at four o'clock, and I met him by appointment, in Glendive, at that time, and we drove to section 8, T. 14 N., R. 55 E.
>
> His testimony, while on the ground corroborated statements made during three previous interviews, except that he did recall that after a heavy ice gorge, in the early years, the land along the original bank line as surveyed in 1883, through the south half of the section, had been covered several feet deep with large blocks of ice. When this ice was melted, the land was covered with many inches of silt. Only the top of the sage brush showed through. The grass did not reappear for about two years.
>
> This recollection quite invalidated his previously reiterated statement that no substantial change had occurred on this area, since he had known the land. Thus it gave little basis now for an assumption that the bank line was not in fact the actual bank line at the time of the original survey.
>
> From this and other statements of the river's action cited by Mr. Trangmoe, it was shown that the behavior of the Yellowstone River in ice gorges is violently avulsive in its action, so that it is entirely unsafe to assume from present conditions, that any low bank line has been in position for any considerable time.
>
> I must therefore conclude that the evidence now available does not justify the survey of the accreted lands in section 8, as now belonging to the General Land Office.

Final Statement of the Problem

Decisions regarding the continuation of the omitted land survey in section 5 and the survey of accretions in section 8 were required. Either further investigation would have to be requested or the decisions would have to be based entirely upon the evidence as it had been presented.

Solution

No further investigation was requested. The omitted land in section 5 and a small area of accretion thereto was surveyed as follows:

1. Section 5 was dependently resurveyed. Lost corners (including meander corners) were restored by proportionate measurement methods.

2. The 1882 record meanders of the left bank of the river were retraced. The closing error was adjusted by the broken boundary method and the four anglepoints were monumented, creating a fixed, non-riparian boundary.

3. The record meander corner on the right bank of the river, between sections 5 and 8, was located on the present left bank of a channel of the river. The land between the present left bank and the foot of the bluff had accreted to the omitted land. New meanders of the present left bank were surveyed downstream along the channel and foot of the bluff to an intersection with the adjusted record meander line at the north end of the section. Therefore the omitted land survey included not only the erroneously omitted area but a small area of land that had accreted since 1882.

4. The omitted land was platted along with the dependent resurvey and was lotted and given areas by extension of the normal section subdivisional lines. Figure 8 is an enlarged sketch of section 5 showing, for informative purposes, the lotting, courses and distances as returned in the field notes and plat.

5. No action was taken to survey any of the accreted lands in section 8. There was not sufficient evidence on which to proceed with that survey.

Field notes were written and the surveys were platted and submitted to Washington for acceptance. The plat was accepted on January 30, 1948 and is shown in figure 9.

Supplemental Topic No. 1

Restoration of an Irregular Boundary

The field notes of the 1882 survey by Towne states that he ran west between sections 5 and 8, setting the ¼ section corner at 40.00 chains and a meander corner on the right bank of the river at 44.00 chains. See figure 3. Towne later ran east between sections 5 and 8, intersected the left bank at 28.21 chains and set a meander corner. He then offset to the south 0.20 chains to a point due west of the meander corner on the right bank. He then laid out a base and triangulated across the river, returning a distance of 7.50 chains. Thus Towne created an irregular section line having three courses instead of only one. Ranney Lyman restored the line as a single course instead of as an irregular boundary as outlined in section 380 of the 1930 Manual and now outlined in section 5-36 of the Manual of Surveying Instructions, 1973. This same condition exists for the line between sections 8 and 17.

Supplemental Topic No. 2

Survey of Accreted Land

Ranney Lyman surveyed the omitted land in section 5 at a time when he assumed that section 8 contained accretion subject to survey as public lands. He therefore used the record right bank meander corner to begin his survey in section 5, since that point was on the present left bank. Because the present left bank intersected the record meanders of the left bank within section 5 and within section 8, no "division of accretion" lines would be required; all of the land would be public land subject to normal lotting.

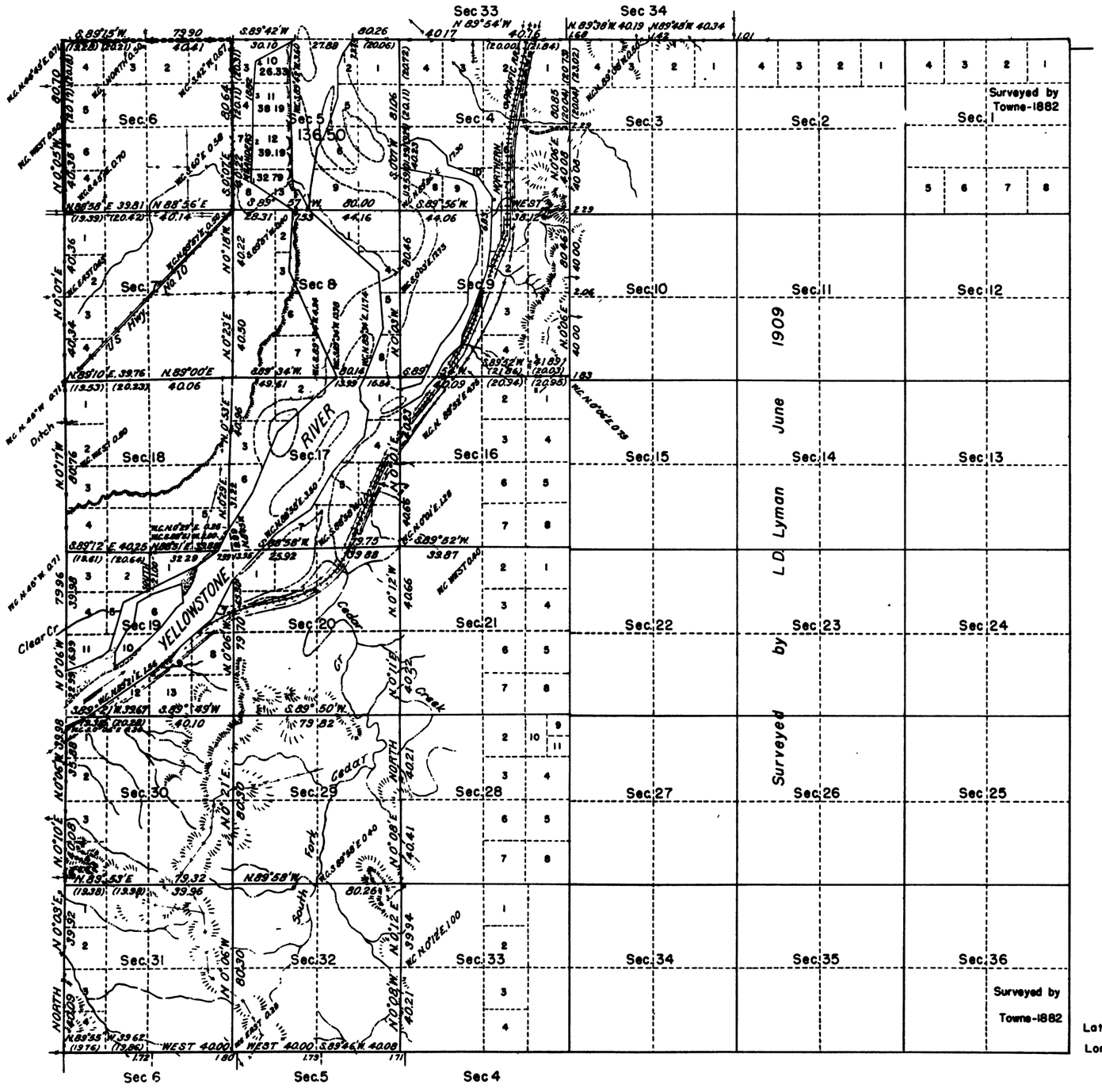
When the accretion survey in section 8 was dropped, a division of accretion line, normal to the left bank (or channel) of the river opposite the restored meander corner of sections 5 and 8, was actually required.

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

DEPENDENT RESURVEY

TOWNSHIP Nº 14 NORTH, RANGE Nº 55 EAST, OF THE PRINCIPAL MERIDIAN, MONTANA.



MEMORANDUM

This plat represents a retracement and reestablishment of a portion of the governing exterior and subdivisional lines designed to restore the corners in their true original locations according to the best available evidence; and, except for the area surveyed in section 5, aggregating 136.50 acres, omitted from the original survey, the lottings and areas are as shown on plats approved September 26, 1883, April 9, 1910, and October 31, 1910.

The position of the original record-meander courses of the left bank of Yellowstone River in section 5 is shown by an irregular line with numbered angle points. This line as thus originally reported was grossly in error, and has therefore been marked as a fixed boundary, with the directions and lengths of the several courses adjusted to the record of the original survey.

Resurvey authorized by General Land Office letter 1788916 "E" dated November 17, 1939.

Latitude 46°54'N
Longitude 104°41'W

Area surveyed: 136.50 acres.
Area resurveyed 8,406.45 acres.

LINES DESIGNATED	BY WHOM SURVEYED	GROUP NO.	DATE OF SPECIAL INSTRUCTIONS	WHEN SURVEYED	
				BEGUN	COMPLETED
Exterior Subdivisional	Ronney Y Lyman	389	April 11, 1940 & June 22, 1944	Sept. 6, 1940	July 6, 1945

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Denver, Colorado, June 2, 1947.
This plat is strictly conformable to the field notes of the survey which have been examined and approved

Acting Chief Cadastral Engineer.

Washington, D. C., January 30, 1948
The survey represented by this plat, having been correctly executed in accordance with the requirements of law and the regulations of this office, is hereby accepted

Assistant Director

Figure 9 - Accepted Plat

OMITTED LANDS ALONG YELLOWSTONE RIVER

T. 14 N., R. 55 E., PRINCIPAL MERIDIAN, MONTANA

Supplemental Topic No. 3

Complete Investigation - Yellowstone River

Subsequent to this survey oil and gas were discovered in the Williston basin. Included were patented lands on which the government had retained rights to minerals, oil and gas.

The question of ownership of the lands along the Yellowstone River and the islands in the river was reopened. During the 1950's and 1960's further investigation and research was made concerning the area.

The following report is a result of thorough investigation of the same situation. This report contains information which should have been developed for the earlier survey and is reprinted in full.

5: 9180.1
Cr. 389
M-011522

State Office
Federal Office Building
316 North 26th Street
Billings, Montana 59101

December 29, 1965

Memorandum

To· District Manager, Miles City

From State Director, Montana

Subject Status of lands embracing lots 1, 4, 5, 8, and NE¼NE¼, sec. 8, T. 14 N., R. 55 E., P M , Montana

During the past few years, your office has directed a number of inquiries to this office in regard to the status of the subject lands.

By research of available records, sufficient evidence has been collected upon which a determination is based that those portions of lots 1, 4, 5, 8, and NE¼NE¼, sec. 8 remaining as firm land are public lands.

The following maps, information, and evidence were considered in arriving at this determination·

1. The Yellowstone River is navigable through this reach of the river and navigability extends upstream approximately 220 miles to Billings.

2. Montana was admitted into the Union November 8, 1889.

3. The Yellowstone River was meandered in this township and the west two tiers of sections and sec. 8 surveyed on December 4 and 5, 1882 by Elmer C. Towne, as shown on the plat approved September 26, 1883.

4. The balance of T. 14 N., R. 55 E., was surveyed by Lewellyn D. Lyman in 1909, as shown on the plat approved April 9, 1910.

5 Sec. 8 and other portions of the subdivision of T 14 N., R 55 E., were dependently resurveyed by Ranney Y. Lyman, from 1940 to 1945, as shown on the plat accepted January 30, 1948

6. Map of the Yellowstone River from Fort Keogh to Fort Buford, by Lt. Edward Maguire, Army Corps of Engineers, dated October 23, 1878.

7. Northern Pacific Railroad maintenance reports of construction of dams and dykes on the Iron Bluff section of the railroad from 1881-1891.

8. Aerial photographs of 1949 and 1957

9. A diagram is attached showing the pertinent points considered in this determination, that an avulsive change of channels in the Yellowstone River occurred in section 8 following the original survey of the township made by Elmer C Towne in December 1882 but prior to 1911; and that since the avulsive action of that period, these channels have had no major movements that would be termed avulsive.

The Northern Pacific Railroad follows along the east side of the Yellowstone River through sections 9 and 17, which is coincident with that portion of the line known as Iron Bluff. This section of the railroad has caused a great deal of trouble from the date of construction because of an underlying clay formation that when water soaked, was slipping toward the river, and in the process, was carrying the rail line with it. The main channel of the Yellowstone River sweeping along the east bank just below the railroad line was scouring away the clay formation, while new earth moved slowly down from Iron Bluff replacing the slippery clay as it was eroded away. This slippage occurred during spring thaws or heavy rainy periods and was thought to be abetted by seepage from the main or east channel of the river.

Various measures were taken by the railroad to protect the roadbed. The alignment of the line was changed, piles driven and drainage channels built but their main effort was extended in the construction of dams and dykes to swing the main channel of the river away from the Iron Bluff area into the west channel which at that time was shallow and carried only a small part of the river

In November 1881, a dyke was built across the east or main channel of the river in about the center of lot 4, sec. 17. This dyke is shown on a plat prepared by the Northern Pacific Railroad using a base map which consolidates sheets 24 and 25 of the report on the Yellowstone River by Lt Maguire of 1878.

In a report on the work done on the river at Iron Bluff, J W. Kendrick, Resident Engineer for the Northern Pacific Railroad, in letter of August 4, 1882, is quoted in part as follows

Iron Bluff

This Bluff, situated ten miles west of Glendive, has always been considered the most difficult place on the Yellowstone Div. if not on the whole railroad, in an Engineering point of view. The whole bluff has a tendency to slide into the river. It is 6,000 ft. long and extends back from the river from 400 to 1000 ft., reaching an elevation of 250 ft. above the river.

On August 21st George S. Morrison, Esq., Engineer in charge of Bismarck Bridge, made a visit to the bluff by request of the Chief Engineer to give an opinion on the matter. He was accompanied by Gen. H. Haupt, General Manager of this road and an Engineer of much experience and ability.

Mr. Morrison, after as full an examination of the ground as was possible in so limited a time, said that in his opinion a dam or dyke to extend from the main land to the point of the island opposite would afford a solution to the problem, the idea being that if the channel were changed and the wash at the base stopped, the sliding material instead of being washed away, would accumulate at the base and in time by accumulation produce equilibrium with the mass coming from above.

Gen. Haupt fully concurred in this.

In accordance with this idea, I had a survey made for a series of dams to accomplish this end.

The work was commenced after an inspection of the ground by the Chief Engineer, on November 1, 1882, and prosecuted during the winter of 1881 and 1882 as will be described.

The result is more favorable even than expected, and the bluff has given no trouble this season.

On November 1, 1881 the work of building the system of dams and dykes at Iron Bluff was commenced.

Including the one at Cedar Bluff there are three dams and one dyke and shore protection as follows·

1. Main dam at Iron Bluff 1143 ft. long.
2. Dam between Hals and Hughes Island 454 ft long.
3. Dyke in extension North from 2 - 1200 ft. long.
4. Dyke extending west from main dam 103 ft long.
5 Shore protection from main dam to Fascine dam, 1200 ft. long.
6. Dam at Cedar Bluff-Crib 283 ft. long, Fascine 860 ft. long.

The main channel of the river at the point where No. 1 was built ---

---

The channel on the other side of the island was small and insignificant, ---

---

The channel between Hals and Hughes Island was practically dry and its bed composed of sand and silt.

Twelve men were employed in cutting logs for the main dam,---. At the same time a cut-off channel was dug by contract to connect the main and the west channels.

The water rose above the dam but did not run over, part of it escaping through the crib and part going through the new channel to the west channel.

This construction work of NPRR begun in November 1881 and completed in the summer of 1882, laid the groundwork for the avulsive changes in the river channel that would follow as a result of the construction of the dams and dykes.

Elmer C. Towne made his survey of T. 14 N., R. 55 E., in December 1882, after these works had been emplaced by the NPRR, but prior to the cutting of new river channels.

The construction of these works also explains in part why Towne did not show the dammed-off main or east channel of the river. Instead, his meanders of the right bank of the river in the NE¼ of sec. 17 appear to have followed the crest of the dams and dykes constructed by the railroad.

Towne's survey of December 1882 was made a few months after the NPRR had dammed the main or east channel of the river. He shows the river flowing in only one channel, much wider, but centered over the west channel as shown by the Corps of Engineers Chart of 1878. In close examination of the position of the Iron Bluff dam finished in the summer of 1882 and Towne's meanders of the right bank of the river in sec. 17, it appears that Towne crossed the NPRR dam with his meander line. Towne apparently felt that the dam then solidly emplaced would permanently cut off all flow of the river into the east channel and, therefore, did not show this channel in his survey. The channel as meandered by Towne was carrying the entire flow of the river and because it had not scoured out to accommodate the heavy flow of water, was at a high level, much above the normal mean high water line, causing the river to be extremely wide and flooding the adjoining river bottom.

Subsequent to the Towne survey, the river during spring thaws apparently scoured out the high water channel across Hughes Island, shown on the Corps of Engineers map of 1878 and over the years since has developed this channel into the main water course of the river, completing an avulsive change caused by man-made structures.

In June of 1909, Lewellyn D. Lyman completed the survey of T. 14 N., R. 55 E. The plat approved April 9, 1910 shows the results of his survey The right channel of the Yellowstone River flowing northerly through the west half of sec. 9, is shown as a flowing channel with dykes extending into the river. From this information, we must assume that the main dam at Iron Bluff was allowing some flow into the east channel. Lyman did not report whether or not the Iron Bluff dam was still in place as his survey work did not extend into sec 17. He did report two dykes acting as groins, extending out into the east channel from the right bank; one in sec. 16 and one in sec. 9. The avulsive action that carried the main channel of the river across Hughes Island had not taken place in 1909 at the time of Lyman's survey, as he shows only the east channel flowing through sec 9 and SW¼, sec. 4. Iron Butte is shown in the east half of sec. 9 from which the adjoining section of the railroad obtained its name., i.e., Iron Bluff.

The plat of L. D. Lyman's survey of 1909 shows the river as surveyed by Towne in 1882, without any channel changes in sec. 8. Major channel changes probably would have been noted by Lyman, but such a showing is not conclusive, as L. D. Lyman was only required to report on that portion of the river included in his surveys. The river as shown in sec. 8 on the plat of the survey by L. D. Lyman, was simply a copy of the record position of the river in sec. 8, drawn to show the connections of the east channel as surveyed by L D. Lyman.

However, if the river had sought new channels prior to 1910, the avulsive actions had not been completed in 1909, as L. D Lyman did not show the present main channel of Yellowstone River as it now flows through the NW¼, sec. 9 and SW¼, sec. 4.

Even though the dams and dykes constructed by the NPRR in 1882 were washed out in later high water periods, the railroad did not stop in its attempts to divert the main channel of the river to west and as attested by the Division Engineer in his report of June 17, 1891, addressed to the Chief Engineer, continued until successful to control this reach of the Yellowstone River.

> In the past four years, since the original dyke went out, no serious trouble has been experienced at Iron Bluff However, during this time, no very high water has been expericnced.---
>
> The proposed elevation of head dyke is 73 feet below that of the original dyke, thus allowing the escape of water, at its highest stages, over the dyke.---
>
> If work is to be done this season, I would recommend that grading east of Station 60 (between Stations 80 and 120) and west of Station 128, be commenced as early as possible, say August 1st and that this work be contracted; that construction of head dyke be commenced as early as low water will permit, say in September, and that as soon as the channel is closed, the gap in embarkment and lower dykes be taken in hand and pushed.

We cannot establish the exact date of the avulsive channel change from the above evidence. It appears that the avulsive sections must have occurred after July 1909 when L. D. Lyman made his survey and prior to 1911.

Ranney Y. Lyman made a dependent resurvey of the Towne surveys in T. 14 N., R. 55 E., under Group 389, Montana, from September 6, 1940 to July 6, 1945, including the survey of omitted lands to the west of the Yellowstone River in sec. 5. In addition, R. Y. Lyman made an investigation of the status of the land in sec. 8, lying between the Towne meanders of the left bank of the Yellowstone River and the present left bank. In this investigation Mr. Lyman interviewed Mr. Nils Trangmoe, now deceased, concerning the condtion of the river in sec. 8.

> Mr. Trangmoe states that in 1911 he helped build a fence in sec. 8, and that he has been familiar with conditions in this section, west of the river, ever since that date. He states that he knows of no one else, now living who would have definite knowledge of that area as far back as that date. He states that conditions in this area have not changed very materially since 1911.

As a result of this investigation in sec. 8, R. L. Lyman recommended that the "additionl" land be surveyed as omitted land. Instructions were issued for the survey, Mr. Lyman returned to Glendive and prior to making the survey, again interviewed Mr. Trangmoe on July 7, 1945 Mr. Trangmoe recalled that in the early years the land along the original bank line through the south half of sec. 8 had been covered several feet deep with large blocks of ice. When this ice melted, the land was covered with many inches of silt and only the sage brush showed through.

Mr. Lyman interpreted this testimony to mean that the land lying between the original meander line of the left bank and the present bank had been deposited by accretion. Therefore, these lands could not be claimed by the Federal government as omitted lands but were accretion having been deposited after entry of the land. Entry of lots 2, 3, 6, and 7, sec. 8 was made in 1908.

Mr. Trangmoe did not state when this ice gorge occurred. His testimony is mainly valuable in determining that no material changes in the channels of the river in sec. 8 have taken place since 1911, and confirms that prior to 1911, an ice gorge formed and completed the avulsive actions initiated because of the structures built by the NPRR to control the river along Iron Bluff

Two other investigations were made in this area: one by David K. Scott under Group 389 Montana in April 1952, to determine if the lands fronting lots 2, 3, 6 and 7, sec. 8 existed either as accretion or as islands at the time Montana was admitted to the Union in 1889, and one by William R. Bandy and James A. Minnie under Group 481 Montana, made in mid-January 1954 to determine the status of an island in sec. 17.

David Scott found no evidence additional to that reported by R. Y. Lyman and concluded that sufficient evidence had not been found for the United States to support a claim to the lands fronting on lots 2, 3, 6, and 7, sec. 8.

The investigation made by Mr. Bandy and Mr. Minnie to determine the status of the island in sec. 17, made no contribution to the conditions in sec. 8.

Copy of a report made by Earl G. Harrington, Cadastral Engineering Staff Officer on January 29, 1958, in memorandum addressed to Abe H. Furr, Appeals Officer, is attached. Mr. Harrington's report on the Ownership of Land in sec. 8, T 14 N., R. 55 E., P.M., Montana, in Montana Oil and Gas files 06853 and 09489, supports the conclusions reached independently in this study.

Aerial photographs taken in 1949 show a dam built by the Northern Pacific across the east channel of the Yellowstone River where the river crosses the line between secs. 9 and 16. This position is almost a half mile below the original position of the Iron Bluff dam. Dykes can also be seen at the head of the east channel and another dyke extending northwest over Hughes Island from the west end of the dam first mentioned.

The aerial photograph of 1957 shows the same dam that can be seen on the photo of 1949. In this photo a growth of brush and small trees can now be seen to completely block the head of the east channel of the river, which for so many years caused the NPRR problems in keeping their line in place and open past Iron Bluff.

It can, therefore, be concluded that.

1. The meander lines of Yellowstone River as surveyed by Elmer C. Towne in 1832 in sec. 8, did not follow the mean high water line, but do in fact represent the position of an extreme high water caused by artificial means.

2. The meanders of Yellowstone River as shown on the chart by the Corps of Engineers is a true representation of the conformation of the mean high water line in 1878 and to the time of the original survey.

3. Artificial dams, dykes and systems to control the flow of the river away from the east channel past Iron Bluff constructed by the NPRR over the period from 1881-1909, caused an avulsive change in the channels of the Yellowstone River in secs. 4, 5, 8, 9 and NE¼, sec. 17, T. 14 N., R. 55 E., subsequent to the original survey of 1882, but prior to 1911, the date that Nils Trangmoe testified that the river channels were stabilized.

4 Those portions of lots 1, 4, 5, and 8 and the NE¼ NE¼, sec 8, remaining as firm land are public lands of the United States, and those lands lying between lots 1, 4, and 5, sec. 8, and the right bank of the river as shown on the Corps of Engineers chart of 1878, are omitted lands subject to survey.

5. Those lands lying between lots 2, 3, 6 and 7, sec. 8, and the left bank of the Yellowstone River as shown on the Corps of Engineers chart of 1878, are omitted lands subject to survey

(Signed) Eugene H. Newell

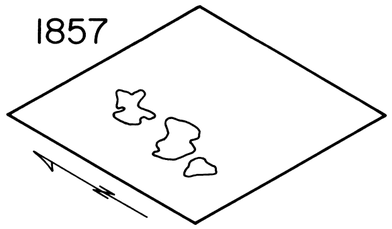
Acting

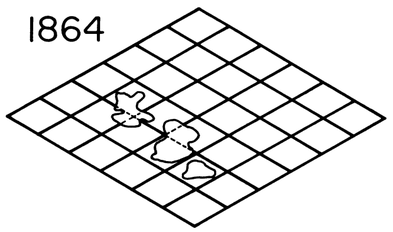
References

Official maps of surveys conducted in T 14 N., R. 55 E.
Group 389 and 481, Montana, case files
Chart of Yellowstone River of 1878 by Corps of Engineers
Maintenance reports and NPRR maps contained in Land Office file Montana 011522

GFTyrrell·svh

OMITTED AND SWAMP LANDS IN HALSEY LAKE





History of Surveys

1857 Artemas Curtis surveyed the exterior boundaries of T 39 N, R 15 E

1864 William E Daugherty surveyed the subdivisional lines and ran the meanders of several lakes as shown on the plat in figure 1, approved March 14, 1865

1927 Joseph C Thoma executed an omitted lands survey in sections 8 and 9 because of fictitious or erroneous meanders of Fay Lake The plat is not illustrated here

Reasons for Request of this Survey

Sections 16, 20, 21 and 29, T. 39 N., R. 15 E., are located in "Long Lake Township," Florence County, Wisconsin, and within Nicolet National Forest. The original survey returns the meanders of a lake in section 29, and a lake, now known as Halsey Lake, in sections 16, 20 and 21. Figure 2 illustrates the record bearings and distances in and around sections 20 and 29. Figure 3 is a portion of the Long Lake and Long Lake SE, 1970, maps of the U.S. Geological Survey.

Comparison of the original plat and the map shows a large discrepancy in the size and shape of Halsey Lake. No lake is shown in section 29.

D.A. McMullen first called attention to the fictitious lake in section 29 in a letter to the Commissioner of the General Land Office on March 30, 1885. McMullen requested a survey of the false lake, stating that he had taken possession of the land and wished to acquire title to it. The Commissioner declined the request on the grounds that under the then existing regulations such lands were not subject to survey.

On January 27, 1967 the Forest Service requested a survey of the apparently omitted lands in sections 16, 20 and 21 adjoining Halsey Lake, and the survey of the bed of the non-existent lake in section 29. Proof of notification of the adjoining land owners and appropriate State officials was furnished with the application. The riparian Lots 4 thru 8 in section 16 are all acquired lands owned by the Forest Service. Lots 1, 2 and 4 in section 20 are privately owned. Lots 3, 5 and 6 in section 20 are Forest lands. All of the surveyed lands in section 29 are Forest lands.

Special Instructions

Special Instructions for Group 91, Wisconsin were prepared on May 23, 1969, providing for an examination and investigation of the apparently omitted lands in sections 20 and 29. A comparison of the record meanders in sections 16 and 21 with Halsey Lake as shown on the topographic map indicates that the original meanders closely follow the actual shore line in section 21. An area of about 65 acres appears in section 16 between the record meanders and the actual lake. The riparian lots in section 16 contain 150.20 acres according to the record. The Special Instructions state a refusal to survey the omitted area in section 16 on the grounds that neither the absolute area (65 acres) nor the ratio to the riparian lots was great enough to meet the requirements for omitted lands.

The Special Instructions provide for the dependent resurvey of the exterior boundaries of sections 20 and 29 and the retracement of the record meanders within those sections. Since Wisconsin achieved statehood in 1848 and the original survey was done in 1864, the Special Instructions also provided for an investigation and examination to determine whether any alleged omitted lands were actually upland in place in 1848, 1864 and thereafter.

Assignment Instructions

Assignment Instructions were issued on August 9, 1971. After preliminary work was completed, Supplemental Special Instructions and Assignment Instructions were issued on September 1, 1971, providing for the establishment of 1/16 section corners on the exterior boundaries of section 20.

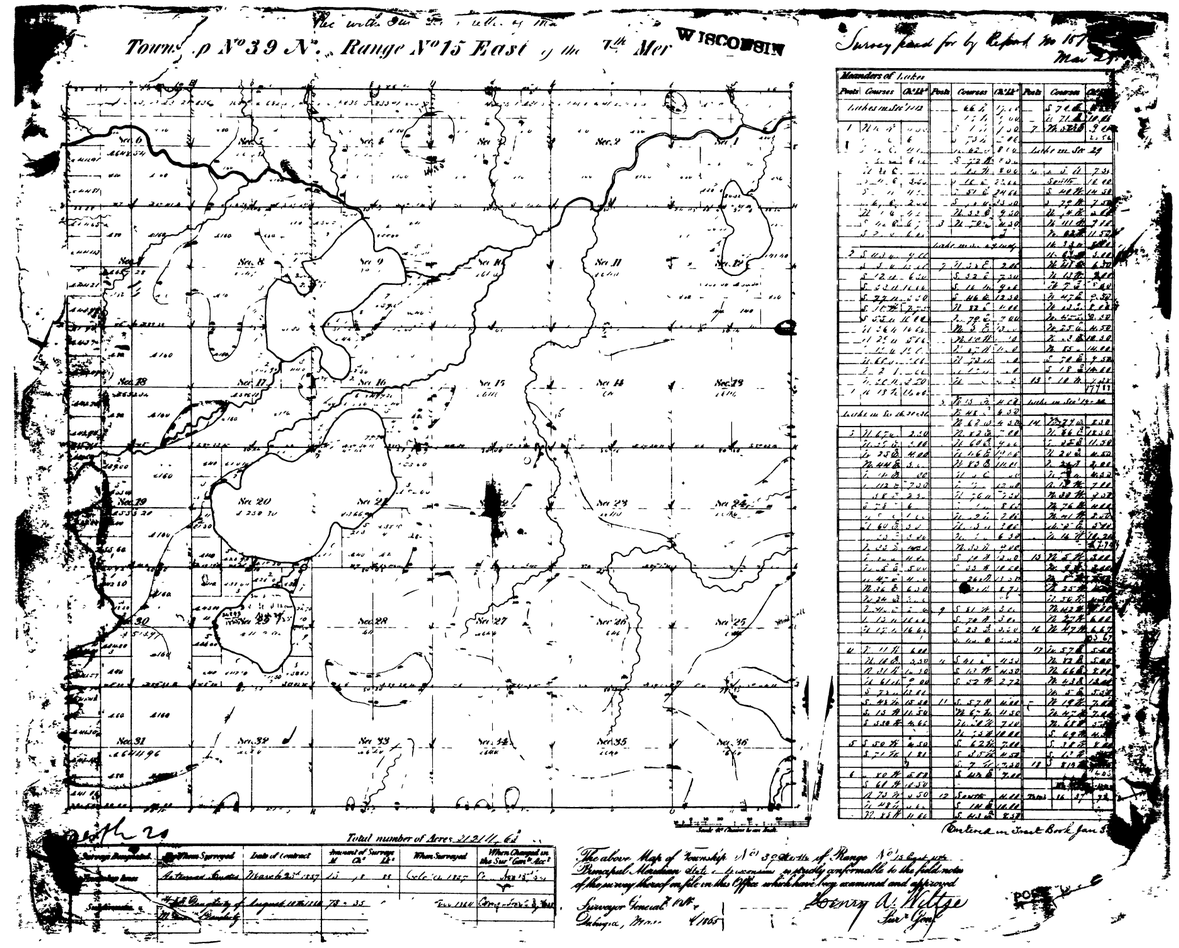
Conditions Found on the Ground

The exterior boundaries of sections 20 and 29 were retraced. Most of the corners had been perpetuated with wood posts. The original meanders of Halsey Lake and the non-existent lake in section 29 were retraced.

