U S DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Cadastral Survey Training Program

Public Lands Surveying
·A Casebook·

prepared by
The Cadastral Training Staff
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PURPOSE

The Bureau of Land Management Cadastral Survey Training Program was established in 1970. At that time there were extremely few publications available on the subject of Cadastral Surveying. For various reasons none were entirely suitable for use as teaching materials.

In order to provide suitable materials for the training job at hand, a very considerable portion of the effort expended toward presentation of the training program involved development of training materials. This book was one such development.

Any teaching material used for training must present accurate information and correct procedures. Any instructional material for use in training cadastral surveyors must not only be correct but it cannot conflict with the instructions given in the Manual of Surveying Instructions. Because the BLM Manual of Surveying Instructions was undergoing complete revision in 1970, during development of this book, it became clear that a text consisting of instructions would unnecessarily paraphrase the Manual to be revised.

Under the conditions at that time the logical method of development of the needed materials was to present actual approved surveys. It would be necessary to provide greater detail than is usually available and to describe how the particular solution was reached. Because the material was factual and had been approved by the Washington Office, the system was adopted.

This compilation of Public Lands Surveys is intended for self-study as well as for use in classroom instruction. It is intended that anyone versed in survey technology who uses this book and the Manual of Surveying Instructions could master the fundamentals of Public Lands Surveying, particularly the resurvey of those lands (as opposed to the original surveys.)

In addition to its use as instructional materials, it is expected that this casebook can be used as a reference work for the practicing surveyor. A number of frequently occuring problems are not discussed in any other publication.

Because the page numbering system permits the future change in number of pages in each survey situation presented, new cases can replace the chosen cases to reflect changes which may occur in legal interpretation of boundaries or to reflect evolution of legal theory as expressed by the higher courts.

HOW TO USE THIS BOOK

In the Classroom. Law students are accustomed to learning principles of law by means of study of court decisions (cases). There is a knack to learning by this method. The secret lies in continually and actively looking for the principle during the time you are trying to understand what happened.

Another aid to learning in this manner is to digest each step of the case in sequence. If the reader tries to skim through the text or (even worse), to "look at the pictures," there can be no real expectation that the true principle will be discovered. It is suggested that the reader start with the History of Surveys text and carefully compare the Graphical History (presented as isometric drawings) with the plats reproduced in full or in part. Follow, in the given sequence, Reasons for Request of the Survey and through the Preliminary Statement of the Problem. At this point, turn to the Manual of Surveying Instructions, 1973 and read the sections referred to under Regulations. After that background you are ready to tackle the meat of the case. The inevitable side issues are discussed under Auxiliary Topics and Supplemental Topics. Remember to keep asking yourself, "What basic principle is represented here?"

As a Self Study Guide. The historic method of training a "new man" in the complexities of Cadastral Surveying was to hand him a copy of the "Manual" and tell him to read it from cover to cover. Just as the learner felt he had mastered one area, he found that the examples elsewhere showed what might be a different solution. The frustration the old timers suffered can now be avoided during self teaching.

The interested surveyor should study this book plus the Manual of Surveying Instructions in the following sequence:

1) "Manual" chapter I, sec. 1-1 to 1-23
2) "Manual" chapter II, sec. 2-1 to 2-20
3) "Manual" chapter III, sec. 3-1 to 3-23; sec. 3-74 to 3-96; sec. 3-124 to 3-127
4) "Manual" chapter IV, sec. 4-1 to 4-22; sec. 4-83 to 4-96
5) "Casebook" section A-1, Fundamentals of Corner Restoration
6) "Manual" chapter V, sec. 5-1 to 5-47
7) "Manual" chapter VI, sec. 6-1 to 6-32
8) "Casebook" chapter A2 and the following cases in serial order, using the "Manual" as indicated in the text, until completion.

Solution of Field Problems. The user who has already studied the book will find the index is all he needs for location of the subject matter.

For those not already familiar with the book, consider the process you are trying to look up, such as Reestablishment of Meander Corners or Evaluation of Evidence, and look under the verb as well as the noun. If neither the verb or noun appears in the index, consider related names or related processes and look there.

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PRINCIPLE I.

Federal Law, including the Manual of Surveying Instructions,

governs boundary location of Public Lands.

General

The Secretary of the Interior, or such officer as he may designate, is authorized to enforce and carry into execution, by appropriate regulations, every part of the provisions of the Public Land Laws not otherwise specially provided for. (1, 5)

The Code of Federal Regulations and the Manual of Surveying Instructions are products of the authority vested in the Secretary of the Interior to make such appropriate regulations as to enforce and carry into execution the provisions of the public land laws not otherwise specially provided for.

Interior Decisions are regulations issued by the Department of the Interior and are considered as law by BLM employees. Some Interior Decisions pertain to methods of execution of the surveys of the public lands.

Caution: Some Interior Decisions (previously called Land Decisions) were issued between dates of issue of Manual of Surveying Instructions.

The Secretary of the Interior may, as of March 3, 1909, in his discretion, cause to be made, as he may deem wise under the rectangular system on that date provided by law, such resurveys or retracements of the surveys of public lands as, after full investigation, he may deem essential to properly mark the boundaries of the public lands remaining undisposed of: PROVIDED, That no such resurvey or retracement shall be so executed as to impair the bona fide rights or claims of any claimant, entrymen, or owner of lands affected by such resurvey or retracement: .... (4)

The general rules which control the location of all public lands and the fundamentals of corner restoration have evolved from the authority vested in the Secretary, statutory law, common law, and court decisions. These rules and fundamentals are now followed by the Bureau of Land Management.

Conflict Between Federal and State Laws

All state laws that are in conflict with the Federal statutes and land department principles concerning methods of survey have been declared void in so far as the boundaries of public lands are concerned. (6)

The survey of acquired or re-acquired lands is governed by the state laws in which the land is physically located.

PRINCIPLE II.

Once established, corners of the Public Lands are fixed in their monumented positions but the government may survey or resurvey its public lands as it chooses.

General

The boundary lines, actually run and marked in the surveys returned by the Secretary of the Interior or such agency as he may designate, shall be established as the proper boundary lines of the sections, or subdivisions, for which they were intended, and the length of such lines, as returned, shall be held and considered as the true length thereof. (3)

Lines As Marked and Surveyed

The boundaries of the public lands, when approved and accepted are unchangeable. (3).

Caution: Check for possible corrections or even a suspension or cancellation of an approved survey before any title has passed to private individuals.

Monuments

The original township, section, and quarter-section corners must stand as the true corners which they were intended to represent, whether in the place shown by the field notes or not. The distance between such corners as returned shall be held and considered as the true length thereof. The monuments set at the time of the original survey are the best evidence as to where the original boundaries were established, and as such the position of the monuments must remain unchangeable (3).

Conclusive Evidence Outweighs the Record

The actual corner monument, when found and is undisturbed, is paramount; the record (field notes and plat) is subordinate to the monument.

Resurvey

A resurvey is a reconstruction of land boundaries and subdivisions accomplished by rerunning and remarking the lines represented in the fieldnote record or on the plat of a previous official survey. The two main objectives of the resurvey are:

1. The adequate protection of existing rights acquired under the original survey in the matter of location on the earth's surface.

2. The proper marking of the boundaries of the remaining public lands.

Line Trees and Blazed Lines

All lines shall be plainly marked upon trees, and measured with chains,... (2).

Therefore, if a boundary line was marked by line trees and an original marked line tree is found, it still marks the boundary line (at least in alinement) and may become an angle point in the line.

Under the law, a definitely identified line tree is a monument of the original survey. As an existing monument, a line tree is used as a control point in the reestablishment of lost corners by the appropriate method of proportionate measurement. (24)

Caution: Often line trees were recorded as being on the original surveyor's random line and not on the actual true line between corners.

If a boundary line was marked with a blazed line by the original surveyor and can be definitely identified, the mean position of the blazed line still marks the boundary line and may be used to fix a meridional line for departure, or a latitudinal line for latitude in the absence of the original monuments. (22)

Caution: Often the random lines were blazed rather than the actual true line between corners. Corrections may have been made by the original surveyor before the final acceptance of his survey or he may have blazed more than one line.

Witness Point

If a boundary line was marked by a witness point and it is found, it still marks the boundary line (at least in alinement) and may become an angle point in the line. (18)

Witness Corner

If a witness corner marked the line (was on line) of the original survey, it should still mark (control the direction of) that line and may become an angle point in the line. (17)

The position of the nearest identified control corners, including witness corners, determines the proportionate measurement of any intermediate positions between those controlling corners.

Supplemental Plats

Supplemental plats prepared by protraction to show new or revised lottings in one or more sections of remaining public domain supersede the lottings shown on the original plat. (35)

Closing Corners

Closing corners are intended to be established where a closing line intersects a boundary already fixed in position. A closing corner not actually located on the line that was closed upon will determine the direction of the closing line, but not its legal terminus; the correct position is at the true point of the intersection of the two lines. (16)

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE III.

The Court will consider the intent of the parties

in reconstruction of deed descriptions.

General

Traditional methods employed to interpret ambiguous agreements or title documents are called Rules of Construction. These rules are to be invoked in ascertaining boundaries only when there is a conflict or inconsistency in the calls found in the field-notes or between the calls in deeds and those of the field notes.

If an accurate description can be built up from existing government monuments and field-notes, there is no uncertainty in the boundary line.

In a dispute, the courts will construe the evidence (interpretation of words) most strongly against the party who writes the deed (8, 11). The United States is considered as the writer when a patent for a parcel of land is issued.

Closing Corners

Closing corners are intended to be established where a closing line intersects a boundary already fixed in position. A closing corner not actually located on the line that was closed upon will determine the direction of the closing line, but not its legal terminus; the correct position is at the true point of the intersection of the two lines.

Plats

Early platting, reproduction, and copying processes often led to errors on various plats. The Land Office copy for the Official Plat is generally the one from which patents are issued and therefore should be the one used if discrepancies (e.g. area, distances, lottings, etc.) exist on various copies thereof.

PRINCIPLE IV.

The plat and the field notes are considered together with,

and as part of, the grant (patent) itself.

Original Field Notes and Plat

When lands are granted according to an official plat of a survey, the plat with all its notes, lines, descriptions and landmarks becomes a part of the grant or deed by which they are conveyed and controls, so far as limits are concerned, as if such descriptive features were written out on face of deed or grant. (12)

The copy of the official plat from which the patent was issued is the copy which becomes part of the patent itself.

Where there is a variance between the plat and the field notes of an original government survey, the plat must control. (13)

The township plat furnishes the basic data relating to the survey and the description of all areas in a particular township. The plat is developed from the field notes and is intended to be an exact pictorial representation thereof.

When the field notes are relied upon to restore a lost corner and are found to be inconsistent, and cannot be reconciled, there is no universal rule that certain ones shall be preferred to others; but, as in a case where living witnesses contradict each other, those should be accepted as correct which, under all circumstances, are most entitled to credit, and most likely to be in accordance with the actual facts. (14)

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

A. AN ORIGINAL SURVEYOR'S MISTAKE WHICH IS IDENTIFIED WILL BE CONSIDERED BY THE COURTS TOWARD PLACING THE ENTIRE BLUNDER WHERE IT OCCURRED.

Place the Blunder Where the Blunder Occurred

All discrepancies in measurement should be carefully verified with the object of placing each difference where it properly belongs. Whenever it is possible to do so, the manifest errors in measurement are removed from the general average difference and placed where the blunder was made. An example of this rule is witnessed by corrections for chaining errors.

When it is obvious or unquestionably proven that the original surveyor made a tally blunder in his chaining, the amount of the blunder is corrected before any remaining discrepancies between the retracement and original survey are adjusted or proportioned.

By placing any blunder where it occurred and weighing corroborative collateral evidence, the surveyor can make a professional decision as to whether a line tree or a blazed line is the best available evidence of the position of the original boundary line.

B. CORNERS ARE RESTORED BY THE NEAREST AND BEST AVAILABLE EVIDENCE:

Existent Corner

An existent corner is one whose position can be identified by verifying the evidence of the monument or its accessories, by reference to the description in the field notes, or can be located by an acceptable supplemental survey record, some physical evidence, or testimony.

Even though its physical evidence may have entirely disappeared, a corner will not be regarded as lost if its position can be recovered through the testimony of one or more witnesses who have a dependable knowledge of the original location.

Obliterated Corner

An obliterated corner is one at whose point there are no remaining traces of the monument or its accessories, but whose location has been perpetuated, or the point for which may be recovered beyond reasonable doubt by the acts and testimony of the interested landowners, competent surveyors, other qualified local authorities, or witnesses, or by some acceptable record evidence. A position that depends upon the use of collateral evidence can be accepted only as duly supported, generally through proper relation to known corners and agreement with the field notes regarding distances to natural objects, stream crossings, line trees, and off-line tree blazes, etc., or unquestionable testimony.

Lost Corner

A lost corner is a point of a survey whose position cannot be determined, beyond reasonable doubt, either from traces of the original marks or from acceptable evidence or testimony that bears upon the original position, and whose location can be restored only by reference to one or more interdependent corners.

Collateral Evidence

Collateral evidence is additional or auxiliary evidence which supports or reinforces the primary evidence of a corner point. The primary evidence is the actual corner monument or its accessories. Collateral evidence may be in the form of acts or testimony of interested landowners, competent surveyors, other qualified local authorities or some acceptable record evidence in identifying the true original position of a corner. Collateral evidence in surveying is similar to circumstantial evidence in law (by itself, it is insufficient; but an abundance of it is conclusive).

Retracement

A retracement is a survey that is made to ascertain the direction and length of lines and to identify the monuments and other marks of an established prior survey. A retracement may, also, show discrepancies of courses and/or distances which exist between the original record and the current physical findings (32). Retracements are often used to gather collateral evidence of the original survey or to develop search areas.

Identification of Monuments

After making due allowances for natural changes, a monument to be identifiable should not differ from the following:

1. The character and dimensions of the monument in evidence should not be widely different from the record.

2. The markings in evidence should not be inconsistent with the record.

3. The nature of the accessories in evidence, including size, position, and markings, should not be greatly at variance with the record. (20)

Accessories are considered as part of the monument; their identification, without finding the monument can fix the position of the monument and restore an obliterated corner to its original location. A search for a monument includes a search for all accessories. (19)

Identification of Lines Run

Where the direction of a line can be determined from the mean position of a number of blazed trees, the direction so established may be controlling where the corner monument is lost. Sometimes a stream or canyon crossing becomes controlling, especially where the crossing is near a corner. (23)

Shoreline as Evidence

Where the official record of a government survey shows that a meander line coincides with the shoreline of a lake, as in the discussion regarding County Ditch No. 67, Murray County, 1922, 186 N.W. 711, 155 Minn. 292, it is prima facie evidence that the meander line marks the actual shoreline.

When other evidence is sparse or nonexistent, the actual shoreline which approximately conforms to the original meanders may be the best available evidence or collateral evidence necessary to reestablish an obliterated meander corner.

Using the actual shoreline, when proven to be located approximately where the original surveyor described it, coincides with the principle of following the footsteps of the original surveyor.

The shoreline as direct evidence is more conclusive where it follows a well defined bank or the distance from a surveyed line crossing or meander corner to a definite bend is relatively short. Conclusive evidence may also be provided where the line crosses a well-defined short leg (point) of water or land (e.g. an island).

Caution: This alternative for possible corner restoration is often overlooked. The use of this method should be in harmony with the original survey, concurrent survey, and the other methods of restoring corners.

Topographic Calls

When items of topography are found where described by a certain surveyor in portions of a particular township, they may substantiate the reliability of similar calls for items of topography by the same surveyor elsewhere in the township.

The topographic calls of the original field notes, when found, may fix the position of a line or corner beyond reasonable doubt. They may also be used to fix a position of a missing corner in either latitude or departure. (25)

Caution: Topographic calls may have been made on the random line rather than the true line between corners. Generally, if the restoration of a corner is dependent upon items of topography alone and appears to be questionable--don't use it! A check should be made to determine whether the results of restoring a corner from topographic calls are harmononiously related to the original and concurrent surveys.

In order for a topographic call to be used to fix the position of a corner or line, it must not be contradicted by evidence of a higher class or by other topographic calls and should have only one reasonable interpretation. In the absence of other collateral evidence, it is better practice to turn to suitable means of proportionate measurement when the specific topographic call is questionable.

Restoration of Lost Corners

Often the best available evidence of the original location of a corner is the method by which it was originally established, and it's relationship to subsequent surveys. The best method or combination of methods used to restore the lost corner may be obtained by following the footsteps (or methods) of the prior surveyors. Listed below are some of those modified forms and combinations of methods for restoring lost corners.

a. One-point control

When a lost corner was originally established at the terminus of a line from one direction only, it should be restored at the record bearing and distance from the nearest regular corner with the possibility of an index correction. An example of this situation would be where a quarter-section corner was originally established on a section line which was never completely surveyed.

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

B. (Cont.) CORNERS ARE RESTORED BY THE NEAREST AND BEST AVAILABLE EVIDENCE.

b. Two-point control

When a lost corner was originally established at the terminus of lines from two directions, it should be restored at the record distances (cardinal equivalents) with the possibility of an index correction. One distance controls latitudinally and the other controls meridionally.

c. Three-point control

When a lost corner was originally established at the terminus of lines from three directions, it should be restored at single proportionate distance in one direction (between control corners in opposite directions), and by letting the record distance (cardinal equivalent) control the position from the remaining direction. Examples of this situation may exist where lost township or section corners were originally established with control lines in only three directions.

d. Irregular boundaries

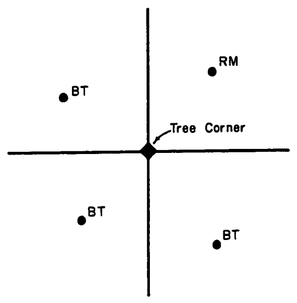
There are three general types of irregular boundaries. First, irregular township lines where originally parts were possibly surveyed from opposite directions and the intermediate portion was completed later by random and true line. Second, irregular section lines where originally a partial survey was followed by a completion survey. Then a retracement would probably reveal a deflection in alinement. Third, irregular section lines or township lines where meander corners have been established from opposite directions on a section line which is intersected by a river, with a tie given across the river between the meander corners. Occasionally, the plat indicates the section line to be a straight line if the tie between the meander corners is within the allowable limits. However, a close examination of the notes may indicate a deflection in alinement of the section or township line.

In these situations any lost intermediate corners should be restored by a modified form of single proportionate method of corner restoration. First single proportion the cardinal equivalent of the closing distance in the direction of the line. Second, single proportion the cardinal equivalent of the closing distance in the other direction based on the accumulated distances attained after the corrections for the first step are completed.

e. Line intersections

When a lost corner was originally established by intersection of surveyed lines, it should be restored at the intersection of the same lines.

Caution: The preponderance of evidence of the actual conditions, in cases such as a center-quarter section corner, may indicate that a four-way proportion would be a better method in some situations.



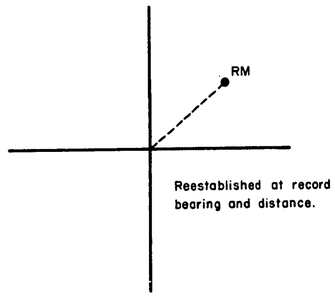
Original

Attempts to emphasize various methods, capabilities of equipment, and existing regulations by which the original corners were established have led to the use of the following methods of restoring lost corners in order to protect bona fide rights:

a. Angle points of nonriparian meander lines. (Compass Rule)--based on the assumption that the angles and distances of the original were measured with equal precision.

b. Grant boundaries. A rotation and scale change which retains the form of the original survey being adjusted. The interior angles are unchanged and the increase or decrease in lengths of lines is constant.

The use of the grant boundary adjustment (in the BLM) may have evolved from questions concerning original surveys such as:



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What are the exact directions in terms of angular measure from a true north and south line?
What are the true lengths of lines when reduced to a common standard?
How, in the event of an obliteration of the marks of angle points, can the lines be recovered, holding to a uniform correction from record direction to that of true direction, and in the same process hold to a uniform proportional adjustment to the lengths of lines as reduced to a standard unit?

Reference Monuments

Ordinarily, reference monuments have been set in situations where the actual corner point was, or could have been, occupied. In fact, reference monuments were often set while the surveyor and his instrument were at the actual corner point.

A reference monument is an accessory to a corner. As such, when found intact, the actual corner point can be located and there is no lost corner---which rules out the possibility of proportioning the corner.

Reference monuments are generally set (located) as if they were bearing trees or bearing objects.

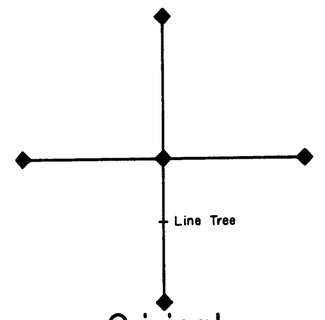
CAUTION: When more than one reference monument is set to witness a corner point, they are often set at equal distances; but not always!

Some reference monuments are set at right angle offsets from the centerline of a highway or railroad.

The actual corner point can be located from one or more reference monuments in the same way it would be located from bearing trees.

Line Trees

A tree intersected by the true line of the original survey was marked as a line tree. Line trees have the same function as a witness point and, therefore, are used in the same way as a witness point for the restoration of lost or obliterated corners. (27)



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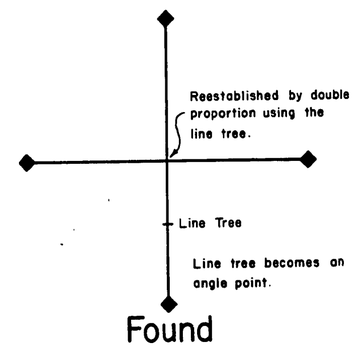

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FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

B. (Continued) CORNERS ARE RESTORED BY THE NEAREST AND BEST AVAILABLE EVIDENCE.

Witness Corners

The position of the nearest identified control corners determines the proportionate measurement of any intermediate positions between those controlling corners.

Caution: Not all witness corners were placed on line and, therefore, not all witness corners can be used as control points for proportionment.

Testimony

The original location of a corner may be restored at a spot pointed out by a person who saw the original corner and knows its former location. The evidence testified to should be given no more weight than would be given in court; i.e., it should not be hearsay, etc.

The following information should be included when obtaining data from a witness concerning the location of an obliterated corner point:

Name
Age
Address
How long at that address?
When he first acquired knowledge of the corner position?
A picture which includes the corner point and the witness with the date, photographer's signature and the witness' signature.
An actual statement by the witness which is complete and signed.

Testimonial evidence given by disinterested parties is often more reliable than that which is given by the adjacent landowners.

All testimonial evidence should be put to the severest possible tests by confirmation relating to known original corners and other calls of the original field notes, particularly to line trees, blazed lines and items of topography. (21)

Map or Plat Reference by Others

Where an acceptable map or plat shows the found location of the original corner, the corner, if obliterated, should be relocated by said map or plat. City, county, state, utility companies, railroads and private surveyors often have maps or plats which include vital information concerning the conditions at an obliterated corner.

Local Corners

Often a corner point has been perpetuated with a monument set by a county surveyor, logging engineer or some other person. Such corners have frequently been relied upon for many years by the adjacent landowners as the actual corner. (34)

It is important that preliminary research for information concerning these local corners be thorough and should include such questions as:

a. Who set it?
b. When was it set?
c. What basis was used to set it?
d. What method was used to determine its position?

These local corners may be accepted as the best available evidence of the original corner point when supported by collateral evidence and found to be harmoniously related to the factors in the original survey.

When the proper method was used to perpetuate a corner and it was done within allowable limits of precision, and relied upon by adjacent landowners as the best available evidence of the original corner position, an indiscriminate rejection of such a corner may lead to serious repercussions.

The acceptance or rejection of a local corner should also be based upon the effect the outcome will have on the bona fide rights of the individual landowners.

Caution: Some local corners are set by landowners at arbitrary positions and others may be fake monuments which resemble the original monuments.

Common Usage

Under special conditions a corner location can be accepted by common usage of a point.

Frequently highways or fences are located along section lines. Where a road or fence has been commonly accepted as the section line and there is no evidence to the contrary, the road or fence is the section line by common report. In the absence of other means, an obliterated section corner can be restored at the centerline intersection of two such roads or intersection of fences which are commonly reported as being the section lines in question. It is far better to accept a long-standing fence corner commonly accepted as the section corner than to try to establish a different position by proportionate measurement. (9)

The acceptance of corners which are commonly agreed upon by the adjacent landowners often avoids disturbing the local conditions.

Caution: The custom of the area concerning how the fence lines were established and the value of the land should be considered.

Unofficial Records

Occasionally, a set of old field books or information concerning a private survey which was not recorded comes to the surface. Such information can and should be used to search for corners and collateral evidence necessary to restore lost or obliterated corners. The bearings and distances as stated in unrecorded surveys cannot legally be used in proportioning any intermediate corners which are missing.

Harmoniously Related

When restoring an obliterated corner or reestablishing a lost corner, an attempt should be made to harmonize the restorative process with the methods used in the original survey (following the footsteps). The following list points out some factors which should be considered in harmonizing the restorative process with existing (the original) and concurrent surveys:

a. Is the end product in harmony with the original plat?
b. Are the corner points, lengths of lines and bearings of lines in harmony with the original and each other?
c. Is there any harmony between the topographic calls in the retracement and those of the record?
d. Are the evidences which are nearest the particular corner in question given the greatest weight and are they harmoniously related to each other?
e. Is the principle of proportionate measurement used which most nearly harmonizes surveying practice with legal and equitable considerations in determining boundaries?
f. Is there harmony between the end product and the evident faithfulness of the original survey?

A position based upon collateral evidence should be duly supported, generally through proper relation (harmoniously related) to known corners, and in agreement with the field notes regarding distances to natural objects, stream crossings, line trees and off-line tree blazes, etc., or unquestionable testimony.

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

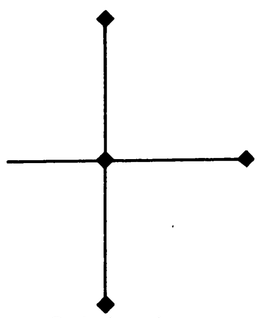
C. PROPORTIONATE MEASUREMENT AND RECORD MEASUREMENT IS APPLIED AS A LAST RESORT OR IT MAY BE USED AS A SUPPLEMENT TO DIRECT EVIDENCE.

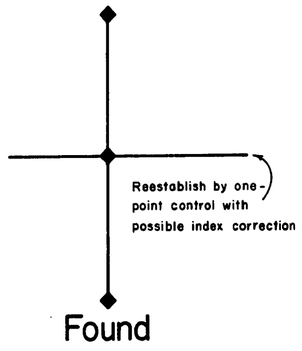
Restoring a corner by proportionate measurement should be regarded as the last resort; all other evidence that might reveal the original location must be exhausted first. (28)

One Point Control

Generally, one point control restores a lost corner at record bearing and distance with the possibility of an index correction (when applicable). (31)

An index correction may be applicable where a retracement has been made of many miles of the original lines between identified corners and there has been developed a definite angular or linear pattern of the original survey. It is then proper to make allowance for the average difference.





Single Proportionate Measurement

Often referred to as "two-way" proportionate measurement. The position of two identified corners controls the direction of the line between those corners, and intermediate positions on that line are determined by proportionate measurement between those controlling corners.

Examples: A quarter-section corner on the line between two section corners; all corners on standard parallels; and all intermediate positions on any township boundary line.

Double Proportionate Measurement

Often referred to as "four-way" proportionate measurement. Four known corners, two each on intersecting meridional and latitudinal lines are used for the purpose of relating the intersection to both. By double proportionate measurement, a lost corner is reestablished on the basis of measurement only, disregarding the record directions. The double proportionate measurement is the best example of the principle that existent or known corners to the north and to the south should control any intermediate latitudinal position, and that corners east and west should control the position in longitude.

Examples: A corner common to four townships, or one common to four sections within a township.

Combinations of Proportionate Measurement Methods

Primary and collateral evidence often lead to abandoning general rules of proportionment and adopting modified forms and combinations of single and double proportionate measurement methods in order to restore lost corners to their original position based on the best available evidence and harmony with existing and concurrent surveys.

Witness Corner

Ordinarily an offline witness corner established in the original survey will fix the true point for the corner at record bearing and distance. Where the witness corner was placed on a line of a survey, if no complications arise, it will be used as control from that direction in determining the proportionate position of the true point. Thus the record bearing and distance would be modified and the witness corner would become an angle point. Unfortunately, the factual statements of the original field notes are not always clear. The record may indicate that the witness corner was established on a random line or there may be an apparent error of calculation for distance along the true line. The monument may not have been marked "WC" plainly or not at all. In these instances, or where there is extensive obliteration, each corner must be treated individually. The important consideration is to locate the true corner point in its original position.

Witness Point

As an existing monument, a witness point is used as a control point in the restoration of lost corners by the appropriate method of proportionate measurement.

Line Trees and Blazed Lines

If line trees or blazed lines are found to be as described by a certain surveyor in a particular township, that fact may substantiate the reliability of similar evidence elsewhere in the township for use of control points in proportioning lost corners.

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

D. PROPORTIONMENT MUST BE APPLIED IN FULL CONSIDERATION OF THE MANNER OF CONDUCT OF PRIOR SURVEYS. (29)

Often the best available evidence of the original location of a corner is the method by which it was originally established. The best method or combination of methods used to restore the lost corner may be obtained by following the footsteps (or methods) of the original surveyors.

Proportionate Measure

If lost corners are to be relocated by proportionate measure, "the new values given to the several parts as determined by the re-measurement shall bear the same relation to the record lengths as the new measurement of the whole line bears to that record."

Importance of One Line Over Another

Not all lines are of equal importance. The method of survey used by the original surveyor often determines the future status of surveyed lines. The precedence of some lines over other lines is recognized in restoring lost corners.

Single Proportionate Measurement

In order to restore a lost corner on a line by single proportionate measurement, a retracement is made connecting the nearest identified corners (or control points) on the line. These corners control the position of the lost corner. Control corners are usually corners established in the original survey of the line. The lost corner is then reestablished at proportionate distance on the true line connecting the recovered corners. Proper adjustment is made on an east and west line to secure the latitudinal curve. Any number of intermediate lost corners may be located on the same plan.

Double Proportionate Measurement

Lengths of proportioned lines are comparable only when reduced to their cardinal equivalents.

An occasional exception to this rule is illustrated in the following example: If the distance along the random line was inadvertently used (even though the random bearing was corrected to the true bearing) on the official plat and in the notes rather than the corrected true line distance, the random distance is the cardinal equivalent of the true distance along the true bearing and no reduction is necessary.

Plat

There is no provision relating to the rules to be followed where corners have been lost, for a proportionate measurement based on the deficiency in acreage of adjoining parcels of land; and, where there is no question as to the establishment of a lost corner, the exact boundaries as shown on the government plat must prevail, and they will control a further description by quantity. (15) .

A deficiency or excess of actual acreage on the ground does not take precedent over the exact boundaries as indicated on the plat. Any proportionment of lost corners will be based on the plat and not on any excess or deficiency of acreage which may exist.

Closing Corners (Off-Line)

It is evident that the law provides for the lengths of the lines, as returned in the field notes, to be held as the true lengths, and the distances between identified corner positions given in the field notes to constitute proper data from which to determine the position of a lost corner; hence the rule that lost corners are restored at distances proportionate to the original measurements between identified positions. When an original closing corner is recovered off the line closed upon and the new monument is established at the true point of intersection, the original position will control the proportionate restoration of lost corners on the closing line which are dependent upon the closing corner. In a like manner the positioning of sixteenth-section corner(s) or lot corner(s) on the closing line, between the quarter-section corner and the closing corner, will be based on the measurement to the original corner monument. (30)

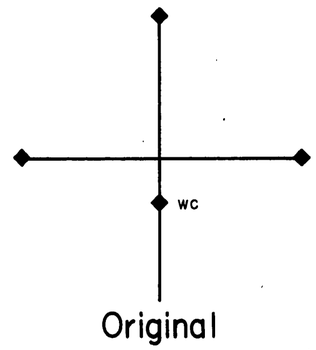
Witness Corners

Following the footsteps of the original surveyor, by considering the Manual and Special Instructions which were current at the time of the original survey along with the field notes, may help to determine whether the true corner point is located by the method of proportionate measurement or at record bearing and distance from the witness corner. (26)

Caution: Determine whether the original witness corner was intended to be on the true line.

Determine which method would best locate the true corner point in its original position.

Some early surveyors have been known to use the terms witness corner and witness point interchangeably.



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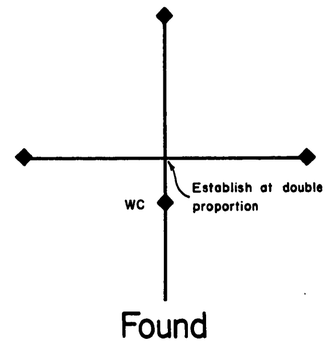

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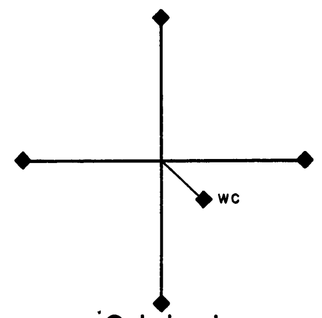

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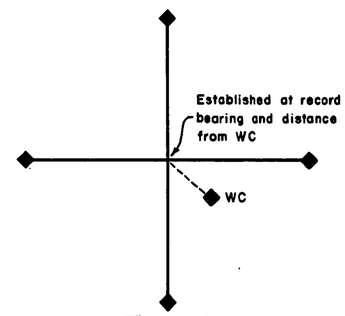


Found

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

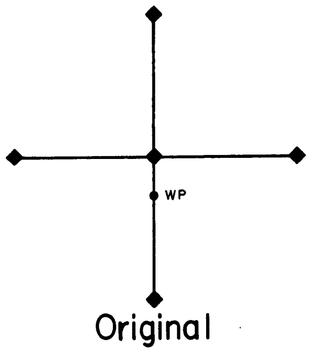
A resurvey restores the monuments at their original positions.

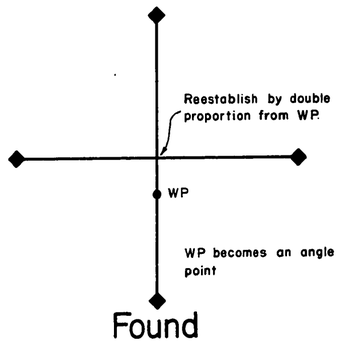
D. (Continued) PROPORTIONMENT MUST BE APPLIED IN FULL CONSIDERATION OF THE MANNER OF CONDUCT OF PRIOR SURVEYS. (29)

Witness Points

Since witness points were ordinarily occupied by the original surveyor and his instrument when set and have a compliment of accessories, they are a pretty reliable source of control when they are found.

A witness point has the same function as a line tree and is used in the same manner to restore lost or obliterated corners. As an existing monument, a witness point is used as a control point in the restoration of lost corners by the appropriate method of proportionate measurement.





Evidence Outweighs the Record

The primary and collateral evidence may be such that the general rules (for single and double proportionate measurement) yield to a more equitable method or combination of methods which restores the corner to its original position.

More Than One Surveyor

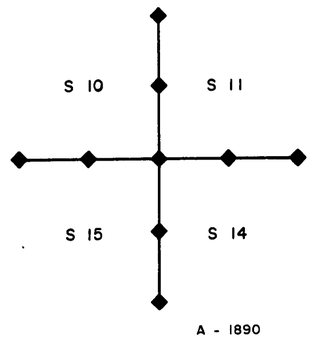
Careful consideration must be exerted in situations where more than one surveyor's work may influence the restoration of a corner. Some pertinent questions which may help in determining which method of restoration to use are:

(a) How well do the surveyors agree in bearings and distances?
(b) How precise are each surveyors' closures?
(c) Was the terrain comparable for each surveyor?
(d) How long a time period between the surveys?
(e) How recent was the last survey?

Caution: More recent surveys tend to be more accurate, but not always!

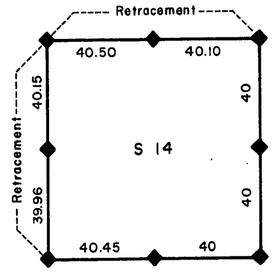
Additional retracement of each surveyor's work in the same township may help to substantiate a preference (confidence) for using his work or giving his work more weight than another surveyor's work.

Conventional methods of corner restoration may give way to the preponderence of evidence.



A - 1890

Surveyor "A"
Called distances as 40's and 80's.
Did not close any section.

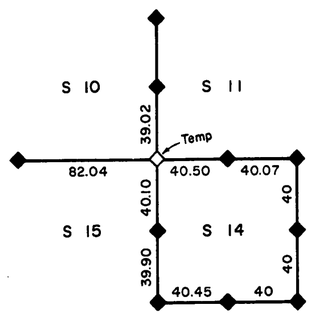


B - 1956

Surveyor "B"
Returned a good closure on section 14.
Returned a distance on the retraced W½ mile between sections 11 and 14 as 40.50 chains.
Returned a distance on the retraced N½ mile between sections 14 and 15 as 40.15 chains.

Problem:
The corner of sections 10, 11, 14 and 15 is lost, as well as the ¼ corner between sections 10 and 15.
How should they be restored?

Present retracement finds:



In this example, the preponderance of evidence indicates that the reestablishment of the section corner by the method of two-point control using surveyor "B's" work is better than blindly using the conventional method of double proportionment.

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

D. (Continued) PROPORTIONMENT MUST BE APPLIED IN FULL CONSIDERATION OF THE MANNER OF CONDUCT OF PRIOR SURVEYS. (29)

COMPUTATION OF THE AREAS OF LOTS ADJOINING THE BOUNDARIES OF TOWNSHIPS. (PARAPHASED FROM THE MANUAL OF SURVEYING INSTRUCTIONS, 1894)

In regular townships, the tracts of land in each section adjoining the north and west boundaries of such townships, in excess of the regularly subdivided 480 acres (except in section 6), will, in general, be in the form of trapezoids, 80.00 chains in length by about 20 chains in width.

On the plats of such townships, each of said tracts will be divided into four lots, by drawing broken lines at intervals of 20.00 chains, parallel to the ends of the tracts, which will be regarded as parallel to each other.

With the exception of section 6, the south boundaries of sections of the north tier, when within prescribed limits, will be called 80.00 chains.

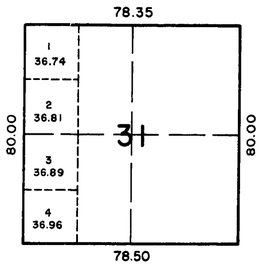
The areas of the lots in any one tract (except in section 6) may be determined as follows:

Divide the difference between the widths of the ends of the tract by 4; if 3 remains, increase the hundredth figure of the quotient by a unit; in all other cases disregard the fraction; call the quotient thus obtained, "d"; then, taking the end widths of the tract in chains and decimals of a chain, the areas of the lots, in acres, will be:

Of the smallest lot: twice the width of the lesser end, plus "d";
Of the largest lot: twice the width of the greater end, minus "d";
Of the smaller middle lot: sum of the widths of the ends, minus "d";
Of the larger middle lot: sum of the widths of the ends, plus "d".

A check on the computation may be had by multiplying the sum of the widths of the ends of the tract by 4; the product should agree exactly with the total area of the four lots.

The proper application of the above rules will always give areas correct to the nearest hundredth of an acre; and, as the use of fractions is entirely avoided, the method is recommended for its simplicity and accuracy.



The ¼ difference of latitudinal boundaries is 0.0375 chains; consequently, "d" is 0.04 chains; then:

18.35 X 2 + .04 = 36.74 acres, the area of lot 1;
18.50 X 2 - .04 = 36.96 acres, the area of lot 4;
18.50 + 18.35 - .04 = 36.81 acres, the area of lot 2;
18.50 + 18.35 + .04 = 36.89 acres, the area of lot 3;

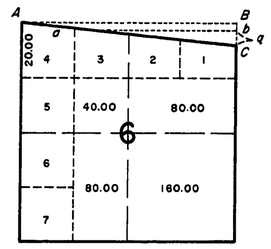
Check: (18.35 + 18.50) X 4 = 147.40 acres, the area of the four lots.

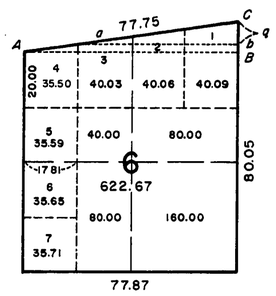
The areas of the lots in section 6 may be determined as follows:

The areas of lots 5, 6, and 7 may be obtained by the foregoing rules in all cases, except when the township closes on a base line or standard parallel; also, the area of lot 4, provided both meridional boundaries are 80.00 chains in length; when the last condition obtains, the areas of lots 1, 2, 3, and 4 will be computed as follows:

Refer to the adjacent diagrams and determine the difference, "q", between the east boundaries of lots 1 and 4 by the following proportion:

N. bdy. sec. 6.: diff. of meridional bdrs. sec. 6.: 60 chs.:q; then will E. bdy. of lot 4 = E. bdy. lot 1 + q; in which, "q" will be added when the east boundary of sec. 6 is less than 80.00 chains; but subtracted when said east boundary is greater than 80 chains.





NOTE
AB and *ab*, are drawn parallel to S. bdy. of the sec.; then, *CA* : *CB* :: *Ca* : *Cb*
N. bdy. sec. 6 : Diff. of meridional boundaries sec. 6 :: 60 chs. : q ; then will E. bdy. of lot 4 = E. bdy. of lot 1 ± q, as in the text, under title "Area of Lots" &c.

Take one third of "q" and add it to the shorter east boundary lots 1 or 4, as conditions may require, and thereby determine the length of one of the meridional boundaries of lot 2; to which, again add "one third of q", and thus obtain the length of the opposite side of lot 2. The areas of lots 1, 2, and 3, in acres, will be found by taking the sum of their respective meridional boundaries, expressed in chains and decimals of a chain.

The area of lot 4 may be had by multiplying its mean width by its mean length.

Finally, to test the entire work, multiply the sum of the latitudinal boundaries by 4, and to the product add the area of the small triangle CAB, if the east boundary is greater than 80.00 chains; but subtract the area of said small triangle if the east boundary is less than 80.00 chains. These operations, correctly performed, will give the true area of the section, which should agree exactly with the total area of its legal subdivisions, obtained in the preceding paragraphs.

Compute areas of lots 5, 6, and 7 of sec 6, as directed previously. Next, write the proportion for "q".

77.75 : 0.05 :: 60.00 : 0.0386 = q; 1/3 = 0.0129
20.0500 - 0.0386 = 20.01, the E. bdy. of lot 4;
20.0114 + 0.0129 = 20.02, the E. bdy. of lot 3;
20.0243 + 0.0129 = 20.04, the E. bdy. of lot 2.

Then, for the areas of lots 1, 2, 3, and 4, compute thusly:

20.05 + 20.04 = 40.09 acres, the area for lot 1.
20.04 + 20.02 = 40.06 acres, the area for lot 2.
20.02 + 20.01 = 40.03 acres, the area for lot 3.

$$\frac{20.00 + 20.01}{2} \times \frac{17.75 + 17.78}{2} =$$

35.54 acres, the area for lot 4

The area in acres of a tract 40.00 chains long, adjoining north or west township boundaries (except in NW¼ section 6), is equal to the sum of its parallel boundaries (expressed in chains and decimals thereof) multiplied by 2.

The area in acres of a tract 60.00 chains long, situated as above described (excluding lot 4, of section 6), may be found by multiplying the sum of its parallel boundaries (expressed in chains and decimals of a chain) by 3.

The area in acres of any section along the north and west boundaries of regular townships (except in section 6) may be had by multiplying the sum of its parallel boundaries (expressed in chains and decimals of a chain) by 4.

Subdivisions closing irregularly to the south or east exterior boundary are to be computed by similar methods.

FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

A resurvey restores the monuments at their original positions.

E. THE RESULT OF PROPORTIONMENT MUST PROTECT THE BONA FIDE RIGHTS OF PRIOR ENTRYMEN. (4)

All lost corners must be restored by proportionate measurement so that all interested parties receive an equitable share of existing excess or deficiency. Patents are equitably protected when a lost corner is proportioned between original corners (or control) which represent the survey from which the patent was issued.

Parenthetical distances and area calculations are important factors which must be considered in order to protect the bona fide rights of prior entrymen.

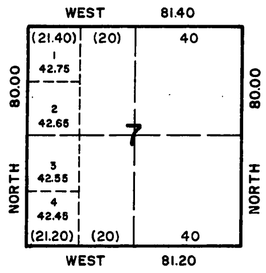
Parenthetical Distances

Parenthetical distances on the plat are implied measurements and are considered to indicate points on a surveyed line which are not monumented. Since they are on the plat and indicate a portion of a surveyed line or of a protracted line from which area can be returned, they are considered as part of the record and must be used to protect the bona fide rights of the patentees.

Where parenthetical distances are used for the calculation of areas, they are also used to protect such area by means of proportionate measurements to the indicated (calculated or implied) points which were not previously monumented.

The parenthetical distances, which are not actually shown on the plat but can be computed from the areas, are equally as important as those which are shown on the plat. The distances were originally calculated and used to compute the areas; therefore, when the areas are given, the implied parenthetical distances based on those areas can be recalculated.

Example: When it is necessary to subdivide section 7 and monument the center-west one-sixteenth section corner, the implied parenthetical distance between lots 2 and 3 can be recomputed based on the areas. The distance can be used with the method of proportionate measurement along the E-W centerline to protect individual rights represented by the area on the original plat.



The implied parenthetical distance upon which the areas in lots 2 and 3 were based is 21.30 chains.

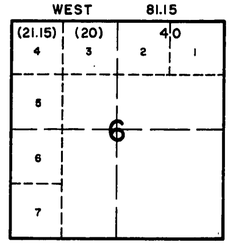
If the west one-half mile of the E-W centerline in a subdivision of section survey is found to be 41.70 chains, the proportioned distances based upon the implied parenthetical distance to the center-west one-sixteenth section corner would be:

21.506 chains from the ¼ section corner of sections 7 and 12.

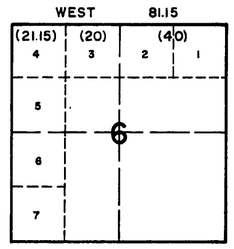
20.194 chains from the center ¼ section corner.

Total 41.70 chains.

Where the entire north boundary of a section abutting the north boundary of the township is shown as parenthetical distances on the plat, it implies that no ¼ section corner for the section represented was set on that line.



1/4 on north boundary is set



1/4 on north boundary not set

Caution: The field notes should always be checked to confirm such implications represented on the plat.

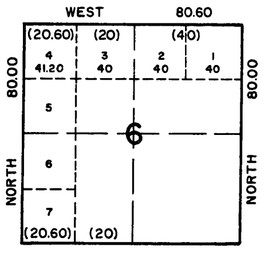
FUNDAMENTALS OF CORNER RESTORATION

PRINCIPLE V.

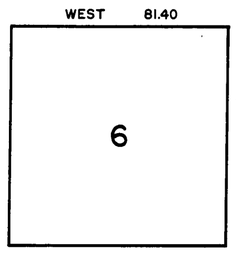
A resurvey restores the monuments at their original positions.

E. THE RESULT OF PROPORTIONMENT MUST PROTECT THE BONA FIDE RIGHTS OF PRIOR ENTRYMEN. (4)

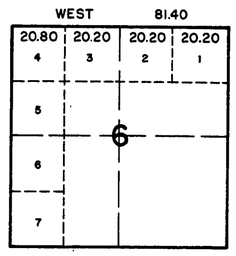
It was the practice in older surveys not to set the quarter-section corners between closing section corners along the north boundary of the township. In such cases the one-sixteenth and the quarter section corners will be established by the method of proportionate measurement based upon the parenthetical distances; PROVIDED, that the areas of the lots confirm the parenthetical distances.



Original



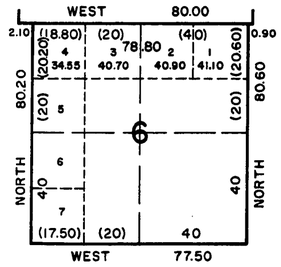
Retracement



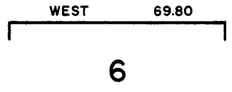
Resurvey

When the parenthetical distances on the original plat are confirmed by the area, the resurvey indicates the distances which would be the result of a retracement of 81.40 chains for the north boundary of section six. The retracement distance is proportioned based on the parenthetical distances.

Example: The ties, which are confirmed by the field notes from the closing section corners to the standard corners indicate an arithmetic error in the length of the north boundary of section 6 as shown on the plat. The parenthetical distances shown are based on the error.

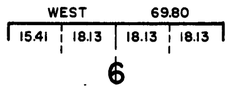


A retracement between the closing section corners on the north boundary of section 6 returns a distance of 69.80 chains.



Problem: What distances should the resurvey return for the north boundary of lots 1 through 4 in section 6?

Solution: In order to "protect the plat", distances westward along the north boundary are computed from the areas of the lots as (20) (20) (20) (17.00), and are used to proportion the retracement length which yields the distances shown on the resurvey.



Occasionally the true line distance on the plat is in error. It may reflect the random distance rather than the reduction of the random and falling distances to the actual true line distance. In such cases, the parenthetical distances, and therefore the areas, are erroneously based upon the random distance instead of the actual true line distance.

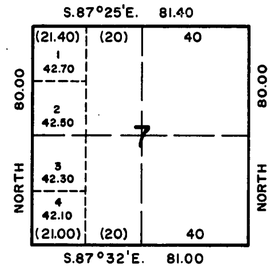
Example: Field notes

Run west on a random line between sections 7 and 18.
40.00 set temp. ¼ cor.
81.00 intersect twp. line 3.50 chains south of section corner common to sections 7, 12, 13 and 18.

Thence S. 87° 32' E on the true line between sections 7 and 18.

41.00 set ¼ corner.
81.00 sec. cor. 7, 8, 17 and 18.

PLAT



The true line distance obtained from the random distance and falling should be 81.08 chains. The true line distance in the notes and on the plat are in error. The parenthetical distances and the areas are in error also.

In order to "protect the plat", the distances (20) (20) (20) (21.00) which were used to compute the areas are used to restore (proportion) the intermediate sixteenth and quarter section corners.

The field notes and the plat constitute the record and both should be examined before restoring a missing corner.

FUNDAMENTALS OF CORNER RESTORATION

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3. 43 U.S.C. 752
4. 43 U.S.C. 772
5. 43 U.S.C. 1201
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7. ibid. Sec. 430
8. ibid. Secs. 495 and 496.
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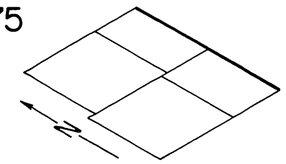
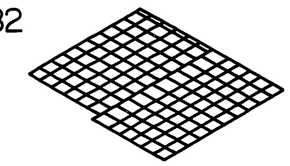
16. U.S. Department of the Interior, "Manual of Surveying Instructions, 1973." Sec. 3-69 and 5-41, Closing Corners.
17. ibid. 4-15 — Witness corners
18. ibid. 4-17 — Witness point
19. ibid. 5-4 and 5-6 — Accessories
20. ibid. 5-7 — Natural changes of evidence
21. ibid. 5-10 and 5-11 — Testimony
22. ibid. 5-15 — Line trees and blazed lines
23. ibid. 5-15 and 5-16 — Line trees and topography
24. ibid. 5-15 and 5-18 — Line trees
25. ibid. 5-16 — Topography
26. ibid. 5-17 — Witness corners
27. ibid. 5-18 — Line trees
28. ibid. 5-21 — Proportion as last resort
29. ibid. 5-24 — Proportionate measurement
30. ibid. 5-41 — Closing corners
31. ibid. 5-45 — One-point control
32. ibid. 6-7 — Retracements
33. ibid. 6-25 — Resurvey
34. ibid. 6-28 — Local control
35. ibid. 9-65 thru 9-75 — Plats

GENERAL PROPORTIONMENT PROBLEMS

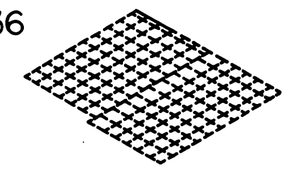
1875



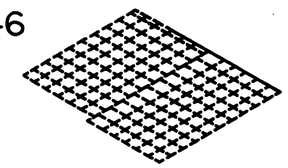
1882



1936



1946



History of Surveys

1875 Chandler Robbins surveyed the Arizona - New Mexico state line, which is the east boundary of fractional range 31 east, Gila and Salt River Meridian, Arizona.

1882 Milton Santee retraced the state line, surveyed and resurveyed the third standard parallel north, surveyed the boundaries and subdivisional lines of townships 12 and 13 north, ranges 30 and 31 east, Gila and Salt River Meridian, Arizona.

1936 Lloyd Toland resurveyed the Arizona - New Mexico state line from mile post 166 to 171.53 and established half mile posts, as part of a dependent resurvey in New Mexico.

1946 Oscar Walsh and Clarence Bilbray resurveyed the state boundary from mile post 171.53 to mile post 183 as part of a dependent resurvey in New Mexico.

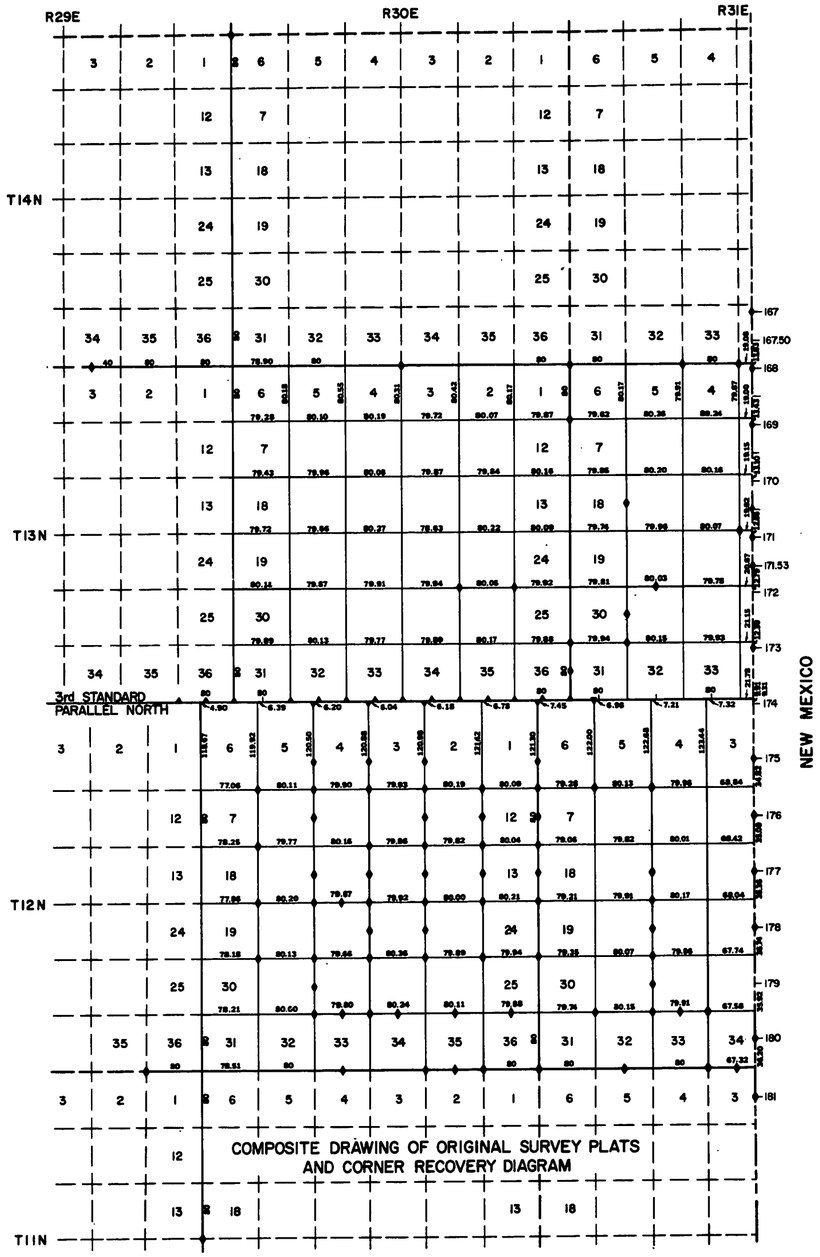


Figure 1 - Composite Sketch

Reason for Request of this Survey

The survey was routinely requested for use in land administration.

Special Instructions

On February 16, 1966, Special Instructions were issued for Groups 443 and 444, Arizona, providing for the dependent resurvey of the boundaries and subdivisional lines in the four townships of sections which contained public lands. The Special Instructions specifically provide for the establishment of ¼ section corners of minimun control, not previously established, and for the establishment of 1/16th 80 and 1/16th 100 corners for the elongated sections in T. 12 N., Rs. 30 & 31 E. The four townships contain intermingled private and public lands but the ownership status is not pertinent to any specific point in the case.

Upon assignment of Groups 443 and 444, Arizona, specific attention was called to the Executive Order of April 17, 1926, which provides for the withdrawal of vacant and unreserved public lands which contain or are within one quarter mile of a spring or water hole. The surveyor was directed to make a direct tie to all such springs or water holes within a reasonable distance of the lines being resurveyed, to facilitate the determination of whether any lands were to be withdrawn under this Executive Order. Figure 5 is a copy of the Executive Order. The essential information required is outlined in Section 3-126, subparagraphs 11 and 20 of the Manual of Surveying Instructions, 1973.

Conditions Found on the Ground

The third standard parallel north was retraced with recovery of most of the original standard corners and five original closing corners for townships 12 north. In 1936 and 1946, the mile posts along the state boundary had been remonumented, or reestablished at single proportionate positions based on the original 1875 survey. The positions of all recovered boundary monuments were well correlated and refute the alleged retracement by Santee.

Figure 1 is a composite sketch of the original plats and shows the original dimensions as shown on the approved plats. All recovered original corners are indicated as well as the mile posts recovered in 1936 and 1946.

Statement of the Problem

These surveys require normal procedure of single and double proportionate measurement based on the original plats for normal, elongated and fractional sections.

There are discrepancies between the Santee plats and field notes in three specific instances. The plat of T. 13 N., R. 31 E., shows a tie from the closing township corner to the 168 mile post of 13.03 chains. The field notes report this tie as 13.35 chains. This same plat shows a tie from the third standard parallel to the 174 mile post of 9.91 chains.

GENERAL PROPORTIONMENT PROBLEMS

The plat of T. 12 N., R. 31 E., shows this tie to be 9.31 chains. The Land Office copy of this plat shows 9.91 chains, and the field notes report the distance as 9.91 chains. The plat of T. 12 N., R. 30 E., shows the line between sections 6 and 7 as 77.06 chains, but the field notes say this mile is 77.96 chains in length. Figures 2 and 3 are copies of the original plats of the four townships with the erroneous portions enlarged for clarity.

In 1882, Santee reported retracing the state boundary and returned distances and bearings that vary considerably from the record of the original Robbins survey of the boundary. Robbins reported his monuments to be 80 chains apart and on a due south bearing. Santee's own retracements were not shown on his plat nor used to compute the areas of the lots in the fractional sections along the boundary. Santee thus disregarded his own work. Toland, Walsh and Bilbray did not use the Santee retracements in restoring the lost mile posts along the boundary.

Regulations

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

3-43, 3-51, 3-113, 3-70	Quarter corners of minimum control
3-126	Springs and Waterholes
5-23	Retracements and discrepancies
5-25 to 5-28	Double proportionment
5-30 to 5-38	Single proportionment
3-68 to 3-73, 5-41	Closing corners
3-83, 3-92, 4-41	Elongated sections

The Arizona - New Mexico state boundary was resurveyed under the 1930 Manual of Surveying Instructions. The remonumentation and restorations were made prior to the present prohibition against restoring state boundaries.

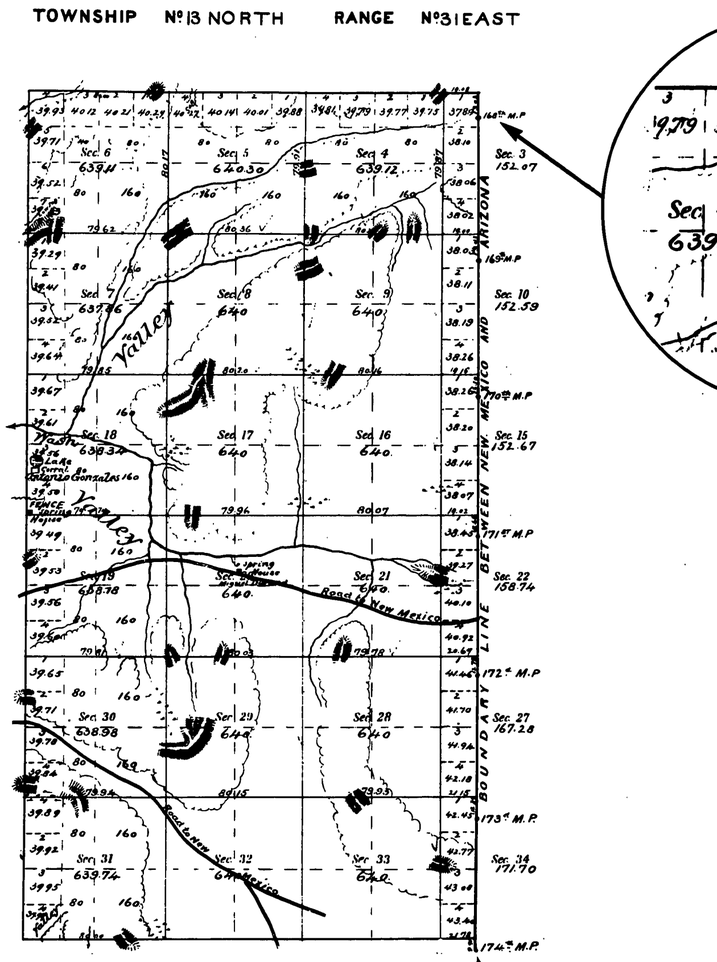
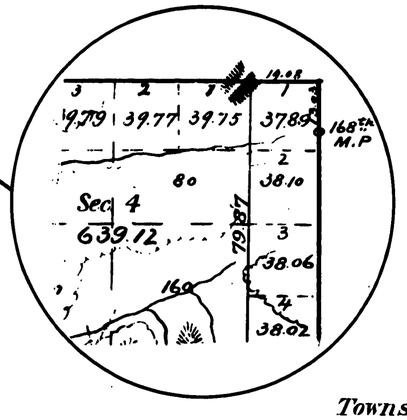
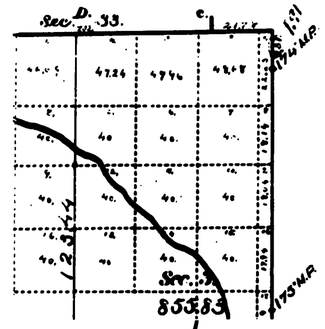


Figure 2a - Portion of Original Plat





Township Nº12 North Range Nº31 East

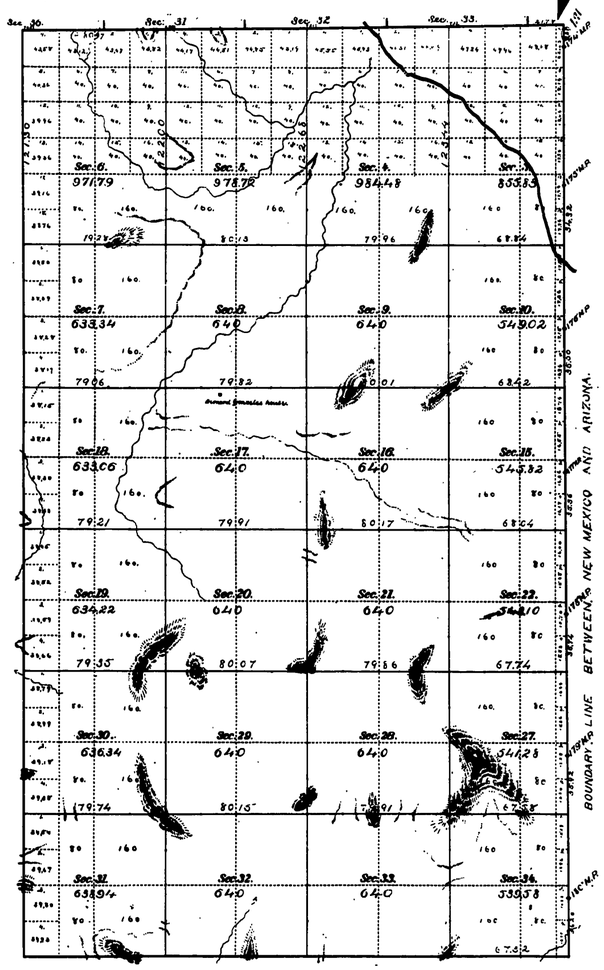
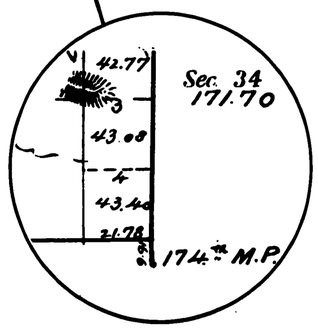


Figure 2b - Portion of Original Plat



ORDER OF WITHDRAWAL

PUBLIC WATER RESERVE NO. 107

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat., 847), entitled "An act to authorize the President of the United States to make withdrawals of public lands in certain areas", as amended by act of Congress approved August 24, 1912 (37 Stat., 497), it is hereby ordered that every smallest legal subdivision of the public land surveys which is vacant unappropriated unreserved public land and contains a spring or water hole, and all land within one quarter of a mile of every spring or water hole located on unsurveyed public land be, and the same is hereby, withdrawn from settlement, location, sale, or entry, and reserved for public use in accordance with the provisions of Sec. 10 of the act of December 29, 1916 (39 Stat., 862), and is aid of pending legislation.

(Sgd.) CALVIN COOLIDGE

President.

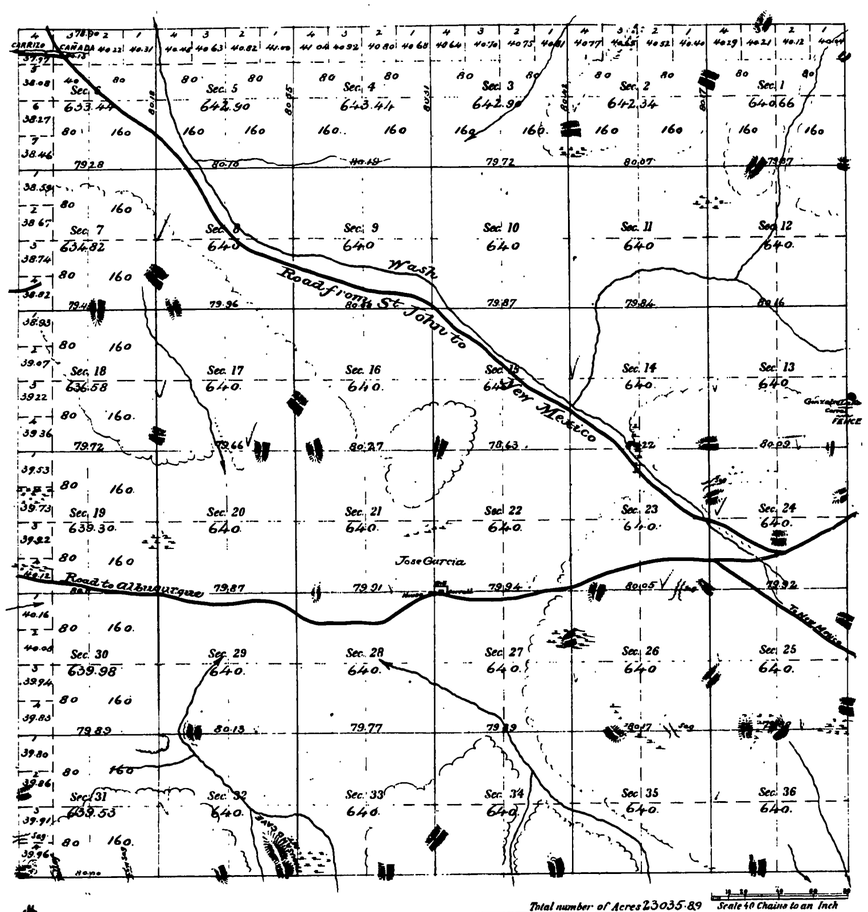
June 17 1926.

Two carbons to General Land Office

Figure 5 - Executive Order

GENERAL PROPORTIONMENT PROBLEMS

TOWNSHIP Nº13 NORTH RANGE Nº30EAST GILA AND SALT RIVER MERIDIAN

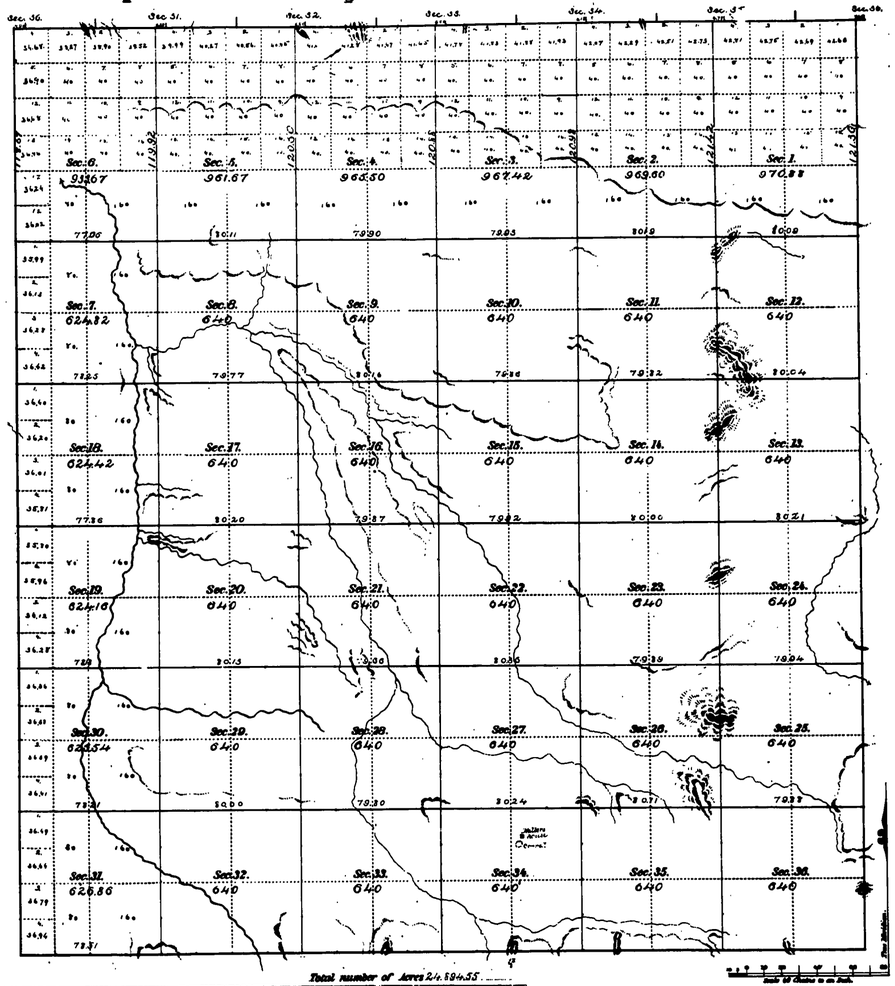


Total number of Acres 23035.89

Surveys Designated	By Whom Surveyed	Date of Contract	Amount of Surveys M.	Chl	Lks	When Surveyed	Mean Declination
Township Lines	Milton Santee	April 29 1882	17	78	00	June 28th to July 5th	14° 11' E.
Subdivisions	" "	" " "	59	78	32	Aug. 30th to Sept. 5. "	14° 00' "
Standard .	" "	" " "	6.	00.	00	June 5th to 6th "	14° 00' "

Figure 3a - Portion of Original Plat

Township Nº12 North Range Nº30 East, Gila and Salt River Meridian.



Total number of Acres 24, 594.55

Surveys Designated	By Whom Surveyed	Date of Contract	Amount of Surveys M.	Chl	Lks	When Surveyed	Mean Declination
Township lines	Milton Santee	April 29th, 1882	13	78	48	June 30th to July 5th 1882	14° 15' E.
Subdivisions	" "	" "	62	34	24	Oct 24th to "	14° 00' E.
Standard	" "	" "	5	77	43	June 6th to "	14° 00' E.

Figure 3b - Portion of Original Plat

GENERAL PROPORTIONMENT PROBLEMS

Final Solution

Third Standard Parallel

The closing corner at the intersection of the third standard parallel and the state boundary was restored by single proportionate measurement between 173 and 174 mile posts, based on a tie of 9.91 chains, as shown on the plat of T. 13 N., R. 31 E., and as given in the field notes. The areas of lots 2, 3 and 4 of section 3, T. 12 N., R. 31 E., are based on a distance of 9.91 chains also. The 9.31 chains tie shown on the plat of T. 12 N., R. 31 E., was rejected. All lost corners along the third standard parallel north, including the lost closing corners, were then restored by the single proportionate measurement method, based on record.

T. 12 N., R. 30 E.

The northwest corner of the township, a closing corner, was restored by single proportionate measurement along the standard parallel. The southwest corner of the township was restored by double proportionate measurement. All lost corners along the south, east and west boundaries were restored by single proportionate measurement. The lost section corners within the township were restored by double proportionate measurement, and the lost ¼ section corners by single proportionate measurement between the recovered or restored section corners. The 1/16 80 and 1/16 100 corners for the elongated sections 1 thru 6 were established by single proportionate measurement in latitudinal position, based on the original plat, after the closing corners were recovered or restored on the standard parallel. The ¼ section corner of sections 6 and 7 was restored by single proportionate measurement based on an original length of 77.96 chs. The plat shows this mile as 77.06 chs. but the field notes report 77.96 chs. The areas of the lots in both sections are based on a 77.96 chs. distance. The dimension shown on the plat is a mistake.

The ¼ section corners of sections 1 thru 5, were established at midpoint in departure between the closing corners and on the standard parallel. The ¼ section corner for section 6 only, was established 40 chains west of the closing corner of sections 5 and 6, proportionately based on a total record departure of 78.51 chains.

T. 12 N., R. 31 E.

The southeast corner of the township, a closing corner, was restored by single proportionate measurement between the 180 and 181 mile posts on the state boundary. The remaining closing corners, for sections 3, 10, 15, 22, 27, and 34, were restored in the same manner at single proportionate positions between the mile posts, based on the Santee record ties and the Robbins record of 80 chains between mile posts. The closing corner of sections 3 and 4 was restored by single proportionate measurement between the restored standard corners. The closing corner of sections 4 and 5 was not restored because it did not control public lands. Lost corners on the south boundary were restored by single proportionate measurement. The necessary lost section corners within the township were restored by double proportionate measurement between recovered or restored control corners. The ¼ section corners were then restored by single proportionate measure, all based on the record plat. The ¼ section corners of minimum control for sections 10, 15, 22, 27 and 34, along the state boundary, were established at midpoint in latitude between the closing corners. The ¼ corner on the east boundary of section 3 was established at 40 chains in latitude, proportionately, north of the closing corner of sections 3 and 10, based on a record length of 124.73 chains. This results in a porportioned distance of 40.08 chains. The ¼ corner on the north boundary of section 3 was established at 40 chains in departure, proportionately, east of the closing corner of sections 3 and 4. The 1/16 80 and

TOWNSHIP 12 NORTH, RANGE 30 EAST

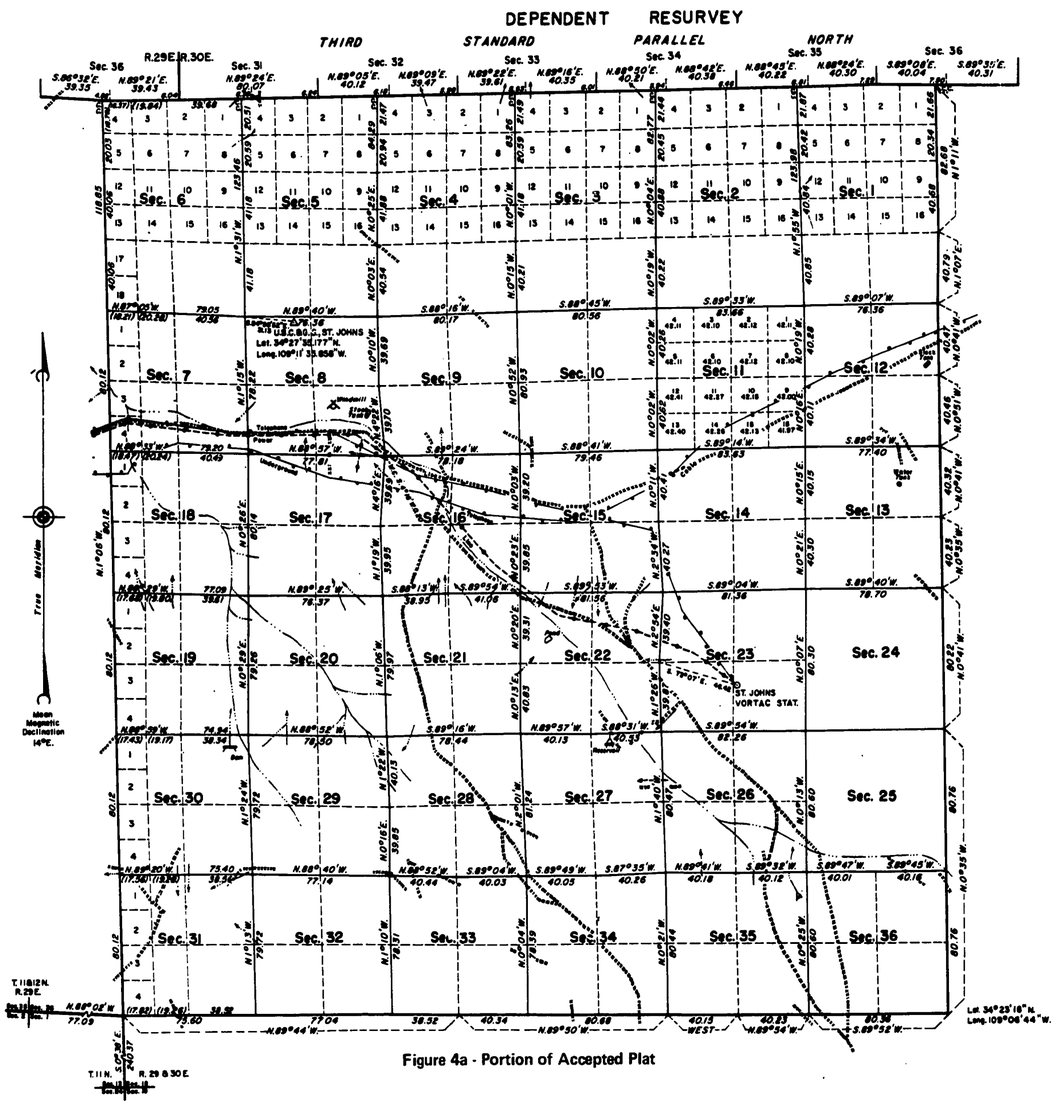


Figure 4a - Portion of Accepted Plat

TOWNSHIP 12 NORTH, RANGE 31 EAST

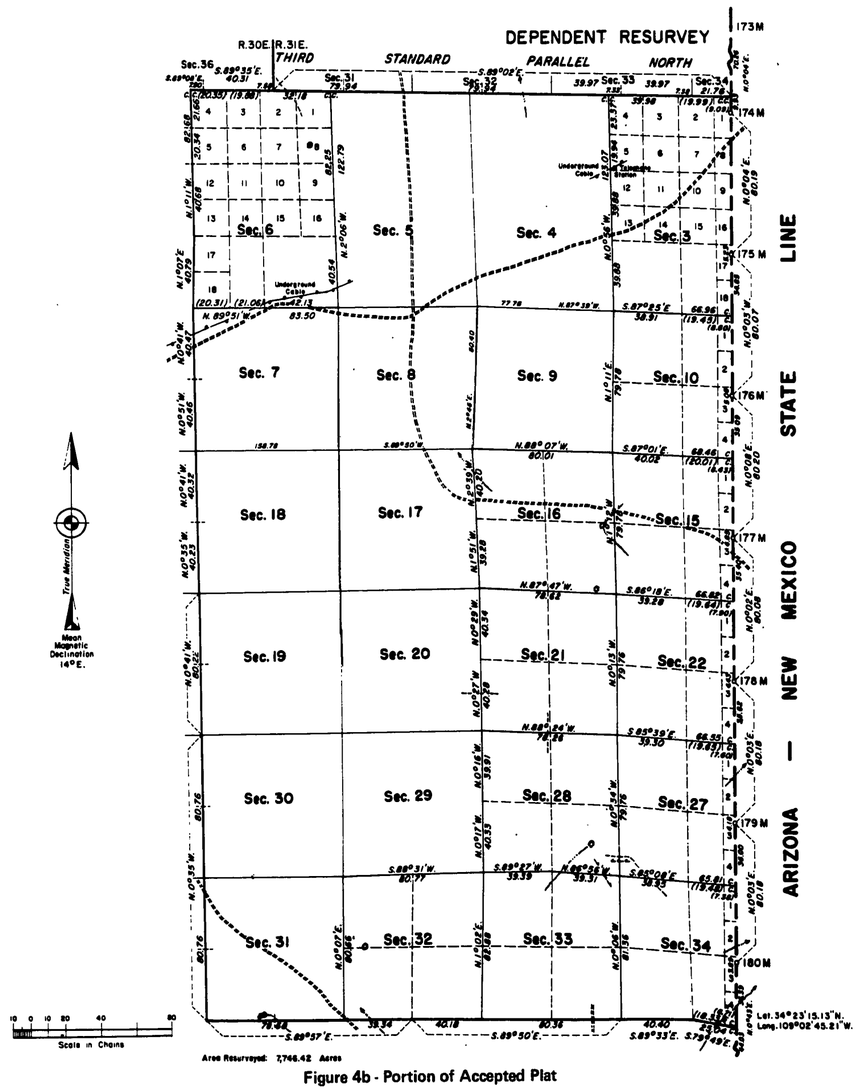


Figure 4b - Portion of Accepted Plat

GENERAL PROPORTIONMENT PROBLEMS

TOWNSHIP 13 NORTH, RANGE 30 EAST, OF THE GILA AND SALT RIVER MERIDIAN

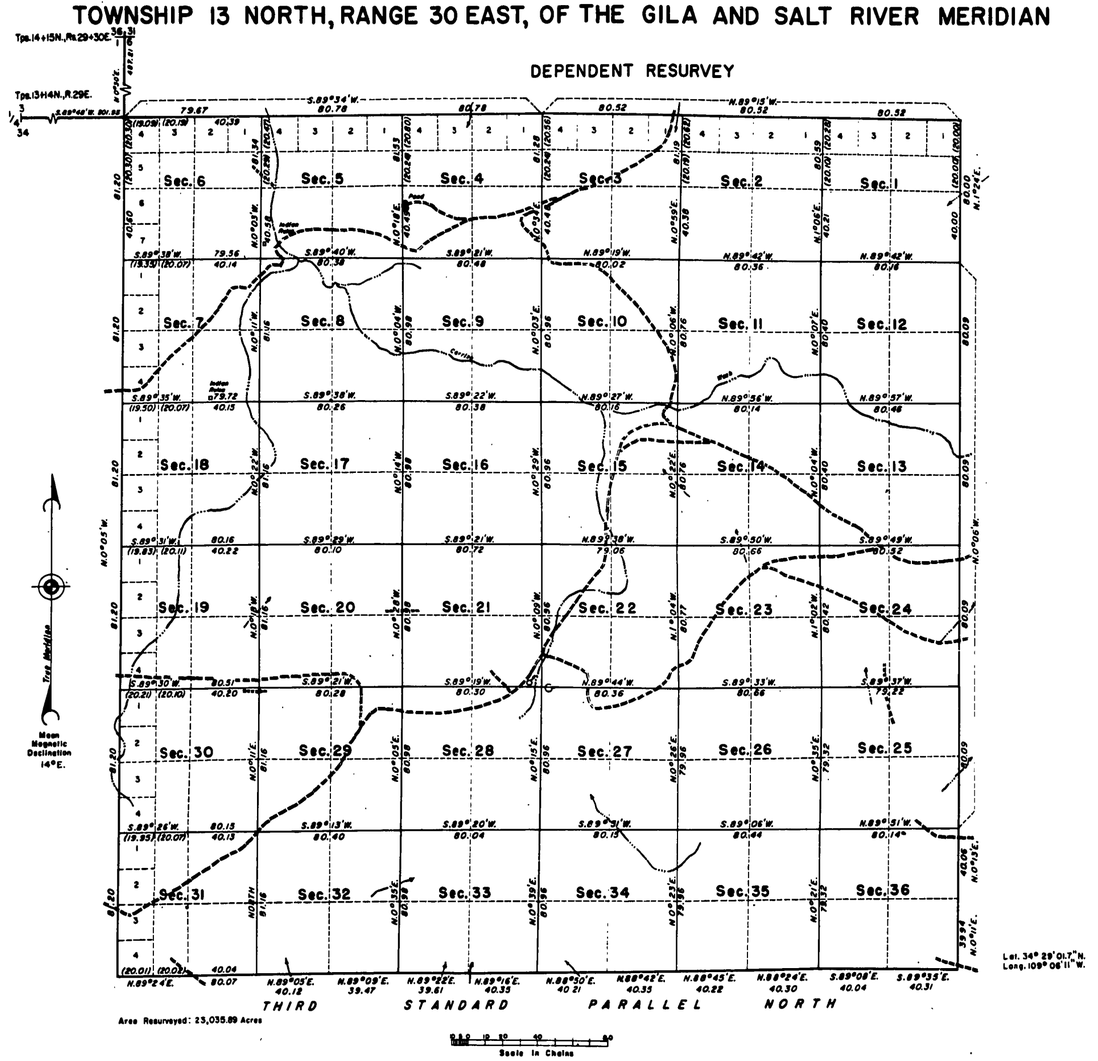


Figure 4c - Portion of Accepted Plat

TOWNSHIP 13 NORTH, RANGE 31 EAST

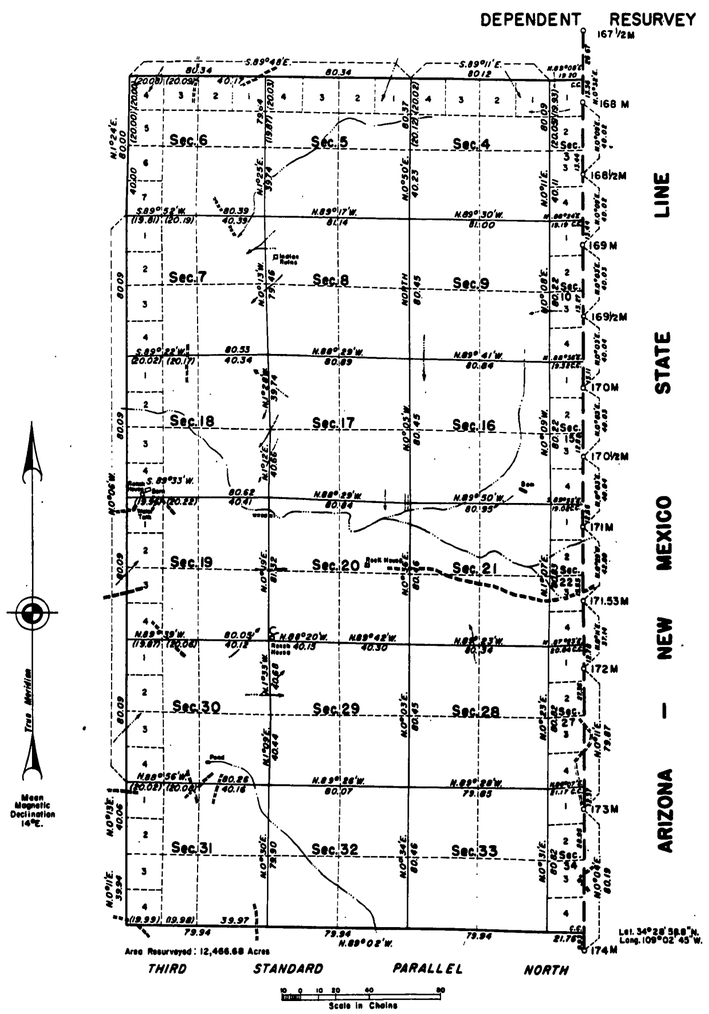


Figure 4d - Portion of Accepted Plat

1/16 100 corners between sections 3 and 4 were established at 80 and 100 chains proportionately. The line between sections 5 and 6 was retraced and found to be N. 2° 06' W., 123.66 chains from the corner of sections 5, 6, 7 and 8 to the original closing corner monument of sections 5 and 6. This original monument was found to be N. 2° 06' W., 0.87 chains from the true point of intersection of the section line and the third standard parallel north. The true point of intersection was monumented and the original monument was marked "AM" and buried in its original position. The ¼ corner of sections 5 and 6 was restored by single proportionate measurement between the corner of sections 5, 6, 7 and 8, and the original closing corner. The ¼ section corner on the north boundary of section 6 was established 40 chains in departure, proportionately, west of the newly established closing corner of sections 5 and 6, based on a record of 80.47 chains for the north boundary of section 6.

T. 13 N., R. 30 E.

The northwest corner of the township was restored by double proportionate measurement, based on the original plats, the control points being 6 miles north, 6 miles south, 3 miles east and 2½ miles west. The lost corners along the boundaries of the township were then restored by single proportionate measurement. Only two section corners were recovered within the township. All the remaining section corners were restored by double proportionate measurements. All the ¼ section corners were restored by single proportionate measurement. All proportions were based on the record plat.

The line between sections 15 and 22 is apparently in error on the original plat. The length is shown as 78.63 chains. The field notes also return this mile as 78.63 chains. Sections 15 and 22 does not close within the limits given in the 1881 Manual. There is no conclusive basis for rejection of the given dimension and, even though it is suspect, the record value of 78.63 chains was used as the basis of the proportioning.

T. 13 N., R. 31 E.

The northeast corner of the township, a closing corner, was restored at proportionate distance between the 167½ and 168 mile posts, using 13.35 chs. as the record tie to the 168 mile post. The plat shows this tie as 13.03 chs. The field notes return 13.35 chs. The areas of Lots 1 thru 4 of section 3 are based on a distance of 13.30 chs. The field note tie is more nearly compatible with the areas, than is the plat tie. Therefore 13.35 chs. was used. The closing corners of secs. 3, 10, 15, 22, 27 and 34, were restored by single proportionate measurements along the state boundary, between mile posts, based on the plat and Robbins' record. The lost corners along the north boundary were restored by single proportionate measurements. The lost section corners within the township were restored by double proportionate measurements using recovered or restored corners for control. The lost ¼ corners were then restored by single proportionate measurements. The ¼ corners along the east boundary, the state line, were established at midpoint between restored closing corners, except for section 3. The ¼ corner for section 3 was established at 40 chs. in latitude, proportionately, north from the closing corner of sections 3 and 10, based on a record of 79.92 chs. for the east boundary of section 3. This resulted in a proportionate distance of 40.02 chs. in latitude.

Figure 4 shows copies of the accepted plats of the dependent resurveys of the four townships.

The accepted plats have a few minor errors in proportioning, as follows:

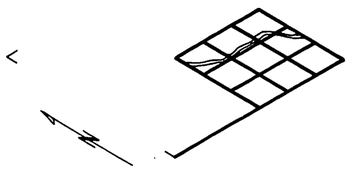
T. 12 N., R. 30 E.; the tie from the closing corner of sections 1 and 2 to the standard ¼ corner of section 35 should be 6.82 chains instead of 6.81 chains.

T. 12 N., R. 31 E.; the tie from the closing corner of sections 3 and 4 to the standard ¼ corner of section 33 should be 7.31 chains instead of 7.33 chains.

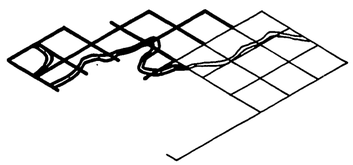
T. 13 N., R. 30 E.; the line between sections 21 and 28 should be 80.32 chs. instead of 80.30 chs. The line between sections 22 and 27 should be 80.34 chs. instead of 80.36 chs.

LINE TREE BASED PROPORTIONMENT, OREGON

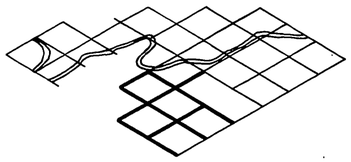
1856



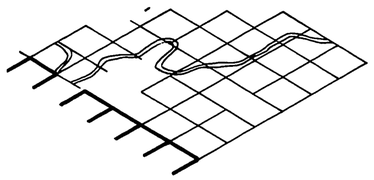
1857-58



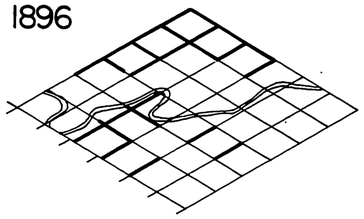
1874



1881



1896



History of Surveys

1856 Dennis Hathorn surveyed the south boundary, the south three miles of the east boundary, the subdivisional lines of the SE¼ of the township and meandered the Umpqua River thru sections 22 to 25.

1857-58 Dennis Hathorn surveyed the west two miles of the north boundary, the west boundary of section 6 and the north 58.95 chains of the west boundary of section 7, setting a witness point 4.34 chains south of the Umpqua River at the terminus of his line. Hathorn then surveyed a portion of the subdivisional lines in the northwest portion of the township and completed the meanders of the Umpqua River. Certain "outlying" areas were protracted on the Hathorn plat, approved April 24, 1858. See figure 1.

1874 William H. Byars surveyed the south 2 miles of the west boundary and a portion of the subdivisional lines in the southwesterly portion of the township. The pertinent portion of the Byars plat, approved August 2, 1875, is shown in figure 2. Byars marked line trees between sections 29 and 30, 20 and 29 and between sections 19 and 20.

1881 Addison R. and Samuel C. Flint subdivided portions of T. 25 S., R. 8 W., including the entire first tier of sections. The Flints surveyed the east boundary of sections 13 and 24, returning each mile as 80.00 chains in length. They retraced the Byars survey between sections 25 and 30, 31 and 36, returning the line between sections 25 and 30 as North, 81.20 chains. They retraced the Hathorn line between sections 1 and 6, returning a length of 80.00 chains. The subdivisional lines were all run "random and true."

1896 William P. Heydon completed the subdivisional lines of T. 25 S., R. 7 W. Heydon began at the Hathorn corner of sections 9, 10, 15 and 16 and ran a sectional correction line due west, setting corners at 40 and 80 chain intervals. He intersected the west boundary at a point 10.00 chains south of the Flint corner of sections 12 and 13 where he set a closing corner for sections 7 and 18. Heydon then ran north between sections 8 and 9, intersecting a witness point set by Hathorn at 13.00 chains. After that he ran north between sections 16 and 17, intersecting his sectional correction line at 80.00 chains, 2.86 chains west of his corner of sections 8 and 9 and set a closing corner. Heydon then ran south between sections 7 and 8 from the Hathorn witness point, intersecting the sectional correction line at 26.70 chains, 1.06 chains west of his corner of sections 7 and 8, and set a closing corner. Heydon then ran north between sections 17 and 18, intersecting his closing corner of sections 7 and 8 at 79.50 chains. Next Heydon ran N. 89° 26' W., between sections 18 and 19, making it parallel to Byars' line between sections 19 and 30. His line intersected the west boundary at 79.40 chains, 12.76 chains south of Flint's corner of sections 13 and 24, where he set a closing corner. Lastly Heydon retraced the east boundary of section 13 and found the line to be N. 0° 50' E., 75.80 chains in length and 78.60 chains between his closing corners. He reports destroying the bearing trees at his (first) corner of sections 7, 8, 17 and 18, but does not make any mention of any corrections to his ¼ corner between sections 7 and 18. The pertinent portion of the Heydon plat, approved November 20, 1897, is shown in figure 3.

The portion of the west boundary from Flint's corner of sections 12 and 13, northerly to Hathorn's witness point between sections 7 and 12 was never reported to be surveyed.

A composite sketch of the pertinent record of these surveys is shown in figure 4.

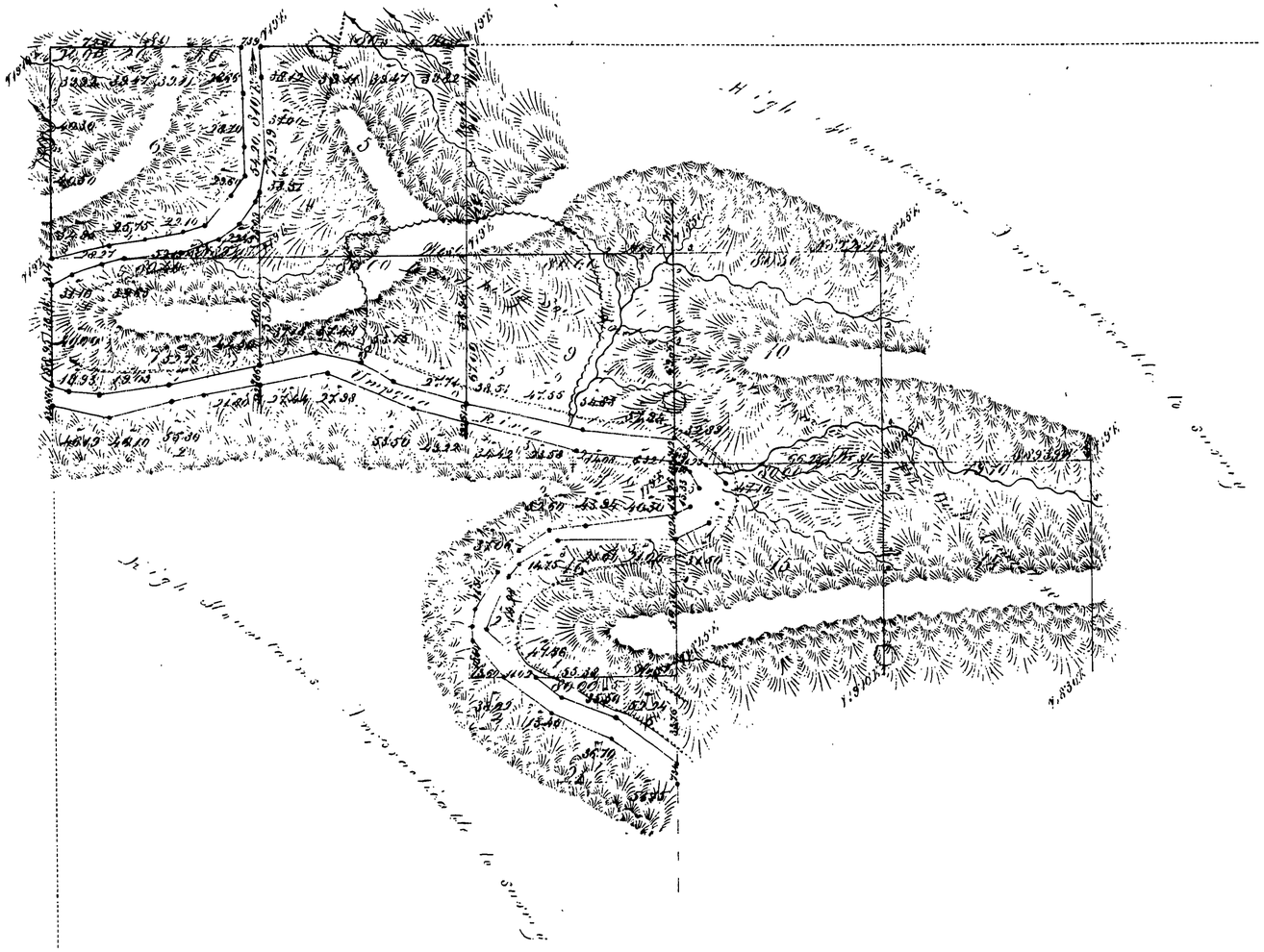


Figure 1 - Portion of Hathorn Plat, 1858

A3-1

LINE TREE BASED PROPORTIONMENT, OREGON

Township 15 South, Range 7 West Willamette Meridian Oregon

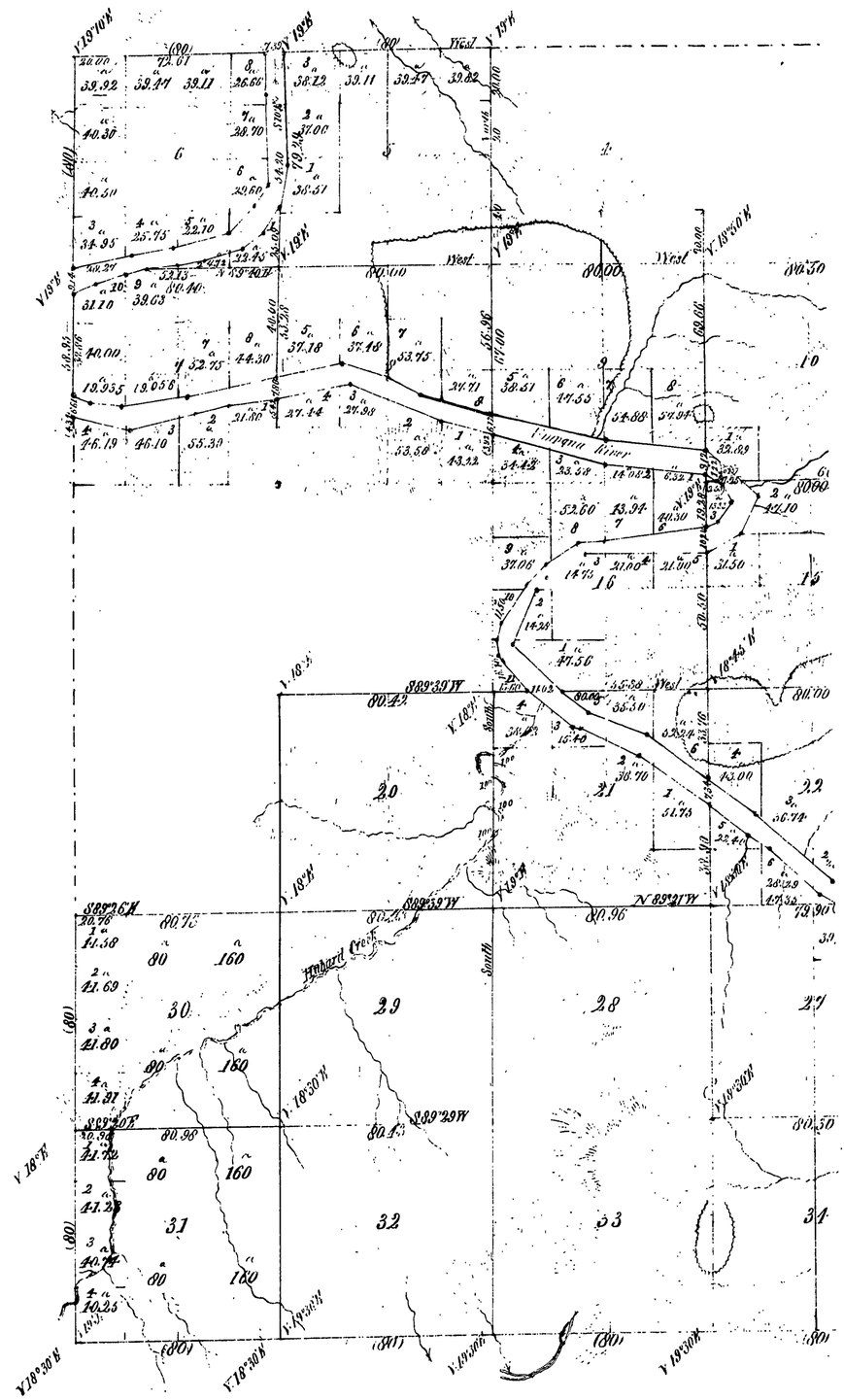


Figure 2 - Portion of Byars Plat, 1874

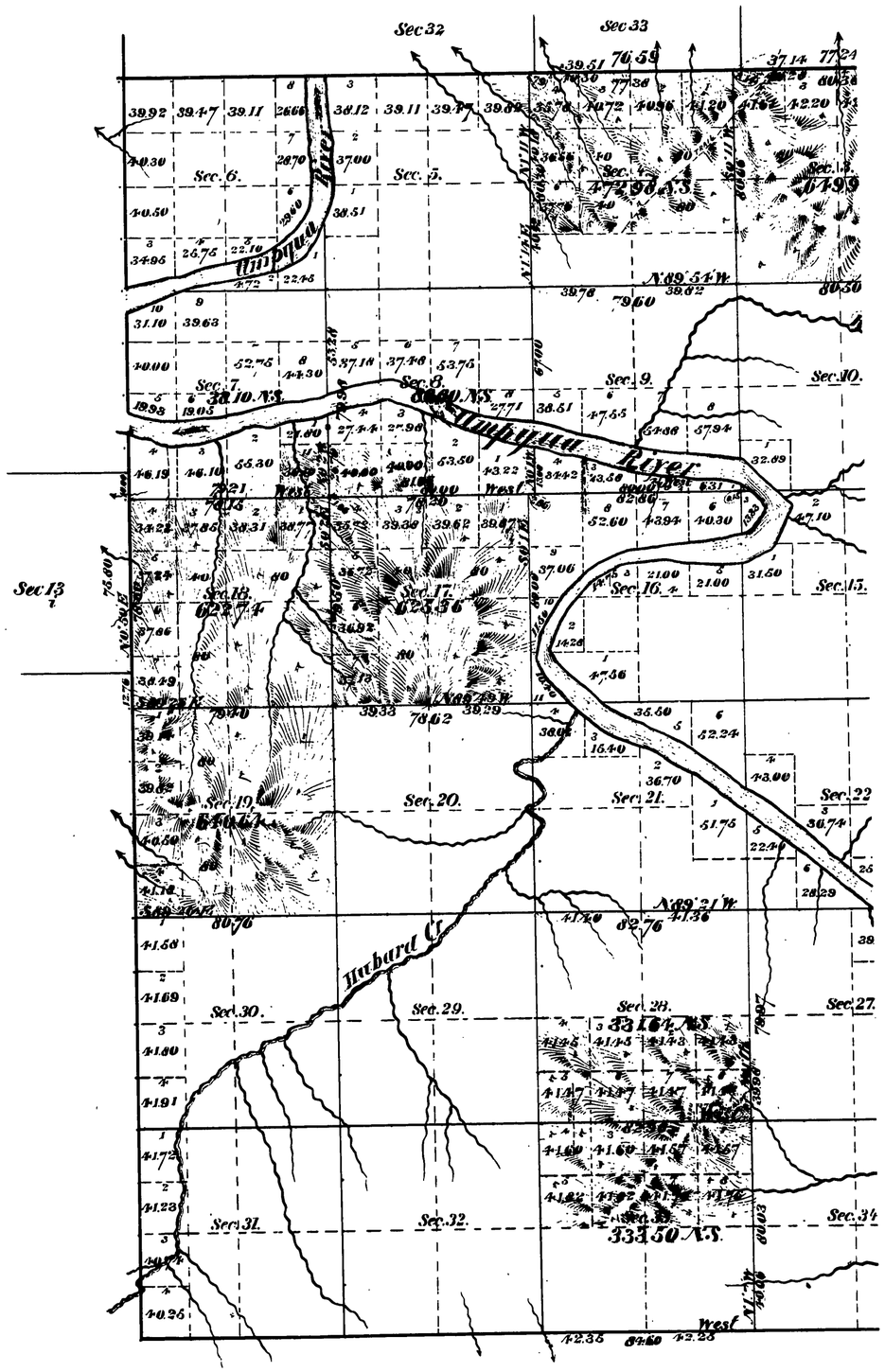


Figure 3 - Portion of Heydon Plat, 1896

LINE TREE BASED PROPORTIONMENT, OREGON

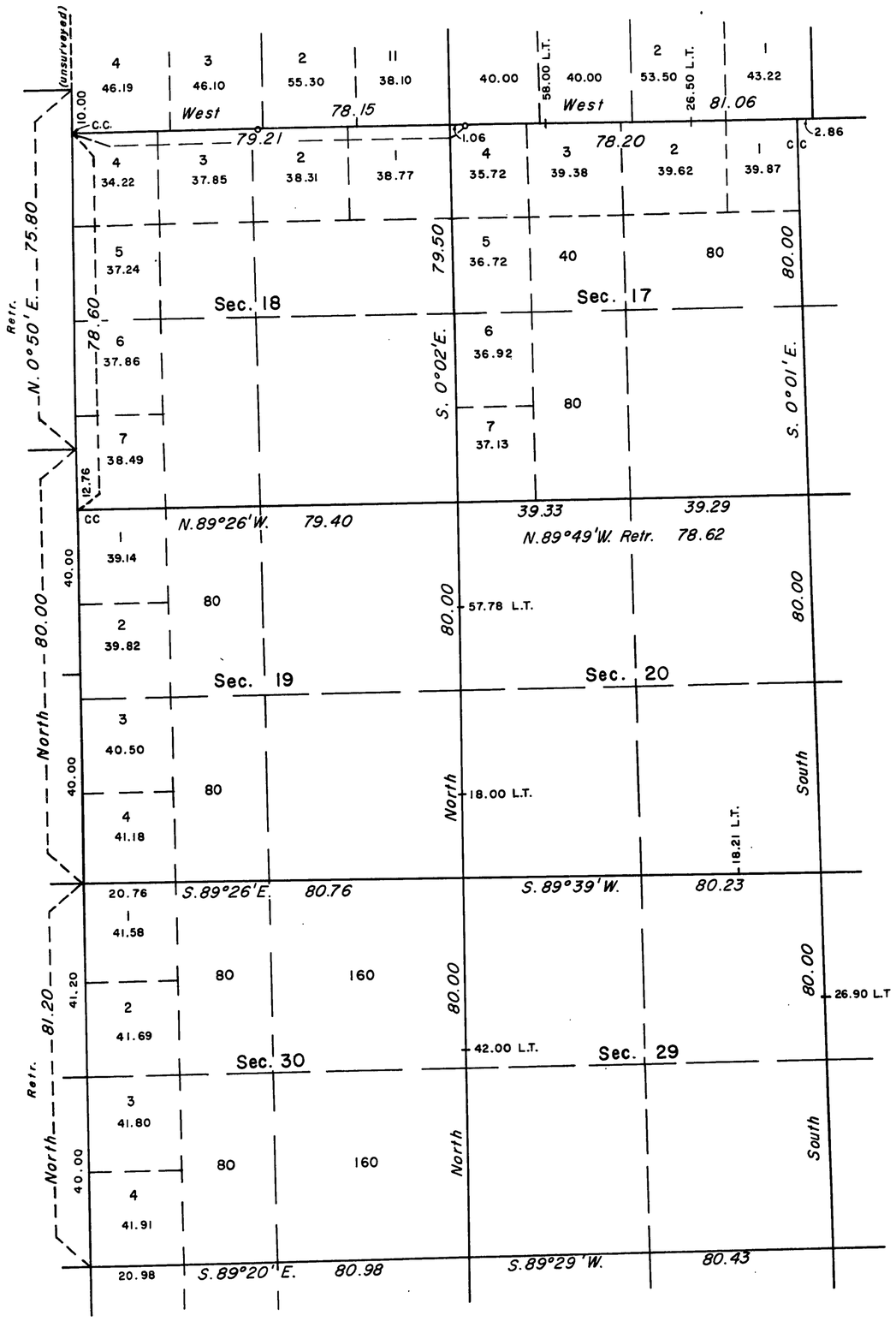


Figure 4 - Composite of Survey Records

Reasons for Request of this Survey

The lands in T. 25 S., Rs. 7 and 8 W., are intermingled patented and O. and C. lands under BLM administration. In the early 1950's, the "Hubbard Creek Fire" burned through the area destroying much survey evidence. The Roseburg District Manager requested a resurvey to identify and/or restore the property boundaries.

Special Instructions

On August 13, 1964, Special Instructions were prepared for Group 563, Oregon. They provided for the requested dependent resurveys. The field work in this discussion was assigned on August 14, 1964 and commenced August 20, 1964, and was limited to the resurvey of the north 5 miles of the west boundary, the boundaries of section 19 and the line between sections 7 and 18. All 1/16 section corners required to define the government lands were to be established on resurveyed lines.

Conditions Found on the Ground

Figure 5 illustrates the recovered corners of the original surveys and an original tree marked by Byars between sections 19 and 20. The land status and retracement data are indicated.

Preliminary Statement of the Problem

The surveyor must restore the lost corners by proportionate measurement methods and establish the necessary 1/16 section corners.

Regulations

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

3-87, 3-89, and 3-92	Subdivision of sections
5-15 and 5-18	Line trees
5-25 to 5-28	Double proportionate measurement
5-30 to 5-34	Single proportionate measurement
5-41	Closing corners

Legal Constraints

The provisions of 43 USC sections 752 and 753 are applicable.

Final Statement of the Problem

The surveyor must restore the lost corners and establish the necessary ¼ section and 1/16 section corners in a manner that will protect the rights of the patentees.

LINE TREE BASED PROPORTIONMENT, OREGON

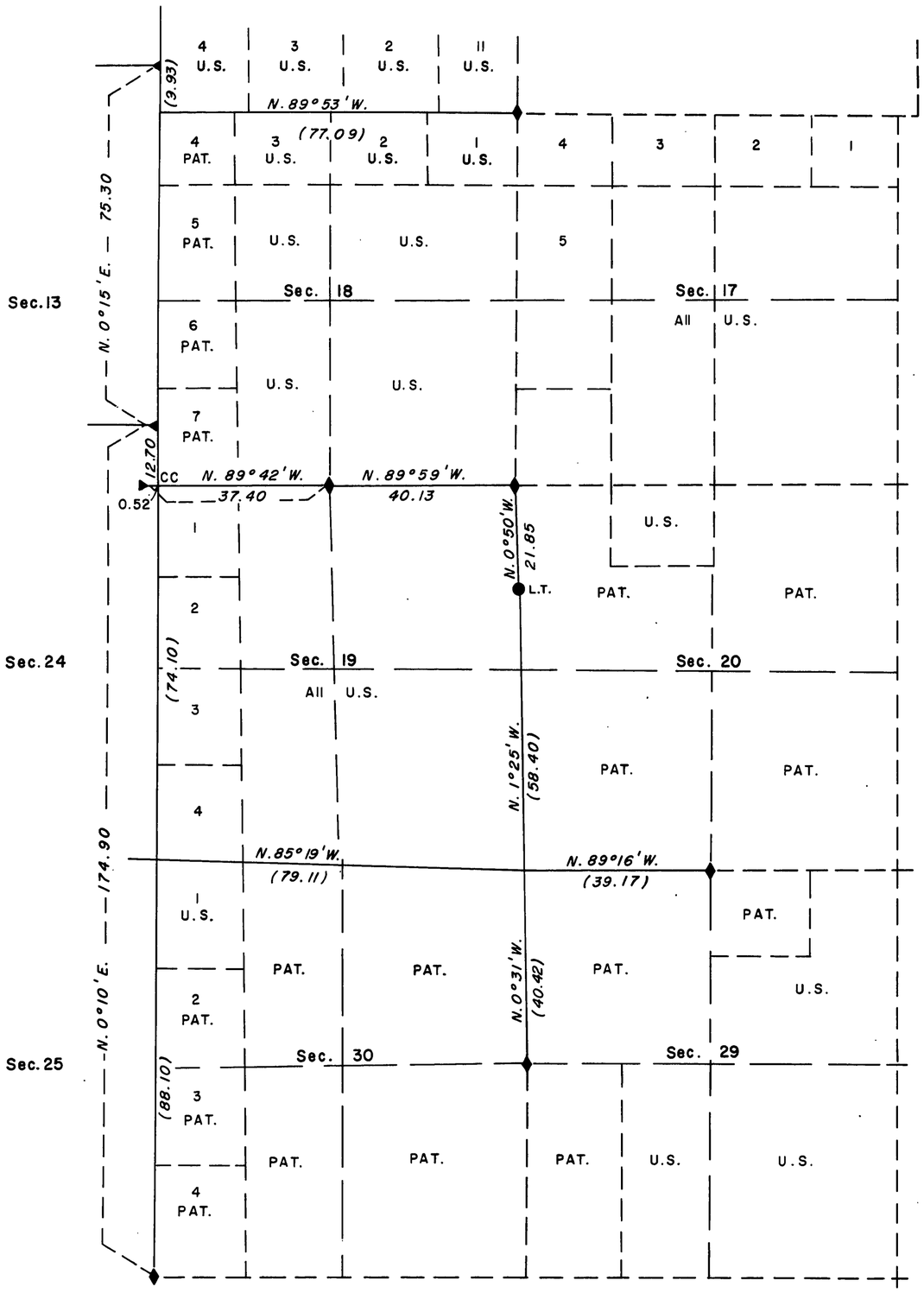


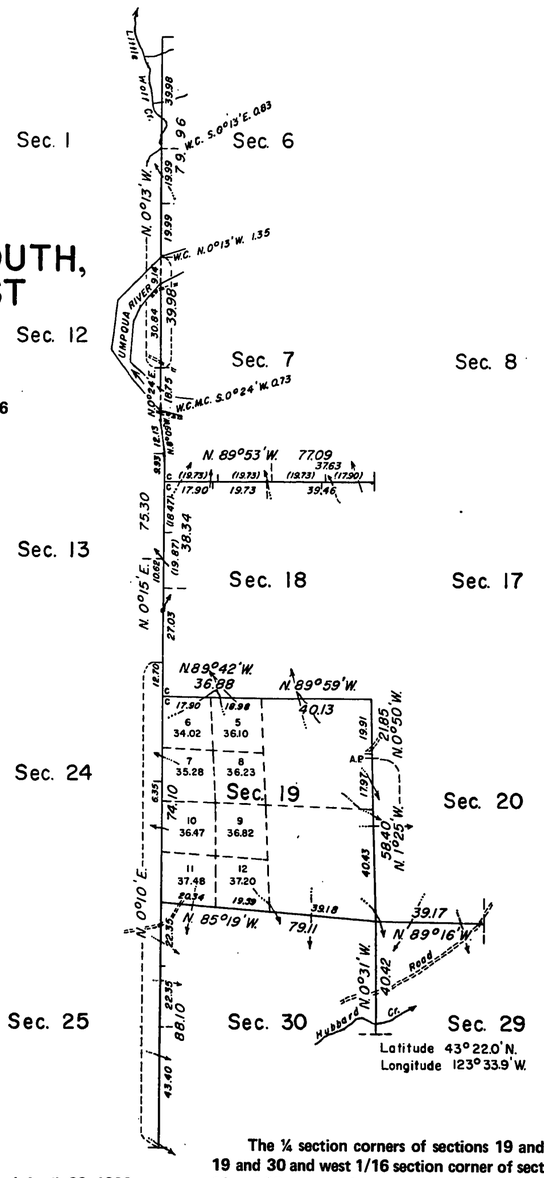
Figure 5 - Recovery Data and Status

◆ ◀ = Found original corner

● = Found line tree

TOWNSHIP 25 SOUTH, RANGE 7 WEST

Figure 6 - Plat Accepted April 28, 1966



Solution

Figure 6 is the plat accepted April 28, 1966, which demonstrates the solution.

The missing corners on the range line were restored by single proportionate measurement between found control corners. The closing corner of sections 7 and 18 was established at single proportionate measurement position on the range line. The line between sections 18 and 19 was terminated at the true point of intersection. The west ¼ corner of section 18 was established at proportionate position based on the plat.

The corner of sections 19, 20, 29 and 30 was double proportioned between the identified line tree between sections 19 and 20, the ¼ corner of sections 29 and 30, the ¼ corner of sections 20 and 29 and the restored corner of sections 19, 24, 25 and 30.

The ¼ section corners of sections 19 and 20, 19 and 30 and west 1/16 section corner of sections 19 and 30 were single proportioned.

The north 1/16 section corner of sections 19 and 20 was established at midpoint in latitude between the restored ¼ section corner and recovered corner of sections 17, 18, 19 and 20, and on line between the line tree and section corner.

The west 1/16 section corner of sections 18 and 19 was established at proportionate position between the ¼ section corner and recovered original closing corner monument, which was found 0.52 chains (west) off line. The true point of intersection was monumented.

The Hathorn and Heydon plats (figures 1 and 3) depict the west 1/16 section corner and ¼ section corner on the south boundary of section 7 as being 20 chains and 40 chains east of the southwest corner of section 7.

LINE TREE BASED PROPORTIONMENT, OREGON

The Heydon plat (figure 3) depicts the ¼ section corner and west 1/16 section corner on the north boundary of section 18 as being 40 and 60 chains west of the corner of sections 7, 8, 17 and 18. These distances are verified by the areas of the lots in sections 7 and 18.

Heydon had set a "¼ corner" 40 chains west of his "original" corner of sections 7, 8, 17 and 18 (which he later destroyed.) His final corner of sections 7, 8, 17 and 18 was 1.06 chains west of the destroyed corner. Heydons "¼ corner" of sections 7 and 18 would not be a ¼ corner of either section had it been recovered. The south ¼ corner of section 7, north ¼ corner and west 1/16 corner of section 18 were single proportioned based on the platted record distance of 78.15 chains.

Supplementary Topic

Establishment of Minor Subdivisions

Title 43 USC 752 states the statutory law on establishment of minor subdivisions:

§ 752. Boundaries and contents of public lands; how ascertained

The boundaries and contents of the several sections, half-sections, and quarter-sections of the public lands shall be ascertained in conformity with the following principles:

First. All the corners marked in the surveys, returned by the Secretary of the Interior or such agency as he may designate, shall be established as the proper corners of sections, or subdivisions of sections, which they were intended to designate; and the corners of half and quarter sections, NOT MARKED ON THE SURVEYS, shall be placed as nearly as possible equidistant from two corners which stand on the same line. (Emphasis added.)

Second. The boundary lines, actually run and marked in the surveys returned by the Secretary of the Interior or such agency as he may designate, shall be established as the proper boundary lines of the sections, or subdivisions, for which they were intended, and the length of such lines, as returned, shall be held and considered as the true length thereof. And the boundary lines which have not been actually run and marked shall be ascertained, by running straight lines from the established corners to the opposite corresponding corners; but in those portions of the fractional townships where no such opposite corresponding corners have been or can be fixed, the boundary lines shall be ascertained by running from the established corners due north and south or east and west lines, as the case may be, to the watercourse, Indian boundary line, or other external boundary of such fractional township.

Third. Each section or subdivision of section, the contents thereof have been returned by the Secretary of the Interior or such agency as he may designate, shall be held and considered as containing the exact quantity expressed in such return; and the half sections and quarter sections, the contents whereof shall have been thus returned, shall be held and considered as containing the one-half or the one-fourth part, respectively, of the returned contents of the section of which they may make part.

On November 1, 1879, the Commissioner of the General Land Office issued a circular pertaining to the subdivision of sections and re-establishment of lost corners which stated in part:

> "In the subdivision of quarter-sections the quarter-quarter corners are to be placed at points equidistant between the section and quarter-section corners and between the quarter corners and common center of the section, except on the last half mile of the lines closing on the north or west boundaries of a township, where they should be placed at twenty chains, proportionate measurement, to the north or west of the quarter-section corner."

The circular dated March 13, 1883 (1 L.D. 671) states in part:

> "3d. That quarter quarter corners not established by the government surveyors must be planted equidistant and on line between the quarter section and section corner." (Emphasis added)

> 5. Re-establishment of interior section corners---sight trees described in the field notes, together with the recorded distances to the same, when fully identified, will, it has been held, govern the line itself, even when not in a direct or straight line between established corners, which line is then necessarily a broken line by passing through said sight trees. Such trees, when in existence and properly identified beyond a question of doubt, will very materially assist in evidencing the correct relocation of a missing corner." (Emphasis added)

These statements regarding the use of sight (line) trees and the establishment of sixteenth section corners, are repeated with minor variations in the circulars of October 16, 1896 (23 L.D. 361) and June 1, 1909 (38 L.D. 1). The circular titled "Restoration of Lost or Obliterated Corners and Subdivision of Sections," 1963 edition, on pages 6 and 27 as well as the Manual of Surveying Instructions, 1973, sections 3-89 and 7-12 state that sixteenth corners, when established, will be established at midpoint positions except on the last half mile closing on township lines.

It has been repeatedly ruled in Federal and State court decisions that a positively identified sight (line) tree marks the line of a survey and must be used to RESTORE a lost CORNER. That matter is now well settled.

There are no Federal or State judicial decisions on the use of line trees in the establishment of sixteenth section corners.

There are many state court rulings on interpretations of 43 U.S.C. 752 which bear on the subject of the establishment of these corners, generally. In Westphal v. Schultz, 4 NW. 136 (1880) the Wisconsin Supreme Court observed, "The section corner posts and the quarter posts were in existence by which the survey was made, but no eighth or sixteenth corner posts were ever established, and these corners are therefore found and located by the resurvey as above." The court concluded: "The authorities cited by the learned counsel of the appellant, which require section corner posts and quarter posts, and other monuments fixed by the original survey, to be consulted in all resurveys, and which make such monuments govern, are inapplicable, because here no eighth or sixteenth corners were established by the original survey, and have been found and fixed by this resurvey, according to the rule, FROM the section corner posts and quarter posts which were found in existence as set by the original survey."

In Caylor v. Luzadder, 36 NE. 909 (1894) the Indiana Supreme Court stated: "The surveyor general was not required to and did not locate the half quarter posts or line...." That court went on to uphold a proportionate position for a north one-sixteenth section corner between sections 1 and 2, and upholding the instructions issued by the Commissioner of the General Land Office.

Both Westphal v. Schultz and Caylor v. Luzadder were favorably cited and used as a basis for the decision by the Arkansas Supreme Court in Tolson v. Southwestern Improvement Association, 133 SW. 603 (1911).

In Overton v. Leonard, 192 P. 221 (1920) the Oklahoma Supreme Court ruled that the quarter section corner and sixteenth section corners on the north boundary of a section 4, (a Standard Parallel) had not been established in the original survey and when established had to be placed at equidistant positions between the closing section corners which had been established. The county surveyor had attempted to place those corners in proportionate positions based on meander corners set during the original survey of the Standard Parallel. That ruling was based entirely upon the court's interpretation of R.S. 2396 and R.S. 2397, (now 43 U.S.C. 752 and 753) and the 1909 circular, 38 L.D. 1.

Recent surveys to establish minor subdivisions have encountered line trees, witness points and witness corners set by the original surveyor. The question arose regarding establishment of the 1/16 corner near such intermediate point which was discovered not at record distance.

In response to an inquiry regarding the establishment of a sixteenth section corner, the B.L.M. Washington Office held the opposite viewpoint in the following memorandum:

October 20, 1953

Memorandum

To: Mr. Swanholm, Regional Chief, Division of Cadastral Surveying, Region II

From: Chief, Division of Cadastral Engineering

Subject: Adoption of line trees

Reference is made to your informal memorandum of October 2 regarding the control to be exercised by line trees in the restoration of corners and boundaries of the public land surveys.

I am unable to cite a reference in the land decisions or official letters on this point, but authorities appear to be in agreement that line trees which are recorded in the field notes of the official surveys and which can be identified with certainty, exercise full control for course and distance.

In this connection it should be realized that the act of February 11, 1805 (R.S. 2396; 43 U.S.C. sec. 752), provides that the boundary lines actually run and marked in the surveys shall be established as the true boundaries of the sections or subdivisions for which they were intended. In the light of the law, I agree fully with the statement in Clark's Treatise on "The Law of Surveying and Boundaries," sec. 421, that an accurately established line tree is a permanent monument of the first order, and, consequently, shows the true location of the line.

The importance to be attached to line trees was apparently realized by the courts as early as 1822. In that year, Chief Justice Marshall delivered the opinion of the Supreme Court in the case of Newsom v. Pryor's Lessee, 7 Wheat. 7 (20 U.S.), in part as follows:

> A call for a natural object, as a river, known stream, a spring or even a marked tree, shall control both course and distance."

Later, in the case of Ayers v. Watson (137 U.S. 584), the Supreme Court again affirmed the importance of line trees. This decision is cited by Clark several times as though it were considered a ruling case on the subject. In that decision, at pages 597 and 598, the charge by the lower court to the jury is quoted, in part as follows:

> "Your duty is to follow the tracks of the surveyor so far as we can discover them on the ground with reasonable certainty, and where he cannot be tracked on the ground, we vave to follow the course and distance he gives, so far as not in conflict with the tracks we can find that he made; and you will constantly bear in mind, in considering the proof in this case, that in fixing the boundaries of a grant the rule requires that courses shall control distance as given in the calls of the field notes of a survey and that marked trees, designating a corner or a line on the ground, shall control both course and distance."

In commenting on the charge to the jury, the Supreme court said:

> "In our judgment this charge was justified by the testimony in the case and, on the whole, gave a correct view of the questions to be solved. The general rules laid down at the commencement are undoubtedly sound."

And, later in the decision, at page 601, the court said:

> "Marked trees, designating a corner or a line on the ground, should control both courses and distances."

These decisions appear to attach even greater weight to line trees than is provided in section 357 of our Manual. Evidently, the courts consider a recorded and identified line tree to have equal weight with a corner monument.

If in your reading on the subject you come across other decisions bearing on this point, we would appreciate hearing about them.

(sgd.) Earl G. Harrington

Chief, Division of
Cadastral Engineering

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

DEC 1974

IN REPLY REFER TO:
9182 (420)
Group 263,
Washington

December 23, 1974

Memorandum

To: Chief, Western Field Office (D-131)

From: Acting Chief, Division of Cadastral Survey

Subject: Use of Witness Corners, Meander Corners, etc., in Establishing Corners of Minor Subdivisions

This is in reply to your memorandum of December 2 to me concerning survey procedure involving witness corners in T. 6 N., R. 13 E., Willamette Meridian, Washington.

A dependent resurvey is a retracement and reestablishment of the lines of the original survey in their original location. It is not to reestablish it where an accurate survey would place it. Our problem here is to establish the south sixteenth corner of sec. 3 and 4 where the original surveyor would have placed it.

All Manuals, from 1930 on, have required that errors in the original survey be placed where they occur and that these errors will not affect measurements beyond identified corners. (Sec. 363, 1930 Manual; Sec. 363, 1947 Manual; Sec. 5-23, 1973 Manual). These same Manuals, as well as the circular "Restoration of Lost or Obliterated Corners" leave no doubt that all corners set in the course of the original survey have equal weight in the restoration of lost corners. This is further amplified in the memorandum dated October 20, 1953, from Earl G. Harrington, Chief, Division of Engineering, to Carl Swanholm, Chief, Division of Cadastral Engineering, Region II. (Copy attached).

There is no doubt that the original surveyor made a two chain error in measurement to the north "witness corner." Since we do not know exactly where the error was made within that segment, the most equitable and legally sound solution is to proportion between the section corner and the north "witness corner."

There should be no question of going beyond the nearest identified corners. The fact that the south sixteenth corner is not at midpoint between the section corner and the quarter section corner is of no more consequence than if the quarter corner were not at midpoint between the section corners.

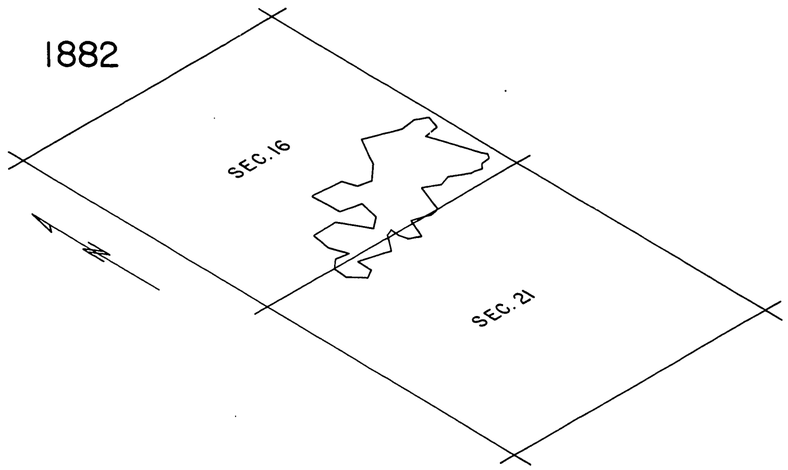
Enclosure

Roger T Barron

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

RESTORED MC BASED PROPORTIONMENT, MINNESOTA



History of Surveys

1875 Samuel E. Stebbins surveyed the Eight Standard Parallel North, along the north boundary of the township.

1882 William P. Allen surveyed the south, east and west township boundaries, the subdivisional lines and meandered three lakes within the township, including Auto Lake, (now named Arrowhead Lake), located in sections 16 and 21. Allen executed his surveys during the month of March. All measurements made across the lakes were made on the ice. Presumably Allen meandered the edge of the ice around the lakes. The plat was approved August 10, 1882. See figure 1.

1910 A small island in section 33 and in Sand Lake was surveyed by C.M. Dorway.

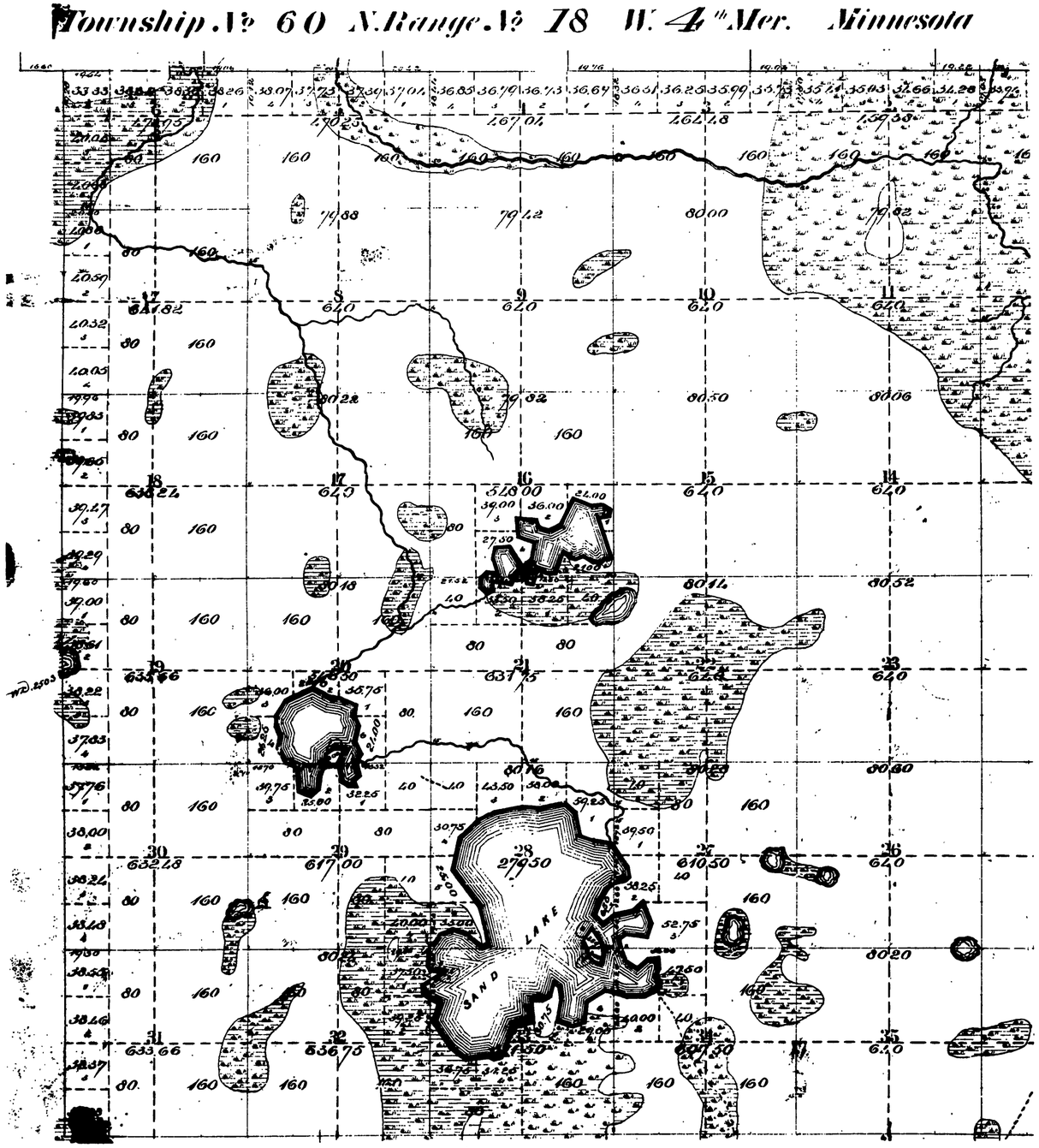


Figure 1 - Original Plat

RESTORED MC BASED PROPORTIONMENT, MINNESOTA

Reasons for Request of this Survey

The federal lands in the township are within the Superior National Forest. The Forest lands are fragmentary and the original corners were either lost or extremely difficult to identify. The Forest Service requested the resurvey to mark and identify their boundaries.

Special Instructions

Special Instructions for Group 63, Minnesota, were approved July 9, 1940. They provided for the dependent resurvey of the boundaries and subdivisional lines of T. 60 N., R. 18 W., 4th P.M., Minnesota. Field work began on July 19, 1940.

This discussion is limited to the restoration of the line between sections 16 and 21 and the meanders of Arrowhead (Auto) Lake.

Conditions Found on the Ground

The corner of sections 16, 17, 20 and 21 and corner of sections 15, 16, 21 and 22 were recovered from the remaining original bearing trees. No evidence could be found of the monuments for the ¼ section corner and meander corners between sections 16 and 21. The following field notes are a transcript of Allen's record for that section line:

East on random line bet. secs. 16 and 21
Va. 8°30' E.

1.00 Ascend hill.
7.00 Top of hill.
21.50 West margin of lake. Set a temporary meander cor.
38.40 Over lake on ice to west side of point of land. Set a temporary meander cor. and enter bog.
40.00 Set temporary ¼ sec. cor.
41.52 East side of point of land. Set temporary meander cor.
46.60 Over bay of lake on ice. Set temporary meander cor. and enter bog.
52.80 A point 12 lks. S. of a bay of the lake.
59.00 Leave bog, bears NE and SW
69.00 Enter swamp bears N. and S.
80.42 Intersect N. and S. line at 14 lks. south of cor. to sec. 15, 16, 21 and 22.
Thence I run,
S. 89°54' W. on true line bet. secs. 16 and 21 with same va.
33.80 Set a post 4 ft. long, 4 ins. square, 24 ins. in the ground, for meander cor. to fractional Secs. 16 and 21, marked,
T. 60 N., M.C. on E.
R. 18 W., S. 16 on N.
S. 21 on S. face, from which,
A spruce 4 ins. diam bears S. 35°E, 11 lks. dist. marked T. 60 N, R. 18 W., S. 21 M.C. B.T.
A spruce 4 ins. diam bears N. 29°E, 34 lks. dist marked T. 60 N., R. 18 W., S. 16 M.C.B.T.
38.90 Set a post 4 ft. long, 4 ins. square, 24 ins. in the ground, for meander cor. to fractional sec. 16 and 21 marked,
T. 60 N., M. C. on W.
R. 18 W., S. 16 on N.
S. 21 on S. face, from which,
A spruce 4 ins, diam. bears S. 19°E, 61 lks. dist. marked T. 60 N., R. 18 W, S. 21 M.C.B.T.
No other tree convenient.
40.21 Set a post 3 ft. long, 3 ins. square, 24 ins. in the ground, for ¼ sec. cor. marked ¼ S. on W. face, from which,
A tamarac 9 ins. diam. bears. S. 10°E, 36 lks. dist marked ¼ S.B.T.
A spruce 4 ins. diam bears N. 2°E. 101 lks. dist marked ¼ S.B.T.
42.00 Set a post, 4 ft. long, 4 ins. square, 24 ins. in the ground, for meander cor. to fractional secs, 16 and 21 marked.
T. 60 N. M. C. on E.
R. 18 W. S. 16 on N.
S. 12 on S. faces, from which
A tamarac, 6 ins, diam bears N. 66°E, 58 lks. dist. marked T. 60 N. R. 18 W. S. 16 M.C.B.T.
A tamarac 6 ins. diam bears S. 86°E. 61 lks. dist. marked T. 60 N. R. 18 W. S. 21 M.C.B.T.
58.90 Set a post, 4 ft. long, 4 ins. square, 24 ins. in the ground, for meander cor. to fractional secs. 16 and 21 marked
T. 60 N. M.C. on W.
T. 18 W., S. 16 on N.
S. 21 on S. faces from which,
a tamarac 6 ins. diam. bears N. 71°W. 22 lks. dist. marked T. 60 N., R. 18 W. S. 16 M.C.B.T.
A spruce 6 ins. diam. bears S. 87°W., 34 lks. dist. marked T. 60 N., R. 18 W. S. 21 M.C.B.T.
80.42 Cor. to secs. 16, 17, 20 and 21
Sand hilly,
Soil 4th rate.
Heavy timber and brush partly fire killed.

March 11th, 1882

Allen later meandered the lake. Figure 2 is a sketch of the Allen record, drawn to scale, the lot areas and status. Lot 1, section 21 is the only federal land. All other lands are patented.

After retracements were completed it was found that the line between sections 16 and 21, from section corner to section corner was S. 88° 22' W., 81.05 chains in length. This direct connecting line (not shown) almost missed the "point of land" described by Allen as the location of the ¼ corner. The line would also have largely different distances to the edges of the lake on the remainder of the line. In the east half mile two small arms (or bays) of the lake, not called by Allen, would have extended into section 21.

The point of land on which Allen reports setting the ¼ corner is substantially in agreement with the record in shape and position relative to the corner of sections 16, 17, 20 and 21.

Preliminary Statement of the Problem

The surveyor must restore the ¼ section corner and meander corners between sections 16 and 21, based on the retracement data and evidence found.

Regulations

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

3-92	Sixteenth-section corners
5-9 to 5-16	Obliterated corners, topography
5-21 to 5-23	Restoration of corners
5-38	Single proportionate measurement
5-40	Restoration of meander corners
6-25 to 6-27	Dependent resurvey

Final Statement of the Problem

The surveyor must restore the ¼ corner and meander corners between sections 16 and 21, giving due weight to the evidence found.

RESTORED MC BASED PROPORTIONMENT, MINNESOTA

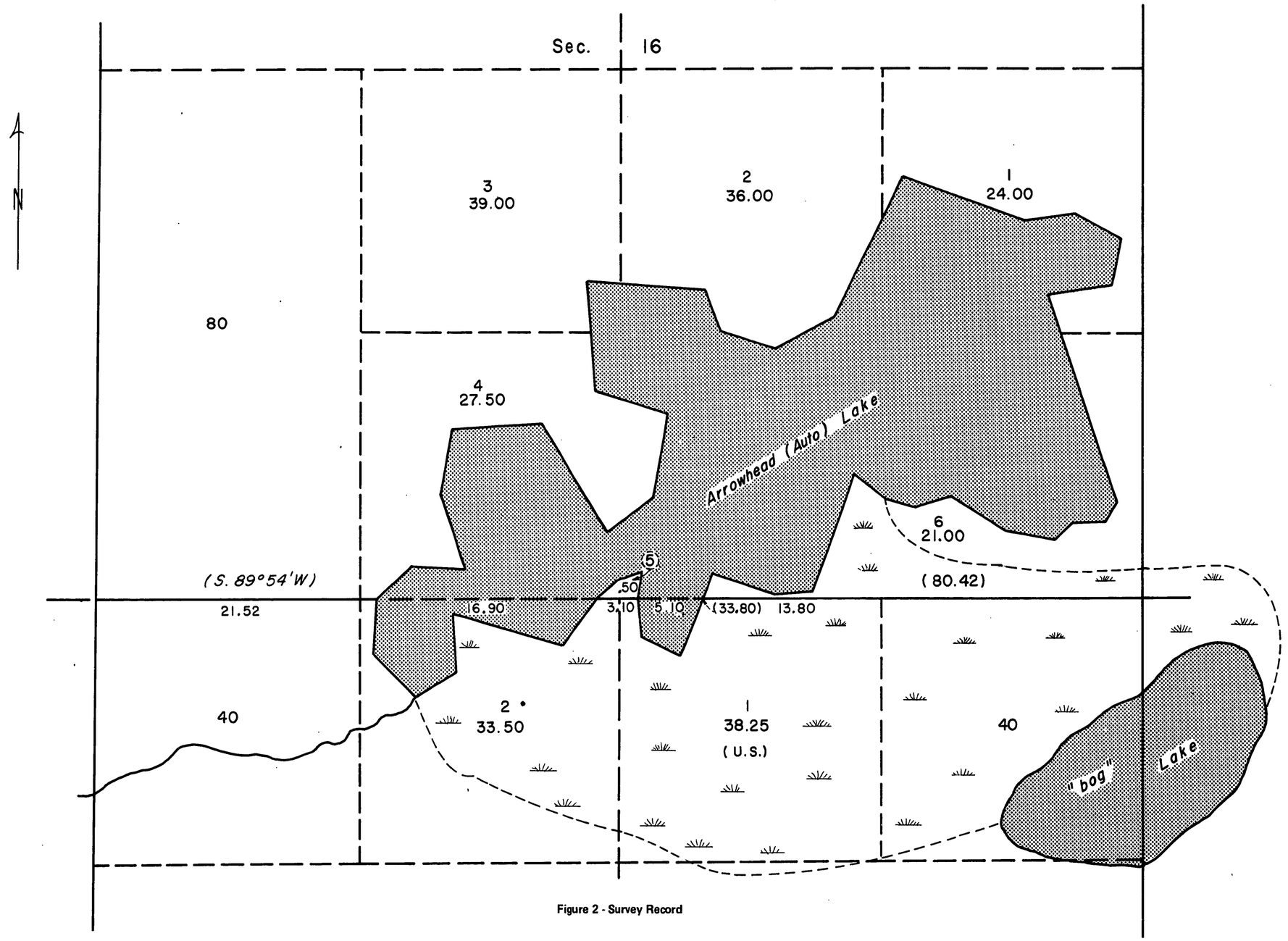


Figure 2 - Survey Record

RESTORED MC BASED PROPORTIONMENT, MINNESOTA

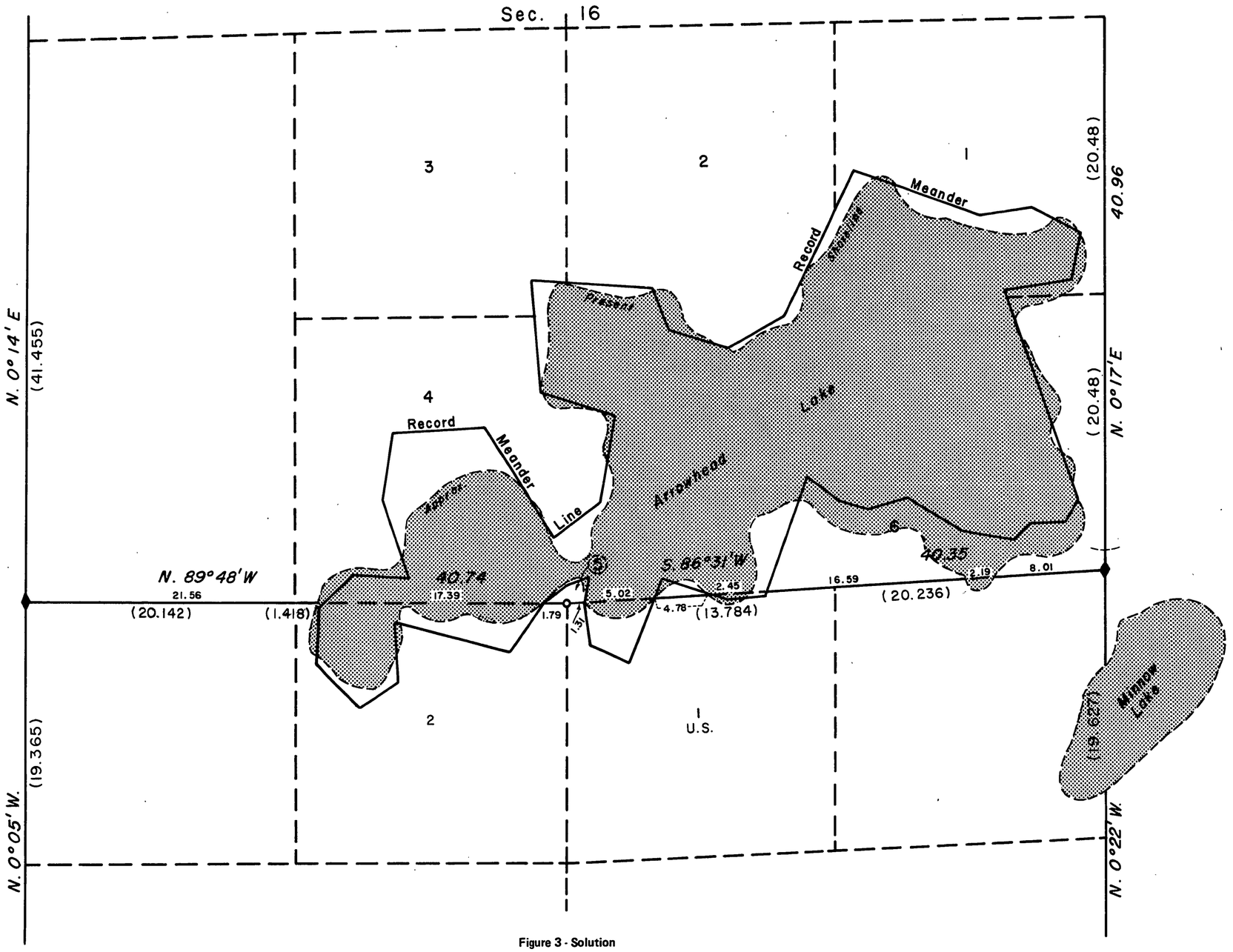


Figure 3 - Solution

Solution

Figure 3 depicts the solution adopted in this case.

The ¼ corner was restored on the "point of land" by measurements from MC's restored by using the actual shoreline. The latitudinal position was determined by an E-W line which crossed the point at record distance (3.10 chains) between edges of the lake. The longitudinal position was then at record distance from each side of the point. The section corners were then connected to the ¼ corner by straight lines.

The shoreline of the lake was thus treated as direct evidence of the position of the original meander corners, rather than a single proportionate position restoration. The meander corners of record on this line were not proportioned. They were restored on the section line at intersections with the actual shoreline.

Four additional meander corners were established on the shoreline of the two small arms of the lake in the east half mile.

The lake was not remeandered but an informative traverse (not given in the field notes) was made for purposes of topography.

The 1/16 section corners were not established.

The plat was approved May 6, 1942, and accepted on November 17, 1942, shown in figure 4.

RESTORED MC BASED PROPORTIONMENT, MINNESOTA

TOWNSHIP NO. 60 NORTH, RANGE NO. 18 WEST OF THE FOURTH PRINCIPAL MERIDIAN, MINNESOTA.

DEPENDENT RESURVEY.

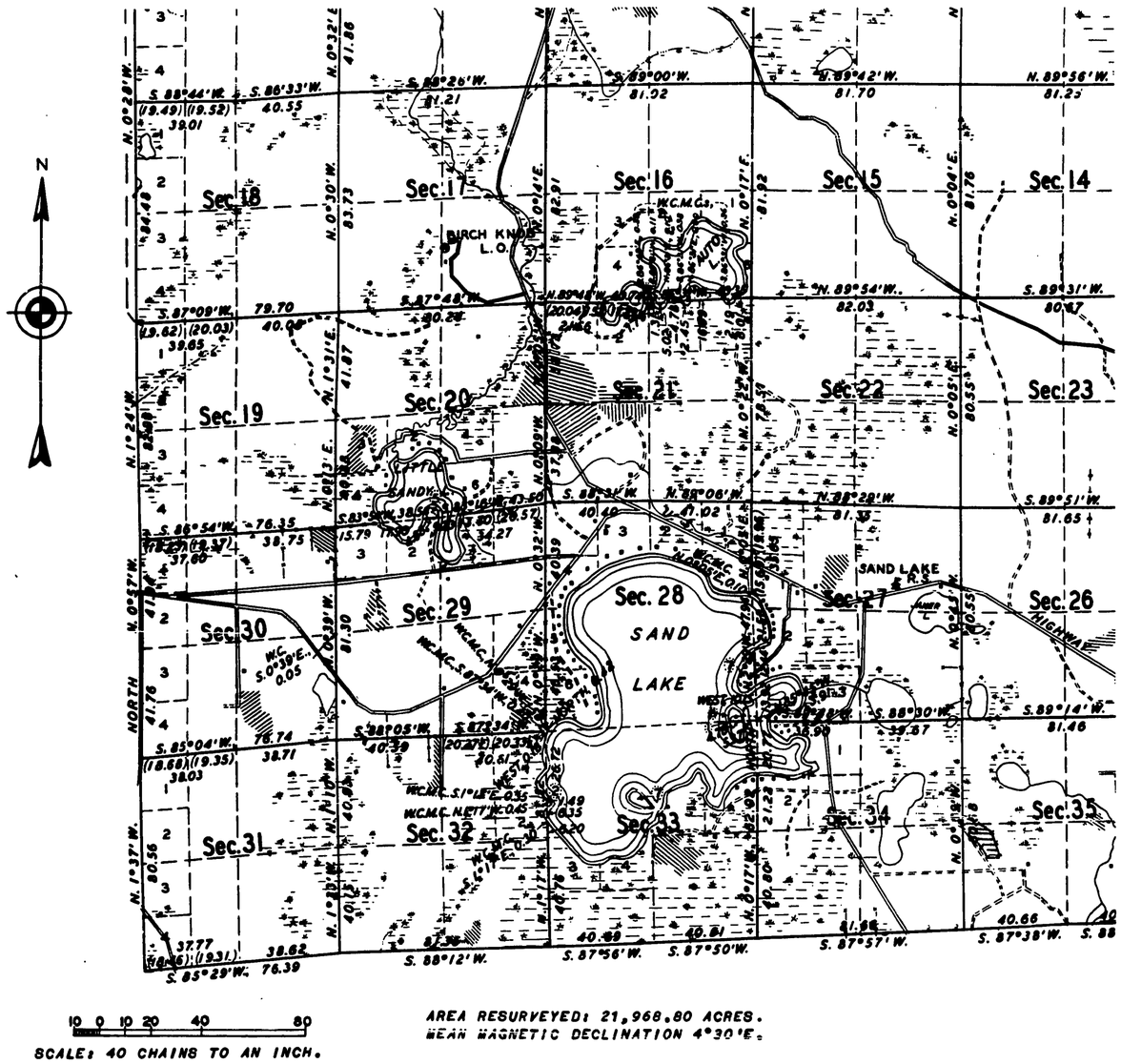


Figure 4 - Portion of Accepted Plat

Supplementary Topic

On June 30, 1966, Mr. Richard L. Floyd, a surveyor from Ely, Minnesota, requested an opinion from the Washington Office concerning the proper method of establishing the W1/16 corner between sections 16 and 21. Should the 1/16 corner be placed at midpoint between the ¼ corner and section corner, or should it be proportioned between the most westerly meander corner and section corner? The following reply (in part) was made:

July 7, 1966

Mr. Richard L. Floyd
Zenith Surveying Company
P.O. Box 628
Ely, Minnesota 55731

Dear Mr. Floyd:

Your letter of June 30 has requested advice on how to establish the North 1/16th corner of the Northwest Quarter, Section 21, T. 60 N., R. 18 W., 4th PM, Minnesota.