In section 20 the original meanders crossed a ridge approximately 160 feet in elevation above the level of Halsey Lake. The meanders did not follow any contour line. Portions of the area between the original meander line and the actual lake were swamp. The meander line crossed the swamp land.

In section 29 the "bed" of the false lake was up to 40 feet above the level of Halsey Lake and the original meanders followed no contour line. Parts of this area, which was drained by Halsey Slough, were also swamp and muskeg.

Both areas were covered with sparse to dense stands of timber. The pine species had been logged in years past. Figure 4 illustrates the data developed during this stage.



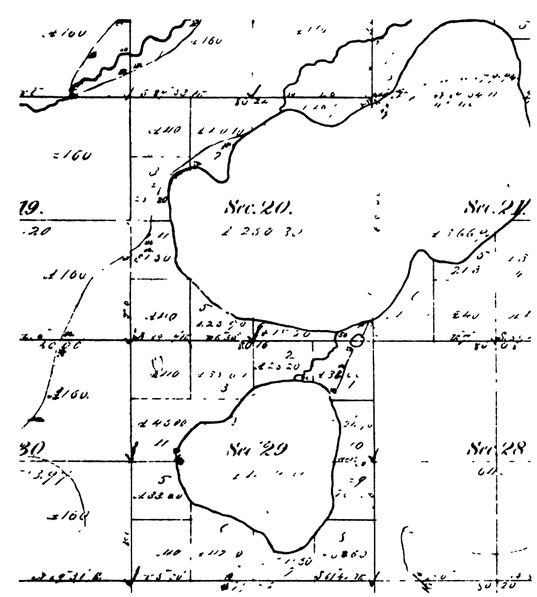
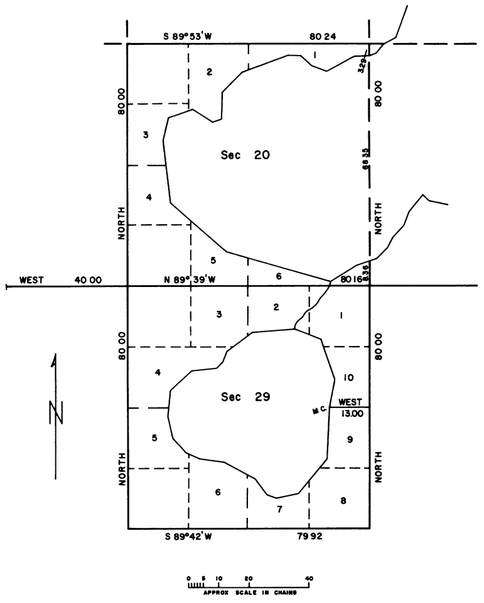


Figure 1 - Original 1864 Survey

OMITTED AND SWAMP LANDS IN HALSEY LAKE



Meanders in Section 29	Meanders in Section 20
S 3° W , 7 50	S 80° W , 5 00
South, 10 00	S 60° W , 10 50
S 40° W , 14 50	N 75° W , 5 50
S 79° W , 7 50	N 48° W , 5 00
N 74° W , 3 00	N 88° W , 4 00
N 41° W , 7 00	S 66° W , 17 00
N 62° W , 11 50	S 42° W , 9 00
N 83° W , 8 00	S 1° W , 7 50
N 63° W , 5 00	S 75° W , 3 00
N 41° W , 6 50	N 62° W , 8 00
N 13° W , 7 00	S 72° W , 8 50
N 7° E , 8 50	S 13° W , 8 00
N 47° E , 9 50	S 10° E , 23 00
N 83° E , 8 00	S 51° E , 24 00
N 45° E , 2 50	S 78° E , 35 50
N 23° E , 4 50	N 53° E , 9.50
N 53° E , 10 50	N. 70½° E , 4.50
N 85° E , 14 00	
S 70° E , 9 50	
S 18° E , 14 00	
S 10° W , 9 38	

Figure 2 - Survey Record

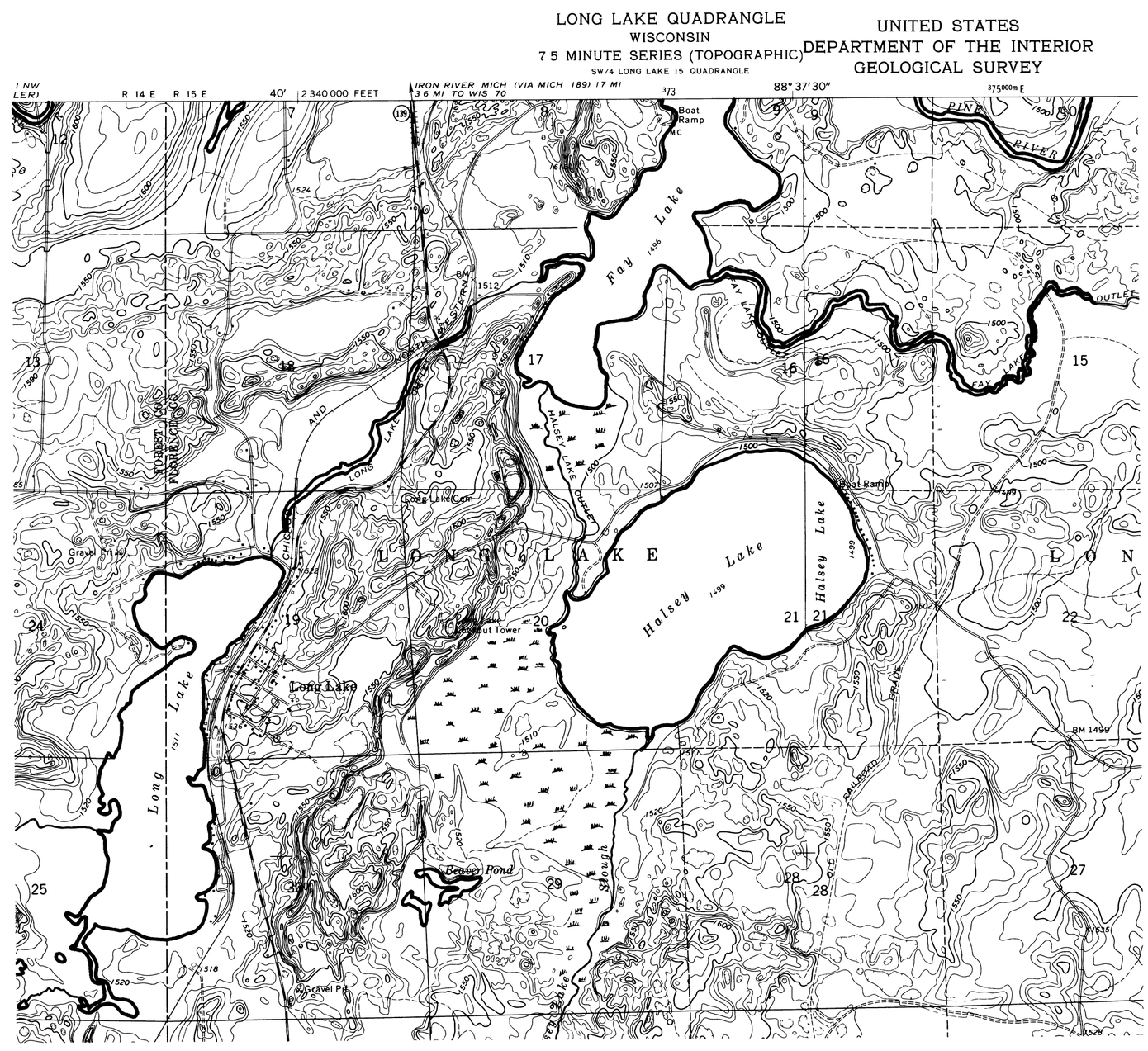


Figure 3 - Long Lake and Long Lake SE Quads, USGS

Preliminary Statement of the Problem

With the examination and investigation complete, three problems to be resolved were: 1) Was the land between the original meander line and the actual lake omitted land and subject to survey? 2) If this area is omitted land, what portion is swamp and overflowed? 3) Should the local perpetuations of corner positions be accepted and used to restore the exterior boundaries of the surveyed lands?

Regulations

This case requires application of the following sections of the Manual of Surveying Instructions, 1973:

3-81 and 3-82	Subdivision and lotting
5-4 to 5-16	Corner identification, esp. section 5-9
5-43	Angle points of nonriparian lines
7-77 to 7-93	Erroneously omitted areas, esp. sections 7-77 to 7-85
7-95 to 7-99	Swamp and overflowed lands, esp. sections 7-98 and 7-99

OMITTED AND SWAMP LANDS IN HALSEY LAKE

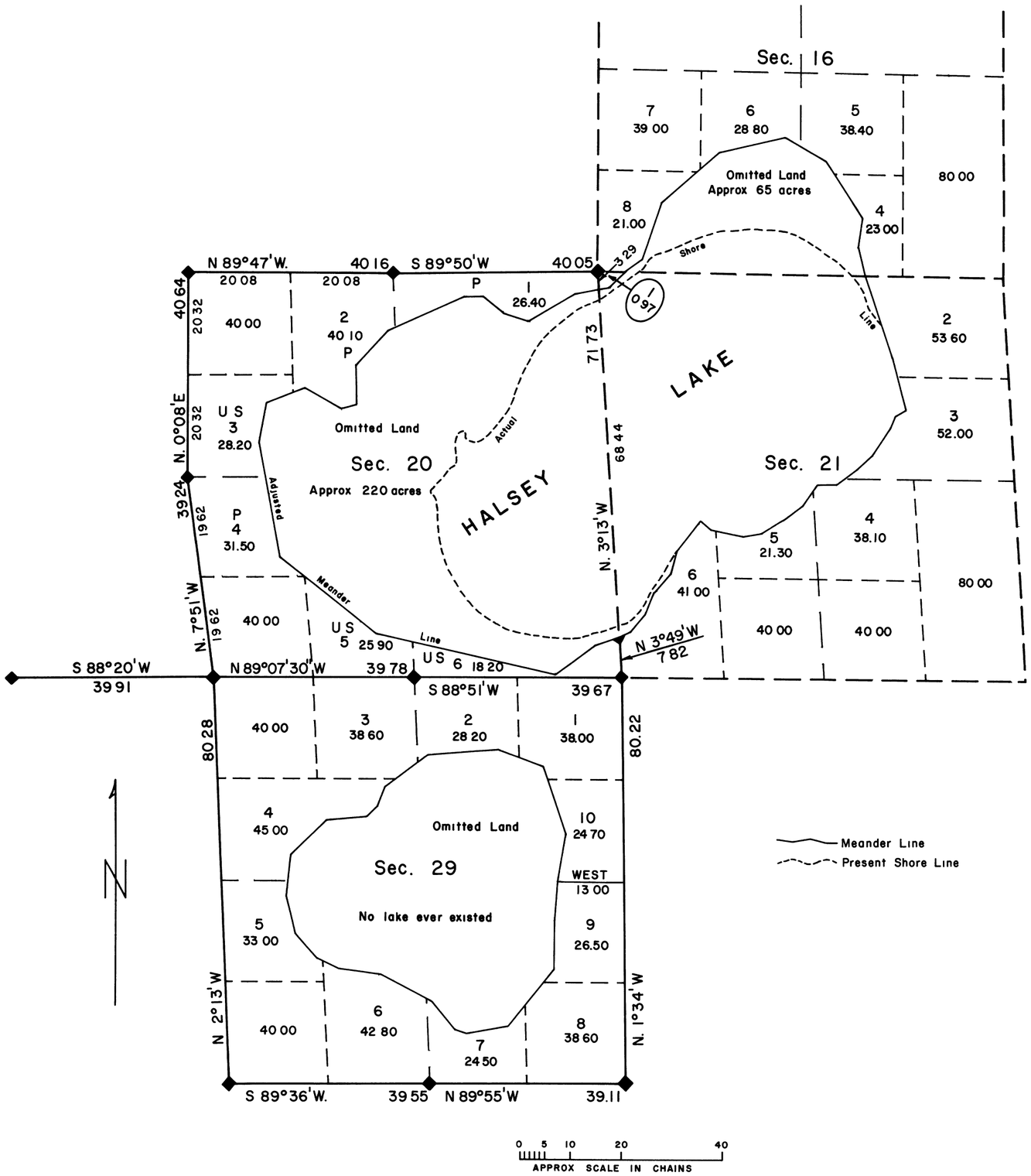


Figure 4 - Retracement, Status and Conditions Found

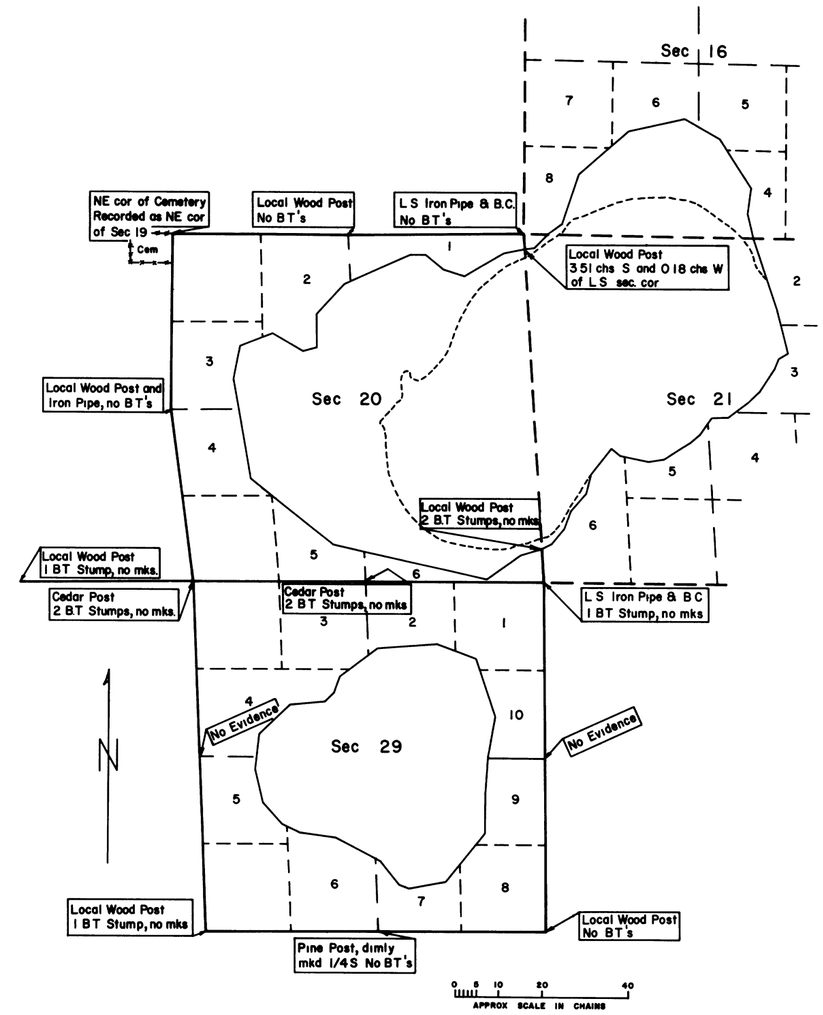


Figure 5 - Corner Evidence

Auxiliary Topic No. 1

Acceptance of Local Survey Corners

Section 5-9 of the Manual of Surveying Instructions, 1973, defines an obliterated corner as "one at whose point there are no remaining traces of the monument, or its accessories, but whose location has been perpetuated, or .... ."

Most of the corners of sections 20 and 29 fell generally within this category. Very little conclusive evidence remained of the original monuments and accessories. Except for the east and west ¼ section corners of section 29, each corner point was perpetuated by wood posts or iron pipes. Several of these monuments were at record distance from tree stumps, but none of the stumps contained scribe marks. A licensed land surveyor had restored the northeast and the southeast corners of section 20. The Florence County records show the northwest corner of section 20 to be at the northeast corner of Long Lake Cemetery. Figure 5 indicates the evidence found at each corner location. The relative position of these points is shown in figure 4.

Section 6-25 of the Manual of Surveying Instructions, 1973, states, "...it (dependent re-survey) is based, first, upon identified original corners and OTHER ACCEPTABLE POINTS OF CONTROL, ... " (emphasis added). Section 6-28 states, "Once it is accepted, a local point of control has all the authority and significance of an identified original corner." Section 6-28 also cautions the surveyor not to "abandon the record of the original survey in favor of an indiscriminate adoption of points not reconcilable with it."

Any corner point must be determined from the best available evidence. If a local surveyor's perpetuation of a corner to Public Lands is supported by agreement among affected property owners or other confirmation, this corner may be considered as acceptable.

The only "local" corner rejected was the wood post for the meander corner of sections 20 and 21 on the north shore of Halsey Lake. This post did not conform to the old survey in relative position and could not be justified by any local record or survey. The ¼ section corner of sections 19 and 20 is displaced in relation to the corners north and south of it, but was locally acceptable and in use to mark the section line and lines of occupancy. All of the remaining corners agreed reasonably well with the record. They were in use as bona-fide monuments and were, therefore, accepted.

OMITTED AND SWAMP LANDS IN HALSEY LAKE

Auxiliary Topic No. 2

Swamp and Overflowed Lands

A considerable portion of the apparently omitted land in sections 20 and 29 is swampy in character. Swamp and overflowed lands, within the meaning of the Act of September 28, 1850 (9 Stat. 519) are defined in paragraphs two, three and four of section 7-98 of the Manual of Surveying Instructions, 1973. The method of designating the new lots in the omitted land area, which is being surveyed for the first time, is outlined in sections 3-81 and 3-82 of that manual. There can be no "gerrymandering" of the lot lines to avoid a just designation of lots containing over 50% swamp, or 50% uplands.

Final Statement of the Problem

Based on the evidence obtained in the retracements and investigations the surveyor must decide:

1. Which monuments at the corner locations are acceptable and which are not?

2. Are the lands in section 20 and 29 omitted land under the criteria laid down by the courts?

3. How should the omitted lands be surveyed if they meet the requirements of (2)?

4. What areas are definable as swamp and overflowed under the Act of September 28, 1850?

Solution

1. The ¼ section corner of sections 28 and 29, the ¼ section corner of sections 29 and 30 and the meander corner between sections 20 and 21 on the north shore of Halsey Lake were restored by single proportionate methods. The required 1/16 section corners were established in the same manner.

All corners were monumented with standard iron posts except the northeast and southeast corners of section 20, which were adequately monumented by a licensed surveyor.

2. Areas in sections 20 and 29 were considered as omitted lands. The area in section 20 contains about 220 acres with the riparian lots, according to the record, containing 170.30 acres. This omission was deemed to be substantial.

The record "lake" contained upland species of timber. It was quite evident that no lake ever existed in section 29. Though a large portion of the area was swampy, the record meanders did not meander the swampy area, rather they crossed ridges, etc., and followed no contour.

These conditions fit all the criteria for omitted lands.

3. The closing error of the record meander courses was adjusted by the broken boundary method. The angle points of the adjusted meanders were monumented with "copperwelds," marked as angle points, and numbered in sequence in the same order as the original survey. Thus the adjusted meanders became a fixed and limiting boundary of the originally surveyed lands. New meanders were made of the actual shore of Halsey Lake in section 20.

4. The newly surveyed, omitted-land areas were subdivided into lots by protraction only. No subdivision of section lines were surveyed in the field. The lots were designated by succeedingly higher numbers in sequence of the normal lot numbering, from east to west and west to east.

5. Each lot was then examined on the ground to determine those lots which were in excess of 50% swamp and overflowed lands. Figure 6 illustrates the lot numbering and the areas which were deemed to be over 50% swamp. The General Description of the field note record specifically lists those lots which are over 50% swamp as well as those which are over 50% upland, in conformity with section 7-98, paragraph 6, of the Manual of Surveying Instructions, 1973.

The field notes of the resurvey, the adjusted record meanders and new meanders of Halsey Lake were written in full detail. The field notes and plat were accepted on September 11, 1972. The accepted plat is illustrated in figure 7.

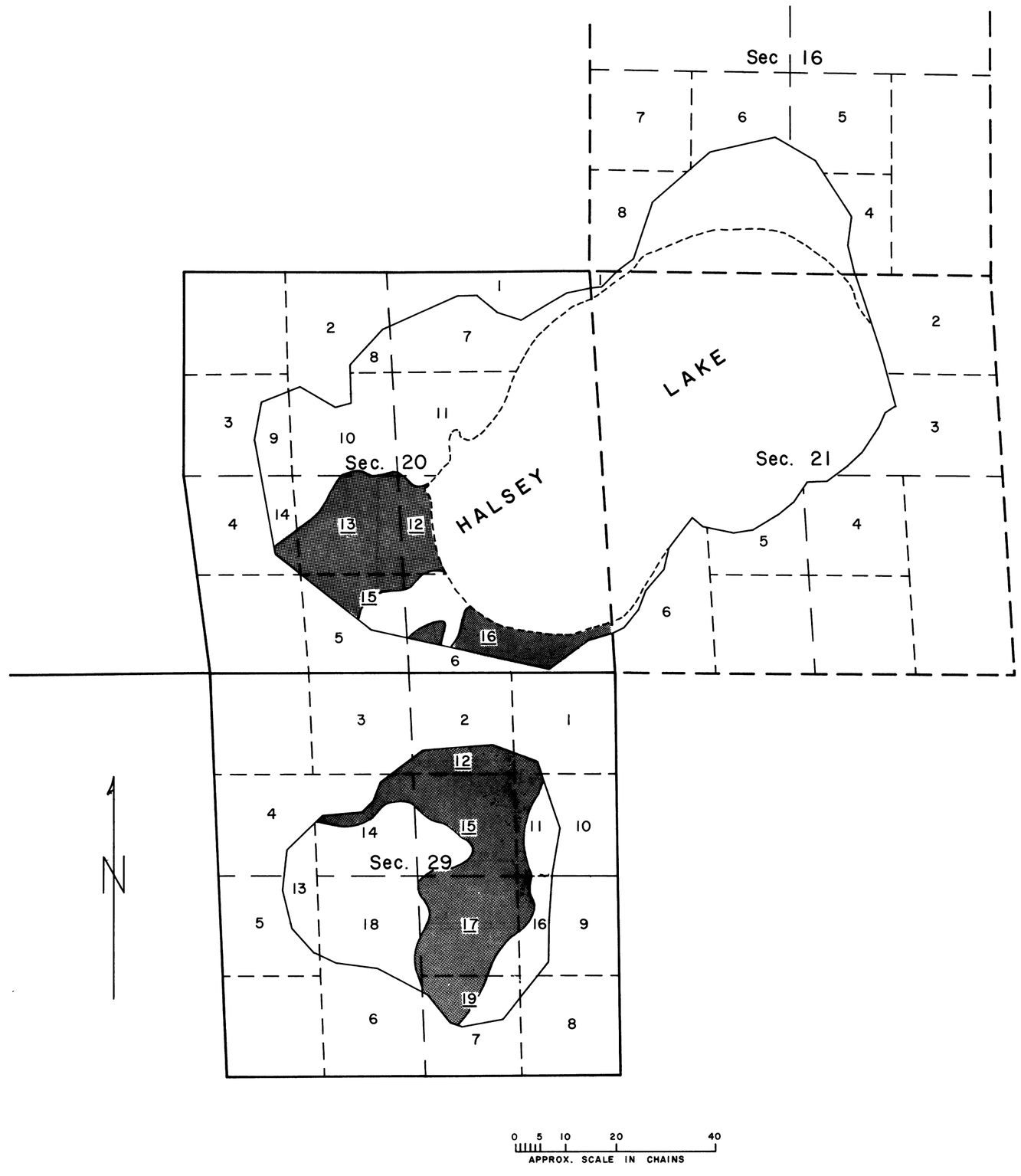
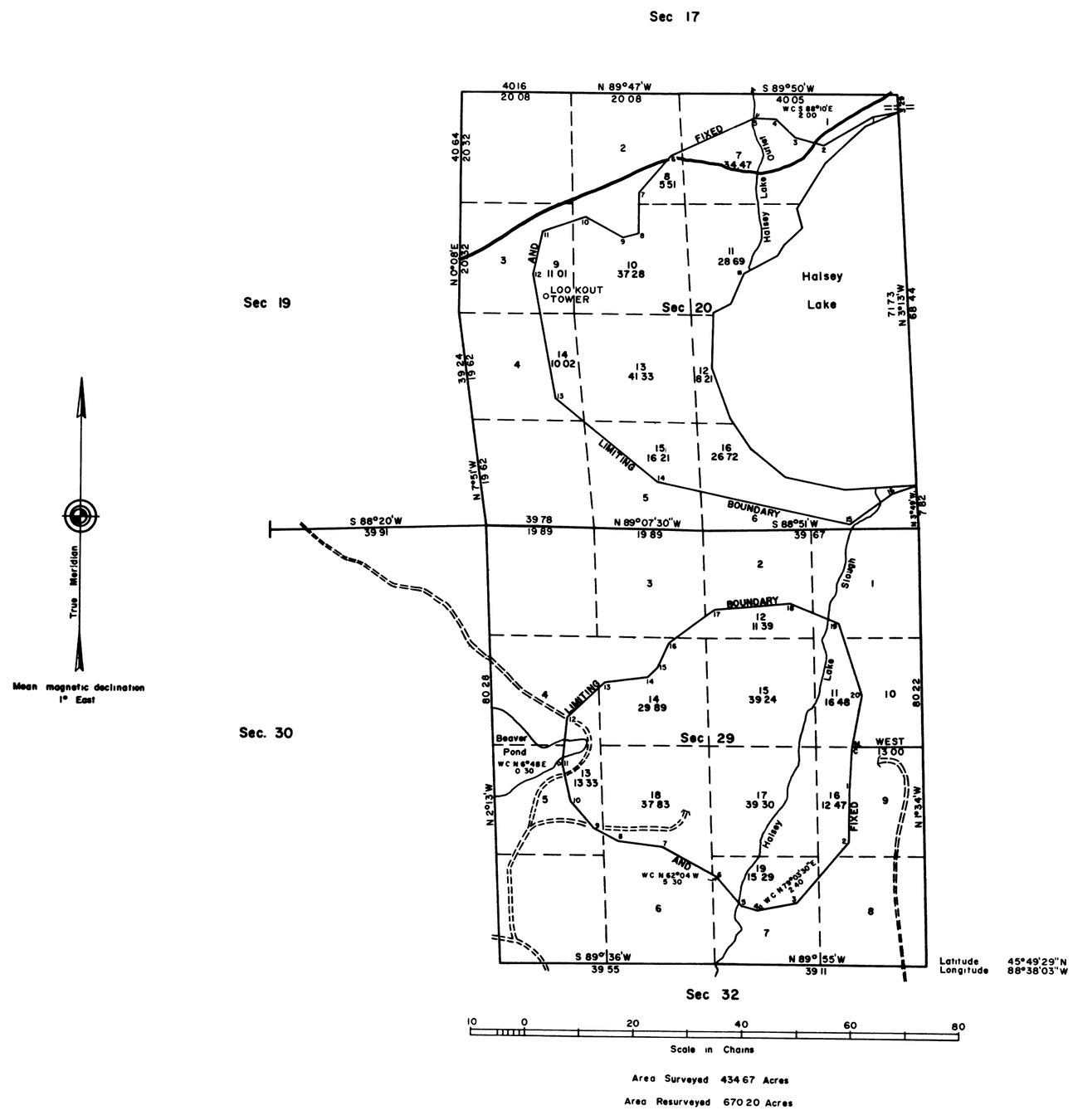


Figure 6 - Swamp and Overflowed Lands

OMITTED AND SWAMP LANDS IN HALSEY LAKE

TOWNSHIP 39 NORTH, RANGE 15 EAST, OF THE FOURTH PRINCIPAL MERIDIAN, WISCONSIN.

DEPENDENT RESURVEY AND SURVEY OF OMITTED LANDS



The history of earlier surveys is contained in the field note record.

This plat represents a retracement and reestablishment of certain subdivisional lines designed to restore the corners in their true original locations according to the best available evidence; and excepting as new or modified vacant subdivisions are shown hereon, the lottings and areas are as shown on the plat approved March 14, 1865.

The positions of the original-record meander courses in secs. 20 and 29 are shown by the irregular lines with numbered angle points. These lines as thus originally reported were grossly in error, and have therefore been marked as fixed boundaries, with the directions and lengths of the several courses adjusted to the record of the original survey.

This survey was executed by
Cadastral Surveyors, from August 16, 1971 to September 24, 1971, under Special Instructions dated May 23, 1969 and Supplemental Special Instructions dated September 1, 1971 for Group No. 91, Wisconsin.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. September 11, 1972

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

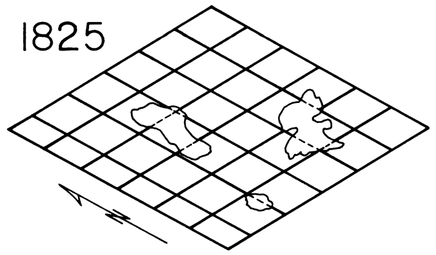
For the Director

Chief, Division of Cadastral Survey

Figure 7 - Accepted Plat

SWAMPS AND OMITTED LANDS IN MICHIGAN

T. 1 S., R. 4 W., MICHIGAN MERIDIAN

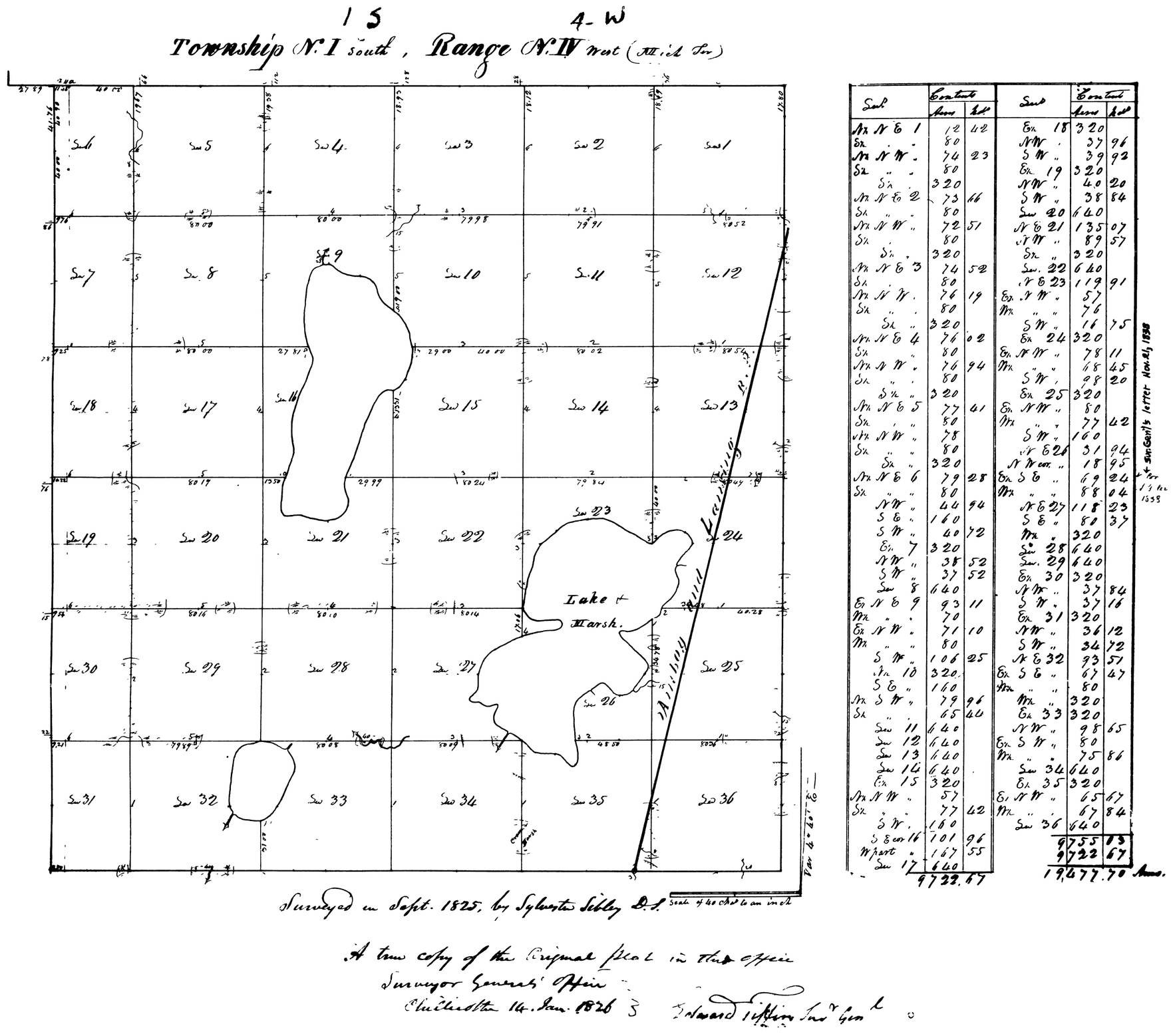


History of Surveys

1825 Sylvester Sybley surveyed the exterior boundaries and subdivisional lines of T 1 S, R 4 W, in March 1825 The plat approved January 14, 1826, is shown in figure 1

Reasons for Request of this Survey

The investigation and survey were requested by the office of Tax Equalization, Jackson County, Michigan. The Sybley plat and field notes indicate that he meandered "a large marsh having nine small ponds in it, lying in sections 23, 24, 25, 26, 27 and 35." Figure 2 is an enlarged sketch of the original survey record of the area surrounding the "marsh." Sybley's field notes indicate that he chained all lines within the swamp area, except the line between sections 23 and 26. They also indicate that he measured the lines across the lakes in sections 9, 16 and 21, and sections 32 and 33. It may be presumed that the measurements were made on the ice since Sybley's field notes do not show any offset measurements or triangulations. Meander corners were set on what he variously called the "side," "edge," or "border" of "the large marsh." The swamp was meandered in the same manner as a normal lake. The individual "ponds" or "lakes" within the swamp were not identified by Sybley. The swamp is being drained to lower the water table and some farming is being done by adjoining land owners in the area. The investigation and survey were requested to determine ownership within the area.