Resurveys executed in 1940 reflect that in crossing the southwesterly arm of Auto Lake, on the W½ mile of the line between secs. 16 and 21, there is an apparent difference of 49 links between the original and resurvey record (original - 16.90 chains; resurvey - 17.39 chains). To protect the riparian rights of Lot 2, Section 21, this difference should be isolated in the lake crossing. Therefore, we would not establish the 1/16th corner of interest at midpoint of the W½ mile. Rather, it would be set at a proportionate point on the line between the northwest section corner and the found meander corner on the west shore of Auto Lake, based on the original record. These proportions would be:

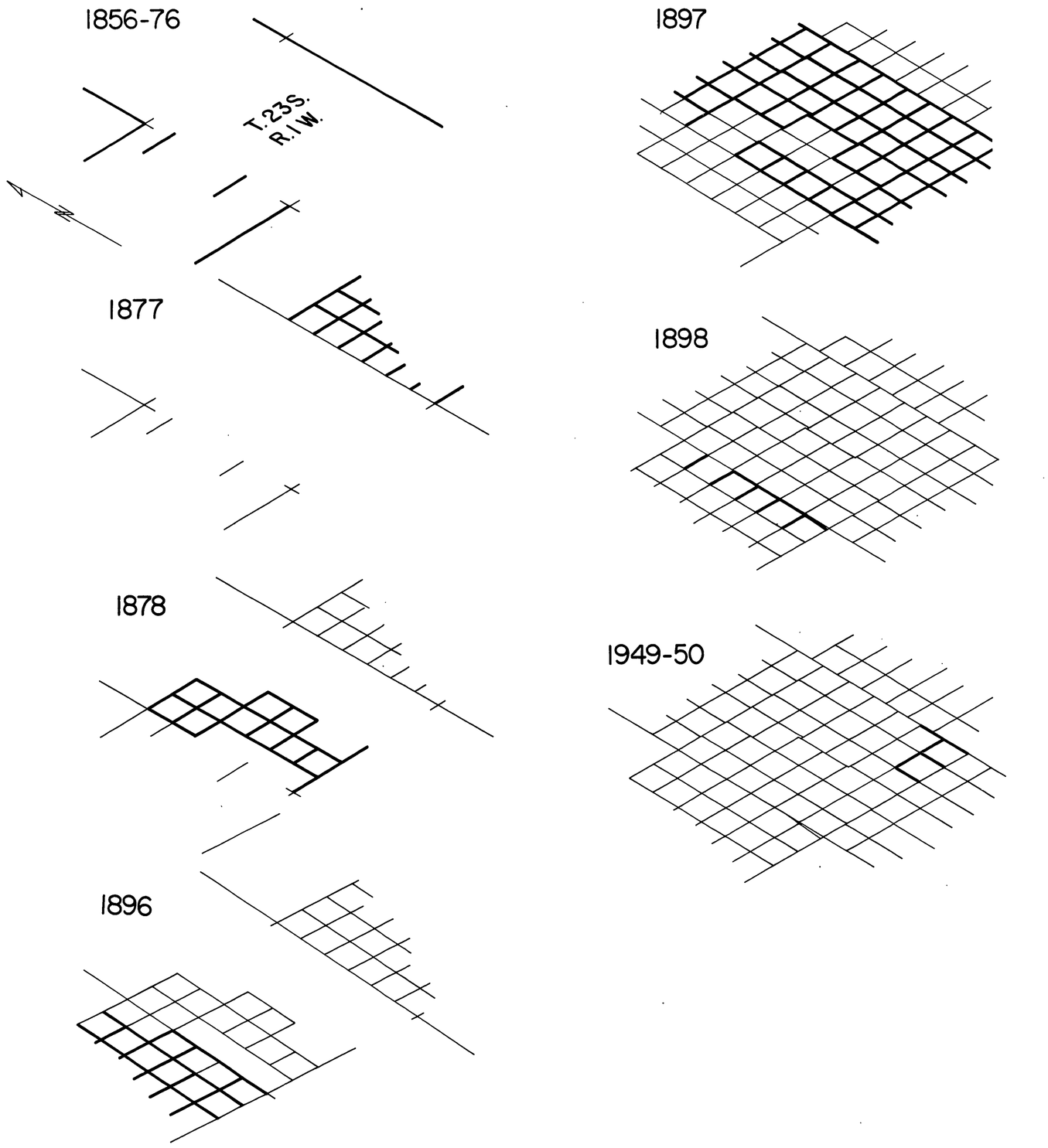
$$\frac{\text{New 1/16 sec. dist.}}{\text{New distance}} = \frac{\text{Record 1/16 sec. dist.}}{\text{Record distance}}$$

In conformity with the method outlined, the parenthetical distances shown on figure 3 are the proportionate positions of the E 1/16 and W 1/16 section corners based on the 1940 resurvey.

It should also be noted that prior to acceptance of the resurvey plat, the propriety of establishing the four most easterly meander corners was also questioned.

It would not be the policy of the Bureau, today, to set those corners and (by survey) determine the rights of lot 6, section 16 and/or the patented NE¼ NE¼ of section 21. The main target of this discussion, however, is the methods used in restoration of the section line and method of establishing the 1/16 section corners.

DOUBLE SET OF CORNERS IN UTAH



History of Surveys

1856 Charles Mogo established the northwest corner of the township and subdivided portions of T. 22 S., R. 1 W and T. 23 S., R. 2 W.

1874 T.C. Bailey surveyed the Salt Lake Meridian. He ran south, setting corners every 40 and 80 chains. No tie to nor connection with the Mogo work was made.

1876 A.D. Ferron completed the south boundary of T. 23 S., R. 2 W., setting a common corner for Tps. 23 and 24 S., Rs. 1 and 2 W. In T. 23 S., R. 2 W., Ferron ran the line between sections 1 and 12, and between sections 24 and 25, setting common corners on the range line but did not survey the range line itself. Ferron also surveyed some additional lines in T. 23 S., R. 2 W.

1877 A.D. Ferron subdivided T. 23 S., R. 1 E., . using the Bailey corners on the Salt Lake Meridian as his west boundary. Bailey's corners became fixed.

1878 A.D. Ferron surveyed a few more lines in T. 22 S., R. 1 W., adding to the Mogo Work. In T. 23 S., R. 1 W., Ferron surveyed the north 2 miles of the west boundary, the west 2 miles of the north boundary, the west 2½ miles of the south boundary, and a portion of the township, all as shown on the plat approved August 1, 1878. See figure 1..

1896 John T. Breckon completed T. 23 S., R. 2 W.Breckon completed the range line by running south from Ferron's corner of sections 7, 12, 13 and 18, and south from Ferron's corner of sections 19, 24, 25 and 30, correcting back on a true line between Ferron corners. He reported a common corner of Tps. 23 and 24 S., Rs. 1 and 2 W. The Breckon plat was approved March 27, 1897. See figure 2.

1897 Hubert D. Page and George C. Swan completed the boundaries and subdivisional lines of Tps. 22, 23 and 24 S., R. 1 W.

In T. 23 S., R. 1 W., Page and Swan completed the north and the south boundaries, closing against the Salt Lake Meridian. They retraced and resurveyed the Meridian, setting corners for T. 23 S., R. 1 W. They established double corners along the north boundary and the west 3 miles of the south boundary. Page and Swan retraced the south 5 miles of the west boundary returning considerably different results from those returned by Breckon. They retraced the exterior lines of the Ferron controlling subdivisional lines, as shown on the plats approved May 26, 1899. The Page and Swan plat of T. 23 S., R. 1 W. is shown in figure 3.

1898 Page and Swan reported large errors in Breckon's surveys of the west boundary. Breckon was ordered to correct his work. On April 28, 1898, Breckon reported a corrective survey of the south 4 miles of the west boundary. He reportedly resurveyed the two miles between the Ferron corners of sections 7, 12, 13 and 18, and 19, 24, 25 and 30, random and true, and destroyed his (Breckon's) 1896 corners. He reported running due south from Ferron's corner of sections 19, 24, 25 and 30, intersected the south boundary 1.51 chains west of the Ferron township corner and established a closing township corner for T. 23 S., Rs. 1 and 2 W. He then corrected his subdivisional lines in T. 23 S., R. 2 W. This corrective work is shown on the plat approved March 27, 1897 (figure 2) and partially reflected on the Page and Swan plat, figure 3.

1949-50 R.C. Yundt resurveyed sections 35 and 36. A composite sketch showing the Ferron, Breckon, and Page and Swan records is shown in Figure 4.

DOUBLE SET OF CORNERS IN UTAH

TOWNSHIP Nº 23 SOUTH RANGE Nº 1 WEST

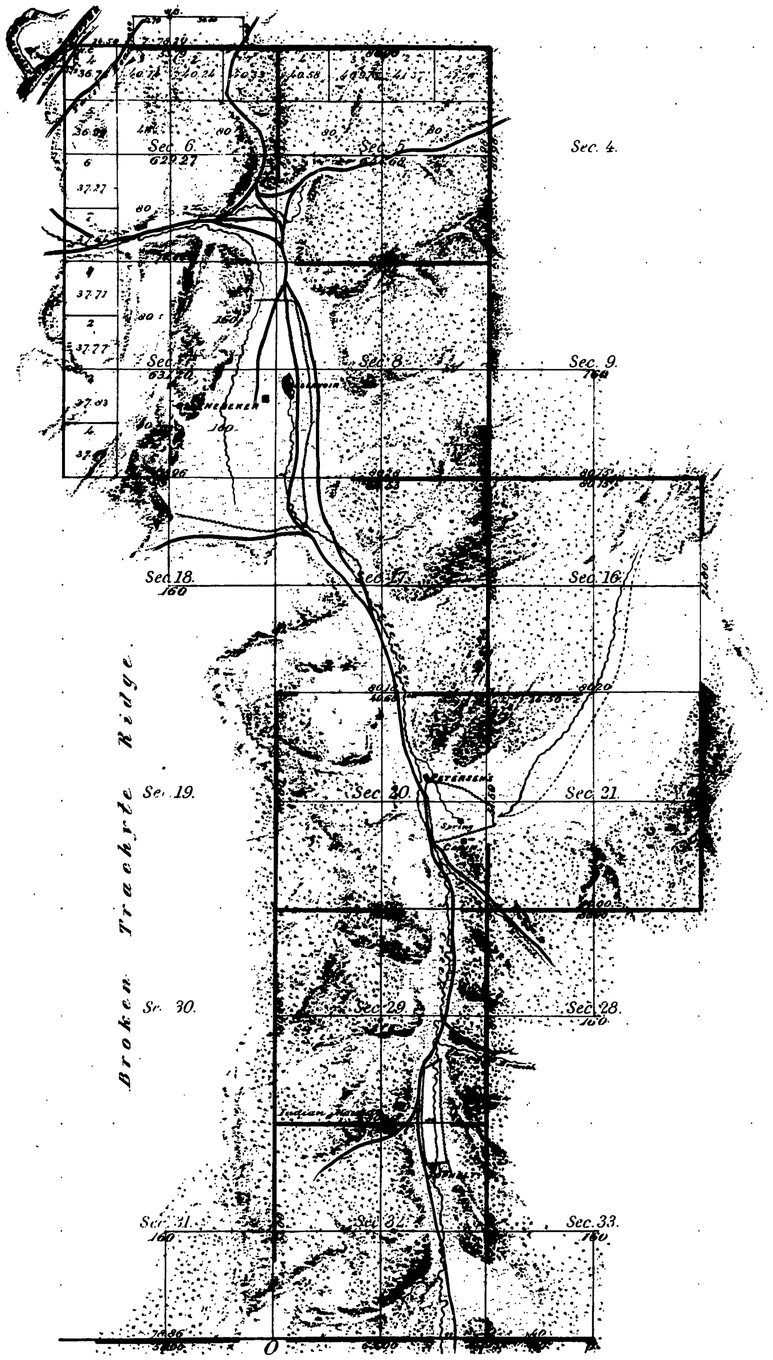


Figure 1 - Portion of Original Plat

DOUBLE SET OF CORNERS IN UTAH

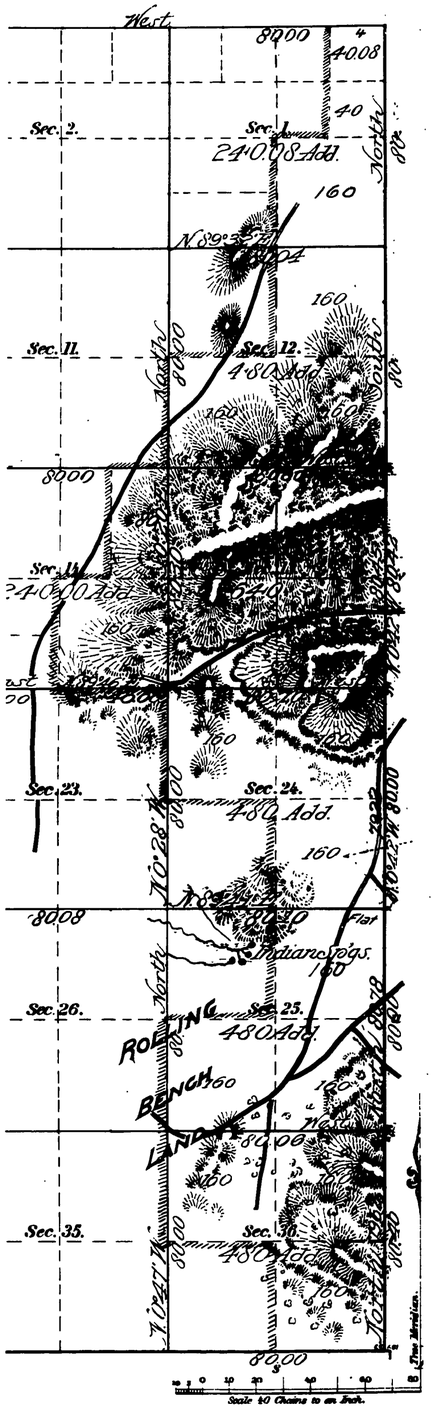


Figure 2 - Portion of Original Plat

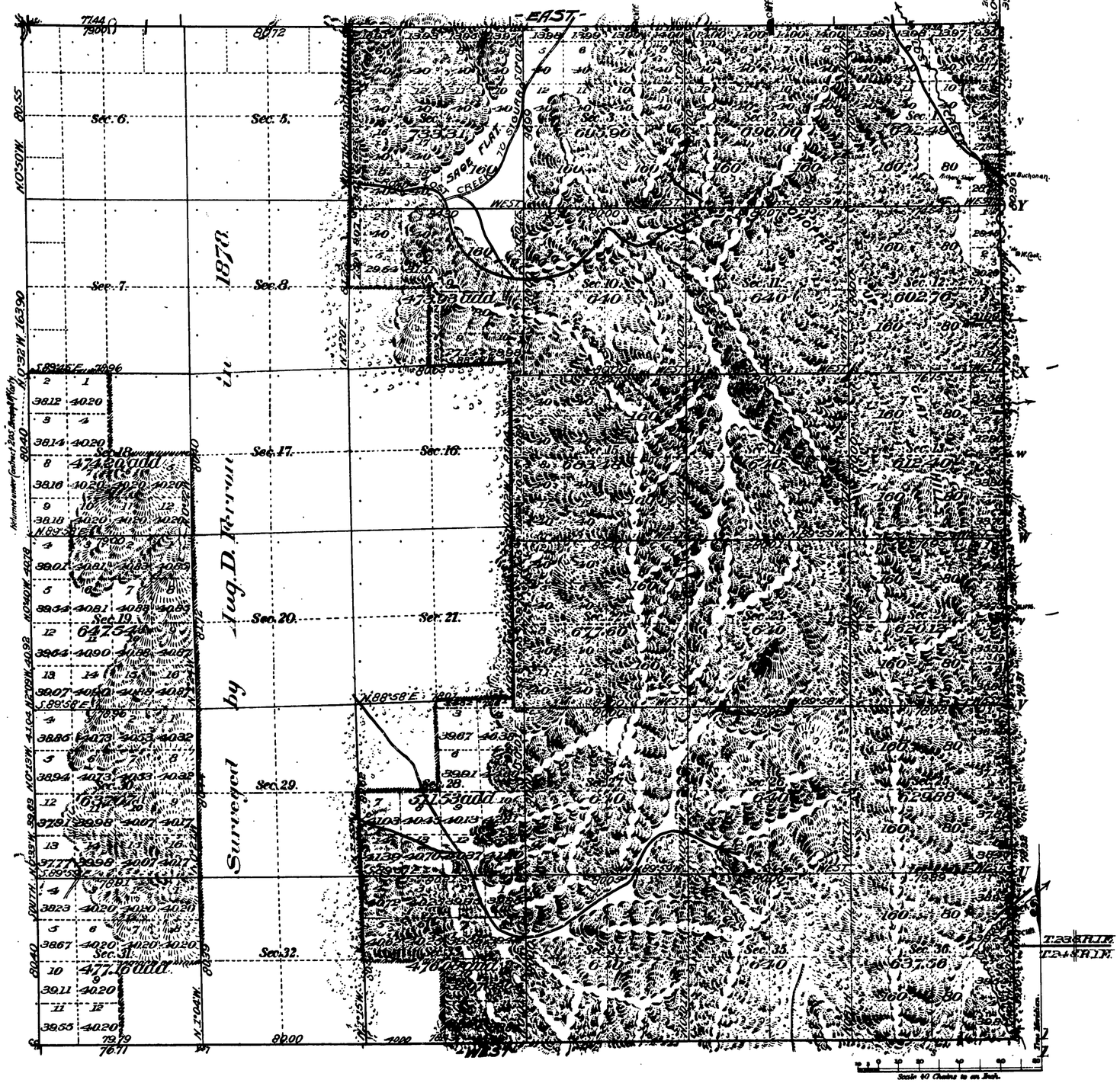


Figure 3 - Portion of Page and Swan Plat

DOUBLE SET OF CORNERS IN UTAH

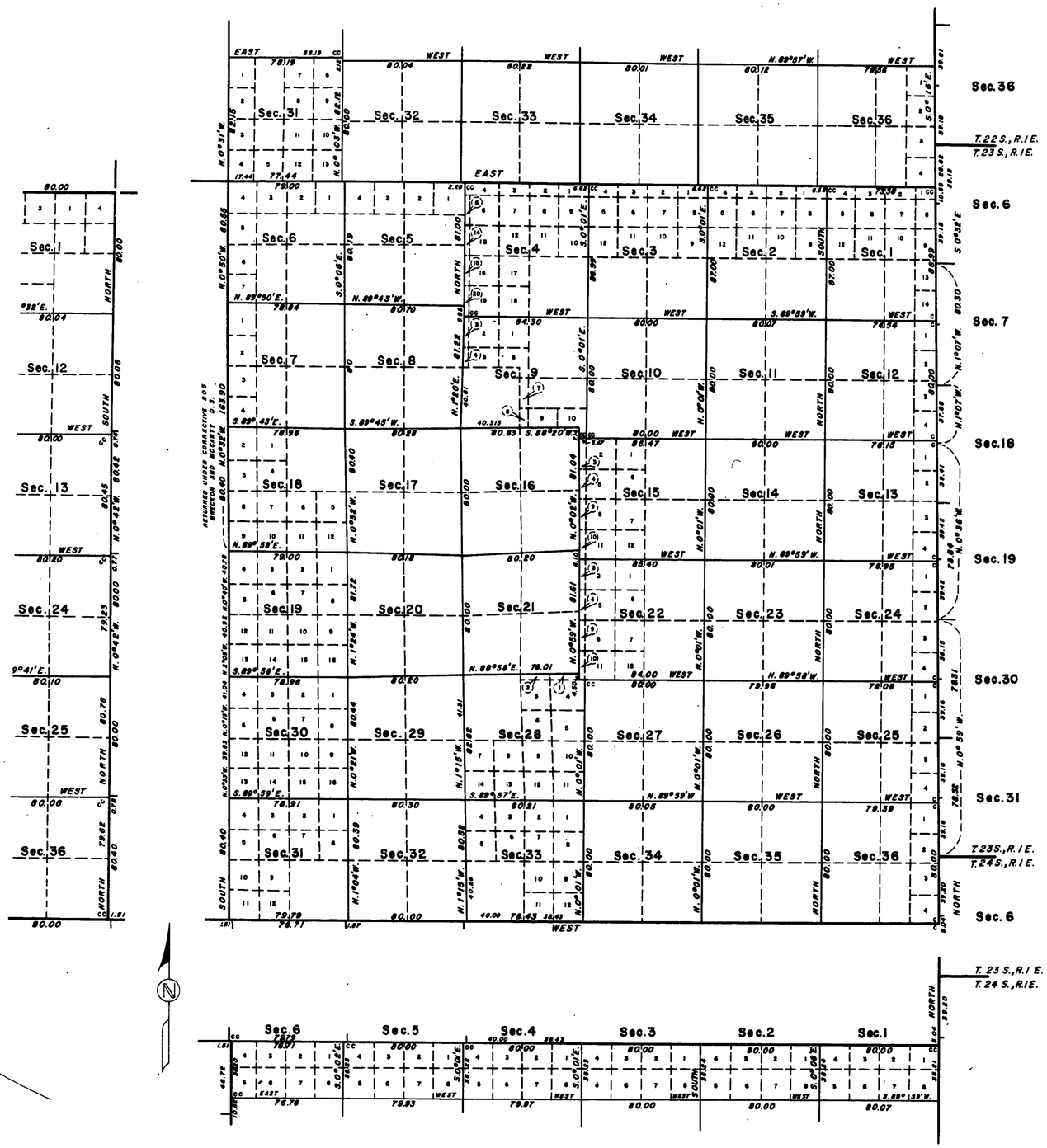


Figure 4a - Composite Sketch of Record

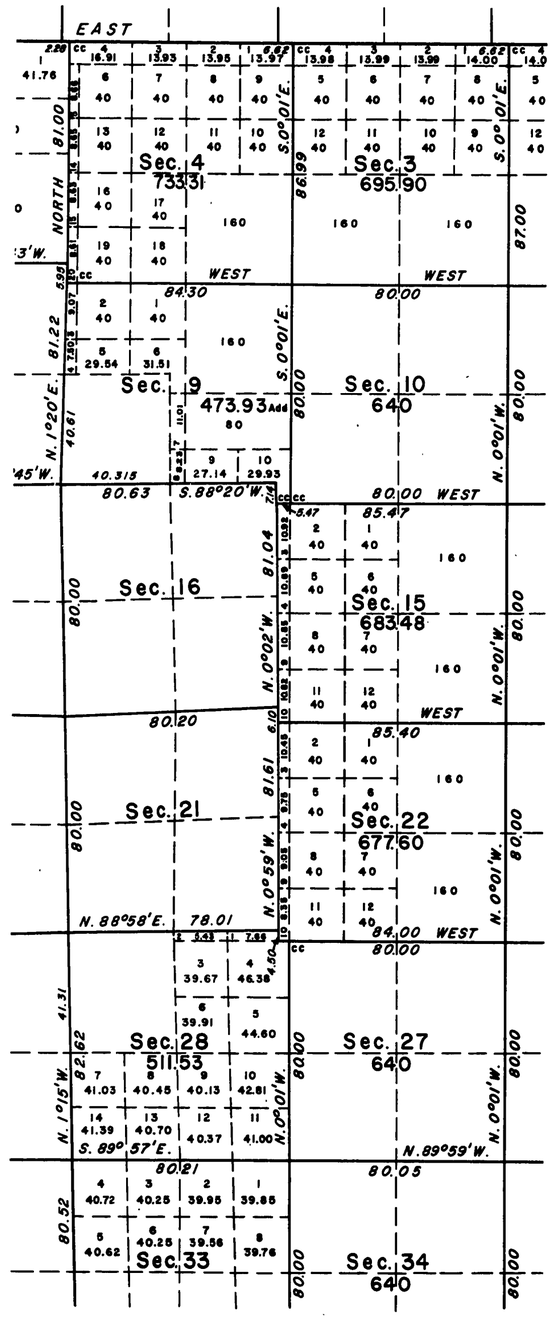


Figure 4b - Composite Sketch of Record

DOUBLE SET OF CORNERS IN UTAH

Reasons for Request of this Survey

Tps. 22 and 23 S., Rs. 1 and 2 W., are intermingled Public Land and patented lands. The "piecemeal" system of original surveys and the double corners make corner identification difficult. Many of the old corners cannot be found. A resurvey was requested to identify the remaining Public Lands. Figure 5 is the Master Title Plat showing the land status.

Special Instructions

On April 12, 1967, Special Instructions were issued for Group 493, Utah. They provided for the dependent resurveys in Tps. 22 and 23 S., Rs. 1 and 2 W. Field work began on May 16, 1967.

TOWNSHIP 23 SOUTH RANGE 1 WEST OF THE SALT LAKE MERIDIAN

DISTRICT 5

SEVIER COUNTY

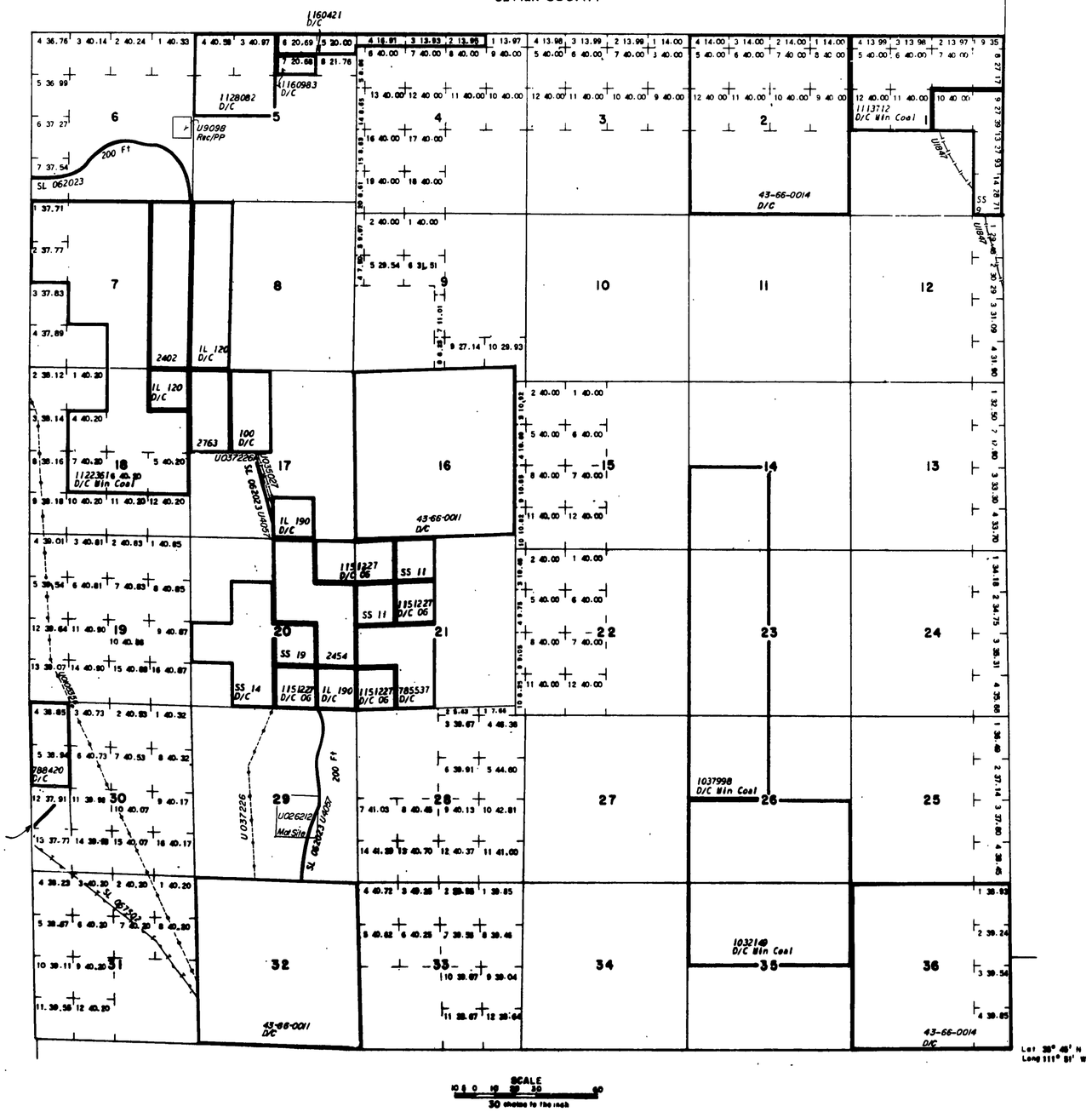


Figure 5 - Master Title Plat

DOUBLE SET OF CORNERS IN UTAH

Conditions Found on the Ground

Figure 6 indicates the corners found during the retracements. Sections 35 and 36 had been resurveyed in 1949-50, so only the east half mile between sections 26 and 35 required retracement on this assignment.

Preliminary Statement of Problem

The lost corners must be restored by appropriate proportionate methods in a manner which will protect the original plats and patented lands. This discussion of proportionment will be limited to the subdivisional lines in T. 23 S., R. 1 W.

Regulations

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

3-74,3-75,3-87, 3-89 to 3-92	Subdivision of sections
5-20 to 5-24	Restoration of lost corners
5-25,5-26,5-28	Double proportionate measurement
5-30 to 5-34 5-38	Single proportionate measurement
5-35	Double set of corners
5-36	Irregular boundaries
5-41 ; 5-42	Closing corners

Final Statement of the Problem

The surveyor must restore the lost ¼ section corner, section corner and closing section corners by proportionate measurements, controlled by the position of the recovered original corners found on the ground, and in a manner which will protect the rights of patented land owners according to the areas which were returned on the original plats.

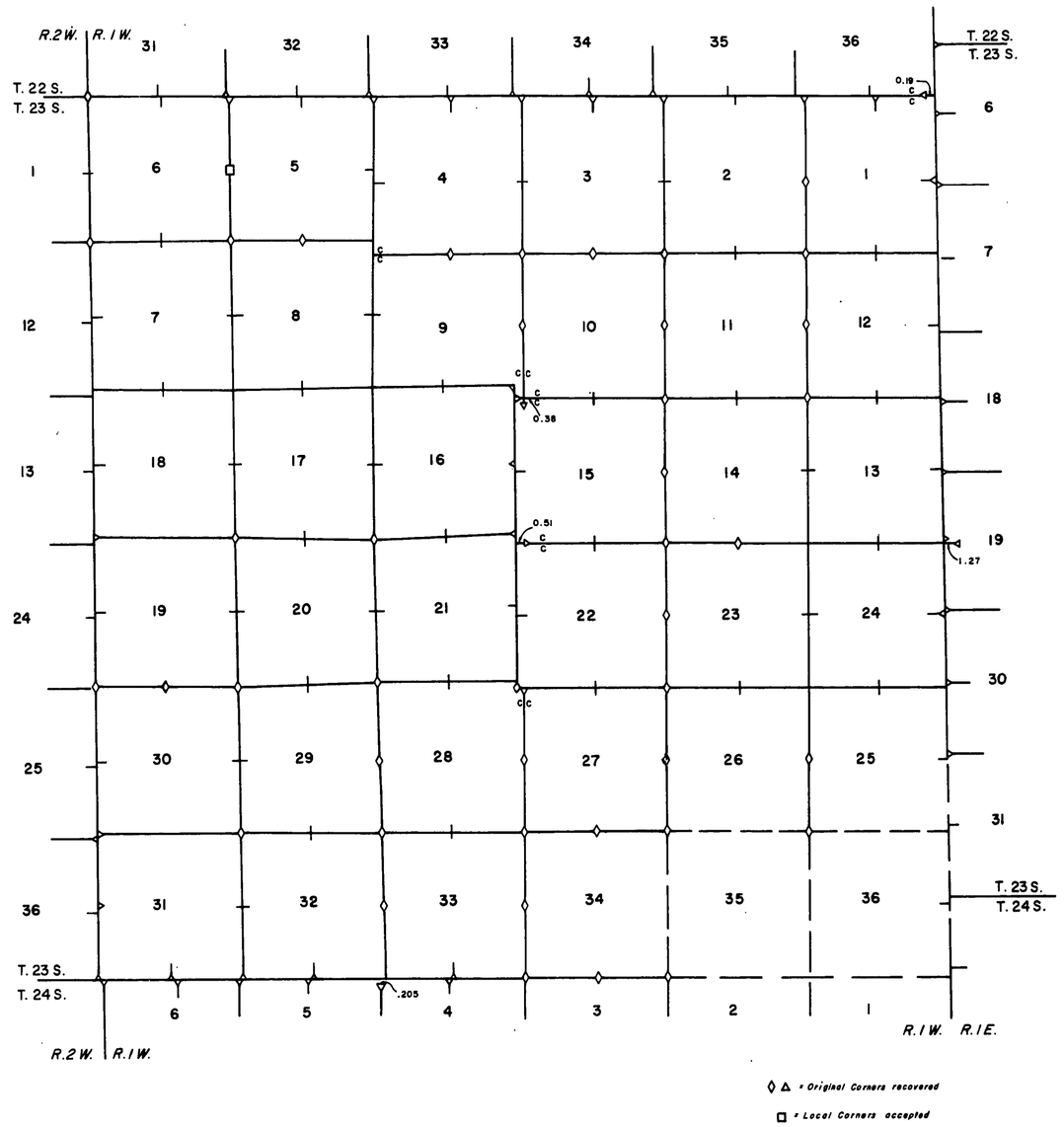


Figure 6 - Corner Recovery Diagram

DOUBLE SET OF CORNERS IN UTAH

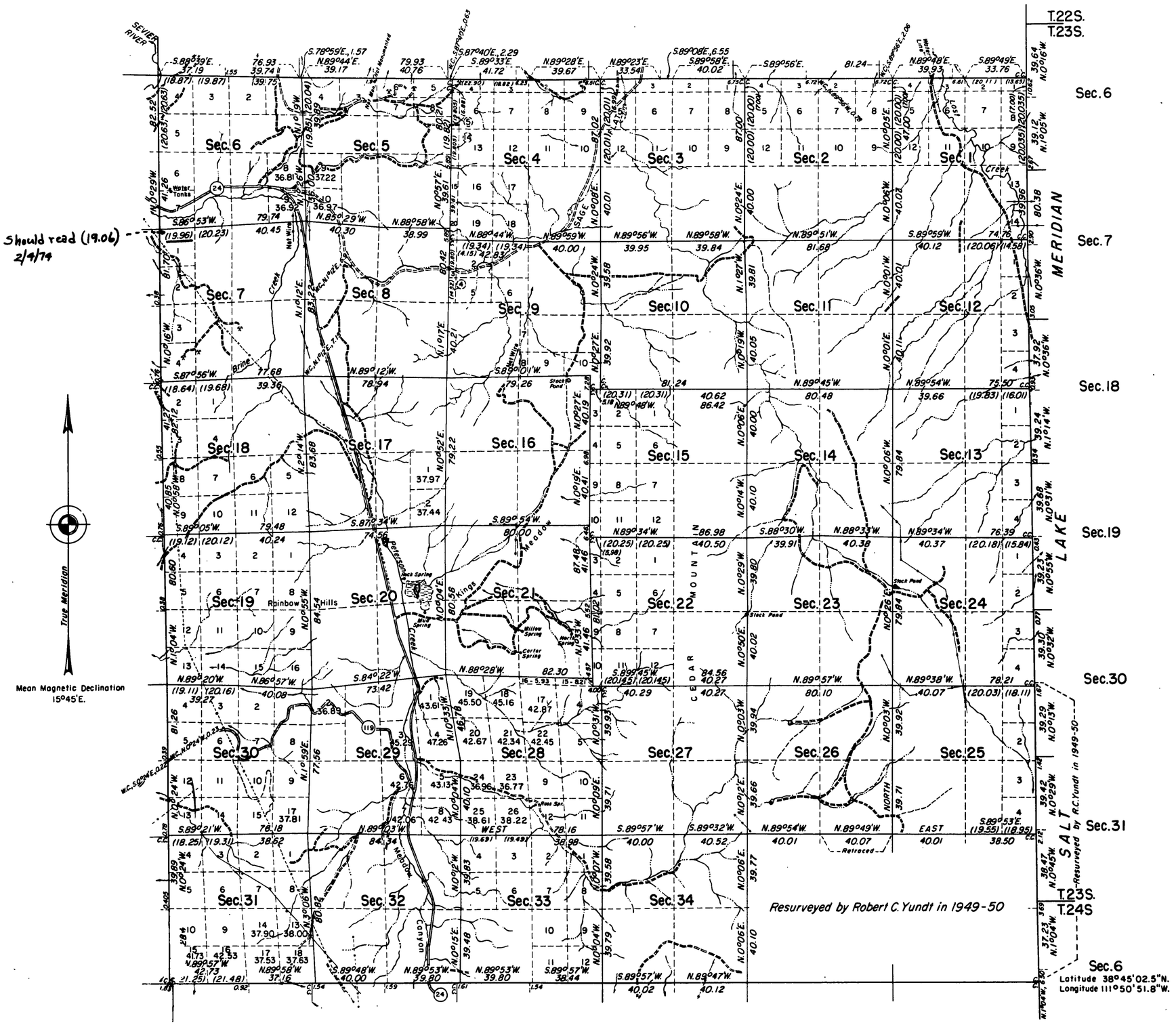


Figure 7 - Portion of Accepted Plat, T. 23 S., R. 1 W.

DOUBLE SET OF CORNERS IN UTAH

Solution

This discussion is limited to the restoration of the lost corners of sections 4, 5, 8, 9, 10, 15, 21 and 22, T. 23 S., R. 1 W.

The east boundary of section 21 was restored by single proportionate measurement between the recovered southwest corner of section 22 and corner of sections 16 and 21.

The line between sections 15 and 22 was extended through the "offline" closing corner of sections 15 and 22 to an intersection with the restored east boundary of section 21. The ¼ corner of sections 15 and 22 was set by single proportionate measurement, based on the plat and field notes, between the original closing corner and the corner of sections 14, 15, 22 and 23.

The west ¼ corner of section 15 was established at midpoint between the "new" closing corner of sections 15 and 22 and the recovered closing corner of sections 9 and 15, the latter being on the true east boundary of section 16.

The west ¼ corner of section 22 was established at midpoint between the southwest corner of section 22 and the "new" closing corner of sections 15 and 22.

The line between sections 9 and 10 was terminated at the true intersection with the north boundary of section 15, and a tie made to the "offline" closing corner. The original closing corner determined the direction of the line between sections 9 and 10, but not the terminus of that line. The original closing corner would also be used to determine the position of a south 1/16 corner of sections 9 and 10.

As shown by the areas on the original plat, the ¼ corner of sections 10 and 15 would not be common because of the resurvey distances. The south ¼ corner of section 10 was placed properly at midpoint between the "new" closing corner of sections 9 and 10 and the recovered corner of sections 10, 11, 14 and 15. The north ¼ corner of section 15 would be proportioned between the northeast and northwest corners of the section. Both sections 10 and 15 are all vacant public domain so the ¼ corner of section 10 was made common with section 15 and avoided a "double" corner.

The corner of sections 8, 9, 16 and 17 was double proportioned as in a normal situation, using the restored corner of sections 7 and 18 on the west boundary for control in that direction.

The latitudinal position of the lost corner of sections 5 and 8 was determined by single proportionate measurement. The longitudinal position was determined by proportionate measurement between the ¼ corner of sections 4 and 9 and the ¼ corner of sections 5 and 8, based on Ferron's record, Page and Swan's survey and retracement differences in longitude. In other words, a "double" proportionate measurement of the corner was made, rather than a "three point" control. [Three point control would be the proper method to use in spite of the effect on the bearing of the east boundary of section 8. The west half mile between sections 4 and 9 would then be nearly 3 chains shorter than the record.]

The closing corner of sections 4 and 9 was single proportioned, as was the ¼ corner of sections 8 and 9 after the corner of sections 5 and 8 was restored.

The east ¼ corner of section 5 was set by single proportionate measurement between the northeast and southeast corners of section 5, based on the plat and field notes.

The west ¼ corner of section 4 was established at single proportionate position between the northwest and southwest corners of section 4, based on the areas returned on the original plat.

The plat was accepted April 19, 1973, and is shown in figure 7.

Supplementary Topic

Parenthetical Distances

Although not shown on the plat nor required for the purpose of this survey, the parenthetical distances for section 9 which correspond to the original plat are of interest. These parenthetical distances would be necessary for and the basis of subdivision of section 9 if required. Figure 8 shows the record of section 9 as shown on the Page and Swan plat as well as calculated parenthetical distances.

A theoretical west ¼ corner and south 1/16 corner on the west boundary of the section would be placed at 40 and 60 chains south in latitude, proportionately from the northwest corner of the section. These would be the basis of a "normal" subdivision of the section.

The southwest ¼ of section 9 would be surveyed by running north, parallel to the west boundary and east, parallel to the south boundary to an intersection to establish the northeast corner of the southwest ¼.

The "normal" subdivision of section lines would be terminated on the boundaries of the southwest ¼.

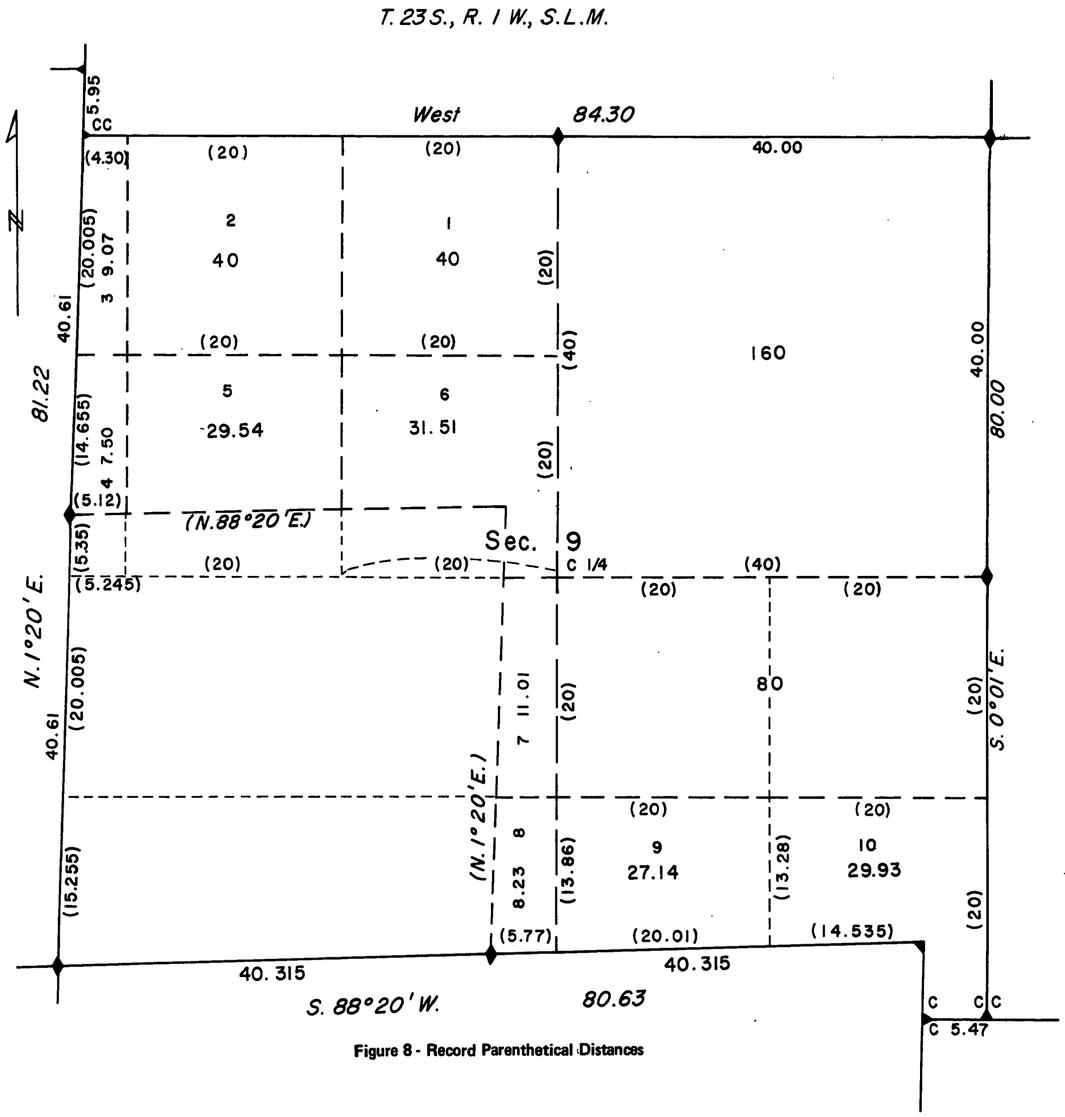
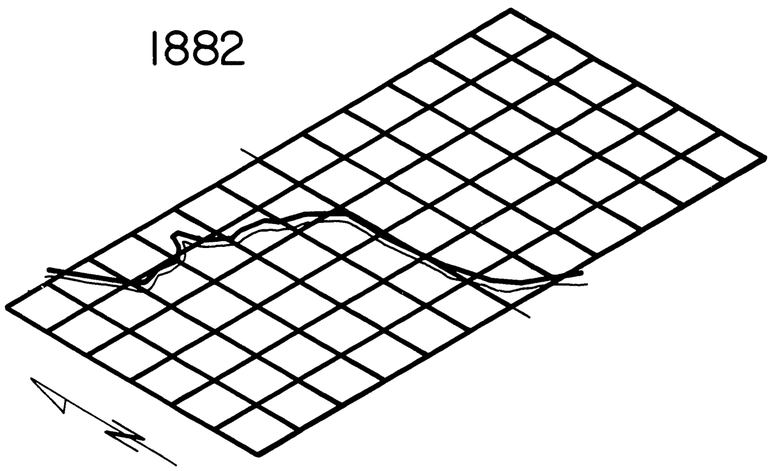


Figure 8 - Record Parenthetical Distances

PROPORTIONMENT ACROSS A RANGE LINE



History of Surveys

1882 The range line between T. 10 N., Rs. 3 and 4 E., and subdivisional lines of both townships were surveyed by John Haughn in August and September, 1882, as shown on the plats approved December 30, 1882. Pertinent portions of the approved plats are shown in figures 1 and 2.

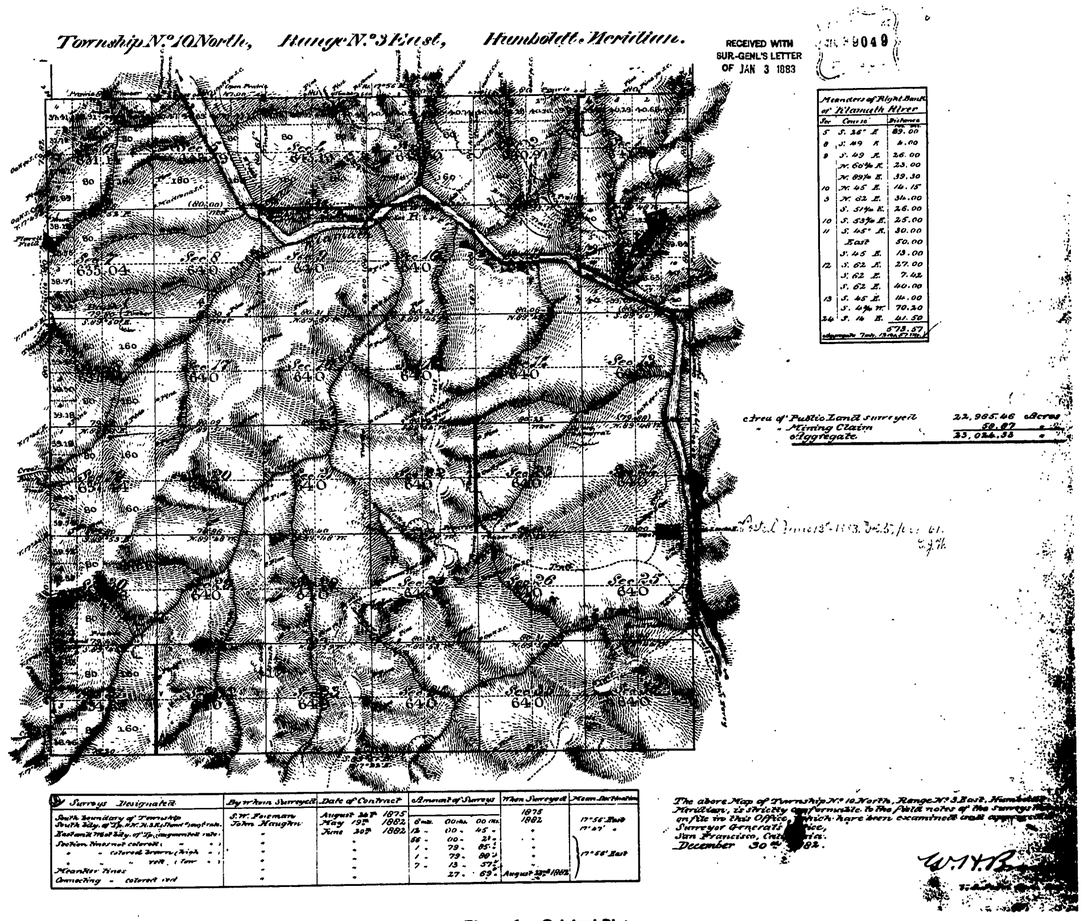


Figure 1a - Original Plat

A6-1

PROPORTIONMENT ACROSS A RANGE LINE

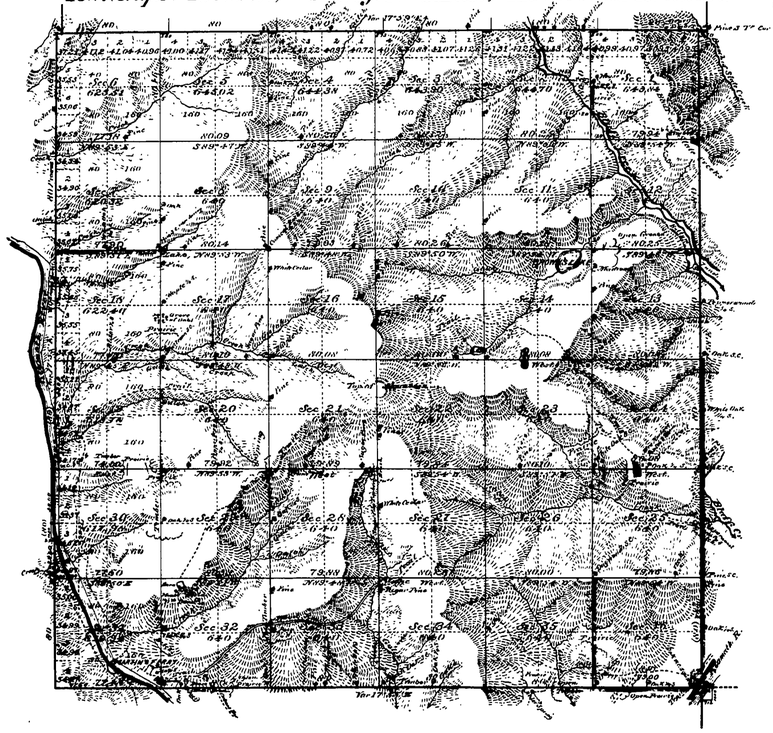


Figure 1b - Original Plat

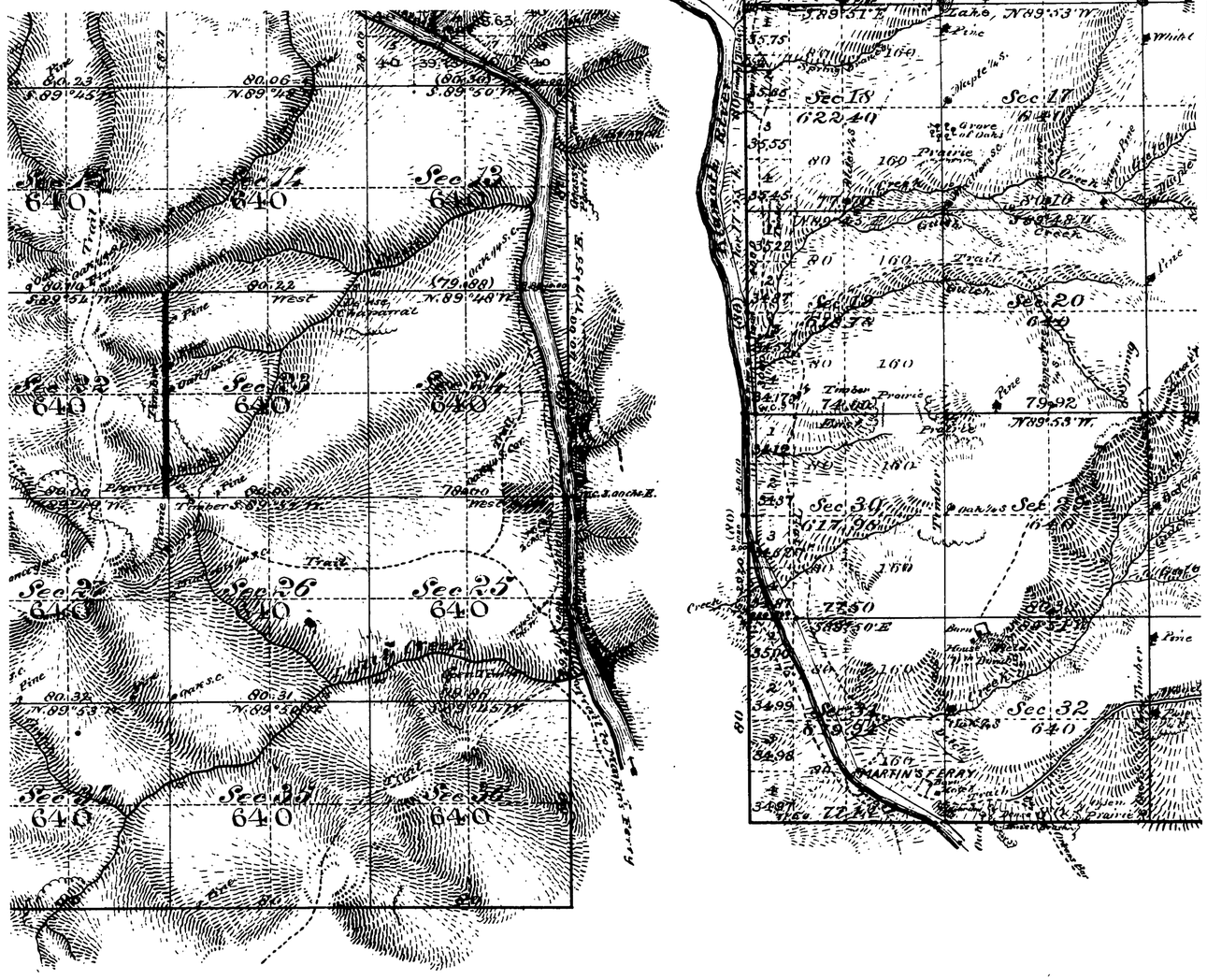


Figure 2 - Portions of Original Plats

PROPORTIONMENT ACROSS A RANGE LINE

Reasons for Request of this Survey

Section 24, T. 10 N., R. 3 E., and section 19, T. 10 N., R. 4 E., are located within the Hoopa Valley Indian Reservation. Portions of both sections have been patented in fee. Trust deeds have been issued by the Bureau of Indian Affairs for allotments in section 24. Most of the descriptions depend upon the location of the boundaries and subdivisional lines of section 24. The line between sections 19 and 24 cannot be identified. The BIA requested a resurvey of both sections, subdivision of section 24 and the survey of a number of allotments.

Special Instructions

Special Instructions were prepared on April 7, 1961 for Group 470, California. They provided for dependent resurveys, subdivision of section surveys and survey of Indian trust lands in T. 11 N., R. 3 E., and T. 10 N., Rs. 3 and 4 E. Field work began on April 18, 1961. This discussion is limited to the restoration of the boundaries between sections 19 and 24.

Conditions Found on the Ground

Refer to figure 3, an enlarged sketch of the Haughn plat. The field notes state that Haughn ran north between sections 25 and 30. At 29.20 chains he intersected the left bank of the Klamath River, offset west, 2.00 chains, set a witness ¼ section corner at 40.00 chains (2 chains west of true point) and set a meander corner between sections 24 and 25 at 80.00 chains, on the left bank of the river, 2 chains west of the true point for the corner of sections 19, 24, 25 and 30, the true point being in the river. Haughn then triangulated across the river, and set a witness corner for the corner of sections 19, 24, 25 and 30, on the right bank of the river, 5 chains east of the meander corner on the left bank and 3 chains east of the true corner point.

Haughn then states that he ran north from the witness corner, on a 3 chain offset, between sections 19 and 24. At 30.00 chains he offset west 3 chains, returning to true line, and at 40.00 chains set the ¼ section corner of sections 19 and 24, on the right bank of the Klamath River. He continued north and set the corner of sections 13, 18, 19 and 24 at 80.00 chains.

On the subdivisional lines, Haughn set a meander corner on the right bank of the river between sections 13 and 24, at 10.00 chains and one on the left bank at 18.88 chains.

He ran the line between sections 19 and 30 West, 74.00 chains to an intersection with the previously established witness corner of sections 19, 24, 25 and 30, returned on true line establishing the ¼ corner of sections 19 and 30 at 34.00 chains east of the witness corner.

The 1881 Manual of Surveying Instructions, section 2, page 34, directs that non-navigable rivers were to be meandered along only one bank, and that this should be the right bank where practicable.

In accordance with the Manual, Haughn reports meandering the right bank of the river:

In Section 30
N. 26½° W., 33.70 chains
North, 50.00 chains to witness corner
and meander corner.
In section 19
N. 4¼° W., 40.20 chains to ¼ corner
and meander corner of section 19 and 24.

In section 24
N. 14° W., 41.50 chains to meander corner
of sections 13 and 24.

The Haughn plats do not segregate the Klamath River. All areas are based on full sections (as returned by him) out to the range line which is shown to be in the river, although the length of the lines between sections 24 and 25, and between sections 19 and 30 are shown only to the meander corner and witness corner respectively.

Between 1951 and 1959 three private surveyors had endeavored to resurvey and subdivide parts of sections 19 and 24, and had recovered five original corners of section 19 and the corner of sections 23, 24, 25 and 26. The corner of sections 13, 14, 23 and 24 had been restored, without monumentation, by double proportionate measurement. The ¼ section corner of sections 19 and 24 had been restored, again without monumentation, on the right bank of the Klamath River.

During this investigation and retracement, the corner of sections 25, 30, 31 and 36 was found. The corner recovery and retracement data are shown in figure 4. The retracement data shows the results of a single proportionate restoration of the range line and resulting distances to the Klamath River. The Klamath River is in a sharply defined canyon with extremely steep slopes. There is no possibility of any movement of the river since 1882.

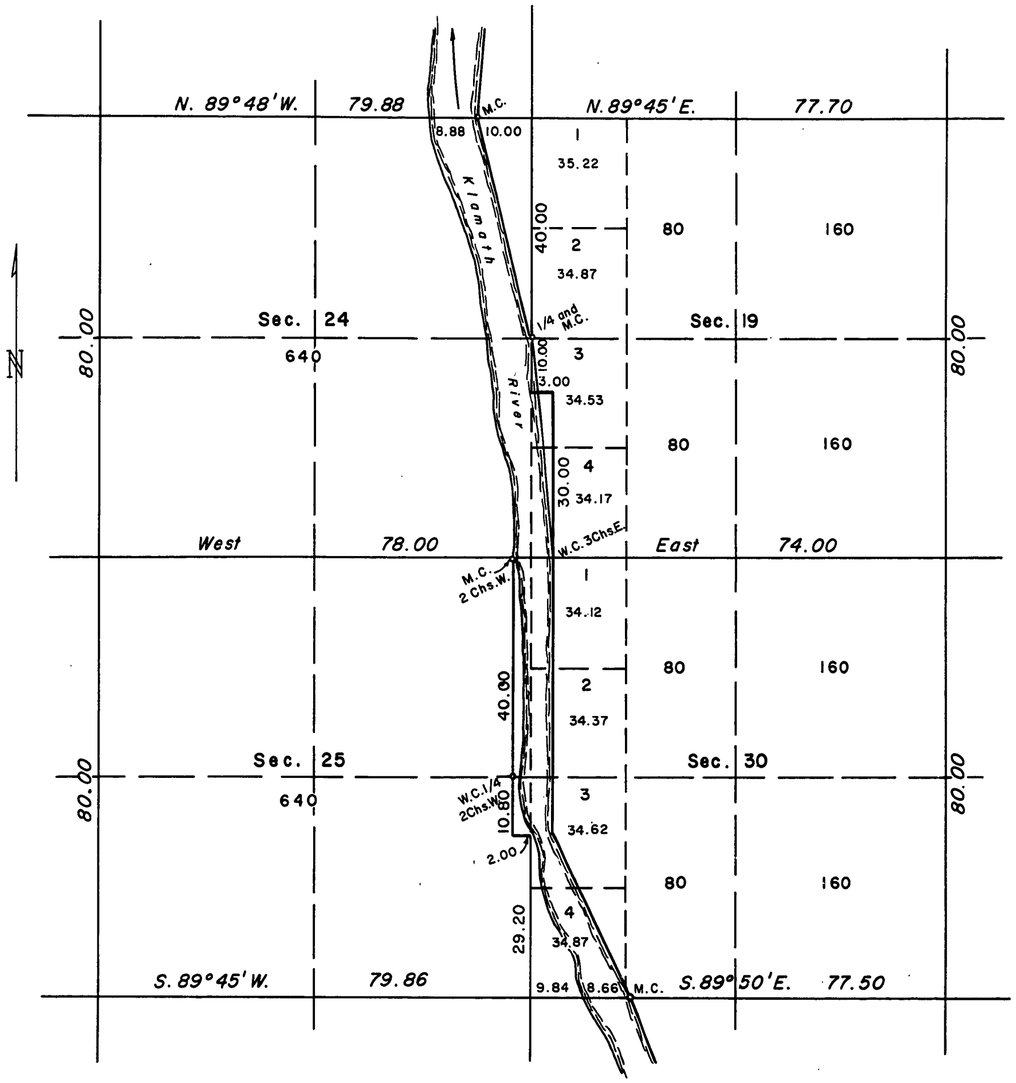


Figure 3 - Original Survey Record

PROPORTIONMENT ACROSS A RANGE LINE

Preliminary Statement of the Problem

How should the missing corners of sections 19 and 24 be restored?

Regulations

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

5-5 and 5-8	Existent corner
5-9 and 5-10	Obliterated corner
5-16	Topographic calls
5-31	Single proportionate measurement
5-37	Double proportionment across township or range line

Final Statement of the Problem

How much weight should be placed on the topographic calls in the original record as to the locations of the corners in relation to the river?

Changes in Instructions

The situation is shown in figure 4. The sketch, along with the status and private surveyors' maps were submitted to the Washington Office on June 14, 1961, asking for a ruling on the matter along with the suggestion that a single proportionate restoration be adopted. The grounds for single proportion were that any other method would greatly distort the sections and there was no evidence (other than the field notes and plats) to show that Haughn had ever, in fact, set the ¼ corner of sections 19 and 24. (It is also obvious that Haughn's meanders of the right bank were fictitious.)

By memorandum dated July 12, 1961, the Washington Office rendered the opinion that the corner of sections 19, 24, 25 and 30 should be restored by double proportionate measurement between recovered original corners to the north, south, and east and west across the range line. Following that, the ¼ corner of sections 19 and 24 should be restored latitudinally by single proportionate measurement and longitudinally on the right bank of the Klamath River. The following comment and citation was also made:

"While not necessarily controlling in our resurvey activities, the attitude of the California courts as to the significance of topographic calls is set out in Chandler v. Hibberd, 332 P. 2d 133 (1958)."

The Chandler v. Hibberd case concerned land in the Cuyama oil field. In it the court ruled that a section corner was to be restored by calls of topography. In that case the calls were much more uncertain than those of the Haughn survey in this situation.

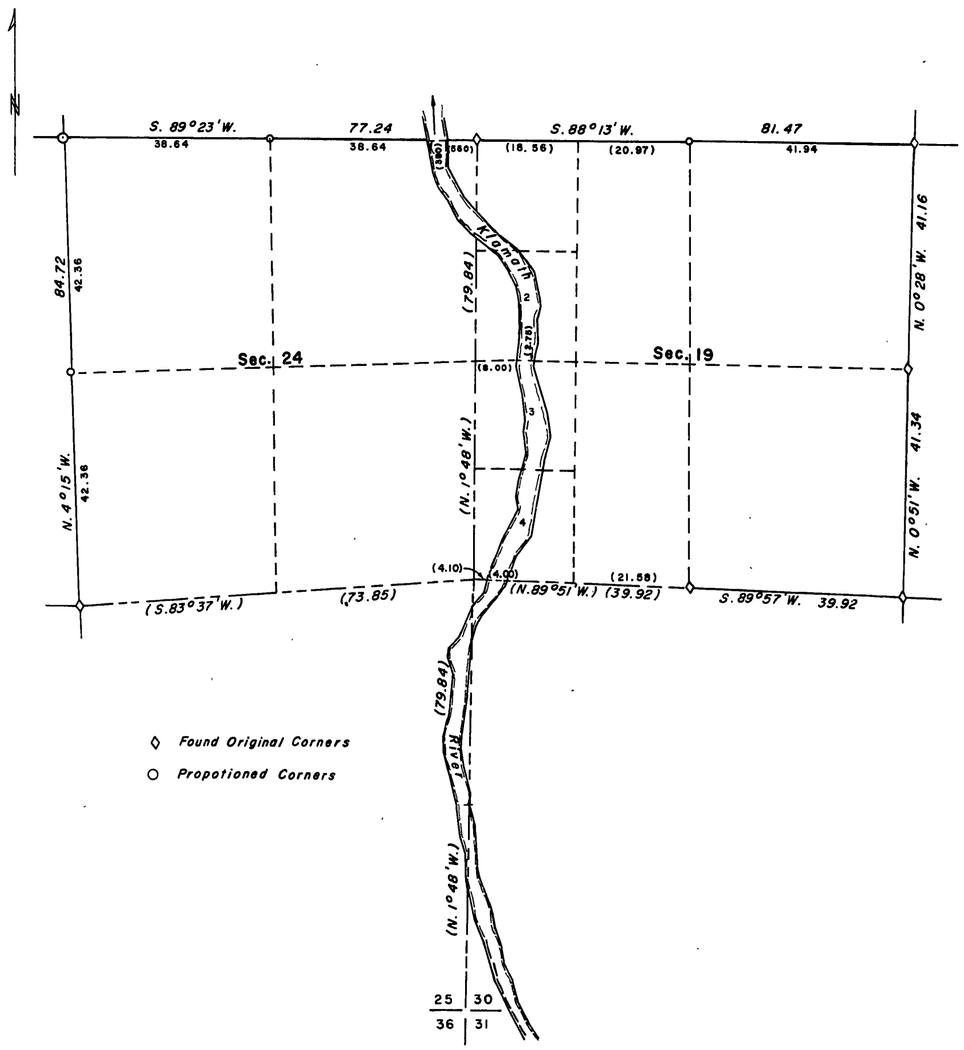
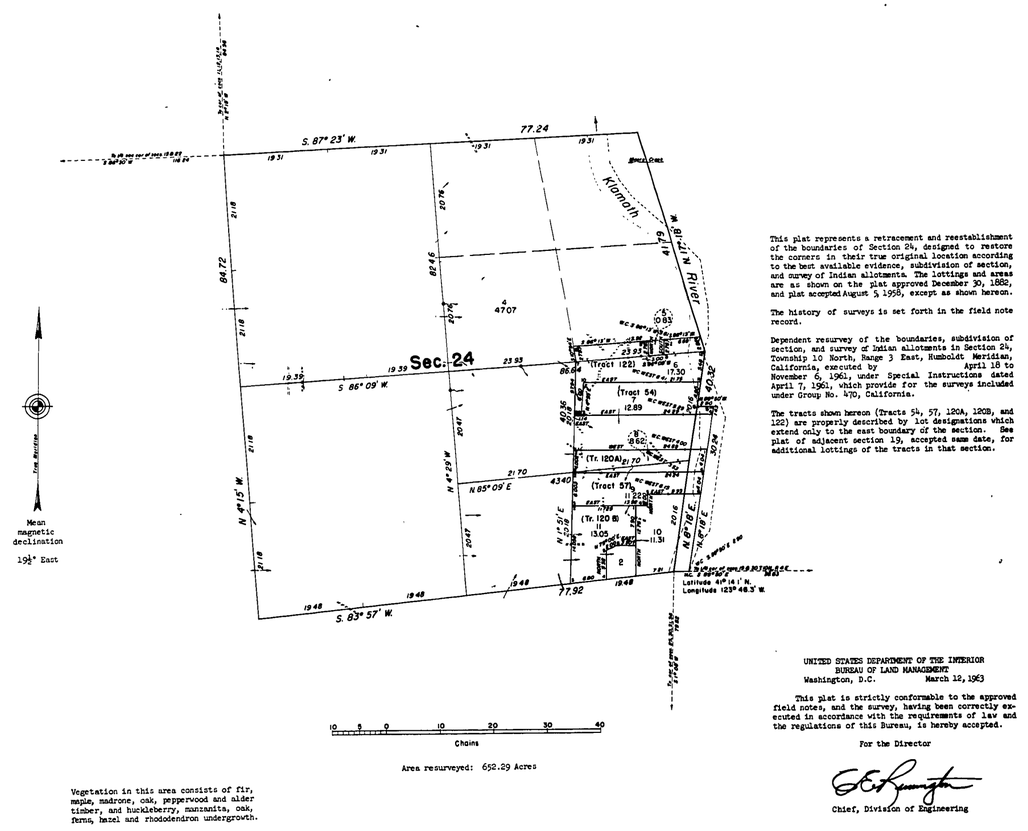


Figure 4 - Proposed Restoration

PROPORTIONMENT ACROSS A RANGE LINE



This plat represents a retracement and reestablishment of the boundaries of Section 24, designed to restore the corners in their true original location according to the best available evidence, subdivision of section, and survey of Indian allotments. The lottings and areas are as shown on the plat approved December 30, 1882, and plat accepted August 5, 1958, except as shown hereon.

The history of surveys is set forth in the field note record.

Dependent resurvey of the boundaries, subdivision of section, and survey of Indian allotments in Section 24, Township 10 North, Range 3 East, Humboldt Meridian, California, executed by April 18 to November 6, 1961, under Special Instructions dated April 7, 1961, which provide for the surveys included under Group No. 470, California.

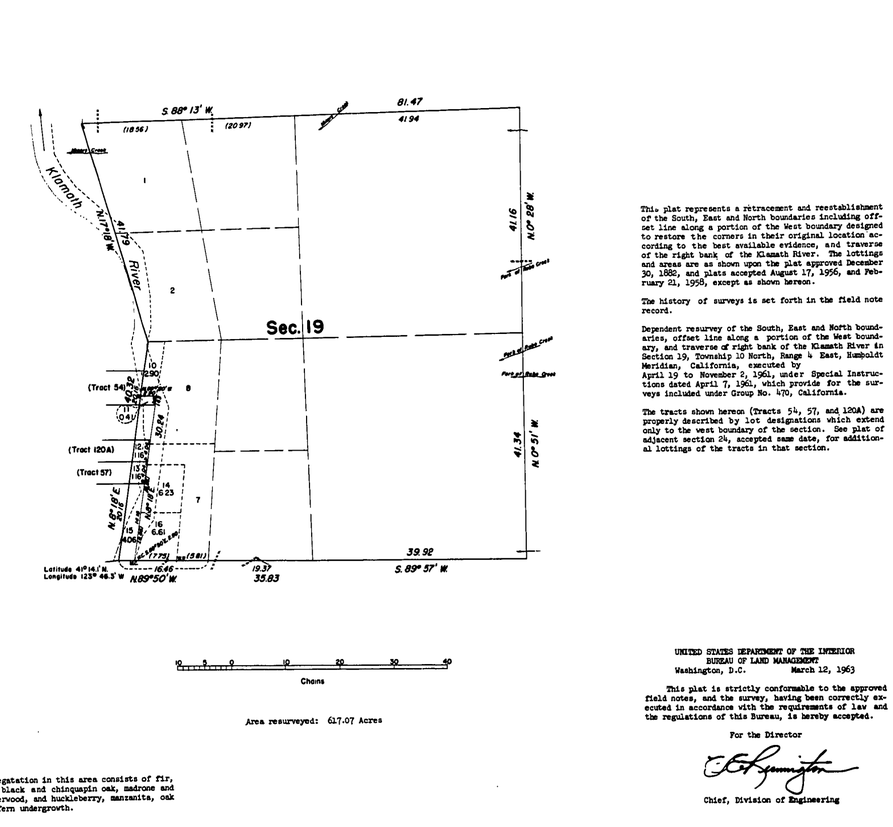
The tracts shown hereon (Tracts 54, 57, 120A, 120B, and 122) are properly described by lot designations which extend only to the east boundary of the section. See plat of adjacent section 19, accepted same date, for additional lottings of the tracts in that section.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. March 12, 1963

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 Engineering



This plat represents a retracement and reestablishment of the South, East and North boundaries including offset line along a portion of the West boundary designed to restore the corners in their original location according to the best available evidence, and traverse of the right bank of the Klamath River. The lottings and areas are as shown upon the plat approved December 30, 1882, and plats accepted August 17, 1956, and February 21, 1958, except as shown hereon.

The history of surveys is set forth in the field note record.

Dependent resurvey of the South, East and North boundaries, offset line along a portion of the West boundary, and traverse of right bank of the Klamath River in Section 19, Township 10 North, Range 4 East, Humboldt Meridian, California, executed by April 19 to November 2, 1961, under Special Instructions dated April 7, 1961, which provide for the surveys included under Group No. 470, California.

The tracts shown hereon (Tracts 54, 57, and 120A) are properly described by lot designations which extend only to the west boundary of the section. See plat of adjacent section 24, accepted same date, for additional lottings of the tracts in that section.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. March 12, 1963

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 Engineering

Figure 6 - Portion of Accepted Plat, Sec. 24

Figure 7 - Accepted Plat, Sec. 19

Solution

The point for the corner of sections 19, 24, 25 and 30 was restored by double proportionment, latitudinally between the corner of sections 25, 30, 31 and 36 and the corner of sections 13, 18, 19 and 24, longitudinally between the ¼ corner of sections 19 and 30 and the corner of sections 23, 24, 25 and 26, as directed. This point fell in the Klamath River.

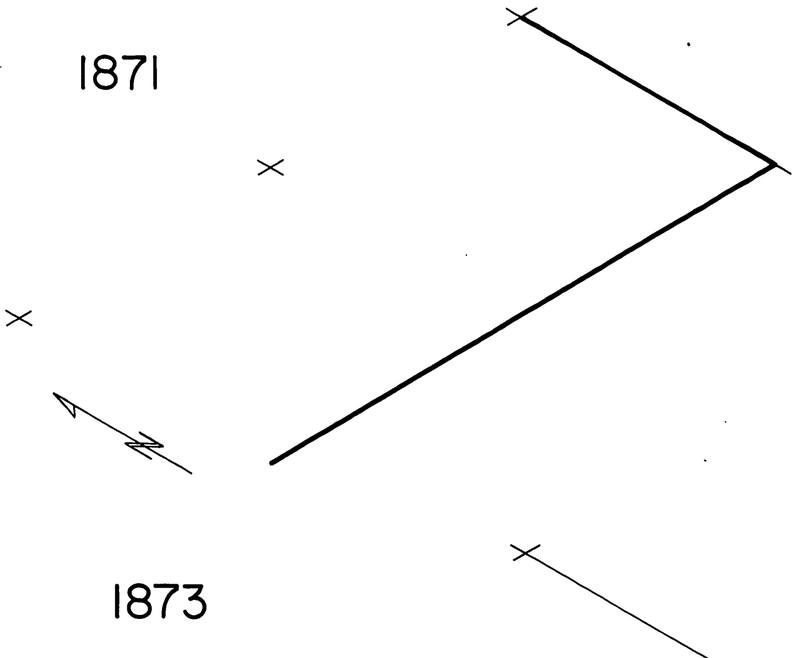
The right bank of the river was traversed (similar to meandering). The ¼ corner of sections 19 and 24 was placed on the traverse line, on the right bank and at proportionate distance latitudinally.

The corners between sections 24 and 25 were established by single proportionate measurement, as was the witness corner and W 1/16 corner between sections 19 and 30.

Section 24 was subdivided, the allotments surveyed and an informative traverse of the left bank of the river was also made.

The plats of sections 19 and 24 were accepted March 12, 1963 and are shown in figures 5 and 6.

IRREGULAR BOUNDARY ADJUSTMENT IN CALIFORNIA



History of Surveys

1871 Henry S. Bradley surveyed the south boundaries of T. 18 N., Rs. 8 and 9 E.

1873 A.W. Brown surveyed the east, west and north boundaries and subdivisional lines of T. 18 N., R. 8 E.

1877 L.D. Bond surveyed the north boundary and subdivisional lines of T. 18 N., R. 9 E. Bond could not close against portions of the previously surveyed west boundary (the Brown survey) and retraced the west boundaries of sections 6, 19 and 30. Bond's plat was approved July 24, 1878, shown in figure 1.

This discussion involves only the restoration of the corner of sections 25, 30, 31 and 36 on the east boundary of T. 18 N., R. 8 E.

Bond retraced the south half mile between sections 25 and 30. He ran south from the Brown ¼ section corner and at 45.54 chains fell 11.44 chains west of the Brown corner of sections 25, 30, 31 and 36. Bond did not retrace between sections 31 and 36. The Brown record for that mile is North, 80.00 chains.

Reasons for Request of this Survey

T. 18 N., R. 8 E., is located in Yuba County, California, and in the Tahoe National Forest. The township contains intermingled public and private lands. Survey corners were difficult to find and there is considerable distortion. As part of a cooperative agreement, the Forest Service requested resurvey of the township as a photogrammetric project known as the Tahoe Test Project.

Special Instructions

Special Instructions for Group 421, California, were prepared on April 30, 1958. They provided for the dependent resurvey of T. 18 N., R. 8 E., as an experimental project in applying photogrammetric procedures to a dependent resurvey. Initial corner search, paneling and photography were already completed. The positions of panel points were determined by photogrammetry and the State Plane Coordinates determined, using California, Zone II. The central meridian of the zone is 122° 00' West longitude. Field work on the final phase began on May 1, 1958.

Conditions Found on the Ground

The ¼ section corner of sections 25 and 30 and the corner of Tps. 17 and 18 N., Rs. 8 and 9 E were found and paneled. No evidence could be found of the corner of sections 25, 30, 31 and 36, nor the ¼ section corner of sections 31 and 36. The state plane coordinate of the ¼ section corner of sections 25 and 30 is given as: X = 76,610.9, Y = 32,248.6. The coordinate of the township corner is: X = 76,664.8, Y = 23,840.9. The latitude of the township corner is 39° 22.5' N., longitude 121° 01.3' W. The Coast and Geodetic Survey Special Publication No. 253 lists the theta angle as + 0° 37' 15"; scale factor as 0.9999282. The average elevation above sea level is 2400 feet, so the resulting sea level factor is 0.999885.

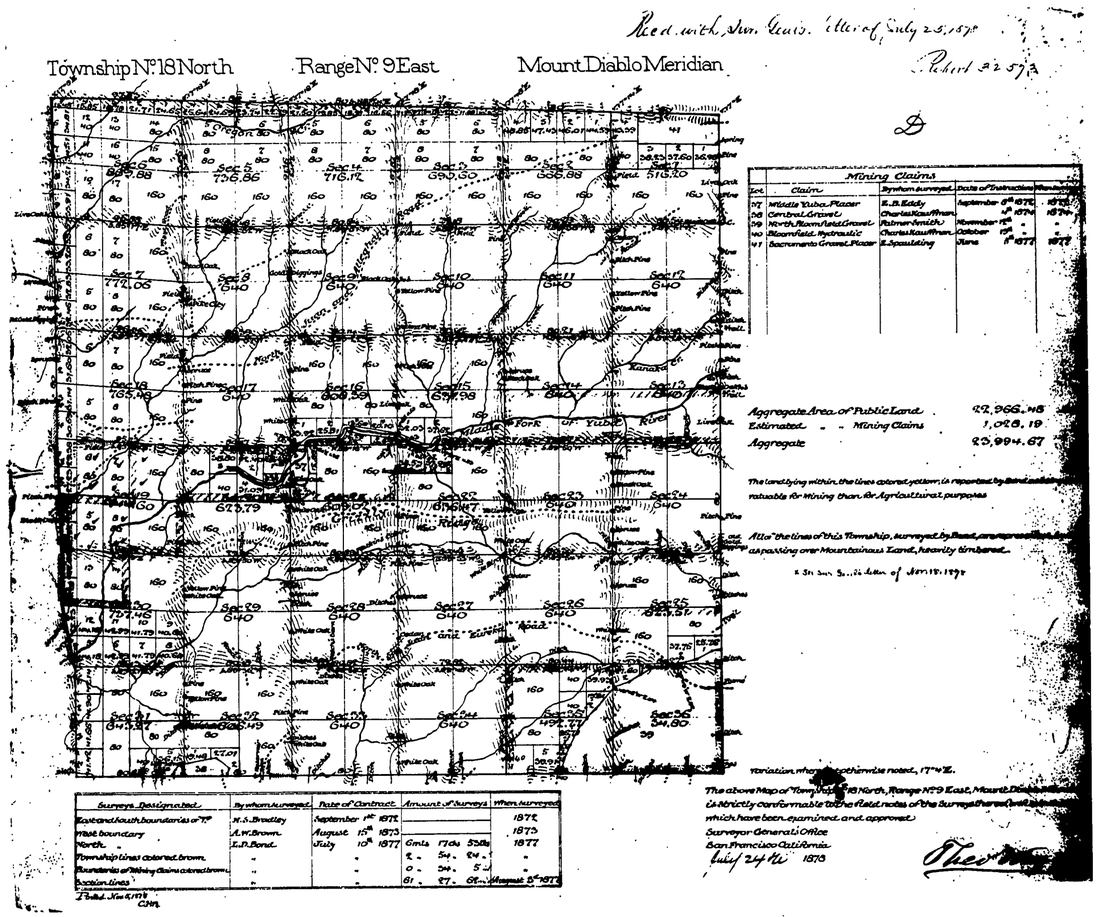


Figure 1a - Original Plat

IRREGULAR BOUNDARY ADJUSTMENT IN CALIFORNIA

Preliminary Statement of the Problem

The surveyor must restore the missing corner of sections 25, 30, 31 and 36 and ¼ section corner of sections 31 and 36 by the appropriate methods.

Regulations

This survey illustrates the application of section 5-36 of the Manual of Surveying Instructions, 1973, Irregular Boundaries. Sections 5-43 and 5-44 are also considered.

Final Statement of the Problem

The appropriate method for corner restoration must be selected according to existing regulations and coordinates of missing corners computed. The information desired in the field will consist of corrections or "moves," which are to be computed.

Solution

Figure 2a shows the record and retracement data and the computed "closing course." The grid bearing and distance between found corners has been converted to true bearing and distance by use of the given theta angle, scale factor and sea level factor. The "second term" is too small to be significant.

Figure 2b illustrates application of the broken boundary (compass rule) adjustment described in section 5-43.

Figure 2c illustrates application of a Grant Boundary adjustment described in section 5-44.

Figure 2d illustrates the irregular boundary adjustment and State Plane Coordinates of the proportioned points at sea level.

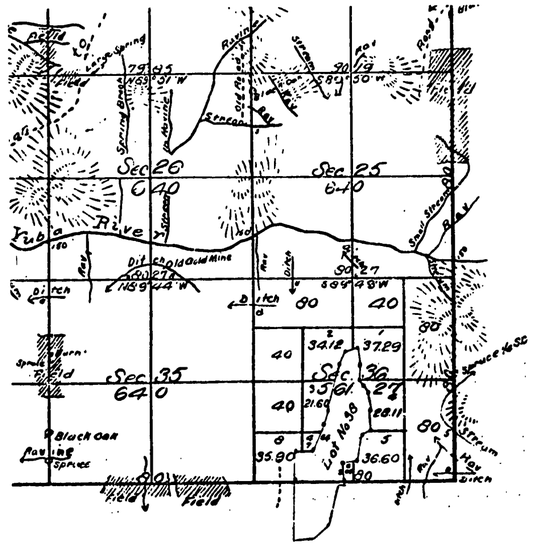


Figure 1b - Portion of Brown Plat

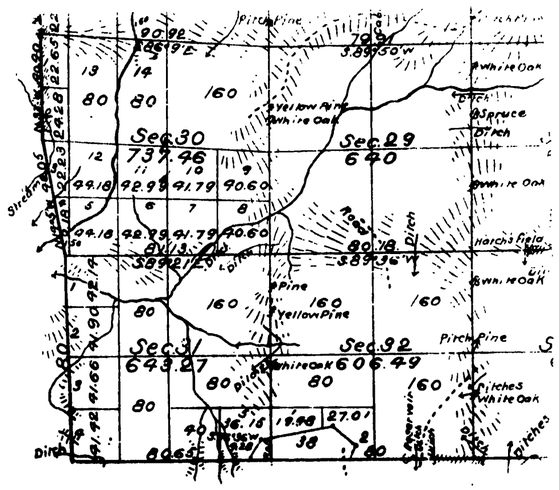
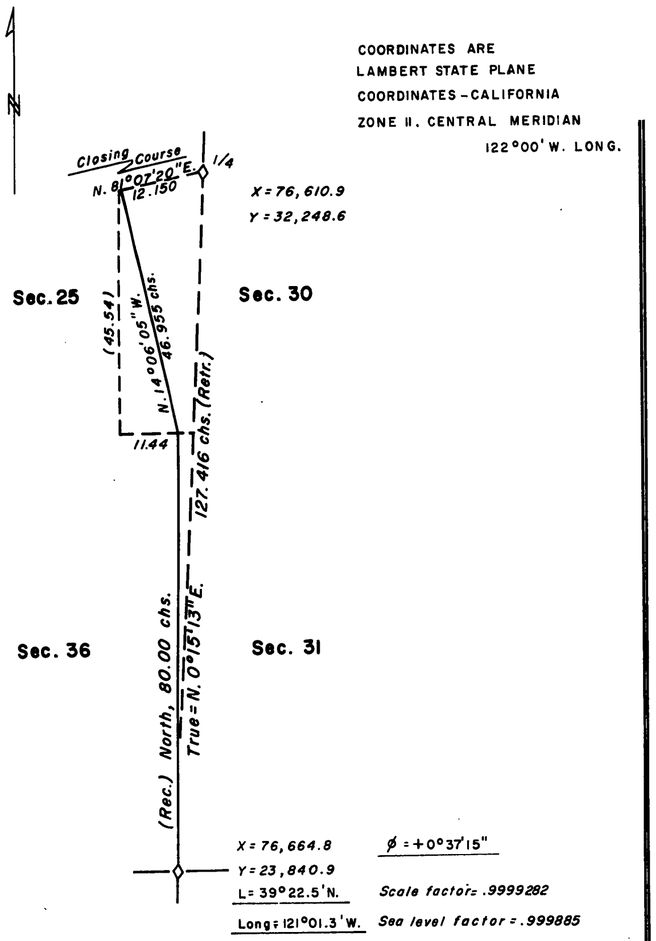
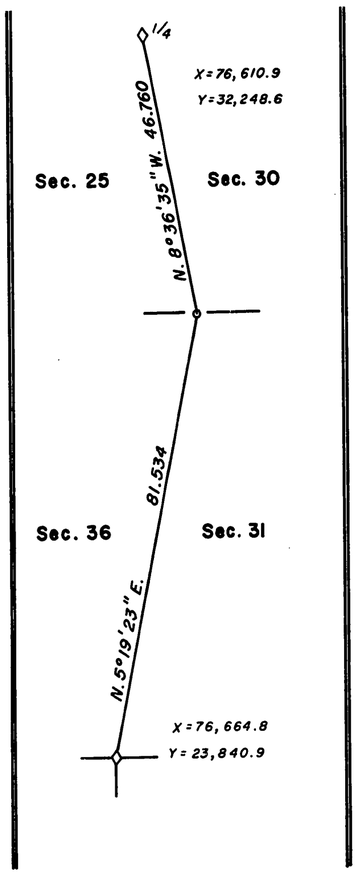
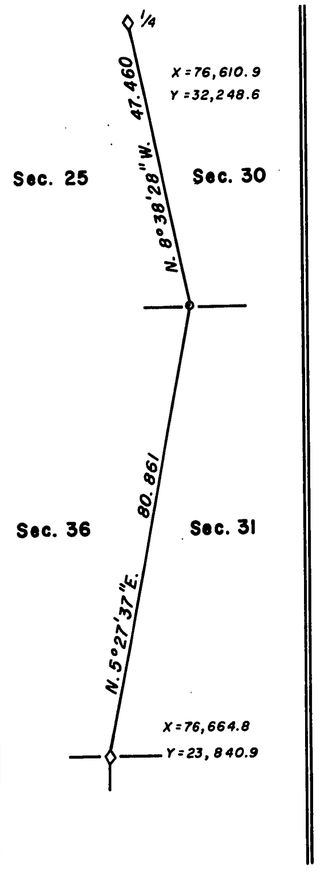
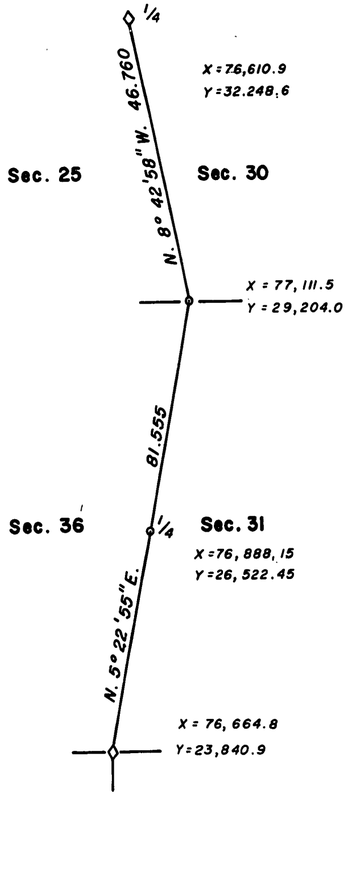


Figure 1c - Portion of Bond Plat









Figures 2a thru 2d - Effect of Various Adjustments

IRREGULAR BOUNDARY ADJUSTMENT IN CALIFORNIA

The irregular boundary adjustment is a single proportionate measurement of the closing error, first the latitudinal single proportion and then a single proportionment of the departure, determined by the proportioned latitudinal distance from the starting point, (in this case the township corner).

Legal theory, in support for application of proportionment measurement methods demands that equal weight be given each part of the survey. The implication is that all of the original survey was performed by the same man at the same time and using the same equipment and methods. Although there were two different surveyors in this instance, the original surveyor, Brown, and the retracement by Bond, their work is properly combined in this adjustment which uses the best available evidence.

The plat of T. 18 N., R. 8 E., was accepted May 29, 1963, and is shown in figure 3.

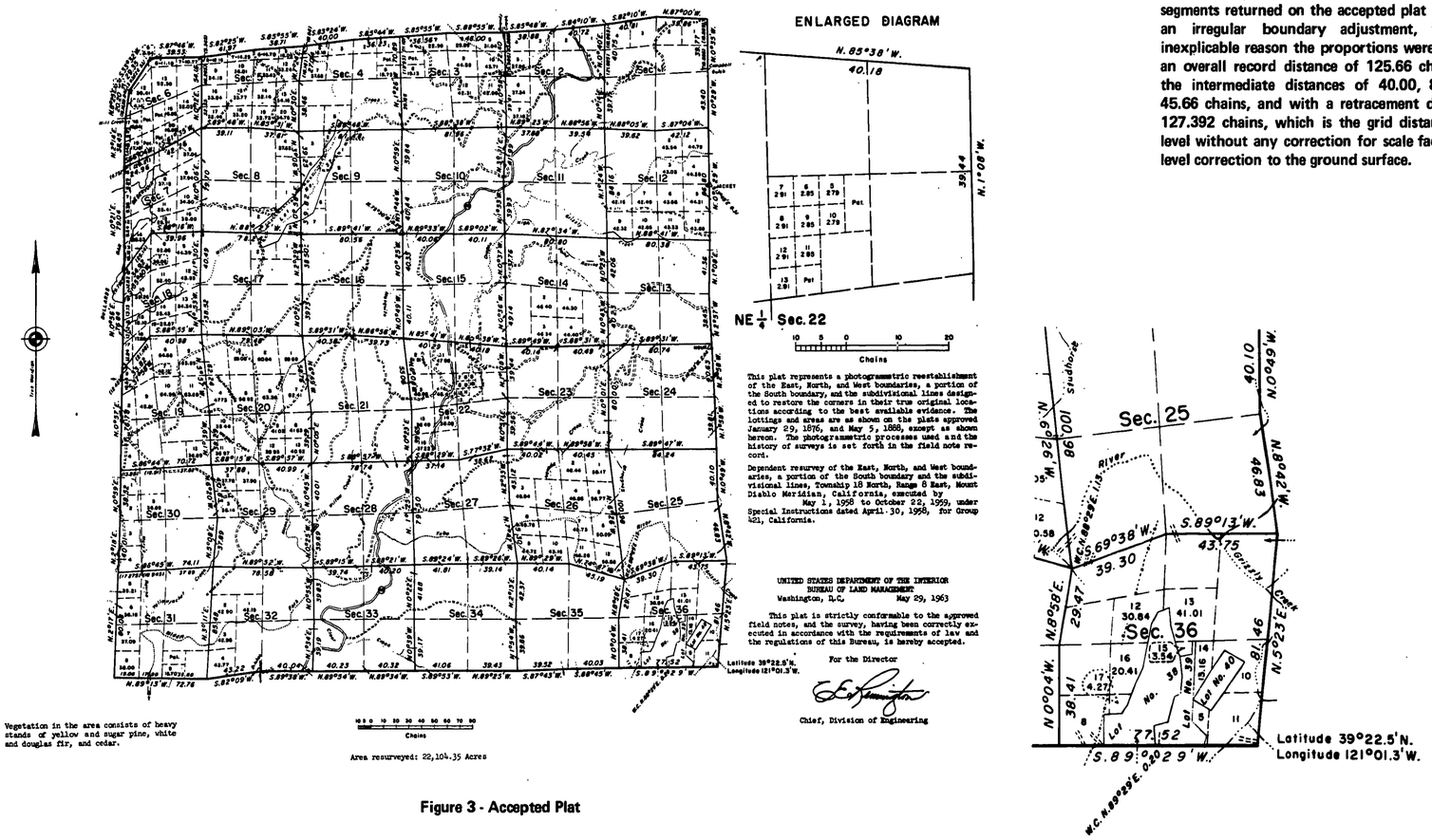


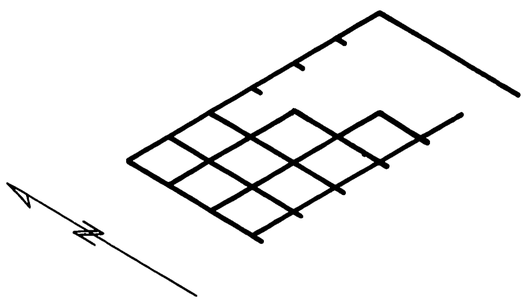
Figure 3 - Accepted Plat

Supplemental Topic

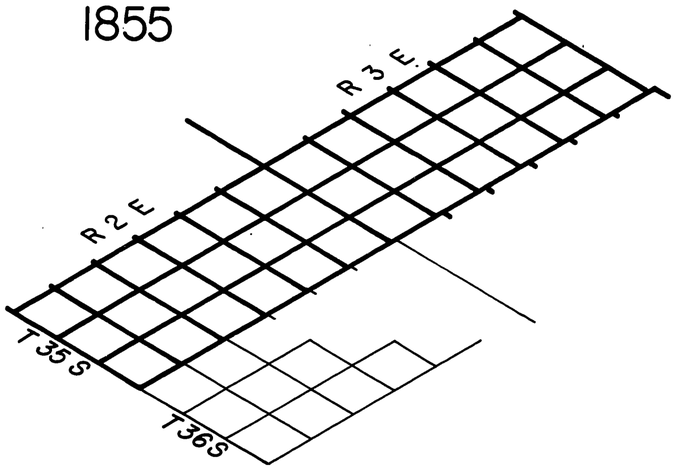
Although the bearings of the two line segments returned on the accepted plat agree with an irregular boundary adjustment, for some inexplicable reason the proportions were based on an overall record distance of 125.66 chains, with the intermediate distances of 40.00, 80.00 and 45.66 chains, and with a retracement distance of 127.392 chains, which is the grid distance at sea level without any correction for scale factor or sea level correction to the ground surface.

IRREGULAR STANDARD PARALLEL IN OREGON

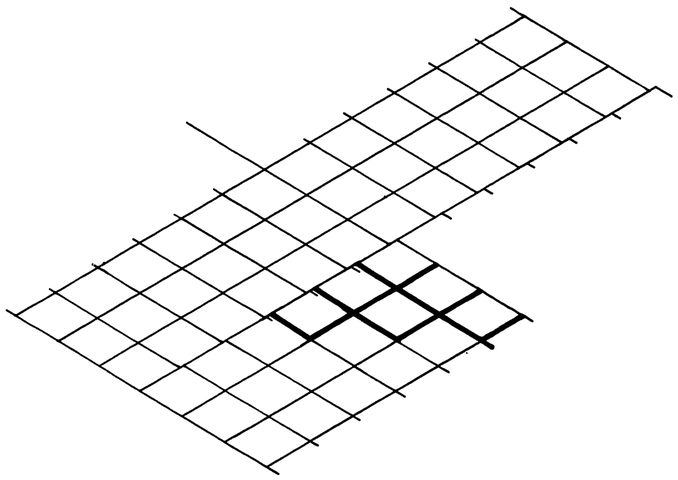
1854



1855



1882



History of Surveys

1854 Butler Ives and George W. Hyde surveyed the 8th Standard Parallel South, through Range 2 East. They set their corners every 40 and 80 chains and marked them for T. 36 S., R. 2 E., the township to the south. They then subdivided a portion of that township but ran only the lines between sections 4 and 5, 5 and 6, into their standard corners.

1855 Nathaniel Ford received a contract to survey and subdivide T. 35 S., Rs. 2 and 3 E.

Ford reported running south between ranges 2 and 3 east, intersecting the Ives and Hyde Standard Parallel 2.64 chains west of the standard corner of T. 36 S., Rs. 2 and 3 E., and established a closing corner for T. 35 S., Rs. 2 and 3 E. Ford then reported retracing the Standard Parallel, running west on the Ives and Hyde line and setting "closing corners" for T. 35 S., R. 2 E., every 40 and 80 chains. Ford called the Ives and Hyde corners, in every instance, to be 2.64 chains east of his "closing corners."

Next, Ford surveyed the standard parallel through range 3 east, setting corners at 40 and 80 chain intervals marked for T. 36 S., R. 3 E., and established the standard corner of T. 36 S., Rs. 3 and 4 E. He then reported running south between T. 35 S., Rs. 3 and 4 E., intersected his standard parallel 3.44 chains west of his standard corner of T. 36 S., Rs. 3 and 4 E. Ford then reports retracing his own standard parallel, running west from his closing township corner, setting corners every 40 and 80 chains (which he again termed "closing corners") for T. 35 S., R. 3 E. In each case the corners were 3.44 chains west of his standard corners. He reported the south boundary of section 31 as 79.20 chains, to his closing corner of T. 35 S., Rs. 2 and 3 E.

Ford reported subdividing T. 35 S., Rs. 2 and 3 E., initiating the subdivisional lines at his "closing corners" along the standard parallel.

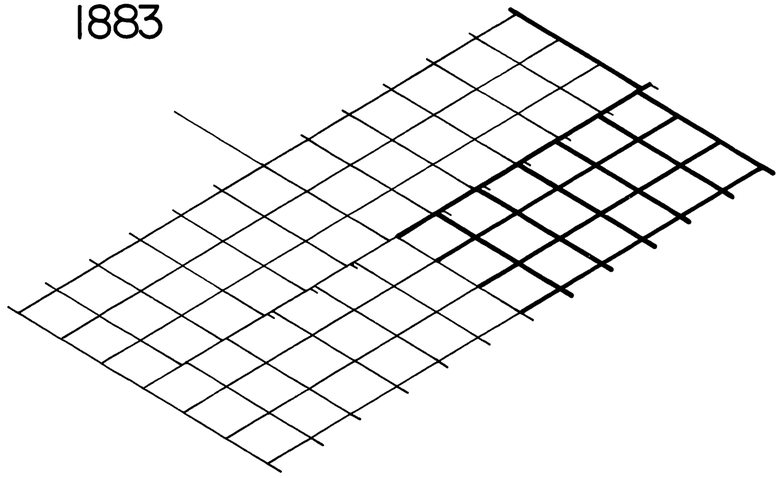
1882 William M. Turner completed the subdivisional lines of T. 36 S., R. 2 E. Turner ran north between sections 1 and 2, 2 and 3, 3 and 4, setting closing corners short distances (29 to 52 links) east of Ives and Hyde's Standard corners. Ives and Hyde's monuments along the north boundary of sections 1-4 no longer marked the corner of sections, and became angle points controlling the Standard Parallel.

1883 Rufus S. Moore was given the contract to survey T. 36 S., R. 3 E. Moore surveyed the east boundary running north. He intersected Ford's Standard Parallel 9.62 chains west of what he called the standard corner of T. 35 S., Rs. 3 and 4 E. Moore redescribed the corner which coincides with Ford's description of the standard corner of T. 36 S., Rs. 3 and 4 E. Moore then retraced the standard parallel running west from the standard township corner. Moore fell 132 links south of a blazed line at 40 chains and set a new ¼ section corner on the blazed line. He then ran west from that point and at 80.82 chains (40.82 chains from the ¼ section corner) fell 50 links south of what he called the corner of sections 35 and 36. The description fits the Ford standard corner of sections 1 and 2. Moore continued this pattern of running west and at stated distances falling a given distance north or south of what he calls corners for T. 35 S., but describing Ford's standard corners. Finally, he reached what he called the standard corner of T. 35 S., Rs. 2 and 3 E. His redescription conforms with Ives and Hyde's record of the standard corner of T. 36 S., Rs. 2 and 3 E., and his plat shows this corner as a corner of all four townships. In no instance does Moore ever call for or describe any of the so called "closing corners" that Ford allegedly set along the Standard Parallel for T. 35 S., R. 3 E.

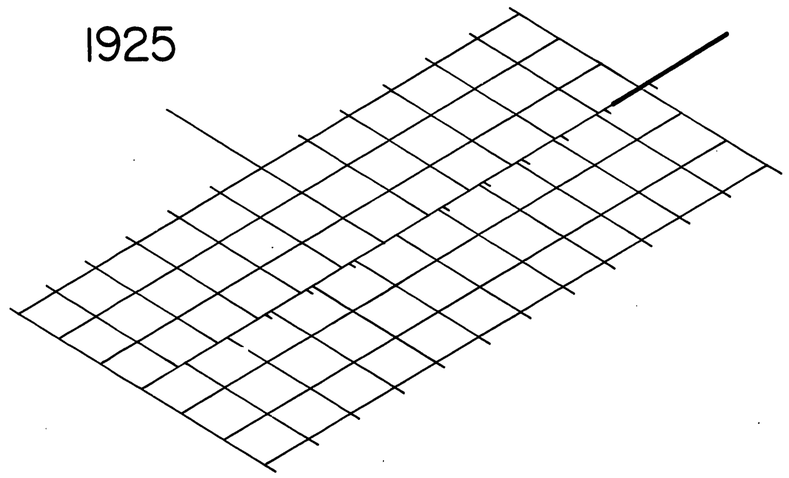
Later, Moore retraced the east boundary of T. 35 S., R. 3 E., prior to subdividing T. 35 S., R. 4 E. Moore began his retracement at what he calls the standard corner of T. 35 S., Rs. 3 and 4 E., but again describes Ford's standard corner for T. 36 S., Rs. 3 and 4 E. Running north, Moore fell 57 links west of Ford's ¼ section corner of sections 31 and 36 (at 40.15 chains.)

Moore also subdivided T. 36 S., R. 3 E. He ran north on all of his lines between the north tier of sections and intersected the Standard Parallel. He set closing (section) corners and gave ties to Ford's standard corners but again calling them corners for T. 35 S., R. 3 E.

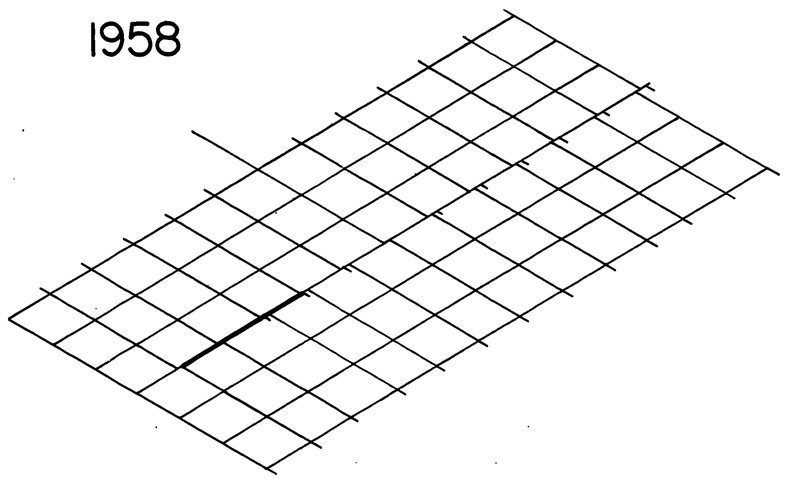
1883



1925



1958



A8-1

IRREGULAR STANDARD PARALLEL IN OREGON

1925 Lincoln E. Wilkes retraced the Standard Parallel from Ford's standard corner of T. 36 S., Rs. 3 and 4 E., west for ½ mile to the ¼ section corner set by Moore (on what Moore called the south boundary of section 36.) Wilkes found Moore's closing township corner at 9.65 chains due west of Ford's standard corner. He amended it and set a new closing corner at the true point of intersection 28 links north. Wilkes found no trace of any of Ford's corners for T. 35 S., R. 3 E. Wilkes also calls Ford's standard corner the standard corner for T. 35 S., Rs. 3 and 4 E.

1958 Hans W. Thielsen resurveyed a portion of the 8th Standard Parallel in Range 2 East along the north boundary of sections 3, 4 and 5, T. 36 S., R. 2 E. Thielsen found the former Ives and Hyde standard ¼ section corner of section 3 and standard corner of sections 3 and 4, which became angle points when Turner completed T. 36 S., R. 2 E., in 1882. Thielsen also recovered Ives and Hyde's standard corner of sections 4 and 5 and standard ¼ section corner of section 5. None of the corners reportedly established by Ford were found nor was Turner's closing corner of sections 3 and 4 found.

Figure 1 is a portion of Ives and Hyde's plat of T. 36 S., R. 2 E., to which the Turner completions were added.

Figure 2 is a portion of Ford's plat of T. 35 S., R. 2 E.

Figure 3 is a portion of Ford's plat of T. 35 S., R. 3 E.

Figure 4 is a portion of Moore's plat of T. 36 S., R. 3 E.

Figure 5 is a composite sketch of the survey records with Moore's retracements reduced to true bearing and distance for purposes of this discussion.

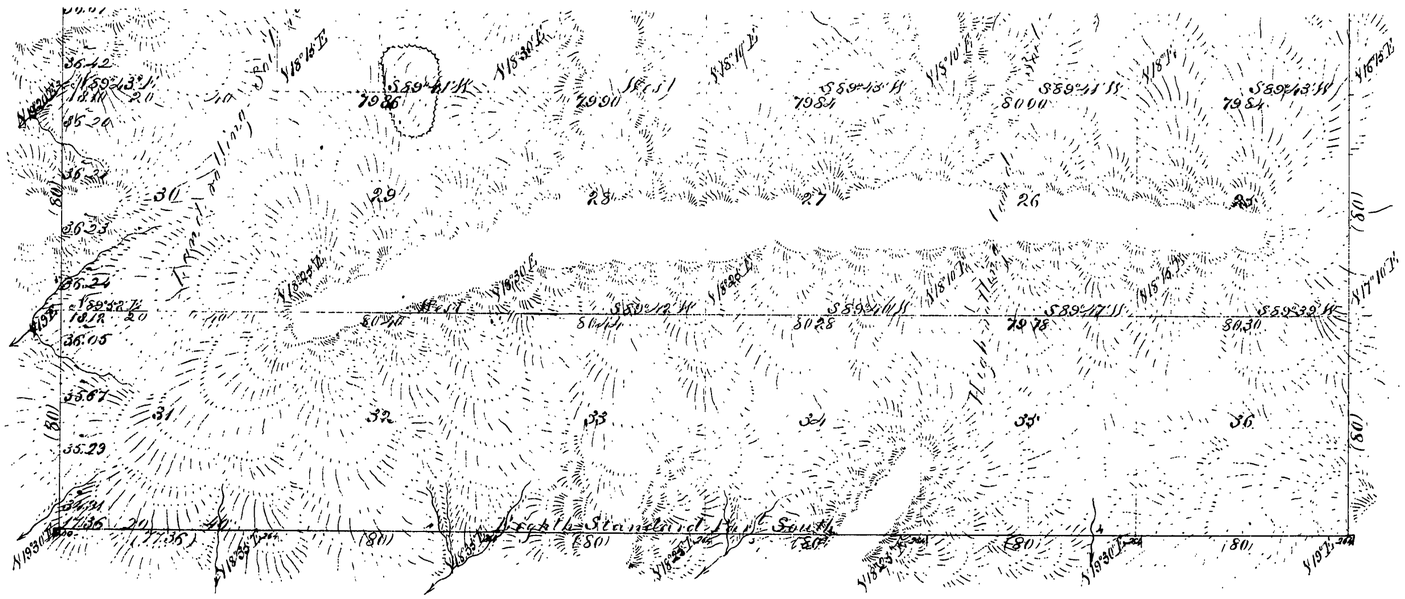


Figure 2 - Portion of Ford Plat, T. 35 S., R. 2 E.

Township №36 South Range №2 East Willamette Meridian.

1957

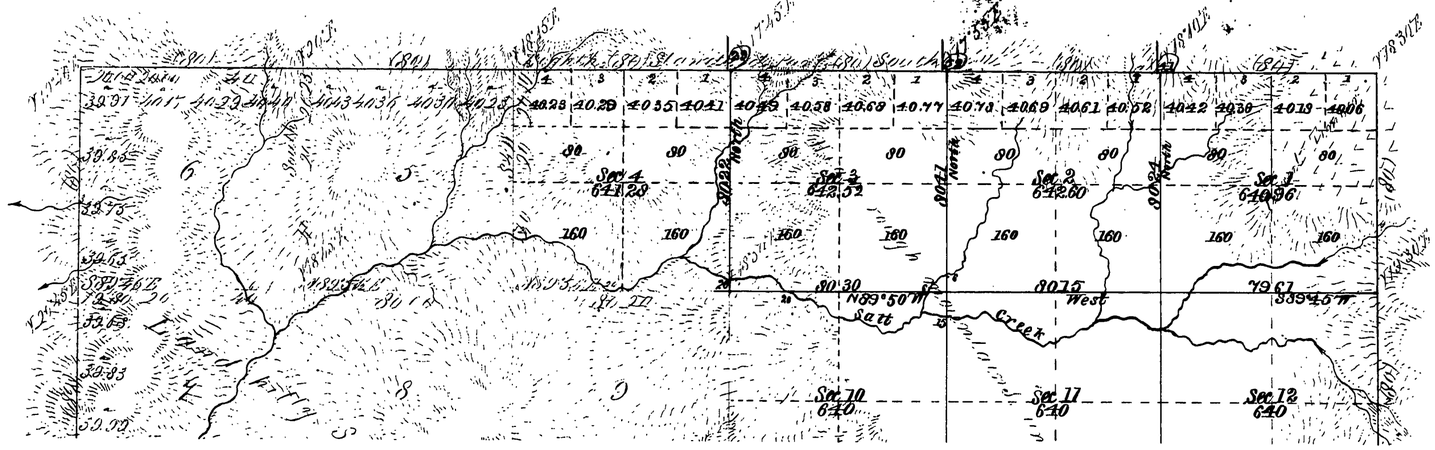


Figure 1 - Portion of Ives and Hyde, Turner Completion

IRREGULAR STANDARD PARALLEL IN OREGON

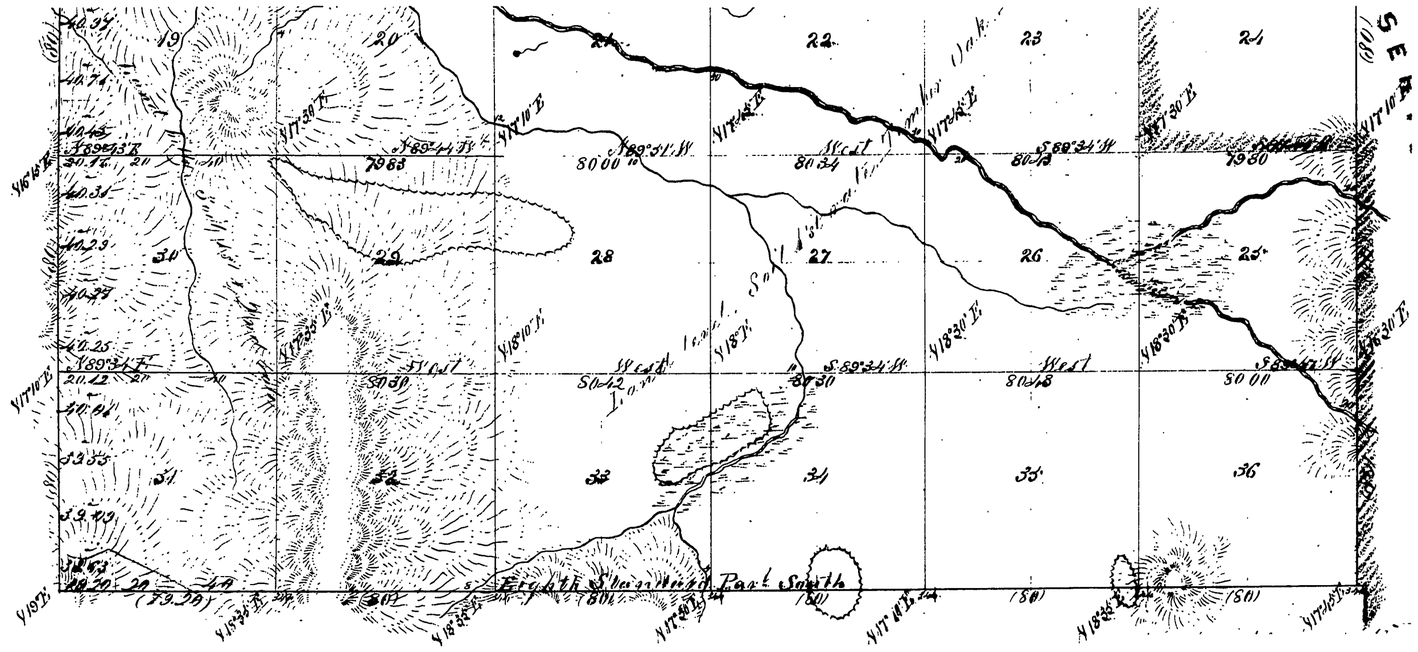


Figure 3 - Portion of Ford Plat, T. 35 S., R. 3 E.

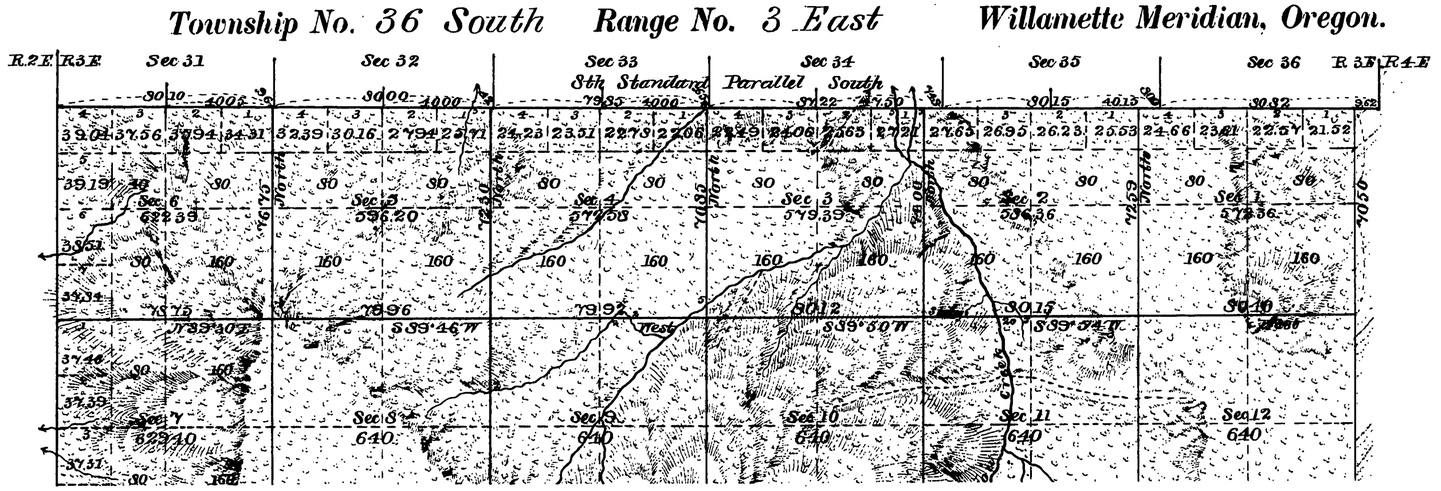


Figure 4 - Portion of Moore Plat, 1883

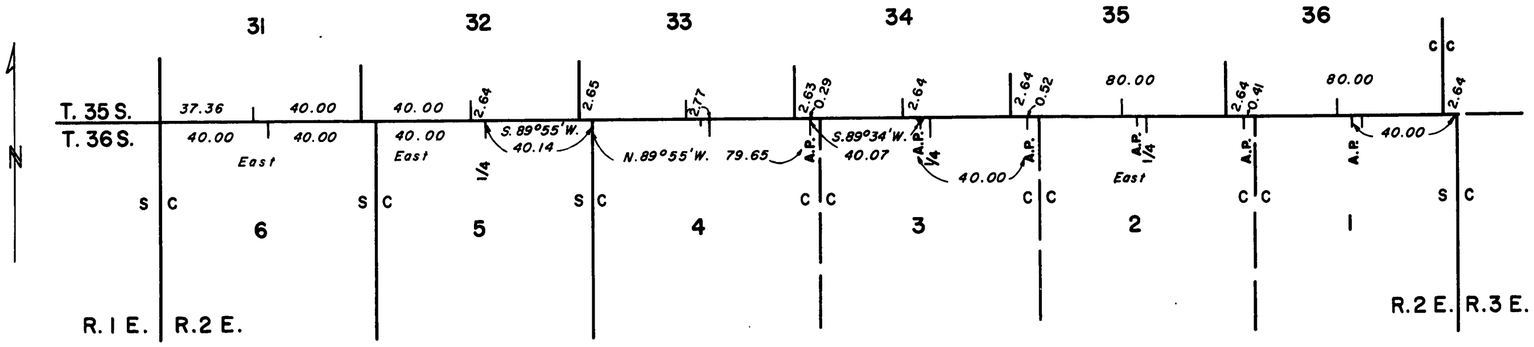
IRREGULAR STANDARD PARALLEL IN OREGON

Reasons for Request of this Survey

Timber sales and the determination of suspected timber trespasses depended upon proper identification of and restoration of survey corners. The Medford District Manager requested a resurvey.

Special Instructions

On April 20, 1962, Special Instructions for Group 473, Oregon, were prepared. They provided for the dependent resurvey of portions of the Eighth Standard Parallel South, resurvey of portions of the boundaries, subdivisional lines and subdivision of certain sections in Tps. 35 and 36 S., R. 2 E., and T. 36 S., R. 3 E., Willamette Meridian, Oregon. Field work began on August 21, 1962.



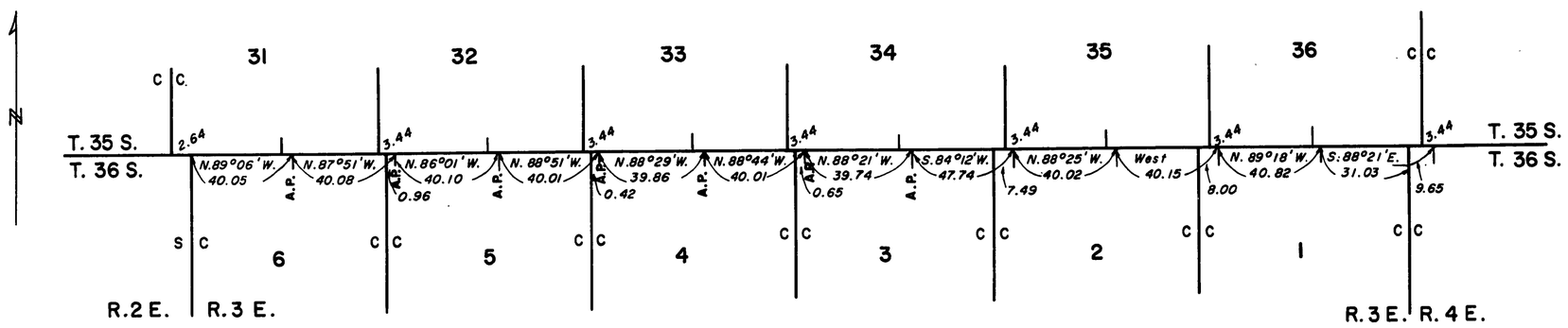


Figure 5 - Combined Record

IRREGULAR STANDARD PARALLEL IN OREGON

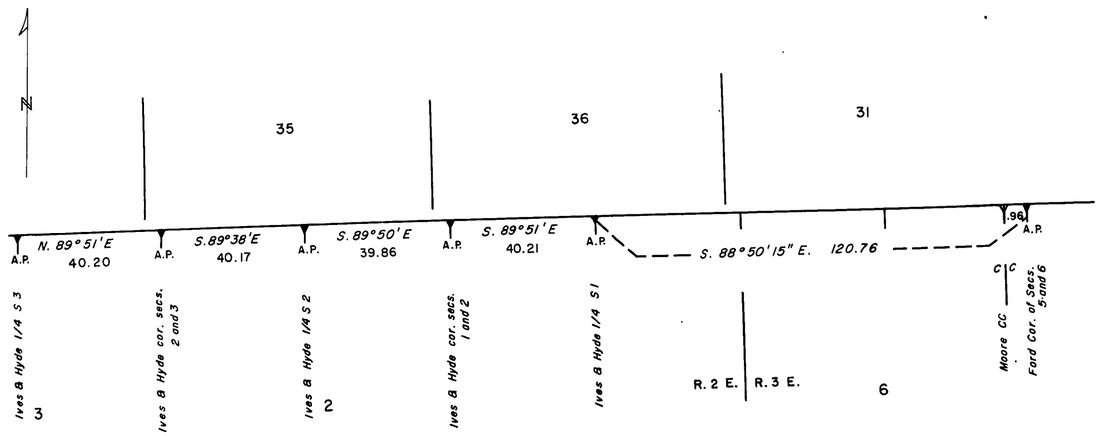


Figure 6 - Retracement Data

Conditions Found on the Ground

This discussion is limited to the restoration of certain corners along the Eighth Standard Parallel.

The standard parallel was retraced easterly from Ives and Hyde's former standard ¼ section corner of section 3, T. 36 S., R. 2 E., (now an angle point) to Ford's standard corner of sections 5 and 6, T. 36 S., R. 3 E., (also an angle point.) Figure 6 indicates the recovered corners and relationships after thorough search and investigation. No evidence of any kind was found of Ford's corners for Tps. 35 S., Rs. 2 and 3 E., nor Turner's closing corners for sections 1 and 2, 2 and 3, T. 36 S., R. 2 E. Moore's closing corner of sections 5 and 6, T. 36 S., R. 3 E., was recovered in a position that eventually identified the restored standard parallel.

Preliminary Statement of the Problem

The surveyor must restore the lost corners along the 3½ miles of the Eighth Standard Parallel and establish corners between closing corners.

Regulations

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

3-75, 3-87 and 3-92	Protection of areas represented on official plat
5-32	Restoration of standard corners
5-36	Restoration of irregular boundary
5-41	Restoration of closing corners

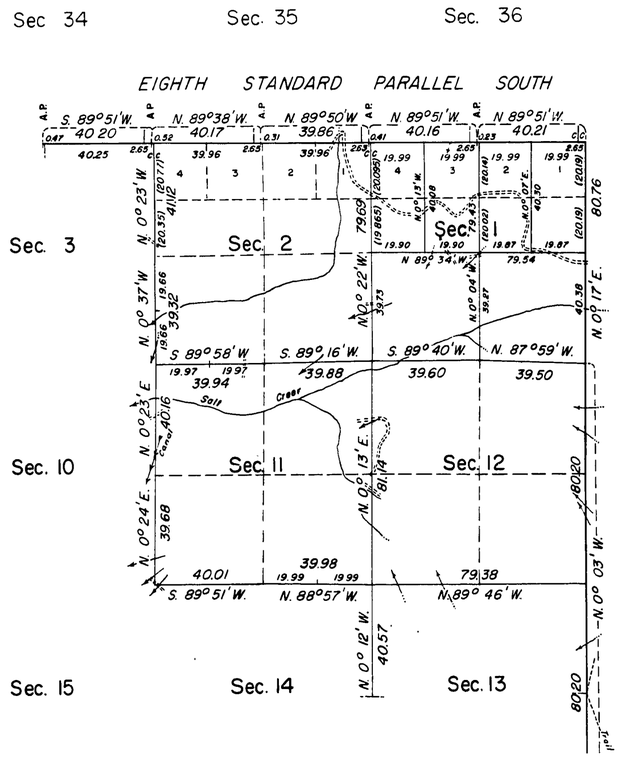


Figure 7a - Portion of Accepted Plat, T. 36 S., R. 2 E.

Final Statement of the Problem

The surveyor must restore the lost corners and angle points along the standard parallel, and establish the north ¼ section corner of section 6, T. 36 S., R. 3 E., north ¼ section corner and the east and west 1/16 section corners on the north boundary of section 1, and the north ¼ section corners of sections 2 and 3, T. 36 S., R. 2 E. The position of the corners to be established must be based upon the representations on the approved plats shown in Figures 1 and 4.

Solution

Ives and Hyde's standard corner of T. 36 S., Rs. 2 and 3 E., and Ford's ¼ section corner of section 6, T. 36 S., R. 3 E., (the latter is now an angle point) were restored by an irregular boundary proportionment based on Moore's record retracements and on the Ives and Hyde - Ford record surveys.

The lost corners of Ford's survey for T. 35 S., Rs. 2 and 3 E., were all restored by single proportionment between the controlling angle points and standard township corner.

The lost closing corners set by Turner were restored by single proportionate measurement also.

The ¼ section corners of sections 1, 2 and 3, were placed at midpoint in departure between closing corners of those sections. The 1/16 section corners for section 1 were established at midpoint positions.

The north ¼ section corner of section 6 was established based on the areas of lots 1 thru 4 as shown on Moore's plat. Although by Moore's own record the north boundary of section 6 was 79.14 chains in departure, all of the areas in section 6 are based on an 80.10 chain departure (which is the distance Moore returned between the Ford corners.) The areas as represented on the Moore plat were protected.

The plats of survey were accepted August 10, 1965, and are shown in Figure 7.

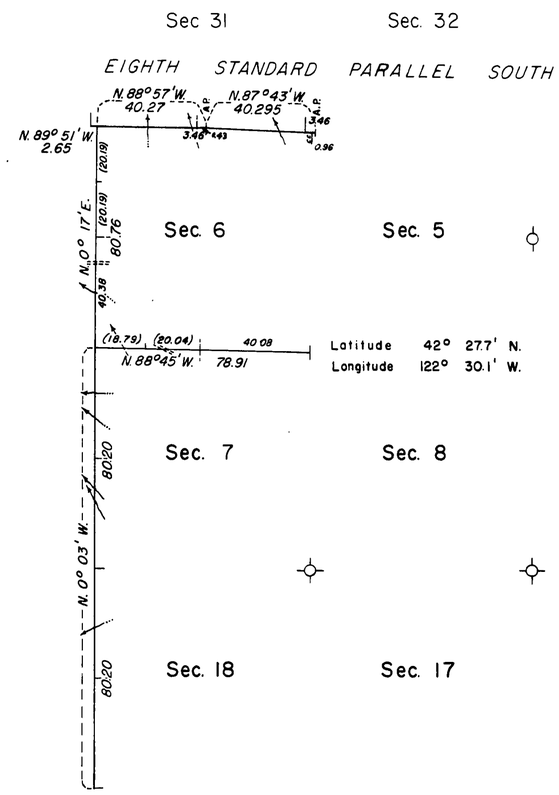
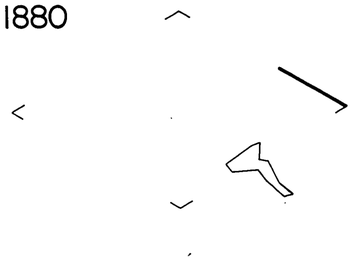


Figure 7b - Portion of Accepted Plat

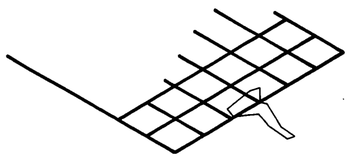
POTRERO de la CIENEGA GRANT BOUNDARIES

1858

1880

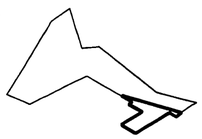


1884

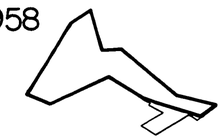


1964

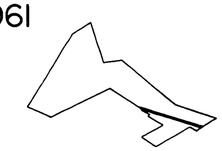
1917



1958

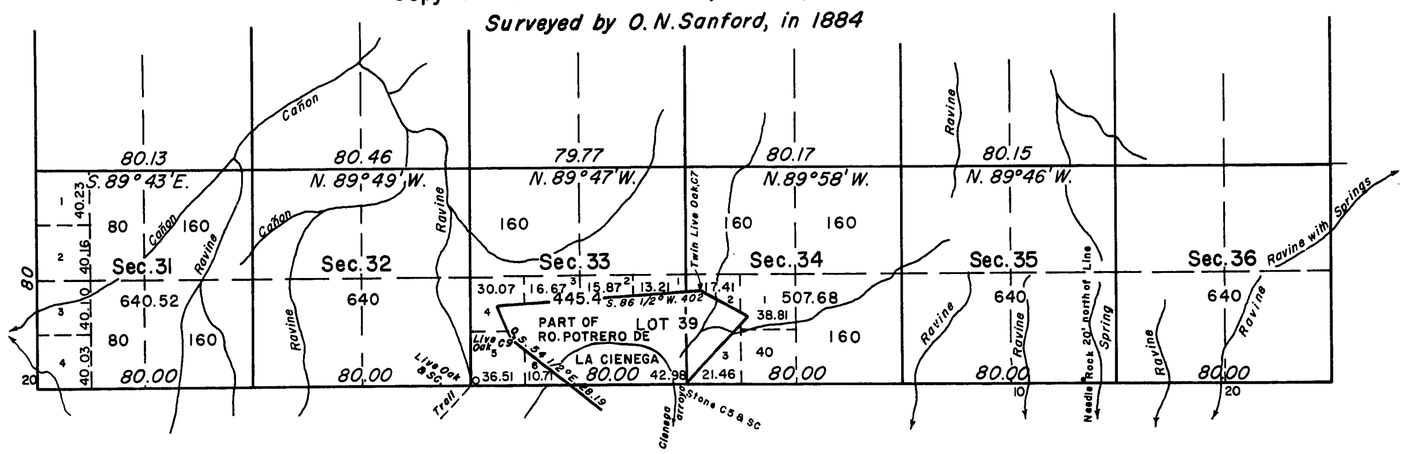


1961



Copy of Portion of T. 6 S., R. 5 W., S.B.M., Calif.

Surveyed by O. N. Sanford, in 1884



History of Surveys

1858 John C. Hays surveyed the boundaries of the Potrero de La Cienega Grant in sections 33 and 34, of T. 6 S., R. 5 W., and in unsurveyed, protracted sections 3, 4, 9 and 10 of T. 7 S., R. 5 W., San Bernardino Meridian.

1880 George Sandow established the southeast corner of T. 6 S., R. 5 W., and surveyed the east boundary.

1884 O.N. Sanford surveyed the south boundary and subdivisional lines of the township. The Sanford Survey is as shown on the plat approved April 28, 1885. A portion of that plat is illustrated in figure 1. Sanford reported that Corner No. 5 of the Potrero Grant is also his corner of sections 33 and 34.

1917 Percy L. Day, Forest Service surveyor, surveyed Homestead Entry Survey No. 237 adjoining the westerly side of the Potrero. The plat of the survey, shown in figure 3, was approved July 26, 1917. Day reportedly recovered corners 1, 10 and 11 of the Potrero, each occupied by the original live oak corner trees. Day established corner No. 1 of the H.E.S. on line 10-11 of the Potrero survey and monumented the point with a brass-capped iron post. Day reportedly made a traverse tie from corner No. 1 of the H.E.S. to the corner of section 33 and 34, which was also corner No. 5 of the Potrero Grant as returned by Sanford.

1958 Manning Engineering Company made a resurvey of the Potrero boundaries. This survey indicates that corner No. 1 of the Potrero and corner No. 1 of the H.E.S. were found and positively identified. The Manning map indicates that they found and accepted a "pipe and marker" or "posts," for corners 2, 3, 5, 8 and 9 and the closing corner on line 9-10 of the Potrero Grant survey. The Manning map also indicates that iron pipes were set for corners 4, 6, 7 and 10 of the Potrero, as well as other pipes for points of private land divisions.

1961 Norman A. Neste, C.E. 8613, resurveyed the lines between the Potrero Grant and H.E.S. 237. Neste found corner No. 1 of the H.E.S. and corner No. 1 of the Potrero Grant (identical with corner No. 10 of the H.E.S.) and restored corner No. 11 of the Potrero in the stump hole of the original corner tree, monumenting the point with an iron pipe and brass tag.

1964 The Harold L. Johnson Engineering Company made a preliminary survey of the Potrero Grant at the request of the Girl Scouts of America, owners of the lands adjacent to the Potrero Grant. Recovery of original corner trees are indicated at corners 2, 4, 7, 9 and 10 of the Potrero Grant survey at the Hays record positions. The Manning survey points are shown at grossly different positions.

Reasons for Request of this Survey

Harold L. Johnson, supported by two congressmen and a senator, requested a BLM determination of the boundaries of this grant on behalf of the Girl Scouts of America. Mr. Johnson's map did not provide definite conclusions. It did indicate conflicting positions for the grant boundaries and adjacent section corners.

The area in question is within the boundaries of the Cleveland National Forest.

Special Instructions

Special Instructions for Group 516, California, were prepared on February 26, 1965. The instructions direct an investigation of the conditions and identification of the boundaries of the Potrero Grant survey, H.E.S. No. 237 and the south boundary of T. 6 S., R. 5 W.

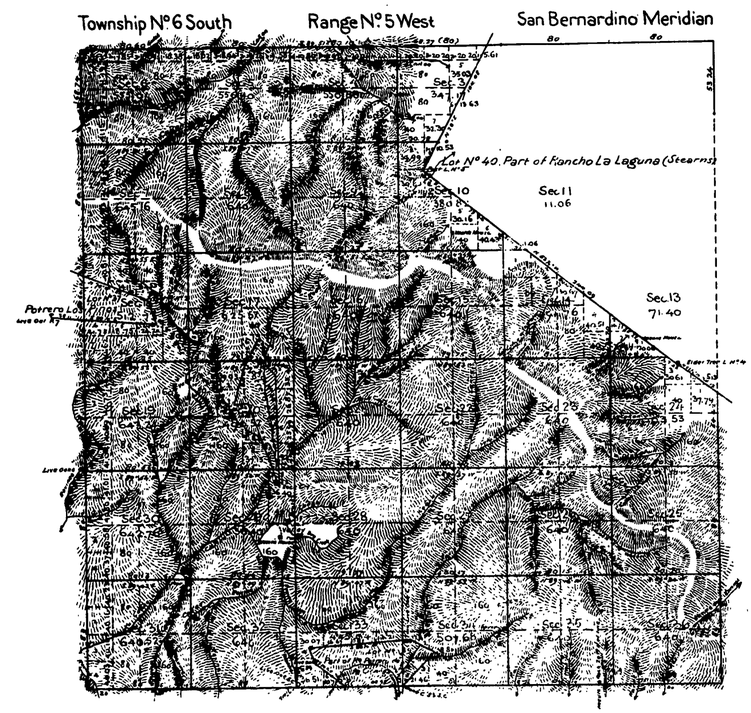
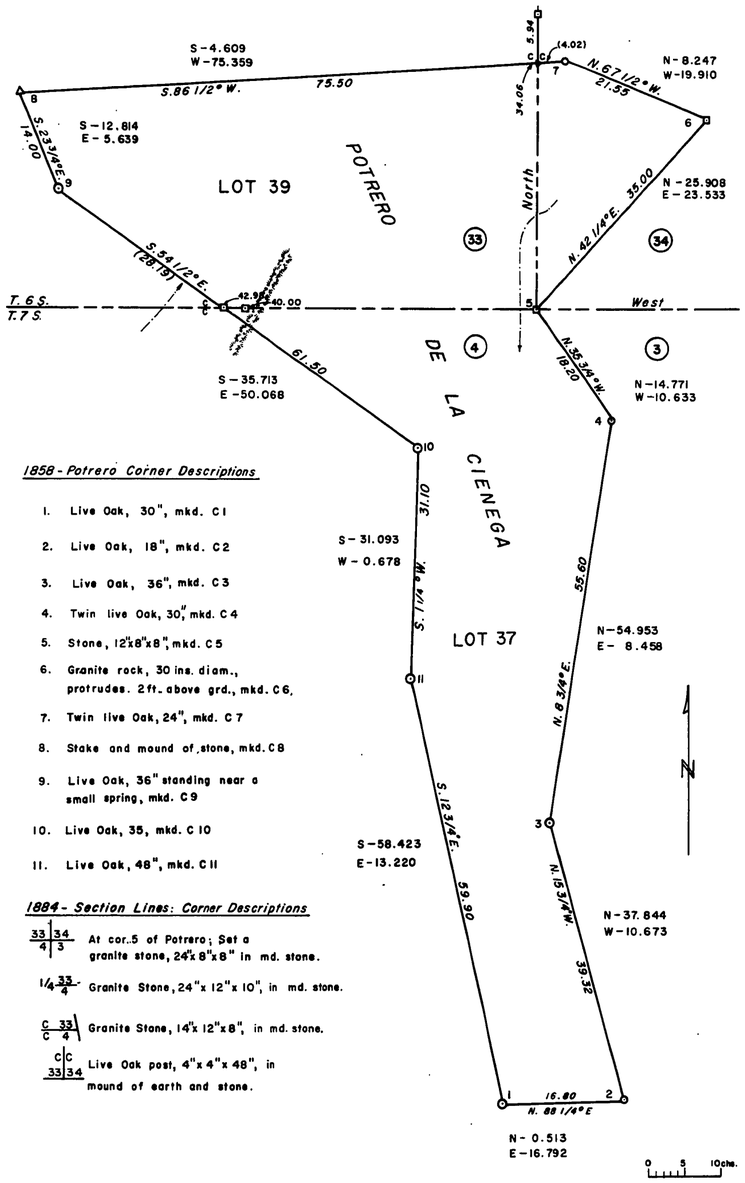


Figure 1 - Portion of Sanford Plat, 1884

POTRERO de la CIENEGA GRANT BOUNDARIES



1858 - Potrero Corner Descriptions

1. Live Oak, 30", mkd. C 1
2. Live Oak, 18", mkd. C 2
3. Live Oak, 36", mkd. C 3
4. Twin live Oak, 30", mkd. C 4
5. Stone, 12"x8"x8", mkd. C 5
6. Granite rock, 30 ins. diam., protrudes. 2 ft. above grd., mkd. C 6.
7. Twin live Oak, 24", mkd. C 7
8. Stake and mound of stone, mkd. C 8
9. Live Oak, 36" standing near a small spring, mkd. C 9
10. Live Oak, 35, mkd. C 10
11. Live Oak, 48", mkd. C 11

1884 - Section Lines: Corner Descriptions

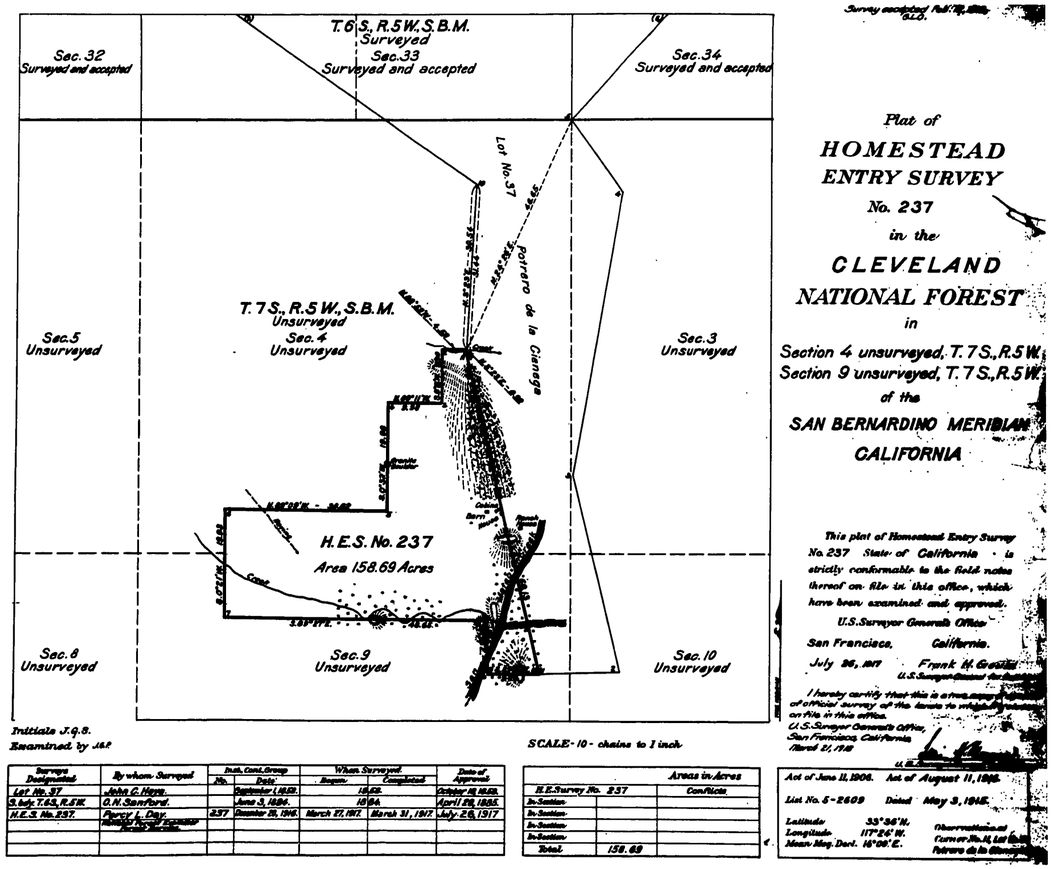
33 | 34 / 4 | 3 — At cor. 5 of Potrero; Set a granite stone, 24"x 8"x 8" in md. stone.

1/4 33 / 4 — Granite Stone, 24"x 12"x 10", in md. stone.

C 33 / C 4 — Granite Stone, 14"x 12"x 8", in md. stone.

C C / 33 34 — Live Oak post, 4"x 4"x 48", in mound of earth and stone.

Figure 2 - Original Record, Showing Latitudes and Departures



Surveys Designated	By whom Surveyed	Instr. Cont. Group No.	Instr. Cont. Group Date	When Surveyed Begun	When Surveyed Completed	Date of Approval
Lot No. 37	John C. Hays		September 1859.	1859.		October 18 1859.
S. bdy. T. 6 S., R. 5 W.	O. H. Sanford.		June 3, 1884.	1884.		April 29, 1885.
H.E.S. No. 237.	Percy L. Day, Deputy Surveyor of California	237	December 19, 1916.	March 27, 1917.	March 31, 1917.	July 26, 1917.

	Areas in Acres	
H.E.S. Survey No. 237		Conflicts
In Section		
In Section		
In Section		
In Section		
Total	158.69	

Figure 3 - HES Survey

Conditions Found on the Ground

The area is generally covered with the dense growth of chamiso typical of the southern California coastal mountains. This brush is very susceptible to the intense fires which frequently burn over the area.

The frequent fires and fire fighting operations had obliterated or destroyed survey corners. The Forest Service had been constantly confronted with the question of the location of the boundaries of the Potrero Grant.

Hays, in 1858, marked mature live oak trees at most of his corners. A live oak tree is susceptible to heart rot when it approaches or reaches maturity. Once the heart rot is exposed it becomes prone to fires. In searching for the original corners the Forest Service and CCC personnel had opened what may have been blazes on about every live oak tree in the vicinity of the record position of the original corners of the Potrero Grant. When the record courses were retraced from corner No. 1, several live oak trees with chopped out and decaying holes were found near each record corner position; but none with any trace of scribe marks. Most of the trees also bore a profusion of axe and wire scars because they had been used as living fence posts when the Potrero Grant was utilized for stock raising.

There were a number of possible monuments at each corner because after each fire someone would "replace the corners" of the Potrero Grant by using a compass and set a white-painted wood post at a "corner." The next fire would burn up the post and the cycle would be repeated. Since these "surveys" were unofficial there is no record of who did them or what was done.

The Manning Engineering map, made in 1958, indicates that they merely accepted these posts, and in some cases iron pipes, without verification. On that basis they set more iron pipes, thus adding to the confusion and proliferation.

The southeast and southwest corners of the township, the corner of sections 35 and 36 on the south boundary, the ¼ section corner of sections 33 and 34, and the corner of sections 27, 28, 33 and 34 were found and positively identified during the investigation. Corner Nos. 1, 10 and 11 of the Potrero Grant and corner No. 1 of H.E.S. No. 237 were also recovered and positively identified. The latter four points were all within a few links of being in the positions as shown on the H.E.S. plat and as described in the field notes of that survey. Figure 4 illustrates the land status at the time and the corners recovered during the investigation.

POTRERO de la CIENEGA GRANT BOUNDARIES

Portion of T. 6 S., R. 5 W., S.B.M., Calif.

Status Diagram and Corner Recovery

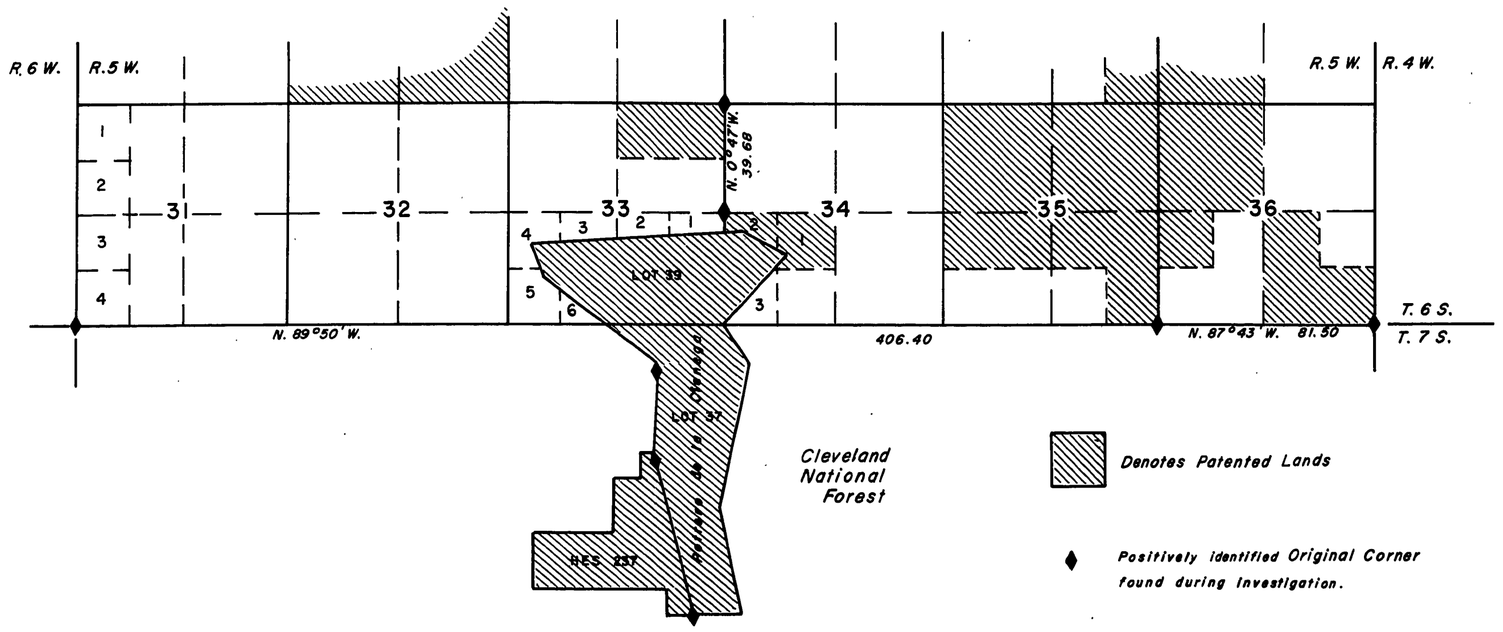


Figure 4 - Status and Corner Recovery Diagram

Other information developed during the corner search follows.

A literal translation of Potrero de la Cienega is a horse (or colt) pasture (or corral) near (or at) a place containing water. Or, perhaps, a horse meadow. It therefore appears logical that Hays' intention was to survey all the usable meadow area historically occupied and used by the Spaniards as a horse pasture. He would have, as far as was practical, extended his survey to include the springs or water sources.

Corner No. 1 of the Potrero Grant was a live oak tree, 50 inches in diameter (record 30 inches) with bearing trees described by the H.E.S. survey.

The record courses were retraced from corner No. 1 of the Potrero Grant, setting temporary points at each expected corner location.

All trees were examined in the vicinity of each temporary point. The live oak trees near the temporary points were found to be neither large enough nor old enough to be original corners. Not one could be found containing any scribe marks or other evidence to verify that it was an original corner tree marked in 1858.

POTRERO de la CIENEGA GRANT BOUNDARIES

From each record position, progressively from corner No. 1, ties were made to all found posts or iron pipes, etc., with the following results:

From record position of corner No. 2
A 4 x 4 ins., forestry location post, painted white, bears S. 83° 15' E., 1.464 chs. distant

From record position of corner No. 3
A 4 x 4 ins. forestry location post, in a mound of stone and painted white, bears S. 44° 01' E., 3.044 chs. distant

From record position of corner No. 4
An iron pipe, 2 ins. diam., bears S. 43° 06' E., 5.832 chains distant, probably set by Manning Engineering in 1958

From record position of corner No. 5
A 4 x 4 ins. forestry location post and a 2 in. diam. iron pipe, bears S. 15° 22' E., 6.372 chs. distant. This post and pipe is N. 24° 27' E., 46.63 chs. from corner No. 1 of H.E.S. 237.