Sect	Contents Acres	Rds
Mx N E 1	12	42
Sx " "	80	
Mx N W "	74	23
Sx " "	80	
Sx " "	320	
Mx N E 2	73	66
Sx " "	80	
Mx N W "	72	51
Sx " "	80	
Sx " "	320	
Mx N E 3	74	52
Sx " "	80	
Mx N W "	76	19
Sx " "	80	
Sx " "	320	
Mx N E 4	76	02
Sx " "	80	
Mx N W "	76	94
Sx " "	80	
Sx " "	320	
Mx N E 5	77	41
Sx " "	80	
Mx N W "	78	
Sx " "	80	
Sx " "	320	
Mx N E 6	79	28
Sx " "	80	
N W "	44	94
S E "	160	
S W "	40	72
Ex 7	320	
N W "	38	52
S W "	37	52
Sec 8	640	
Ex N E 9	93	11
Mx " "	70	
Ex N W "	71	10
Mx " "	80	
S W "	106	25
Mx 10	320	
S E "	160	
Mx S W "	79	96
Sx " "	65	44
Sec 11	640	
Sec 12	640	
Sec 13	640	
Sec 14	640	
Ex 15	320	
Mx N W "	57	
Sx " "	77	42
S W "	160	
S E cor 16	101	96
W part "	167	55
Sec 17	640	
	9722	67

Sect	Contents Acres	Rds
Ex 18	320	
NW "	37	96
S W "	39	92
Ex 19	320	
NW "	40	20
S W "	38	84
Sec 20	640	
N E 21	135	07
N W "	89	57
Sx "	320	
Sec 22	640	
N E 23	119	91
Ex N W "	57	
Mx " "	76	
S W "	16	75
Ex 24	320	
Ex N W "	78	11
Mx " "	68	45
S W "	98	20
Ex 25	320	
Ex N W "	80	
Mx " "	77	42
S W "	160	
N E 26	31	94
N W cor "	18	95
Ex S E "	69	24
Mx " "	88	04
N E 27	118	23
S E "	80	37
Mx "	320	
Sec 28	640	
Sec 29	640	
Ex 30	320	
N W "	37	84
S W "	37	16
Ex 31	320	
N W "	36	12
S W "	34	72
N E 32	93	51
Ex S E "	67	47
Mx " "	80	
Mx " "	320	
Ex 33	320	
N W "	98	65
Ex S W "	80	
Mx " "	75	86
Sec 34	640	
Ex 35	320	
Ex N W "	65	67
Mx " "	67	84
Sec 36	640	
	9755	83
	9722	67
	19,477	70 Acres.

Surr Genl's letter Nov. 21, 1838

Figure 1 - Original 1825 Survey

(Approved by Edward Tiffin, Surveyor General)

SWAMPS AND OMITTED LANDS IN MICHIGAN

T. 1 S., R. 4 W., MICHIGAN MERIDIAN

Special Instructions

Special Instructions for Group No. 74, Michigan, prepared on May 6, 1971, provided for an investigation and conditional survey of the omitted lands in sections 23 through 27 and in section 35, T. 1 S., R. 4 W., Michigan Meridian. The surveyor was instructed to notify the office of Tax Equalization in Jackson, Michigan, the appropriate state officials and all adjoining land owners in Calhoun County, prior to the investigation, that a survey was contemplated. Also, he was to notify them of lawful rights to file claims in the event of a survey of omitted lands.

The investigation was needed to determine whether or not there was in fact a substantial area of omitted land between Sybley's original meander line and the actual mean high water line of the lakes within the area as they existed in 1825. If found to have been omitted, the land was to be surveyed and the lakes were to be meandered.

Conditions Found on the Ground

Figure 3 illustrates the general conditions existing at the time of this survey.

Very little direct evidence of the original survey remains. Some corners had been remonumented by the county surveyor in 1888 when the original corners were still evident. Other corner points were perpetuated by fences and road intersections and were locally accepted by the land owners. All of the adjoining lands have been patented. To protect existing rights and conditions, fence lines and roads were used, in combination with proportionate and record measurements, to control other corner positions, whether in latitude or longitude.

After the controlling section lines and corners were satisfactorily restored, the record meander line was retraced. The major portion of the large swamp was within the 930 foot contour and, in places, went above the 940 foot contour. Six separate lakes were within the record meanders. The swamp area contained aspen, willow, cranberry and other swamp-land vegetation. The uplands outside the record meanders contained oak, hickory and elm trees. Drainage ditches crossed the swamp lands and connected the larger lakes. Some of the swamp was being cultivated.

Preliminary Statement of the Problem

Is the land within the original meander line omitted land subject to survey as public land of the United States? This is the problem to be solved.

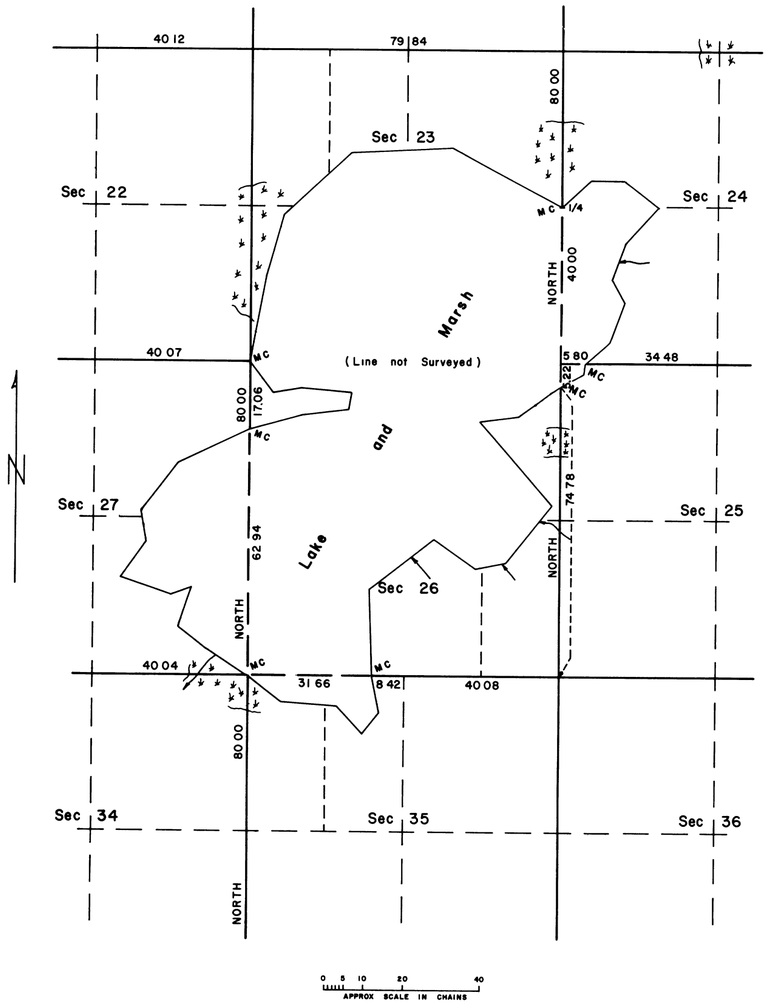


Figure 2 - Original Survey Record

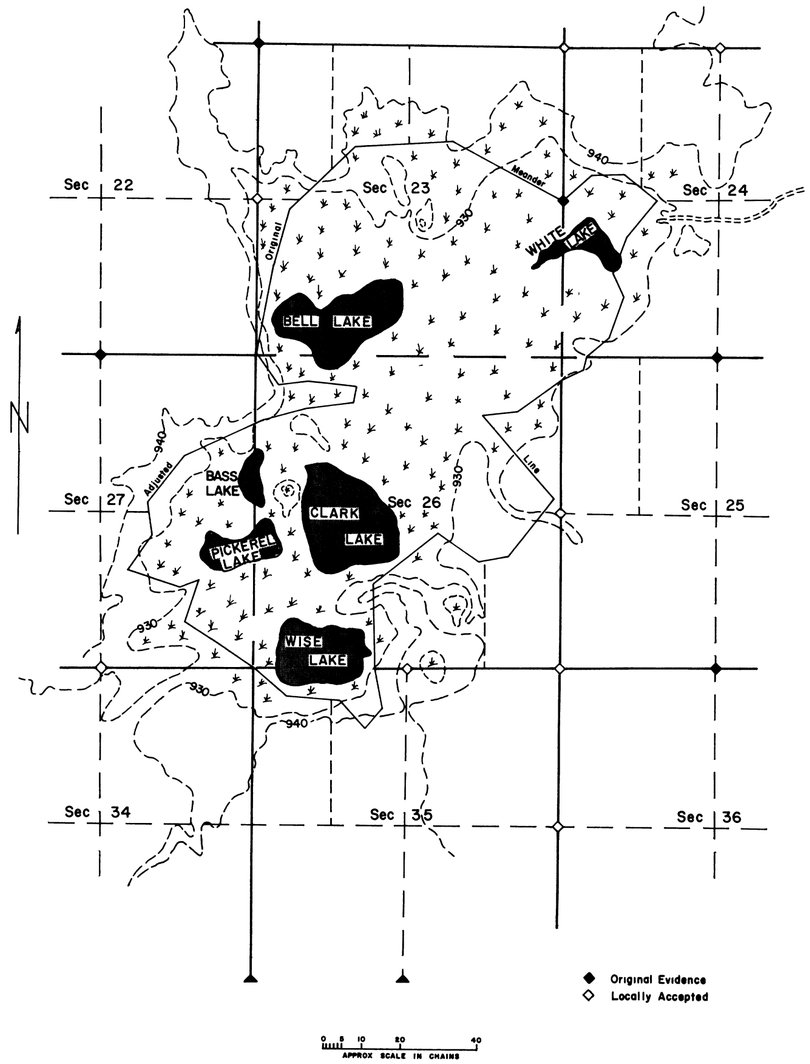


Figure 3 - Existing Conditions

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

1-13 to 1-15	Swamp and overflowed lands
3-103 to 3-110	Completion of partially surveyed sections
3-115 to 3-119, 3-121	Meandering
5-43	Angle points of non-riparian meander lines
7-77 to 7-85	Erroneously omitted areas
7-95 to 7-99	Swamp and overflowed lands

Legal Constraints

Omitted lands surveys are governed in part by regulations outlined in 43 CFR 9185.

The Swamp Lands Act of September 28, 1850 (9 Stat. 519) granted to various states then within the Union those lands that were at that time (1850) swampy and overflowed to the extent that they were unfit for cultivation. Michigan became a state in 1837. If omitted lands were found, each legal subdivision or lot was to be identified as either more or less than 50% swamp and overflowed under the intent of the Swamp Lands Act.

Determination of swamp lands is contained in 43 CFR 2625.

Final Statement of the Problem

It must be determined whether or not land within the record meander line is, in fact, public land subject to survey. If so, the extent of the omitted land must be determined as well as whether or not any of the omitted land is subject to the provisions of the 1850 Swamp Lands Act.

SWAMPS AND OMITTED LANDS IN MICHIGAN

T. 1 S., R. 4 W., MICHIGAN MERIDIAN

ORIGINAL

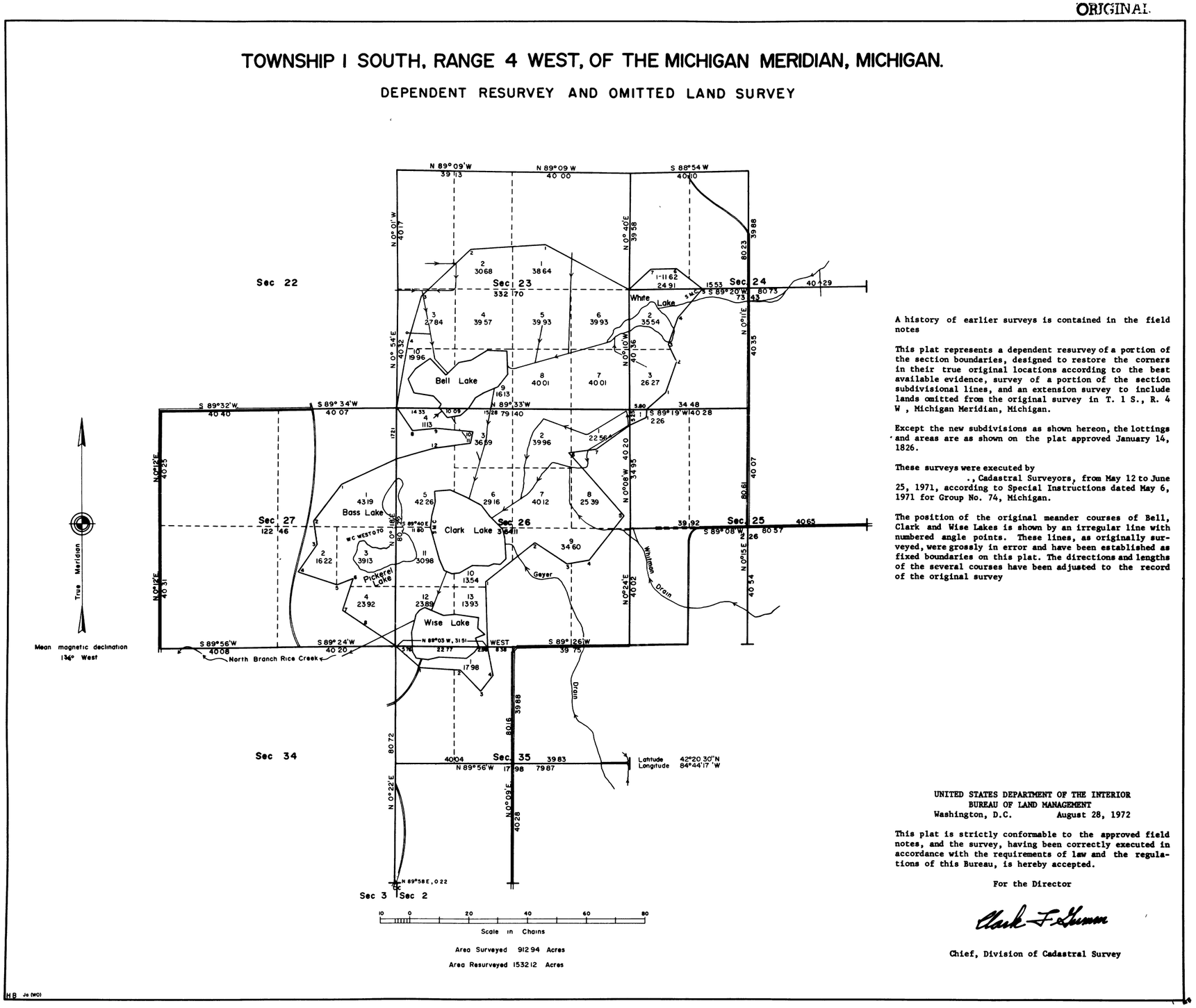


Figure 4 - Accepted Plat

meandered a swamp, which is land in place, and not a body of water. The swamp land is public land subject to survey.

The original survey of the section lines was restored and the necessary section subdivisional lines were surveyed. The section lines were then completed within the original meander lines. The closing error in the record meander courses was adjusted by the broken boundary method and each angle point was monumented, creating a fixed and limiting boundary of the previously surveyed and patented lands.

Bell Lake, Clark Lake and Wise Lake were each more than 25 acres in area. These lakes were meandered at mean high water line as they presently exist. Appropriate meander corners and special meander corners were established and monumented.

White Lake, Bass Lake and Pickerel Lake are each less than 25 acres in area and were not meandered. It was decided that the exteriors of these lakes were to be shown on the plat as items of topography only.

The swamp land boundaries were carefully determined for purposes of determining (preparing) the "swamp land list." After the lottings within the omitted land area were determined, a list was included at the end of the general description in the field notes. It stated which lots were more than 50% swamp and overflowed and which were more than 50% upland. Lots 8 and 9, section 26, were the only lots which were more than 50% upland. All the other lots were classified as swamp land and are subject to selection by and patent to the State of Michigan.

The plat and field notes were accepted on August 28, 1972. The accepted plat is illustrated in figure 4. The notice of filing of the plat of survey was published in the Federal Register on December 11, 1972. No protests were received. The plat was officially filed on January 22, 1973.

Supplementary Topic

Section 232 of the Manual of Surveying Instructions, 1947, in effect in 1971, directed that all lakes of 25 acres or more be meandered. The minimum size is now lakes of 50 acres and upward; section 3-121, 1973 Manual.

Solution

The preponderance of available evidence indicated that the swamp lands were public lands subject to survey and disposal under the public land laws, as follows:

1. Sybley meandered the approximate edge of the "marsh." Edward Tiffin was Surveyor General at the time of the original survey and his instructions do not contain any references to surveying policy in regard to swamps or marshes. The Swamp Lands Act was not passed until 26 years later so there was no reason for Sybley to have any special concern about swamp lands as such. The land was wet and unfit for normal cultivation. Settlers were not interested in such lands at that time, so Sybley surveyed it as a swamp containing lakes.

2. The area within Sybley's meanders could not have been a frozen lake. Sybley's meander line crosses above the 940 foot contour line. Had this area been a lake, the greater part of the whole township would have been covered with water.

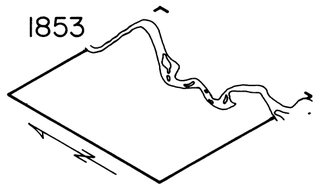
3. The oldest available maps are the Springport and Marshall quadrangles published by the U.S. Geological Survey in 1919 and 1921. These maps show the lakes and swamp substantially the same as they are now, minus the recently constructed drainage ditches. No change has occurred in the past 50 years. There is no available evidence or testimony to show that any change took place in the 94 years prior to 1919.

4. The original meander line did not traverse the borders of a body of water. No riparian rights inured to the fractional lots because the condition required for riparian rights did not exist. The "meander line" was grossly in error in that it

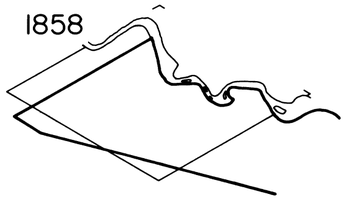
FOSTER ISLAND OMITTED LANDS

T. 23 N., R. 2 W., M. D. M.

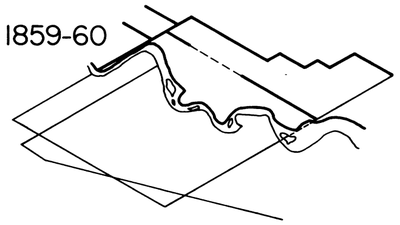
1853



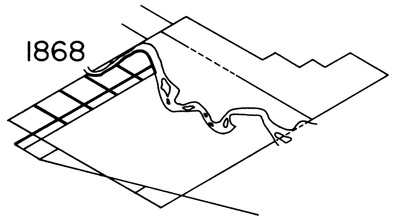
1858



1859-60



1868



History of Surveys

1853 R B Hays surveyed the north, south and west boundaries of T 23 N., R 2 W, Mt Diablo Meridian, lying west of the Sacramento River, in 1853

1858 A.W Von Schmidt surveyed the boundaries of the Capay Rancho during April and May of 1858 This Mexican Grant was described as being "situated on the western bank of the Sacramento River of the extent of five leagues from south to north and two leagues from east to west, north of the mouth of the Rio Capay" Von Schmidt began his survey of the Rancho at the junction of Capay Creek, on the right bank of the Sacramento River, and then meandered up stream along the right bank of the river At the end of many of his meander courses Von Schmidt marked trees A portion of the plat of the Capay Rancho is shown in figure 1

1859-1860 A.W Von Schmidt surveyed the boundaries of the Bosquejo Rancho and part of the Rancho Rio de los Molinos in 1859-1860 Von Schmidt began his survey at the mouth of Deer Creek on the left (easterly) bank of the Sacramento River and meandered the left bank downstream, again marking trees at the end of many of his meander courses Von Schmidt's field notes call for an island "near the left bank" on the 48th and 49th courses of his meanders This island, as well as a larger island, is shown on the official plat of the Bosquejo Rancho, approved January 21, 1861, illustrated by figure 2

1868 William Magee surveyed portions of T 23 N, R 2 W, lying north of the Capay Rancho and west of the Sacramento River as shown on the plat approved February 8, 1869 The Magee plat, illustrated by figure 3, shows two islands in the river approximately in sections 11 and 14 and in approximately the same position as shown in figure 2

1881 The next known record is a map filed in the Butte County records on May 24, 1881 This "subdivision map of a portion of the Gerke Rancho" is shown in figure 4 Gerke's Island, containing 150 acres, is shown on this map

1896 A map of the "Subdivison of the Ashurst Tract" was filed in the records of Tehama County This map, illustrated by figure 5, shows a somewhat larger island in the river with a smaller, detached parcel surrounded by channels of the "Gazelle Chute"

1917-1923 The U S Engineers mapped the Sacramento River area from Chico Landing to Red Bluff A portion of the U S Engineers' map is shown in figure 6 This map shows two islands, "Gazelle Island" and "Foster Island," divided by a narrow high-water channel The islands are shown as separated from the mainland by a channel of the river but the map does not show the small detached parcel indicated in figure 5 This map also shows fences on both islands and a building on "Foster Island"

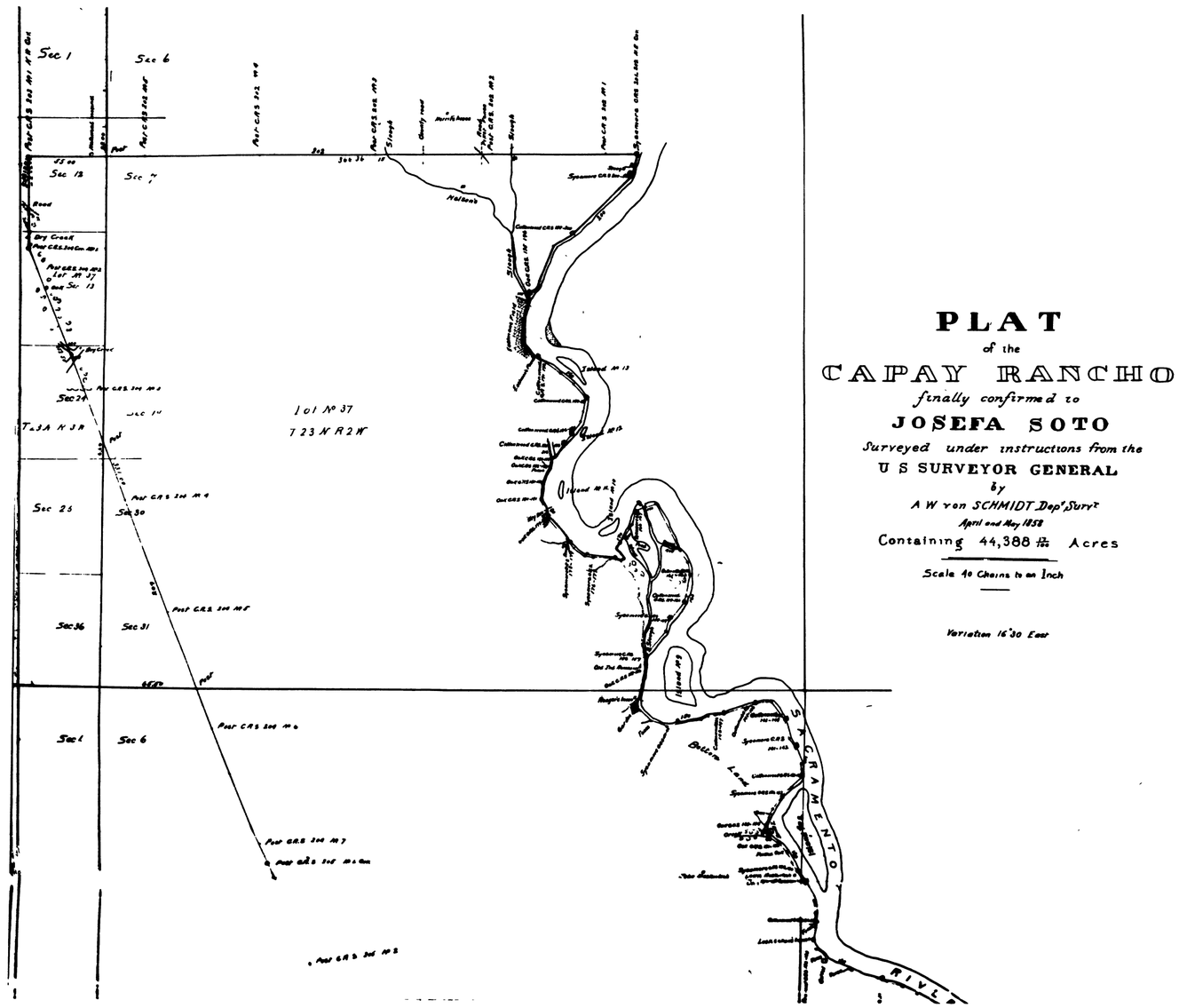


Figure 1 - Northern Portion of Capay Rancho, 1858

FOSTER ISLAND OMITTED LANDS

T. 23 N., R. 2 W., M. D. M.

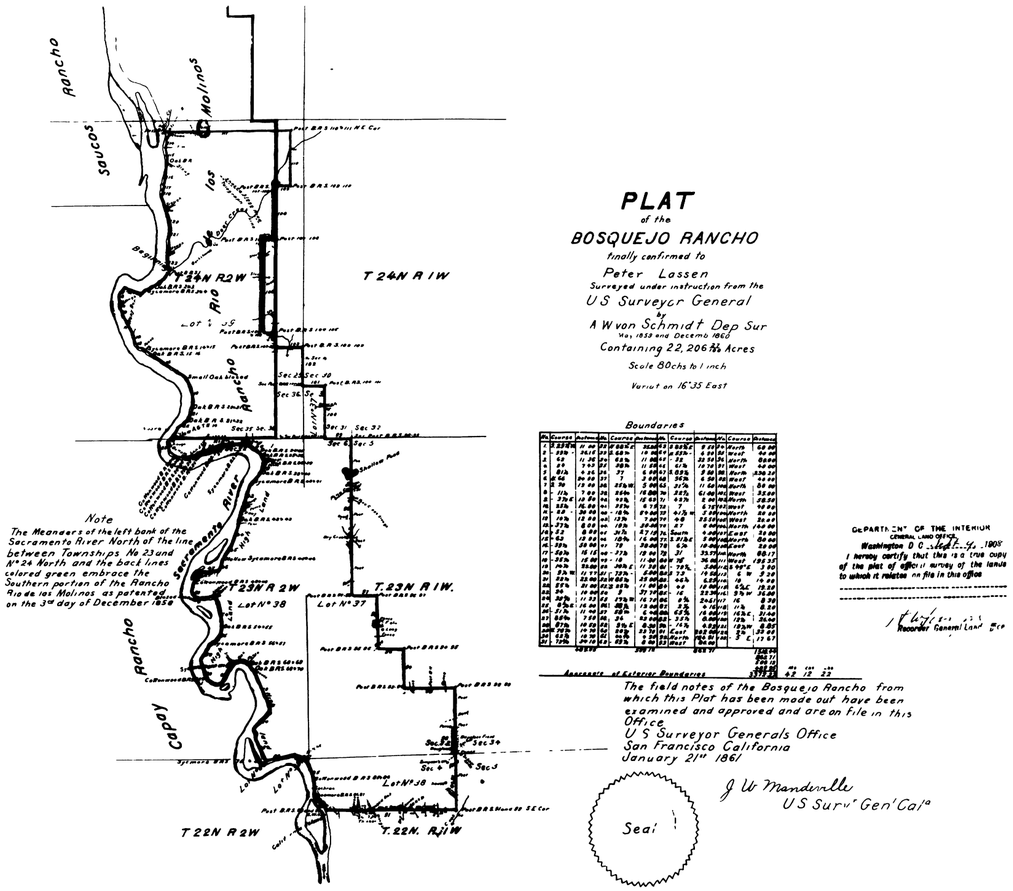


Figure 2 - Bosquejo Rancho, 1859-1860

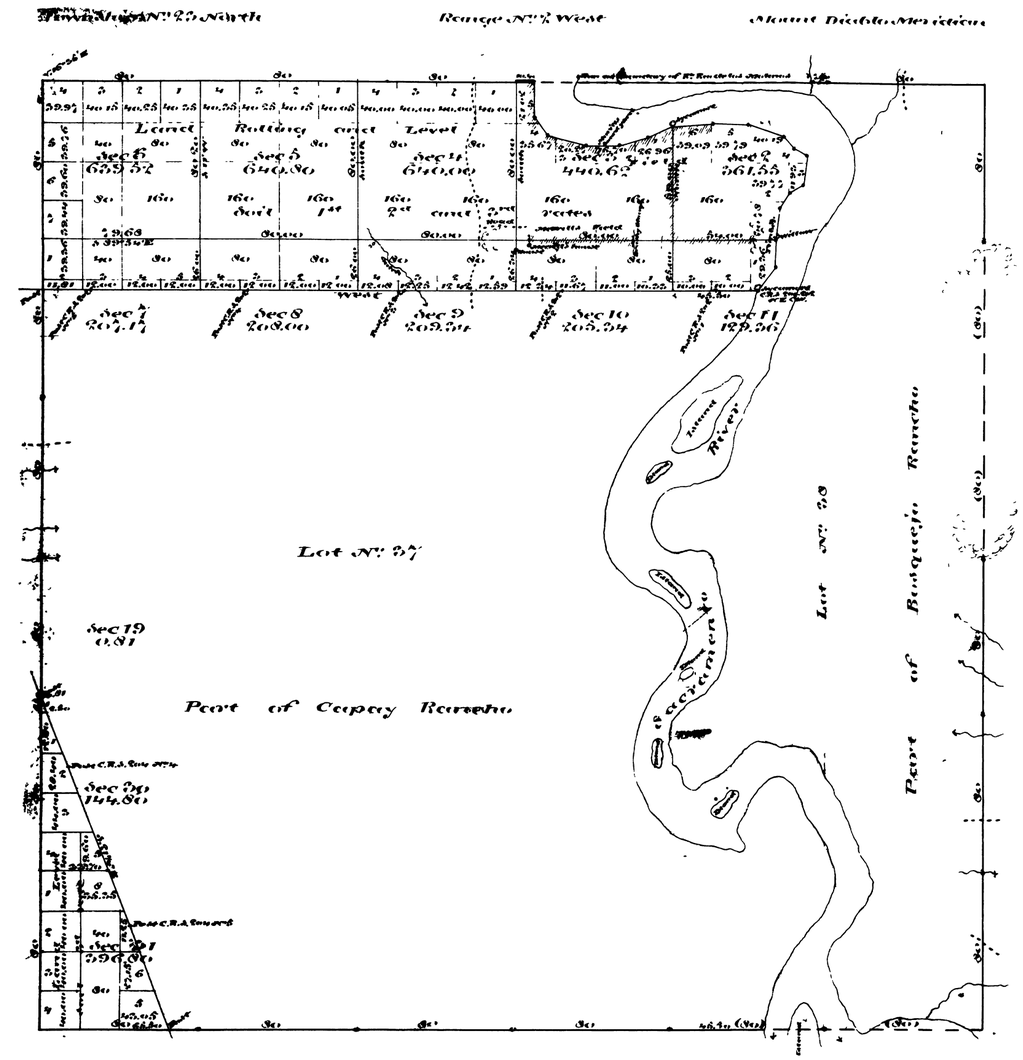


Figure 3 - 1868 Magee Survey of T. 23 N., R. 2 W., M. D. M.

Reasons for Request of this Survey

In September 1949 Thomas W. and Sylvia Lee Laird served notice on the adjacent land owners and the State of California that they (the Lairds) intended to apply for the survey of the Foster Islands, under regulations outlined in 43 CFR 9185.2-2. This notice must be given at least 30 days prior to making an application to the Land Office for the survey of an island omitted from the original survey, as outlined in 43 CFR 9185.1-1(b).

The Lairds never filed the application for survey as required by the regulations.

After several subsequent transactions, the Upper and Lower Foster Island came into the possession of Jacob A. Dykstra, in 1960. The only access to the Islands was across the adjacent lands of the Capay Rancho, owned by the Windswept Ranch Company.

In 1965 Mr. O.N. Burroughs (of the Windswept Ranch) sought a title report on the Foster Islands. The title report on the islands revealed an imperfect title to the islands originating in 1921 and not traceable to any Spanish, Mexican or United States government grant.

Mr. Burroughs had requested an opinion of title from an attorney whose report concluded that the islands belonged to the United States and were unsurveyed islands in existence at the date of Statehood, September 9, 1850. The attorney's report cites two court cases, Scott vs. Lattig 277 U.S. 229, 57 L.Ed. 490, and U.S. vs. Chandler-Dunbar, 209 U.S. 447. The opinion was that these islands were in the same category as those in the Scott vs. Lattig case-omitted islands which were in existence on the date of statehood and which were in a navigable river.

The Tax Assessor of Tehama County reported to the California State Lands Commission in May 1966 that his records showed the Foster Islands as owned by the State. In their reply to the Assessor, the Commission denies any interest contrary to the rights of Dykstra, except ownership of the natural channels of the river, and swamp and overflowed lands (if any) under the Act of September 28, 1850.

On August 10, 1966 Jacob A. Dykstra filed a Color of Title application in the Sacramento Land Office for Upper Foster Island and Lower Foster Island, both situated in the Sacramento River. The application was made in accordance with the regulations in 43 CFR subparts 2540 and 2541, under class 1. Mr. Dykstra subsequently sold his possessive rights to the Windswept Ranch Co., owner of the adjacent Capay Rancho.

On September 21, 1966, the Chief of the Lands Adjudication section of the Land Office requested that the Division of Engineering make an investigation to determine if the islands were in fact lands omitted from the original survey. It was at this point that the Branch of Cadastral Survey became officially involved in the case. Cadastral Survey obtained the latest (1964) aerial photography from the Corps of Engineers, figure 7. The maps shown in figures 4, 5 and 6 were also obtained.

Meanwhile, the islands were visited in August 1967 and, with the aid of the aerial photographs and U.S. Geological Survey map, Foster Island, 1950, the examination was made of the soil, timber cover and river channels.

Upper and Lower Foster Islands were found to be separated by a narrow silted channel which apparently flows slowly and at high water only. The main channel of the river lies to the east of the island. The island is separated from the "mainland" on the westerly side by an old deep-water channel which now flows only during periods of high water, though it contains some water during periods of low water. An older channel, now nearly filled, cuts across a portion of the northwesterly side of the upper portion of the island.

The soil is a sandy loam of alluvial origin. The elevation varies from 160 to 175 feet above sea level, the same as the adjoining lands on the mainland in the Capay Rancho. The river level is about 150 feet above the sea level during normal water level periods.

FOSTER ISLAND OMITTED LANDS

T. 23 N., R. 2 W., M. D. M.

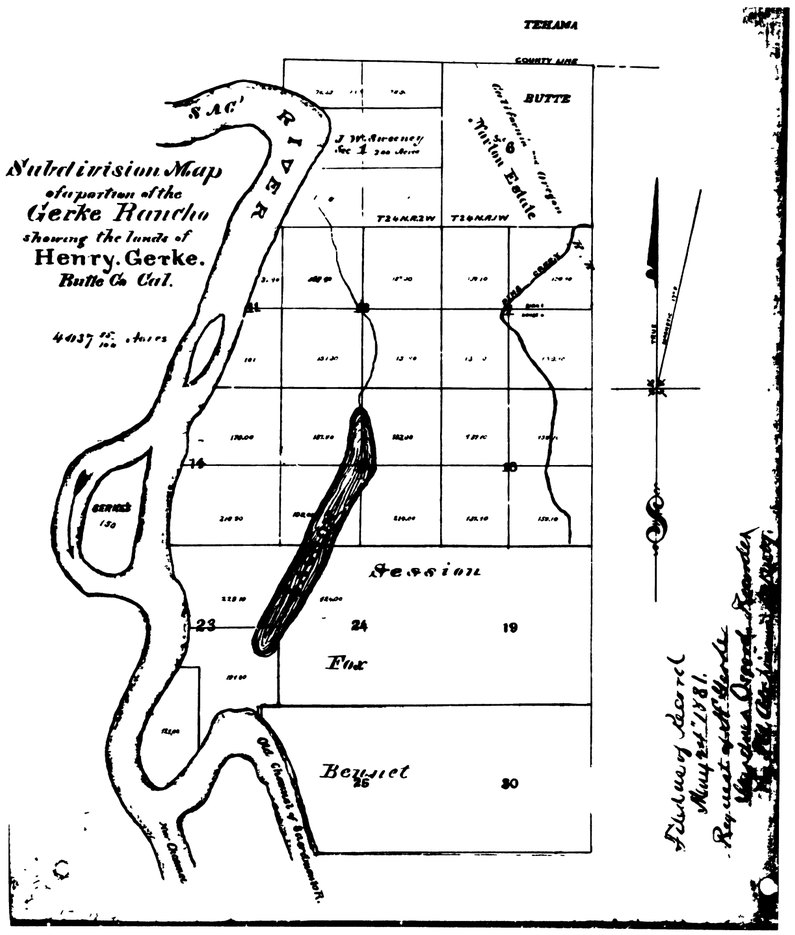


Figure 4 - Gerke Rancho, 1881

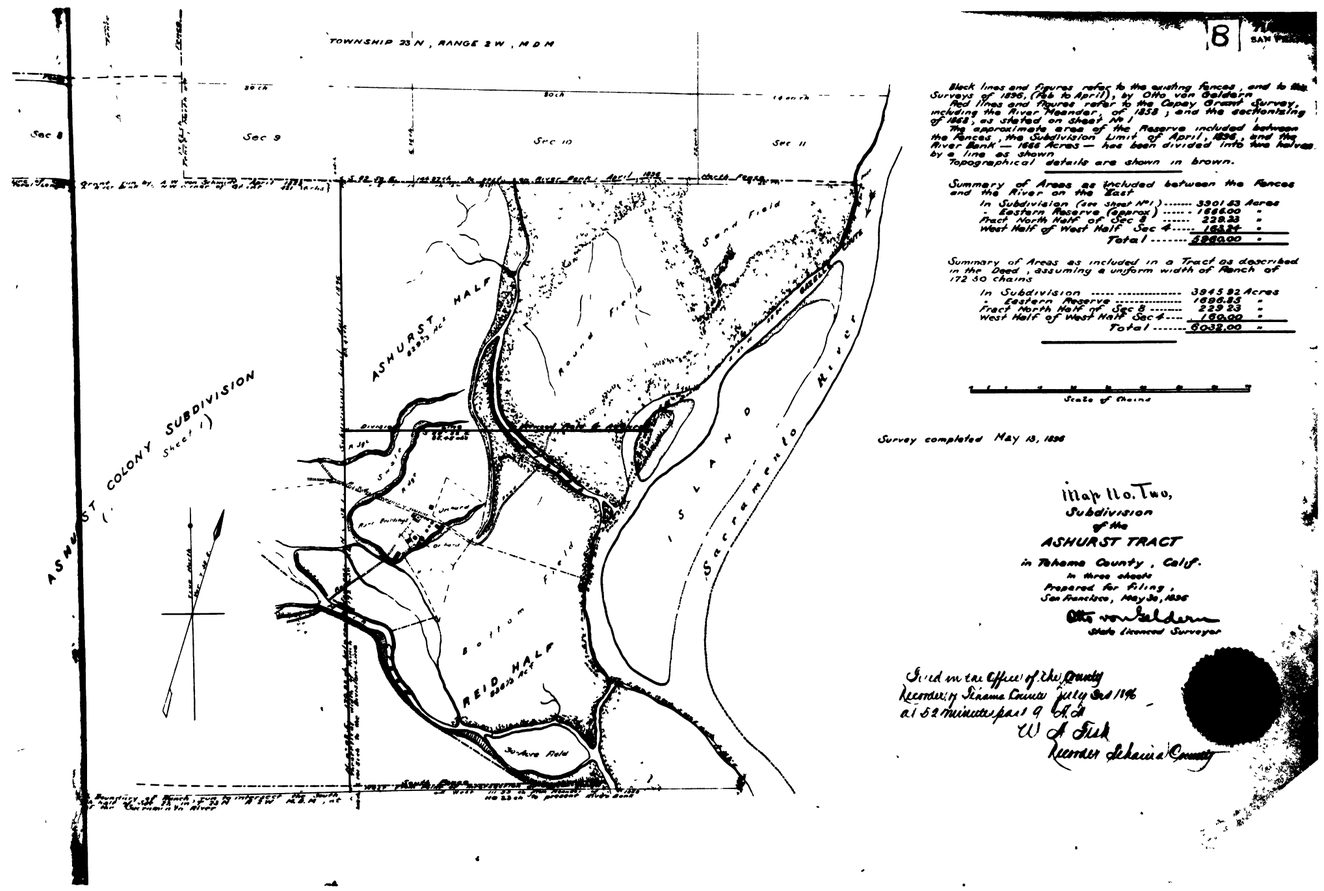


Figure 5 - Map No. 2 of the Ashurst Tract

About half of the island has been cleared for farming. The remainder is covered with trees and brush. An increment borer was used to determine the ages of 6 trees-five oaks and a sycamore. The locations of these trees are shown by the number on the aerial photo, figure 7. No. 1 is a Black Oak, 56 inches in diameter, 120 years of age; No. 2 is a Black Oak, 54 inches in diameter, 206 years; No. 3, a Black Oak, 48 inches in diameter, 138 years; No. 4, a Black Oak, 50 inches in diameter, 85 years; No. 5, a Black Oak, 80 inches in diameter, 180 years; No. 6, a Sycamore, 60 inches in diameter, 150 years of age.

It was also found that during periods when the river is very high, usually during the winter and spring months, a large portion of the island becomes inundated and is completely isolated from the mainland by the high-water channel along the westerly side.

A complete report of these findings was made to the Land Office, with an opinion that Foster Island was an island in place at the date of statehood and was public land subject to survey.

Special Instructions

Special Instructions for Group 549, California, were prepared on October 24, 1967. They provided for the survey of the island. The rectangular surveys were to be extended from the nearest identified corner of the Magee survey to a theoretical corner of sections 10, 11, 14 and 15, and then onto the island where meander corners were to be established and the island meandered.

Notification that the Government intended to survey the island was sent by certified mail to all adjacent land owners on both sides of the river. The Attorney General of California and the Secretary of State, as well as the California State Land Commission were also notified. The State Land Commission protested on the grounds that the island was not in existence in 1850 and that even if it was in existence, no boundary line could be determined unilaterally by the Federal Government because agreement by the State should be required. There were no other protests.

Conditions Found on the Ground

Figure 8 is a portion of U.S. Geological Survey map, Foster Island (California, 1950), with the Von Schmidt meanders of 1858 protracted from meander point 192-193 to 201-202 and the north boundary of the Capay Rancho westerly. The Von Schmidt field notes for these segments of his survey follow:

Copy Of

FIELD-NOTES OF THE FINAL SURVEY

Of the "CAPAY RANCHO"

Confirmed to Josefa Soto

Made under instructions from the U S Surveyor-General of the State of California, dated March 25, 1858, by A W Von Schmidt, U S Deputy Surveyor.

Survey Commenced,

April 29, 1858

				Beginning at a point on the left bank of "Capay" creek, at its junction with the Sacramento river, I set a post 20 links east, from the left bank of "Canay creek", and 30 links north from the right bank of the Sacramento river marked "C R S.E Cor No. 1", from which a cottonwood tree 18 inches diameter, bears south 37¾° W, 40 links distant
				A cottonwood tree, 20 inches diameter, bears north 29½° E, 65 links distant.
				A willow tree 24 inches diameter bears north 76° E, 100 links distant. Marked each tree "B T C R S E" Cor "Capay Creek", near this point runs south and is 9 chains wide at its mouth
				Thence, I meandered up the right bank of the Sacramento river as follows, the variation of the Magnetic Needle, being 16° 30' E, ...
			12 25	To an oak tree 22 inches diameter, marked "C R S 180, 181"
181	N	5½ W	9 50	To an oak tree 36 inches diameter, marked "C R S 181, 182"
182	N	28½ E	10 00	Opposite upper end of small island (No 11) near the left bank which extends down about 10 chains
			12 90	Cross Eastman's lower fence, course northwest
			13 53	To an oak tree 27 inches diameter, marked 'C R S 182, 183"
183	N	7¾ E	6 40	To a large oak tree 44 inches diameter, marked "C.R S. 183, 184", stands on bank of slough, course south 6° east
184	N	50¾ E	3 16	Across same slough
185	N	30¾ E	9 63	To a large cottonwood tree 30 inches diameter, marked "C R S 185, 186"
				2 notches underneath on both sides.
186	N	38½ E	8 80	To a cottonwood 20 inches diameter, marked "C R S 186, 187"
187	N	36½ E	3 50	Opposite lower end of small Island No 12, distant 3 chains
			10 00	Opposite upper end of same Island
			11 00	
188	N	11¾ E	16 28	To a cottonwood tree 20 inches diameter, marked "C R S 188, 189 2 notches underneath both sides
189	N.	35½ W	9.00	Opposite lower end of Island No. 13 on the side of main channel.
			13.87	Station
190	N.	48½ W.	14.00	
191	N.	56½ W.	8.00	Pass upper end of Island No. 13.
			17.80	To a cottonwood tree 12 inches diameter, marked "C.R.S. 191, 192.

FOSTER ISLAND OMITTED LANDS

T. 23 N., R. 2 W., M. D. M.

192	N. 78	W	2.15	Cross Mr. Eastman's fence, bears south 40 west. Enter field.
			3.70	
193	N. 39¾	W.	10 00	
194	N. 2¼	W.	16.00	
195	N. 13¾	E	15.00	Leave field, bears off northwest to slough 1 chain wide, course south by east.
			19.00	To an oak tree 43 inches diameter, marked "C.R S 195, 196".
196	N. 41¼	E.	7.00	
197	N 27	E.	5 00	
198	N 21	E.	26.00	
199	N. 58¾	E	15.00	To a large cottonwood tree 45 inches diameter, marked "C.R.S. 199, 200.
200	N. 45	E.	56.80	To a sycamore tree 18 inches diameter, marked "C.R.S. 200, 201".
201	N. 16½	E	3 00	To a slough 50 links wide, course east.
			9.30	To slough 25 links wide, course east.
			16.80	To a sycamore tree 18 inches diameter, marked for the northeast corner of the Capay Rancho, "C R.S. 201, 202", "C.R N.E. Cor". Thence - Variation 16° 30' east Leaving the river bank, I ran.-
202	West		21.36	Set post marked, "C.R.S. 202, No. 1".
			86.66	Cross slough 30 links wide, course south.
			101.36	Set post marked "C.R.S. 202, No. 2". Leave underbrush.

Thorough search was made for a corner of Magee's survey of the section lines lying north of the Capay Rancho boundary. The corner of sections 4, 5, 8 and 9 was found, determined at the intersection of wire fences extending east, west and south with a bladed road bearing North and South along the east side of the fence. This road is shown on the U.S. Geological Survey map. The corner of sections 2, 3, 10 and 11 was temporarily reestablished by two point control, at record distance in departure, 160.00 chains East of the corner of sections 4, 5, 8 and 9, and record distance in latitude, 25.00 chains, north of the north boundary of the Capay Rancho.

During the search for evidence of the Von Schmidt meanders, only the vicinity of his meander point 195-196 was found. The original oak tree has been destroyed by farming, but fences reflecting the position formed an angle at this location. The point was in accord with the original call of the slough, 1 chain wide, 4 chains, S. 13 3/4° W., as described in the Von Schmidt field notes. A retracement of the record meanders revealed that Von Schmidt had meandered the old abandoned channel along the northwesterly side of the island outlined during the investigation. The parcel of land lying northwesterly of the abandoned channel and the present high water channel was carefully examined and found to be of the same nature and vegetation as the adjacent "mainland." This evidence, together with the "Ashurst Tract" map (figure 5), indicated that the Sacramento River had made an avulsive cut around the parcel between 1881 and 1896. The parcel was not attached to Foster Island through accretion.

Preliminary Statement of the Problem

In order to begin the survey, the extension of a control line from the rectangular system to the island was required. It was also necessary to meander the island so that its area might be shown.

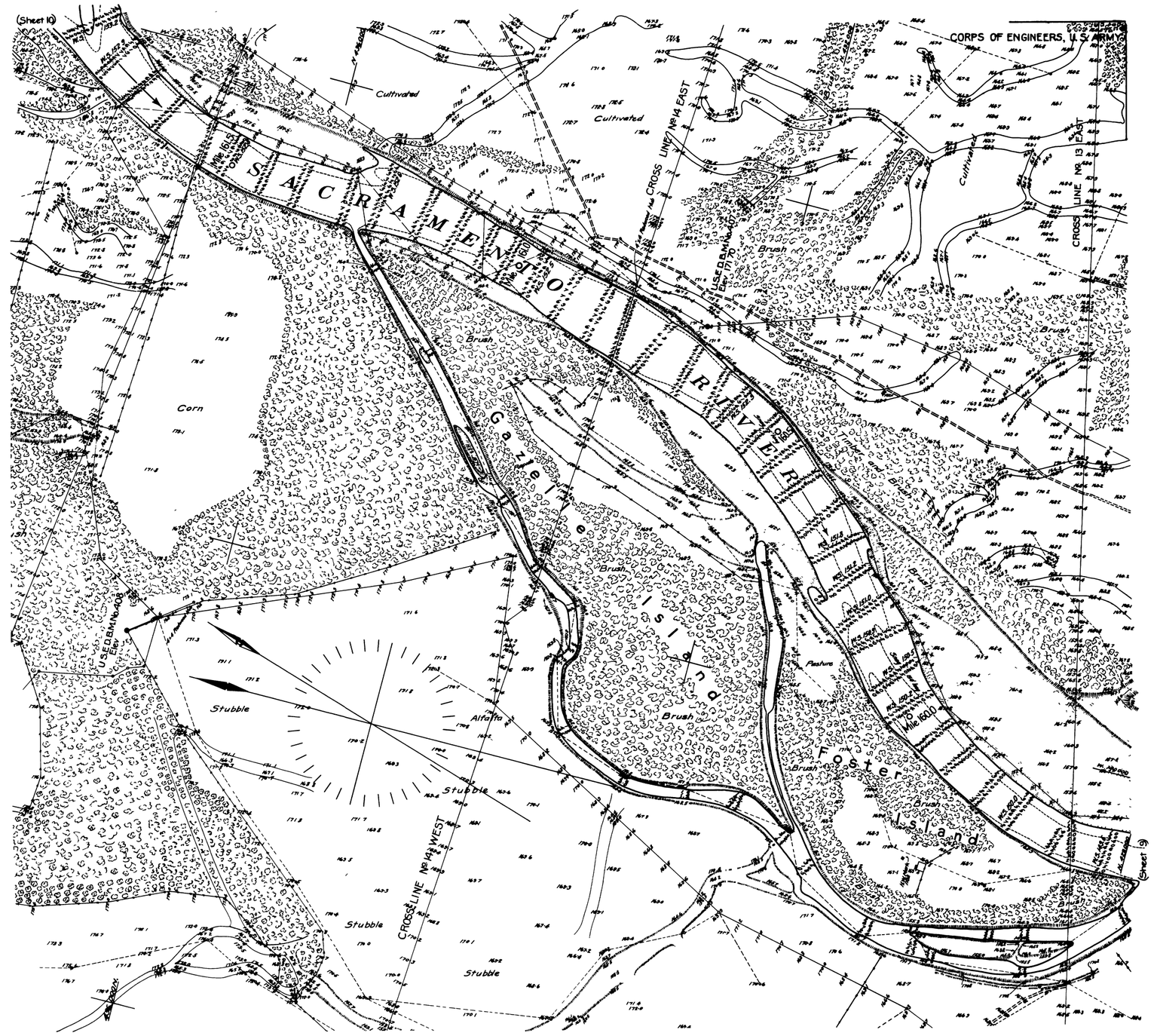
Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

3-115 to 3-120	Meandering and Rivers
3-122	Islands
7-47 to 7-50	Navigability
7-71 to 7-76	Avulsion
7-95 to 7-99	Swamp and overflowed lands

Final Statement of the Problem

The surveyor is required to meander the island without conflict with the previously established Grant boundaries. He must then extend the rectangular system across the included area.



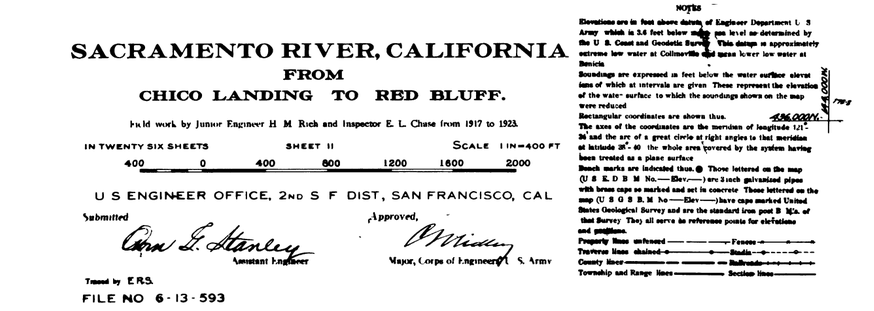
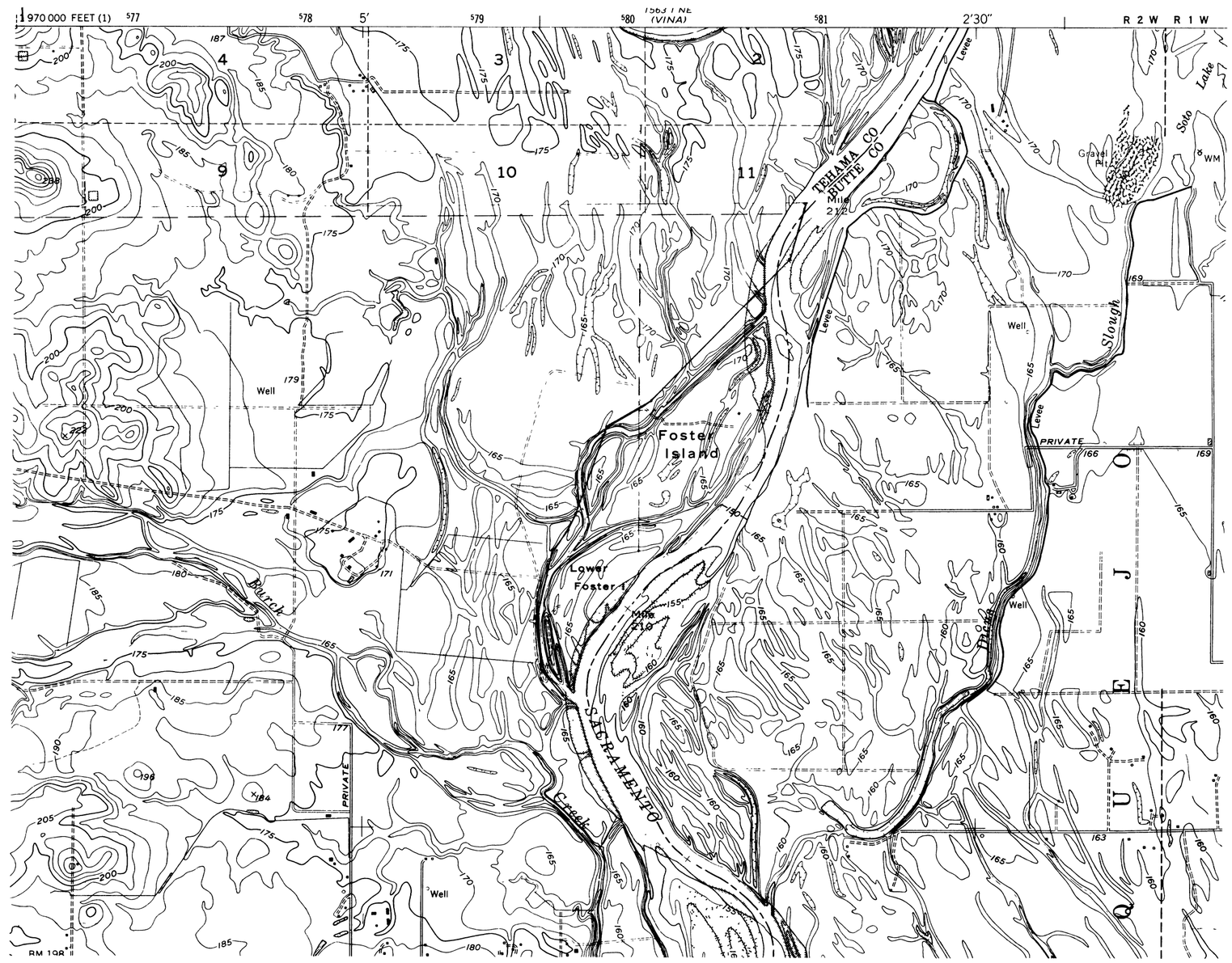


Figure 6 - Portion of U. S. Engineers' Map, 1923

FOSTER ISLAND OMITTED LANDS

T. 23 N., R. 2 W., M. D. M.

Figure 7 - Aerial Photomosaic



ROAD CLASSIFICATION

Medium duty — Light duty

Unimproved dirt

QUADRANGLE LOCATION

FOSTER ISLAND, CALIF.
SE/4 CORNING 15' QUADRANGLE
N3945—W12200/7 5

1950
PHOTOREVISED 1969
AMS 1563 I SE—SERIES V895

Figure 8 - Portion of Foster Island Quad, USGS

FOSTER ISLAND OMITTED LANDS

T. 23 N., R. 2 W., M. D. M.

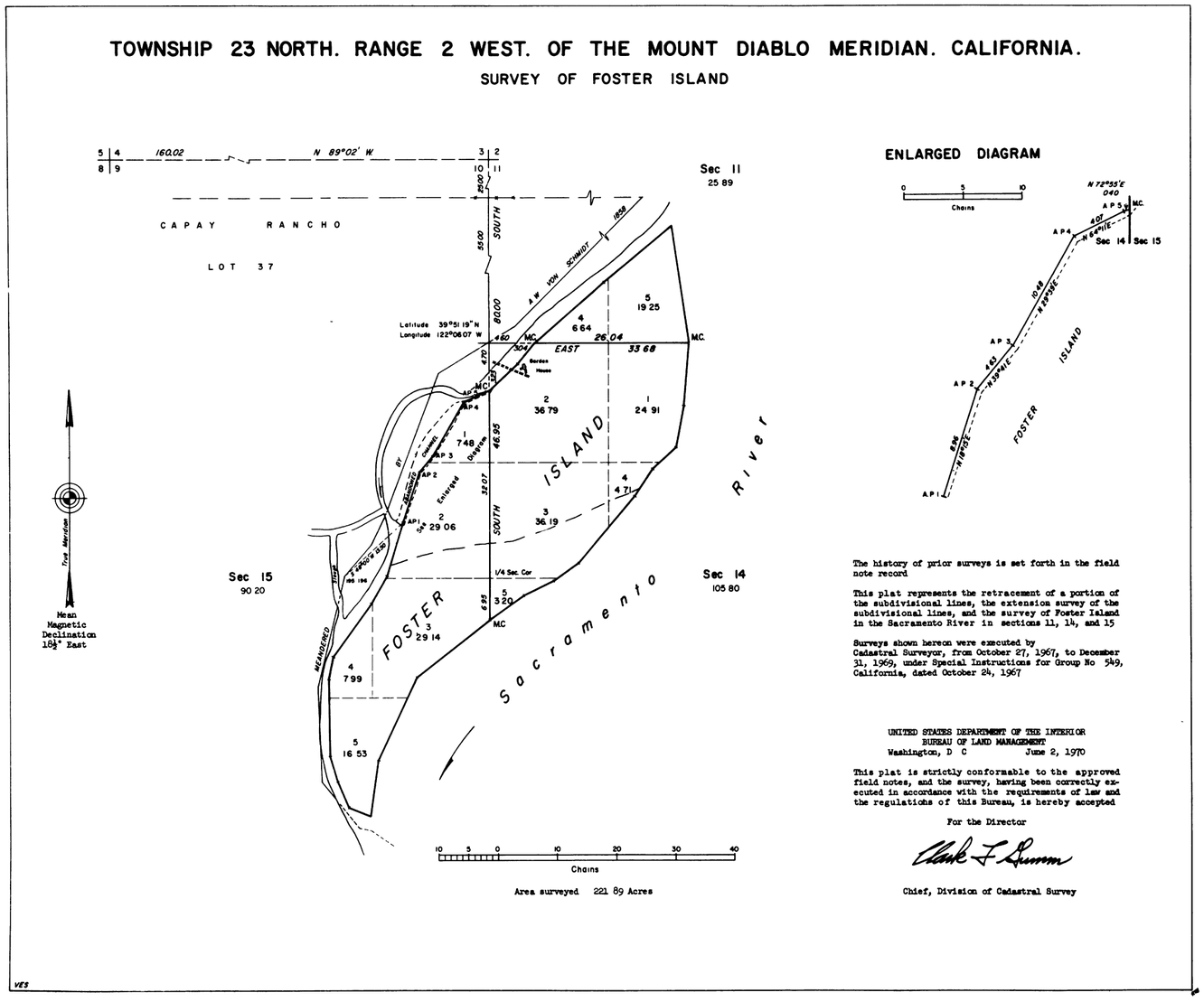


Figure 9 - Accepted Plat

Solution

From the point for the corner of sections 2, 3, 10 and 11 the line between sections 10 and 11 was extended on record bearing, south, 80.00 chains to a theoretical corner of sections 10, 11, 14 and 15 in the Capay Rancho. The line was then continued due South between sections 14 and 15 across the river channel meandered by Von Schmidt. A meander corner of sections 14 and 15 was established on the left bank of the old channel, at 7.93 chains. At 40.00 chains the ¼ section corner of sections 14 and 15 was established. At 46.95 chains the line intersected the right bank of the main channel of the Sacramento River, where a meander corner was established.