The proportionate point for the corner of sections 33 and 34 on the south boundary of T. 6 S., R. 5 W., bears S. 48° 29' E., 6.468 chains distant. This point is at single proportionate position between the corner of sections 35 and 36, and the southwest corner of the township.

From the record position of corner No. 6
No iron pipes or posts were found. This point is located on private land approximately between 2 small springs, 2 chains south and 3½ chains north.

From the record position of corner No. 7
No iron pipes or wood posts were found. The original ¼ section corner of sections 33 and 34, bears N. 6° 28' E., 1.624 chains distant. This point was monumented with a 3 x 3 ins. post in a bulldozed fire break, at record bearing and distance from the original live oak bearing tree.

From the record position of corner No. 8
A mound of stone, 3 ft. diameter, 1 ft. high, bears S. 18° 18' E., 5.618 chains distant, with a 4 x 4 ins., 6 feet long, white painted post, lying beside the mound of stone. This mound of stone is in an area of large boulders and has the appearance of being in place for a long period of time.

From record position of corner No. 9
No posts or pipes were found. A spring mentioned by Hays, which drains northwesterly and is located in a ravine near the westerly edge of an open meadow, known as "Round Potrero," bears N. 75° 21' E., 4.11 chains distant. This spring was a favorite campsite.

From the record position of the closing corner on line 9-10 of the Potrero, counting from the corner No. 9, A 4 x 4 ins. forestry location post, painted white, bears S. 21° 07' E., 6.114 chains distant. This post is N. 88° 55' W., 42.64 chains distant from the post and iron pipe previously tied in from the record position of corner No. 5.

At record position of corner No. 10
An iron pipe, 2 inches diameter, with brass tag marked RCE 7676, bears S. 10° 45' W., 3.85 chains distant. This pipe is shown as being set by Manning Engineering Company in 1958.

A live oak tree, 51 inches diameter, with open and rotted blazes on east and northeast sides bears N. 8° 42' E., 93 links distant. This tree is very old; it was reported as 44 inches in 1917 and 35 inches in 1858. It stands on the west edge of an undisturbed portion of the valley and is in the position described by H.E.S. 237 for corner No. 10.

From record position of corner No. 11
The iron pipe set by Neste in 1961 in the center of a large stump hole, and at record position in relation to the bearing trees marked in 1917, bears N. 58° 36' W., 1.122 chains distant.

The original corner tree was reported by Day in 1917 as being 50 inches diameter. This tree has been totally consumed by fire and the iron pipe is in the stump hole.

From the pipe set by Neste, corner No. 1 of H.E.S. 237 bears N. 3° 14' E., 0.90 chains distant. It is monumented with the original brass capped iron post. From this H.E.S. corner an original bearing tree, a live oak, 18 inches in diameter bears S. 82° E., 70 links distant. There is no trace of the original northwest bearing tree for H.E.S. corner No. 1.

Figure 5 illustrates the relative position of all points given in the foregoing information. Figure 6 is a portion of the Sitton Peak Quadrangle covering the area. The only other item of physical evidence on the ground is a short section of old and fallen fence, which had been fastened to both trees and posts, adjacent to the record course between corners 3 and 4. This fence is shown in figure 5 and is across the open area shown on the contour map.

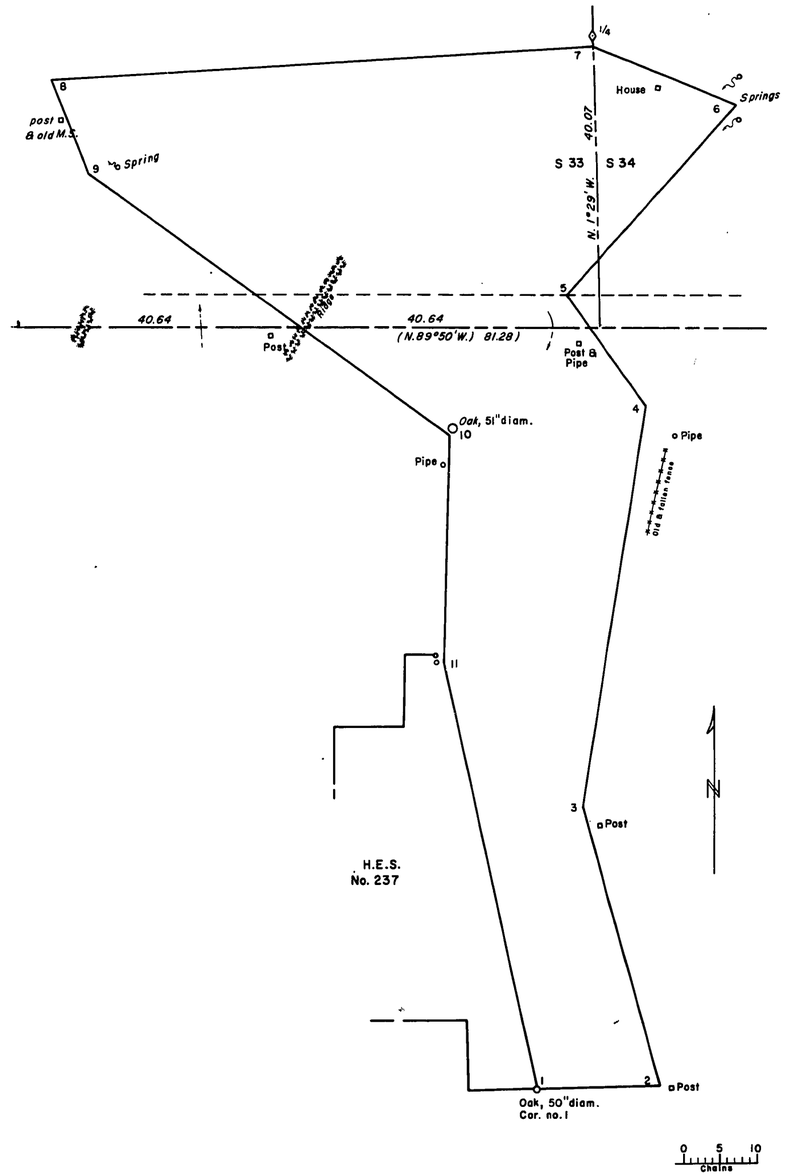


Figure 5 - Evidence Relative to Record Courses

POTRERO de la CIENEGA GRANT BOUNDARIES

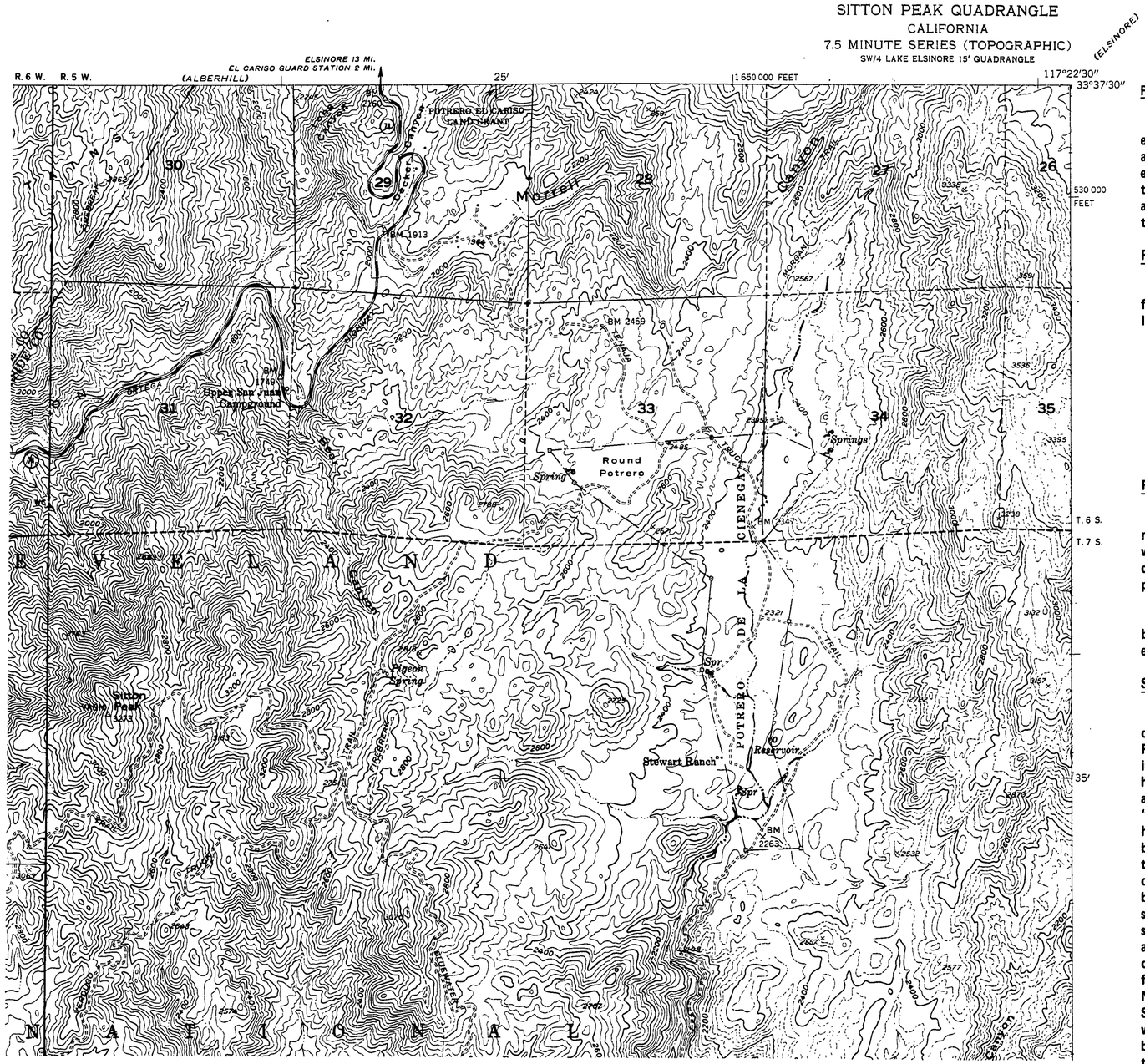


Figure 6 - Sitton Peak, USGS Map

Preliminary Statement of the Problem

The surveyors' first major problem is one of evaluating and weighing evidence when a large array of conflicting locations are present. When the evidence to be retained is determined and locations to be rejected are removed, an equitable adjustment and restoration must be determined for the lost corners.

Regulations

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

5-44	Grant boundaries
5-4 to 5-16	Identification of existent corners
5-20 to 5-23	Restoration of lost corners

Final Statement of the Problem

Resolution of ambiguous corner information must be undertaken first. Testimony by unbiased witnesses is the best means of resolution of such conflicts where the monument itself cannot be proven genuine.

The township boundary and the grant boundary must be restored using the best available evidence.

Solution

A retired Forest Service employee was contacted through the Forest Supervisor and the Regional Office in San Francisco. This retiree was interviewed in Santa Anna. He had ridden on horseback into the area as far back as the 1920's and had camped at the small spring near the "Round Potrero." He stated that older employees had frequently pointed toward the brushy and boulder strewn area northwest of the spring and told him, "A mound of stone over there is a corner of the Potrero." He had never climbed through the brush and personally examined the mound of stone; he just knew it to be there. The retiree also stated that he had never known or heard of any authentic monument near corner No. 5, nor any other corners of the Potrero Grant except the tree for corner No. 1 and the mound of stone at Corner No. 8. He stated that over the years various Forest Service personnel had tagged trees or set posts where they thought corners should be, or might be, but so far as he knew none were anything more than approximations.

When the township boundary was restored by single proportionate measurement, each mile proportioned out to 81.28 chains, on a bearing of N. 89° 50' W. From the proportioned corner of sections 33 and 34 the original ¼ section corner was N. 1° 29' W., 40.07 chains distant. The north half mile between these sections was found to be N. 0° 47' W., 39.68 chains in length.

Going west on the south boundary of section 33 through the Potrero Grant, the Sanford field notes called for an arroyo at 2.00 chains, a ridge at 38.60 chains, the ¼ section corner at 40.00 chains and the closing corner on line 9-10 of the Potrero Grant at 42.98 chains.

The dependent resurvey of the south boundary of section 33 found the arroyo at 6.40 chains, proportioned ¼ section corner at 40.64 chains and the ridge top at 41.00 chains.

Thus the topographic calls were not greatly at variance with the record. Every attempt was made to fit all the record calls of topography together into a fixed locus for Corner No. 5 of the Potrero Grant and the corner of sections 33 and 34. All efforts proved fruitless. The Cienega Arroyo is in the wide valley bottom, and has several channels. These channels could easily have shifted in position due to erosion caused by heavy rains after fires had killed the hillside brush cover. The ridge top bears in a N. 30° E., and S. 30° W., direction and as any line is shifted in latitude, even by several chains, it could still fit the record very closely. The original calls were close enough however, to verify that Sanford had, in fact, surveyed the lines. The Sanford plat also shows a spring north and east of Corner No. 9. The Forest Service had long used Round Potrero and the spring as a camp ground. Sanford probably used the same camp in 1884. He then would have known the approximate location of the spring in relation to Corner No. 9, even though he didn't make a direct tie to it. When Hays surveyed the Potrero Grant he had to cross the ridge and run his lines around the "Round Potrero" to include it in the survey, and would surely have included the spring. Thus there can only be the conclusion that both Hays and Sanford executed their surveys in good faith and the Sanford plat is a true representation of conditions as he found them in 1884. If this conclusion is accepted, there is then no doubt that Corner No. 5 of Potrero de la Cienega Grant and the corner of sections 33 and 34 are one and the same point.

The next step was to decide the most logical and equitable method of restoring the lost corners.

Since a single proportion of the township line resulted in a logical relationship between the proportioned corner of sections 33 and 34 and the recovered ¼ section corner of sections 33 and 34, and was not greatly in disagreement with the topographic calls, the township line was restored by single proportion, fixing the position of corner No. 5 of the Potrero Grant.

POTRERO de la CIENEGA GRANT BOUNDARIES

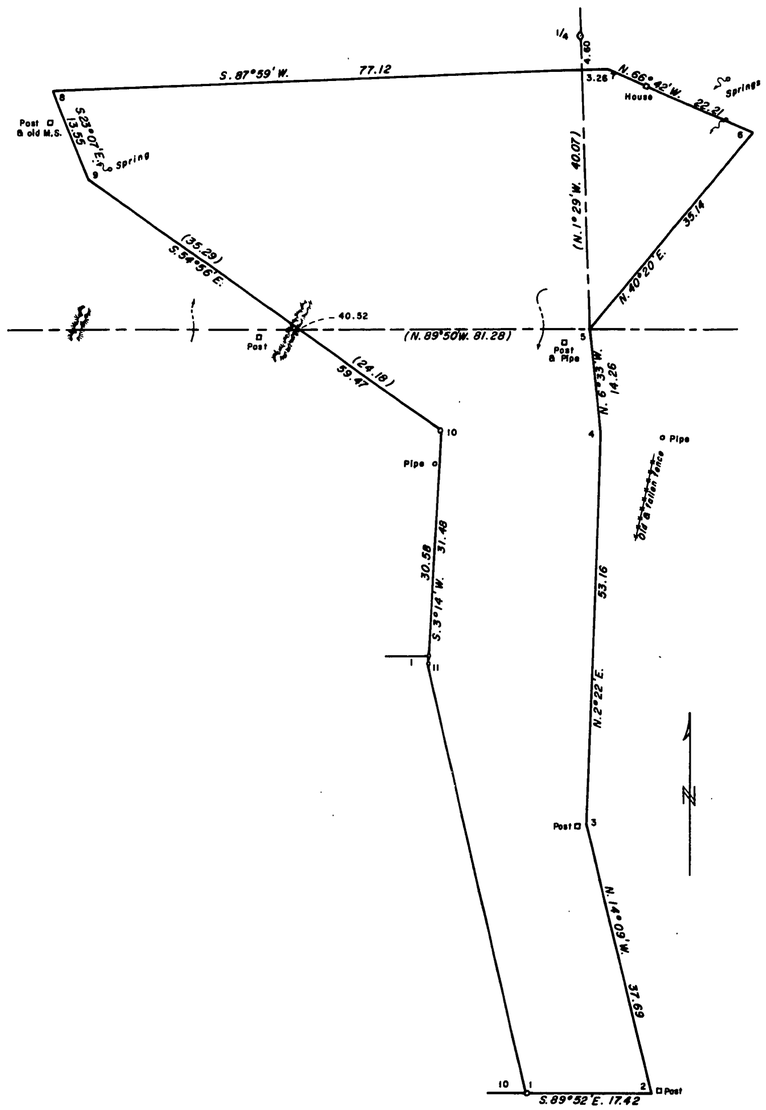


Figure 7 - Broken Boundary Adjustment

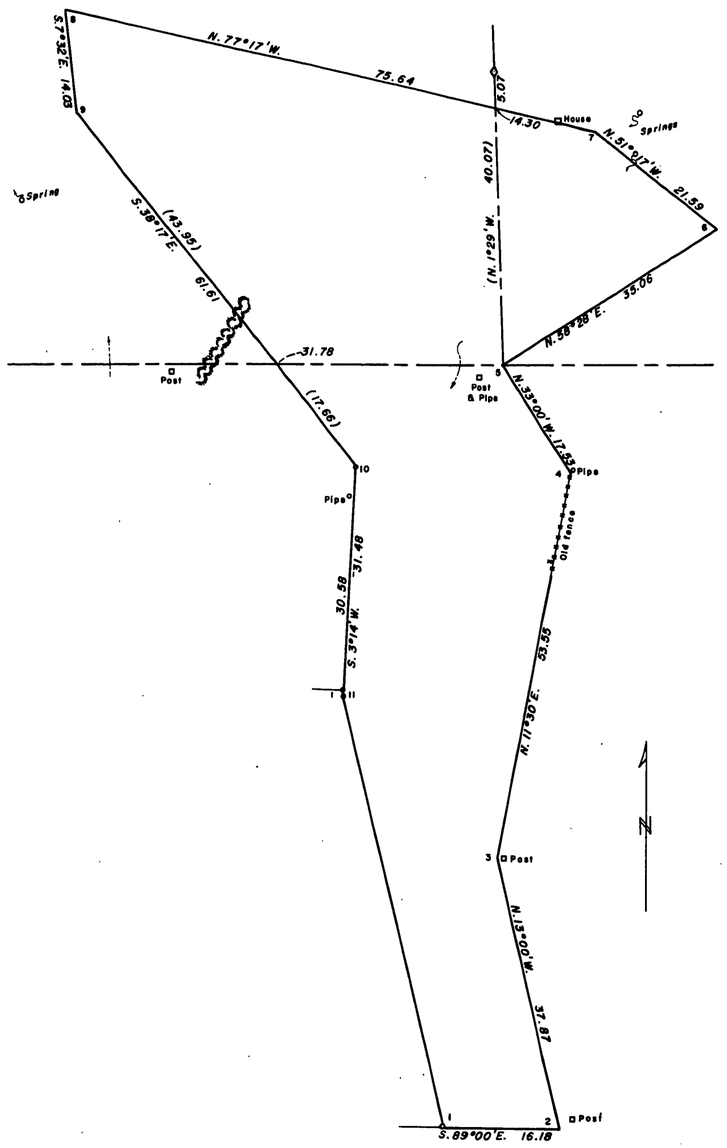


Figure 8 - Grant Boundary Adjustment

A tentative broken boundary adjustment (section 5-43, Manual of Surveying Instructions, 1973) was calculated, using the now fixed position of corner No. 5 and the recovered original corners 1 and 10 for control. The results are as shown in figure 7.

A grant boundary adjustment (section 5-44, Manual of Surveying Instructions, 1973) was calculated, using the same control points with the resulting relationships shown in figure 8.

A grant boundary adjustment was also calculated, accepting the old mound of stone at corner No. 8 and the fixed position of corners No. 1, 5 and 10. The resulting relationships are illustrated by figure 9.

Lastly, a broken boundary adjustment was made, also accepting the same mound of stone at corner No. 8 and holding the fixed position of corners 1, 5 and 10. These relationships are illustrated by figure 10.

POTRERO de la CIENEGA GRANT BOUNDARIES

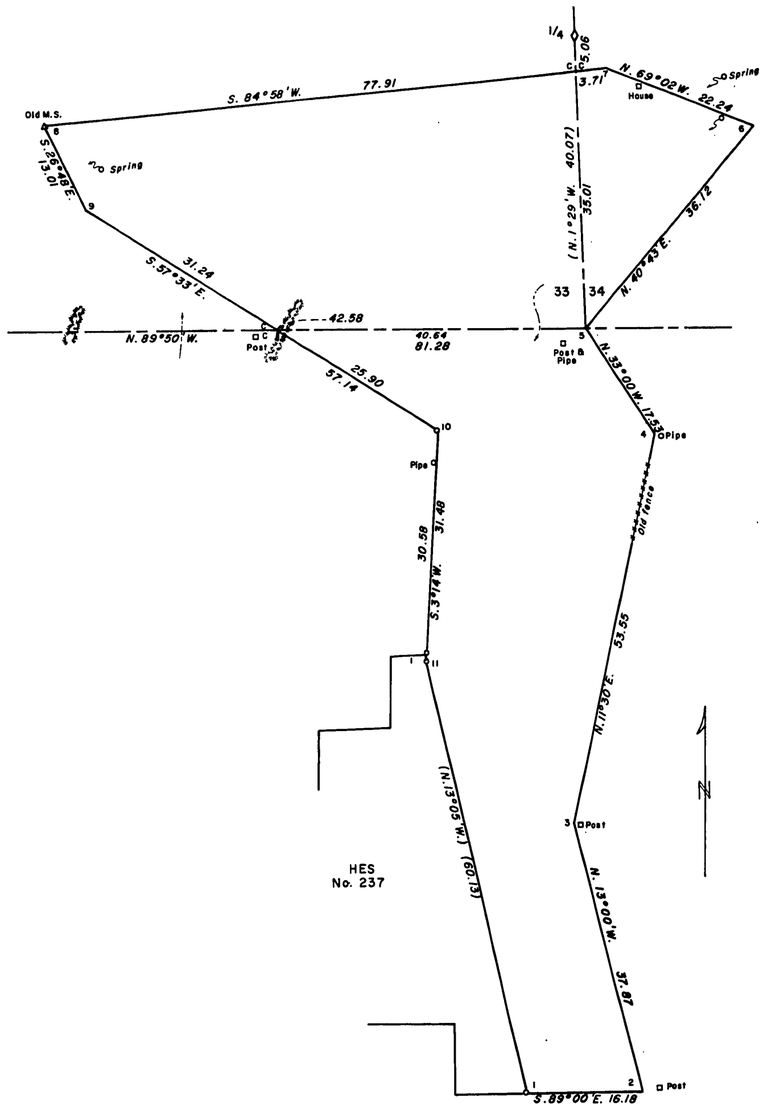


Figure 9 - Grant Boundary Adjustment
Accepting Mound of Stone at Corner No. 8

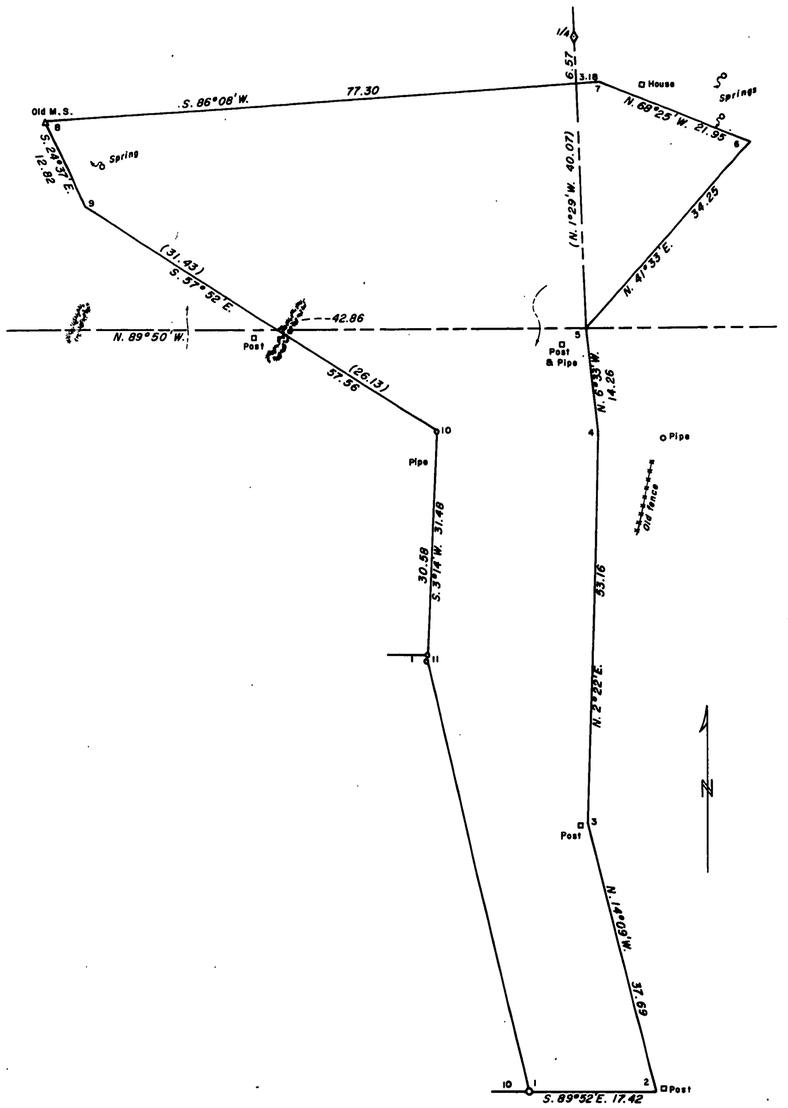


Figure 10 - Broken Boundary Adjustment
Accepting Corner No. 8

POTRERO de la CIENEGA GRANT BOUNDARIES

After some study the grant boundary adjustment procedure illustrated in figure 9 was adopted for the following reasons:

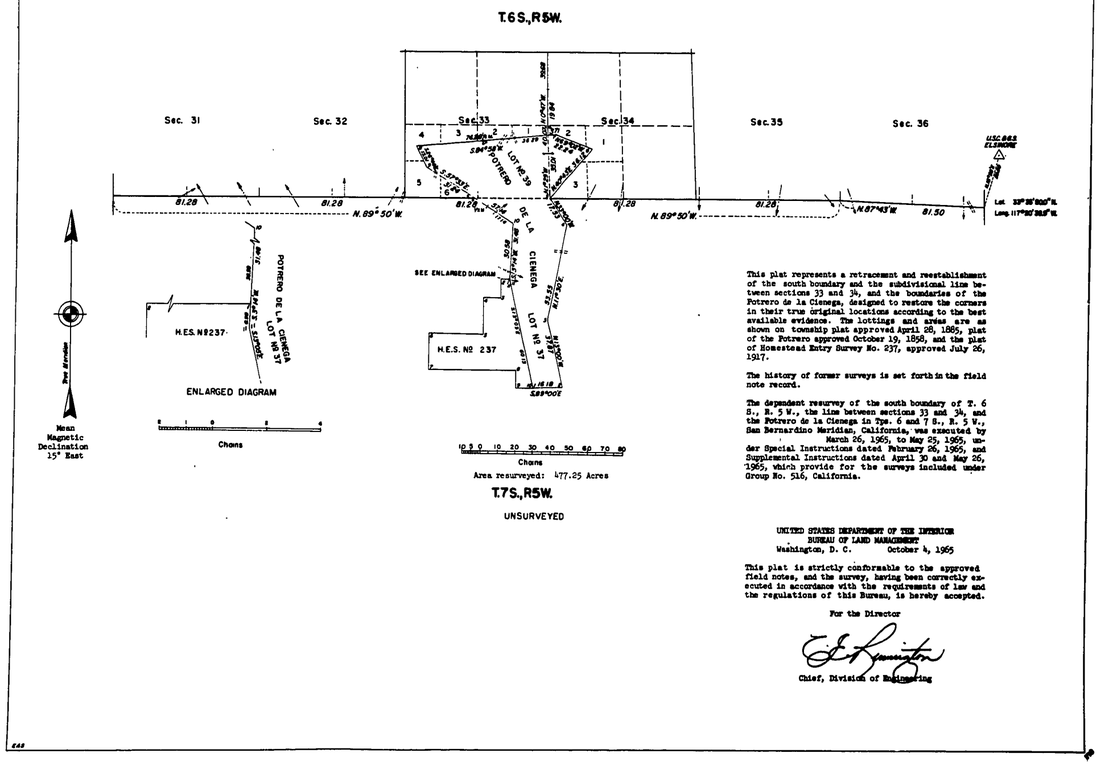
1. It holds the shape of the original surveys more closely than any other method.
2. It includes the spring near corner No. 6 inside the Potrero Grant and Hays most probably ran his courses 5-6 and 6-7 up the valley for the purpose of including the spring.
3. The line 3-4 follows along the old and fallen fence which crosses a small arm of the valley.
4. The method maintains a better ratio of original record to resurvey between the closing corner, corner No. 7 and the ¼ section corner of sections 33 and 34.
5. It is the one method applicable to all conditions throughout, without arbitrarily resorting to a mixture of methods to restore the same surveyor's work.
6. Section 5-44 of the Manual of Surveying Instructions, 1973, specifically states that the grant boundary adjustment is used on land grants surveyed prior to the rectangular surveys.
7. The Potrero Grant survey contains 488 acres, 10.74 acres more than returned by Hays, only a 2% difference.

The resurvey was executed on the basis of the grant boundary method illustrated by figure 9. The plat and field notes were accepted on October 4, 1965.

DUPLICATE ORIGINAL

TOWNSHIP 6 SOUTH, RANGE 5 WEST, OF THE SAN BERNARDINO MERIDIAN, CALIFORNIA.

DEPENDENT RESURVEY



This plat represents a retracement and reestablishment of the south boundary and the subdivisional line between sections 33 and 34, and the boundaries of the Potrero de la Cienega, designed to restore the corners in their true original locations according to the best available evidence. The lottings and areas are as shown on township plat approved April 26, 1865, plat of the Potrero approved October 19, 1868, and the plat of Homestead Entry Survey No. 237, approved July 26, 1917.

The history of former surveys is set forth in the field note record.

The dependent resurvey of the south boundary of T. 6 S., R. 5 W., the line between sections 33 and 34, and the Potrero de la Cienega in Tps. 6 and 7 S., R. 5 W., San Bernardino Meridian, California, was executed by [illegible] March 26, 1965, to May 25, 1965, under Special Instructions dated February 26, 1965, and Supplemental Instructions dated April 30 and May 26, 1965, which provide for the surveys included under Group No. 516, California.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. October 4, 1965

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.

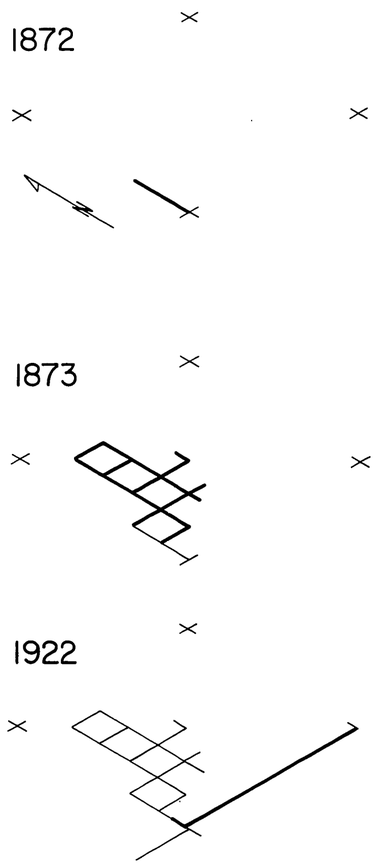
For the Director

E. E. Remington

Chief, Division of Engineering

Figure 11 - Accepted Plat

RESTORATION BY RECORD MEASUREMENT, NEVADA



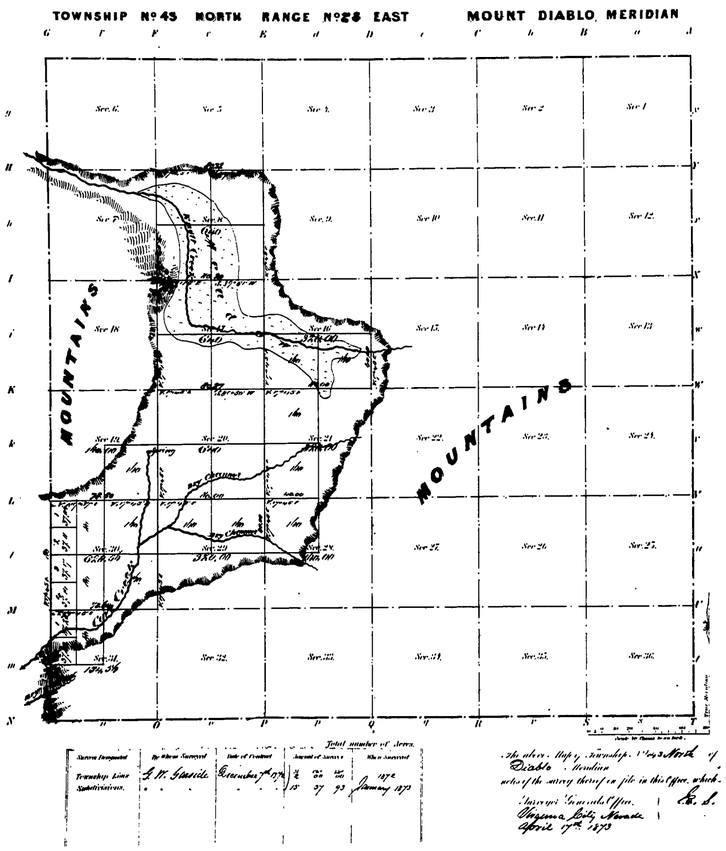


Figure 1 - Portion of 1873 Plat

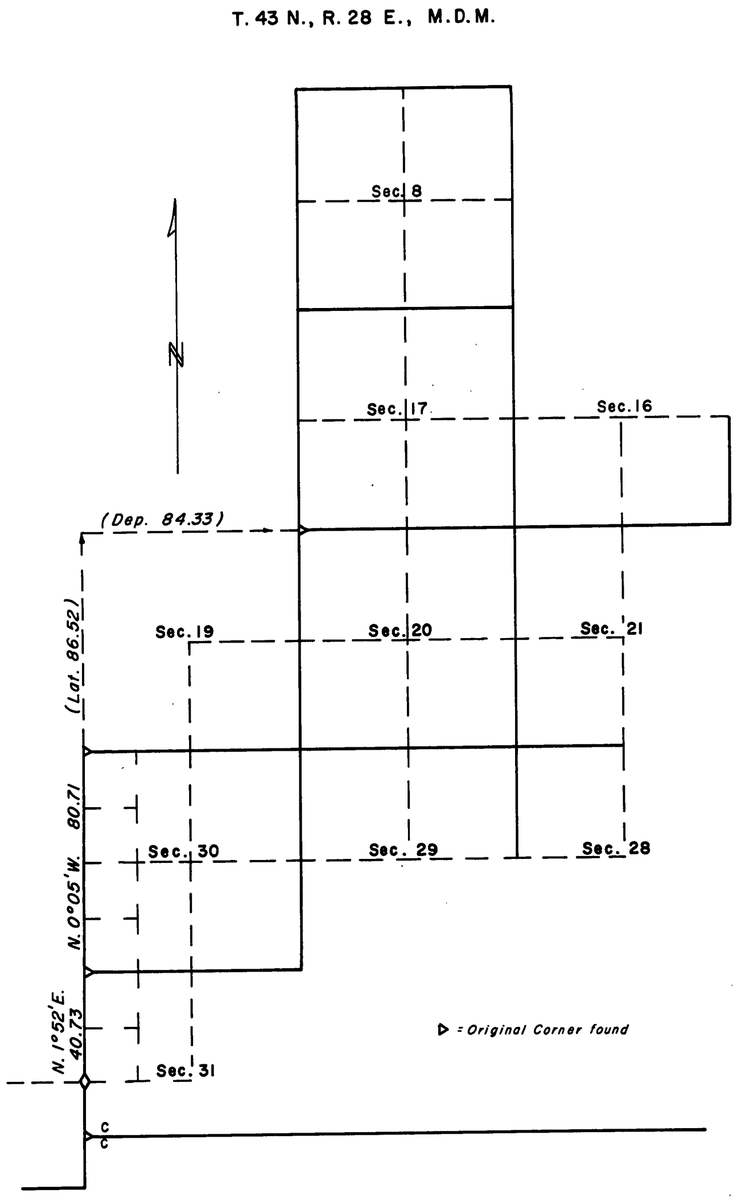


Figure 2 - Corner Recovery

History of Surveys

1872	The south two miles of the west boundary were surveyed by George W. Garside in 1872.
1873	A portion of the subdivisional lines were surveyed by Garside in January 1873, as shown on the plat approved April 17, 1873, figure 1. The remainder of the subdivisional lines are unsurveyed.
1922	Emil Voigt surveyed the south boundary of the township and retraced the south half of the east boundary of section 36, T. 43 N., R. 27 E. The eastern portion of T. 43 N., R. 27 E., is unsurveyed.

Reasons for Request of this Survey

The surveyed lands in the township are intermingled public and patented lands. Very few corners can be found. The BLM District Manager requested a resurvey to restore the lost corners.

Special Instructions

Special Instructions for Group 400, Nevada were prepared on March 13, 1962. They provided for the dependent resurvey of the west boundary and subdivisional lines originally surveyed by Garside in 1872-73. Field work began on June 18, 1962.

Conditions Found on the Ground

Only four original corners could be found after complete investigation and corner search. The recovered corners, and relationship to each other, are shown in figure 2. The land is mountainous and broken. There are no fences or other improvements.

Preliminary Statement of the Problem

The surveyor must restore the lost corners by an appropriate method and resurvey the section lines.

Regulations

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

5-29	Two and three point control
5-45	One point control

Final Statement of the Problem

Topographic calls are too widespread and inconclusive to be used to restore the lost corners. There is no basis for proportionment for lost corner restoration.

RESTORATION BY RECORD MEASUREMENT, NEVADA

Solution

The lost corners had to be restored by "one point" and "two point" control. Such record measurements can be modified to obtain results which conform to other work by the same surveyor. But there was insufficient data to determine such an "average difference" as described in sections 5-29 and 5-45 of the Manual.

The southeast corner of section 30 was restored by two point control, record distance (78.64 chains) in departure east of the corner of sections 30 and 31 and record distance (160 chains) in latitude south of the recovered corner of sections 17 and 20.

The corner of sections 19, 20, 29 and 30 was restored by two point control, record distance (78.50 chains) east of the corner of sections 19 and 30 and record distance (80 chains) in latitude south of the recovered corner of sections 17 and 20.

The corner of sections 20, 21, 28 and 29 was restored by one point control 80.00 chains east of the restored corner of sections 19, 20, 29 and 30.

The corner of sections 16, 17, 20 and 21 was restored by two point control, record distance (80.27 chains) in departure east of the recovered corner of sections 17 and 20 and record distance (80 chains) in latitude north of the restored corner of sections 20, 21, 28 and 29.

The lines between sections 16 and 17 and east boundary of section 8 were restored by one point control at record bearing (North) and distance (80 and 160 chains), from the restored corner of sections 16, 17, 20 and 21.

The corner of sections 8 and 17 and northwest corner of section 8 were restored by two point control, record distance north of the recovered corner of sections 17 and 20 and record distance in departure west of the restored corner of sections 8 and 17 and northeast corner of section 8.

The lines between sections 28 and 29, 21 and 28, 16 and 21 and east boundary of section 16 were all restored by single point control, at record bearing and distance from previously restored control corners.

The remaining ¼ section corners between section corners were restored by single proportionate measurement, based on the original plat.

The corners of section 8, the E¼ section corner and southeast corner of section 16, the W¼ section corner of section 17, the original corner of sections 17 and 20 and the southeast corner of section 30 were marked as corners of minimum control. The corners on the west boundary of section 30 were marked as corners of minimum control.

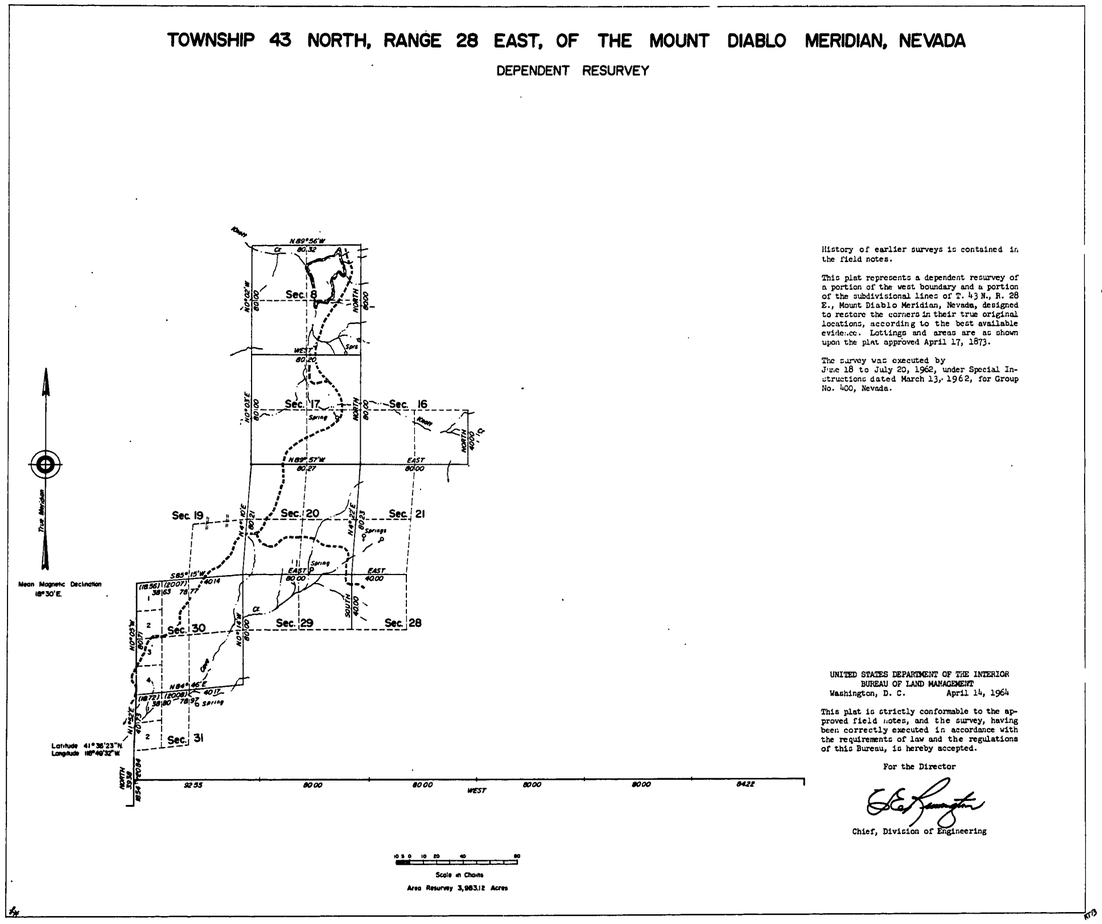
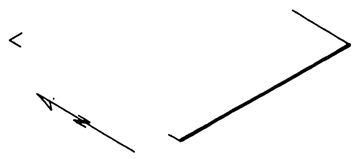


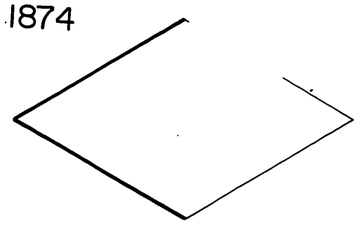
Figure 3 - Accepted Plat

NEARBY TOPOGRAPHIC CALL FOR CORNER RESTORATION

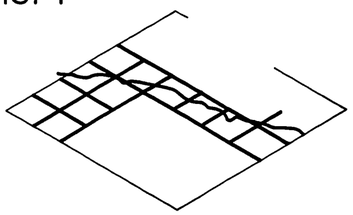
1873



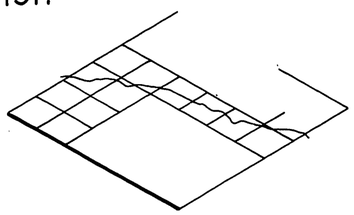
1874



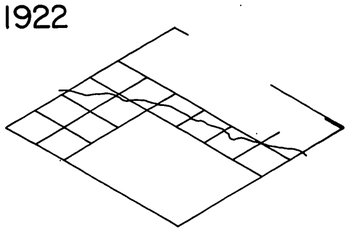
1874



1917



1922



History of Surveys

1873	G.W. Garside surveyed the south boundary and the south two miles of the east boundary of T. 43 N., R. 27 E., M.D.M., Nevada.
1873	G.W. Garside and C.S. Preble surveyed the north and west boundaries.
1874	A.J. Hatch, W.W. Skinner and C.S. Preble surveyed selected portions of the subdivisional lines as shown on the plat approved October 14, 1874.
1917	H.P. Purington resurveyed the west boundary.
1922	Emil Voigt resurveyed the south half mile of the east boundary.

Reasons for Request of this Survey

The introductory paragraphs of field notes state, "The resurvey was requested by the District Manager through the State Director to identify boundaries of the public domain intermingled with private lands to facilitate administration under the appropriate land laws."

Special Instructions

In March 1962 Special Instructions were issued for Group 400, Nevada. They provided for the dependent resurvey of portions of the boundaries and subdivisional lines of several townships. This discussion will be limited to the restoration of the corner of sections 26, 27, 34 and 35. Figure 1 is a copy of the original 1874 field notes for the lines between sections 26, 27, 34 and 35. Figure 2 is a copy of the original plat.

29

T 43 N. R 27 E.

North between 34 and 35
Var 17° 45' E.
descending over rolling ground.
40.00 Set a sandstone 14x10x6. marked 1/4
8 in deep and made mound of stone
for 1/4 sec cor.
68.00 Enter meadow Ct W & S.
80.00 Set a sandstone 18x7x6. 10 in in ground
marked 1 north 8 and 26. for cor
of sections 26. 27. 34. 35
Sand 1st 68 chs rolling sand hills
balance 1st class meadow grass.

Easton true line between 26 & 35
Var 17° 45' E.
1.50 Crane Creek 6 lks wide Ct 10° W.
2.00 Leave meadow Ct S. enter hills
38.00 Base of steep mountains Ctd. as and

30

M. D. M.

40.00 Set a trap stone 18x10x5. marked 1/4.
10 in in ground. for 1/4 sec cor.
Sand excepting meadow. rolling hills
with sage brush. Sand to east mts.

North between 26 and 27
Var 17° 45' E.
10.50 Crane Creek 6 lks wide Ct W.
40.00 Set a sandstone 16x6x4 marked 1/4
10 in in ground. made mound of stones
for 1/4 sec cor.
50.00 Leave meadow Ct W & S 10° E. enter
rolling hills
80.00 Set a granite stone 7x9x6. 10 in deep
marked 2 notches Sand E. for
cor of secs 22. 23. 26 & 27
1/2 part good grass land balance
rolling hills with fair soil.
Base of Mts 30 chs E.

Figure 1 - 1874 Field Notes

A11-1

NEARBY TOPOGRAPHIC CALL FOR CORNER RESTORATION

Conditions Found on the Ground

During retracement of the lines, the ¼ section corners to the north, south, east and west of the corner of sections 26, 27, 34 and 35 were recovered. They were monumented with the properly marked original stones.

No evidence of the original monument could be found for the corner of sections 26, 27, 34 and 35 and no collateral evidence or testimony was available.

When the normal procedure of application of proportionate measurement was applied, however, the point fell approximately 50 links east of the natural channel of Craine Creek. Craine Creek had been diverted since the original survey, and now flows in a diversion channel 2.10 chains west of the natural channel.

The original field notes and the plat calls for the corner to be 1.50 chains west of Craine Creek. When the measurements found in the retracement are compared with the topographic calls in the original field notes, differences of up to several chains are revealed; but in no case is a recovered corner in the wrong direction from a topographic call.

Preliminary Statement of the Problem

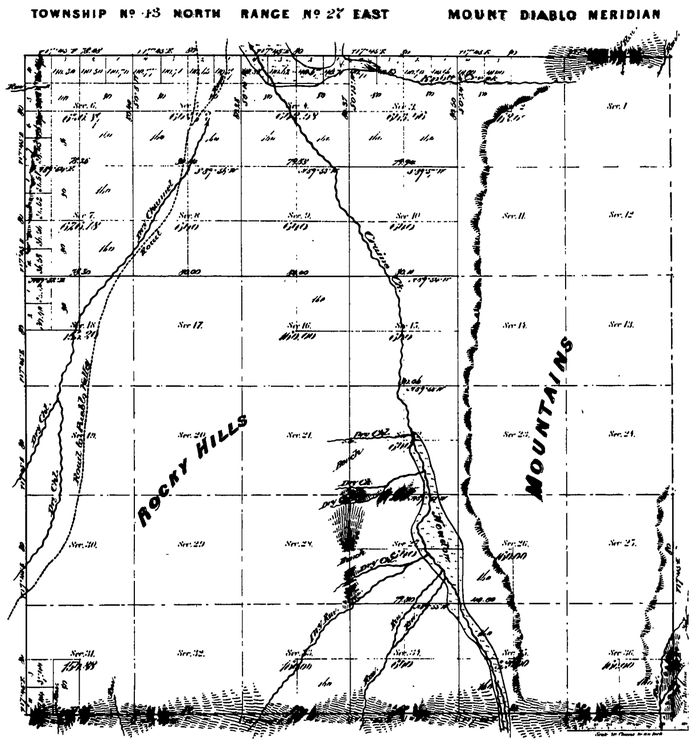
The corner point as determined from proportionate measurement falls on the wrong side of a definite topographic feature called for in the field notes. Using this proportioned point the north half mile between sections 34 and 35 would be N. 3° 15' E., 41.95 chains. The south half mile between sections 26 and 27 would be N. 2° 13' W., 41.91 chains. See figure 3.

Regulations

This survey illustrates the application of sections 5-16 of the Manual of Surveying Instructions, 1973.

Final Statement of the Problem

It must be determined whether or not the topographic call for Craine Creek provides sufficient reliable evidence of the original location to justify its use in restoration of this corner.



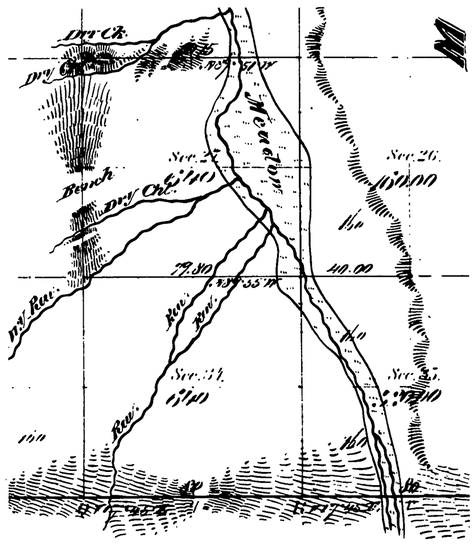


Figure 2 - Original Plat with Inset

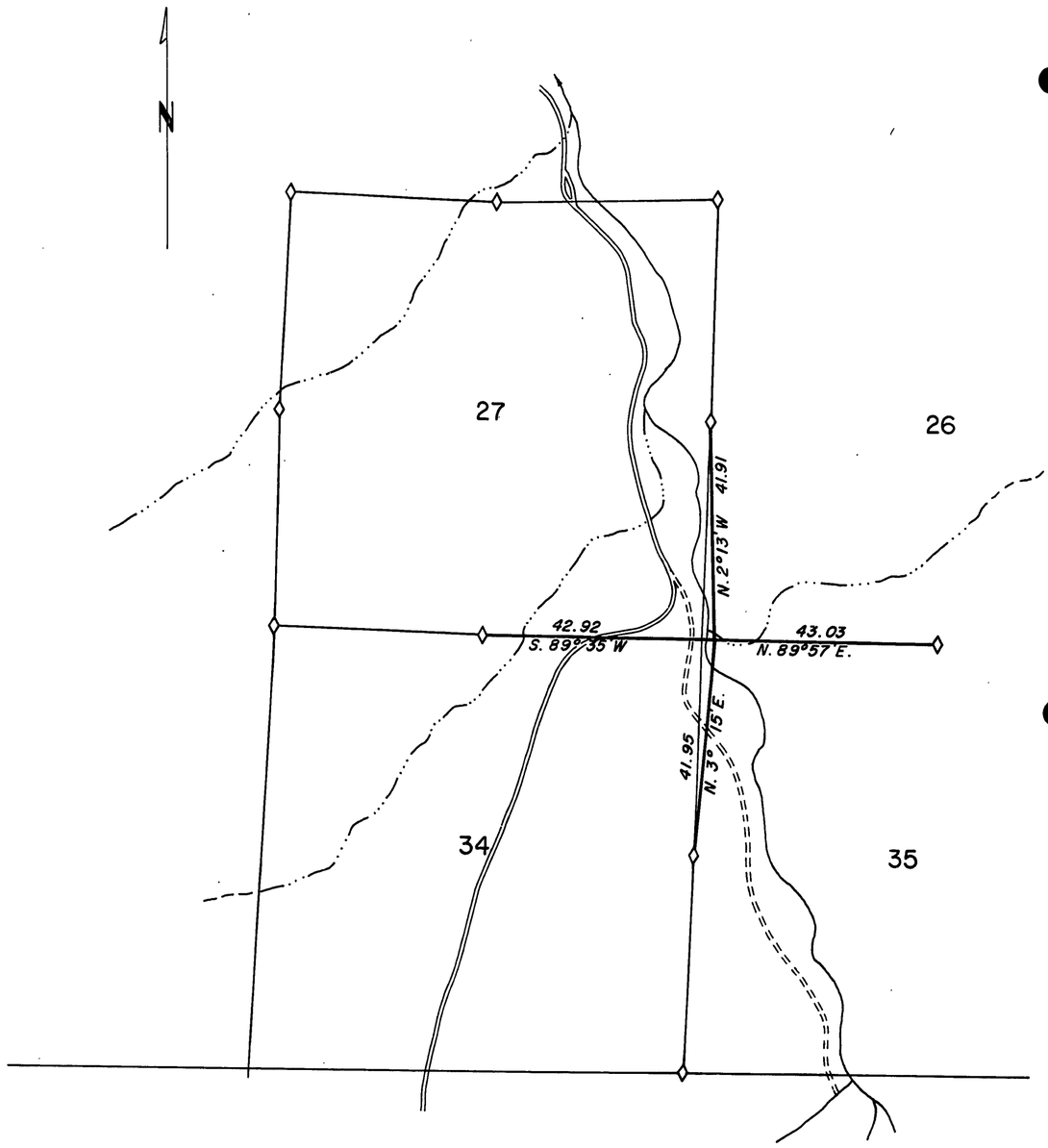


Figure 3 - Preliminary Proportionment

A11-2

NEARBY TOPOGRAPHIC CALL FOR CORNER RESTORATION

Solution

No other line between recovered corners of the subdivisional lines resulted in a heavy northwest bearing. Nearly all of the lines have northeast bearings, with only a few having not more than one degree of northwest bearing. All of the resurvey measurements are nearly 4 chains of excess and average roughly 2 chains long per half mile. Thus there developed a clear indication that the original surveyor ran to the right and chained long. The original measurements were unreliable over any significant distance.

Section 5-16 of the Manual of Surveying Instructions, 1973, describes the use of topographic calls for restoring an obliterated or lost corner. Only those calls which are nearby and definite may be used, and the reliability of the topographic calls should be proven. The corner of sections 26, 27, 34 and 35, could not be restored solely on the basis of topographic calls. The combination of the nearby call to Craine Creek for the longitudinal position and a proportionment between the nearest found corners to the north and south for the latitudinal position was used. Double proportionment would have placed the corner on the wrong side of Craine Creek.

The procedure which was used placed the section corner at midpoint on line between recovered ¼ section corners to the north and south. The resurvey field notes reveal that the record distance (1.50 chains) from Craine Creek was actually used for the longitudinal position, even though the result on the final plat appears to be only a single proportionate measurement between recovered corners to the north and south.

Figure 4 is a copy of the plat of the dependent resurvey which was accepted April 14, 1964.

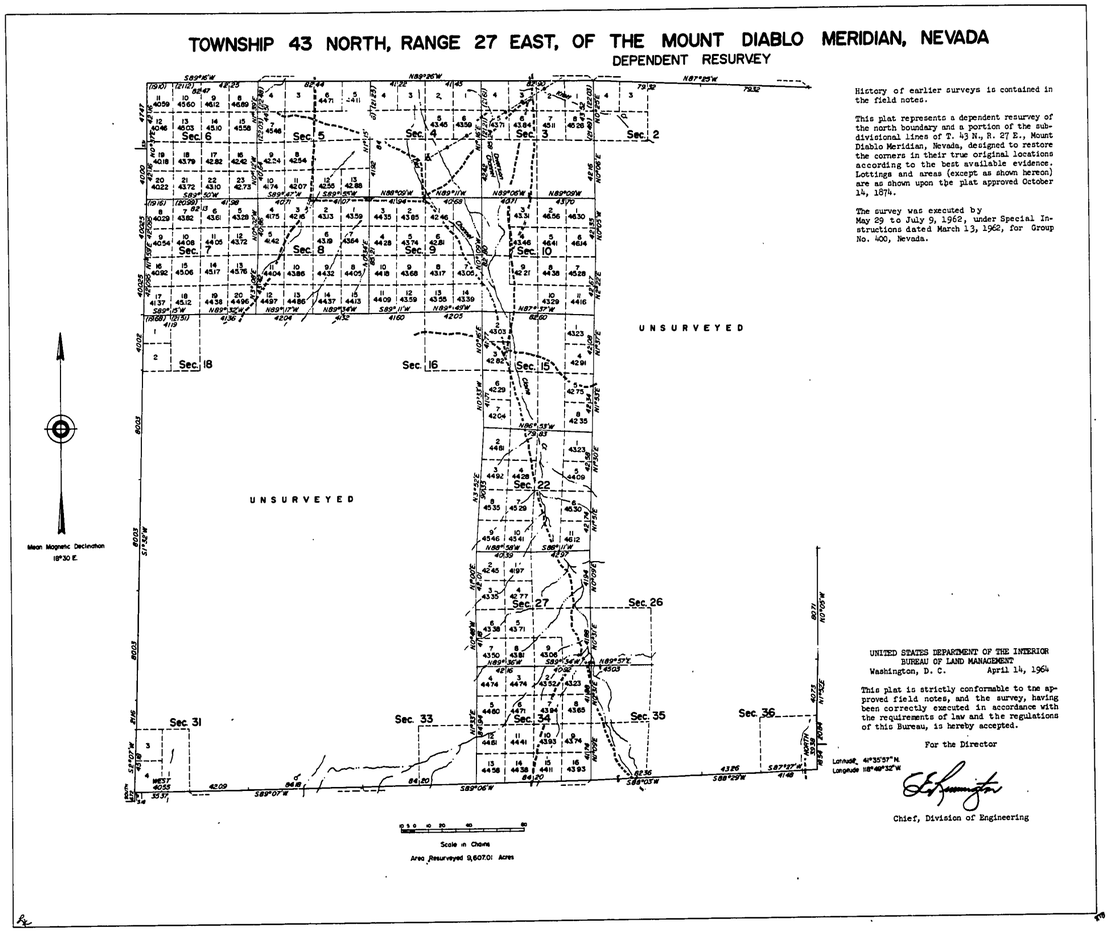


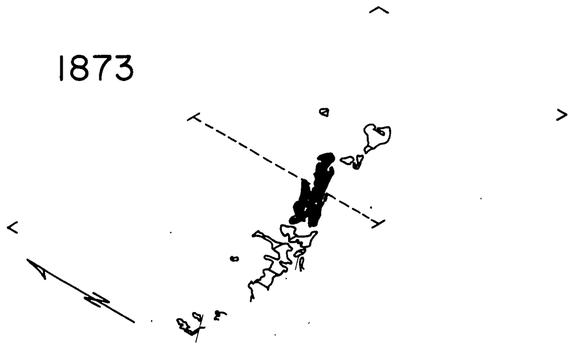
Figure 4 - Accepted Plat with Inset

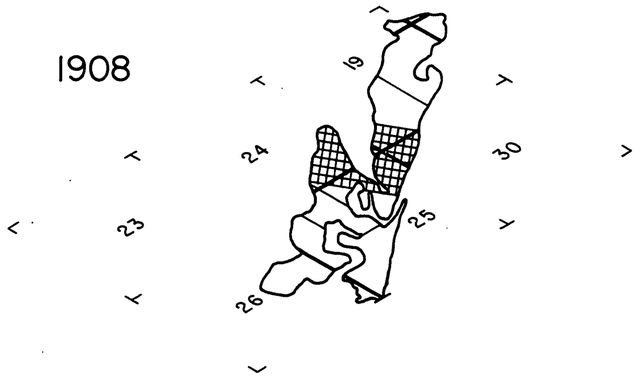
OVERLAY OF MEANDERS OF GRASSY KEY

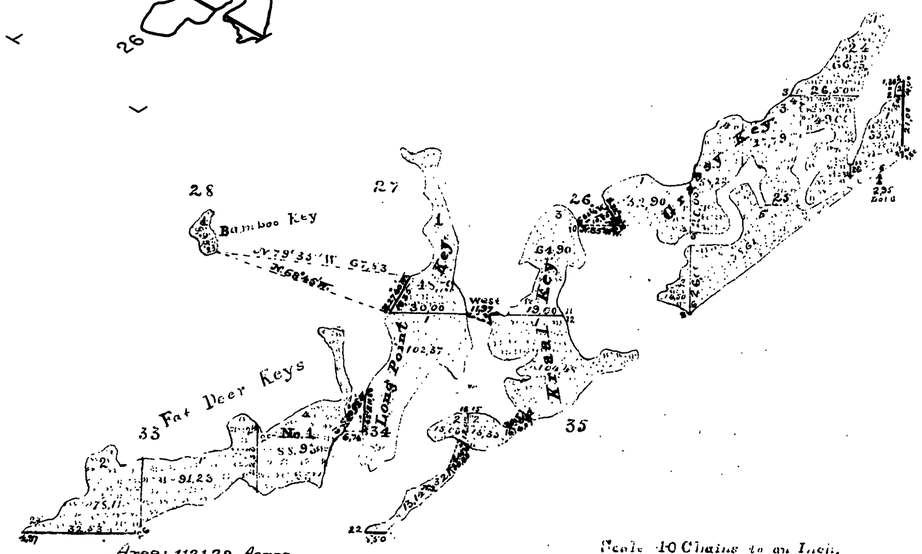
T. 65 S., RS. 33 & 34 E., TALLAHASSEE MERIDIAN

1873

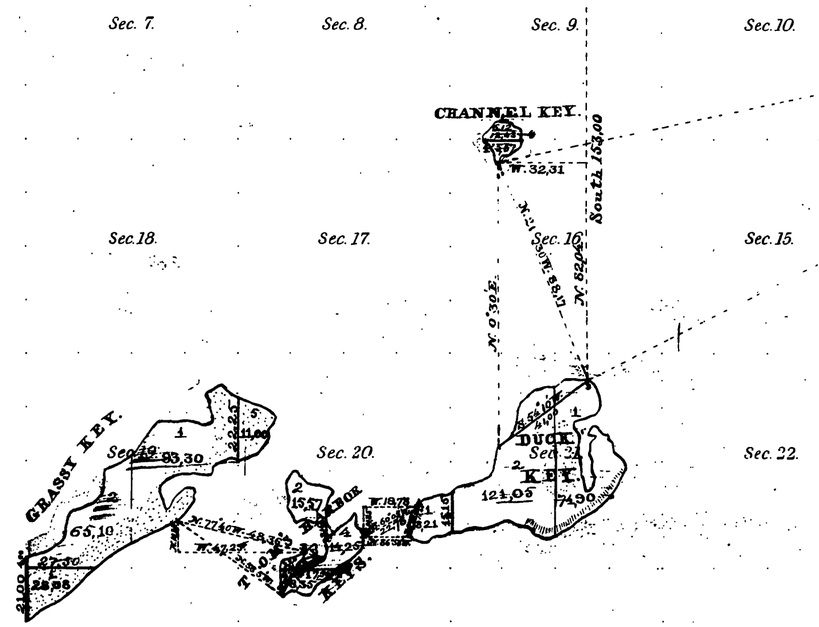
1908







Date of Contract	Amount of Survey			When Surveyed
	M.	Ch.	Lk.	
Nov 20th 1872.	1	29	90	February
	2	14	50	74, 75, Nov 20th.
	23	66	89	
	1	79	55	1873.



Surveys Designated	Whom Surveyed	Date of Contract	Ammont of Surveys			When Surveyed
			M.	Ch.	Lk.	
Township lines						
Subdivisions	Chas F. Smith.	Nov. 20th 1872		78.	15.	Feb 11th 12th 13th
Meanders -			10.	23.	41.	1873.
Triangulations			8.	24.	06.	

Total number of Acres 464.70

Figure 1 - Portions of Original Survey Plats

A 12-1

OVERLAY OF MEANDERS OF GRASSY KEY

T. 65 S., RS. 33 & 34 E., TALLAHASSEE MERIDIAN

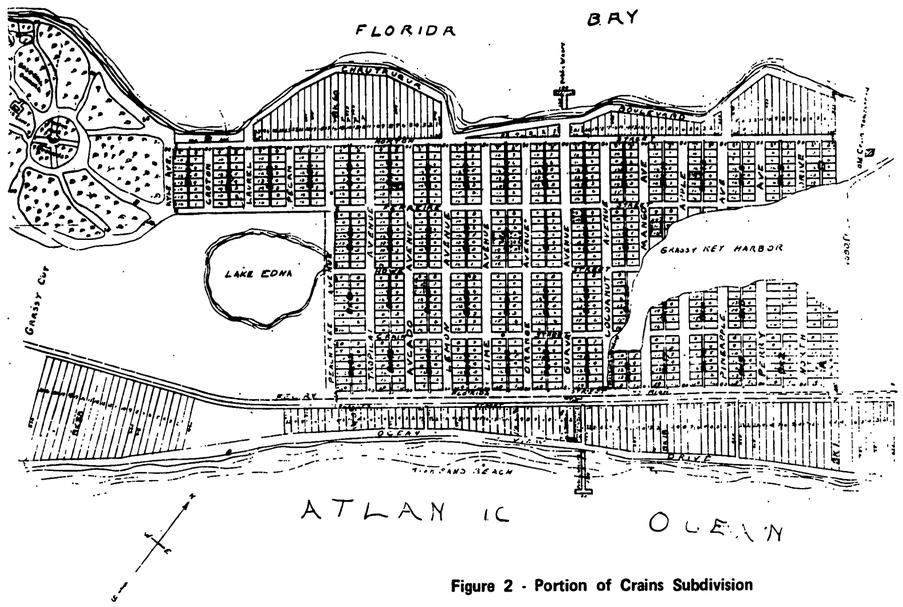


Figure 2 - Portion of Crains Subdivision

MAP OF
CRAINS SUBDIVISION
OF GRASSY KEY
IN SECS 24-25-26-
TP 65S, R6 33E, FLA.

Reasons for Request of this Survey

The lots and blocks in Crain's subdivision are owned by a large number of different people. Marks and Pentland were attempting to develop their land in sections 19 and 30. The Squires survey provided them no conclusive results and was open to contention.

The original survey monuments, which were posts in mounds of stone, had long since been washed away by hurricanes. No evidence of them remained.

The Monroe County Surveyor refused to attempt to resolve the dispute and suggested that the only way to settle the matter was to have the Bureau of Land Management resurvey sections 19, 24, 25 and 30.

Marks requested the Washington Office to execute a resurvey of Grassy Key and restore the disputed section corner. Because all of the land is patented, Marks' request was refused on the grounds that the BLM had no jurisdiction and could not resolve local disputes. Marks was informed of the provisions of the Act of September 21, 1918, 40 Stat. 965. This act states that a resurvey can be made upon application by three-fourths of the owners of the privately owned lands within a township, or upon application by a court of competent jurisdiction. The applicants pay the cost of such a resurvey.

Pentland and Marks filed a Bill of Complaint (petition) with the Circuit Court of the Eleventh Judicial circuit, Monroe County, Florida, asking the court to request the desired resurvey by the BLM. On March 31, 1948, the formal request was made by an Order of Aquilino Lopez, Jr., Circuit Judge of the Florida courts in the case of Robert R. Pentland, Jr., et al., vs. William Patton, et al., No. 11-246. The order contained a defective description which was corrected on July 29, 1949. The estimated cost of the survey, $900, was deposited by Pentland and Marks.

Special Instructions

Special Instructions for Group 109, Florida, prepared on January 17, 1950, provided for a limited dependent resurvey and the retracements necessary to restore the lost corner of sections 19, 24, 25 and 30 and, to a limited extent, other lines that might be required to satisfy the needs of Judge Lopez and Mr. Marks. The work was assigned on January 20 and begun on January 31, 1950.

Conditions Found on the Ground

Examination confirmed that no evidence of any kind remained of the original survey monuments. The record meanders of Grassy Key were carefully plotted to scale, as indicated in figure 4. This sketch was then used as an overlay on the U.S. Coast and Geodetic Survey Topographic Map No. T-5542. A portion of this map is shown in figure 5. A comparison of the record meanders and the "T-sheet" revealed that the original meanders had been well and accurately run, if allowance was made for extensive erosion along the southeasterly, or ocean, side of Grassy Key, which is an open beach.

Observations of the tides were made to determine as nearly as practicable the mean high water line. Grassy Key was remeandered in sections 19, 20, 30 and 24 and the east half of section 25. The point established by Squires was tied to these new meanders. The shore line conditions and new meanders are shown in figure 6. Squires had died so there was no way to conclusively determine how he had arrived at his corner point. Apparently he attempted to use the existing shore line and the original calls to arrive at that location.

Preliminary Statement of the Problem

With no remaining evidence of the original monuments and no valid perpetuations of them, the problem is how to restore the section lines in their original position, as nearly as may be.

Regulations

All of the lands involved in this case are privately owned and would normally be subject to state law and the local courts. The local court has requested the government resurvey presumably to insure use of the same methods which would be employed if the lands were public domain. Chapters 5 and 6 of the Manual of Surveying Instructions, 1973, are applicable. In this instance and this particular situation, sections 5-29, 5-40 and 5-45 are particularly applicable.

Legal Constraints

The resurvey must comply with good surveying practice and is limited to only those lines necessary to fulfill the needs of the court.

Final Statement of the Problem

The surveyor must decide what is the best remaining evidence and use that evidence to fix the corner location.

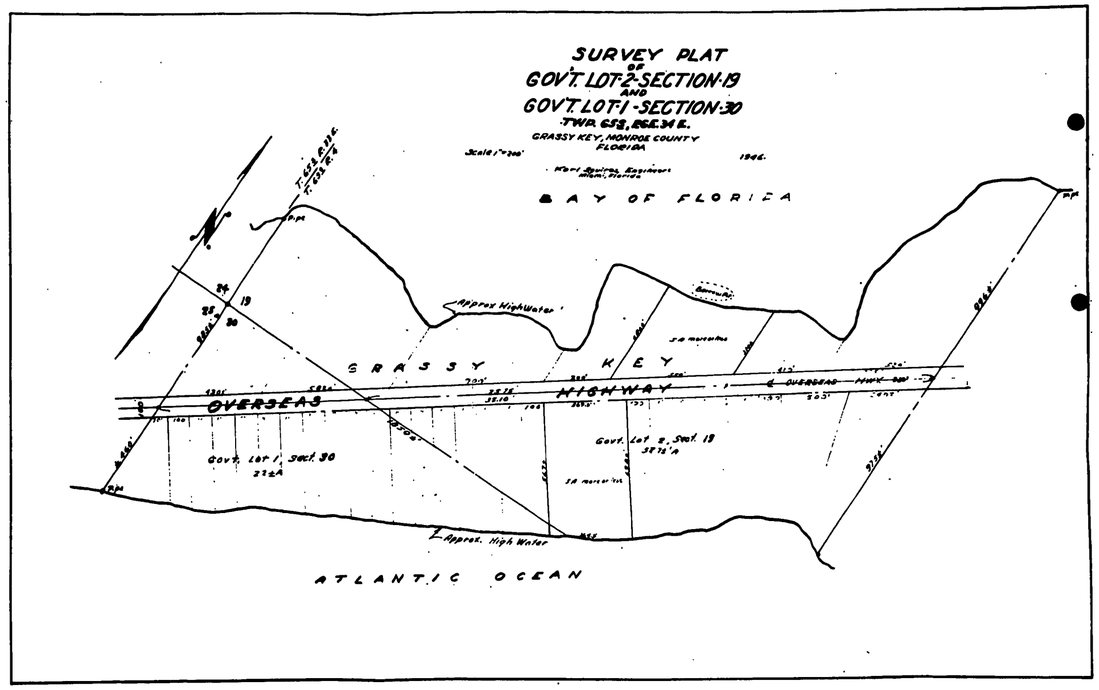


Figure 3 - Squires' Map

OVERLAY OF MEANDERS OF GRASSY KEY

T. 65 S., RS. 33 & 34 E., TALLAHASSEE MERIDIAN

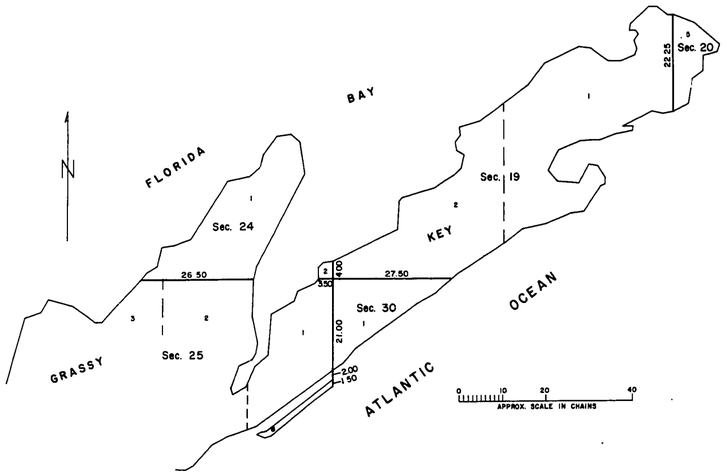


Figure 4 - Record Meanders

Solution

The original meanders of Grassy Key were carefully drawn to a large scale as indicated in figure 4. One course in section 19 was erroneously recorded as S. 55° W., 5.00 chains instead of N. 55° W. Conflicts between the plat and field notes were resolved on three courses in section 24 during the plotting. The new meanders were carefully plotted to the same large scale on an overlay. The overlay was shifted around for a logical fit. The old and new meanders fit very well along the abrupt coral ledges in sections 19 and 24. Along the Atlantic Ocean shore there was a general conformation but extensive erosion and filling (accretion) had taken place.

Section 5-40 of the Manual of Surveying Instructions, 1973, second paragraph, allows restoration of lost meander corners by treating the shore line as an identified natural feature under "favorable conditions." The stability of the land or shore line is a deciding factor as is the conformity of the record to the physical shoreline.

The record bearings of the meanders did not fit over a long distance but a rotation of 0° 40' in angle, to the left, provided an acceptable fit of the new meanders to the old and pin-pointed the position of the section corner. This average rotation of 0° 40' in angle was then carried through the resurvey to restore the section lines and meander corners. This "index correction" as outlined in section 5-45 of the Manual of Surveying Instructions, 1973, was applicable only to the bearing of the section lines in this particular situation.

After the resurvey was completed, ties were made to existing corners and evidence of Crain's subdivision as represented in figure 2. The Squires location of the section corner was tied in. This point was located S. 47° 24' W., 7.32 chains from the restored corner of sections 19, 24, 25 and 30. Pertinent buildings and improvements were tied to the resurveyed lines to show their positions and assist the court.

The plat was accepted April 27, 1950 and is shown in figure 7.