From the point for the corner of sections 10, 11, 14 and 15, the line between sections 11 and 14 was surveyed due East. A meander corner was established at 7.64 chains on the left bank of the old channel and another meander corner was established on the right bank of the river, at 33.68 chains.

The head of the abandoned river channel was found to be at the meander corner on the left bank of the abandoned channel between sections 14 and 15. This abandoned channel was nearly filled in, but a definite low point or thread of the channel could be seen along a sharply defined bank on the southeasterly side of the channel and northwesterly side of the island. This abandoned channel reentered the present high-water channel about 28 chains downstream.

The meanders of the island were begun at the meander corner of sections 11 and 14 on the right bank of the Sacramento River and proceeded downstream. The old high-water channel which had created "Upper and Lower" Foster Islands was noted. The south end of the island was reached at the end of the third course in section 15. The meanders were then continued upstream along the left bank of the high-water channel. The old island-dividing channel was again noted. At the end of the 11th course, in section 15, the meander line intersected the thread (thalweg) of the abandoned, relicted channel that had been originally meandered in 1858. At this point Angle Point No. 1 was established and monumented. A direct tie was made from AP 1 to the Von Schmidt meander point 195-196. From AP 1, a traverse was surveyed up the dry thalweg of the abandoned channel, creating a fixed boundary along the portion of Foster Island. Five Angle Points were established and the fixed boundary terminated at the meander corner of sections 14 and 15 which was at the head of the abandoned, dry channel.

The meanders of the left bank of the high water channel were continued through sections 14 and 11 to the northerly end of Foster Island, then down the right bank of the river terminating at the meander corner of sections 11 and 14.

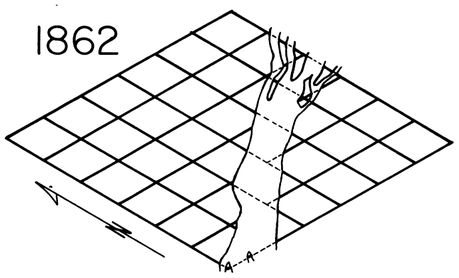
Fractional lots were protracted on the plat of the island in the normal rectangular manner. Each lot was then examined to determine its status under the Act of September 28, 1850, Swamp and Overflowed Lands. (Under this Act if more than 50% of any legal subdivision or fractional lot is classified as being swamp or overflowed lands unfit for cultivation, that part of the section is granted to the State of California.) None of the lots on Foster Island met this requirement so all were public lands subject to other disposal.

Before completion of the field work the California State Lands Commission withdrew its formal protest of the survey, but requested the right to review the completed work.

The written field notes and prepared plat were submitted to Washington for acceptance. The plat was accepted on June 2, 1970 and is shown in figure 9.

OMITTED ISLAND IN NON-NAVIGABLE PLATTE RIVER

T. 13 N., R. 6 W., 6TH PRINCIPAL MERIDIAN



History of Surveys

1862 McCarthy and McCracken surveyed the subdivisional lines of T 13 N, R 6 W, in October of 1862, as shown on the plat approved March 26, 1863 See figure 1

Reasons for Request of this Survey

On April 25, 1934, Emery Land applied for the survey of an island in the Platte River. The island was situated between Island No. 2 and Parker's Island in section 14. The applicant submitted evidence that the island was in existence at the date of original surveys in 1862 and at all times since. He also submitted proof that notice of his application had been served on adjoining land owners and the proper state officials. The Land Office records indicate that all of the adjoining islands and uplands have been patented. The earliest date of entry was for lands in sections 14 and 23, dated 1864 and 1867. Parker's Island was patented in 1870.

Special Instructions

Special Instructions for Group 84, Nebraska, were prepared on August 20, 1935. They provided for the examination and conditional survey of any unsurveyed islands situated in the Platte River in sections 13, 14 and 23. A sketch indicating the existence of other unsurveyed islands had been submitted with the application. It was enclosed with the Special Instructions.

The examination to be made was to determine if separate and distinct islands existed as dry land in place above the mean high water level of the Platte River in 1864 when adjoining surveyed lands were first entered upon. If such islands were found to be in existence in 1864 they were to be surveyed as public lands in a non-navigable stream. Any lateral accretions to the island(s) since 1864 would also be surveyed.

Attached to the instructions was an affidavit signed by one Frank Foster. Foster stated that he had known the islands for more than 50 years and that they were separate and distinct islands and not accretions to the mainland.

Figure 2 is an enlargement of the original survey plat of the area involved in the assignment. The corner of sections 14, 15, 22 and 23 was established in 1862 by direct chaining across the then nearly dry river bed. The point for this corner is now under water. No original ties were made from the corner point along the lines between sections 14 and 23 or between sections 15 and 22.

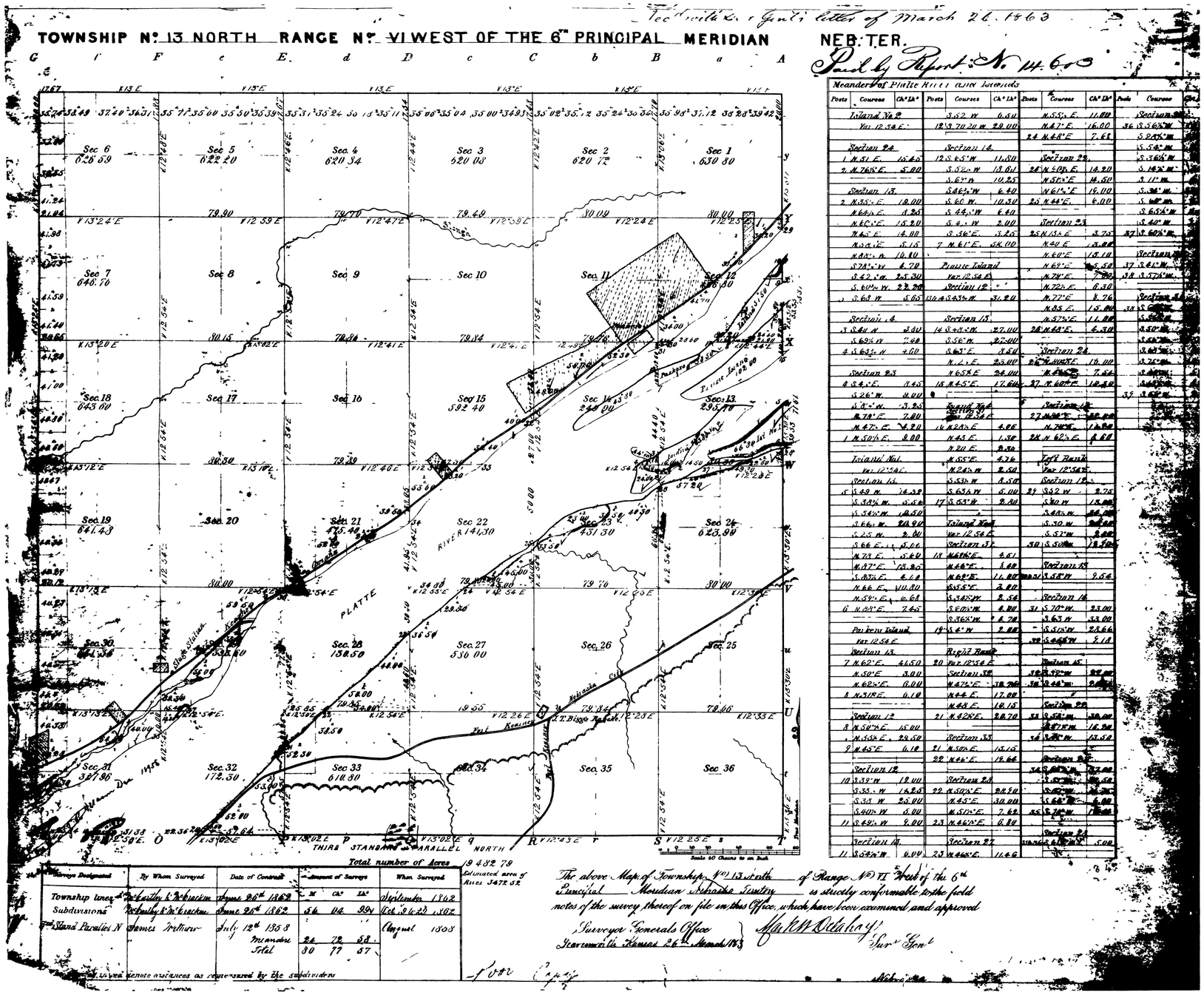


Figure 1 - Original 1862 Survey

OMITTED ISLAND IN NON-NAVIGABLE PLATTE RIVER

T. 13 N., R. 6 W., 6TH PRINCIPAL MERIDIAN

Conditions Found on the Ground

Figure 3 illustrates the situation found during the investigation and the identified corners of the original survey.

The islands numbered 5, 6 and 7 were found to be from 4 to 8 feet in elevation above the mean high water level of the Platte River in 1864, and at the present time. The old portion of these islands contained stumps of trees (described in the original field notes as Red Cedar) from 24 to 34 inches in diameter, as well as stumps of completely decayed Cottonwood trees. The cedar stumps were decayed and appeared to have been cut about 1875-1880. These Cedar trees grow slowly and would require more than 200 years to reach a diameter of 24 to 34 inches. Similar stumps were found on all three islands, so it was concluded that the islands were land in place above mean high water in 1864.

Two local residents verified this evidence stating that they had known the islands for more than 50 years and that the islands were land in place during all that period of time.

The river had formed accretion to the surveyed islands, the unsurveyed islands and to the banks of the river. Some smaller islands had formed in the bed of the river channel. The apparent age of these accretions was up to about 35 years as indicated by the condition of the Cottonwoods and underbrush.

None of the areas of the unsurveyed islands downstream from the Union Pacific Railroad right-of-way were over 35 years of age.

The water in the main channel of the river was at its lowest stage during the investigation. It was only about 6 inches deep and 40 links wide.

The location of the low-flow channel (thread of the stream) could be determined by wading. Stakes set at ruling points along the thread of the stream were used as traverse points which were measured in by direct measurement.

Preliminary Statement of the Problem

The surveyor must decide how to survey the islands omitted by the original survey and define the limits of the public lands remaining in sections 13, 14 and 23.

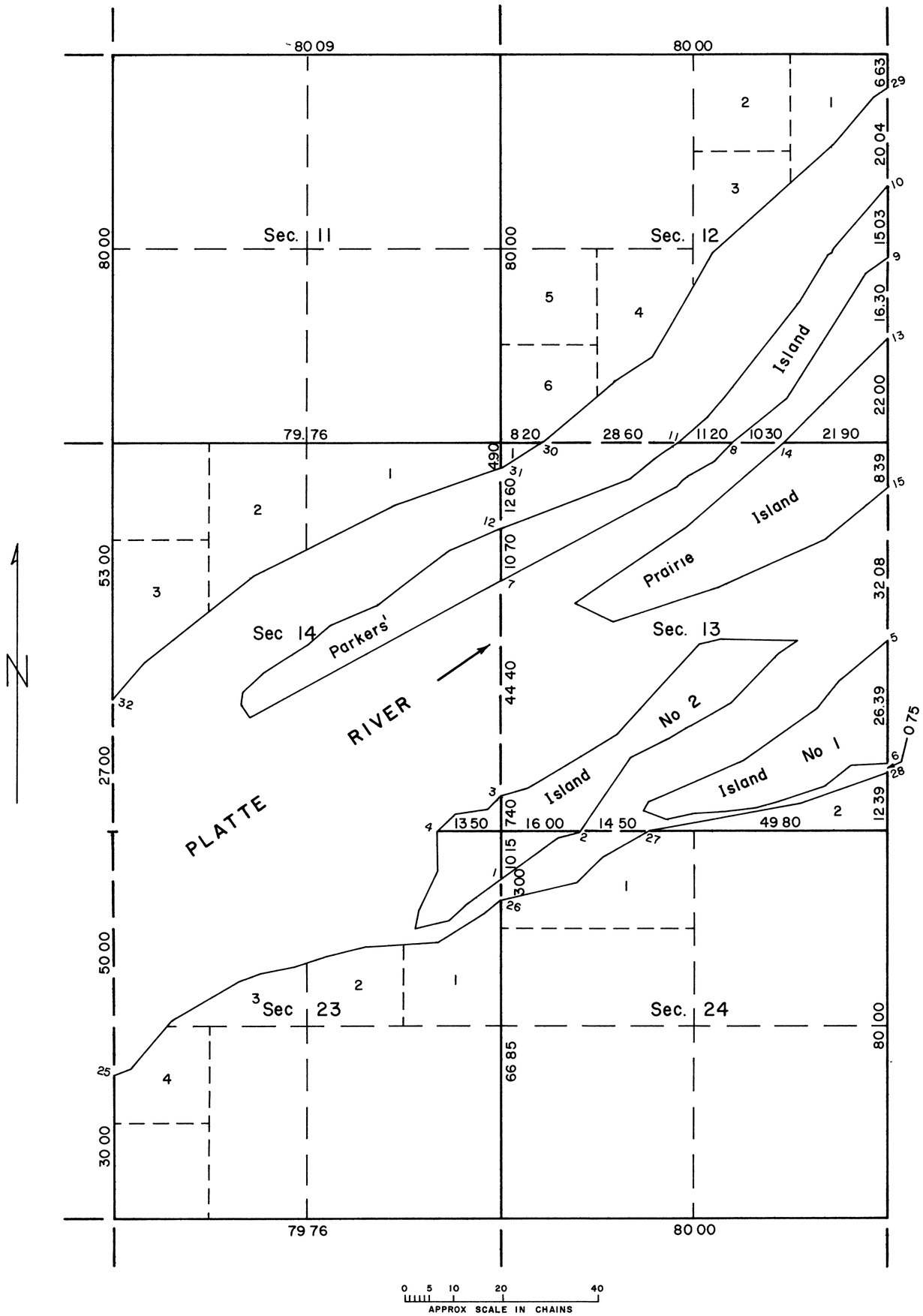


Figure 2 - Portion of Original Record

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

3-115 to 3-119	Meandering
3-120	Rivers
3-122	Islands
6-1 to 6-32	Dependent resurveys
7-51 to 7-53	Beds of non-navigable lakes and streams
7-59	Partition lines
7-62 to 7-67	Accretion

Legal Constraints

Nebraska was admitted to the Union in 1867. Nebraska law grants full riparian rights to the beds of all streams, navigable or non-navigable, to the riparian owners of the adjoining uplands.

Final Statement of the Problem

The areas erroneously omitted from the original surveys and the accretions formed since entry on the adjacent surveyed lands, were to be identified and surveyed according to the existing laws and court decisions.

OMITTED ISLAND IN NON-NAVIGABLE PLATTE RIVER

T. 13 N., R. 6 W., 6TH PRINCIPAL MERIDIAN

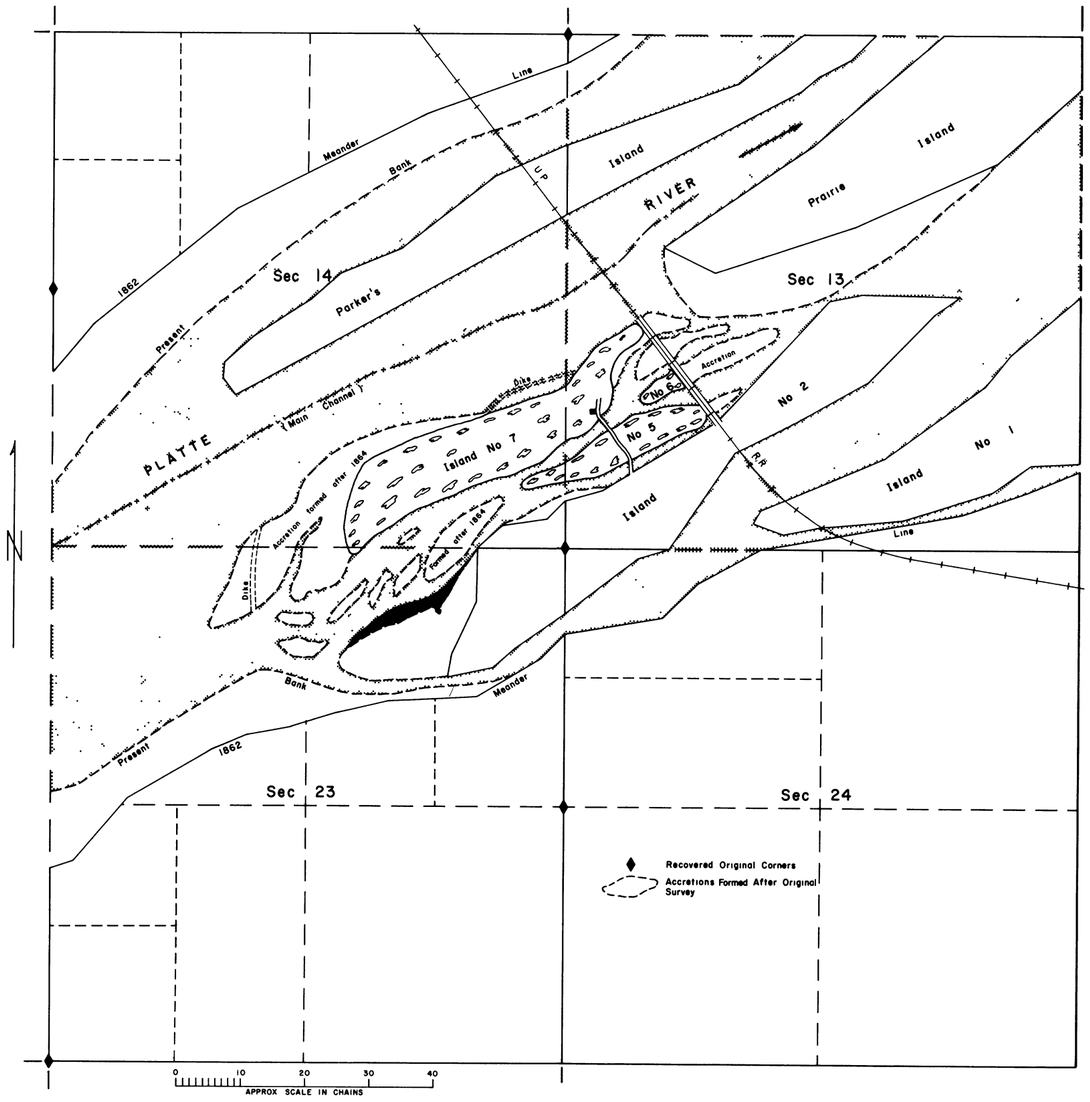


Figure 3 - Conditions Found

Islands No. 5 and 6 were meandered in the customary manner along the mean high water line. There was no significant accretion at the upstream end of either island. All land downstream from the railroad and attached to Islands No. 5 and 6 was recently deposited and was not meandered.

Island No. 7 was meandered upstream from the meander corner of sections 13 and 14, on the south side of the island, through section 23 to the meander corner on the southwesterly side between sections 14 and 23. From this latter meander corner a line was surveyed N. 40¼° W., perpendicular to the main river channel, across the accretion to the high water line on the northwesterly side of Island No. 7, where an Auxiliary Meander corner was established The remaining meanders were surveyed along the mean high water line in the customary manner.

All of the lateral accretion to Islands 5, 6 and 7, above the mean high water line, was thus surveyed. None of the accretion, either upstream or downstream, which had formed since 1864 was included.

The field notes and plat illustrated in figure 4 were accepted on May 24, 1937.

The owner of the patented Island No. 2 protested the survey of Islands 5, 6 and 7. He alleged that the islands belonged to the owners of the mainland and cited the case of Grand Rapids and Indiana R.R. Co. v. Butler (159 U.S. 87) in support of that contention.

The protest was dismissed by the Assistant Commissioner on the basis of Emma S. Peterson, 39 L.D. 566, and Whitaker v. McBride (197 U.S. 510).

The method of survey of the islands, cutting off the accretion to them at the upper and lower ends may be based on an interpretation of 43 U.S.C. 931 (Revised Statutes 2476) rendered by the Court of Appeals of Kentucky in the 1927 case of McGill v. Thrasher (299 S.W. 955). Also see: Archer v. Southern Ry. Co., 75 So. 251, and St. Louis v. Rutz, 138 U.S. 226.

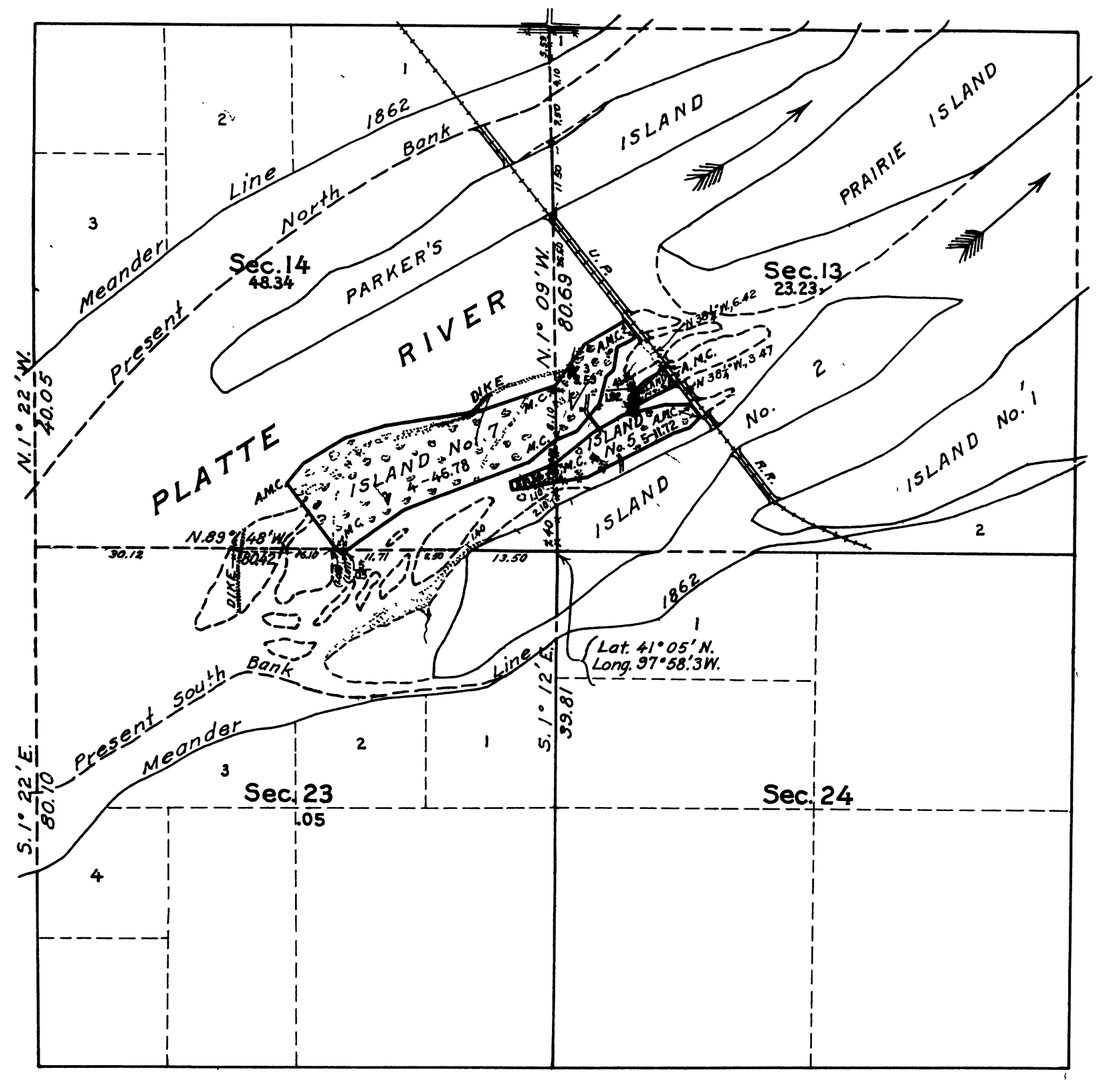


Figure 4 - Portion of Accepted Plat

Solution

The line between sections 13 and 14 was dependently resurveyed. Meander corners were established at the intersection of mean high water line on Islands No. 5 and 7. The record distances for the original meander corners on Island No. 2 and Parker's Island were called but not remonumented.

The corner of sections 14, 15, 22 and 23 was temporarily established in the river, at single proportionate measurement position, between the recovered corner of sections 22, 23, 26 and 27 and the recovered ¼ section corner of sections 14 and 15.

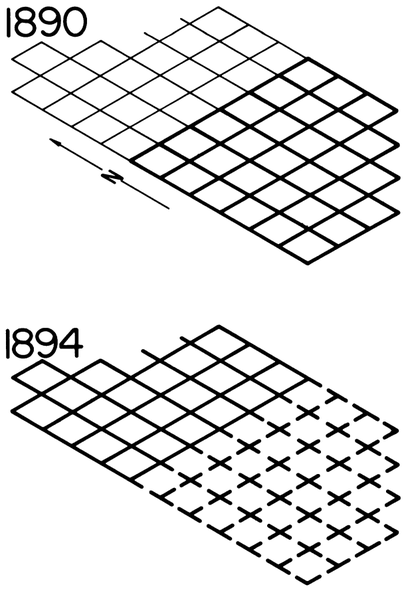
The line between sections 14 and 23 was resurveyed and extended to the temporary corner of sections 14, 15, 22 and 23. A meander corner was established where this line intersected the high water line on southeasterly side of Island No. 7.

At the intersection of the line between sections 14 and 23 with the old high water line on the southwesterly side of Island No. 7 another meander corner was established. The remainder of the line between sections 14 and 23 was recorded for informative purposes without further monumentation. This shows the extent of accretions and channel positions.

Auxiliary meander corners were established on the downstream end of the original portion of each island and on both sides of each island. These AMC's were set on a line perpendicular to the thread of the main channel. This perpendicular line was also along the railroad right-of- way. Direct ties were made between the AMC's on each island.

FRAUDULENT MEANDERS OF CUMMINGS LAKE

T. 63 N., R. 14 W., 4TH PRINCIPAL MERIDIAN



History of Surveys

1880 & 1882 George Sturtz surveyed the south boundary and E W Griffin surveyed the west boundary of T 63 N , R 14 W , of the 4th Principal Meridian, Minnesota Neither of these surveys affected the job discussed here

1890 John A Westby surveyed the north boundary and subdivisional lines as shown in figure I The plat was approved December 8, 1890

1894 Guy A Eaton retraced portions of the north boundary of this township and subdivided the township to the north A portion of the Eaton plat is shown in figure 2

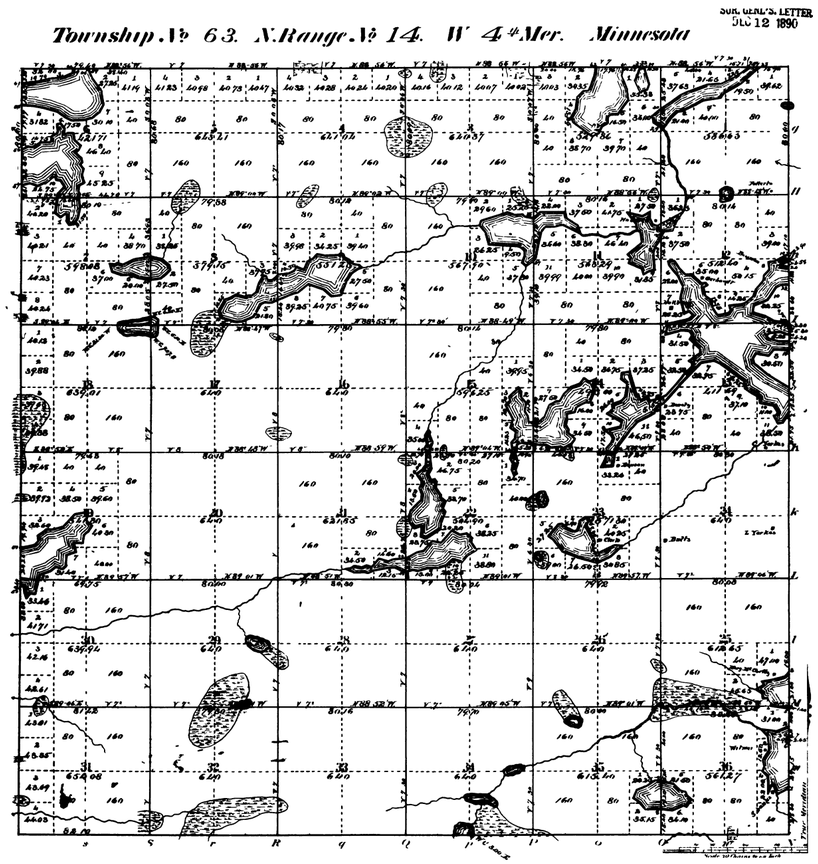


Figure 1 - Original 1890 Survey

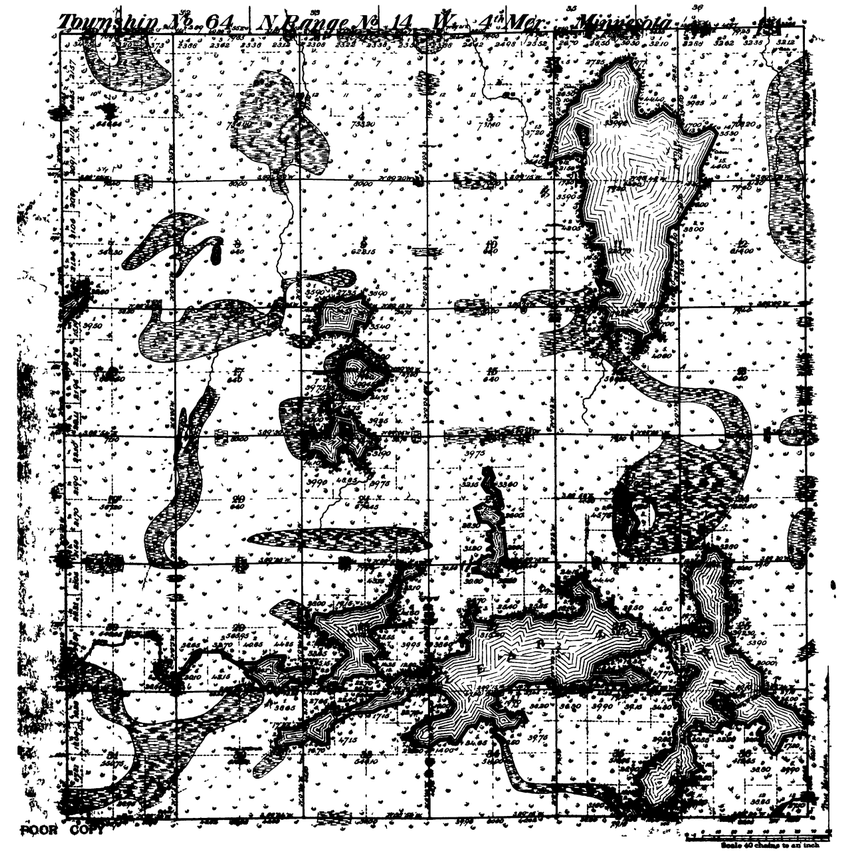


Figure 2 - Original 1894 Survey

Reasons for Request of this Survey

The large "boot shaped" bay of Cummings Lake in section 2 is shown in figure 3, a portion of Crab Lake, 1956, a map of the U.S. Geological Survey. The original survey plat shows this bay to be a grossly different shape.

An area of approximately 100 acres, lying at an elevation of up to 80 feet above the lake level, is shown on the original plat as part of Cummings Lake.

Section 2 is located in the Superior National Forest and the Burntside State Forest. Lots 2, 3, 4 and the SW¼ NW¼ of the section were patented to the state of Minnesota by lieu selection.

The Forest Service requested an investigation and survey of the apparently erroneously omitted lands.

Special Instructions

Special Instructions were prepared for Group 94, Minnesota, on September 24, 1963. These instructions directed that section 2 be retraced and then an examination of the terrain be made to determine whether the apparently omitted lands were in fact upland in place above mean high water line at the date of statehood in 1858 and at the time of the original survey in 1890. If the examination proved that the area was in fact public land omitted from the original survey the original meander line would be retraced, the closing error adjusted and the angle points monumented as a fixed and limiting boundary between surveyed and unsurveyed lands. The actual shore line of Cummings Lake would be meandered and the omitted lands surveyed.

Conditions Found on the Ground

The exterior boundaries of section 2 were dependently resurveyed first, as instructed. All original corners were recovered, except the ¼ section corner of sections 2 and 3. See figure 4. Section 2 is about 5½ chains shorter in latitudinal length between the north and south boundaries than the original record. The south boundary is displaced about 9 chains in longitudinal position in relation to the north boundary. The distances along the north and south boundaries are reasonably close to the original record. The adjusted meanders of Cummings Lake, based on the record, and the recovered meander corners are shown in figure 4 along with the actual shore line of the lake. The section subdivisional lines are protracted on figure 4 as well. Study of figure 4 shows that the adjusted original meander lines greatly distort the shape and area of the lots relative to the original plat.

Ground investigation showed that the terrain between the actual shore line and record meander line was as high as 80 feet in elevation above the lake and contained trees and stumps up to 30 inches diameter.

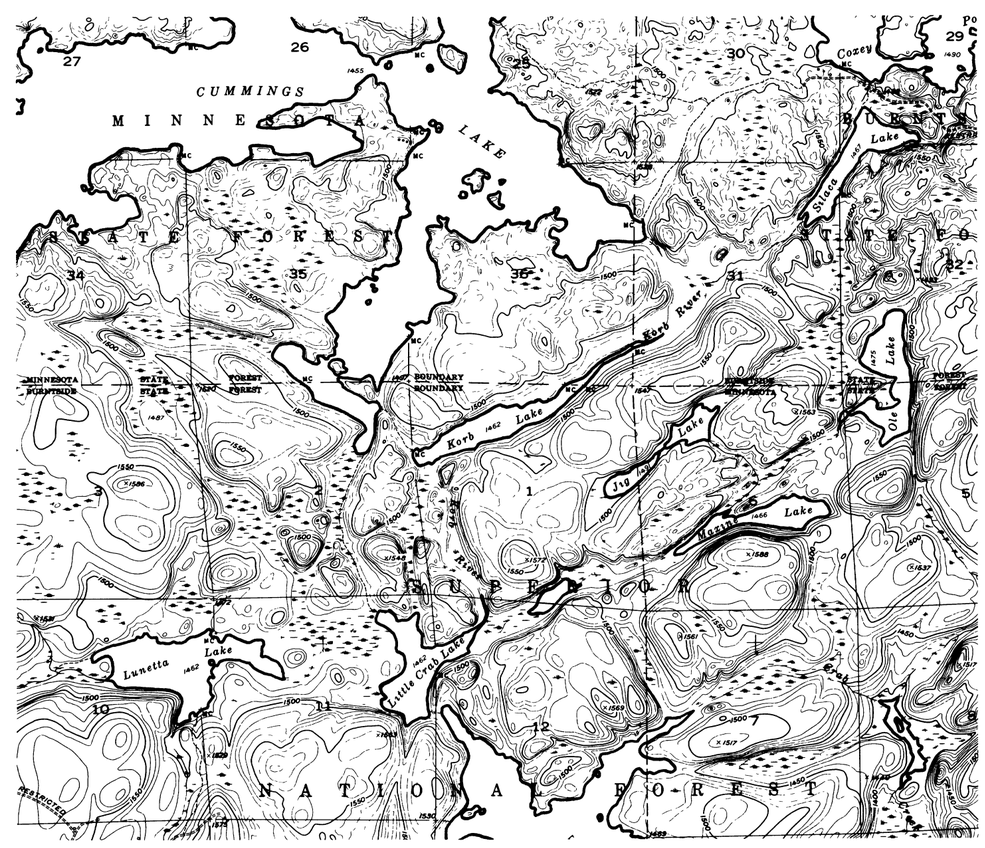


Figure 3 - Crab Lake, 1956 Quad, USGS

FRAUDULENT MEANDERS OF CUMMINGS LAKE

T. 63 N., R. 14 W., 4TH PRINCIPAL MERIDIAN

Preliminary Statement of the Problem

It was necessary to determine whether the erroneous meanders were grossly in error, and, if so, to decide on methods for restoring the survey in a manner which would protect "bona fide rights of prior claimants."

Regulations

This survey illustrates the following sections of the Manual of Surveying Instructions, 1973:

5-43	Angle points of non-riparian meander lines.
7-79 to 7-85, 7-90 to 7-93	Erroneously omitted areas
9-1 to 9-5	Importance of the plat

Applicants for surveys of omitted lands are required to notify adjoining land owners of their intent; 43 CFR 9185.2.

The Forest Service made the required notification to the adjoining land owners and state officials of their intent to apply for a survey.

Final Statement of the Problem

Preliminary investigation had shown that the omitted areas were indeed significant and that the original meanders were probably fictitious or fraudulent.

It remained to determine how to restore the survey in a manner that would protect the bona fide rights of the owners of the patented lands.

Solution

Figure 5 is an enlargement of the section as shown upon the original plat using the original courses and distances. Also shown are retracements of the exterior boundaries made by Eaton in 1894.

The record exterior boundaries were adjusted to a precise closure by the broken boundary method. The section subdivisional lines were computed using adjusted section boundaries. Next, the record meanders were similarly adjusted and the point of intersection of the subdivisional (lot) lines and the adjusted meanders were calculated. These calculated distances are shown in figure 5, in parentheses. The distances along each appropriate meander course to the intersection of section subdivisional lines were also calculated. These computed distances all became part of the "record."

The next step computed the section subdivisional lines in a normal manner based on the dependent resurvey of the exteriors. The "points of intersection" were calculated by the single proportionate measurement method, temporarily "fixing" the meander line at that point.

Then the computed "record" meanders were adjusted in front of each of the eight lots by the broken boundary method and a coordinate value assigned the angles points so determined. This resulted in a "break" in bearing at each section subdivisional line intersection. No bearing changes occur in the record courses at these intersections.

Using the calculated coordinate position of the angle points to the left and right of the section subdivisional lines, a straight course was computed between the angle points, eliminating the unjustified "break" in the meander courses. The results of these calculations are shown in figure 6. The computed meanders were then surveyed as a fixed and limiting boundary, clockwise, in the same order as the record, numbered consecutively, 1 thru 17. Angle points 1, 2 and 3 fell within Cummings Lake and could not be monumented. The remaining angle points, 4 thru 17, were monumented and appropriately marked.

The present shore line of Cummings Lake was meandered. The intersections of the adjusted record meanders and the actual shore line meanders were determined and monumented. The omitted land was divided into new lots by extension of the normal section subdivisional lines by protraction. The areas of the new lots were computed. Each new lot was examined to determine the extent of any "swamp and overflowed" lands.

None of the newly created lots were over 50% swamp and overflowed. Therefore none were granted to the state under the Act of March 12, 1860 (12 Stat. 3) which granted swamp and overflowed lands to Minnesota and Oregon.

Figure 7 is the plat of this resurvey and survey, accepted April 30, 1964.

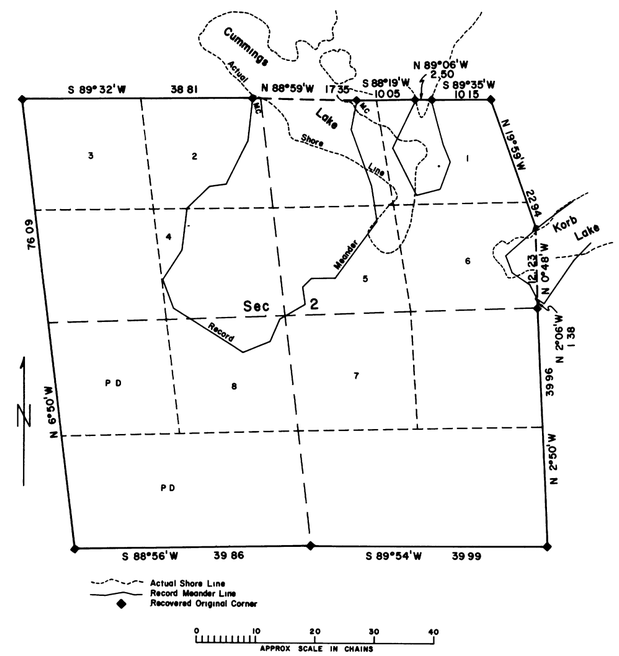
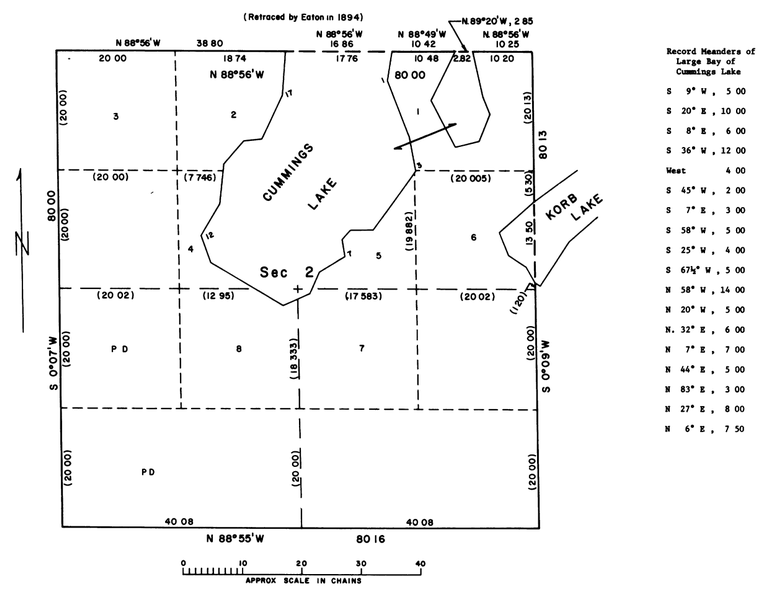


Figure 4 - Conditions Found



Record Meanders of Large Bay of Cummings Lake

S 9° W ,	5 00
S 20° E ,	10 00
S 8° E ,	6 00
S 36° W ,	12 00
West	4 00
S 45° W ,	2 00
S 7° E ,	3 00
S 58° W ,	5 00
S 25° W ,	4 00
S 67½° W ,	5 00
N 58° W ,	14 00
N 20° W ,	5 00
N. 32° E ,	6 00
N 7° E ,	7 00
N 44° E ,	5 00
N 83° E ,	3 00
N 27° E ,	8 00
N 6° E ,	7 50

Figure 5 - Original Survey Records and Parenthetical Distances

FRAUDULENT MEANDERS OF CUMMINGS LAKE

T. 63 N., R. 14 W., 4TH PRINCIPAL MERIDIAN

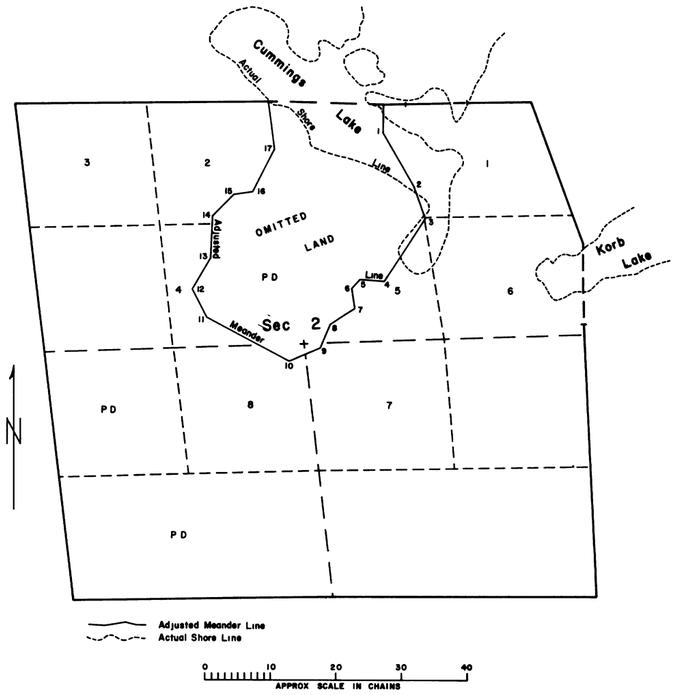


Figure 6 - Adjusted Meanders

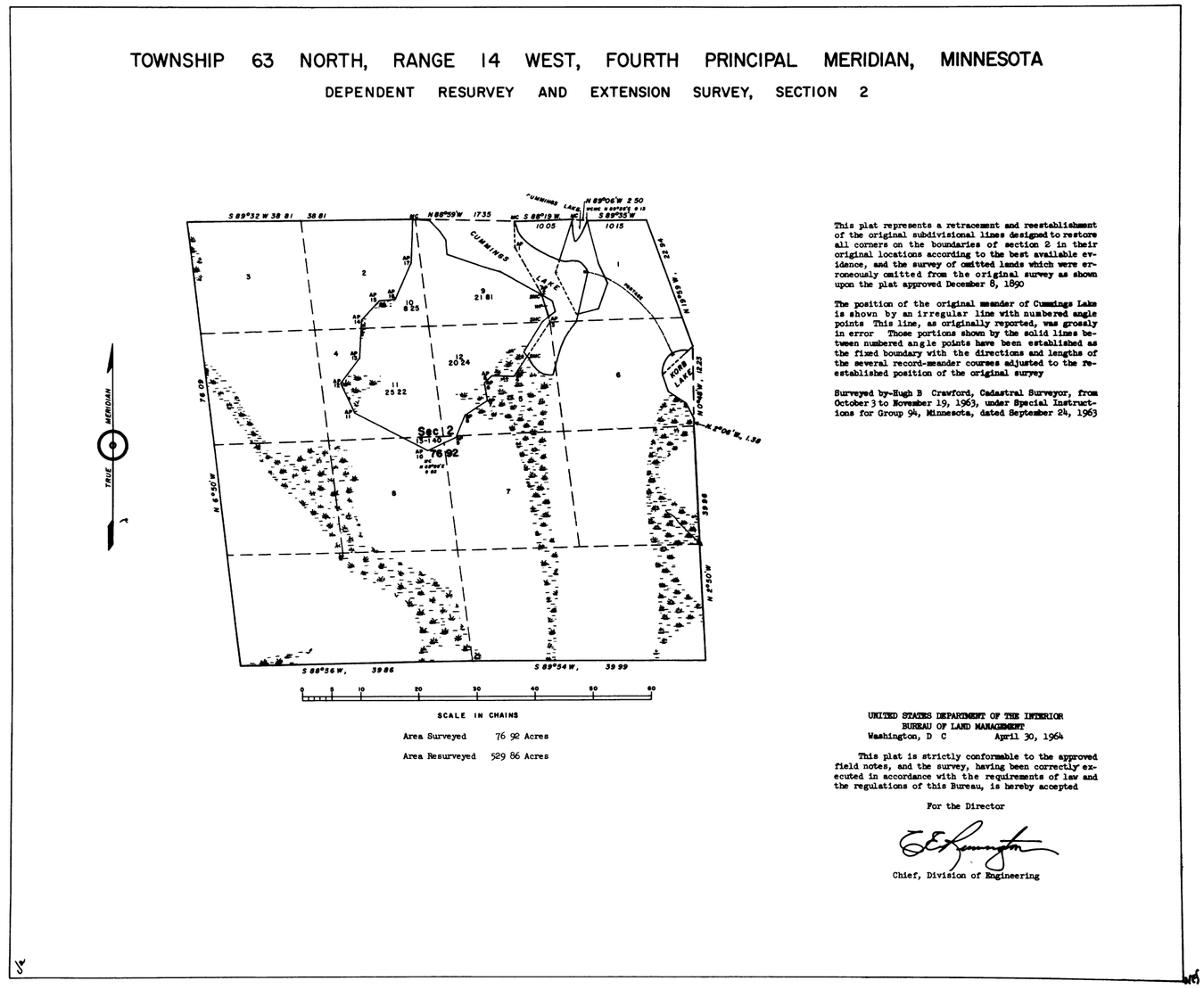


Figure 7 - Accepted Plat

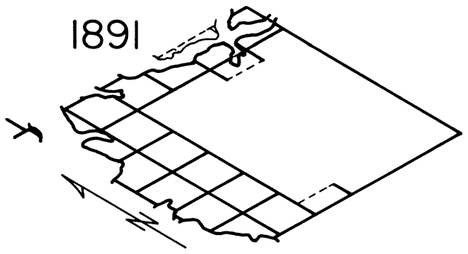
Supplementary Topic

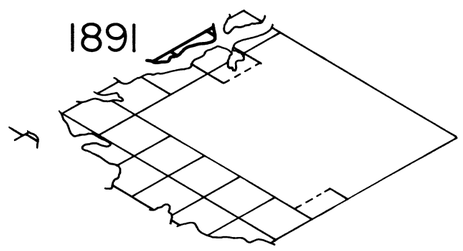
The small "point" of land lying easterly of the line AP2 - AP3 is physically attached to new lot 9, but is a surveyed, "detached," part of original and patented lot 1.

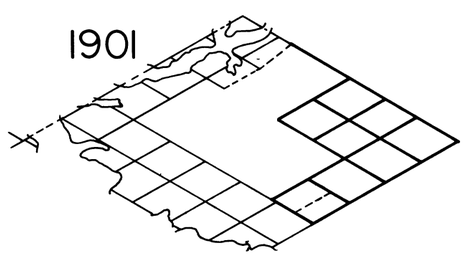
If the original surveyor had properly meandered Cummings Lake, this point would not have been included in lot 1 on the original plat. However, the patent to lot 1 included all of the land area represented on the plat; therefore, the new lot 9 is limited by the original, non-riparian meander line between AP2 and AP3. See Weaver v. Knudson, 127 N.W. 2d 217, a 1964 Wisconsin Supreme Court decision.

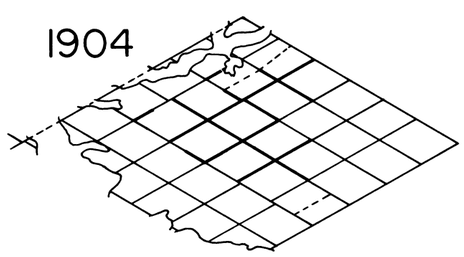
RESTORATION OF MC'S ON BEAUTY BAY

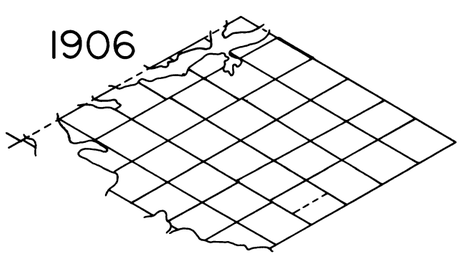
T. 49 N., R. 3 W., BOISE MERIDIAN











History of Surveys

1891 W. Clayton Miller surveyed most of the exterior boundaries and a portion of the subdivisional lines in November and early December 1891, as shown on the plat approved February 23, 1893. See figure 1.

Miller ran the fourth meridional line N 0°04' W and established the corner of sections 4, 5, 8 and 9 He then ran the fifth latitudinal line on a random to the corner of sections 1, 6, 7 and 12 on the east boundary, returning on true line setting corners at proportionate distances of 79.65 chains per mile. Miller made the corner of sections 1, 2, 11 and 12 serve also as the meander corner on the east side of Beauty Bay. From that corner he "stubbed" S. 0° 01' E. for ½ mile He also ran N 0° 01' W, setting a terminal meander corner on the south shore of Wolf Lodge Bay.

1891 Oscar Sonenkalb surveyed a portion of the north boundary and subdivisional lines of sections 1, 2 and 3, north of Wolf Lodge Bay, on December 11 and 12, 1891 Figure 2 shows the plat approved March 30, 1893. Sonenkalb also subdivided T. 50 N, R. 3 W. Because of the manner of progression of surveys, the east range of sections in that township is "missing."

1901 Harold A. Rands completed a portion of the subdivisional lines in the southeastern portion of the township and resurveyed the south 4½ miles of the east boundary.

He also retraced part of the east boundary and discovered a "two tally" error in the south half mile between sections 7 and 12.

1904 Ernest P Rands completed the subdivisional lines of the township, including a retracement of the line between sections 2 and 11, west of Beauty Bay. Figure 3 shows the plat approved January 29, 1906. Rands noted a "one tally" error in the line between sections 2 and 11.

1906 J.W McArthur retraced the east boundary of section 12 and remonumented the corner of sections 1, 6, 7 and 12.

Figure 4 is a composite sketch of the pertinent original survey records on which the dependent resurveys in this case must be based. The lines between sections 1 and 2 and between 2 and 3 have never been tied across Coeur d'Alene Lake. The meander corners on those lines are terminal. The corner of sections 1, 2, 11 and 12 is also a meander corner on the easterly shore of Beauty Bay.

Reasons for Request of this Survey

Figure 5 illustrates the ownership status in sections 1, 2, 11 and 12. The Coeur d'Alene District Manager requested this resurvey to aid in processing a suspected occupancy trespass and timber trespass along the line between sections 1 and 12 and to satisfy other administrative needs.

Special Instructions

Special Instructions were prepared on June 11, 1962, for Group 378, Idaho. They provided for the dependent resurvey of that portion of section 1 lying south of Coeur d'Alene Lake (Wolf Lodge Bay) and the east half mile between sections 2 and 11. The field work was begun on June 18, 1962.

Conditions Found on the Ground

Figure 6 illustrates both corner recovery and the general conditions found.

The water level in Coeur d'Alene Lake has been raised 11 feet since the time of the original surveys. The rise was caused by dam construction at Post Falls, Idaho.

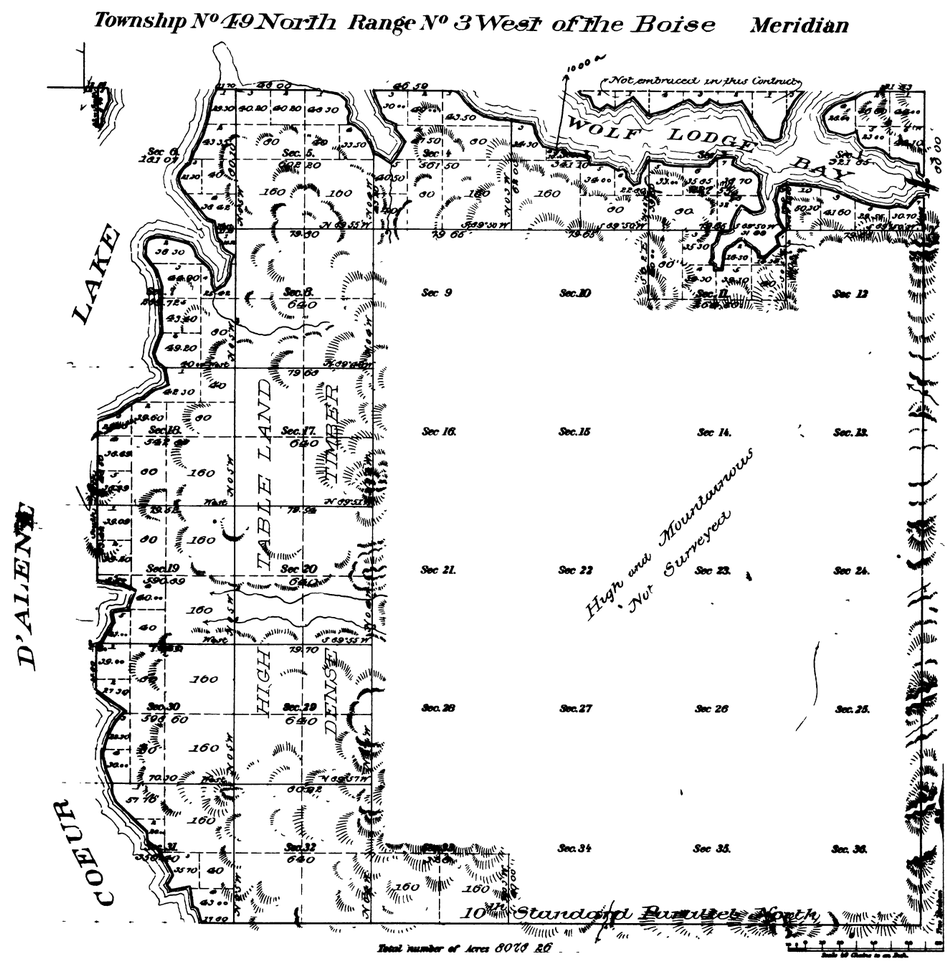


Figure 1 - 1891 Miller Survey

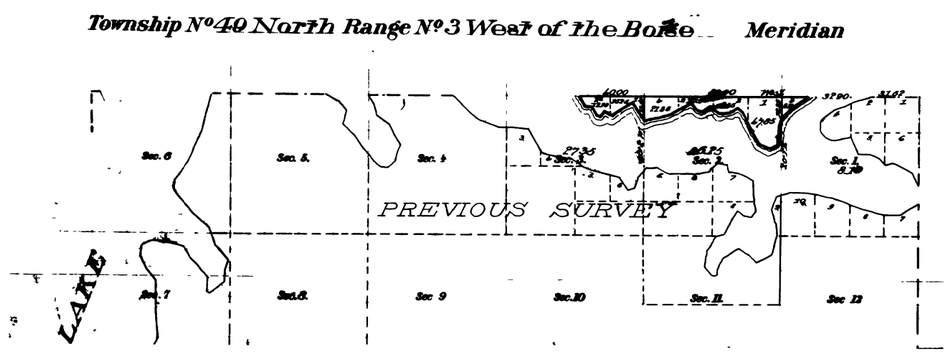


Figure 2 - 1891 Sonnenkalb Survey

RESTORATION OF MC'S ON BEAUTY BAY

T. 49 N., R. 3 W., BOISE MERIDIAN

The east boundary of section 1 is 88.44 chains in length; the record was 80 chains. Neither meander corner on that line can be found and the distance to the lake shore from the corner of sections 1, 6, 7 and 12 is 24.23 chains. The record distance was 18.86 chains. The land south of the lake is very steep down to the water. The north side is a more gradual slope.

Study of the record indicates that the 1891 Miller survey was apt to contain 5 or 10 chain mistakes caused by dropping one or two tallys. In 1901 Harold Rands found and returned a "two tally" mistake in the south half mile between sections 7 and 12. Ernest P. Rands reported a 5.61 chain difference from the record between the ¼ section corner and the meander corner of sections 2 and 11, west of Beauty Bay.

U.S. Highway 95 Alternate has been constructed along the lake shore and may have destroyed the corner of sections 1, 2, 11 and 12 since no direct evidence of the corner can be found. The ¼ section corner of sections 1 and 12 is lost.

A direct line between the recovered corner of sections 1, 6, 7 and 12 and the recovered meander corner of sections 2 and 11, on the west shore of Beauty Bay, bears S. 89° 16′ W. a total distance of 113.19 chains. This line passes about 7 links north of a fence corner located about 1 chain east of an east-west proportionate position for the lost section corner. From this fence corner the fences extend southerly and easterly along the line for about 20 chains.

From a point set by an east to west proportionate measurement on the S. 89° 16′ W direct line, the recovered ¼ section corner of sections 2 and 11 bears S. 0° 21′ E, 40.55 chains distant. From the proportionate measurement position a line run on record bearing, N. 0° 01′ W., intersects the present shore of Wolf Lodge Bay at 29.15 chains.

The proportionate measurement position on the direct line falls in the edge of the water on the present easterly shore of Beauty Bay.

Township No. 49 North, Range No. 3 West of the Boise Meridian, Idaho.