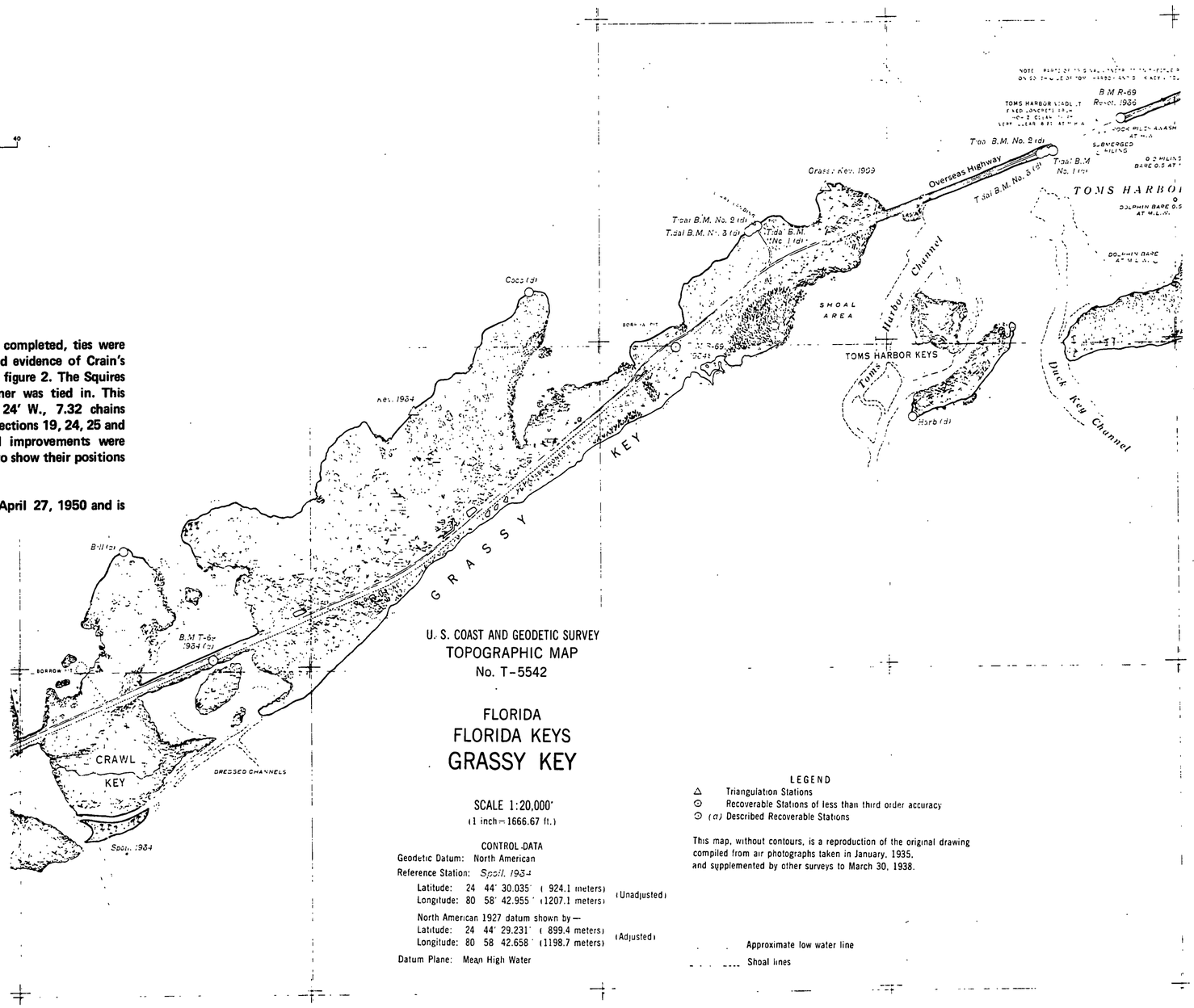


Figure 5 - U. S. C. & G. S. "T-sheet"

OVERLAY OF MEANDERS OF GRASSY KEY

T. 65 S., RS. 33 & 34 E., TALLAHASSEE MERIDIAN

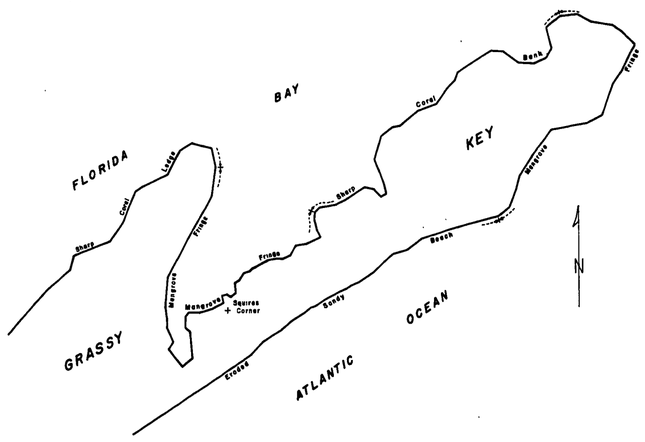


Figure 6 - Existing Conditions

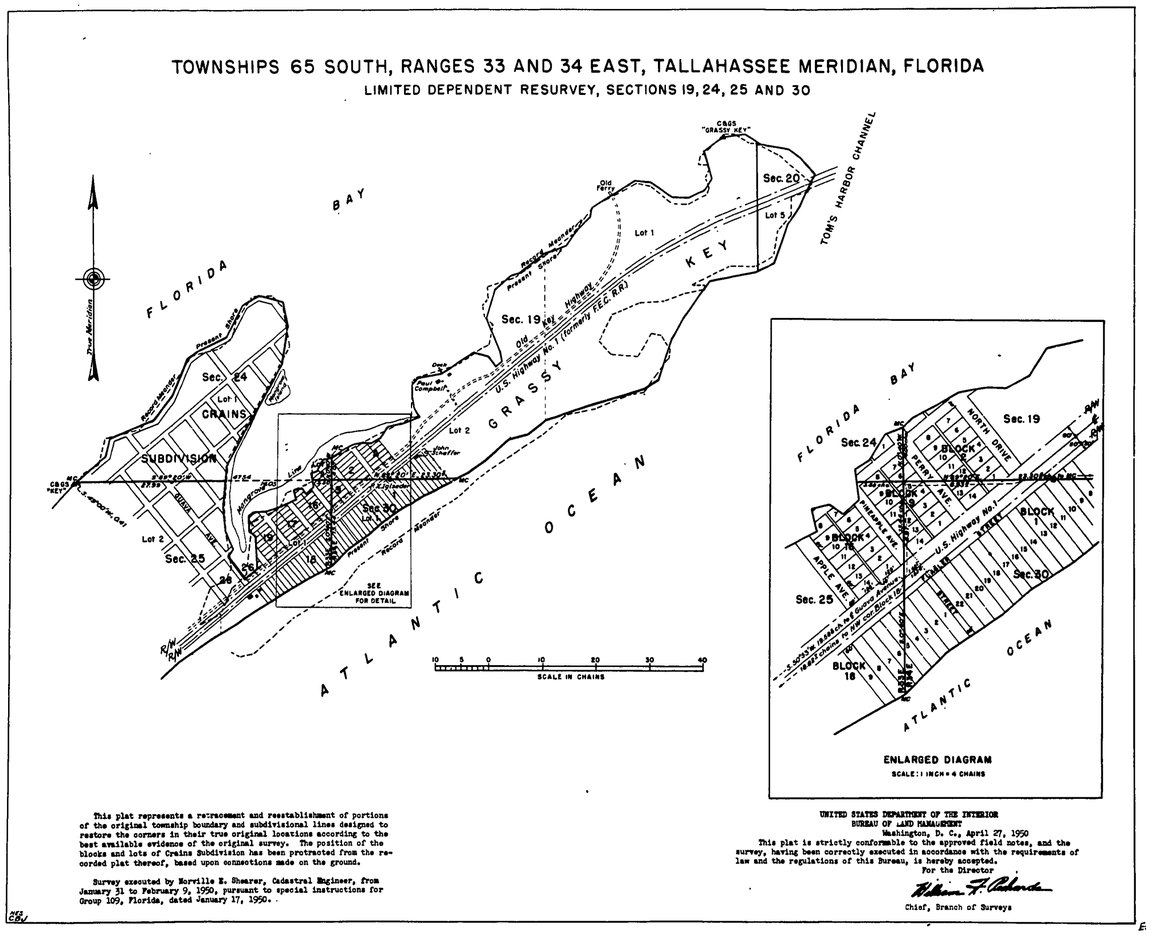
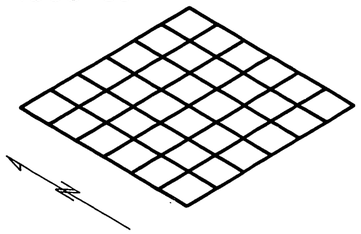


Figure 7 - Accepted Plat

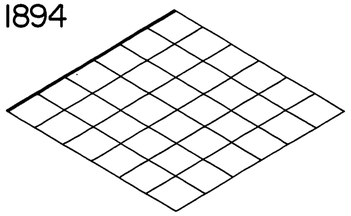
HIGHWAY DEPARTMENT SURVEY EVIDENCE

HIGHWAY DEPARTMENT SURVEY EVIDENCE

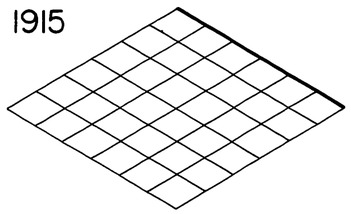
1868-69



1894



1915



History of Surveys

1868	C.C. Tracy surveyed the exterior boundaries and subdivisional lines of T. 34 N., R. 55 E., in 1868 and 1869.
1894	H.S. Maxson resurveyed the north boundary.
1915	Winfred A. Pray resurveyed the east boundary. Pray recovered the corner of sections 7, 12, 13 and 18 and restored the remaining corners by single proportionate measurement.

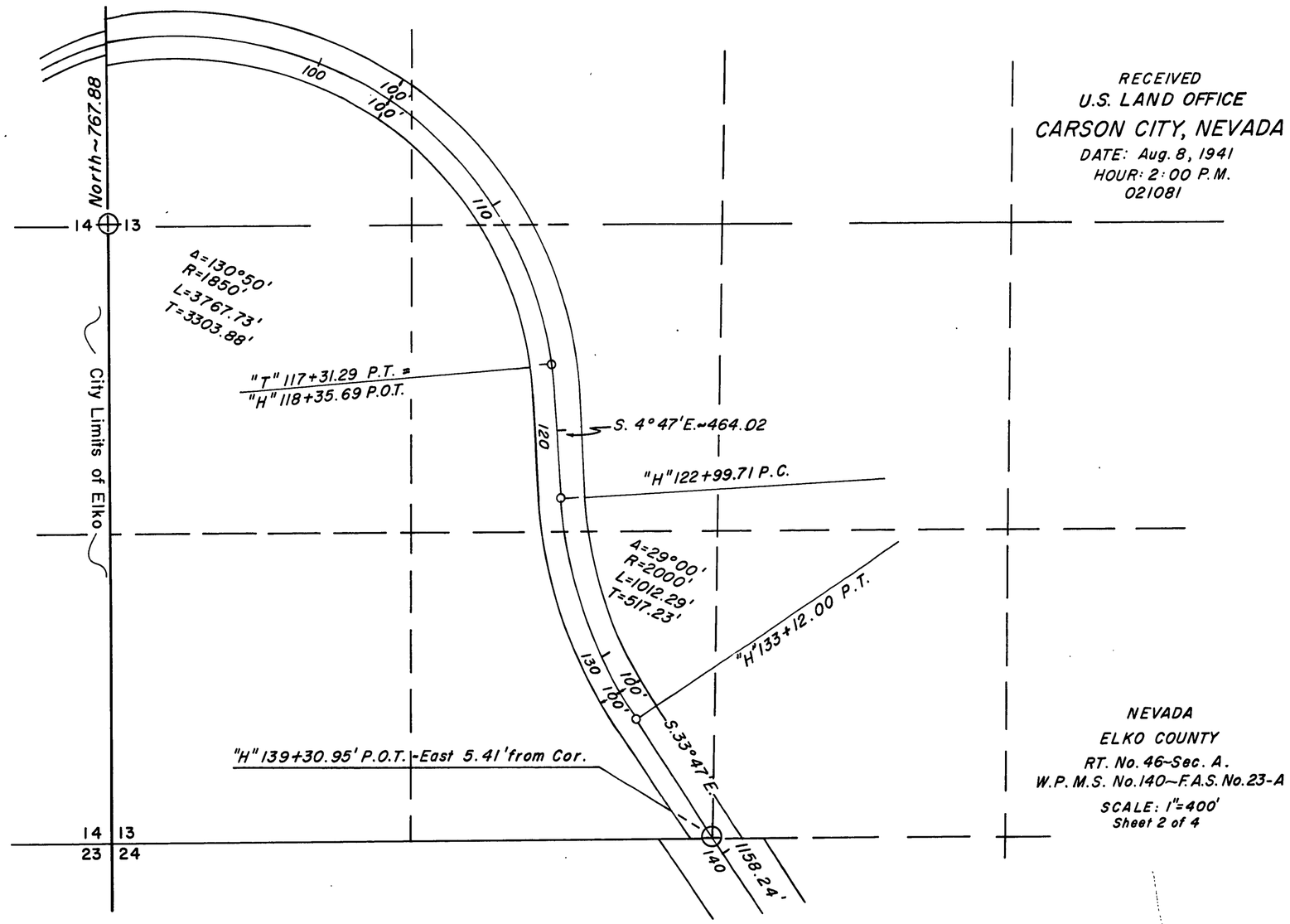


Figure 1 - Portion of Highway Dept. Map

Reasons for Request of this Survey

The resurvey of section 24 was necessary for the proper management and disposal of the remaining public lands. The necessity was more immediate because section 24 is adjacent to the City of Elko, Nevada.

Special Instructions

On March 21, 1969, Special Instructions were prepared under Group No. 462, Nevada. They provided for the dependent resurvey of section 24.

Conditions Found on the Ground

The surveyor assigned retraced the north, south and west boundaries of the section. All corners were recovered except the ¼ section corner of sections 24 and 25 and the ¼ section corner of sections 13 and 24.

The original corner monuments were all stone or charred stakes with pits. No bearing trees were taken, and there are no verifiable calls of topography.

The proportionate position for the ¼ section corner of sections 13 and 24 was located within the right-of-way of Nevada State Highway No. 46. No remaining original evidence could be found of either ¼ section corner.

Preliminary Statement of the Problem

The surveyor must restore these missing corners by proportionate measurement or discover collateral evidence or testimony for restoration.

Regulations

This survey illustrates the application of section 5-9 and 5-10 of the Manual of Surveying Instructions, 1973.

Amended Information

In 1941, a Nevada State Highway Department map which showed 6 miles of Route No. 46 was filed in the Land Office of the G.L.O., then located in Carson City. The map, which consisted of four sheets, showed the location of the highway across vacant public lands. Portions of sheets 2 and 3 are shown in figures 1 and 2.

As shown in figures 1 and 2, the ¼ section corner of sections 13 and 24 had been recovered by the Highway Department in 1941. The corner was tied in as being 5.41 feet west of highway centerline station "H" 139 + 30.95, a point on a tangent between curves. Figure 2 indicates that right-of-way markers were set left and right of this centerline station, marking a right-of-way which extends 200 feet each side of the centerline, measured 90° to the centerline, which bears S. 33° 47' E.

HIGHWAY DEPARTMENT SURVEY EVIDENCE

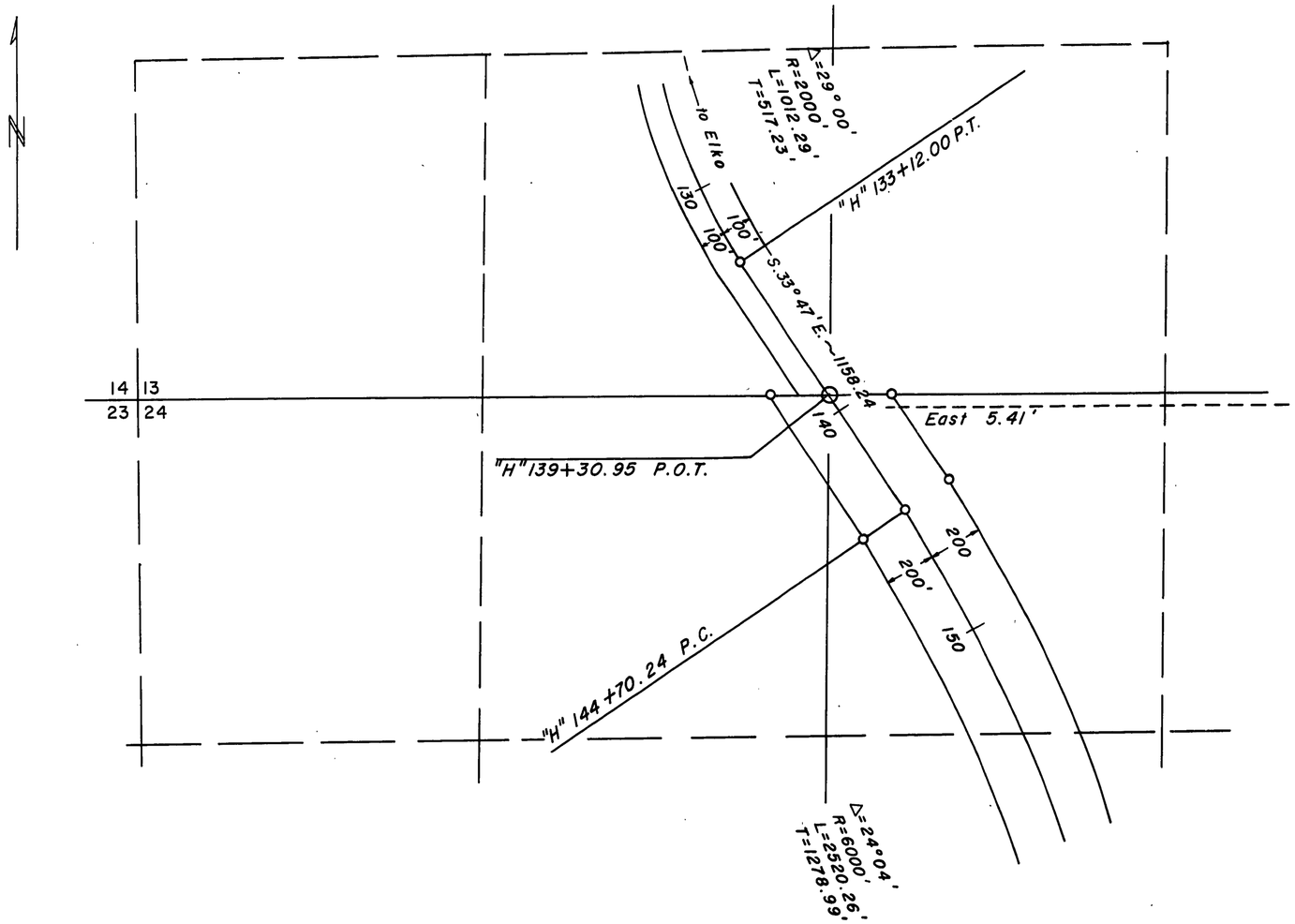


Figure 2 - Portion of Highway Dept. Map

HIGHWAY DEPARTMENT SURVEY EVIDENCE

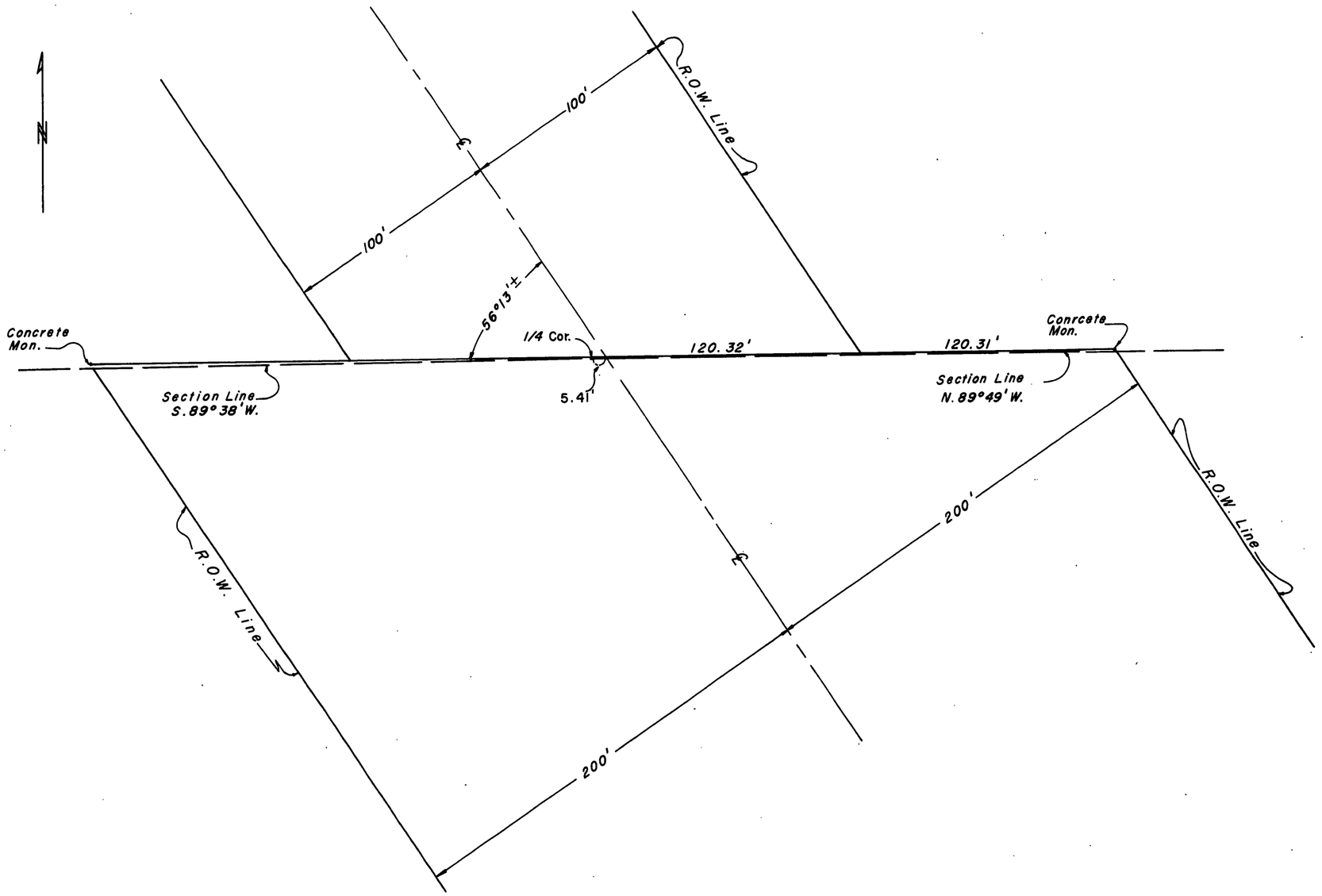


Figure 3 - Solution

Final Statement of the Problem

The highway survey data is adequate to restore the corner, provided the position correlates with other corners of the original survey.

It must be determined whether or not the centerline station can be definitely established and, if so, the corner point must be determined from that. The wording on sheet 3 of 4 (figure 2) is not clear as to whether the corner was east or west of the highway centerline.

HIGHWAY DEPARTMENT SURVEY EVIDENCE

Solution

No collateral evidence was found pertaining to the ¼ section corner of sections 24 and 25, so it was restored by the single proportionate measurement method at midpoint on line between the section corners.

Both right-of-way markers near the ¼ section corner to sections 13 and 24 were monumented with 4x4 inch concrete posts and were readily recovered. The centerline station "H" 139 + 30.95 was restored at midpoint on line between the markers and the ¼ section corner was set at a point 5.41 from the centerline. The measurement to the corner was made on a west bearing as determined by using the highway centerline as S. 33° 47' E. according to the Highway Department's reported value.

The corner was remonumented with a patented, copper-coated steel stake and brass cap. Two brass-capped iron posts were set for reference monuments, one N. 70° W. and the other S. 20° W., each 55 feet distant from the corner.

The section line was then resurveyed using the restored ¼ section corner. This resulted in a bearing of N. 89° 49' W., 39.50 chains for the east ½ mile. The west half mile was S. 89° 38' W., 40.34 chains. These bearings and distances are fully compatible with the other section lines, and the original record of N. 89° 56' W., 80.08 chains for the mile. No gross distortion exists. Figure 3 is an enlargement of the situation at the ¼ section corner. Neither highway right-of-way marker is located on the true section line, as dependently resurveyed.

Figure 4 is a copy of the dependent resurvey plat of section 24 which was accepted January 28, 1971.

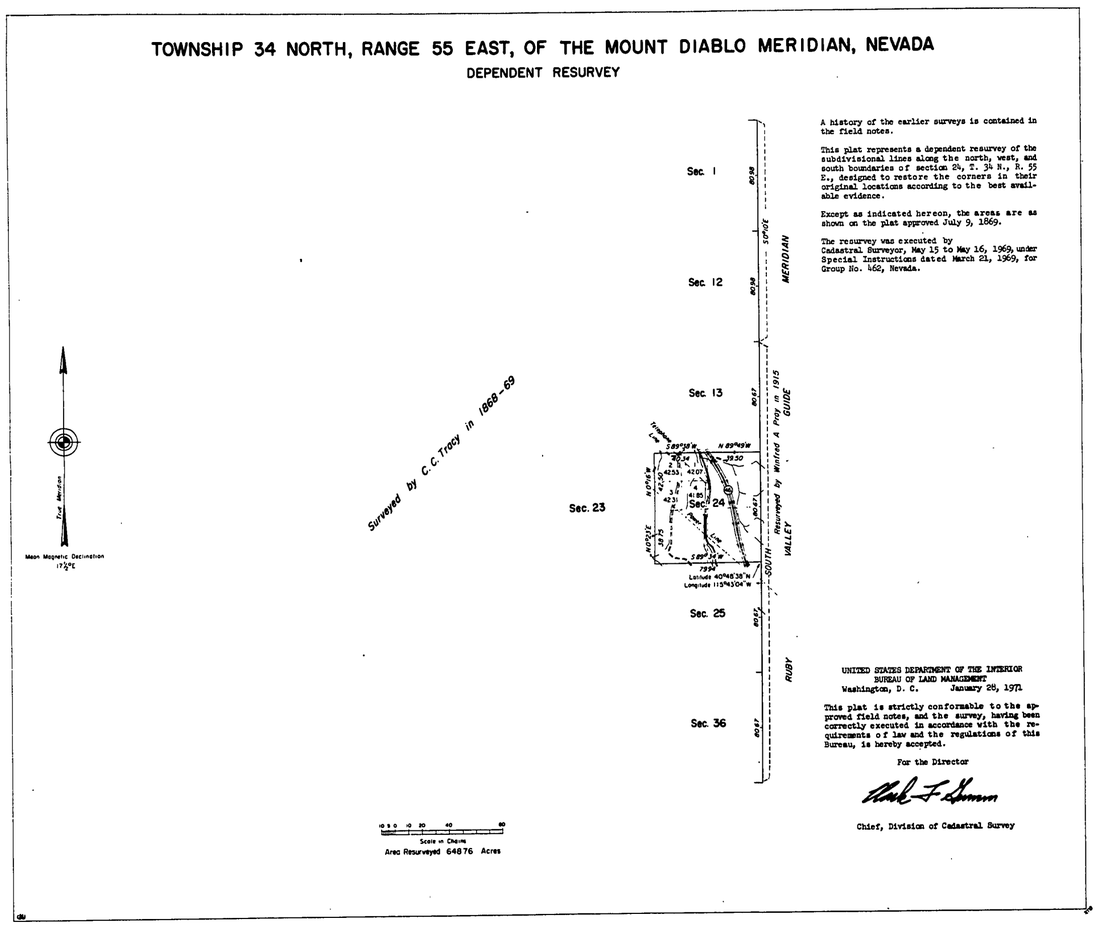
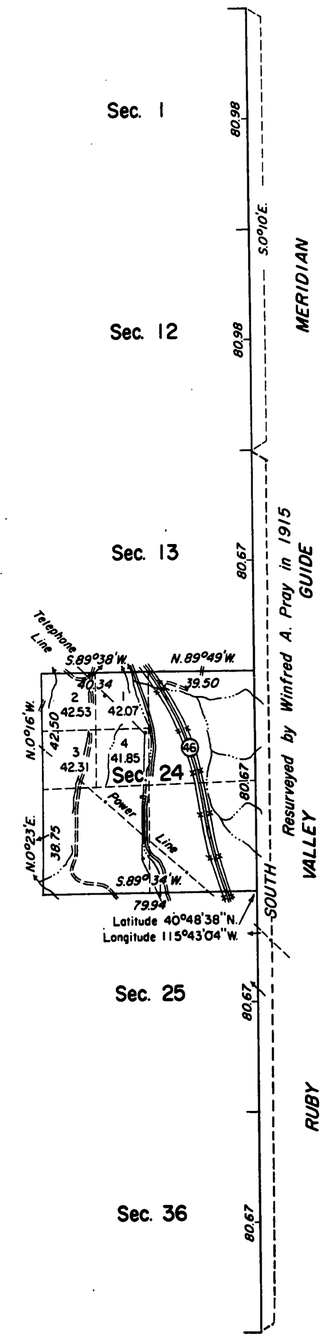
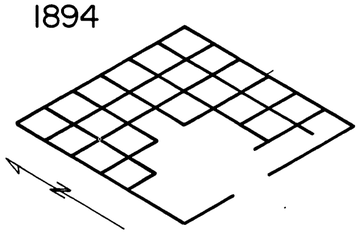


Figure 4 - Accepted Plat

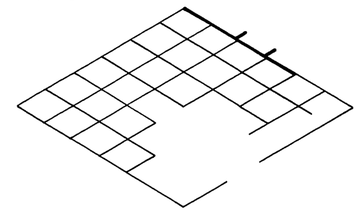


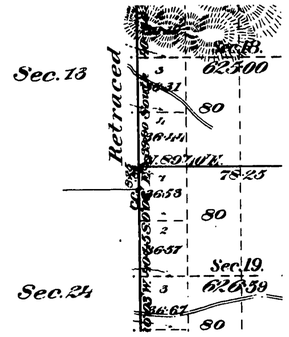
CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

1894



1902





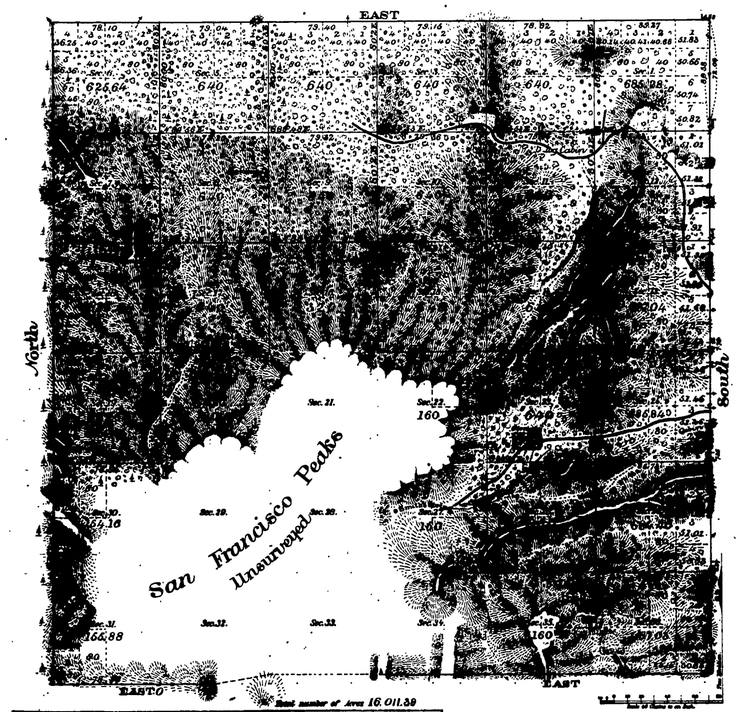
History of Surveys

1894 Frances W. Oury and Charles E. Perkins surveyed the range line through T. 23 N., between Rs. 7 and 8 E. The line was surveyed north to south.

1894 Oury and Perkins also surveyed a portion of the subdivisional lines of T. 23 N., R. 7 E. The line between sections 13 and 24 was run East and a closing corner was established 7.79 chains south of the previously set corner to sections 13, 18, 19 and 24. A portion of the plat approved July 13, 1895, is shown in figure 1.

1902 James A. Lamport surveyed a portion of the subdivisional lines of T. 23 N., R. 8 E. He surveyed the line between sections 18 and 19, parallel to the south boundary of section 19, establishing the closing corner of sections 18 and 19 on the range line at a point 80 links north of the former corner of sections 13, 18, 19 and 24 as established by Oury and Perkins. Because he found misclosures, Lamport then retraced the north four miles of the range line.

Township No 23 North Range No 7 East Gila and Salt River Meridian Ariz.



Township No 23 North, Range No 8 East, Gila and Salt River Meridian, Arizona.

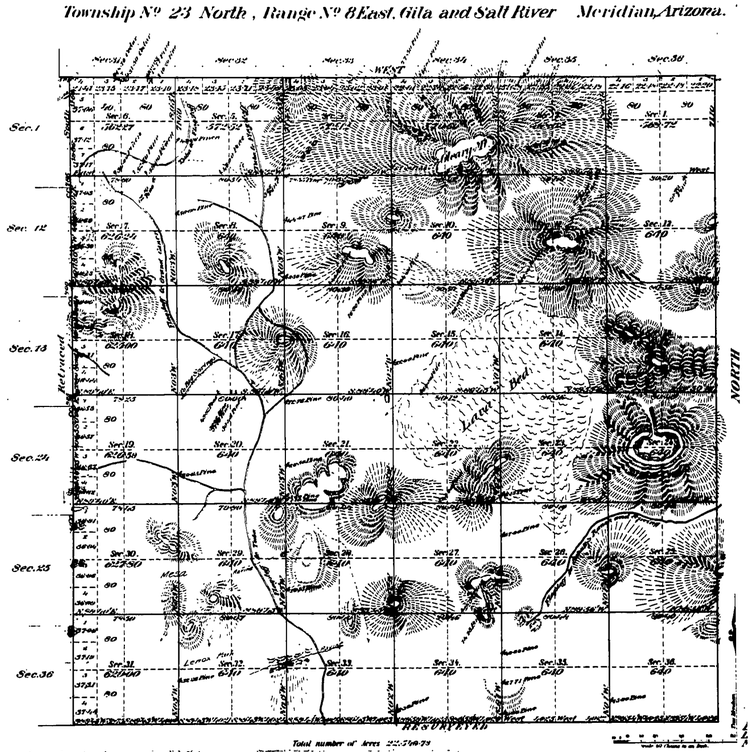


Figure 1 - Original Plats with Insets

A14-1

CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

Reasons for Request of this Survey

The Forest Service requested this survey because they had become involved in a dispute between claimants of mining property within the boundary of the Coconino (pronounced Coca-knee-no) National Forest. Settlement of the dispute between claimants would also settle the boundary between public lands and patented mining claims.

On June 13, 1938, Earl E. Collins recorded placer mining claim locations for the Collins No. 1 and No. 2 claims in sections 13 and 24. These claims were tied to the ¼ section corner of sections 13 and 24.

On May 18, 1943, Roy E. Kincanon recorded a placer claim location for the Kincanon No. 1 claim. This claim was also tied to the ¼ section corner.

On June 10 and August 10, 1943, Del W. Fisher recorded location claims on the Fisher Lode and Fisher Placer claims, in sections 13 and 24. These claims are also described as tied to the ¼ section corner of sections 13 and 24, T. 23 N., R. 7 E. These five location notices are shown in figure 2 as recorded in the Coconino County records.

In 1959 Del W. Fisher amended his locations to conform to legal subdivisions as part of a procedure for obtaining a patent. Each claim would, in theory, contain approximately 20 acres and be bounded on the east by the north-south centerline of sections 13 and 24. The claims were staked by Harvey W. Smith, Registered Professional Engineer in August, 1959. Smith did not survey the claims. Fisher applied for patent and patent was issued January 5, 1961, to Fisher Placer No. 1a, S½ SE¼ SW¼, section 13, and to Fisher Placer No. 1, N½ NE¼ NW¼ of section 24.

Special Instructions

Special Instructions for Group 477, Arizona, were issued on November 30, 1966. They provided for the resurvey of the section line and ties to the Fisher, Collins and Kincanon claims.

Conditions Found on the Ground

The line between sections 13 and 14 was retraced. The corner of sections 13, 14, 23 and 24, and the closing corner of sections 13 and 24 were both recovered and remonumented. Original bearing trees remained at both corners. Careful and complete search was made for any remaining conclusive evidence of the original ¼ section corner monument and bearing trees. None was found.

NOTICE OF MINING LOCATION

PLACER CLAIM

TO WHOM IT MAY CONCERN:

This Placer Mining Claim, the name of which is the Earl Collins Placer Mining and Sand Claim, No. 1, situate on lands belonging to the United States of America, and being a form of valuable mineral deposit other than in veins or lodes of quartz or other rock in place, was entered upon and located for the purposes of exploration and purchase by me E. E. Collins, a citizen of the United States and a resident of the State of Arizona, on the 16th., day of May, 1938.

I claim eighteen and sixty five one hundredths (18.65) acres thereof and have marked the same on the ground as follows:

Beginning at Corner No. 1, from which the quarter corner between sections 13 and 24, T. 23 N., R. 7 E., G. & S. R. B. & M. Arizona bears North 70 degrees East, 283 feet; thence South 64 degrees 44 minutes north 6 degrees 07 minutes west, 543.0 feet to corner No. 3; thence north 10 degrees 12 minutes west, 756.7 feet to corner No. 4; thence south 67 degrees 42 minutes west 1336.0 feet to corner No. 1, the place of beginning and containing 18.65 acres more or less.

Beginning at Corner No. 1, from which the quarter corner between sections 13 and 24, T. 23 N., R. 7 E., G. & S. R. B. & M. Arizona bears North 70 degrees East, 283 feet;

All done under the provisions of the Revised Statutes of the United States and the laws of the State of Arizona.

Dated and posted on the grounds this 11 day of June, 1938.

Earl E. Collins

Recorded at the request of F. M. Gold
June 13th, A. D. 1938 at 4:00 o'clock P. M.
Marie Gregg, County Recorder.

PLACER CLAIM

TO WHOM IT MAY CONCERN:

This Placer Mining Claim, the name of which is the Earl Collins Placer Mining and Sand Claim, No. 2, situate on lands belonging to the United States of America, and being a form of valuable mineral deposit other than in veins or lodes or quartz or other rock in place, was entered upon and located for the purposes of exploration and purchase by me E. E. Collins, a citizen of the United States and a resident of the State of Arizona, on the 16th., day of May, 1938.

I claim eighteen and sixty seven one hundredths, (1867) acres thereof and have marked the same on the ground as follows:

Beginning at corner No. 1, from which the quarter corner between sections 13 and 24 T. 23 N., R. 7 E., G. & S. R. B. & M, Arizona, bears north 70 degrees east, 283 feet; thence south 10 degrees west, 480 feet to corner No. 2; thence south 50 degrees east, 480 feet to corner No. 3; thence south 56 degrees east, 500 feet to corner No. 4; thence north 60 degrees east, 800 feet to corner No. 5; thence north 64 degrees 44 minutes west, 1548.2 feet to corner No. 1, the place of beginning and containing 13.67 acres more or less.

Beginning at corner No. 1, from which the quarter corner between sections 13 and 24 T. 23 N., R. 7 E., G. & S. R. B. & M, Arizona, bears north 70 degrees east, 283 feet;

All done under the provisions of the Revised Statutes of the United States and the laws of the State of Arizona.

Dated and posted on the ground this 11th day of June, 1938.

Earl E. Collins

Recorded at the request of F. M. Gold
June 13th, A. D. 1938 at 4:00 o'clock P. M.
Marie Gregg, County Recorder.

NOTICE OF MINING LOCATION

PLACER CLAIM

TO ALL WHOM IT MAY CONCERN:

This Placer Mining Claim, the name of which is the Kincanon No. 1 Placer Mining Claim, situate on lands belonging to the United States of America, and being a form of valuable mineral deposit other than in veins or lodes of quartz or other rock in place, was entered upon and located for the purposes of exploration and purchase by Roy E. Kincanon, a citizen of the United States the undersigned, on the 18th day of May, 1943.

I claim 17 acres thereof, and have marked the same on the ground as follows: Beginning at a point which bears N. 70° W., 283 feet from the South 1/4 corner of Section 13, T. 23 N., R. 7 E. G. & S. R. B. M. thence N. 9° W., 486.7 feet, thence N. 67° 42' E., 1000 feet, thence N. 42° 18' E., 400 feet, thence S. 55° 30' E. 243 feet, thence S. 1° 10' E. 167 feet, thence S. 37° 32' W. 233.9 feet, thence S. 67° 42' W. 1336' to the place of beginning, at a Post in Stone Monument (post, stone or other monument) where this notice is posted; containing 17 acres, all in Sugar Loaf Mt. Mining District, in the County of Coconino in the State of Arizona, about 1 mile in a westerly direction from the divide on Highway 89.

Beginning at a point which bears N. 70°W., 283 feet from the South ¼ corner of Section 13, T. 23 N., R. 7 E. G. & S. R. B. M.

All done under provisions of Chapter Six, of Title XXXII, of the Revised Statutes of the United States, and of an Act of the General Assembly of Arizona, entitled "An Act to Revise and Codify the Laws of the Territory of Arizona," approved March 16, 1901.

Dated and Posted on the Ground this 18 day of May, 1943.

Roy E. Kincanon

NOTE. - If the location is upon surveyed lands, the claim must conform to such survey by rectilinear subdivisions.

Recorded at the request of Roy E. Kincanon
May 18th, A. D. 1943 at 4:00 o'clock P.M.
Marie Gregg, County Recorder

Figure 2a - Mining Location Notices

CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

NOTICE OF MINING LOCATION

LODE CLAIM

TO ALL WHOM IT MAY CONCERN:

This Mining Claim, the name of which is the Fisher No. 1 Mining Claim, situate on lands belonging to the United States of America, and in which there are valuable mineral deposits, was entered upon and located for the purpose of exploration and purchase by D. W. Fisher (a citizen of the United States) the undersigned, on the 9th day of June, 1943.

The length of this claim is one thousand feet, and I claim two hundred feet, in an easterly direction, and eight hundred feet in a westerly direction, from the center of the discovery shaft, at which this notice is posted, lengthwise of the claim, together with three hundred feet in width of the surface grounds, on each side of the center of said claim. The general course of the lode deposit and premises is from the East to the West.

The claim is situated and located in Coconino Mining District, in Coconino County, in the State of Arizona, about seventeen miles in a North Easterly direction from Flagstaff and one and one half miles in a Westerly direction from the devide on Highway 89. The claim is located in a mountain known as Sugar Loaf.

The surface boundaries of the claim are marked upon the ground as follows: Beginning at a point which bears N. 45°W. (Approximately) 500 feet plus or minus from the South ¼ corner of Section 13, T. 23 N., R. 7 E., G & S. R. B. M. which point is in an Easterly direction two hundred feet from the discovery shaft (at which this notice is posted), being in the center of the East end line of said claim; thence Northerly 300 feet to a 2x2 Redwood post, being the North East corner of said claim; thence Westerly one thousand feet to a 2x2 Redwood Post, being the North East corner of said claim; thence Westerly one thousand feet to a 2x2 Redwood Post, being at the Northwest corner of said claim; thence South 300 feet to a 2x2 Redwood Post at the center of the West end of said claim; thence Southerly 300 feet to a 2x2 Redwood Post being at the Southwest corner of said claim; thence Easterly 1000 feet to a 2x2 Redwood Post at the Southeast corner of said claim; thence Northerly 300 feet to the place of beginning.

Dated and posted on the ground this 9th day of June, 1943.

D. W. Fisher

Recorded at the request of D. W. Fisher
JUne 10th, A. D. 1943 at 2:40 o'clock P. M.
Marie Gregg, County Recorder
Fern Otteson, Deputy.

NOTICE OF MINING LOCATION

PLACER CLAIM

TO ALL WHOM IT MAY CONCERN:

This Placer Mining Claim, the name of which is the Fisher No. 1 Placer Mining Claim, situate on lands belonging to the United States of America, and being a form of valuable mineral deposit other than in veins or lodes of quartz or other rock in place, was entered upon and located for the purposes of exploration and purchase by D. W. Fisher, a citizen of the United States, the undersigned, on the 6th day of July, 1943.

I claim 20 acres thereof, and have marked the same on the ground as follows: Beginning at Corner No. 1, which is a monument of stone and which is a point on the Section line between said Sections 13 and 24, 95.9 feet west of the One Quarter Section Corner common to said sections 13 and 24; thence south 23°35' East, 127 feet to Corner No. 2, a monument of stone which is a point on the West line of Collins No. 2 Placer Claim; thence South 7°10' West, along said West line of Collins No. 2, a distance of 350 feet to Corner No. 3, which is a monument of stone and which is a point 87 feet from the Corner No. 2 of Collins No. 2, where this notice is posted; thence West 1045 feet to Corner No. 4, a monument of stone; thence North 463.7 feet to Corner No. 5, a monument of stone, and which is a point on the Section Line between said Sections 13 and 24; thence North 375 feet to Corner No. 6, a monument of stone; thence East 875 feet to Corner No. 7, a monument of stone which is a point on the westerly line of Silver Bell Lode Claim 62 feet southerly from the Northwest corner of said Silver Bell Claim; thence South 23°35' East along the westerly line of said Silver Bell Claim, 407 feet to the place of beginning, and containing 20 acres, more or less, all in Coconino Mining District, in the County of Coconino, in the State of Arizona, about 17 miles in a Northeasterly direction from the town of Flagstaff and 1-½ miles in a westerly direction from the divide on Highway 59.

All done under the provisions of Chapter Six, of Title XXXII, of the Revised Statutes of the United States, and of an Act of the General Assembly of Arizona, entitled "An Act to Revise and Codify the Laws of the Territory of Arizona," approved March 16, 1901.

Dated and Posted on the ground this 6th day of July, 1943.

D. W. Fisher

Recorded at the request of D. W. Fisher
August 10th, A. D. 1943 at 2:30 o'clock P.M.
Marie Gregg, County Recorder
Fern Otteson, Deputy

Beginning at a point which bears N. 45°W. (Approximately) 500 feet plus or minus from the South ¼ corner of Section 13, T. 23 N., R. 7 E., G & S. R. B. M.

Beginning at Corner No. 1, which is a monument of stone and which is a point on the Section line between said sections 13 and 24, 95.9 feet west of the One Quarter Section Corner common to said sections 13 and 24;

The original field notes of the line between sections 13 and 24 read in part:

Chs.	
	East on a true line bet. secs. 13 and 24 Var. 15°06' East. Over mountainous heavily timbered land. Descend 400 ft.
9.00	Foot of descent in bed of ravine, course S. 40° E. Ascend 60 ft. to
13.00	Top of ascent on ridge, brs. N. and S. Descend 300 ft.
26.40	Foot of descent in bed of ravine, course N. 60° E. Ascend 100 ft.
37.00	Top of ascent, on ridge course N.W. and S.E. Descend 100 ft. to
40.00	Set a limestone 19 x 19 x 12 ins., 15 ins. in the ground for 1/4 sec. cor. marked 1/4 on N. face, and raised a mound of stone 2 ft. high, 3 ft. base alongside, from which A pine 6 ins. diam brs. S. 2°16' E. 88 lks. dist. marked 1/4 S.B.T. A pine 8 ins. diam. brs. N. 46°33' W. 112 lks. dist. marked 1/4 S.B.T. Descend gradually over rolling land to
85.73	Intersect E. boundary of Tp. 7.79 chs. S. of cor. to secs. 13, 18, 19 and 24, as hereinbefore described, from which I obliterate all marks which refer to surveys on the W. At the point of intersection I set a malpais stone 19 x 14 x 13 ins, 15 ins. in the ground for closing cor. to secs. 13 and 24, marked C.C. on W. face, with 3 notches on N. and S. faces and raised a mound of stone 2 ft. high, 3 ft. base alongside, from which A pine, 12 ins. diam. brs. N. 30°20' W. 46 lks. dist. marked T. 23 N., R. 7 E., S. 13 B.T. A pine 24 ins. diam brs. S. 72°05' W. 93 lks. dist. marked T. 23 N. R. 7 E. S. 24 B.T. A pine 20 ins. diam. brs. S. 51°15' W., 106 lks. dist.

Figure 2b - Mining Location Notices

A14-3

CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

In 1966 the Collins and Kincanon claims were amended by their owners and application was made for a U.S. Mineral Survey of these claims. On October 3, 1966, order for M.S. No. 4650, the Collins No. 1 and No. 2 claims was issued to J. William Waara, Mineral Surveyor. On November 8, 1966, order for Mineral Survey No. 4652, the Kincanon No. 1 claim was also issued to Waara who proceeded with both Mineral Surveys in accordance with the amended locations. He made ties to the corner of sections 18 and 19 on the east boundary of T. 23 N., R. 8 E., which corner of sections 18 and 19 was not specified. The Mineral Survey plats are shown in figure 3. Waara did not tie to the ¼ section corner of sections 13 and 24 on the grounds that there was no remaining evidence of the original monument.

The Waara surveys show the Collins and Kincanon claims to be entirely clear of conflict with the north-south center section line and the previously patented placers.

Fisher maintained that those claims were in conflict because he considered the ¼ section corner between sections 13 and 24 to be marked by a monument at a different location.

This dispute concerns the validity of the retracement of the line between sections 13 and 24 and reveals the following facts:

1. A straight line between the corner of sections 13, 14, 23 and 24 and the closing corner of sections 13 and 24 bears S. 88° 20′ E., 79.88 chains distant. The point for the ¼ section corner of sections 13 and 24, based on strict single proportionate measurement falls at 37.27 chains.

2. About 500 feet in elevation below and at 26.50 chains from the corner of sections 13, 14, 23 and 24 along the straight line is a ravine which drains southeasterly. (Record 26.40 chains and course N. 60° E.)

3. At 36.00 chains is the top of ascent on a rounded spur which slopes northerly. The westerly side of the spur has been excavated and the top of the ascent may have been slightly farther west prior to excavation. (Record 37 chains)

4. At 40.70 chains the straight line intersects the foot of the slope and enters a canyon bottom which bears NE and S. 70° W.

5. At 41.675 chains corner No. 4 of the Collins No. 1 Placer, Mineral Survey No. 4650 bears North, 9 links distant.

6. At 79.88 chains is the closing corner of sections 13 and 24.

At a point 0.927 chains east and 0.201 chains south from the point for the ¼ section corner of sections 13 and 24, as determined by single proportionate measurement, is a 1 1/2-inch diameter iron pipe with an iron cap marked for the ¼ section corner of sections 13 and 24. The pipe, which has been driven firmly into the ground, is not rusted. There is no firm evidence to indicate how long it has been in this position. This iron pipe is referenced by a ponderosa pine, 36 inches diameter, N. 8¼° E., 34 links distant with the scribe marks ¼ S13 BT on an open blaze. It is also referenced by a ponderosa pine, 25 inches diameter, S. 72¼° E., 16 links distant, with the scribe marks ¼ S24 BT, on an open blaze. A careful ring count indicates that these two bearing trees were blazed about the year 1957 to 1959.

A ½ inch steel rod bears N. 88° 15′ W., 1.448 chains distant (95.6 feet) from the iron pipe and is driven firmly into the ground.

The true point for corner No. 4 of the Collins No. 1 Placer, Mineral Survey No. 4650 bears N. 87° 19′ E., 3.484 chains distant (229.9 feet) from the iron pipe. This point is monumented with the remains of a wooden post which has been cut off below the ground surface by a bulldozer.

Preliminary Statement of the Problem

A retracement of the mile in question shows that some of the Topography fits the original calls in the first half mile. No other direct evidence of the original monument remains.

Collateral evidence of the corner location is the only remaining method available for restoration of the ¼ section corner. The surveyor must evaluate:

1. Testimony of adjacent owners and their surveyors.

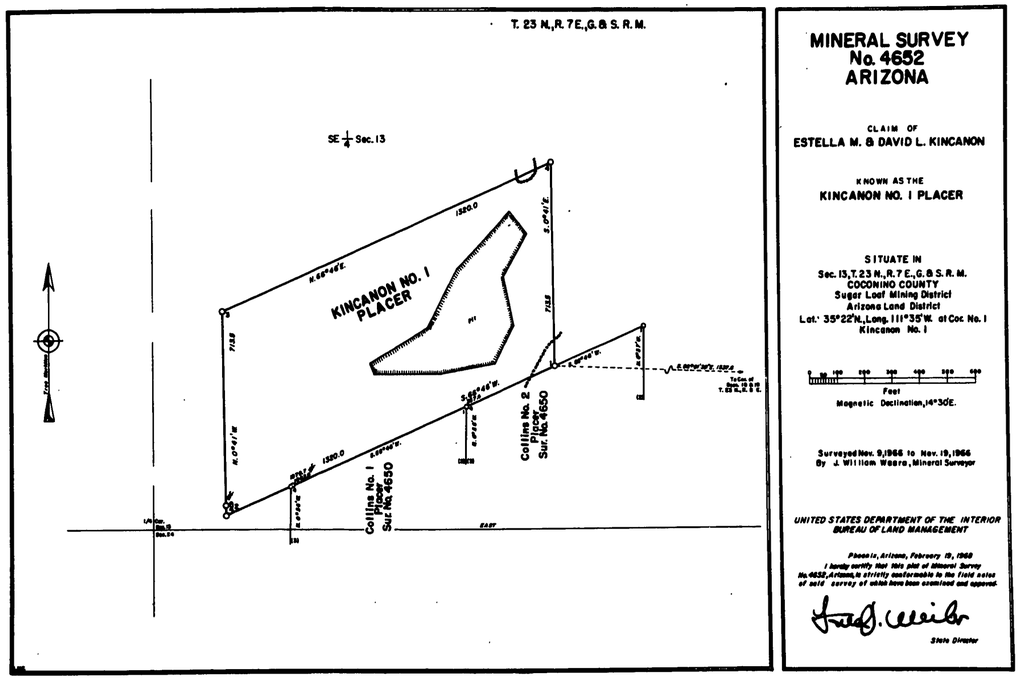
2. Testimony of disinterested parties who may have knowledge of the corner.

3. Ties by private surveyors.

4. Ties by mining location notices.

The original corner of sections 13, 18, 19 and 24 is now an angle point controlling the range line, with the closing corner of sections 18 and 19, 0.80 chains northerly and the closing corner of sections 13 and 24, 7.45 chains southerly (Lamport record) therefrom.

Upon retracing the Fisher Placer and Collins No. 2 locations, corner No. 3 of the Fisher Placer was recovered, monumented with an 8x8 inch square wood post with nails driven into it forming the letters and numbers for corner No. 3. At a point 87 feet distant on a bearing of about S. 10° W., from the wood post was an old mound of stone with an unmarked round wood post in the center.



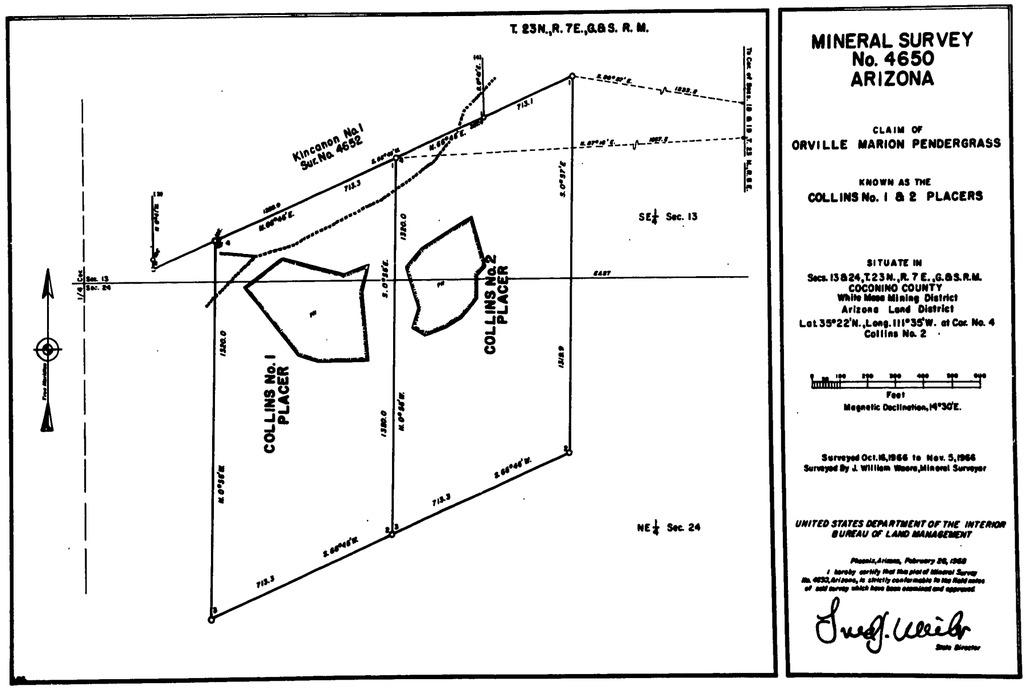


Figure 3 - Mineral Survey Plats

CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

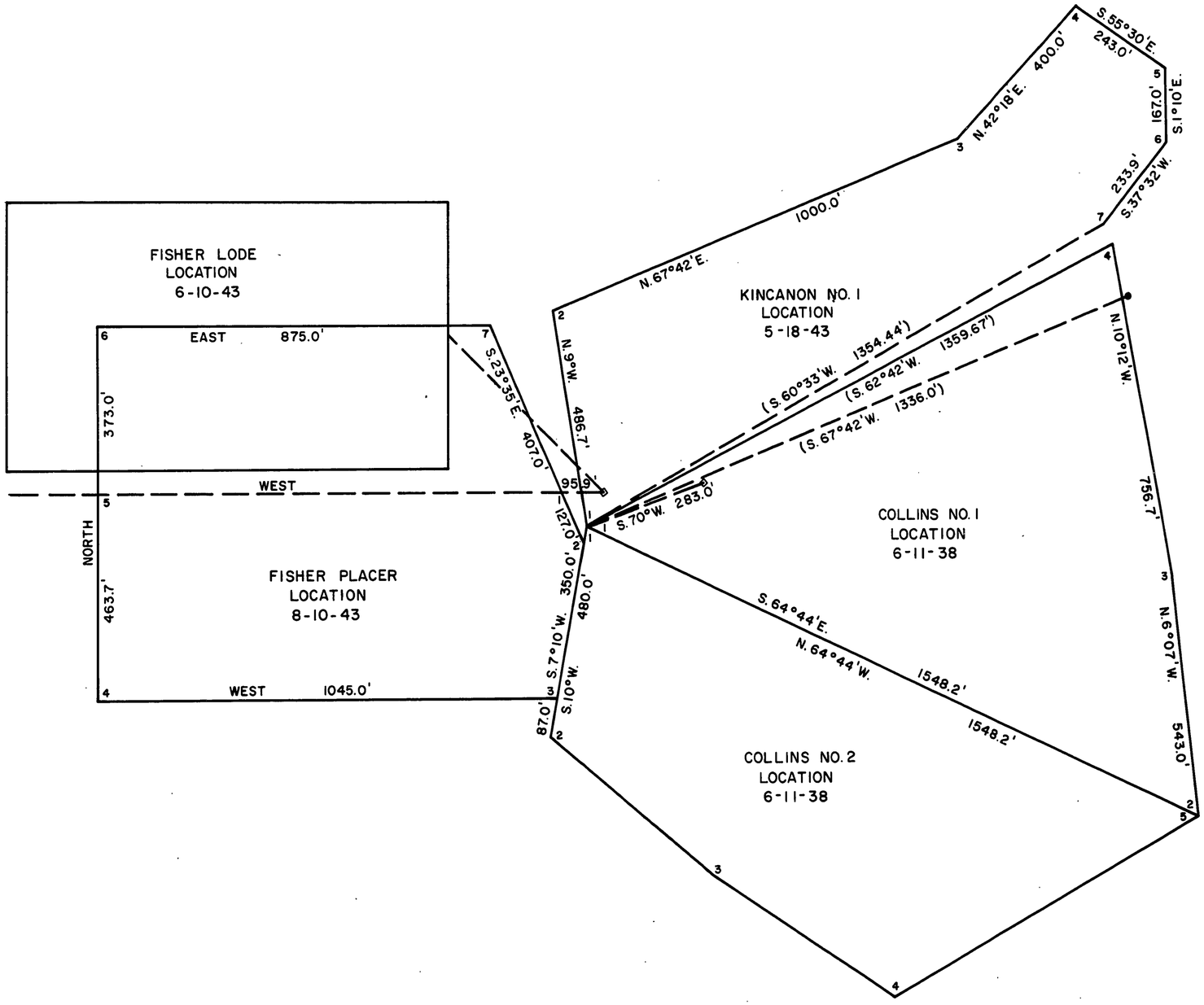


Figure 4 - Sketch of Combined Data

A14-5

CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

Regulations

This survey illustrates the application of sections 6-25 to 6-30, Dependent Resurveys, of the Manual of Surveying Instructions, 1973.

Amended Information

Statements made in writing were examined to determine collateral evidence.

The principal points were made in a letter from Mineral Surveyor Waara and in affidavits from attorney Hale C. Tognoni, Professional Engineer Clyde M. Etter, and E.R. Traggitt, Registered Professional Engineer and mineral examiner for the Forest Service. Letters from Estella M. Kincanon and Orville M. Pendergrass, owners of the Kincanon and Collins claims respectively, were also used.

Mr. Waara contended that the iron pipe and bearing trees (described above) were too new, not the original ¼ section corner and were fictitious; that ¼ section corner used for the ties in the Collins and Kincanon location descriptions was located at corner No. 4 of the Collins No. 1 Placer as that corner appears on Mineral Survey No. 4650; and that all the claims, including the Fisher claims had been tied to that position. Waara strongly advocated restoring the ¼ section corner by single proportionate measurement methods.

Mr. Tognoni's affidavit contains many exibits including sketch maps of the claims (none are recorded surveys) and pictures of the iron pipe and bearing trees. The main points of the affidavit are:

1. Tognoni had recommended that Mr. Fisher employ Harvey W. Smith, Registered Engineer and Deputy Mineral Surveyor to survey the Fisher claims for patent. He stated that Smith plotted the location notices and made a plat of the amended claims, all using the iron pipe for position of the ¼ section corner. Smith's plat was shown as an exibit and is dated August 23, 1959.

2. Tognoni stated he had visited the iron pipe ¼ section corner on many occasions, as both an attorney and professional engineer, on behalf of various clients and for various purposes and that it was the only valid corner position.

Mr. Etter's affidavit is shown in full in figure 5. The claims in Item 2, the "Christenson Claims," are actually the Collins claims which were purchased by Christensen who later sold them to Pendergrass. Item 5, Kincanon amended to legal subdivision on August 11, 1966 but amended again to "metes and bounds" on October 19, 1966. Also presented, but not as part of the affidavit, was a description of the "Fisher No. 1 Placer Claim," dated 7-19-43, and signed by Clyde M. Etter. The signatures are the same.

Figure 6 is the affidavit of Mr. Traggitt, mineral examiner for the Forest Service.

AFFIDAVIT OF CLYDE M. ETTER

STATE OF ARIZONA)
) ss.
County of Yavapai)

CLYDE M. ETTER, being duly sworn, deposes and says that he is a citizen of the United States and resides at Sedona, Arizona, that he is an Arizona Registered Professional Engineer #977 and that he has examined the affidavit of Hale C. Tognoni dated July 6, 1967, the maps and attached pictures thereof concerning the quarter corner common to Sections 13 and 24, T. 23 N., R. 7 E., G&SRB&M, Coconino County, Arizona.

That the quarter corner as pictured in those pictures is the same quarter corner from which he made the following surveys:

1. May 29, 1938 for Earl Collins. He identified the outside corners of the two Collins claims which are now owned by Mr. Pendergrass. That it was probably Mr. Collins who first took him to said quarter corner.

2. April, 1942 for F. L. Christianson. He surveyed the Christianson #1 and #2 claims from said quarter corner.

3. May 19, 1943 for R. E. Kincanon. He surveyed the Kincanon #1 claim from said quarter corner.

4. July 19, 1943 for Del Fisher. He surveyed the Fisher lode and Fisher placer claims from said quarter corner.

5. August 11, 1966 for Estella Kincanon. He returned to said quarter corner and surveyed the Kincanon #1 claim for Mrs. Kincanon and laid out the legal subdivision area for the amended Kincanon claim.

That at various times he had identified surrounding section corners in the area and then surveyed from those corners to said quarter corner.

That the pipe that now exists on the ground was there when he visited said corner in 1966.

That in 1938 when he visited said corner a limestone marker measuring 19" x 19" x 12" was in place where the pipe now stands.

That in 1942 and 1943 when he visited said quarter corner a pile of rocks lay over the area where the stone was in place in 1938.

That the same two witness trees pictured were there in 1938, 1942, 1943 and 1966.

That until Mr. Waara telephoned him in the fall of 1966 and stated that the corner was not proper, no one had questioned that said corner was not the true quarter corner.

That in his opinion this is a proper location of the original quarter corner common to Sections 13 and 24, T. 23 N., R. 7 E.

Clyde M Etter
Clyde M. Etter

Figure 5 - Etter Affidavit

AFFIDAVIT OF E. ROWLAND TRAGITT IN SUPPORT OF QUARTER CORNER COMMON TO SECTIONS 13 and 24, T. 23 N., R. 7 E.

STATE OF NEW MEXICO)
) ss.
County of Bernalillo)

E. ROWLAND TRAGITT, Arizona Professional Engineer #2613, being first duly sworn, deposes and says that he is a mining engineer for the U. S. Forest Service in the Albuquerque, New Mexico, Regional Office and that he is personally acquainted with the geographic location of what is known as the quarter corner common to Sections 13 and 24, T. 23 N., R. 7 E., G&SRB&M, Coconino County, Arizona.

That he has examined the affidavit of Hale C. Tognoni dated July 6, 1967, the maps and affidavits and pictures thereof concerning said quarter corner.

That the quarter corner pictured in those pictures is the same quarter corner which was pointed out to him by the local forest ranger as being said quarter corner.

That he examined the Fisher 1 and Fisher 1(A) mining claims to determine the validity of same for patent in the fall of 1957.

That at that time upon his visit to the claim with said forest ranger, he went to said quarter corner and followed the stakes of Harvey W. Smith, Deputy Mineral Surveyor around the outside of the claim.

That at that time, it appeared to be no conflict as to the location of said quarter corner and to his knowledge was accepted as the proper location of said quarter corner in the community.

That until the fall of 1966, when Mr. Waara's survey was made, his first mineral survey from said quarter corner, and raised the question of the location of said quarter corner, that he had never known that anyone claimed any other location of said quarter corner.

That in his opinion, said quarter corner's location is the accepted location of said quarter corner.

E. Rowland Tragitt
E. Rowland Tragitt

Subscribed and sworn to before me this 24th day of July, 1967.

Notary Public

My Commission Expires:
March 14, 1971

Figure 6 - Tragitt Affidavit

CORNER IDENTIFICATION USING CONFLICTING TESTIMONY & EVIDENCE

Mr. Pendergrass makes no contention in his letter as to the actual location of the ¼ corner, only that it isn't "nailed down" and he is applying for patent under the "Gulch Placer" method.

Mrs. Kincanon states in her letter: "My knowledge of this described corner above (¼ corner) would be located at the position of the N.W. corner of the Collins No. 1 claim (corner No. 4, Mineral Survey 4650-Ed.) a common tie corner to the Collins claims, Fisher claims and the Kincanon No. 1 claim, situated down on the flat territory and not on the steep side hill. This is the common tie corner which has been used since 1937, by Mr. Clyde Etter, and was used in our original survey, also the Mineral Survey done by Mr. Waara.

"My first knowlege of the 1½ inch iron post, marked ¼ section corner of sections 13 and 24, situated on the side hill, was the early spring of 1960."

Next, the collateral evidence using prior surveys by private surveyors was to be considered. These surveys were made for the purpose of location of mining claims.

An examination of the location notices revealed that:

1. The Collins No. 2, closes nearly perfectly in latitude but miscloses 8.4 feet in departure.
2. The Collins No. 1 miscloses about 117 feet in latitude and 28 feet in departure.
3. If the line 4-1 of the Collins No. 1 is calculated as a closing course it would be S. 62° 42' W., 1336 feet.
4. The Kincanon claim miscloses by about 159 feet in latitude and 57 feet in departure.
5. The Fisher claims both close flat.
6. The description of the Collins and Kincanon claims "tied" to a common point described as a ¼ section corner.
7. The Fisher Placer was tied to a different ¼ section corner location, about S. 84° 15' W., 228 feet from the Collins-Kincanon ¼ section corner location. (Depending on the bearing of line 1-2 of the Collins No. 2).

From the descriptions it appears that the Collins claims were prepared by a surveyor because of the bearings of the closing courses which are given in minutes. Such preparation is indicated by the closures, if due regard is given to an error of numbers in the line 4-1 of the Collins No. 1, i.e., 67° instead of 62° . The line 7-1 of the Kincanon claim coincides exactly with line 4-1 of the Collins No. 1 in the descriptions, indicating they were common. The N. 70° W., 283 feet instead of S. 70° W., 283 feet from the ¼ section corner to corner 1 of the Kincanon was another error. The large misclosure and description errors indicate that the Kincanon claim may not have been staked by a surveyor or at least the description may not have been written by a surveyor. There is no requirement that claim locations be surveyed to be valid.

The Fisher claims both close flat. The Fisher Placer is limited by calls to line 1-2 of the Collins No. 2 and a boundary of the "Silver Bell Claim." It appears nearly certain that the Fisher Placer was described by a surveyor, and may have been surveyed when staked on the ground. The claims are plotted in figure 4.

Final Statement of the Problem

After all the available evidence and testimony was assembled, the surveyor had to decide between these possible solutions:

1. Restore the ¼ section corner at the position of corner No. 4, Collins Placer No. 1, Mineral Survey No. 4650, as contended by the Collins and Kincanon locations owners.
2. Restore the ¼ section corner at the 1½ inch iron pipe and bearing trees. The monument was probably set during the survey of the Fisher claims but there is no evidence available to support that.
3. Restore the corner by single proportionate measurement methods on a straight line.

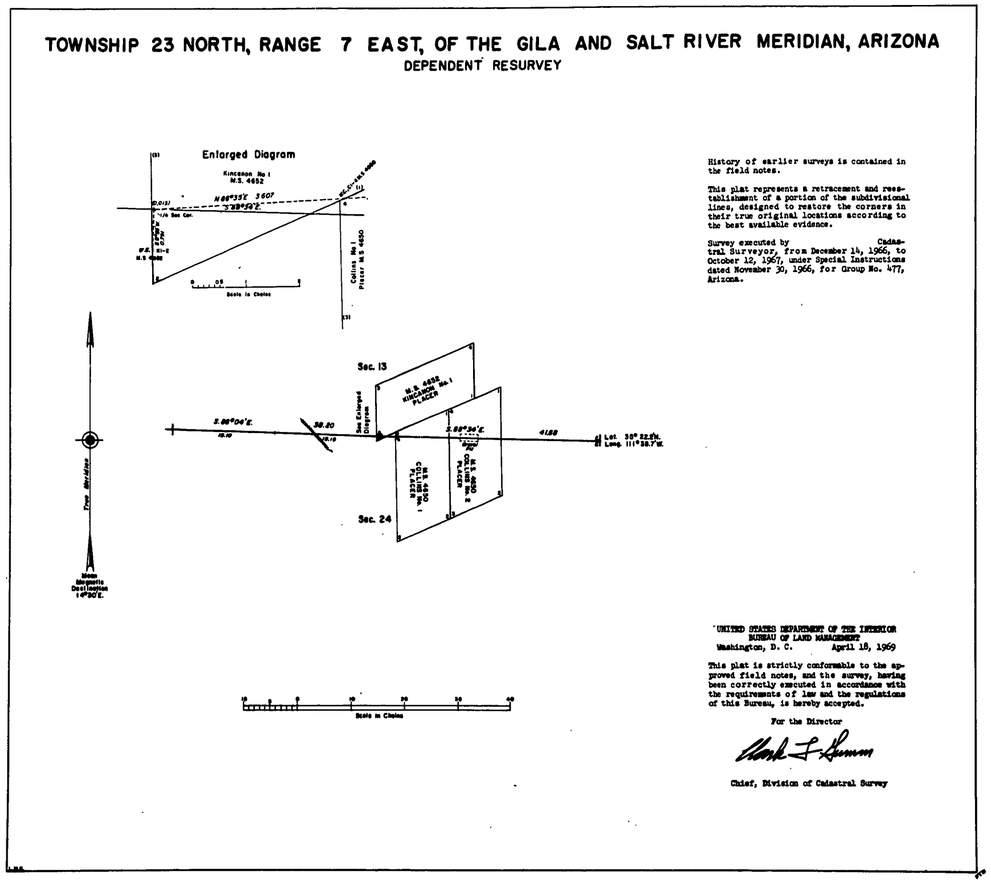


Figure 7 - Accepted Plat

Solution

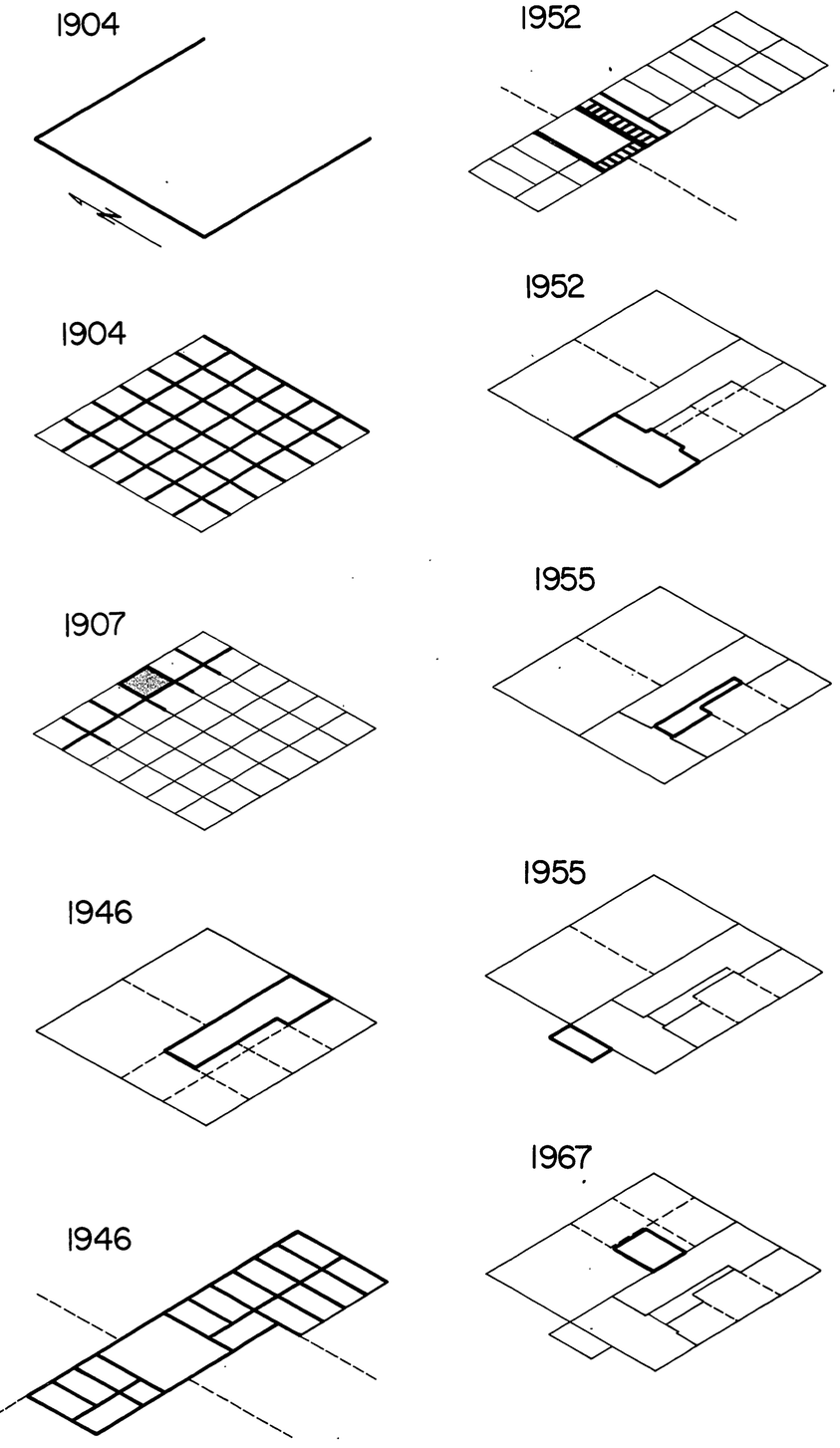
The 1½ inch diameter iron pipe was accepted and monumented for the following reasons:

1. It more nearly fits the topography given in the original field notes.
   a. The ravine called at 26.40 chains fits.
   b. The iron pipe is 2.20 chains east of the top of an ascent. The record called for 3.00 chains east. The "Collins-Kincanon" position is 5.67 chains east of the top.
2. Etter's affidavit and his signed description of the "Fisher Placer," dated 7-19-43, contain obvious contradictions. If he surveyed all of the claims as stated then he must have used two different positions for the ¼ section corner, but he must have used the 1½ inch diameter iron pipe position for the Fisher survey.
3. The iron rod 95.6 feet westerly from the iron pipe which monuments corner No. 1 of the original Fisher Placer fits the Fisher location description.

   The old mound of stone with an unmarked round wood post in the center at a point S. 10° W., 87 feet distance from the post with nails in it (corner No. 3 of the Fisher Placer), was accepted as corner No. 2 of the Collins No. 2. These two posts verified the iron rod at corner No. 1 of the Fisher Placer.
4. The iron pipe was accepted and used as the basis for approval of the Fisher Patent in 1959 and was not "protested" until 1966.

The field notes and plat were submitted to the Washington Office and were accepted April 18, 1969. The plat is shown in figure 7.

CORNER IDENTIFICATION IN PAYSON, ARIZONA



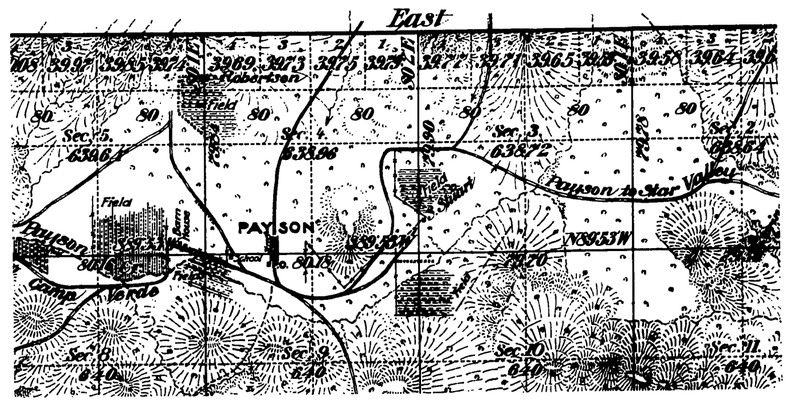
History of Surveys

1904	Charles L. Campbell and Ivan E. Oakes surveyed the north, south and west boundaries of T. 10 N., R. 10 E., in July 1904.
1904	Ivan E. Oakes surveyed the subdivisional lines.
1907	Charles L. Campbell made a corrective survey of the northern tier of sections and portions of the north boundary, including all of the lines around section 3. Figure 1 is a portion of the original plat, approved December 11, 1908.
1967	The north boundary of the township was resurveyed under Group 456, Arizona.

Reasons for Request of this Survey

The town of Payson, Arizona is located in section 3 as well as adjacent sections. Most of section 3 is patented. The remaining public lands are part of the Tonto National Forest. Figure 2 is the Master Title Plat of section 3, with patent dates added. There were about 15 "City Subdivision" plats recorded for lands within the section up to the year 1967, as well as other private surveys within the section. This includes a private survey of Patent No. 02-67-0046 made in 1966 prior to the patent. This patent was issued to the Payson Investment Co., William Miller, Secretary, as part of an Exchange Agreement with the Forest Service in exchange for an H.E.S. in T. 11 N., R. 10 E. This patent is referred to as the "Miller Patent" in this discussion.

The Forest Service needed a definite determination of the boundaries of the Federal lands.



Township No. 10 North Range No. 10 East, Gila and Salt River Meridian Arizona.

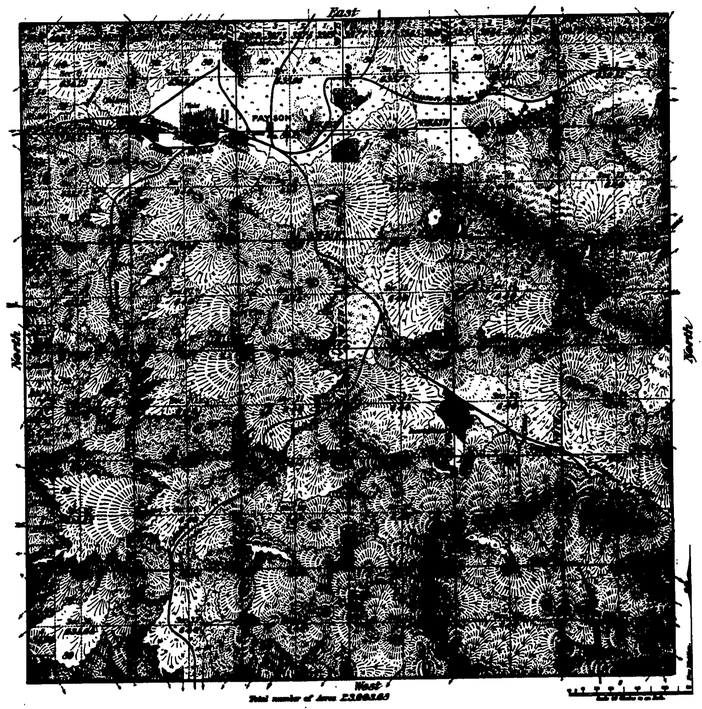


Figure 1 - Portion of Original Plat

CORNER IDENTIFICATION IN PAYSON, ARIZONA

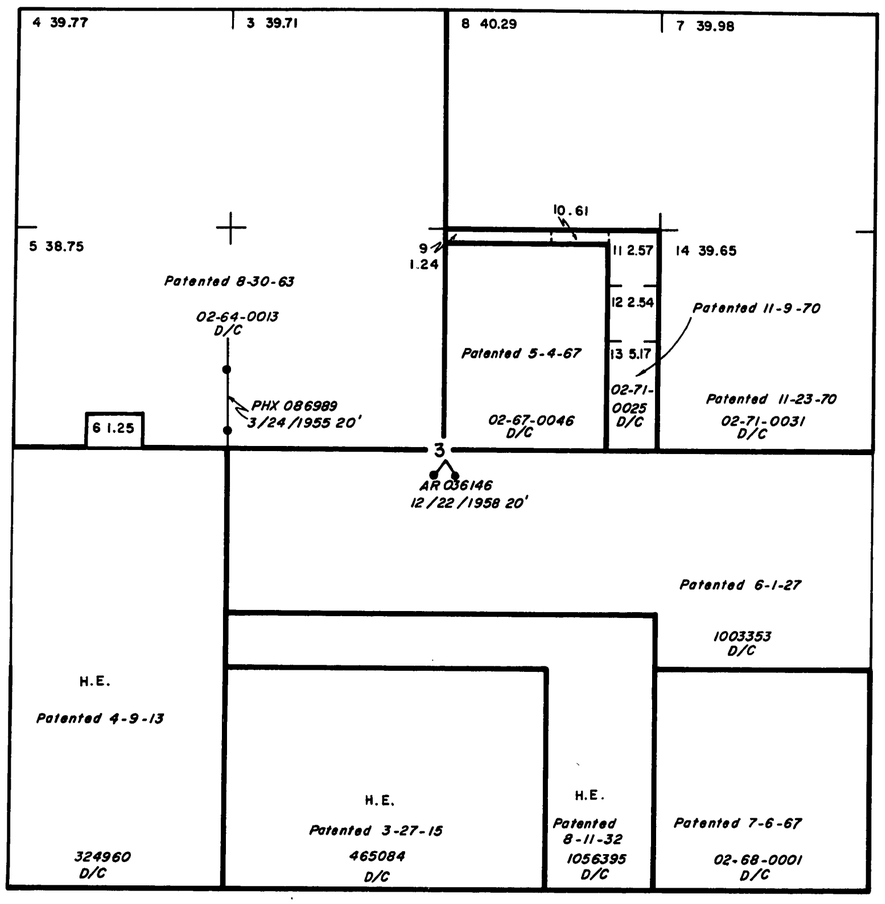
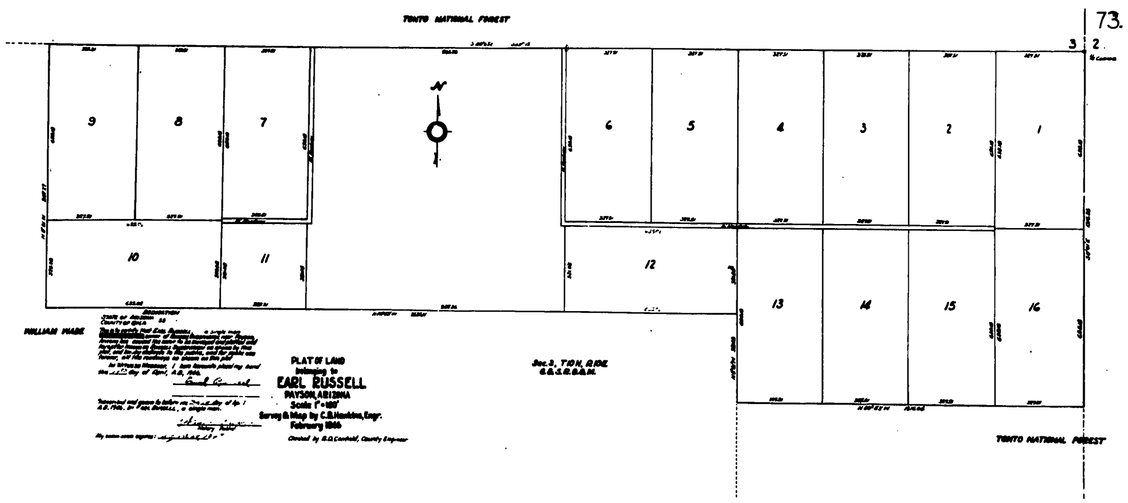
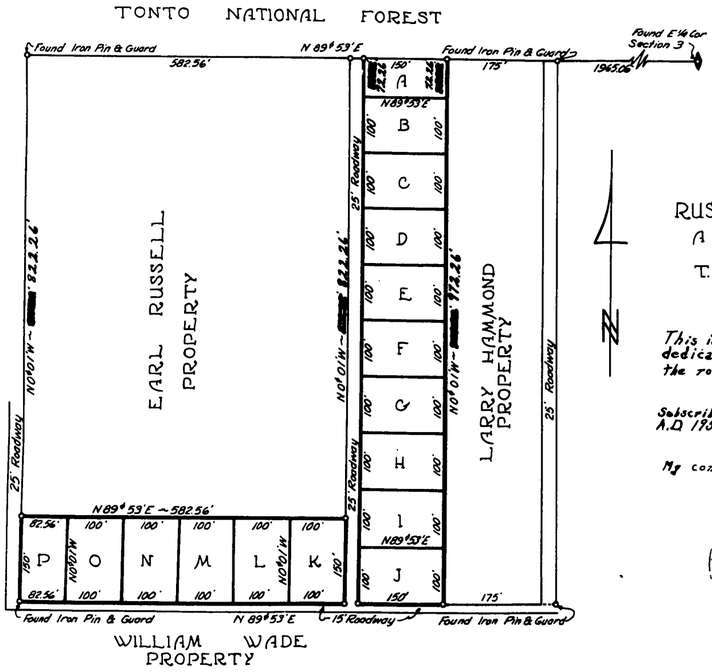


Figure 2 - Master Title Plat





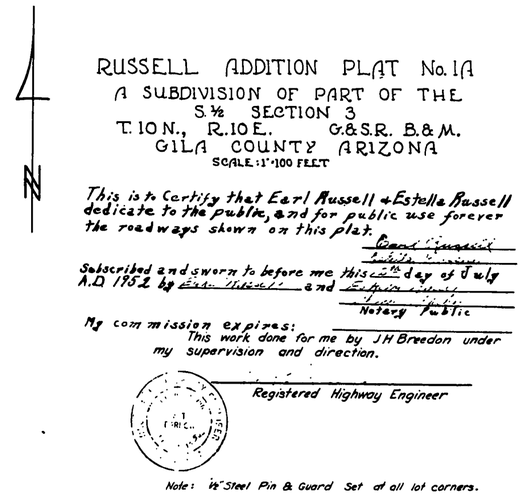


Figure 3 - Plats 73 and 114

Special Instructions

At the request of the Forest Service, Special Instructions for Group 480 were issued on May 22, 1967. They provided for the dependent resurvey and subdivision of sections 3, 10, and 11, T. 10 N., R. 10 E.

All corners which defined the boundaries of the remaining public lands were to be monumented, as was shown on a diagram which accompanied the Special Instructions. All of the NE¼ of section 3, except the "Miller Patent" was Tonto National Forest lands.

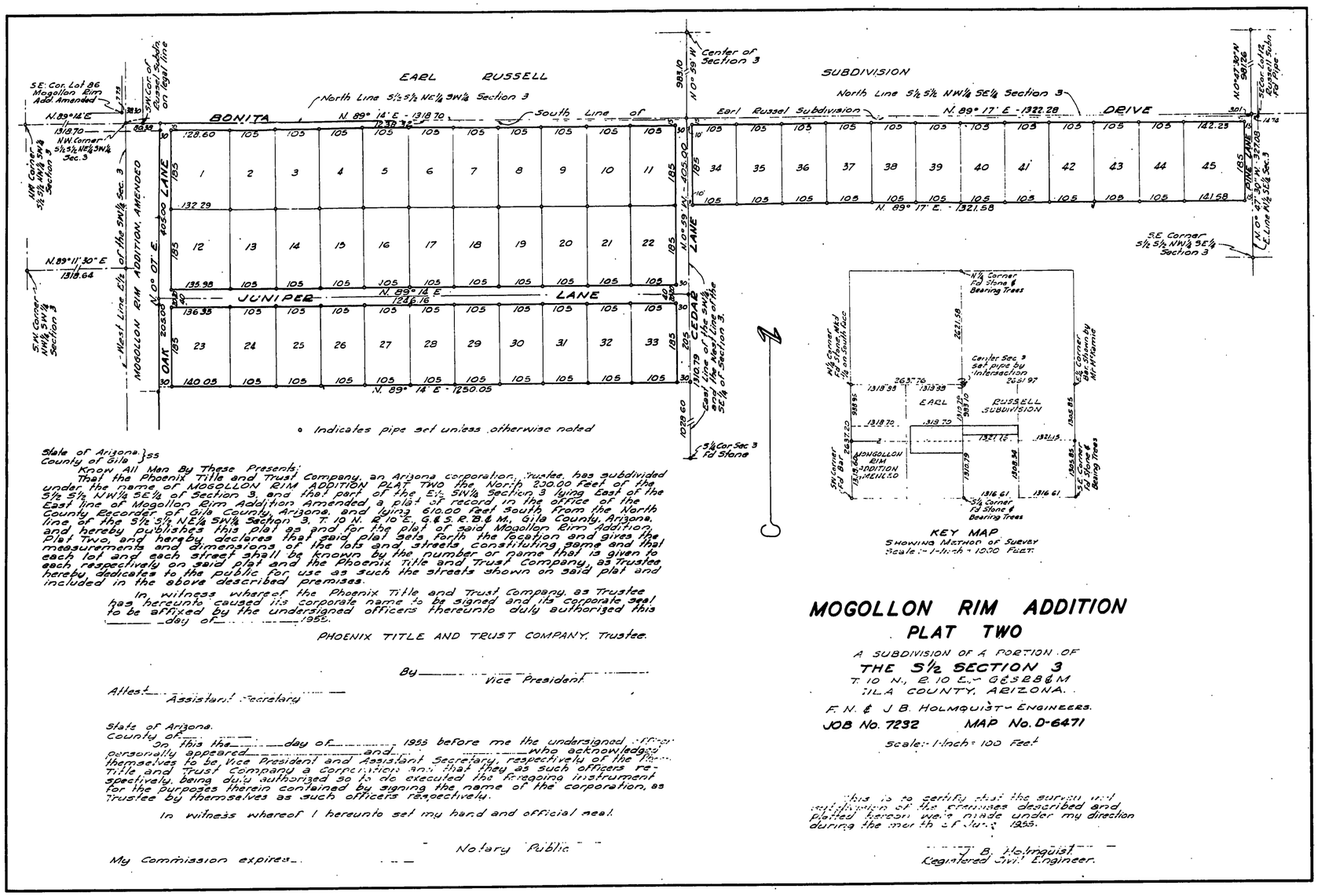
Conditions Found on the Ground

The boundaries of section 3 were retraced. The four corners of the section, the ¼ section corner on the north boundary and the ¼ section corner of sections 3 and 10 were all recovered in their original positions. These points had all been recovered by private surveyors and presented no problem.

This discussion will be limited to section 3. The centerlines of that section were run by random lines and investigation was made of the conditions existing within the section.

A15-2

CORNER IDENTIFICATION IN PAYSON, ARIZONA



State of Arizona } ss
County of Gila }

Know All Men By These Presents:

That the Phoenix Title and Trust Company, an Arizona corporation, Trustee, has subdivided under the name of MOGOLLON RIM ADDITION PLAT TWO the North 2030.00 Feet of the S½ S½ NW¼ SE¼ of Section 3, and that part of the E½ SW¼ Section 3 lying East of the East line of Mogollon Rim Addition Amended a plat of record in the office of the County Recorder of Gila County, Arizona, and lying 610.00 feet South from the North line of the S½ S½ NE¼ SW¼ Section 3, T. 10 N., R. 10 E., G.&S.R.B.&M., Gila County, Arizona, and hereby publishes this plat as and for the plat of said Mogollon Rim Addition, Plat Two, and hereby declares that said plat sets forth the location and gives the measurements and dimensions of the lots and streets constituting same and that each lot and each street shall be known by the number or name that is given to each respectively on said plat and the Phoenix Title and Trust Company, as Trustee hereby dedicates to the public for use as such the streets shown on said plat and included in the above described premises.

In witness whereof the Phoenix Title and Trust Company, as Trustee has hereunto caused its corporate name to be signed and its corporate seal to be affixed by the undersigned officers thereunto duly authorized this _____ day of _____ 1955.

PHOENIX TITLE AND TRUST COMPANY, Trustee.

By _____ Vice President

Attest _____ Assistant Secretary

State of Arizona.
County of _____

On this the _____ day of _____ 1955 before me the undersigned officer personally appeared _____ and _____ who acknowledged themselves to be Vice President and Assistant Secretary, respectively of the Phoenix Title and Trust Company a corporation and that they as such officers respectively, being duly authorized so to do executed the foregoing instrument for the purposes therein contained by signing the name of the corporation, as Trustee by themselves as such officers respectively.

In witness whereof I hereunto set my hand and official seal.

Notary Public

My Commission expires _____

This is to certify that the survey and subdivision of the premises described and platted hereon was made under my direction during the month of June 1955.

J. B. Holmquist
Registered Civil Engineer.

Figure 4 - Plat No. 150

The most important of the fifteen urban subdivisions and local surveys which had varying effects on the subdivisional lines of section 3 are:

Plat No. 73, Earl Russell Subdivision, dated 1946.

Plat No. 114, Russell Add., Plat 1A, dated 1952.

Plat No. 150, Mogollon Rim Add., Plat Two, dated 1955.

Plat No. 151, Mogollon Rim Add., Plat Three, dated 1955.

Survey for Bill Miller, dated 1966.

Plats 73 and 114 are shown by figure 3, part of Plat No. 150 by figure 4, Plat No. 151 by figure 5 and the survey of the Miller Patent by figure 6. Figure 7, an enlargement of the 1907 plat of section three, shows these surveys and their relative positions within the section. Figure 8 is a copy of the Miller Patent.

CORNER IDENTIFICATION IN PAYSON, ARIZONA

The ¼ section corner of sections 2 and 3 was restored at record bearing and distance from a remaining bearing tree. The abbreviated 1904 Oakes record of this corner reads as follows:

Set a granite stone, 18 x 10 x 6 ins., 12 ins. in the ground for ¼ sec. cor., from which

A oak, 14", S. 23¾° E., 119 lks., mkd. ¼ S2 BT
A pine, 12", S. 783/4° W., 119 lks., mkd. ¼ S3 BT

The corrective notes by Campbell in 1907 describing this corner read:

Set a granite stone, 18 x 10 x 6 ins., 12 ins. in the ground for ¼ sec. cor., from which

A pine, 12", S. 60° W., 96 lks., mkd. ¼ S3 BT
An oak, 14", S. 48° E., 120 lks., mkd. ¼ S2 BT

The 1967 resurvey notes at this corner read in part:

The ¼ sec. cor. of secs. 2 and 3, determined from an original bearing tree

A juniper, 24 ins. diam., bears S. 48° E., 120 lks. dist., mkd. ¼ S2 BT. (Record calls for an oak)

The ¼ section corner of sections 3 and 4 was restored at record bearing and distance from the remaining original bearing tree. The 1904 Oakes record of this corner shows erasures. The record was corrected to read as follows, with the original (erased) data given in parentheses:

Set a granite stone, 18 x 8 x 8 ins., 12 ins. in the ground, for ¼ sec. cor., marked ¼ on W. face, from which

A cedar (juniper) 24 (9) ins. diam., bears N. 20° E., (S. 24° W.) 72 lks. dist., marked ¼ S3(4) BT.

A juniper (cedar) 9 (24) ins. diam., bears S. 24° W. (N. 20° E.) 56 lks. dist., marked ¼ S. (3) 4 BT

The corrective survey notes by Campbell in 1907 read as follows:

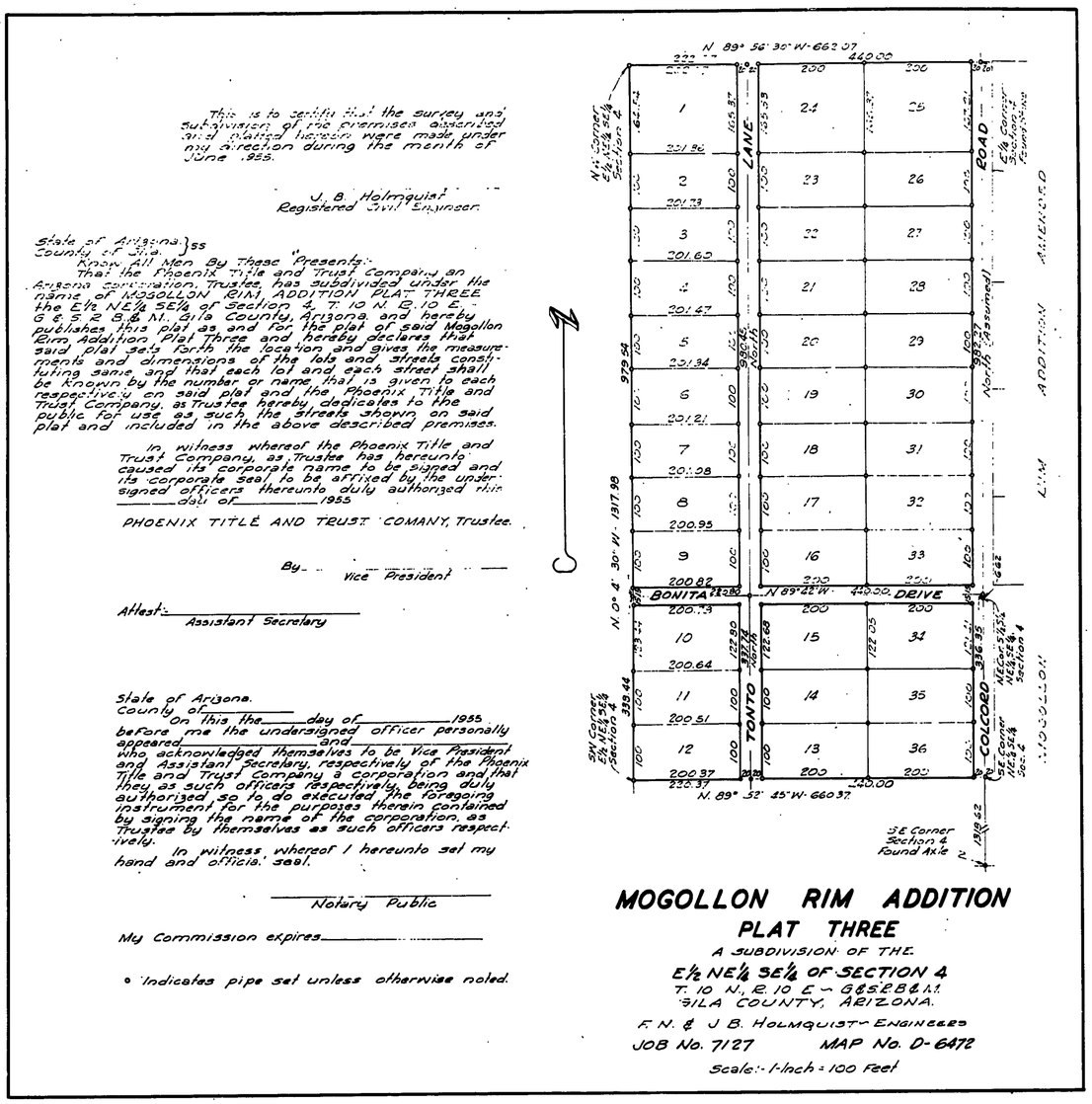
Intersect the original ¼ sec. cor., as marked witnessed and described as in the original field notes

The 1967 resurvey notes read in part:

The ¼ sec. cor. of secs. 3 and 4, determined from an original bearing tree

A juniper, 11 ins. diam., bears S. 24° W., 56 lks. dist., mkd. ¼ S4 BT.

This corner was not monumented.



This is to certify that the survey and subdivision of the premises described and platted hereon were made under my direction during the month of June 1955.

J. B. Holmquist
Registered Civil Engineer.

State of Arizona } ss
County of Gila }

Know All Men By These Presents:
That the Phoenix Title and Trust Company an Arizona corporation, Trustee, has subdivided under the name of MOGOLLON RIM ADDITION PLAT THREE the E½ NE¼ SE¼ of Section 4, T. 10 N. R. 10 E. G & S. R. B. & M. Gila County, Arizona, and hereby publishes this plat as and for the plat of said Mogollon Rim Addition Plat Three and hereby declares that said plat sets forth the location and gives the measurements and dimensions of the lots and streets constituting same, and that each lot and each street shall be known by the number or name that is given to each respectively on said plat and the Phoenix Title and Trust Company, as Trustee hereby dedicates to the public for use as such the streets shown on said plat and included in the above described premises.

In witness whereof the Phoenix Title and Trust Company, as Trustee has hereunto caused its corporate name to be signed and its corporate seal to be affixed by the undersigned officers thereunto duly authorized this _____ day of _____ 1955

PHOENIX TITLE AND TRUST COMANY, Trustee.

By _____ Vice President

Attest: _____ Assistant Secretary

State of Arizona.
County of _____ } On this the _____ day of _____ 1955 before me the undersigned officer personally appeared _____ and _____ who acknowledged themselves to be Vice President and Assistant Secretary, respectively of the Phoenix Title and Trust Company a corporation and that they as such officers respectively, being duly authorized so to do executed the foregoing instrument for the purposes therein contained by signing the name of the corporation as Trustee by themselves as such officers respectively. In witness whereof I hereunto set my hand and official seal.

_____ Notary Public

My Commission expires _____

° Indicates pipe set unless otherwise noted.

N. 89° 56' 30" W. - 662.07
440.00
N¼ Corner Sec. 4 T. 10 N. R. 10 E. Section 4
LANE
ROAD
E¼ Corner Section 4 Found Pipe
N. 0° 4' 30" W. 1317.98
973.54
Assumed
LYM ADDITION AMENDED
BONITA DRIVE
N. 89° 28' W. 440.00
TONTO
COLCOED
SW Corner E½ NE¼ SE¼ Section 4
339.44
NE Corner NW¼ SE¼ Section 4
SE Corner NE¼ SE¼ Sec. 4
N. 89° 52' 45" W. 660.37
SE Corner Section 4 Found Axle

MOGOLLON RIM ADDITION
PLAT THREE
A SUBDIVISION OF THE
E½ NE¼ SE¼ OF SECTION 4
T. 10 N., R. 10 E. - G&SRB&M.
GILA COUNTY, ARIZONA.
F. N. & J. B. HOLMQUIST - ENGINEERS
JOB No. 7127 MAP No. D-6472
Scale:- 1-Inch = 100 Feet

Figure 5 - Plat No. 151

CORNER IDENTIFICATION IN PAYSON, ARIZONA

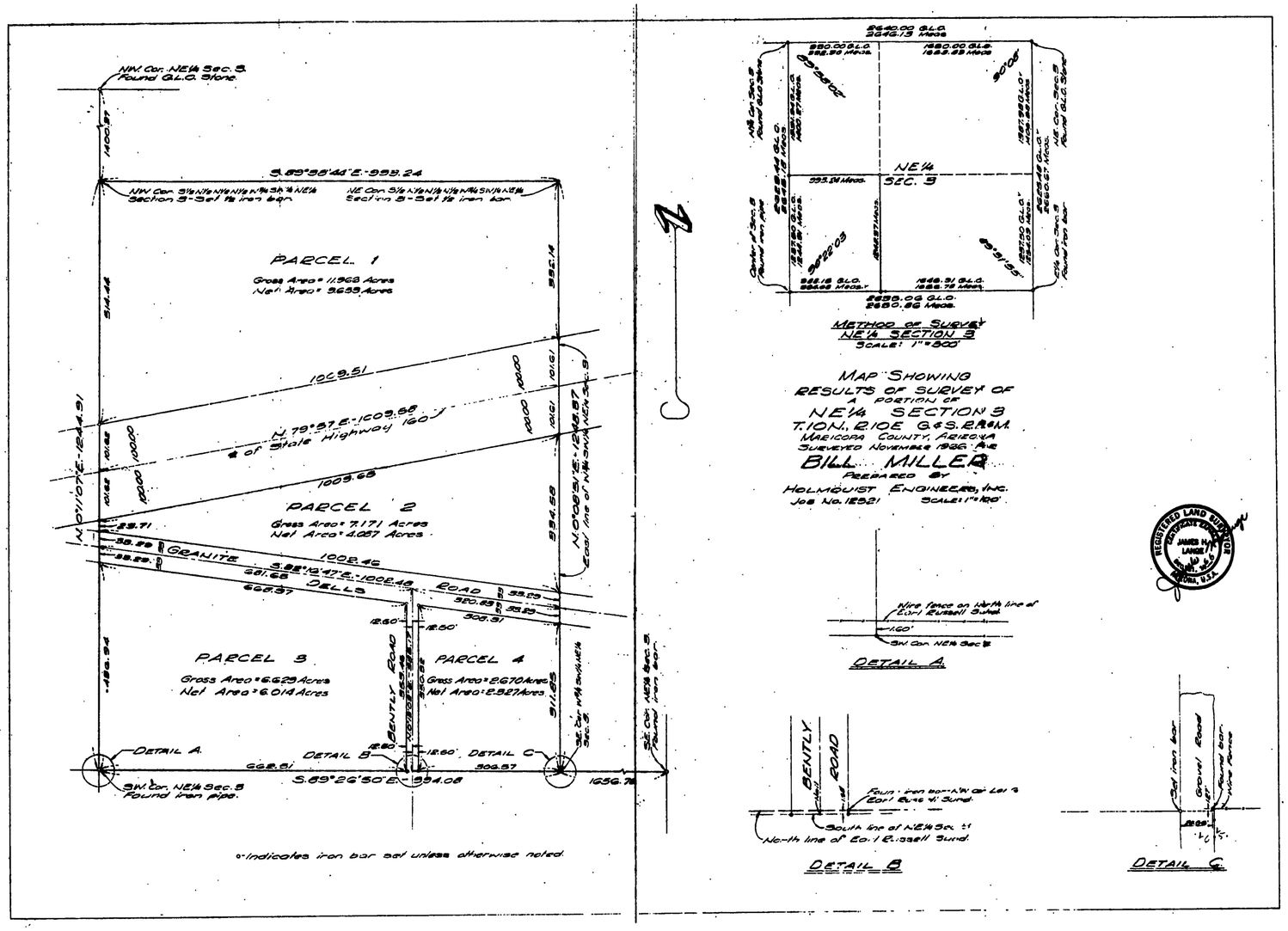


Figure 6 - Survey of Miller Patent

CORNER IDENTIFICATION IN PAYSON, ARIZONA

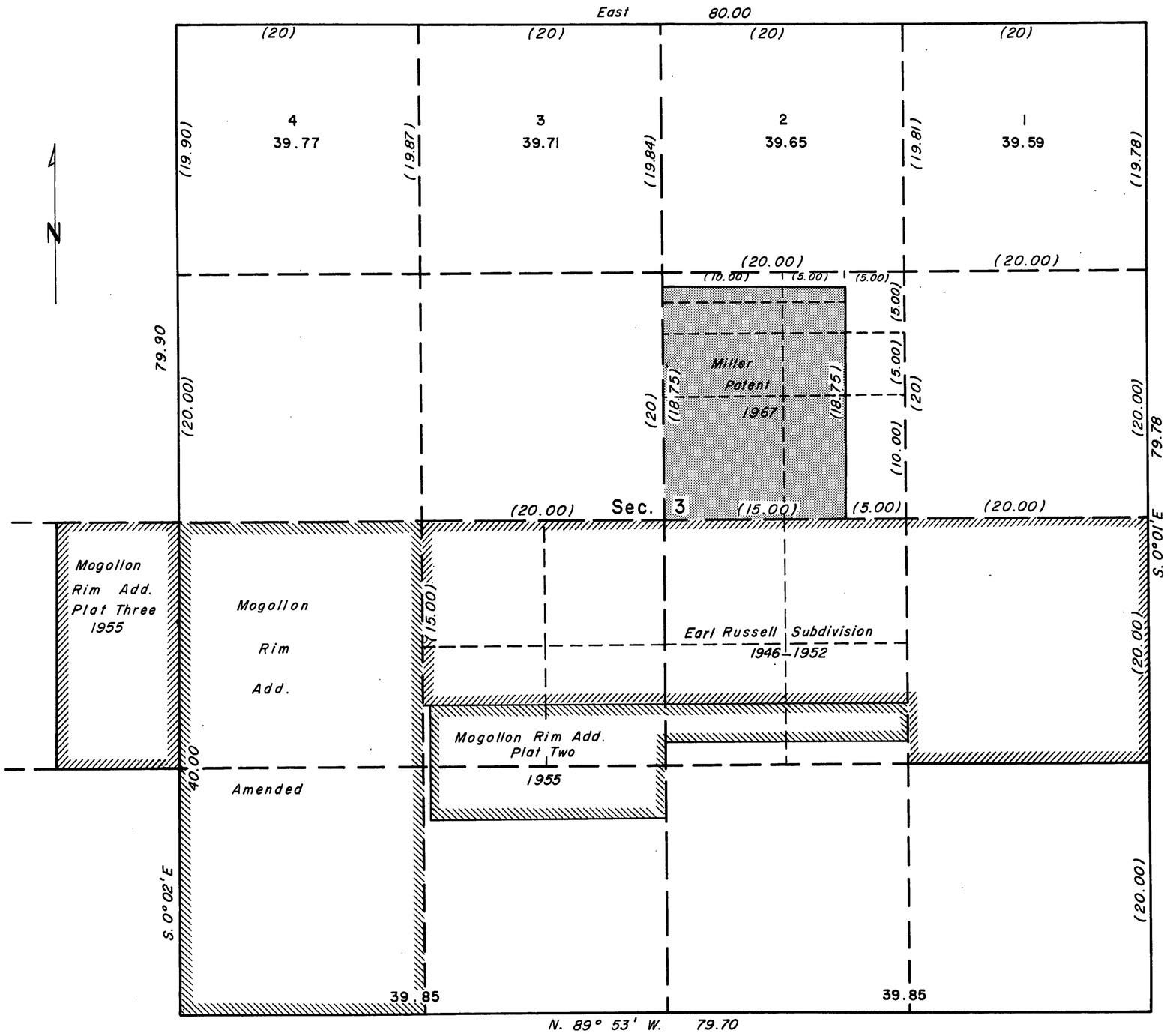


Figure 7 - Relationship of Surveys

A15-6

CORNER IDENTIFICATION IN PAYSON, ARIZONA

Form 1860-8
(January 1965)
(formerly 4-1040)

Serial: Arizona 035732

The United States of America,

To all to whom these presents shall come, Greeting:

WHEREAS Payson Investment Company is entitled to a Land Patent pursuant to the General Exchange Act of March 20, 1922 (42 Stat. 465), as amended by the Act of Febraury 28, 1925 (43 Stat. 1090), for the following described lands:

Gila and Salt River Meridian, Arizona
T. 10 N., R. 10 E.,
Sec. 3, $S\frac{1}{2}N\frac{1}{2}NW\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$,
$S\frac{1}{2}N\frac{1}{2}N\frac{1}{2}NW\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$,
$S\frac{1}{2}N\frac{1}{2}NW\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$,
$S\frac{1}{2}NW\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$, $SW\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$,
$W\frac{1}{2}SE\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$, $SW\frac{1}{4}NE\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$,
$S\frac{1}{2}NW\frac{1}{4}NE\frac{1}{4}SW\frac{1}{4}NE\frac{1}{4}$

Containing 28.125 acres;

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES unto the above named claimant the land above described; TO HAVE AND TO HOLD the said land with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said claimant, his successors and assigns, forever; Subject, however, to any vested and accrued rights therein; and

EXCEPTING AND RESERVING TO THE UNITED STATES from the land so granted:

A right-of-way thereon for ditches and canals constructed by the authority of the United States. Act of August 30, 1890, 26 Stat. 391; 43 U.S.C. 945.

IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

GIVEN under my hand, in Phoenix, Arizona, the FOURTH day of MAY in the year of our Lord one thousand nine hundred and SIXTY-SEVEN and of the Independence of the United States the one hundred and NINETY-FIRST.

[SEAL]

By /s/ Glendon E. Collins
Manager, Arizona Land Office

Patent Number 02-67-0046

Figure 8 - Facsimile of Miller Patent

Preliminary Statement of the Problem

The subdivision of section three is a dependent resurvey of a number of existing private surveys as well as subdivision of a section.

Because the entire problem is known only as the resurvey proceeds, the north-south centerline of section three was surveyed from the ¼ section corner of sections 3 and 10 to the accepted center ¼ section corner established in 1955, as shown in figure 4. The line was surveyed from the center ¼ section corner to the accepted 1/4096 section corner established as the northwest corner of the Miller Patent, figure 6. The center N-S 1/64 section corner was established by proportion between these two accepted monuments. From the 1/4096 section corner the north-south centerline was surveyed to the original ¼ section corner on the north boundary of section 3, and the center N 1/16 section corner established on the line at proportionate distance, based on the original plat.

The ¼ section corner of sections 2 and 3 was monumented at the 1907 record bearing and distance from the juniper (oak) bearing tree. The east-west centerline was then surveyed to a ½ inch diameter iron rod monument, accepted as the center E 1/16 section corner, found in an east-west fence along the north boundary of the Russell Subdivision, figure 3. The line was then run to a ¾ inch diameter iron rod monument marked for "Bill Millers SE corner." This point was set in 1966 (figure 6). The line was then surveyed to a square iron peg monument accepted for the center W-E 1/64 section corner. (The field notes state that a ¾ inch diameter iron rod bears north, 2½ links distance from that point.) From the accepted center W-E 1/64 section corner the centerline was then surveyed to the accepted center ¼ section corner. The line was then surveyed to the ¼ section corner of sections 3 and 4, which was reestablished at the 1907 record bearing and distance from the remaining original bearing tree described above.

The NE¼ of section 3 was then subdivided. The north-south centerline of the NE¼ was surveyed on a straight line from the accepted center E 1/16 section corner to the E 1/16 section corner on the north boundary of the section. The east-west centerline of the NE¼ was surveyed on a straight line from the N 1/16 section corner of sections 2 and 3 to the center N 1/16 section corner. The NE 1/16 section corner was established at the intersection with the east-west centerline of the NE¼. The points for the center S-NE 1/64 and center N-S-NE 1/256 corners were established at proportionate positions between the center E 1/16 section corner and NE 1/16 section corners. The center E-W-NE 1/256 and center W-NE 1/64 corners were established at proportionate distances between the NE 1/16 and center N 1/16 section corners.

The SW¼ of the NE¼ of the section was then subdivided. A straight line was surveyed from the accepted center W-E 1/64 section corner to the center W-NE 1/64 section corner, with the SW-NE 1/64 section corner established at the intersection with the east-west centerline of the SW¼ NE¼ of section 3. The center N-SW-NE 1/256 section corner was established at midpoint between the SW-NE 1/64 and the center-W-NE 1/64 section corners. The east-west centerline of the SW¼ NE¼ was surveyed on a straight line from the center-S-NE 1/64 section corner to the center-S-N 1/64 section corner. The center-E-SW-NE 1/256 section corner was set at midpoint between the center-S-NE 1/64 and the SW-NE 1/64 section corners.

Finally the NE¼ SW¼ NE¼ of section 3 was subdivided. The north-south centerline was surveyed from the center E-SW-NE 1/256 corner to the accepted 1/4096 corner monumented with a ¾ inch diameter iron rod marked for the "NE corner Bill Miller" set in 1966, figure 6. The line was then run to the center E-W-NE 1/256 corner. The east-west centerline of the NE¼ SW¼ NE¼ of section 3 was surveyed as a straight line from the center N-S-NE 1/256 corner to the center N-SW-NE 1/256 section corner, with the NE-SW-NE 1/256 section corner at the point of intersection of the centerlines. This completed the subdivision of section 3 to the extent required to define the boundaries of the remaining public lands in the NE¼ of the section.

The field notes and plat were prepared and transmitted to the Washington Office. They were accepted on February 13, 1969. A portion of the accepted plat is shown in figure 9.

Regulations

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

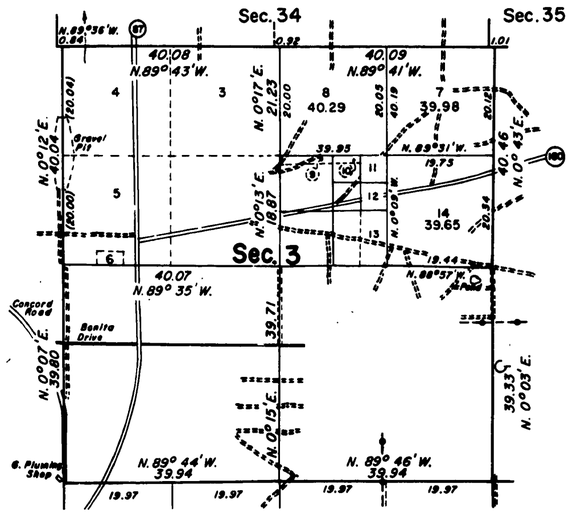
3-86, 3-87, 3-89, 3-91, 3-92, 7-8, 7-11, 7-12	Subdivision of sections
3-109, 5-4 to 5-14	Identification of existent corners
6-12 to 6-16	Bona fide rights of claimants
6-25 to 6-32	Dependent resurvey

Legal Constraints

The law states that the boundaries and subdivisions of the public lands as surveyed under approved instructions by duly appointed engineers and subsequent approvals are unchangeable after passing of title by the United States. The surveys referred to were original surveys, however. The Act of March 3, 1909 and later amendments provides for resurveys with the important proviso:

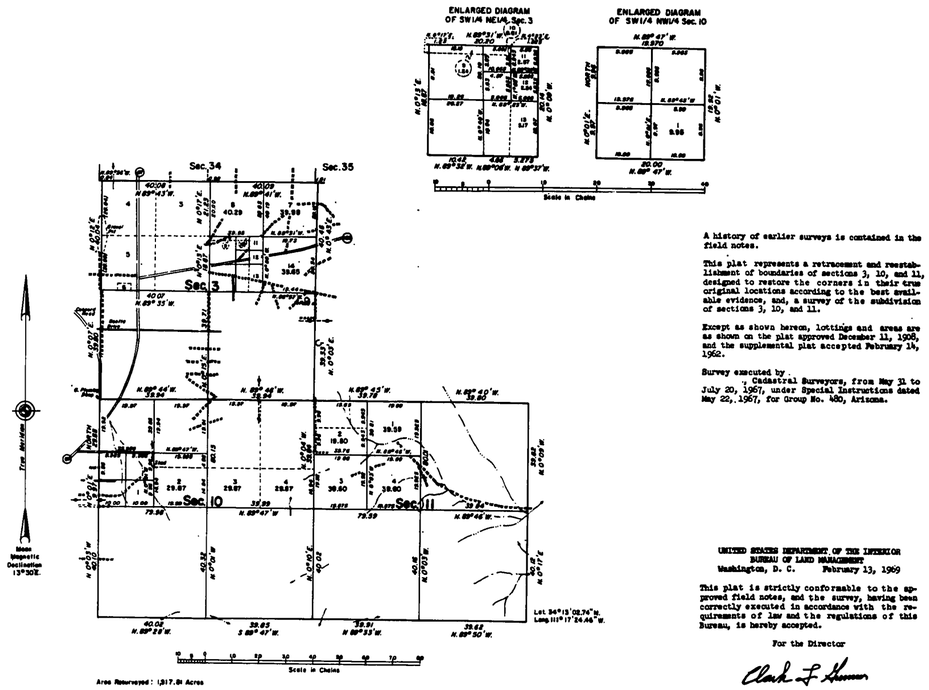
"Provided, that no such resurvey or retracement shall be so executed as to impair the bona fide rights or claims of any claimant, entryman, or owner of lands affected by such survey or retracement."

CORNER IDENTIFICATION IN PAYSON, ARIZONA



TOWNSHIP 10 NORTH, RANGE 10 EAST, OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA

DEPENDENT RESURVEY AND SUBDIVISION OF SECTIONS 3, 10 AND 11



A history of earlier surveys is contained in the field notes.

This plat represents a retracement and reestablishment of boundaries of sections 3, 10, and 11, designed to restore the corners in their true original locations according to the best available evidence, and, a survey of the subdivision of sections 3, 10, and 11.

Except as shown hereon, lottings and areas are as shown on the plat approved December 11, 1908, and the supplemental plat accepted February 14, 1962.

Survey executed by . , Cadastral Surveyors, from May 31 to July 20, 1967, under Special Instructions dated May 22, 1967, for Group No. 480, Arizona.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. February 13, 1969

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

Clark L. Hamer

Chief, Division of Cadastral Surveys

Figure 9 - 1967 Survey

Amended Information

A private surveyor engaged in surveying lands in the NW¼ of section 3 protested the 1967 dependent resurvey position for the ¼ section corner of sections 3 and 4. The protest, filed on November 12, 1970, was based on the following evidence:

1. An 18x8x8 inch granite stone was found at a point 15.7 links north and 7.7 links east of the point determined in 1967. The stone, which was marked with a cross on top and ¼ on the south face, was buried 14 inches below the surface of a bladed road which bears north and south.

2. The plat of Mogollon Rim Addition, Plat Two, figure 4.

3. The Plat of Mogollon Rim Addition, Plat Three, figure 5.

4. A plat of the Mesa-Payson Highway, dated 1965. (This plat is not illustrated here.)

5. A copy of the field notes of the ¼ section corner of sections 3 and 4 and accessories, taken during the subdivision of section 3, in 1955, by the surveyors of the Mogollon Rim Additions. These notes show the same information as shown in figure 4, plus the notation at the ¼ section corner of sections 3 and 4:

W ¼ cor. sec. 3 a granite stone
under E & W Fence

marked ¼ on S face

W of S 10" Juniper

Blazed & scribed (Face) 47.7

E of N to Face 24" stump 35.2

Position?

The distances to the bearing trees from the stone are in feet which, converted to links, are: 47.7 = 72.3 links, 35.2 = 53.3 links. The trees in 1955 were then NE, 53.3 links and SW, 72.3 links as measured to the face of the bearing trees. A comparison with the original record(s) show these distances to be almost a direct reversal of the 1907 field notes, and in nearly exact agreement with what had been recorded in 1904 by Oakes, but later erased.

Final Statement of the Problem

The surveyor must investigate the material submitted in the protest and determine if the corner was correctly restored or not. If the allegations are correct the survey must be corrected.

This evidence was submitted to the Washington Office and request was made for advice on how to proceed. On November 30, 1970 the Washington Office authorized an amendment to the 1967 dependent resurvey.

Solution

On December 8, 1970, Supplemental Special Instructions were issued. They provided for the amended resurvey of the line between sections 3 and 4 and the west half of the east and west centerline of section 3.

If corners have been properly recovered or properly re-established and monumented according to the laws of the United States and the State in which they are located, the burden is on anyone who protests to prove that they were otherwise. In this case the primary objective was to establish the boundaries of the Miller Patent which, in turn, would define the boundaries of public lands. Since these corners had been established by private surveyors, based on the original plat, and the monuments were substantially in the correct position within the section, the cadastral surveyor was correct in accepting them.

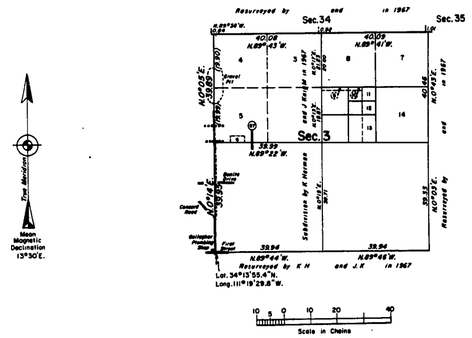
When conclusive proof was presented to show that the ¼ corner of sections 3 and 4 was incorrectly positioned by the cadastral surveyor, the Bureau amended the resurvey to reflect the correct position of the corner. The "bona fide rights" of the land owners were thus protected.

These lines were then resurveyed using the marked stone ¼ corner monument as the controlling point. Field notes were written fully describing the reasons for the amendment as well as the 1½ miles of resurvey. The plat and field notes were accepted on November 11, 1971. See figure 10.

CORNER IDENTIFICATION IN PAYSON, ARIZONA

TOWNSHIP 10 NORTH, RANGE 10 EAST, OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA

AMENDED RESURVEY



A history of earlier surveys is contained in the field notes.

This plat represents an amended resurvey of the line between sections 3 and 4 and the W½ of the E-W center line of section 3, amending that portion of the survey executed by in 1967, under Group No. 480, Arizona. Lottings and areas are as shown on the plat approved December 11, 1908, supplemental plat accepted February 14,1962 and the plat accepted February 13, 1969.

This resurvey was executed by Cadastral Surveyors, on December 9, 1970, under Supplemental Special Instructions, dated December 8,1970, for Group No. 480, Arizona.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. November 11, 1971

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

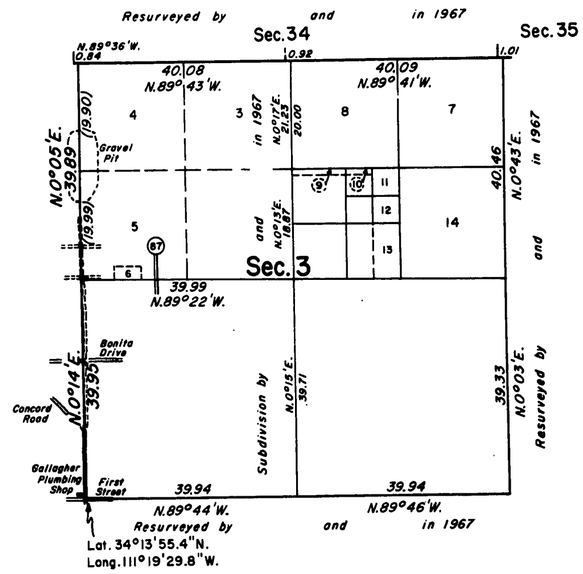
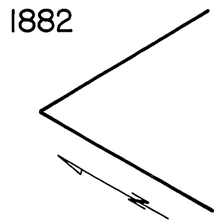
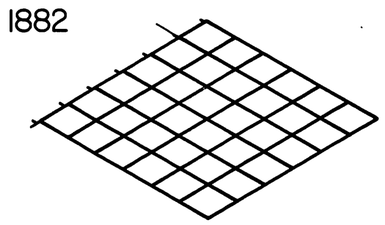
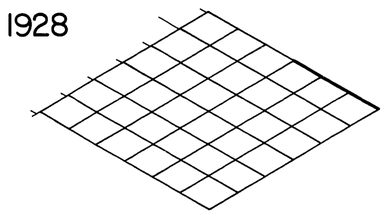


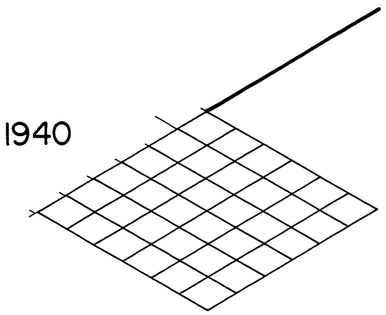
Figure 10 - Amended Resurvey

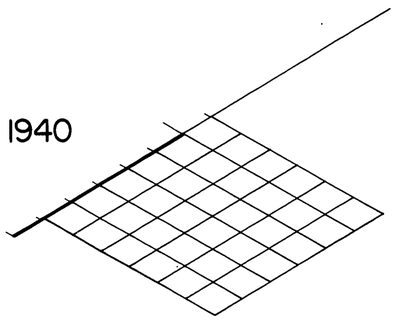
WYOMING RESURVEY USING PHOTOGRAMMETRY











History of Surveys

1882 Charles W. Brown surveyed the north boundary, a portion of the Seventh Standard Parallel North, and the west boundary, a portion of the Eleventh Auxiliary Guide Meridian West.

1882 Robert W. Black surveyed the south boundary, the east boundary, retracements of the north and west boundaries, and the subdivisional lines of the township, as shown on the plat approved May 5, 1883, figure 1.

1928 Clyde W. Atherly resurveyed the south 3 miles of the east boundary.

1940 Leo M. Peterson resurveyed the Seventh Standard Parallel North through Range 91 West.

1940 Mark D. King resurveyed the Seventh Standard Parallel North, through Range 92 West.

Reasons for Request of this Survey

By memorandum dated February 17, 1965, the Washington Office requested Wyoming to suggest a possible area of 15 to 20 contiguous townships containing mostly public lands that needed resurveying and which might lend itself to application of photogrammetric survey. The Wyoming Office responded with a block of 17 townships located in the Rawlins and Lander Districts. These districts had repeatedly requested resurveys in the area in previous years. T. 27 N., R. 90 W., was already programmed for resurvey by conventional methods under Group 282, Wyoming. The remainder of the 17 townships were mostly public land, were relatively open desert type lands, were being extensively leased for oil and gas exploration and were mostly old surveys with stone monuments difficult to identify. It was felt that this kind of situation lent itself to application of photogrammetric resurvey methods.

Special Instructions

On July 1, 1965, Supplemental Special Instructions for Group 282, Wyoming, were prepared, adding the dependent resurvey of Tps. 25 N., Rs. 90 through 94 W.; Tps. 26 N., Rs. 92 and 93 W.; Tps. 27 N., Rs. 91 through 94 W., and Tps. 28 N., Rs. 90 through 94 W., to the original Group 282. T. 25 N., R. 94 W., was to be resurveyed by using electronic distance measuring equipment and personnel from the Alaska State Office. The remaining 16 townships were to be resurveyed by phogrammetric methods. Horizontal and vertical control would be derived from the existing triangulation net, with any necessary additional control points to be established by the Alaskan personnel. The aerial photography and analytical bridging, etc., would be contracted for by the Washington Office. On the ground paneling and corner monumentation would be executed by the Wyoming cadastral survey personnel. The topographic overlay for the plats was to be furnished by contract with the U.S. Geological Survey.

The initial corner search, remonumentation and paneling commenced on July 1, 1965. This discussion is limited to T. 28 N., R. 92 W., as representative of the project as a whole.

Conditions Found on the Ground

Using existing photography, the field notes and the plat, search was made for each corner of the original survey(s). If a corner was found it was remonumented with a brass capped iron post (unless already so monumented) and paneled. The panels on this project consisted of a 4x4 foot piece of plywood, painted international orange, centered over the corner, and two rays of "butcher" paper, 1½ feet wide and 20 feet long, placed in line on each side of the corner. The paper "rays" were fastened down with earth and stones.

If the original corner could not be found, a temporary point consisting of a 2x3 inch hub was set in the vicinity of the corner and paneled. The search areas were first identified on the photography using scaled distances, topography, fence lines, etc. to determine the locus of corners. The temporary points were located within the search area. If a found corner happened to be obscured from clear overhead view, an "offset" point tied by bearing and distance to the true corner, was paneled in a nearby but suitable location. Bearings were determined using the solar transit.

Carefully indexed and complete field notes were kept of each corner recovered, with details as to location, type of slope, fence lines, and nearby topography entered.

The triangulation network control stations and supplementary control stations were all paneled with the 4x4 foot piece of plywood and three 20 foot long rays of butcher paper.

After the initial search and all paneling was completed, the aerial photography was flown by a contractor. Two sets of photography were taken. The first flight was made using aerial color film, flown at 28,000 feet above mean sea level, or approximately 20,000 feet above average ground level. The resulting photography was at a scale of about 1:40,000. This color photography was made in late October, 1965.

The second set of photography was made on black and white film in the spring and summer of 1966. This resource photography was flown at 17,800 feet above mean sea level, using equipment that resulted in black and white photos at a scale of about 1:15,840.

The analytical work was performed by a contractor in Los Angeles, California. Using the glass diapositives of the color photography and a Wild PUG 2 point transfer device, the pass points and paneled points were drilled. The analytical bridging was done with a Mann 422D screw comparator. The x, y and z coordinates of all points were based on the Wyoming State Plane Coordinate System, West Central Zone, in the foot unit. Each corner or paneled point was assigned a number. The computer printed out the x, y and z coordinate of each point by number. The specifications called for the accuracy to be 1:8000 of the flight height of the camera. This should result in a coordinate value within 2½ feet of the absolute true position of the point.

Preliminary Statement of the Problem

Using the x, y and z coordinates of the paneled points, the surveyor must compute the moves from the temporary points to true corner points, convert the grid bearings to true astronomical bearings and the distances from sea level to the ground surface. He must make the computed moves and remonument the missing corners in their proper proportionate positions. The true bearings and distances between all corners must be computed.

Regulations

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

2-8 to 2-16	Photogrammetry
3-87	Establishing quarter-section corners between closing corners
5-20 to 5-35	Restoration of lost corners, single and double proportion
5-41	Closing corners

Auxiliary Topic

This photogrammetric resurvey was executed in 1965-68. It was found that 16 townships was too large an area, the color photography was not adequate and that the panels were too small for the scale of the photography. Recourse had to be made to the black and white resource photography to complete the panel identification and analytical bridging. Where panels could not be identified, three natural terrain features (tree, fence corner, road intersection, etc.) were identified and their positions computed from which the "corner moves" were made.

The technology of analytical aerotriangulation is an evolutionary stage. The "photo project" is a team effort and requires careful planning of the panel design and size, type of film, photo scale, project selection and size. At the present time (1974), it is felt that the given project should be more limited in area. On the latest photogrammetric resurveys it has been held to one township in area, black and white film was used, and the computer print-out returned the values of the panel points as geographic positions.

This photogrammetric resurvey illustrates the general methods used and should not be considered as an example of how a similar project would be executed now or in the future.

Solution

Using the coordinates of all the original corners recovered in the initial search and paneling, the moves from the temporary point to a calculated proportionate point for a corner were computed. The "theta" angle and correction to ground surface was applied, with the final "move" referenced to true north.

Using a solar transit and steel tape, the calculated move was made. Further search for the original corner was then undertaken. All missing section corners were searched for first. If the original corner was found, it was remonumented and the true point tied to the temporary point. In T. 28 N., R. 92 W., only one section corner was never recovered and had to be proportioned, see figure 2. If a section corner was not found, the moves and section search was made for the missing corners in the four directions from it. When all controlling corners had been searched for the second time, the final move could be computed for a corner, the move made, and the proportioned position monumented. All proportioning was done in the same manner as it would have been had the distances and bearings been determined by conventional methods of resurvey. Of 141 original corners involved in this township, only 20 had to be restored by proportionment.

The three "off-line" closing corners on the north boundary were amended by marking the original stone AM and burying it in place. The true point for the closing corner on the standard parallel was monumented. The ¼ section corners for sections 1 thru 6 were established and monumented. The two locally established corners were verified by their relationship to original corners and were accepted, and functioned the same as original corners.

The field notes were written in normal order as though the lines had been run on the ground, but with only the corner description, accessories, site location and nearby topography given. Direct ties from the closing corners and ¼ section corners on the north boundary were made to the nearest standard corner. The tie was given in the field notes.

The bearings and distances between corners are shown only on the resurvey plat. The Geological Survey made two overlays of the topography at the scale of 1 inch equals 40 chains. The brown ink overlay shows all contour lines; the black ink overlay shows all water courses, roads, etc. The topography is shown only on the plat accepted November 3, 1969, shown in figure 3.

WYOMING RESURVEY USING PHOTOGRAMMETRY

TOWNSHIP Nº 28 NORTH, RANGE Nº 92 WEST of the 6TH Principal MERIDIAN.

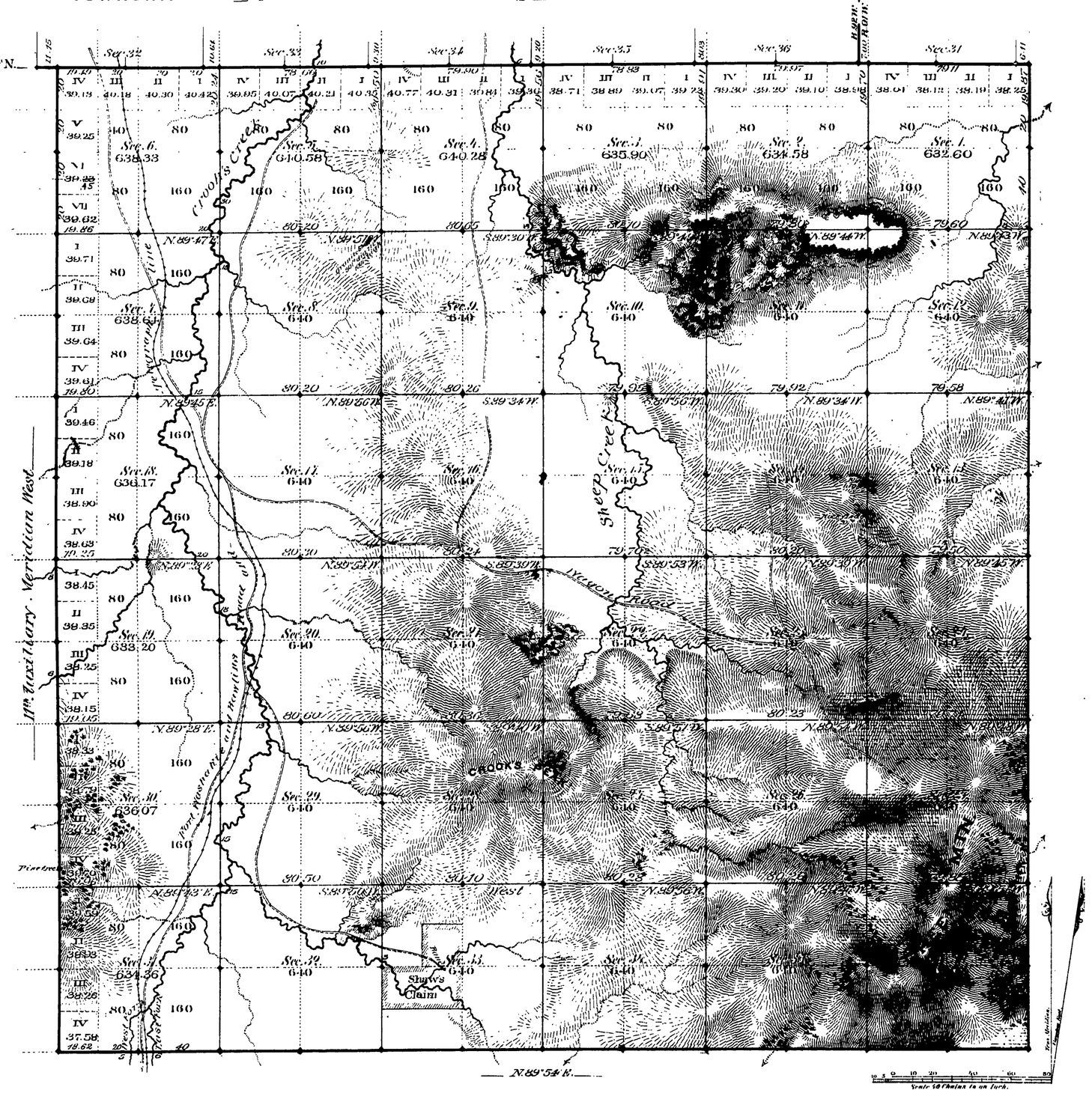


Figure 1 - Original Plat

A16-2

WYOMING RESURVEY USING PHOTOGRAMMETRY

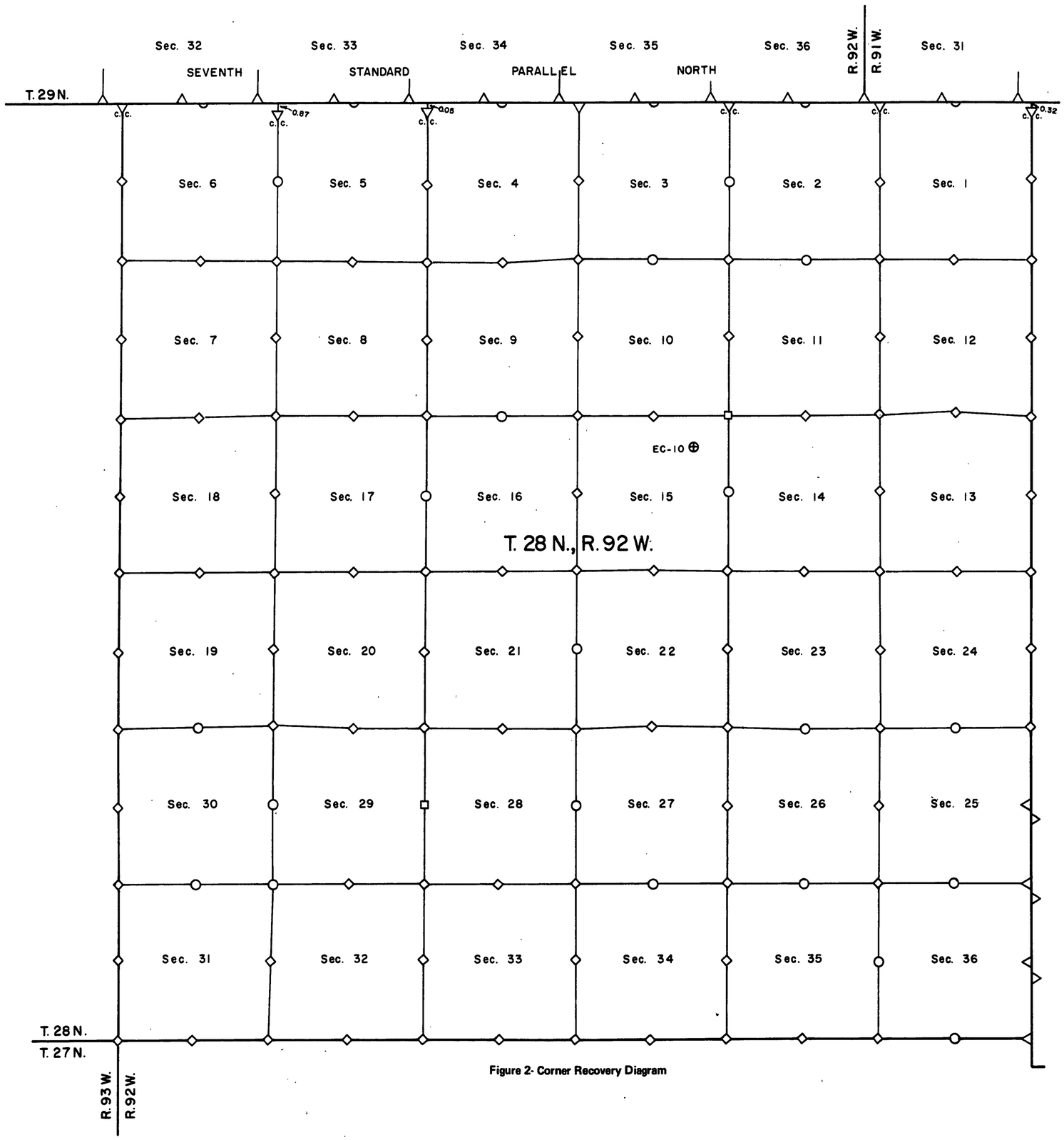


Figure 2- Corner Recovery Diagram

A16-3

WYOMING RESURVEY USING PHOTOGRAMMETRY

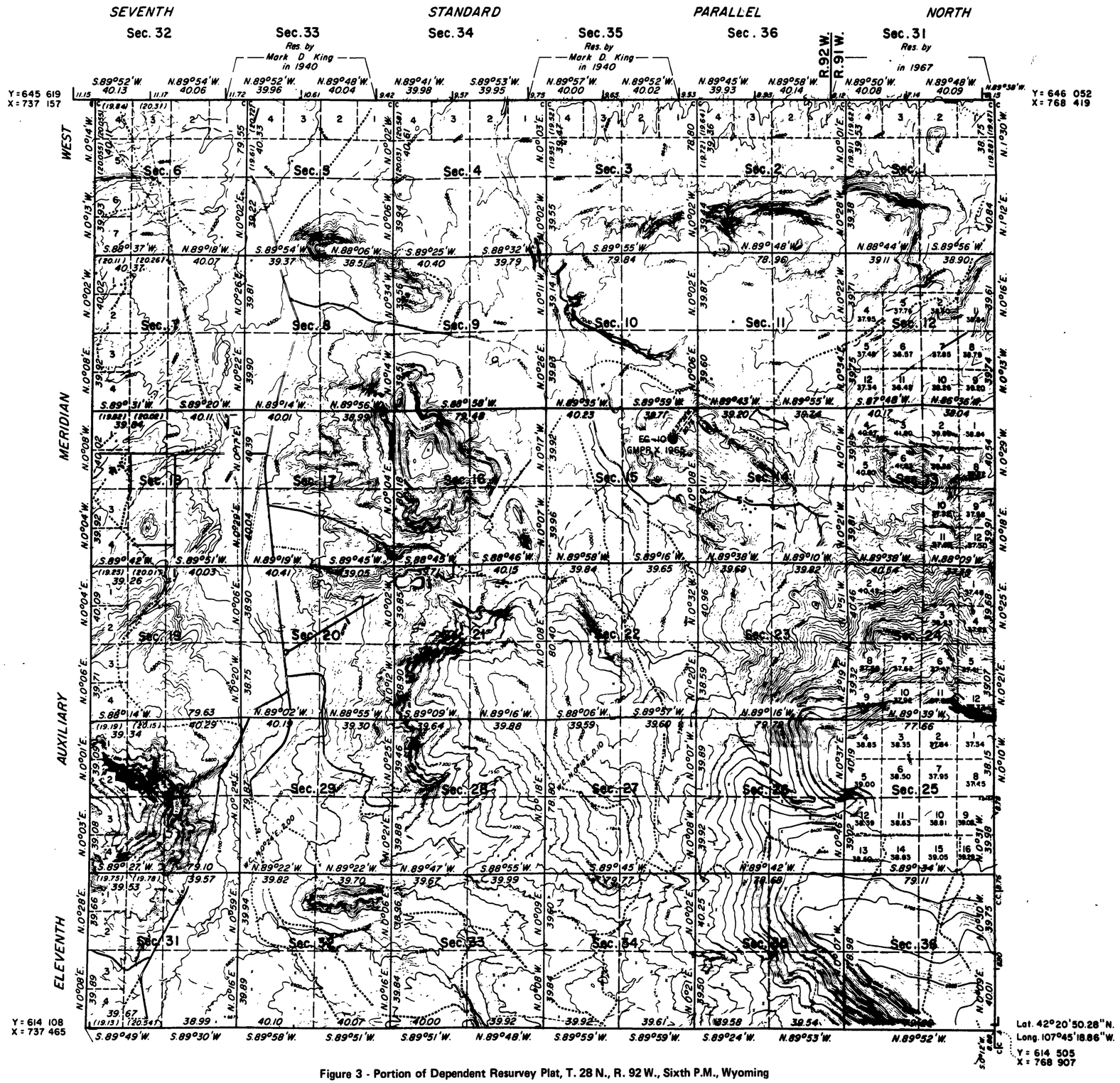


Figure 3 - Portion of Dependent Resurvey Plat, T. 28 N., R. 92 W., Sixth P.M., Wyoming

FUNDAMENTALS OF COMPLETIONS AND INDEPENDENT RESURVEY

Introduction

The following examples of original surveys, subdivision-of-section surveys, completion surveys and independent resurveys, are grouped together for discussion because the same basic fundamentals of law, regulations, procedures and so forth will apply in some aspect of their execution.

In nearly every case there is an out boundary to be determined by the dependent resurvey method, with unsurveyed areas being determined by the original method. The extent and form of the original survey is to be controlled by the location of any prior survey and any applicable plat.

There are only two basic types of surveys, original and dependent; original surveys create boundaries and dependent resurveys reestablish boundaries. All other designations are employed to identify the primary purpose of the survey.

Definition

An original survey creates boundaries and is usually executed in accordance with a plan. The contents of the plan will vary in detail. The plan of survey in the rectangular system is a very formal plan, wherein every detail of execution is set forth. The plan of survey for a placer claim, tract and so forth, will have fewer detailed specifications.

The dependent resurvey restores prior established boundaries, and is dependent on the condition and position of the prior survey for the correct procedure of execution.

The terms completion, independent resurvey, subdivision-of-section and so forth are in effect either an original survey, dependent resurvey, or a combination of both, executed for a primary purpose.

A completion survey is an original survey executed to complete: (a) a part of a township boundary, (b) the boundaries of a township, (c) the subdivisional lines of a township, (d) the boundaries of a section or (e) the subdivision of a section.

The Manual of Surveying Instructions, 1973, discusses this in chapter 3, sections 100-112, entitled "Extension and Completion Surveys". In order to clarify the surveys under discussion here, the following comparison is made: An extension survey continues survey lines over accreted lands or omitted lands where the original plat returned the land as being surveyed. An extension survey may also continue lines through unsurveyed areas. Completion surveys, on the other hand, are surveys made to finish lines or enclose areas which permit the computation of the areas of adjacent public lands.

The independent resurvey is a survey designed to supersede the prior official survey on large areas of remaining Public Lands. Where the on-the-ground evidence of the original survey has become completely lost or where the evidence and the record are at such variance that the differences are irreconcilable, or the ground survey never existed in fact, the independent resurvey may be authorized.

Statutory Laws and Regulations

In making a completion survey or an independent resurvey, it is possible and even likely that it will be necessary to apply every law or regulation pertaining to surveys of the Public Lands. In keeping with the intent of these laws and regulations, there are three paramount considerations:

1. Limit of Authority of Surveyor

   The authority of a surveyor is limited to identifying and marking the boundaries of the public lands on the ground and to determine whether or not lands embraced within a claim, as occupied, have been correctly related in position to the survey on which the claim is based. He is authorized to interpret the evidence with respect to its effect upon the manner in which the resurvey will be executed.

   Whether or not claims for lands have complied with all the requirements of law under certain entry is a question beyond the function of the surveyor, and should be resolved before the resurvey is initiated.

2. Protection of Rights
   Bona fide Rights are those rights acquired in good faith under the law, and cannot be affected except by due process of law. The surveyor will be concerned only with the question of whether the lands have actually been located in good faith. It has been held, generally, that the entryman has located his lands in good faith, if such care was used in determining his boundaries as might be expected by the claimant exercising ordinary intelligence under existing conditions.

   A claim cannot generally be regarded as having been located in good faith if no attempts have been made to relate it in some manner to the original survey.

   Where lands have been occupied in good faith, but where the boundaries, as occupied, disagree with the position of the description, it should be regarded as an erroneous location. In cases of this nature the solution is not to be found in surveying, but in the process of adjudication by an amended entry. The claim boundaries may be considered in positioning the resurvey lines to which they in fact relate, but not those lines as stated in the erroneous location.

3. Ascertain the Limiting Boundaries

   The limiting boundaries of the lands to be independently resurveyed or completed must agree with the previously established and identified surveyed lines of the approved surveys. In order to qualify as a limiting boundary, a line of the accepted established surveys must be conclusively identified in one position to the exclusion of all others. The lands on one side of the line are to be resubdivided under a new plan. On the other side, the original subdivisions are to be strictly maintained and none of the original conditions are to be disturbed.

The lands previously entered or patented under a prior survey are to be in no way affected as to location by a resurvey. All such lands must be identified and protected in one or two ways:

1. Wherever possible, the sections in which the claims are located are reconstructed from evidence of the original survey.

2. Where irrelated control prevents the reconstruction of the sections that would adequately protect the claims, the alienated lands are segregated as tracts.

Necessity for Survey

A prerequisite for any comprehensive and effective management of lands is to be able to physically identify and locate the boundaries of those lands.