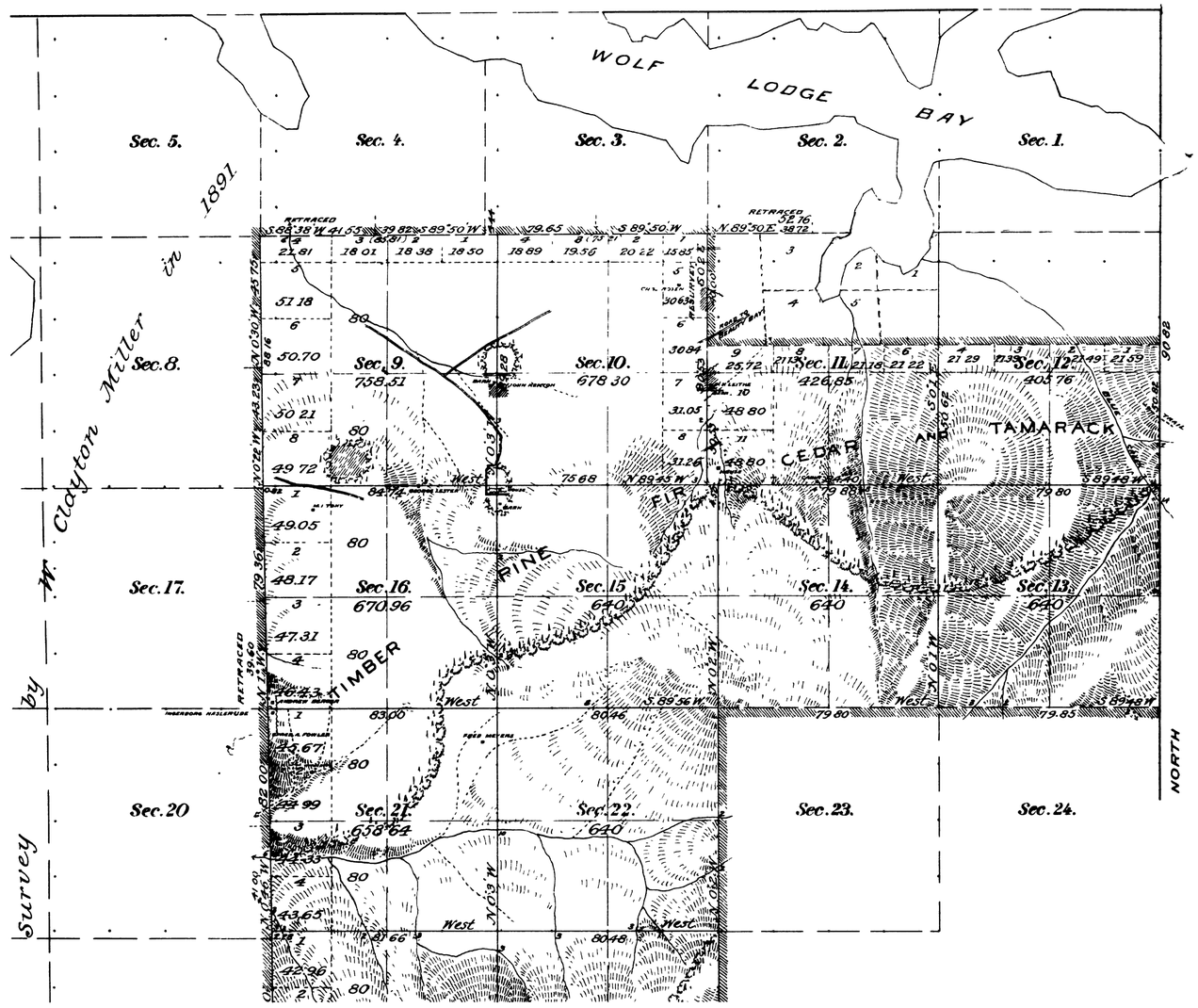


Figure 3 - 1904 Rands Completion Survey

RESTORATION OF MC'S ON BEAUTY BAY

T. 49 N., R. 3 W., BOISE MERIDIAN

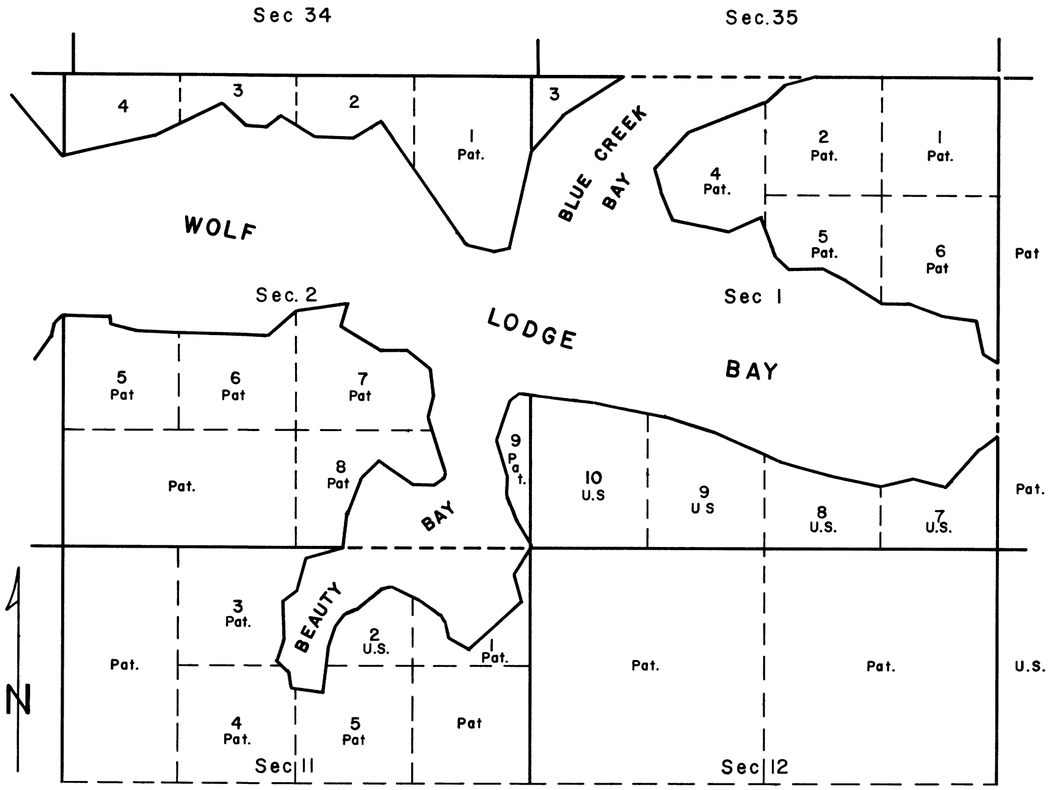


Figure 5 - Ownership Status

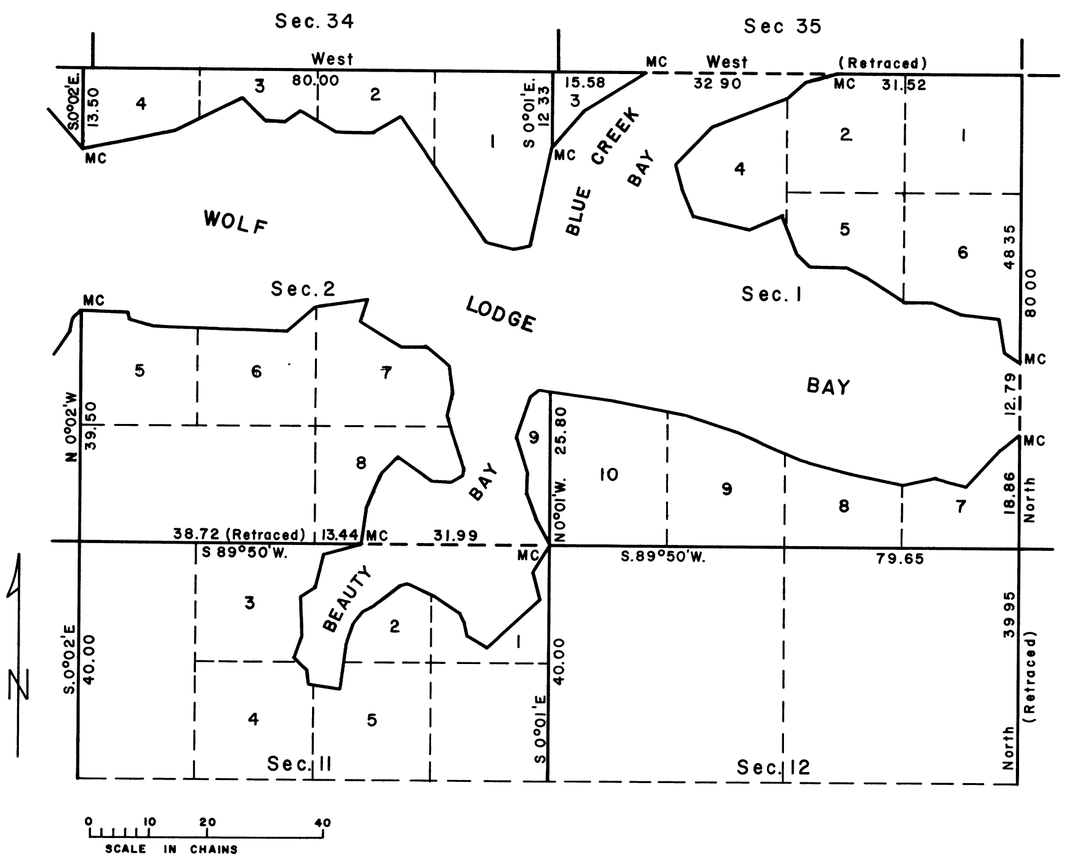


Figure 4 - Composite Survey Record

RESTORATION OF MC'S ON BEAUTY BAY

T. 49 N., R. 3 W., BOISE MERIDIAN

Beauty Bay Park, a private subdivision, was filed in the county court house on December 30, 1912 by A.O. Modlin, a licensed surveyor. Modlin's plat subdivided part of the N½, section 12, and lot 1, section 11.

This plat shows the corner of sections 1, 2, 11 and 12 to be 101 feet east of the edge of the water in Beauty Bay prior to the raising of the water level. The plat also indicates that "black gas pipe" was used to monument lot corners along the section line. Four galvanized iron pipes were found at locations indicated on figure 6. The most westerly pipe was 40 links south of the fence, the middle two were 1 link south of the fence and the easterly pipe was 1.34 chains east and 4 links south of a proportionate measurement point for the ¼ section corner on the direct line. None of the iron pipes were gas pipe and none were at the distances indicated by Modlin.

The Beauty Bay Park subdivision was legally vacated in 1953, at which time it was believed that no evidence remained of Modlin's survey. No lots were ever sold in the Beauty Bay Park subdivision.

The owners of the NW¼ of section 12, lot 9, section 2, lot 1, section 11, all stated that the east-west fence was on the line between sections 1 and 12.

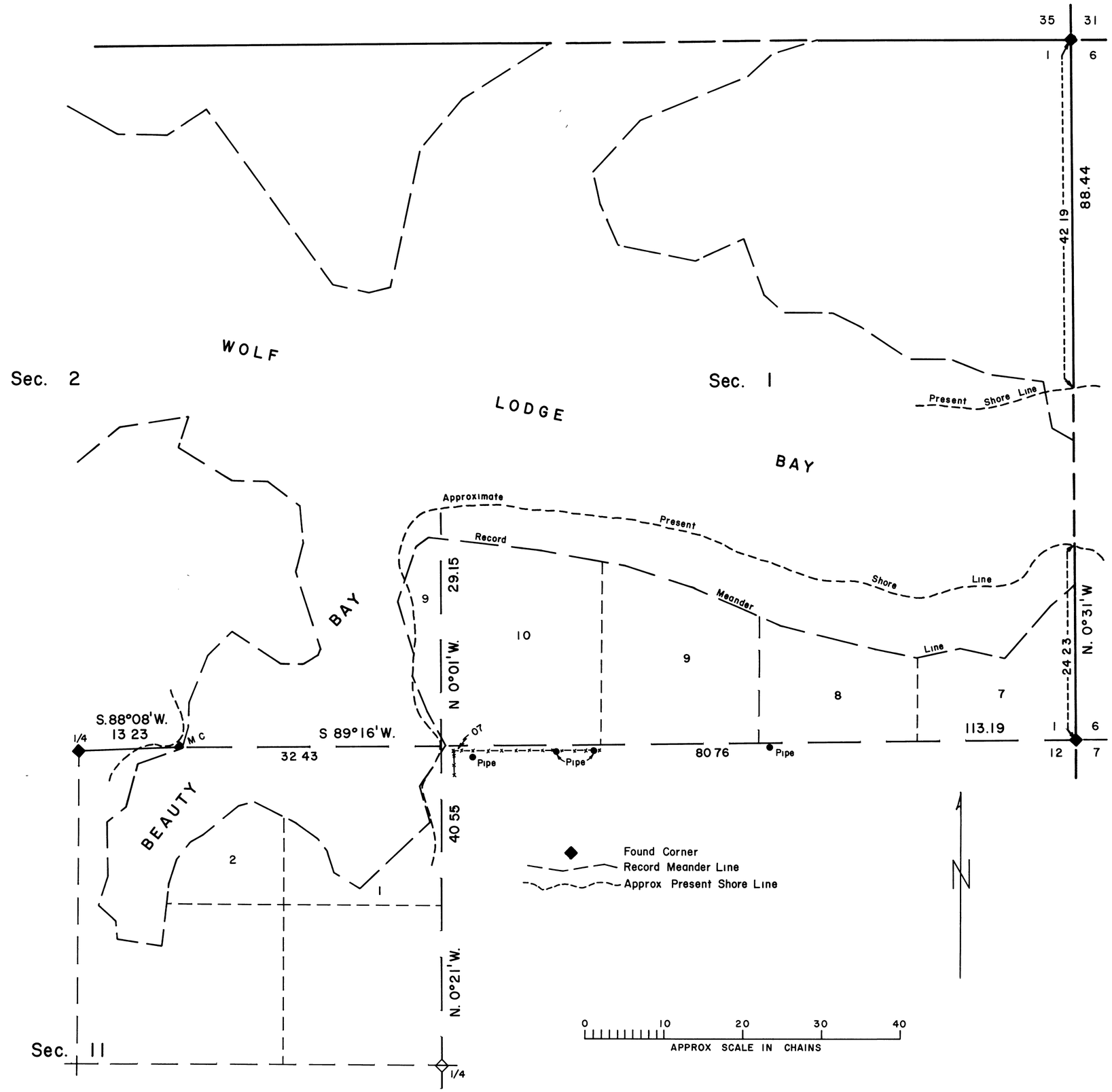


Figure 6 - Conditions Found and Corner Recovery

RESTORATION OF MC'S ON BEAUTY BAY

T. 49 N., R. 3 W., BOISE MERIDIAN

The proportionate position (on the direct line) for the corner of sections 1, 2, 11 and 12 is located in the edge of the water of Beauty Bay at its present elevation. At a point 102 feet west of the proportionate position the water depth measures 11 feet which equals the depth increase caused by the dam.

Two adjacent land owners alleged at various times that the original corner was in four different locations, all of which contended positions were progressively further east of a proportionate position. These owners have no evidence to prove their contentions.

The corner of sections 1, 2, 11 and 12 was not tied in by the Highway Department prior to road construction. The section lines were protracted on the highway maps and the corner is shown as being west of the highway and on the shoreline of Beauty Bay.

Preliminary Statement of the Problem

The corner of sections 1, 2, 11 and 12, ¼ section corner of sections 1 and 12 and the meander corners on the south side of Wolf Lodge Bay must be restored. The restorations must be based on the best available evidence and/or proportionate measurements.

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

5-5	Existent corner definition
5-9	Obliterated corner definition
5-10 to 5-16, 5-20 to 5-23	Evidence of corner location
5-30	Single proportionate measurement
5-40	Lost meander corners
5-43	Adjustment of non-riparian lines
5-45	One point control
6-6	Field returns
6-15	Basis of corner restoration
6-25 to 6-28	Acceptance of corners

Final Statement of the Problem

The contradictory contentions of each interested owner as to the locations of the lost corner must be rejected or honored if no direct evidence of the corner location is available. Some means must be found for determining where the blunder in the range line occurred so it may be placed where the original surveyor blundered.

Solution

The fence line was used to determine the latitudinal position of the lost section corner because abutting owners agreed that it was on the original line. The longitudinal position for the corner was determined at a proportionate distance between the recovered meander corner and the corner of sections 1, 6, 7 and 12.

The range line was restored on a direct line between the recovered corner of sections 1, 6, 7 and 12 and the recovered corner of Ts. 49 and 50 N., Rs. 2 and 3 W.

The shape of the present shore line on the south side of Wolf Lodge Bay conforms very well with the original meanders. The shoreline is very steep and a rise of 11 feet in the water level would have little effect on the horizontal position of the shoreline. The present shoreline was adopted as the controlling position in latitude for restoration of the meander corner of sections 1 and 6.

From the restored corner of sections 1, 2, 11 and 12 the line between sections 1 and 2 was run on record bearing, N. 0°01' W., to an intersection with the present shoreline, where the meander corner of sections 1 and 2 was reestablished.

The ¼ section corner of sections 1 and 12 was restored by the single proportionate measurement method.

The record meanders in section 1 were retraced between restored meander corners and adjusted by the broken boundary method without any monumentation.

The corner of sections 1, 2, 11 and 12 fell in the edge of the water and was monumented with a witness corner. The meander corner of sections 2 and 11 also fell in Beauty Bay and a witness meander corner was necessary. All recovered and restored corners were properly monumented.

Lots 7 thru 10, section 1, were relotted and given new areas based on the resurvey.

The two adjacent land owners protested the resurvey, alleging that the corner of sections 1, 2, 11 and 12 should be placed approximately in line with the east-west fence but at various distances up to about 90 links east of the restored position. They presented no evidence to verify these contentions. Their protest was dismissed by the Washington Office on September 21, 1965.

The field notes and plat were accepted on March 20, 1969. The plat is illustrated in figure 7.

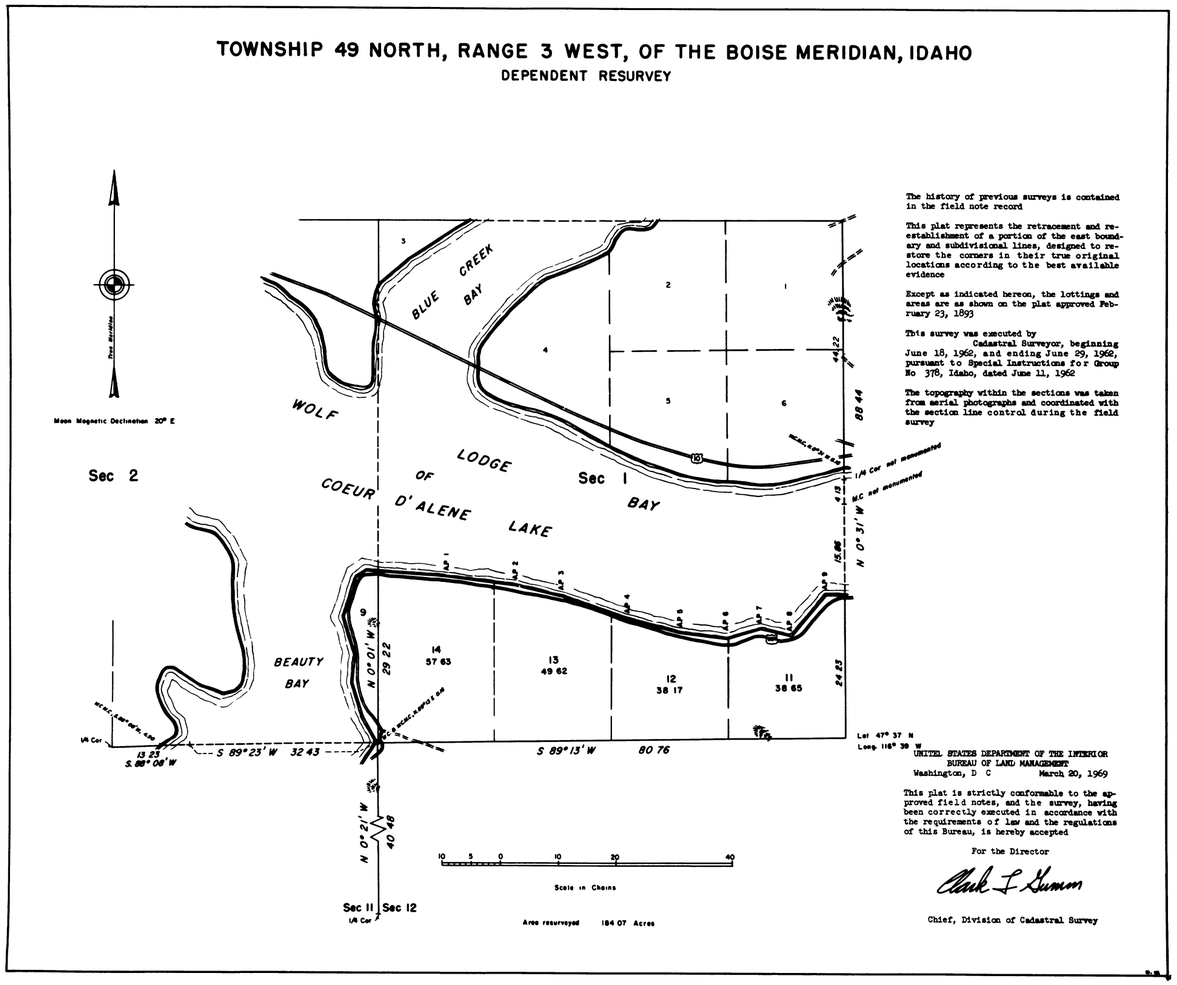
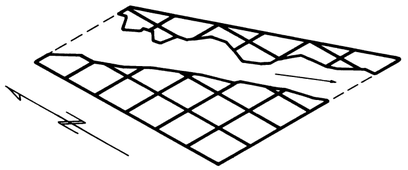


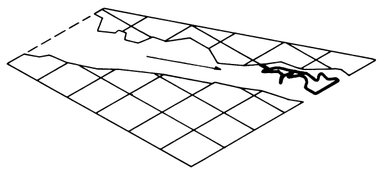
Figure 7 - Accepted Plat

OMITTED & SWAMP LANDS, PELICAN ISLAND

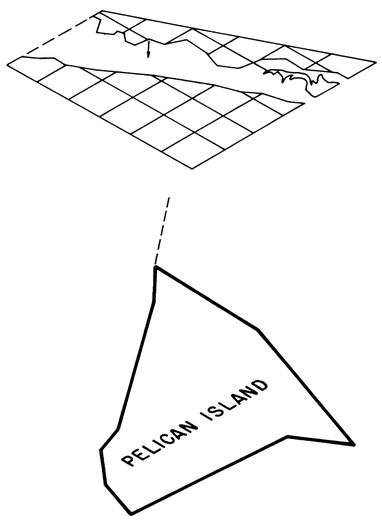
1859



1886



1903



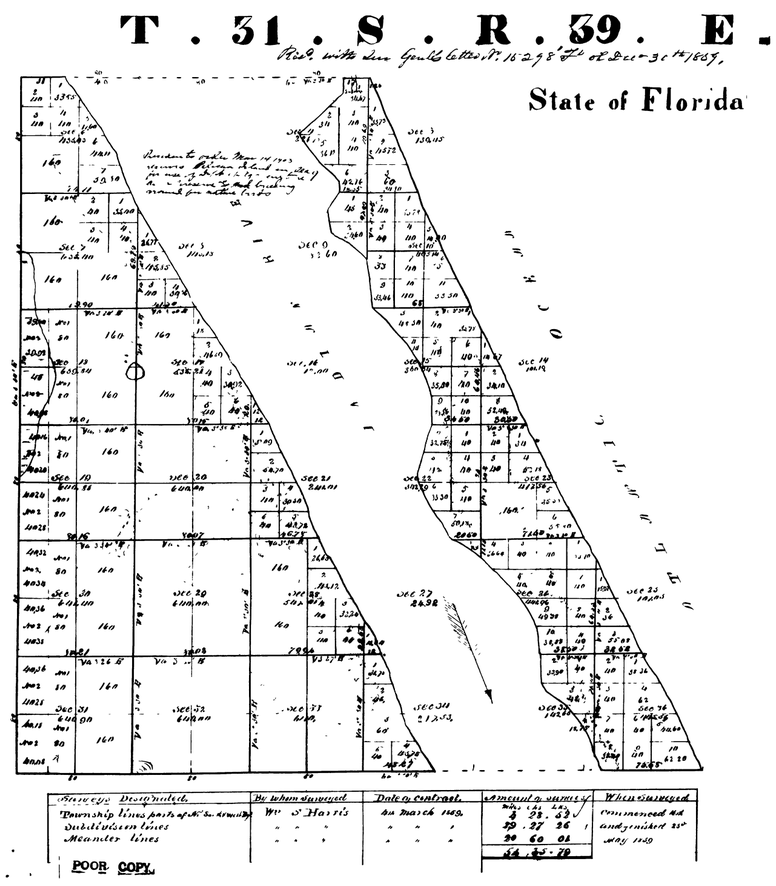


Figure 1 - Portion of Original Plat

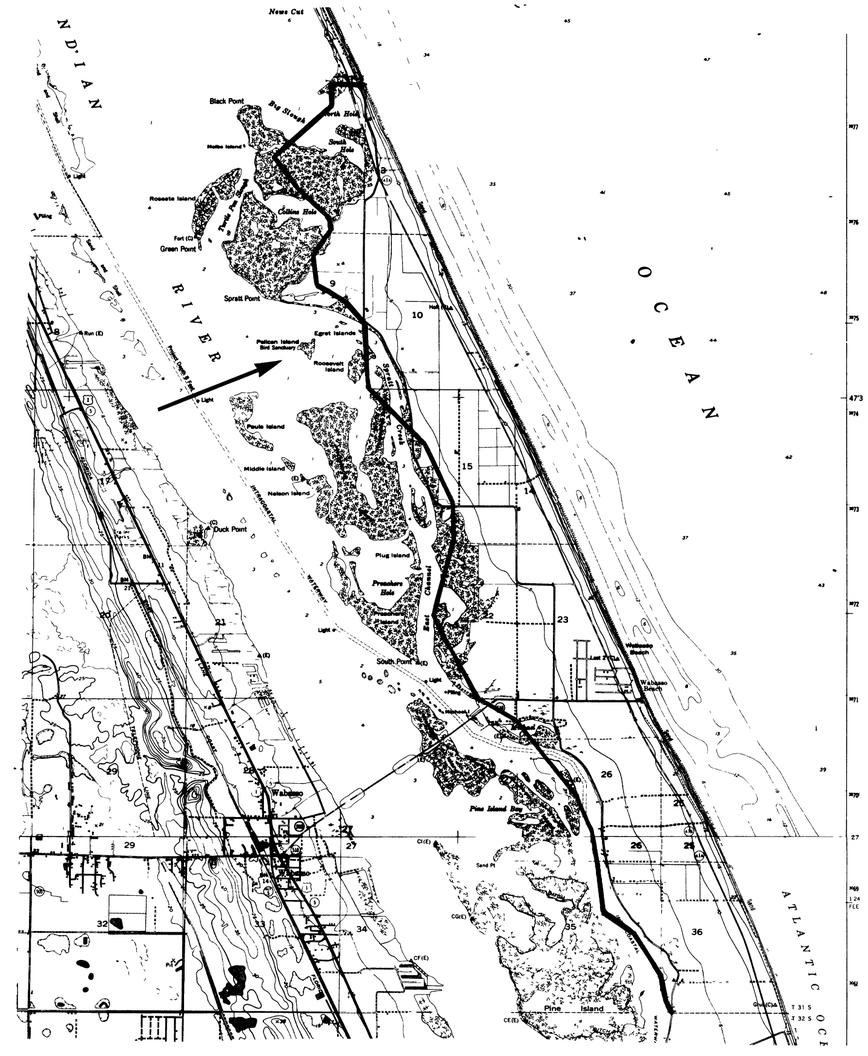


Figure 2a - Portion of Topographic Map With Record Meanders

History of Surveys

1859 William S Harris surveyed T 31 S, R 39 E, Tallahasse Meridian, in May 1959 as shown on the plat approved December 28, 1859. See figure 1.

1886 R Frank Hartford surveyed Pine Island, located in sections 26, 27, 34 and 35 in 1886

1903 A.W Barber surveyed Pelican Island, located in section 9, in December 1903.

Reasons for Request of this Survey

The Indian River is a shallow salt water lagoon separating the Florida mainland and the barrier island. The barrier island along the Atlantic Ocean is about a mile in width and extends for over 140 miles along the central east coast. Indian River Lagoon contains countless mangrove islands and swamps. Pelican Island is one of these islands.

The Pelican Island National Wildlife Refuge was created as a bird santuary by Executive Order on March 13, 1903. This is the first such refuge created in the United States. The refuge was expanded by Executive Order No. 1014 on January 26, 1909, to include all of the unreserved mangrove islands within sections 9 and 10. To further expand the refuge, Public Land Order 3276, dated November 29, 1963, withdrew all of the unsurveyed lands and islands lying west of the original meander line or shoreline and east of the Indian River Intracoastal Waterway in sections 4, 5, 8, 15, 16 and 22, plus Wabasso and Michael Islands in section 27. (The withdrawal of the latter two islands was revoked by PLO 3551 on February 23, 1965).

In 1963 the State of Florida accepted applications for sale of the non-island mangrove swamp and salt marsh lying outside the record meander line in sections 4 and 9. The proposed sale was apparently based on the assumption that these lands were submerged in 1845 when Florida became a state, and had emerged when Sebastian Inlet in section 20, T. 30 S., R. 39 E., was cut through the barrier island in 1924. Florida contended that if the mangrove swamps in the Indian River were submerged in 1845, the state acquired them under its sovereign right.

Wildlife enthusiasts protested the proposed sale because of its effect on the nearby bird sanctuary. The protest was lodged on the grounds that the State had no title to the land. They claimed that the land was upland and was omitted from the original survey and therefore still unsurveyed Public Lands. The State could, of course, get patent to any of the disputed land which was actually a swamp under the Swamp and Overflowed Lands Act of September 28, 1850.

As a result of the protest, the BLM conducted a preliminary investigation in December 1963. The record meander line was adjusted and imposed on the U.S. Geological Survey Maps Sebastian, 1949 and Vero Beach, 1949. See figure 2. The adjusted meander line was then compared with the Coast and Geodetic Topographic Survey Chart, No. T-1544, made in 1880-81, see figure 3. This is the oldest available map of the area except for the Harris 1859 plat.

A comparison of figure 2b and figure 3 reveals that the islands in Indian River and the shoreline are identical on both maps. The Harris meander line of the east bank of Indian River does not closely follow the actual shoreline and is grossly in error in sections 4 and 9.

OMITTED & SWAMP LANDS, PELICAN ISLAND

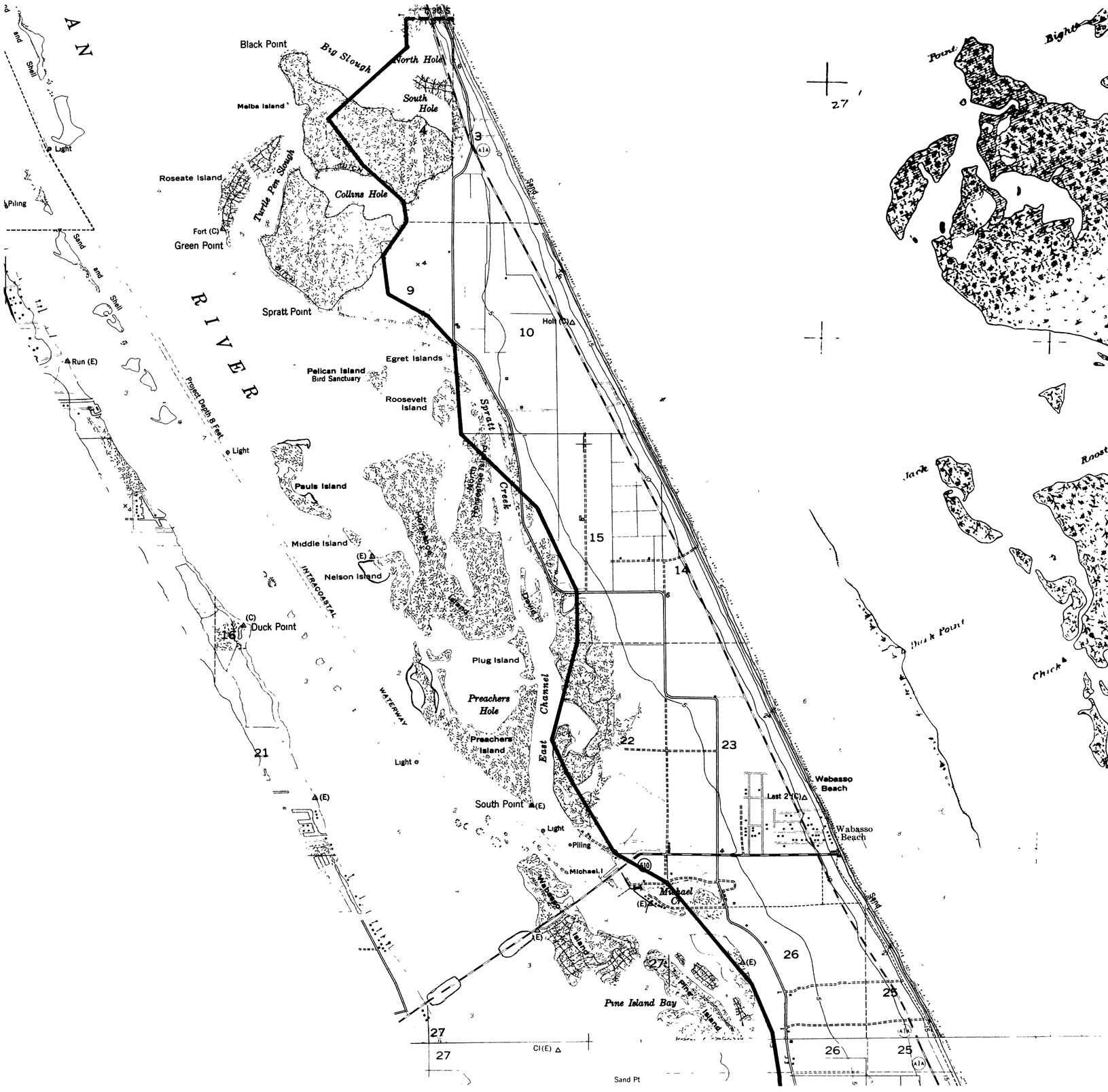


Figure 2b - Portion of 1949 U.S.G.S. Map at 1:24,000

Figure 3 - Portion of 1880 Chart at 1:20,000

OMITTED & SWAMP LANDS, PELICAN ISLAND

Affidavits from five local residents stated that the cutting of Sebastian Inlet had lowered the water level in the Indian River by no more than 2 inches; the lands in sections 4 and 9 were flooded by the daily tide only during October and November; and that these lands had been artificially flooded with salt water by means of levees and ditches to control mosquitoes. This flooding would not be necessary if the land was washed by the daily tides. Sebastian Inlet was closed from 1942 to 1948. The affidavits stated that this closure had had very slight effect on the water level in the Indian River.

The lands are covered with red mangrove, (Rhizophora mangle), black mangrove, (Avicennia nitida), white mangrove, (Laguncularia racemosa), buttonwood, (Conocarpus erectus) and a few palmetto or cabbage palms. It is known that black mangrove will not grow on land subject to daily flooding by the tides. All of the black mangrove was dead in the parts of sections 4 and 9, inundated by the mosquito control flooding.

On March 12, 1964, the Bureau of Sport Fisheries and Wildlife requested a survey of the apparently omitted lands in and around the Pelican Island Refuge.

Special Instructions

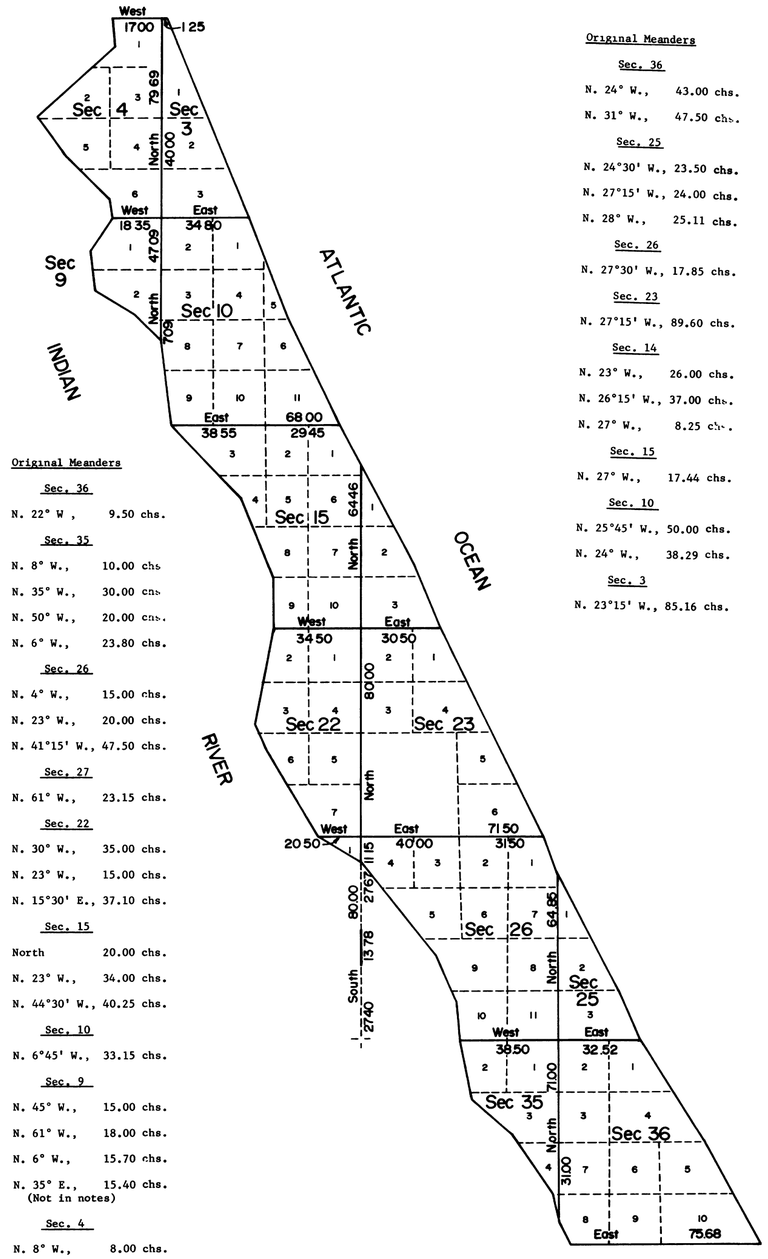
On April 8, 1965, Special Instructions were prepared for Group 146, Florida. They provided for the dependent resurveys necessary and examination and conditional survey of any omitted lands and islands in sections 4, 5, 9, 10, 15, 16, 21, 22, 26, 27, 34 and 35, T. 31 S., R. 39 E. Careful examination was to be made of the apparently omitted lands, outside the Harris meanders, in sections 4, 9 and 15 to determine whether they were in fact omitted through gross error or fraud. The unsurveyed islands in the Indian River, excluding dredge spoils from the Intracoastal Waterway, were to be examined to determine whether they were fast land, above mean high tide, in 1845, although probably swamp and overflowed under the intent of the Swamp Land Act. If found to be fast lands they were to be surveyed as public lands. All of the surveyed lands on the barrier island are patented.

Conditions Found on the Ground

Figure 4 illustrates a portion of the original survey records on which the dependent resurveys were based.

No direct evidence of the original corners and accessories remained but the corner of sections 25, 26, 35 and 36 had been perpetuated in 1926. The corner of sections 3, 4, 33 and 34 was previously perpetuated and referenced in 1924. That corner point is now in the ocean.

The remaining recovered corner points were locally reestablished and accepted monuments and points on section lines. The record meanders were retraced along the east bank of the Indian River in sections 4, 9, 10, 15 and 26. The closing errors adjusted by the broken boundary method (compass rule).



Original Meanders

Sec. 36

N. 22° W , 9.50 chs.

Sec. 35

N. 8° W., 10.00 chs

N. 35° W., 30.00 chs

N. 50° W., 20.00 chs.

N. 6° W., 23.80 chs.

Sec. 26

N. 4° W., 15.00 chs.

N. 23° W., 20.00 chs.

N. 41°15' W., 47.50 chs.

Sec. 27

N. 61° W., 23.15 chs.

Sec. 22

N. 30° W., 35.00 chs.

N. 23° W., 15.00 chs.

N. 15°30' E., 37.10 chs.

Sec. 15

North 20.00 chs.

N. 23° W., 34.00 chs.

N. 44°30' W., 40.25 chs.

Sec. 10

N. 6°45' W., 33.15 chs.

Sec. 9

N. 45° W., 15.00 chs.

N. 61° W., 18.00 chs.

N. 6° W., 15.70 chs.

N. 35° E., 15.40 chs.
(Not in notes)

Sec. 4

N. 8° W., 8.00 chs.

N. 47° W., 22.00 chs.

N. 36° W., 21.00 chs.

N. 48° E., 41.00 chs.

N. 2° W., 11.13 chs.

Original Meanders

Sec. 36

N. 24° W., 43.00 chs.

N. 31° W., 47.50 chs.

Sec. 25

N. 24°30' W., 23.50 chs.

N. 27°15' W., 24.00 chs.

N. 28° W., 25.11 chs.

Sec. 26

N. 27°30' W., 17.85 chs.

Sec. 23

N. 27°15' W., 89.60 chs.

Sec. 14

N. 23° W., 26.00 chs.

N. 26°15' W., 37.00 chs.

N. 27° W., 8.25 chs.

Sec. 15

N. 27° W., 17.44 chs.

Sec. 10

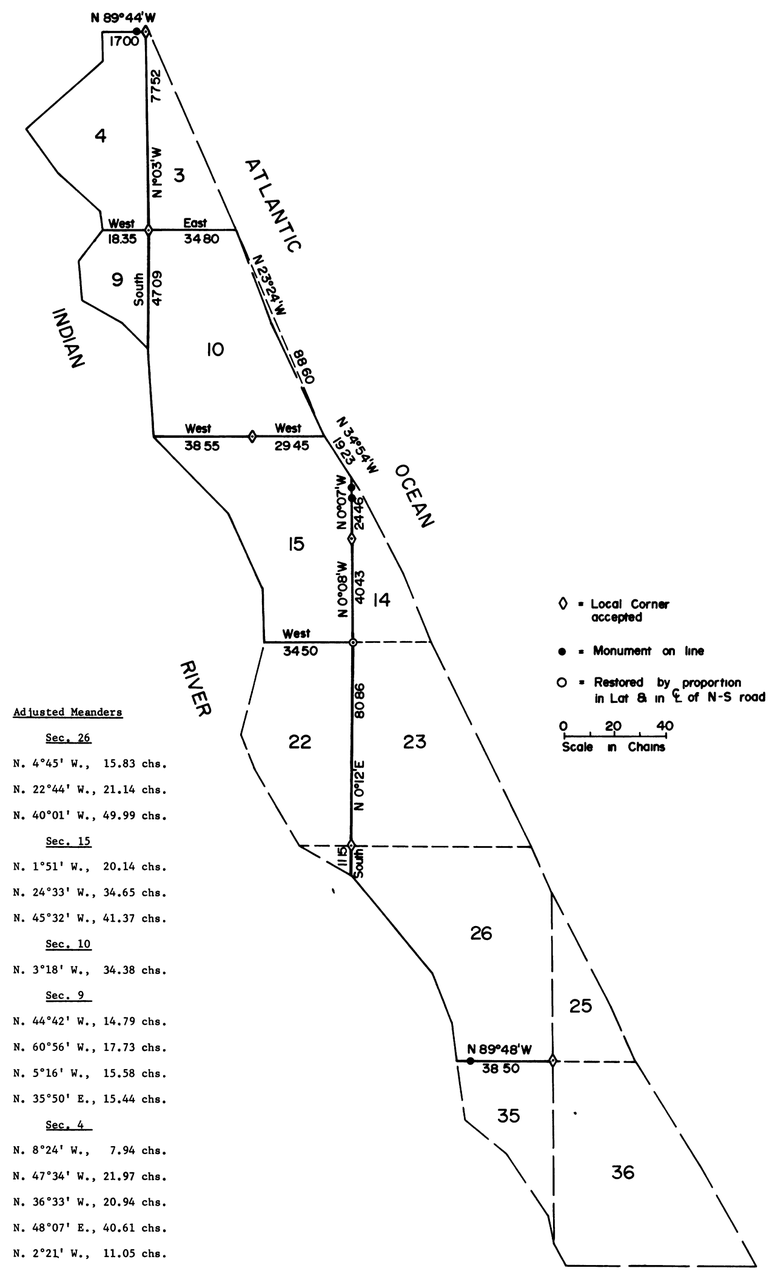
N. 25°45' W., 50.00 chs.

N. 24° W., 38.29 chs.

Sec. 3

N. 23°15' W., 85.16 chs.

Figure 4 - Sketch Showing 1859 Survey and 1886 Extension



Adjusted Meanders

Sec. 26

N. 4°45' W., 15.83 chs.

N. 22°44' W., 21.14 chs.

N. 40°01' W., 49.99 chs.

Sec. 15

N. 1°51' W., 20.14 chs.

N. 24°33' W., 34.65 chs.

N. 45°32' W., 41.37 chs.

Sec. 10

N. 3°18' W., 34.38 chs.

Sec. 9

N. 44°42' W., 14.79 chs.

N. 60°56' W., 17.73 chs.

N. 5°16' W., 15.58 chs.

N. 35°50' E., 15.44 chs.

Sec. 4

N. 8°24' W., 7.94 chs.

N. 47°34' W., 21.97 chs.

N. 36°33' W., 20.94 chs.

N. 48°07' E., 40.61 chs.

N. 2°21' W., 11.05 chs.

Figure 5 - Dependent Resurvey

Figure 5 illustrates the results and extent of the dependent resurvey. The record meanders in sections 22, 27 and 35 were retraced for investigative purposes only.

The original meander line did not follow the actual east bank of Indian River and there was no indication that the shoreline had ever been at or near the position returned by Harris in 1859. In sections 10, 15 and 26, the record meanders were in the river. They were up to 15 or more chains from the present shoreline and crossed several unsurveyed mangrove islands.

In sections 4 and 9 the record meander was up to 50 chains inside the present shoreline. The record position of the meander corner between sections 4 and 9 fell on the shoreline at the end of Collins Hole. (See map, figure 2). The first 3 courses in section 9 crossed high fast land and partially through a citrus grove. The remaining record courses in sections 4 and 9 passed through mangrove swamps on both sides of line. These swamps were flooded with water up to 2 feet deep and the black mangrove trees were all dead.

The record position for the meander corner between sections 10 and 15 fell 19 chains west of the actual shoreline along Spratt Creek. The remaining meander corner positions fell close to an actual shoreline or at points that were reasonably close to what Harris could have construed to be the edge of Indian River.

OMITTED & SWAMP LANDS, PELICAN ISLAND

Although the leading court decisions hold that it is immaterial how or why the original surveyor made his errors it is usually helpful to attempt to determine "what happened" to cause a large discrepancy between the record and actual ground conditions.

Harris' contract was for the survey of a large number of townships. The Special Instructions read in part: "Before proceeding to section any of the townships embraced in your contract you will make an examination of it, and should you find there is not sufficient good land or land fit for cultivation and not subject to overflow, that when sold would not pay the expense of surveying, you will at once abandon it as it is not proposed, by your contract, to survey any land not fit for cultivating, or that would not find ready sale when brought into market."

Harris could easily have construed these instructions to mean that he was to survey only uplands, and that he was not to survey swamp and overflow lands. Such an omission would not preclude the right of the government to survey them at some later date. The record meander corner positions indicate that Harris made no attempt to survey the mangrove swamps, or extend his lines across them in search of the true edge of the Indian River.

The 1859 report of the Surveyor General of Florida and the Commissioners report of that year state that Harris was forced to abandon the original surveys because of heat and insects. An examination of the Harris field notes reveal that four sheets, (8 pages) are written in different handwriting than the remainder of the notes and appear to be insertions, i.e., page 918 - blank, pp. 919 - the line between sections 17 and 18, pp. 922 - the line between sections 8 and 17, pp. 923 - blank, pages 932 and 933 - the north boundary of the township across Indian River, pp. 956 - meanders in sections 4 and 9, pp. 957 - meanders of the Atlantic beach in sections 25, 26 and 36. On page 956 only three meander courses are returned in section 9, the fourth course shown on the plat as N. 35° E., 15.40 chains does not appear in the field notes.

A letter dated at St. Augustine, Florida, on January 20, 1860, from the Surveyor General to the Commissioner of the General Land Office reads in part: "Your letter dated January 12, 1860, has been received accompanied by four books of field notes returned for want of index diagrams. The contents of this letter have been carefully noted and in reply have to state that your letter of the 20th ultimo, directing the manner of distinguishing the lines run for closing or completing the survey of townships previously partly surveyed; was not received at this office for several days after the last plats of Mr. Harris' work had left this office."

Later in the letter the townships under discussion are identified as T. 31 S., R. 39 E., and Tps. 32, 33 and 34 S., R. 40 E.

Based on this incomplete evidence it is possible that Harris never did complete the surveys in T. 31 S., R. 39 E., and that the meanders of Indian River, at least in sections 4 and 9, were "completed" in the office. There is no clear evidence to show that Harris was paid for completing his work. There is little doubt that those meanders were never run on the ground and if not fraudulent, they were grossly in error.

Preliminary Statement of the Problem

The problem to be solved deals with omitted lands and what constitutes gross error If the record meander line is grossly in error it is to be surveyed as a fixed and limiting boundary of the surveyed (and now patented) lands. Are all of the record meanders grossly in error or only part of them? Once this decision is made how shall any unsurveyed lands be surveyed, and the rectangular survey extended? Are the "mangrove islands" upland subject to survey as public lands?

Regulations

This survey illustrates the application of the following sections of the Manual of Surveying Instructions, 1973:

1-12	Navigable waters
1-13 to 1-15 7-95 to 7-99	Swamp and overflowed lands
3-103 to 3-111	Completion of partial sections
3-115 to 3-119, 3-122	Meandering
5-43	Broken Boundary adjustment
5-45	One point control
7-77 to 7-84	Omitted lands

Regulations pertaining to the determination of swamp lands are contained in 43 CFR 2625.

Omitted lands are governed in part by regulations outlined in 43 CFR 9185.

Legal Constraints

The leading court decisions pertaining to this case are, Niles v. Cedar Point Club, 175 U.S. 300; Mitchell v. Smale, 140 U.S. 406; French-Glenn Livestock Co. v. Springer, 185 U.S. 47 and many others. The Department has ruled on similar cases on appeal: Rust-Owen Lumber Co., 50 L.D. 678, Hatcher, et al., 49 L.D. 452, and Burt A. Wackerli, et al., 73 I.D. 280. An unreported decision Donald P. Campbell, A-26311, decided May 2, 1952, is also pertinent.

Final Statement of the Problem

No further information changed the problem from the preliminary statement.

Solution

The area of fractional lots 1, 2, 5 and 6, section 4, is shown on the Harris plat as containing 146.75 acres. The area of lots 1 and 2, section 9, is shown as 82.60 acres. An extension of the line between sections 4 and 9 west to Turtle Pen Slough reveals that about 115 acres of land in section 4 and 156 acres in section 9 lie outside the record meander line. Thus there is an excess of about 271 acres of land over the patented area of 229 acres, a ratio of 1.2 to 1.0. The meander line passes over land that is the same on both sides of the line. The record meanders are up to 50 chains from the actual shore of Indian River. Black mangrove will not grow on land subject to daily flooding by the tides, although the area contains black mangrove throughout. The black mangrove is now dead due to flooding for mosquito control. A comparison of the 1880-81 and 1949 topographic maps shows no change in the shoreline in those intervening 78 years. There is no reason to believe that any change took place between 1859 and 1880, a period of only 21 years. Clearly the excess lands in sections 4 and 9 are omitted lands, the original meanders were grossly in error if not fraudulent.

In sections 10, 22, 26 and 35, the record meanders are generally outside the actual shoreline by as much as 15 chains. In sections 15 and 27 the record meanders are inside the actual shoreline by a maximum of about 10 chains but the ratio of excess lands to that shown on the originally fractional lots does not approach a 1:1 ratio. Therefore it would be nearly impossible to sustain an argument of omitted lands in sections 15 and 27 under the present court decisions.

The adjusted record meander line crossed two islands in section 26, lying easterly of the surveyed Pine Island, North Horseshoe Island, Roosevelt Island and one of the small Egret Islands. In the Donald P. Campbell decision, A-26311, it is said (syllabus) "Where a meander line crosses part of a island in a navigable lake, that part of the island within the meander line passes with the patent to the mainland." So even though the Harris meanders were in error in sections 10, 15, 22, 26, 27 and 35, they could not be held to be grossly in error and all lands in those sections inside the record meander line passed from the United States with the patent, even though part of those lands were outside the actual shoreline. The patentee did not gain ownership of the submerged lands, however, for those lands belonged to the State of Florida in her sovereign right. In the same manner some "land" had been added to Paul's, Nelson and Preacher's Islands and the unnamed island in section 26, by deposits of dredge spoils from the Intracoastal Waterway. These spoils were deposited on submerged lands and were manmade accretions to those islands. These spoil deposits were not public land subject to survey. See U.S. v. Mission Rock Co., 189 U.S. 391.

The conclusion reached was that all lands outside the record meander line in sections 4 and 9, and all unsurveyed islands in the Indian River outside the record meander line were public land subject to survey and disposal under the land laws.

The field surveyor obtained a list of all owners of surveyed lands on the barrier island from the county records. Notice was served by Certified Mail on all affected owners and appropriate state officials of the intention to survey these public lands.

After the section line resurveys were completed the record meander line through sections 4 and 9 was adjusted with the angle points monumented and numbered consecutively.

In sections 10, 15 and 26, none of the angle points fell on unpatented land so none were monumented. Where the adjusted meander line intersected the mean high water line of an unsurveyed island, auxiliary meander corners were established and monumented.

The section lines were extended in a manner similar to a normal completion survey across the omitted lands in sections 4 and 9, and across the unsurveyed islands, with meander corners established at mean high water line of the Indian River, its sloughs and channels. If a section line did not cross an unsurveyed island an auxiliary meander corner was established in an appropriate location on the island at mean high water line. These auxiliary meander corners were then tied by course and distance to a regular corner or meander corner of the section in which the island was located. The omitted lands in sections 4 and 9 and the unsurveyed islands or portions of them lying outside the adjusted record meander line were meandered along mean high water line. Dredge spoil deposits were not meandered but were noted for information and topographic purposes.

After the field work was completed the field notes were written and the plat constructed in 3 sheets. The plats accepted on March 29, 1968, are shown in figures 6 and 7. All of the new lots were classified as Swamp and Overflow Lands except lot 9, section 9 which was classified as Upland under the Swamp Land Act of 1850.

Protests and Appeals

After the field work was completed, two land owners in sections 4 and 9 protested the survey. The protestants were Mr. and Mrs. William P. Surman, owners of lot 2, section 9 (less 15 acres), and by First Realty Associates, Inc., owners of lot 1, section 9 and lot 6, section 4. In general the protests were based on the argument that these lots were riparian on the Indian River and that the Harris survey was correctly executed as shown on the plat. The contention was that there were no omitted lands abutting their ownership, the boundary of their property was the Indian River. The Surman's had a citrus grove on a portion of alleged omitted land in section 9 (lot 9).

These protests were dismissed by the Chief, Division of Engineering on May 15, 1968. The dismissal was based on the grounds that the 1859 meander line was grossly in error, that it was up to 50 chains from the actual shoreline, and the area of omitted land exceeded the area called for in the patent and was therefore substantial, that the leading applicable court decisions supported this decision and that the government had the right to survey lands omitted by the original surveyor. The protestants were notified of their rights to appeal the dismissal within 30 days and were given procedures for making an appeal.

Another protest of the survey was received from the Rio Corporation, owners of lots 2 and 5 and other lands in section 4. The protest was made after the dismissal of the Surman and First Realty protests and after acceptance of the plat. Since the Rio Corporation protest was basically the same area of consideration, the Solicitor for Land Appeals considered it along with the appeals from Surman and First Realty.

The decision titled William P. Surman, et al., A-31010, was rendered by the Assistant Solicitor, Land Appeals, on December 1, 1972. The decision affirmed the decision by the Chief, Division of Engineering and dismissed the Rio Corporation protest.

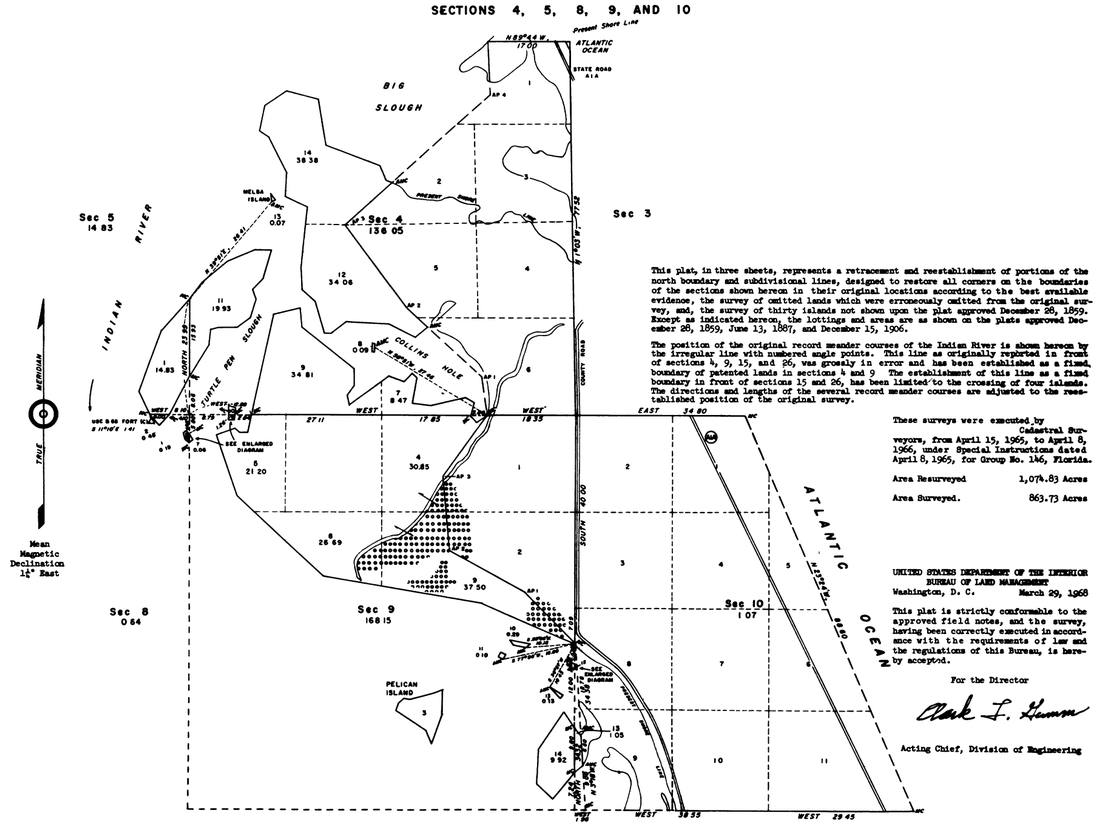
Subsequently the mangrove island and swamp areas were patented to the State of Florida under the Swamp Land Act. Those lands were then leased from the State by the Bureau of Sports Fisheries and Wildlife as part of the Pelican Island Refuge. Lot 9, section 9 was withdrawn for possible inclusion into the Refuge. Surman filed a Homestead Entry application on lot 9, then a public sale application and lastly a color of title application. These applications were all rejected. On appeal the color of title application was rejected by the Interior Board of Land Appeals on December 6, 1974 in the decision titled William P. Surman, IBLA 75-16.

OMITTED & SWAMP LANDS, PELICAN ISLAND

TOWNSHIP 31 SOUTH, RANGE 39 EAST, OF THE TALLAHASSEE MERIDIAN, FLORIDA

DEPENDENT RESURVEY, EXTENSION SURVEY AND SURVEY OF ISLANDS

SECTIONS 4, 5, 8, 9, AND 10



This plat, in three sheets, represents a retracement and reestablishment of portions of the north boundary and subdivisional lines, designed to restore all corners on the boundaries of the sections shown hereon in their original locations according to the best available evidence, the survey of omitted lands which were erroneously omitted from the original survey, and, the survey of thirty islands not shown upon the plat approved December 28, 1859. Except as indicated hereon, the lottings and areas are as shown on the plats approved December 28, 1859, June 13, 1887, and December 15, 1906.

The position of the original record meander courses of the Indian River is shown hereon by the irregular line with numbered angle points. This line as originally reported in front of sections 4, 9, 15, and 26, was grossly in error and has been established as a fixed boundary of patented lands in sections 4 and 9. The establishment of this line as a fixed boundary in front of sections 15 and 26, has been limited to the crossing of four islands. The directions and lengths of the several record meander courses are adjusted to the reestablished position of the original survey.

These surveys were executed by Cadastral Surveyors, from April 15, 1965, to April 8, 1966, under Special Instructions dated April 8, 1965, for Group No. 146, Florida.

Area Resurveyed	1,074.83 Acres
Area Surveyed.	863.73 Acres

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. March 29, 1968

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Acting Chief, Division of Engineering

SECTIONS 15, 16, 21, AND 22

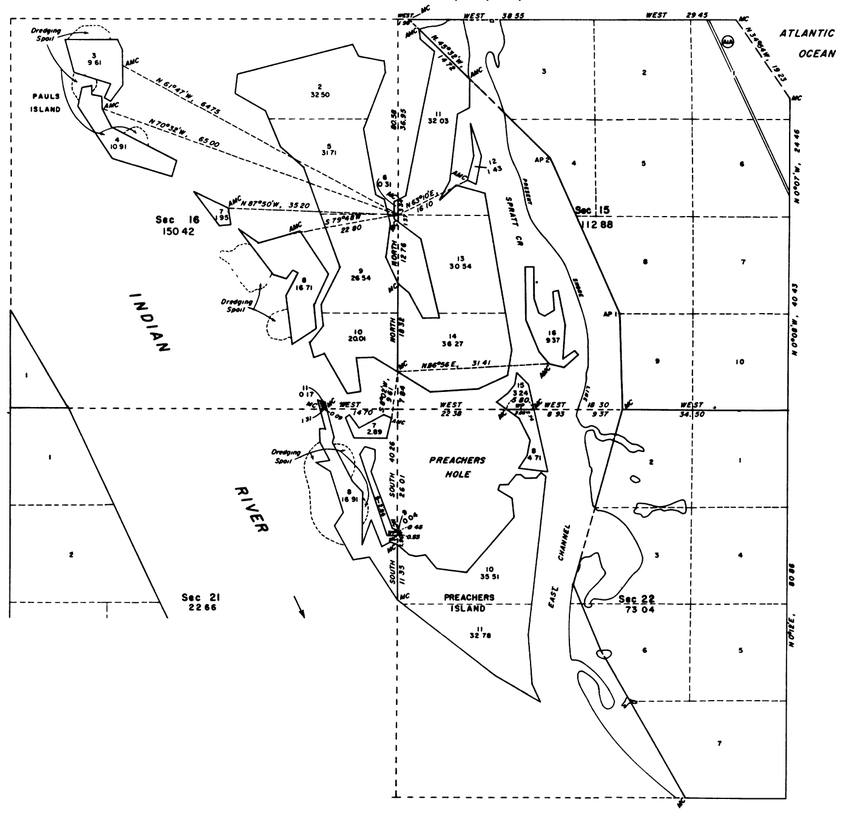
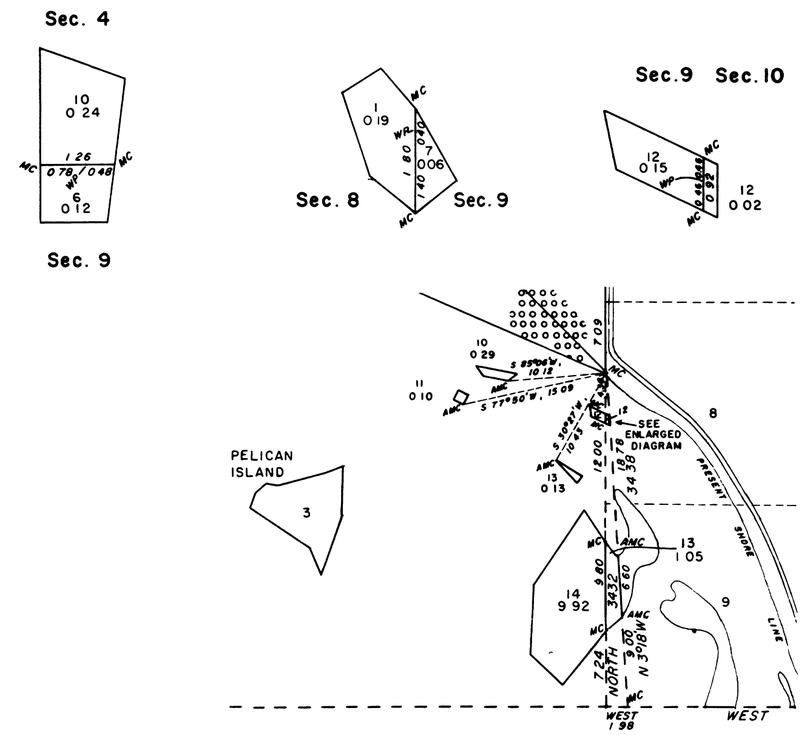


Figure 6 - Portions of Sheets 1 and 2 of the Accepted Plat

ENLARGED DIAGRAMS



SECTIONS 26, 27, 34, 35, AND 36

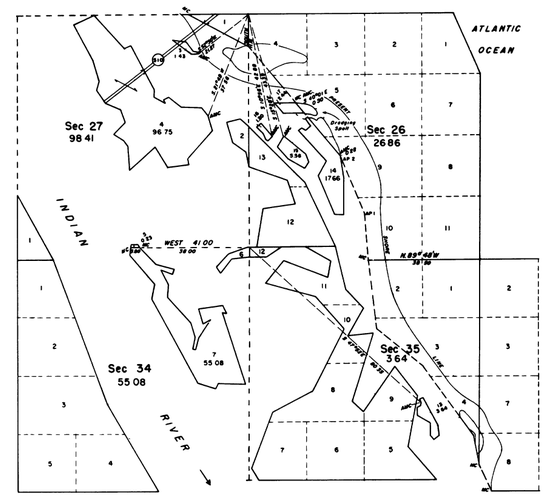


Figure 7 - Portions of Sheet 3 of the Accepted Plat