The necessity and justification for the surveys are generally determined by the requesting agency. Surveys are required to mark patented outlying areas, to resolve trespass cases or to adequately administer the Public Lands.

If the boundaries of the lands cannot be identified on the ground, a need for a survey exists.

Reason for Occurrence

Generally, incomplete surveys are the consequence of expediency. In the earlier surveys only those lands classified as agriculture lands were to be surveyed. In the early 1950's, the "skeleton" or "school section" survey provided for the survey of certain sections in a township, leaving most of the subdivisional lines as well as parts of the township boundaries unsurveyed. Homesteads on unsurveyed lands and mineral surveys are all sources of incomplete surveys.

The independent resurvey is most generally found necessary because of a fraudulent survey or a survey so grossly erroneous as to constitute fraud. When a survey has been faithfully executed, there is generally sufficient evidence remaining so that an independent resurvey would not be necessary.

Procedure

The procedures to follow in the execution of the independent resurvey or a completion survey are of two types, administrative and technical. They are necessarily performed in appropriate order to comply with existing laws and regulations and to produce an acceptable survey with a minimum of cost and effort.

The administrative procedure is concerned with the delegation of authority, determination and justification for the survey, and the research of record data pertaining to the surveys in the area under consideration.

The technical procedure concerns the legal and proper execution of the survey and preparation of the final returns.

FUNDAMENTALS OF COMPLETIONS AND INDEPENDENT RESURVEY

Administrative Procedure

The administrative procedure generally consists of seven major items. The sequence and content can be modified to some extent. A correct procedure, however, will assure that complications are kept to a minimum and that the requirements of law and regulations are fulfilled.

The procedure as outlined below lists the items in the appropriate position of execution:

1. The Request

   Surveys are generally initiated by a request, which should:

   (A) Define which lines are to be surveyed.

   (B) Use the township as the base in developing requests.

   (C) Provide current land status.

   (D) Indicate identified corners, with information as to the remaining evidence.

   (E) Identify the need for the survey.

   (F) Set priority.

   (G) Identify the benefiting activity, for cost coding.

   (H) Provide any other information that would aid in the execution of the survey.

   When the requests are received in the appropriate cadastral survey office, they should be reviewed, to ascertain if the survey is really needed. The request should be viewed in its effect on long range needs as well as the present needs. It is a good idea to contact other using agencies to determine if they have survey needs in the area.

2. Research

   Research is the gathering and compiling of known survey information pertaining to the area under consideration.

   Data in the form of both plats and notes should be compared and any differences reconciled. Also, any reproduction should be checked for legibility.

   The ideal person to conduct the research would be the surveyor who is going to make the survey. In this way he will be aware of any problems that may exist, and he will have time to analyze the problem and plan a course of action.

3. Special Instructions

   With all the known data available, a more comprehensive set of Special Instructions can be written. In the event that there is insufficient information as to the condition of the surveys on the ground, the Special Instructions can be written for Investigative and Conditional surveys, thus eliminating the need for Supplemental Instructions at a later date.

   In the event that an independent resurvey is likely, the prior survey should be suspended. This will prevent any land actions from being initiated or completed.

   The Special Instructions for a completion survey should provide that unentered, outlying protracted subdivisions need not be protected and are annulled, thus simplifying the execution and platting of the new surveys.

4. Assignment Instructions

   Congress has authorized the Secretary of the Interior to make surveys and resurveys as he may deem necessary to mark the boundaries of the Public Lands.

   The assignment instructions are legal documents authorizing and assigning a cadastral surveyor to execute a survey of the Public Lands. The surveyor is then acting, through the Bureau of Land Management, under the authority of the Secretary of the Interior. The authority given by the assignment instructions is limited to the work as outlined in the Special Instructions. In the event that the Special Instructions are inadequate, they will need to be supplemented.

5. Approval of Plan of Survey

   The independent resurvey or completion survey can be executed in different ways and still be technically correct. However, there may be a difference of opinion as to which way is better. Therefore, it is suggested that the plan of survey, as submitted by the field man, have the approval of the authorized administrative officers.

6. Prepare the Returns of the Survey

   The field notes and plat are the primary records of any survey. The chief of the field party is responsible for the accuracy and sufficiency of this record.

   Due regard should be given to the Manual requirements and form though it is intended that set forms of expression be used flexibly and modified when necessary to conform to the survey. The work of the reviewing officers will be directed to the fundamental requirements of the Manual and the written Special Instructions, and the comments, if any, as to the form of the transcribed field notes, will be based upon broad grounds.

7. Survey Accepted and Filed

   The Public Lands are not considered surveyed or identified until the survey is accepted and filing of the plat in the administering land office by direction of the Bureau of Land Management.

   Any necessary suspension or cancellation of a survey must be made by the approving authority. If a survey was suspended and a independent resurvey executed, the prior survey is to be cancelled at the time of accepting the new survey.

Technical Procedure

The procedure to be followed in the technical execution of the completion survey or the independent resurvey consists of six distinct steps:

1. An investigation with an on-the-ground identification of the existing approved official surveys. The possible limiting boundaries of the area are determined along with any valid claims.

2. The type and extent of the survey needs are determined using the evidence from the investigation.

3. Determine the limiting boundaries of the area and develop a plan of survey, that will:

   A. Protect any valid claims.

   B. Create as many aliquot parts as possible.

   C. Establish a minimum number of corners. (closing corners, corners of minimum control)

   D. Place excess or deficiency against the north or west boundaries or adjacent to previous surveys.

4. Have the plan of survey approved.

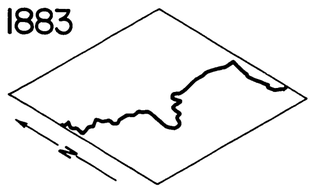
5. Reestablish the out-boundaries by the dependent resurvey method or in the case of a completion survey by the applicable method. Segregate or determine the boundaries of any lands embraced in a valid claim based on the former approved survey.

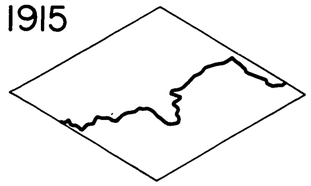
6. Complete the survey on the approved plan.

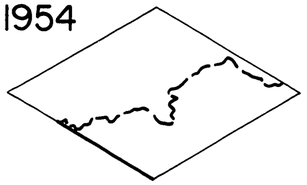
COMPLETIONS NEAR SAN CARLOS RESERVATION

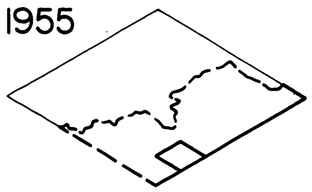
T 3 S., R. 24 E., G. & S. R. M.

TOWNSHIP 3 SOUTH, RANGE 24 EAST, OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA.









History of Surveys

1875 T.F. White established the southwest corner of T. 3 S., R. 24 E.

1883 Paul Riecker surveyed the south boundary of the White Mountain Indian Reservation, also known as the San Carlos Indian Reservation.

Riecker ran a line due north through the flagstaff at Camp Goodwin, to the summit of the Gila Mountains. The south boundary of the reservation was to then follow the summit of the Gila Mountains southeasterly to 109° 30' west longitude.

Riecker's field notes state that he could not survey along the impassable summit of the mountains so he erected monuments on prominent peaks and points along the ridge top, measured base lines in the flats to the north and, by triangulation, computed the courses and distances along a major portion of the boundary.

Riecker's work was later held to be unsatisfactory and resurvey was ordered.

1915 H.L. Baldwin resurveyed the south boundary of the San Carlos Reservation from one mile south of Camp Goodwin to the summit of the Gila Mountains and southeasterly along the summit to the southeast corner of the reservation. Baldwin's resurvey mentions the Riecker monuments, where found, but the resurvey along the summit was independent of them. Baldwin ran a traverse line along the summit, setting mile and half mile corners monumented with iron posts. Along the portion of the boundary through range 24 east, Baldwin did not monument any of his angle points, except as they were also a mile or half mile corner.

1920 W.H. Thorn and B.J. Kinsey established the southeast corner of T. 3 S., R. 24 E.

1954 D.E. Harding surveyed the west boundary of T. 3 S., R. 24 E., G.&S.R.M.

1955 D.E. Harding and F.R. Chappell surveyed the south and east boundaries of T. 3 S., R. 24 E., and section 32. See figure 1.

Reasons for Request of this Survey

The Safford, Arizona, District Manager requested this survey for BLM administrative purposes.

Special Instructions

On September 15, 1961, Special Instructions were written and approved providing for the completion survey of townships 3 south, ranges 23, 24 and 25 east, G.&S.R.M., under Group No. 363, Arizona. This case is concerned with T. 3 S., R. 24 E. only.

Conditions Found on the Ground

The surveyors assigned to conduct this completion survey found errors in the 1954-55 surveys of the boundaries and could not close against them within the limits set by the Manual of Surveying Instructions, 1947. They retraced the west, south, and east boundaries. The east boundary was 0.55 chains longer than record. The south boundary was defective in alinement but not defective in measurement when taken overall, or on the average. The west boundary was within limits for alinement but defective in measurement when the errors were taken accumulatively from the southwest corner of the township. The surveyed section 32 was within limits.

Four portions of the San Carlos Reservation boundary were found defective. See figure 2.

The following are abstracted from Baldwin's field notes:

From the 31 mile corner:

Thence along the summit of the Gila range of Mountains and 32nd mile of the S. bdy. of the White Mountain (or San Carlos) Indian Reservation.

Ascending

S. 68° 45' E.,	11.90 chs.	
S. 51° 45' E.,	2.10 "	
S. 51° E.,	5.00 "	Descending to low point Ascend
S. 16¼° E.,	4.60 "	
S. 31° E.,	3.40 "	To top of high pinnacle on ridge, brs. SE. and NW.
S. 51¼° E.,	7.70 "	
N. 81° 45' E.,	2.00 "	Set an iron post .... for 31½ mile corner Cor. falls bet. two large boulders, or rather a crack in rock, on 1st pinnacle West of peak at south end of ridge leading north, about 3.00 chs. W. of the saddle bet. this peak and pinnacle ..... Thence descending
N. 74¼° E.,	3.20 chs.	Thence ascending
East	4.70 "	
S. 71° E.,	2.70 "	
S. 38½° W.,	.80 "	At 16 lks. - Probable old Monument No. 3, but no marks can be discerned on surrounding rocks. Thence steep descent.
S. 36° W.,	10.70 chs.	
S. 39° 45' W.,	4.70 "	
S. 35½° E.,	7.20 "	
S. 54° 45' E.,	2.50 "	
S. 43° E.,	3.50 "	Set an iron post ..... for 32 mile corner and angle point on bdy., ... Cor. falls on SE. slope 1/8 mile N. of brushy peak.

Note: Some of the mile and half mile corners heretofore have fallen at angle points of the boundary and some on straight portions thereof. Therefore, I will hereafter distinguish between such by markings on posts and bearing trees, adding the letters AP at angle points, and omitting same when cor. falls on straight portion of the boundary.

From the 33 mile corner:

Thence along summit of the Gila range of mountains ..... Ascending

S. 55° 15' E.,	4.10 chs.	
N. 85° E.,	5.00 "	
S. 51° E.,	6.50 "	
N. 83° 45' E.,	2.30 "	
S. 27° 45' E.,	2.30 "	
S. 51 3/4° E.,	7.00 chs.	to highest point of hill. Descend along narrow broken ridge.
S. 17° 30' E.,	12.80 chs.	Set an iron post ..... for 33½ mile corner ..... Cor. falls about 3 ft. W. of rock ledge - the 1st one east of saddle before ascent to high peak. A very large amphitheater falls off abruptly to the west.

From the 37 mile corner:

Thence I run along the summit of the Gila range of mountains .....

N. 50° E.,	3.90 chs.	to top of rocks. From this point .....
N. 87½° E.,	2.10 "	To top of rock ledge
N. 82° E.,	2.90 "	" " "
N. 75° E.,	3.90 "	
N. 81° 45' E.,	3.70 "	
N. 78¼° E.,	8.50 chs.	
S. 88¼° E.,	10.70 "	Thence descend.
N. 78½° E.,	1.40 "	
N. 82½° E.,	2.90 "	Set an iron post ..... for 37½ mile cor., also angle point ..... Cor. falls about 2.00 chs. E. of top of knoll.
N. 13½° E.,	2.60 chs.	Descending.
N. 7½° W.,	7.90 "	Point in saddle bet. drains E. and W. Wire fence brs. E. and W. Ascend.
N. 1° 10' E.,	13.50 chs.	
N. 23¼° E.,	3.80 "	To top of hill. Thence descend.
N. 41½° E.,	2.50 "	
N. 53° 45' E.,	3.50 "	
S. 50½° E.,	2.50 "	
S. 55½° E.,	3.70 "	Set an iron post ..... for 38 mile cor., also angle point .....

Cor. falls on flat ridge gradually descending to E.

Thence along summit of the Gila range of mountains ..... Continuing descent.

S. 68° E.,	8.80 chs.	
S. 88½° E.,	12.80 "	
N. 77° E.,	18.40 "	At 13.00 chs. - foot descent. Thence ascend. Set an iron post ..... for 38½ mile cor. ..... Cor. falls in saddle 4.00 chs. W. of foot of rock ledge on volcanic knoll.

From the 40 mile corner:

Thence I run along the summit of the Gila range of mountains, which at this place is flat prairie land .....

N. 79° 30' E.,	25.00 chs.	At 7.00 chs. on this course, trail brs. N. and S. Ascend.
S. 67° 30' E.,	3.50 "	
S. 33¼° E.,	2.30 "	Thence descend.
S. 14½° W.,	3.30 "	
S. 15 3/8° W.,	5.90 "	Set an iron post ..... for 40½ mile cor. and angle point .....

At the beginning of each mile Baldwin states that his line was along the summit of the Gila range of mountains. It seems reasonable to assume that he made an effort to determine, as nearly as possible, the position of the summit and then run his traverse line in a manner similar to meandering a stream or lake. The U.S.G.S. map (Fort Thomas, 1960) shows this ridge to be sharply defined between the 31 and 39 mile corners but somewhat flat and undefined between the 39 and 42 mile corners.

Preliminary Statement of the Problem

The defective surveys on the boundaries needed to be considered before a plan of completion was possible.

The retracements and resurveys of the boundaries and section 32 were computed using coordinate positions of the corners to prepare a plan. Figure 2 is a sketch of the township showing defective conditions.

A plan of completion was required to give the township the greatest possible number of "regular" sections and aliquot parts, and the least number of fractional lots and "double" corners. This is the desirable objective and follows the intent of the first sentence of section 3-66 of the Manual of Surveying Instructions, 1973.

Regulations

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

3-33 to 3-45 Limits and defective exteriors

3-97 to 3-102 Fractional townships, Extension and completion surveys

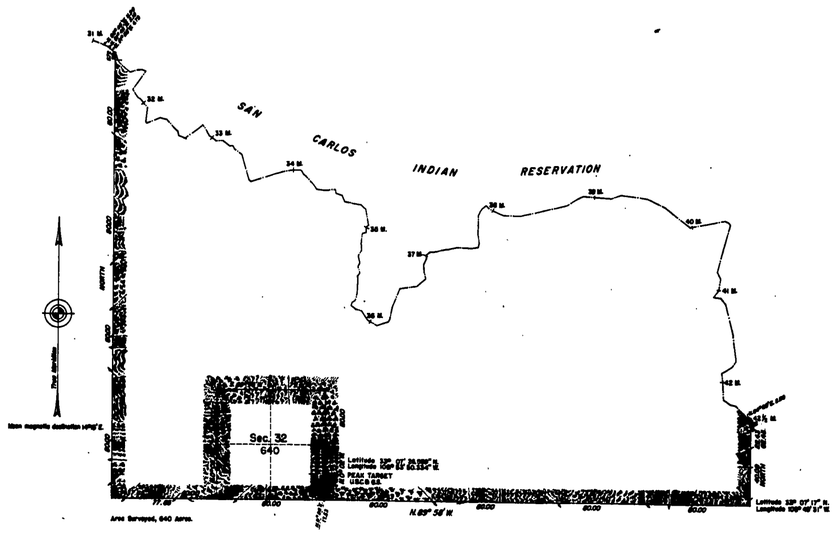


Figure 1 - Original Plat

COMPLETIONS NEAR SAN CARLOS RESERVATION

T 3 S., R. 24 E., G. & S. R. M.

5-20 to 5-24	Restoration of lost corners
5-43	Broken boundaries

Auxiliary Topic No. 1

Section 5-44 of the Manual of Surveying Instructions, 1973, specificially states that the "Grant Boundary" method of adjustment should be used to adjust errors in reservation boundaries which were surveyed prior to the township and section lines which close against it. The method is to be used after the natural calls are satisfied. In this case the natural calls were satisfied in three segments of the reservation boundary and no further adjustment was required. Three more segments were adjusted by the "Broken Boundary" method, section 5-43 of the Manual of Surveying Instructions, 1973. This method is ordinarily used on nonriparian meander lines and some other metes and bounds surveys. The "Summit of the Gila Mountains" is a natural feature of the terrain, just as is the shoreline of a lake or stream. This is possibly the reason for using the broken boundary method to adjust the reservation boundary. It is also possible that the broken boundary adjustment kept the adjusted line more closely along the summit than a grant boundary adjustment would.

The Manual of Surveying Instructions, 1973, section 7-16, states in part:

> Boundaries of this sort are normally winding, and it should be understood that they are technically defined by the natural feature and not by the straight lines between angle points monumented in a survey. *Northern Pacific Railway Co.* v. *United States*, 227 U.S. 355 (1913).

Final Statement of the Problem

The surveyor will complete the survey with a minimum of fractional sections and lottings.

Solution

The west boundary was resurveyed holding the 1955 survey corners for alinement but changing them to angle points, with new corners set at 40 and 80 chain intervals in latitudinal measurement. The adjacent T. 3 S., R. 23 E., was being completed under the same group and the new corners were marked for maximum control.

A sectional correction line was surveyed East from the original corner of sections 28, 29, 32 and 33, with corners established at 40 and 80 chain intervals, to a closing corner of sections 25 and 36 on the San Carlos Reservation boundary.

The lines between sections 33 and 34, 34 and 35 and 35 and 36, were surveyed random and true with the excess or deficiency placed in the south half mile. Closing corners against the defective south boundary were not required because the bearings of these lines fell within the limits of 21' of arc.

The meridional lines were surveyed northerly from the sectional correction line, parallel to a theoretical east boundary. Corners were established at normal intervals with closing corners on the San Carlos Reservation boundary. The line between sections 24 and 25 was surveyed East to a closing corner, as were the lines between sections 7 and 18 and between sections 17 and 20. The line between sections 21 and 28 was surveyed random and true with two closing corners established on the San Carlos Reservation boundary. The portion of this line inside the reservation was surveyed as a blank line. The lines between sections 18 and 19, sections 19 and 30 and between sections 30 and 31 were surveyed random and true, with the deficiency in the west half mile.

A south ¼ section corner of section 36 was established 40 chains east of the corner of sections 1, 2, 35 and 36. The original ¼ section corner was corrected to refer to section 1, only.

Upon closing against the south boundary of the San Carlos Indian Reservation, ties were made to the nearest mile or half mile corner and closures were computed based on the record of Baldwin's 1915 resurvey. If the fractional sections closed within limits, the reservation boundary was retraced on record courses and distances to the closing section line. The closing corners were set at the true points of intersection.

Sections 17, 18, 22 and 24 did not close within limits because of error in the reservation boundary. The reservation boundary was retraced and resurveyed between the mile corners 31 and 32, 33 and 33½, 37 and 38½ and between the 40 and 40½ mile corners. The following field notes are abstracted from the field notes of T. 3 S., R. 24 E., approved February 26, 1964, and cover the portions of the boundary that were resurveyed.

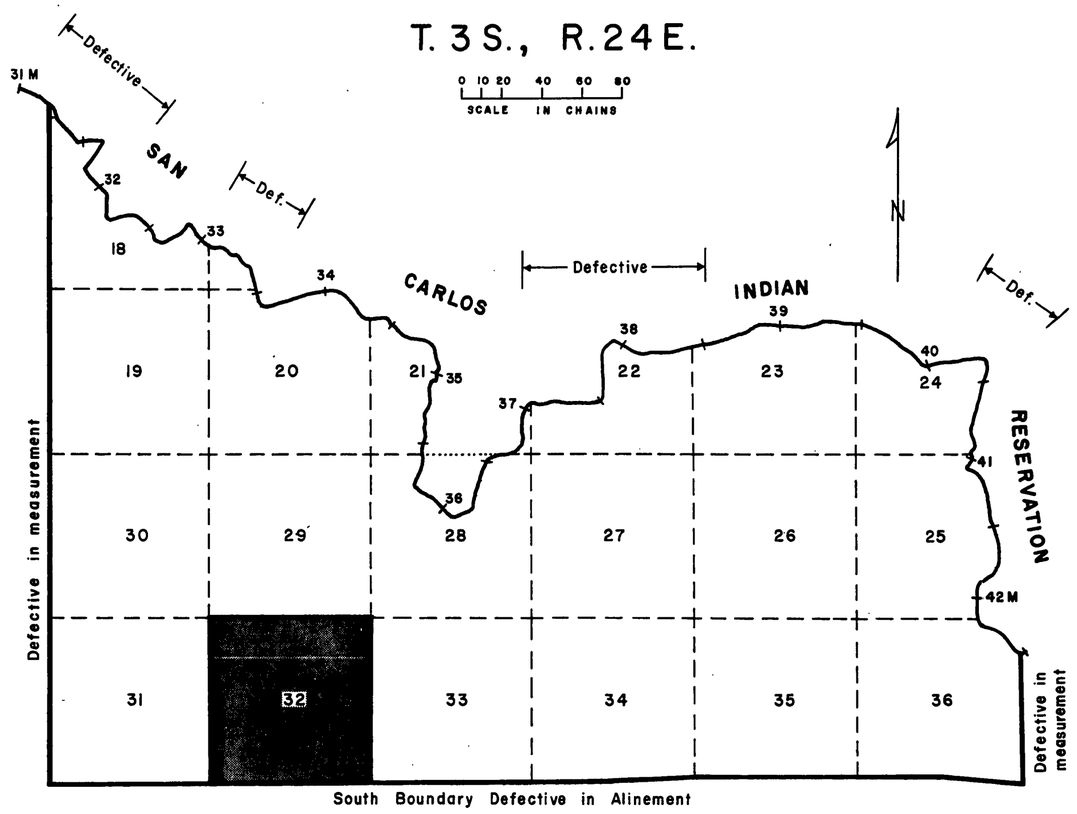


Figure 2 - Defects

Retracement of a Portion of the Survey Executed by H. L. Baldwin in 1915

From the 31 mile cor. on the S. bdy. of the San Carlos Indian Reservation, monumented by an iron post as described in the official record.

S. 68° 45' E., 11.90 chs. dist.

S. 51° 45' E., 2.10 chs. dist.

S. 51° E., 5.00 chs. dist.

S. 16° 15' E., 4.60 chs. dist.

S. 31° E., 3.30 chs. dist.

S. 43° 30' E., 3.40 chs. dist.

S. 51° 15' E., 9.90 chs. dist. — This dist. as originally recorded, 7.70 chs. from top of high pinnacle is in error as the original distance leaves the watershed.

N. 81° 45' E., 2.00 chs. dist. — The 31½ mile cor., monumented by an iron post as described in the official record.

Thence, from the 31½ mile cor.

N. 74° 15' E., 3.20 chs. dist.

East, 4.70 chs. dist.

S. 71° 00' E., 2.70 chs. dist.

S. 38° 30' W., 0.80 chs. dist.

S. 36° 00' W., 10.70 chs. dist.

S. 39° 45' W., 4.70 chs. dist.

S. 35° 30' E., 8.20 chs. dist. — This distance is officially recorded as 7.20 chs., which is in error as it lacks a chain of reaching to top of the ridge.

S. 54° 45' E., 2.50 chs. dist.

S. 43.00' E., 3.50 chs. dist. — The 32 mile cor., monumented by an iron post as described in the official record.

From the 33 mile cor. on the S. bdy. of the San Carlos Indian Reservation, monumented by an iron post as described in the official record.

With adjusted traverse to the 33½ mile cor.

S. 55° 43' E., 4.10 chs. dist.

N. 84° 35' E., 5.02 chs. dist.

S. 51° 27' E., 6.49 chs. dist.

N. 83° 22' E., 2.31 chs. dist.

S. 28° 09' E., 2.29 chs. dist.

S. 52° 13' E., 6.99 chs. dist.

S. 17° 50' E., 12.72 chs. dist. — The 33½ mile cor., monumented by an iron post as described in the official record.

From the 37 mile cor. on the S. bdy. of the San Carlos Indian Reservation, monumented by an iron post as described in the official record.

N. 50° E., 3.90 chs. dist.

N. 87° 30' E., 2.10 chs. dist.

N. 82° E., 2.90 chs. dist.

N. 75° E., 3.90 chs. dist.

N. 81° 45' E., 3.70 chs. dist.

S. 78° 30' E., 8.50 chs. dist. — This course as originally recorded was N. 78° 30' E., which leaves the summit of the mountains.

S. 88° 15' E., 10.70 chs. dist.

N. 78° 30' E., 1.40 chs. dist.

N. 82° 30' E., 2.90 chs. dist. — The 37½ mile cor., monumented by an iron post as described in the official record.

With adjusted traverse from the 37½ mile cor.

N. 12° 24' E., 2.60 chs. dist.

N. 8° 30' W., 7.96 chs. dist.

N. 0° 07' E., 13.56 chs. dist.

N. 22° 10' E., 3.79 chs. dist.

N. 40° 30' E., 2.48 chs. dist.

N. 54° 56' E., 3.46 chs. dist.

S. 50° 02' E., 2.46 chs. dist.

S. 55° 03' E., 3.62 chs. dist. — The 38 mile cor., monumented by an iron post as described in the official record.

S. 67° 57' E., 8.83 chs. dist.

S. 88° 23' E., 12.84 chs. dist.

N. 77° 10' E., 18.45 chs. dist. — The 38½ mile cor., monumented by an iron post as described in the official record.

From the 40 mile cor. on the S. bdy. of the San Carlos Indian Reservation, monumented by an iron post as described in the official record.

With adjusted traverse to the 40½ mile cor.

N. 79° 30' E., 25.24 chs. dist.

S. 67° 48' E., 3.53 chs. dist.

S. 33° 45' E., 2.31 chs. dist.

S. 13° 59' W., 3.29 chs. dist.

S. 14° 53' W., 5.88 chs. dist. — The 40½ mile cor., monumented by an iron post as described in the official record.

The seventh course from the 31 mile corner was found to be 2.00 chains in error. In conformity with section 5-23 of the Manual of Surveying Instructions, 1973, this two chain mistake was placed where it occurred. The ridge top is sharply defined at this point and if the course were held at the record 7.70 chains, the last course would not reach the 31½ mile corner and would be off the ridge. It was manifest where the mistake occurred.

The seventh course from the 31½ mile corner was in error by 1.00 chain, evidenced also by the summit of the Gila Mountains.

The sixth course from the 37 mile corner was mistaken in bearing. Instead of N. 78° 30' E., it was clear that the bearing had to be S. 78° 30' E., for the line to remain on the ridge top and fit the monuments on the ground.

After the obvious blunders were placed where they occurred, no further adjustments had to be made in those three portions of the reservation boundary. No surplus or deficiency remained to be proportioned.

COMPLETIONS NEAR SAN CARLOS RESERVATION

T 3 S., R. 24 E., G. & S. R. M.

In the segments between the 33 and 33½, 37 and 38½, and between the 40 and 40½ mile corners the error in closure could not be isolated into any specific course or courses. These segments were retraced on the record bearings and distances and the misclosure measured to the extant mile or half mile posts. The misclosure was then adjusted into the courses by the broken boundary method, section 5-43 of the Manual of Surveying Instructions, 1973.

After the necessary retracements and adjustments were made, the section closures were again computed. All fell within limits. The closing corners were then established at the intersections of the section lines and the adjusted boundary.

A triangulation station, "Peak Target," was located in section 33. A direct tie was made to that station. From the published geodetic coordinates of this station the latitude and longitude of the southeast corner of the township was computed. The field work was thus completed. The field notes were written and the plat prepared. Figure 3 illustrates the accepted plat.

Two mistakes appear on the plat of T. 3 S., R. 24 E:

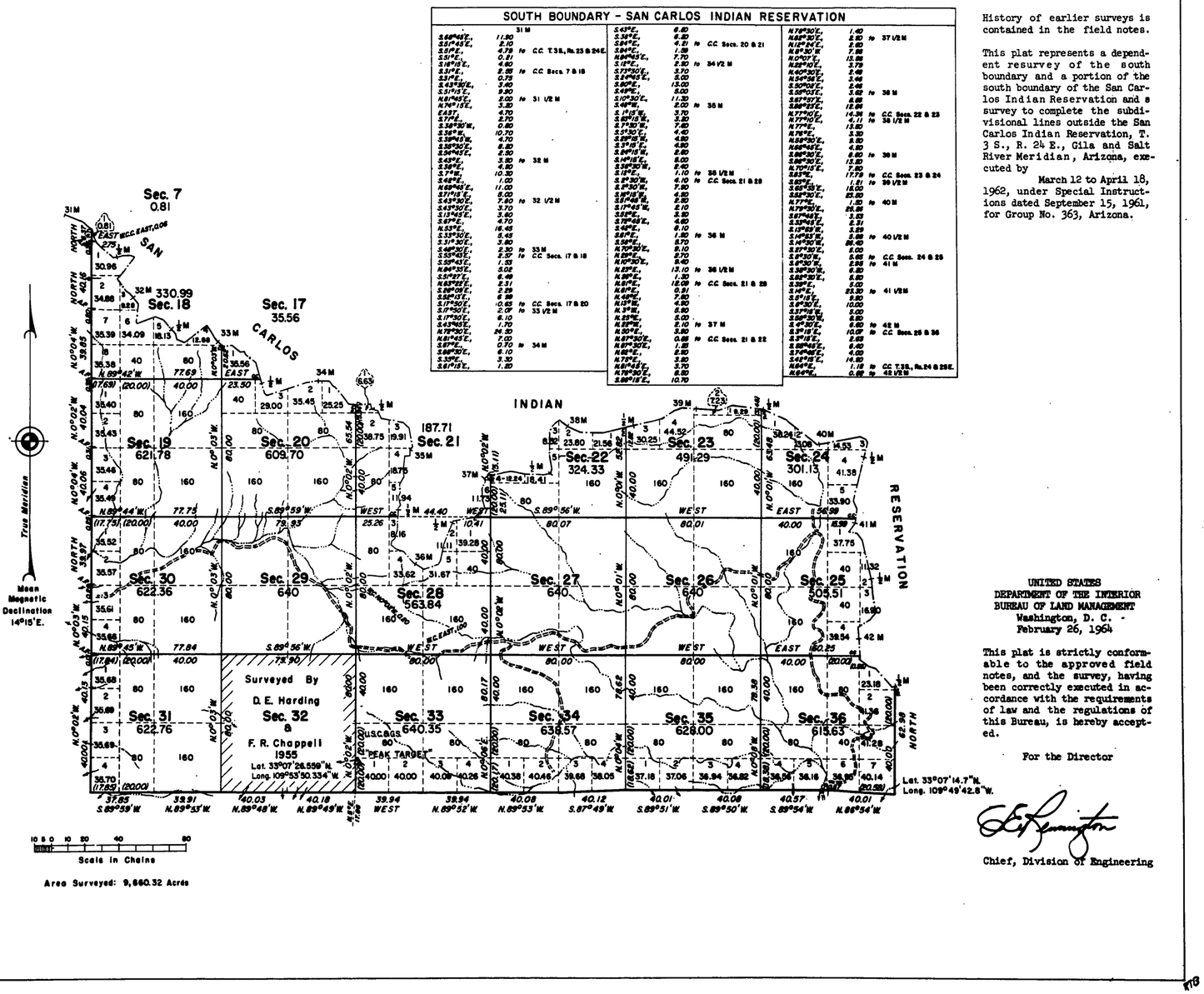
1. The sixth course from the 37 mile corner is shown on the plat as N. 78° 30' E., which is the Baldwin record of this course. The 1961 resurvey notes say this course is S. 78° 30' E., and explain the change. The plat is incorrect.

2. The segments of the reservation boundary from the 33 to 33½, 38 to 38½, and 40 to 40½ mile corners were adjusted by the broken boundary method. A re-computation of these segments proves the adjustments to be correct by that method. The segment from the 37½ to 38 mile corner is incorrectly given in both field notes and on the plat. As given, the courses and distances do not check by any known method of adjustment and must be in error. The mistake is probably in the 6th course, given as "N. 54° 56' E., 3.46 chains dist." All of the other courses in the segment are given an adjustment in bearing to the left. The sixth course is given an adjustment in bearing to the right.

No lines closed against the erroneously adjusted course between the 37½ and 38 mile corners. The intervening angle points between the mile and half mile corners are not monumented. Any closing corner established against the reservation boundary is subject to amendment if another resurvey finds them to be not actually on the boundary.

TOWNSHIP 3 SOUTH, RANGE 24 EAST, OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA.

COMPLETION SURVEY



History of earlier surveys is contained in the field notes.

This plat represents a dependent resurvey of the south boundary and a portion of the south boundary of the San Carlos Indian Reservation and a survey to complete the subdivisional lines outside the San Carlos Indian Reservation, T. 3 S., R. 24 E., Gila and Salt River Meridian, Arizona, executed by

March 12 to April 18, 1962, under Special Instructions dated September 15, 1961, for Group No. 363, Arizona.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C.
February 26, 1964

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

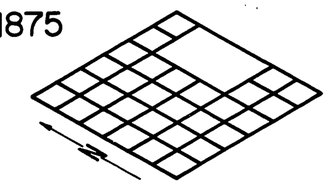
Chief, Division of Engineering

Figure 3 - Accepted Plat

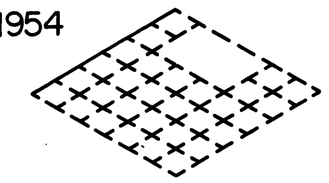
COMPLETIONS WITH DEFECTIVE BOUNDARIES

T. 4 S., R. 23 E., G. & S. R. M.

1875



1954



History of Surveys

1875 T.F. White surveyed all four boundaries and most of the subdivisional lines. The original plat is shown in figure 1.

1954 D.E. Harding resurveyed the north boundary and established new corners referring to the township to the north, T. 3 S., R. 23 E., Gila and Salt River Meridian.

Reasons for Request of this Survey

This survey was routinely requested for administration of the public lands.

Special Instructions

On February 24, 1958 Special Instructions were written and approved, providing for the dependent resurvey of a portion of the subdivisional lines and completion of the subdivisional lines of the township. The completion was to be executed in the normal manner unless errors of closure indicated other procedures were required.

Conditions Found on the Ground

All of sections 11 through 14, 23 and 24 were vacant public lands. Four quarter sections were protracted on the 1876 plat, see figure 1.

The surveyor retraced the exterior lines of sections 11-14, 23 and 24, including 3 miles of the east boundary. Most of the corners on the subdivisional lines were missing and the retracements were extended to the lines of sections 2, 3, 10, 15 and 22, in search for control points to govern reestablishment of the missing corners. Figure 2 indicates those corners which were recovered and those which were lost.

Preliminary Statement

It is required to complete the survey of the township subdivisional lines with as many normal sections and aliquot parts as possible.

The lost corners of the 1875 survey had to be restored before the completion plan could be determined.

Regulations

This survey illustrates the application of the following sections of the Manual of Instructions for Survey of the Public Lands, 1973:

5-25 to 5-28	Double Proportionate measurement
5-29	"Three point" control (combined single proportionate and record measure in opposite direction)
3-100 to 3-102	Extension and Completion Surveys
3-103 to 3-111	Completion of partially surveyed sections

Auxiliary Topic No. 1, Three Point Control

This survey illustrates the "three point control" method of restoring a lost corner. The double proportion method can be applied only when the lines surveyed have been extended in all four directions from the lost corner. When surveyed lines have been extended in only three directions from a lost corner there is no basis for a double proportion. This is the situation at the lost corners of sections 1, 2, 11 and 12; 10, 11, 14 and 15; and 14, 15, 22 and 23, as established in 1875. To reestablish the lost corner, the record distance of the line is used in one direction to control either the latitudinal or longitudinal position and single proportion is used to establish the opposite latitudinal or longitudinal position.

The corner of sections 1, 2, 11 and 12 was restored at record distance southerly in latitude from the corner of sections 1 and 2 on the north boundary and in departure by single proportionment between the corners of sections 1, 6, 7 and 12 and 3, 4, 9 and 10.

The corners of sections 10, 11, 14 and 15, and 14, 15, 22 and 23 were also restored by three point control at single proportion in latitude between the ¼ corner of sections 10 and 11, and the corner of sections 22, 23, 26 and 27; and at record distance in departure, easterly from the corners of sections 9, 10, 15 and 16, and 15, 16, 21 and 22.

Auxiliary Topic No. 2, Protracted Areas

The original survey plat showed protractions of the areas of NW¼ section 11, NE¼, section 12, SW¼ section 23, and SE¼ section 24.

The accepted plat of this survey shows the protracted SE¼ of section 24 and SW¼ of section 23 but not the protracted NE¼ of section 12 and NW¼ of section 11.

The protraction of the SW¼ of section 23 is technically incorrect, and should not have been shown in this manner. The original protraction was from the original (1875) ¼ corner of sections 22 and 23. If any portion of section 23 had been patented the survey of the section would be based on the original corner and not the newly established ¼ corner of section 23 only. Since the section is all public land no actual problem exists and the section could be subdivided as the plat is drawn.

TOWNSHIP No. 4 SOUTH RANGE No. 23 EAST GILA AND SALT RIVER MERIDIAN

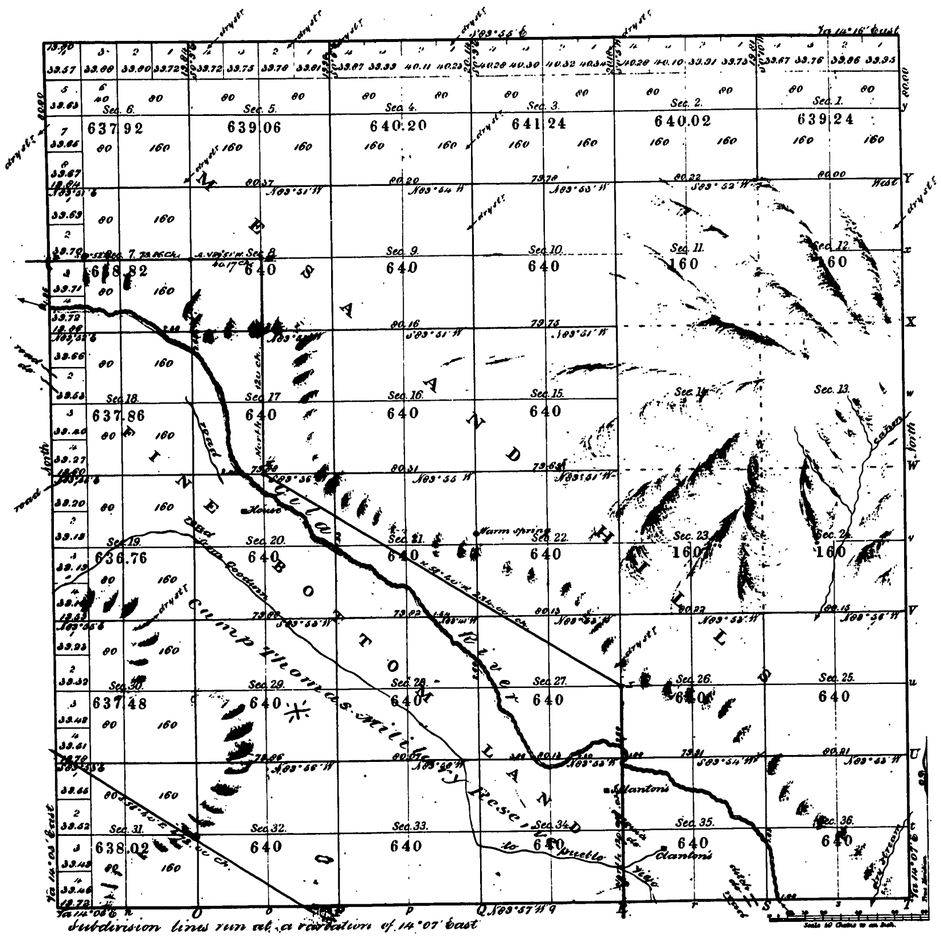


Figure 1 - Original Plat

The areas of lots 1 thru 4 of section 24 on the accepted plat are in error and could be misleading because of the protracted SE¼ of section 24. As drawn, the plat implies that the protracted ¼ section is based on lines parallel to the south half of the east boundary and east half of the south boundary of section 24, creating a "broken" centerline situation. There would be no good reason for this because the centerlines of the section, if surveyed normally would properly protect the protracted SE¼ of section 24 if it had been patented. The line between sections 13 and 24 is well within limits for "midpointing" that ¼ section corner. The ¼ corner of sections 23 and 24 is 40 chains north, protecting the protraction in latitude also.

Figure 4 is a diagram of section 24, with the error of closure adjusted by the broken boundary method. The diagram shows the section boundaries and center lines, based on an adjusted, flat, closure. The 1/16 section corners are placed at midpoint between ¼ corners and the center lines of the SW¼ are normal. The areas of Lots 1 thru 4 are recomputed, based on the described method of subdivision. A comparison of the areas tends to prove that this is the method of subdivision intended on the new plat.

The protractions on the 1876 plat, of the NE¼ of sections 12 and NW¼ of section 11, were cancelled and the sections lotted as shown with as many aliquot parts as possible. When an entire section is vacant this is proper and is required. If either of these ¼ sections had been patented the procedure of completion would be quite different, in order to protect the patented lands.

Auxiliary Topic No. 3, Distortion

Sections 5-29 and 5-45 of the Manual of Surveying Instructions, 1973, outline an exception of using the record distance when control in one direction is lacking. Any "average difference" must be conclusive and though there is a shortage in the original survey measurements in this case it is not conclusive. Using an average of all the retracement distances between recovered corners would distort some of the lines being restored.

An average of all the shortages is 20 links per half mile, with a range of from 2 links up to 40 links. This range could not be construed as a definite deficiency under the circumstances.

COMPLETIONS WITH DEFECTIVE BOUNDARIES

T. 4 S., R. 23 E., G. & S. R. M.

TOWNSHIP 4 SOUTH, RANGE 23 EAST, GILA AND SALT RIVER MERIDIAN, ARIZONA.
COMPLETION SURVEY

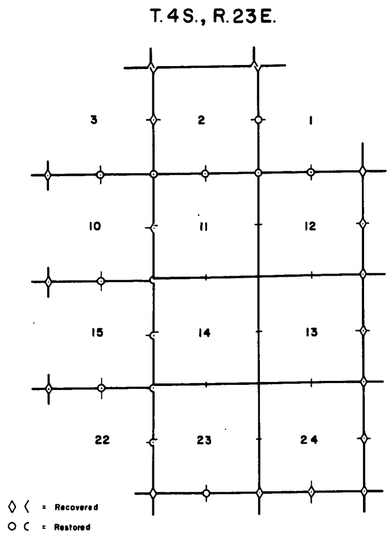


Figure 2 - Corner Recovery

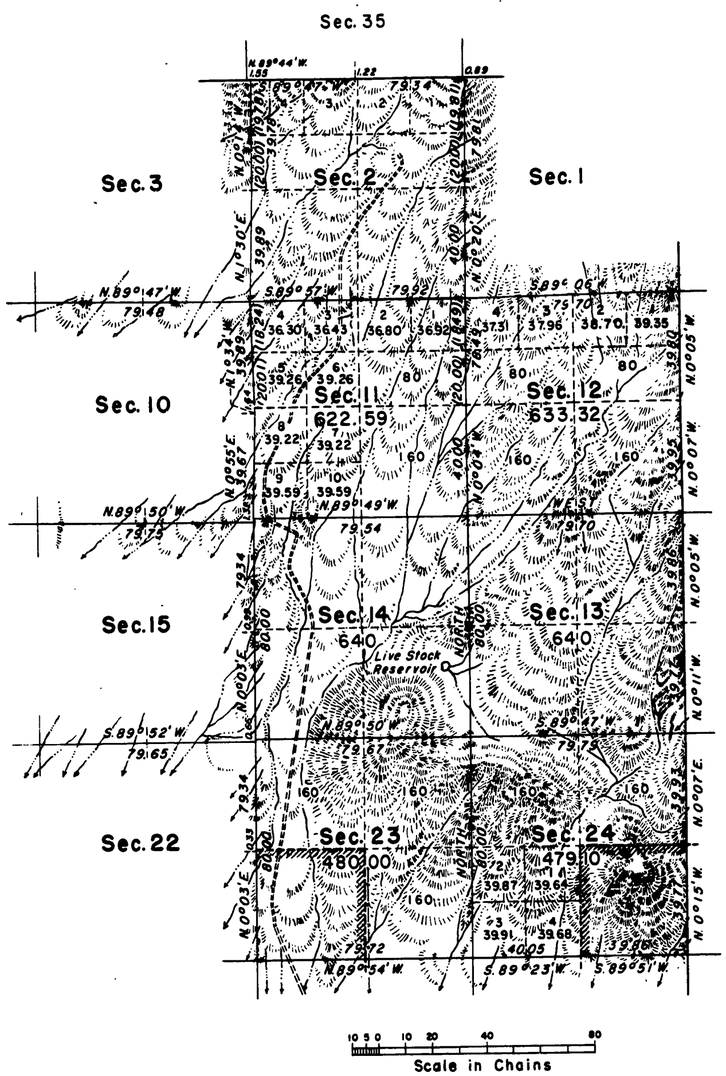


Figure 3 - Accepted Plat

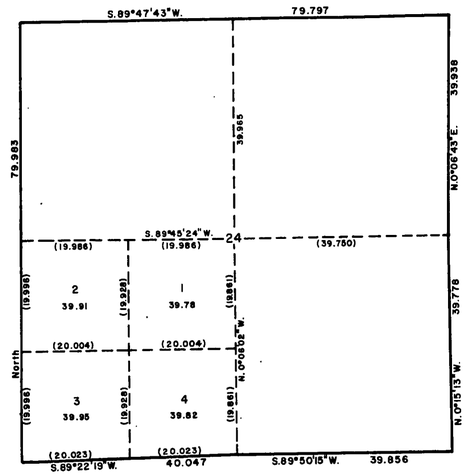


Figure 4 - Areas in Section 24

Solution

The missing corners of the 1875 survey had to be restored before the completion plan could be determined. See Auxiliary Topic No. 1 for restorations performed first.

The corner of sections 2, 3, 10 and 11 was restored by double proportionate measurement between the corner of sections 1, 6, 7 and 12 and sections 3, 4, 9 and 10; and between the ¼ section corners of sections 2 and 3 and sections 10 and 11.

The missing ¼ section corners were restored by single proportionate measurement between the recovered or restored section corners.

The west boundaries of sections 11, 14 and 23 were defective in measurement. The west boundary of section 11 and west half of the south boundary of section 24 were defective in alinement. The east boundary of sections 12, 13 and 24 was irregular but not defective, and by computation the line between sections 11 and 12 would not exceed 21' of arc.

The completion survey proceeds along the basic principle that the completion pattern should provide as many normal sections as possible with as few "double" corners and closing corners and as little lotting as possible.

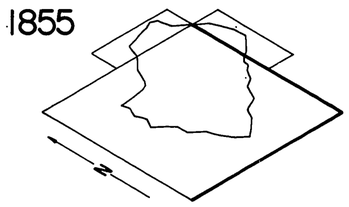
New corners were established along the west boundary of sections 11, 14 and 23 at 40 and 80 chain intervals in latitude, counting from the corner of sections 22, 23, 26 and 27, with the deficiency in the north half of the west boundary of section 11. The original, or restored, corners along this line were changed to refer to sections 10, 15 and 22 only. This creates what is called a "double set" of corners, with the 1875 survey controlling for alinement. The 1875 survey is the "senior" line controlling any future restorations.

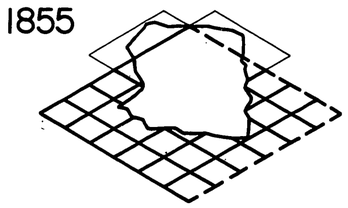
The first meridional line was surveyed north from the corner of sections 23, 24, 25 and 26 with corners established at 40 and 80 chain intervals. The line between sections 11 and 12 was surveyed "random and true," with the deficiency in the north half mile.

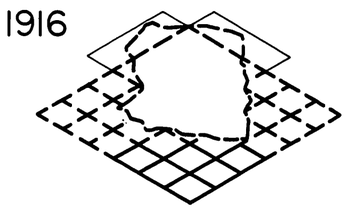
The east-west section lines were completed by surveying them random and true. All fell within limits for both alinement and measurement. The ¼ section corners were therefore established at mid-point on those lines.

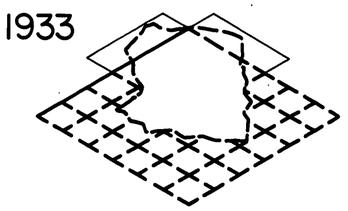
COMPLETIONS OF KOEHN DRY LAKE BED

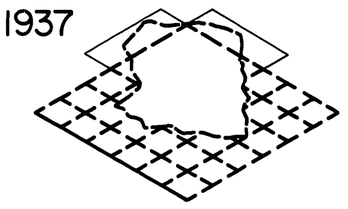
T. 30 S., R. 38 E., M. D. M.











History of Surveys

1855 H.S. Washburn surveyed the south and east boundaries.

1855 James G. McDonald surveyed the north and west boundaries, the subdivisional lines and the meanders of Koehn Dry Lake. His Special Instructions directed him to meander the lake and omit the lake bed from the rectangular survey even though the lake bed was dry at the time. The original plats are shown in figures 1, 2 and 3.

1904 M.W. Buffington, Kern County Surveyor, reestablished or perpetuated many of the original corners in the western portion of the township. Figure 4 illustrates Buffington's recorded map.

1916 A.M. Strong, licensed surveyor, made a private resurvey of portions of section 19 and sections 29 to 33. Most of Strong's work was based on Buffington's map.

1933 J.E. Little, C.E. No. 3897, resurveyed the north boundary and restored the corner of townships 29 and 30 south, ranges 38 and 39 east by double proportionate measurement methods. Little's township corner was controlled by recovered original corners, 2 miles north, 1 mile east, 3 miles south and 4½ miles west. Little then restored the corners along the township and range lines by single porportionate measurement.

1937 John Warboys resurveyed the west boundary of the township under Group 299, California.

1940 F. Wayne Forrest made an investigative retracement of the east and north boundaries. A portion of Forrest's investigation diagram is shown in figure 5.

1948 G. Marvin Litz resurveyed the east boundary of T. 29 S., R. 38 E. Litz accepted the 1933 restoration of the township corner by Little. The Forrest and Litz retracements verified Little's proportionments.

1949 Robert F. Myers, L.S. No. 1911, resurveyed section 8. Myers recovered most of the Buffington monuments and restored the meanders of Koehn Dry Lake by holding the record length of the three meander courses. As restored, the Myers work reflects the Buffington work and the original survey very closely.

1958 In 1958 the Kern County Surveyor resurveyed the lines between sections 5 and 8, 7 and 8, 17 and 18, 18 and 19, 19 and 20, and 17 and 20, restoring the corner of sections 17, 18, 19 and 20 by double proportionate measurement.

1960 In July, 1960, Alan Harrision, L.S. No. 2263 resurveyed portions of the boundaries of sections 27, 28, 33 and 34, and subdivided the north half of section 34 into small tracts.

1960 Eugene Fields, C.E. No. 1988, restored the ¼ corner of sections 20 and 21 and the meander corner of sections 27 and 28, and other corners not under discussion here.

Reasons for Request of this Survey

Two applications for sodium leases were filed with the Bureau for lands within the unsurveyed Koehn Dry Lake. Deposit was made for the survey of the lands under regulations outlined in 43 CFR 3501.1-2. Request for the necessary resurveys and survey was made by the state supervisor in August 1960.

Special Instructions

On September 9, 1960 Special Instructions were prepared for Group 464, California. They provided for necessary dependent resurveys in townships 29 and 30 south, range 38 east and completion survey of the subdivision lines within the dry bed of Koehn Dry Lake. On November 2, 1966 Supplemental Special Instructions were prepared to include the completion of T. 30 S., R. 39 E., MDM.

The Special Instructions for Group 464 included 3½ pages of instructions detailing the completion procedure.

Assignment Instructions

The field work was assigned on September 9, 1960.

The retracements, resurveys and completions of sections 34, 35 and 36 of T. 29 S., R. 38 E., were executed in 1960 and approved April 16, 1962. This discussion is limited to the surveys in T. 30 S., R. 38 E.

During retracement of the line between sections 7 and 8, T. 30 S., R. 38 E., the field party was halted and later arrested on a trespass charge for entering private lands in sections 7 and 8. Although the trespass charges were subsequently dismissed, no action was taken to acquire entry for the purposes of dependently resurveying the west boundaries of sections 8 and 17 and the line between sections 8 and 17. Due to these difficulties, and other factors, the deposit money was returned to the sodium lease applicants.

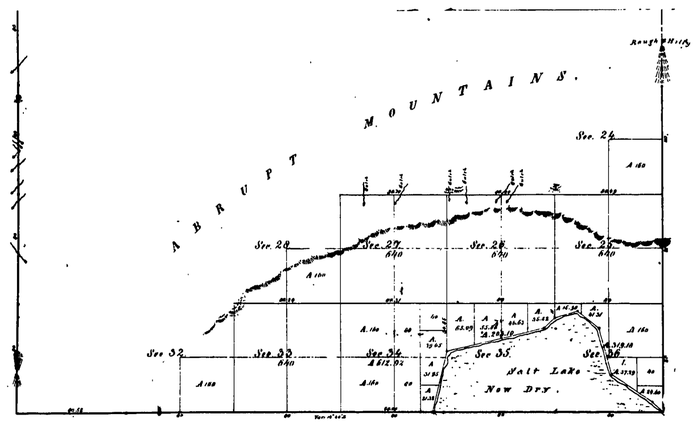


Figure 2 - Original Plat

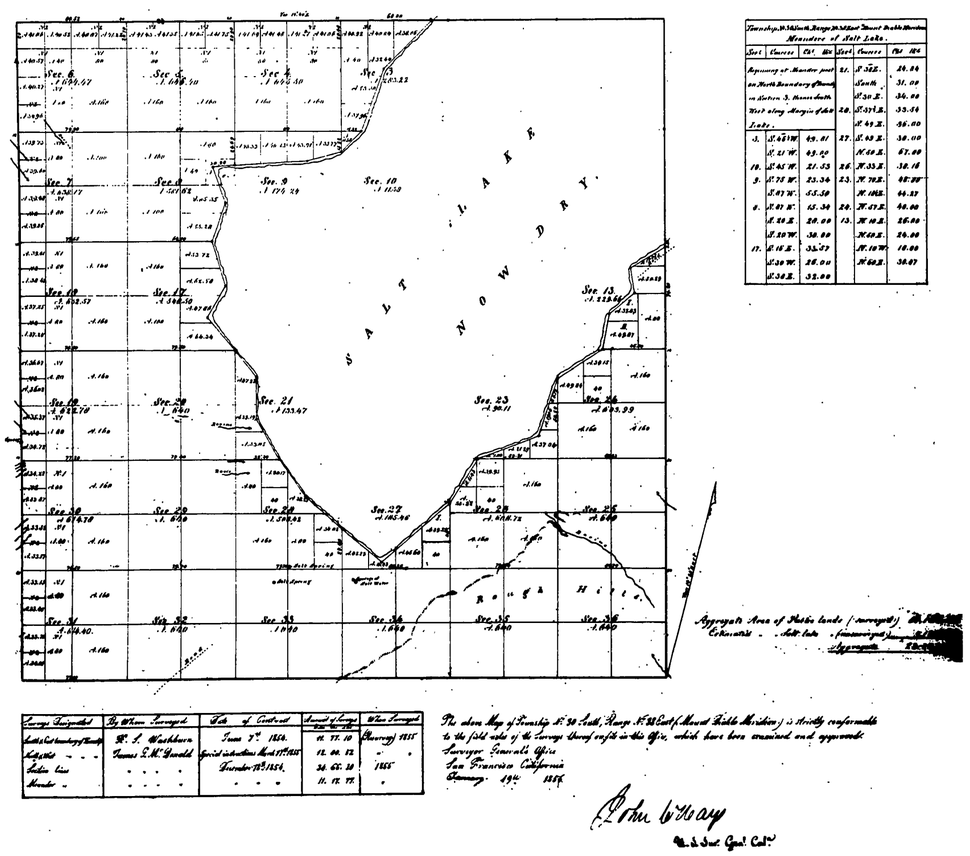


Figure 1 - Original Plat

COMPLETIONS OF KOEHN DRY LAKE BED

T. 30 S., R. 38 E., M. D. M.

43 CFR 9185.2 establishes a notification procedure whereby applicants for survey of omitted lands must notify adjacent landowners. In April of 1961 letters of notification were sent to all interested land owners near Koehn Dry Lake as contemplated by regulations outlined in 43 CFR 9185.2-2, even though the lake bed was unsurveyed land and not omitted from survey.

The field work was consequently resumed payable from Management of Land and Resources funds as a BLM project.

Conditions Found on the Ground

The resurveys and restorations by the private surveyors and county surveyors were recorded with the Kern County Surveyor and the patented lands involved were found to be occupied based upon these surveys.

The east boundary, the east four miles of the south boundary, the interior section lines and necessary meanders of the dry lake were retraced to the extent possible. The original surveys had all been monumented with mesquite wood stakes or similar material with pits and mounds. Obliteration of the original monuments was extensive and very little direct evidence of the original 1855 work was recovered.

Nine corner points were restored by single point control.

Lost section and ¼ section corners were restored by single and double proportionate measurement.

The original meanders were restored by the broken boundary method, except in section 8 where the 1949 Myers resurvey monuments were accepted. All angle points of the non-riparian meander line were monumented and marked for a fixed boundary.

For the remaining restorations, the field surveyor had to resort to the collateral evidence provided by the many private surveyors cited in the history of surveys as well as proportionate measurement methods and the original record.

Figure 7 is a sketch of the completed dependent resurvey, showing corner recovery and the final courses and distances. The west boundaries of sections 8 and 17 and the line between sections 8 and 17 west of the dry lake were not retraced because of the prohibition against entering.

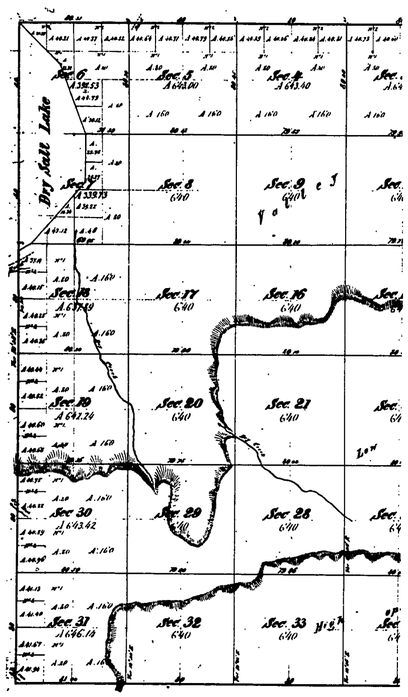
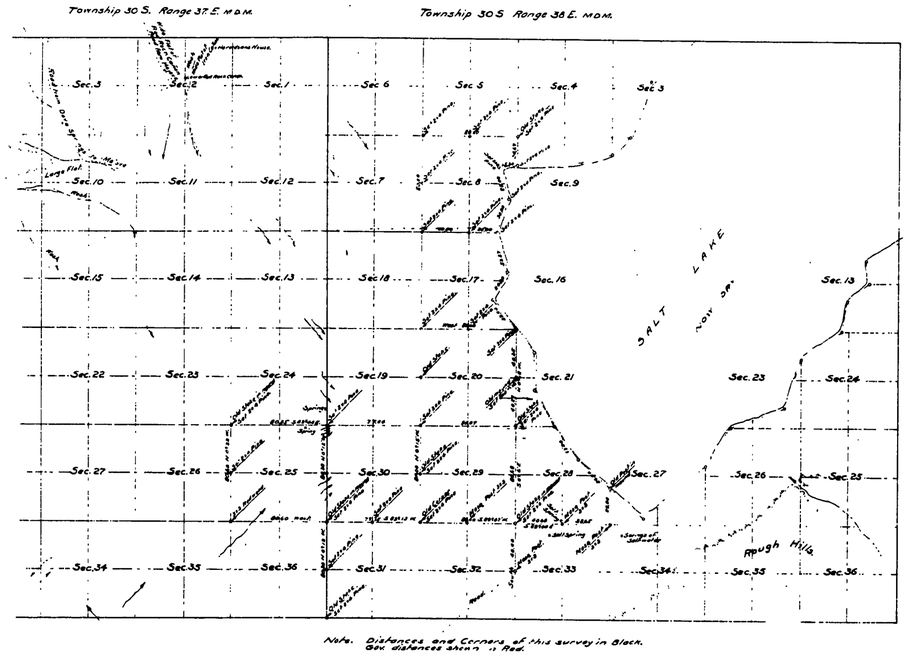


Figure 3 - Original Plat

SURVEY FOR MESSRS. DAVIS, MUNSEY AND OTHERS.

Made by M. W. Buffington. Scale 40 chs to one inch. SEAL. County Surveyor. Oct 10th & 12th 1904

Filed By M. W. Buffington Deputy Surveyor Chas. A. Lee, Recorder Feb 30th 1905



Note. Distances and Corners of this survey in Black. Old distances shown in Red.

Figure 4 - Buffington Map

Preliminary Statement of the Problem

Following completion of restoration of all the surrounding surveys, the next step was to determine which method of completing the survey of the lands within the dry lake would protect the protracted areas returned on the 1855 plat. The completion must be accomplished so as to stay within the limits of rectangularity and achieve as many normal aliquot parts as possible from the unsurveyed lands.

The Special Instructions contain an extensive treatment of the method for completion of the surveys in this dry lake bed. All of these instructions were prepared before the corner restorations began so that the methods shown were based on the record positions of the adjacent surveys.

The surveyor is instructed to perform the completions according to that method if possible.

Regulations

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

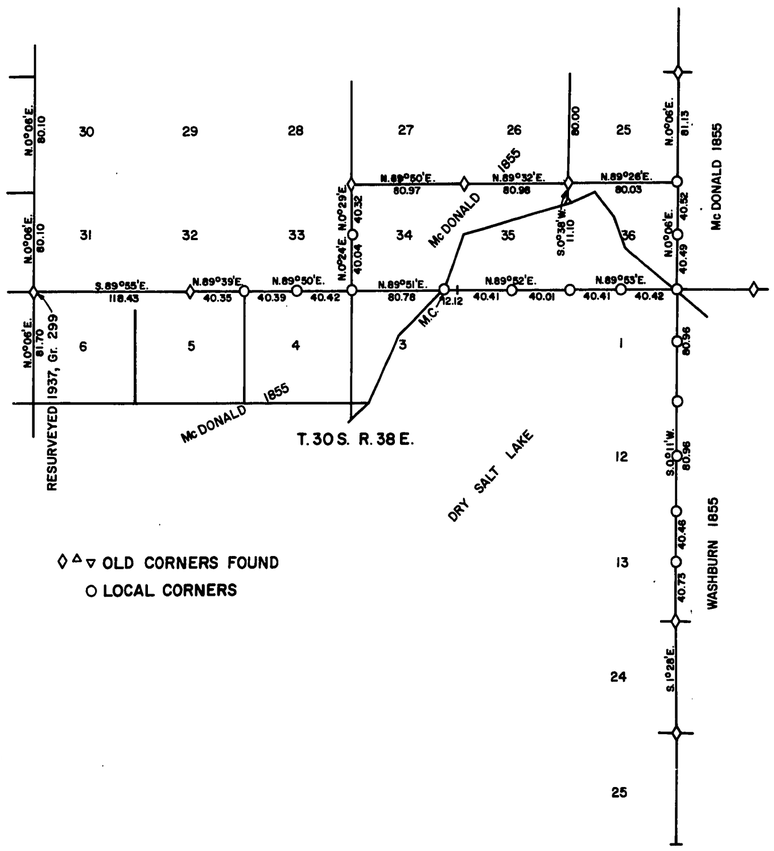
3-112 to 3-114	Completion of township subdivision
5-25 to 5-28	Single and double proportionate measurement
5-43	Broken boundaries
5-45	Single point control
6-25 to 6-32	Dependent resurvey
7-77 to 7-93	Examples of survey of erroneously omitted areas

Amended Information

The anticipated method of completion shown in the Special Instructions could not be followed. After the resurvey data was obtained and analyzed, another method was required.

COMPLETIONS OF KOEHN DRY LAKE BED

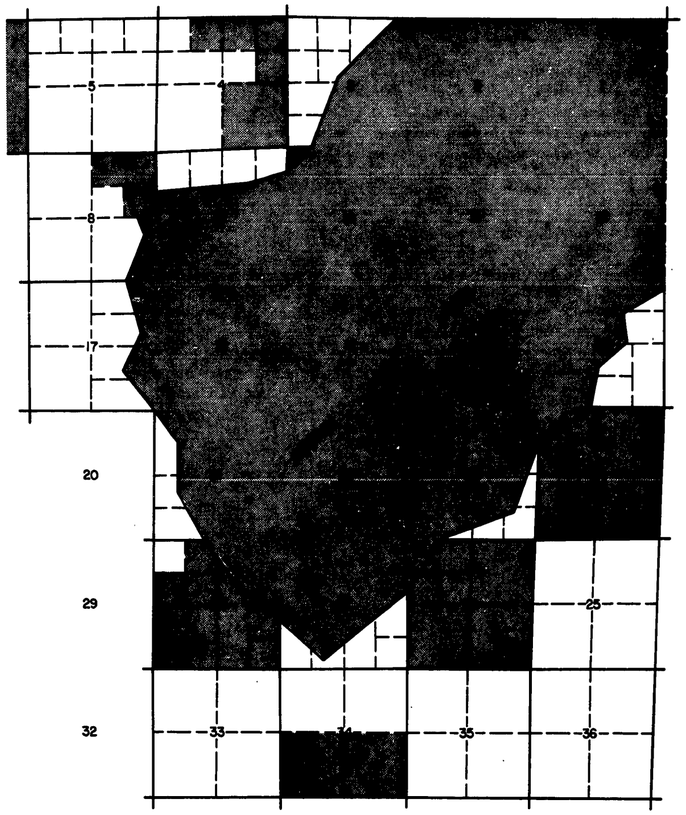
T. 30 S., R. 38 E., M. D. M.



◊ △ ▽ OLD CORNERS FOUND
○ LOCAL CORNERS

Figure 5 - 1940 Investigation by F. Wayne Forrest

T. 30 S., R.38 E., M.D.M., CALIFORNIA
STATUS DIAGRAM



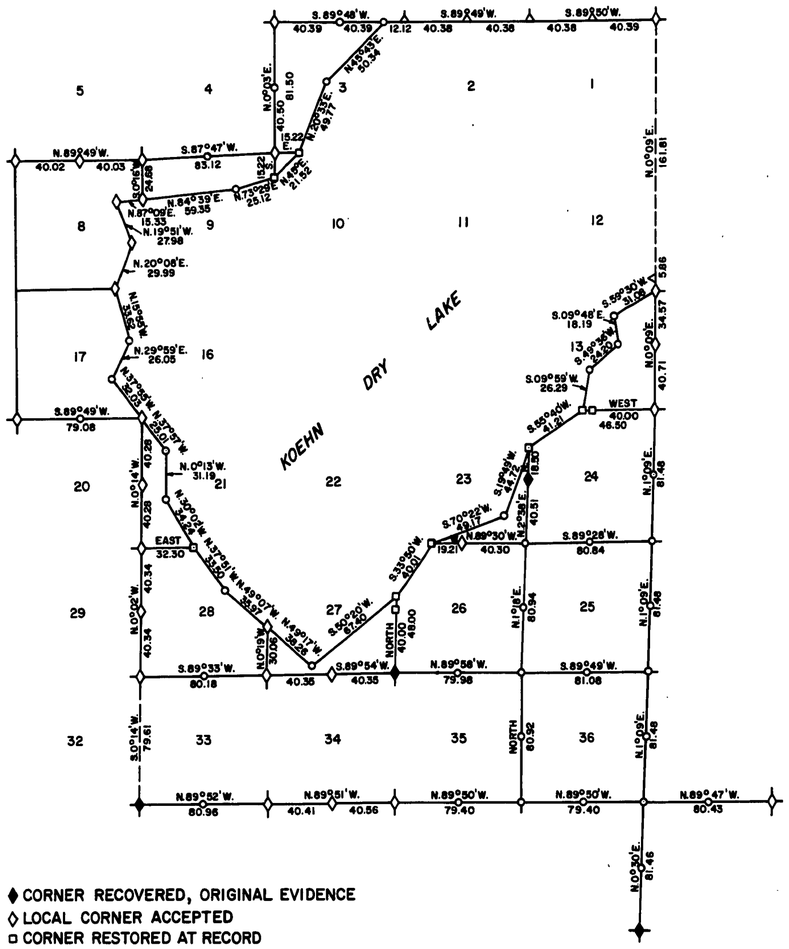
PUBLIC DOMAIN

Figure 6 - Ownership Status

COMPLETIONS OF KOEHN DRY LAKE BED

T. 30 S., R. 38 E., M. D. M.

T. 30 S., R. 38 E., M.D.M., CALIFORNIA
RESULTS OF DEPENDENT RESURVEY



♦ CORNER RECOVERED, ORIGINAL EVIDENCE
◊ LOCAL CORNER ACCEPTED
□ CORNER RESTORED AT RECORD
○ CORNER PROPORTIONED

Figure 7 - Dependent Resurvey

Final Statement of the Problem

Although a theoretical plan can be protracted for any completion survey, the final result must be based upon the data obtained in the field concerning the condition of the controlling resurveys. In this situation the survey of the fractional sections had to be executed in a manner that would protect the fractional lotting on the original plat and at the same time stay within rectangular limits within the new areas. Changes in the plan may be required during the progress of the work as closures on other surveys are made.

COMPLETIONS OF KOEHN DRY LAKE BED

T. 30 S., R. 38 E., M. D. M.

Solution

The final solution adopted, employing the procedure which follows, is illustrated by the plat accepted July 30, 1971, figure 8.

The east boundary was held to the dependently resurveyed alinement of N. 0° 09' E., from the corner of sections 12 and 13 to the township corner, with corners for sections 1 and 12 established at 40 and 80 chain intervals with the excess in the last half mile. The first meridional section line was extended N. 0° 08' E., from the meander corner of sections 23 and 24, parallel to the east boundary. The corner of sections 14 and 23 only was established at the intersection of the first meridional line with a line run due East from the corner of sections 16, 17, 20 and 21. The corner of sections 13 and 24 was established at the intersection of a line run due west from the MC of sections 13 and 24. The corners of sections 2 and 11 as well as sections 11 and 14 were established at 40 and 80 chain intervals in latitude from the southeast corner of section 14. The corner of sections 12 and 13 was established at the point of intersection with a line run due west from the corner of sections 12 and 13 on the east boundary. The ¼ section corner of section 13 was established at midpoint on the west boundary of section 13. The corners on the west lines of section 1 and section 12 were established at 40 and 80 chain intervals from the southwest corner of section 12. The first meridional line was terminated at a closing corner on the north boundary of the township. The ¼ section corner on the north boundary of section 1 was established at midpoint.

The line between sections 14 and 23 was run due West, 80 chains, and the corner of sections 14, 15, 22 and 23 was thus established. The ¼ section corner was placed at midpoint.

The line between sections 26 and 27 was extended due North from the meander corner to an intersection with a line extended due East from the MC of sections 21 and 28. The NE corner of section 27 was established at the intersection.

The southeast corner of section 22 was established at the intersection of the line extended due East from the MC of sections 21 and 28 with a line run due South from the corner of sections 14, 15, 22 and 23. The southwest corner of section 23 was established at the intersection with a line extended due West from the MC between sections 23 and 26. The ¼ section corner of section 23 was established 40 chains north of the southwest corner of the section. The ¼ section corner of section 22 was established 40 chains south of the corner of sections 14, 15, 22 and 23.

From the corner of sections 14, 15, 22 and 23 the second meridional line was surveyed N. 0° 08' E., parallel to the east boundary, to a closing corner on the north boundary. The corner of sections 10, 11, 14 and 15 was established at 80 chains; the ¼ section corner of 10 and 11 at 120 chains; the corner of sections 2 and 11 at 160 chains and the ¼ section corner of section 2 at 200 chains. The corner of sections 3 and 10 was established at the intersection of a line extended due East from the MC of sections 3 and 10. The ¼ section corner for section 3 was established 40 chains north of the southeast corner of the section. The lines between sections 2 and 11 and sections 11 and 14, were surveyed "random and true" with the ¼ section corners at midpoint. The ¼ section corner on the north boundary of section 2 was established at midpoint between closing corners.

The line between section 27 and 28 was extended due North from the MC to an intersection with the line extended due East from the MC of sections 21 and 28, fixing the corner of sections 21, 22, 27 and 28.

The ¼ section corner of sections 27 and 28 was established at midpoint.

The south ¼ section corner of section 22 was established 40 chains west of the southeast corner of the section. The north ¼ section corner for section 27 was placed at midpoint on the north boundary of that section. The ¼ section corner for sections 21 and 28 was also established at midpoint.

The line between sections 21 and 22 was run N. 0° 13' W., parallel to the west boundary of section 21, with the corner of sections 15, 16, 21 and 22 established at the intersection of the line run due West from the corner of sections 16, 17, 20 and 21. The East ¼ section corner for section 21 was set at midpoint. The West ¼ section corner for section 22 was established 40 chains south of the northwest corner of section 22 placing the excess in lots along the south side of section 22.

The ¼ section corner for sections 15 and 22 was set 40 chains west of the corner of sections 14, 15, 22 and 23, with the excess in lots along the west side of those sections. The line between sections 16 and 21 was well within limits for measurement and a common ¼ section corner was established at midpoint.

The line between sections 15 and 16 was surveyed due North, parallel to the west boundary of section 16, with the ¼ section corner set at 40 chains and the corner of sections 15 and 16 only at 80 chains.

The north boundary of section 15 was surveyed "random and true", with the ¼ section corner of sections 10 and 15 established 40 chains west of the corner of sections 10, 11, 14 and 15, and the corner of sections 9 and 10 only established at the intersection of a line extended due south from the MC of sections 9 and 10. The ¼ section corner of sections 9 and 10 was established at 40 chains north of the corner of those sections, with the excess in section 10 placed in lots along the north and west sides of the section.

The line between sections 3 and 10 was completed by establishing the ¼ corner for section 10 at 40 chains west of the northeast corner of the section. The ¼ section corner for section 3 was established 40 chains east of the corner of sections 3, 4, 9 and 10, protecting the protracted north and south centerline on the 1855 plat.

Since the line between sections 17 and 18 could not be retraced, recourse had to be made to the 1855 record for the bearing of that line. Therefore the line between sections 16 and 17 was surveyed due North, with the ¼ section corner of section 16 at 40 chains and the corner of sections 9 and 16 established at 80 chains.

The line between sections 9 and 16 was surveyed "random and true," with the ¼ section corner for section 16 set at midpoint on the north boundary of that section and the ¼ section corner for section 9 established at midpoint on the south boundary of section 9.

The west boundary of section 9 was surveyed "random and true," from the corner of sections 9 and 16 to the meander corner. It happened that the bearing of the line was an extension of the resurveyed portion lying north of the dry lake. The ¼ section corner for section 9 was set at 40 chains north of the southwest corner of the section.

The line between sections 8 and 17 was extended due east from the MC to an intersection with the west boundary of section 9, where the corner of sections 8 and 17 was established. The east ¼ section corner for section 17 was set at midpoint on the east boundary of that section. The east ¼ section corner for section 8 was placed at midpoint on the east boundary of section 8, completing the survey of the subdivisional lines in the township.

Supplementary Topic No. 1 - Rectangular Limits

Three technical errors appear on the accepted plat (in addition to the error indicated by the marginal note).

The line between sections 21 and 22 (80.56 chains) and the north boundary of section 27 (80.84 chains) are in excess of the rectangular limits (50 links) prescribed in section 3-34 of the 1973 Manual. The east ¼ corner of section 21 and north ¼ corner of section 27 were properly established at midpoint positions, but the half miles exceed the 25 link limit per half mile. The east half of section 21 and all of the north half of section 27 should have been lotted.

Supplementary Topic No. 2 - Protecting Prior Rights

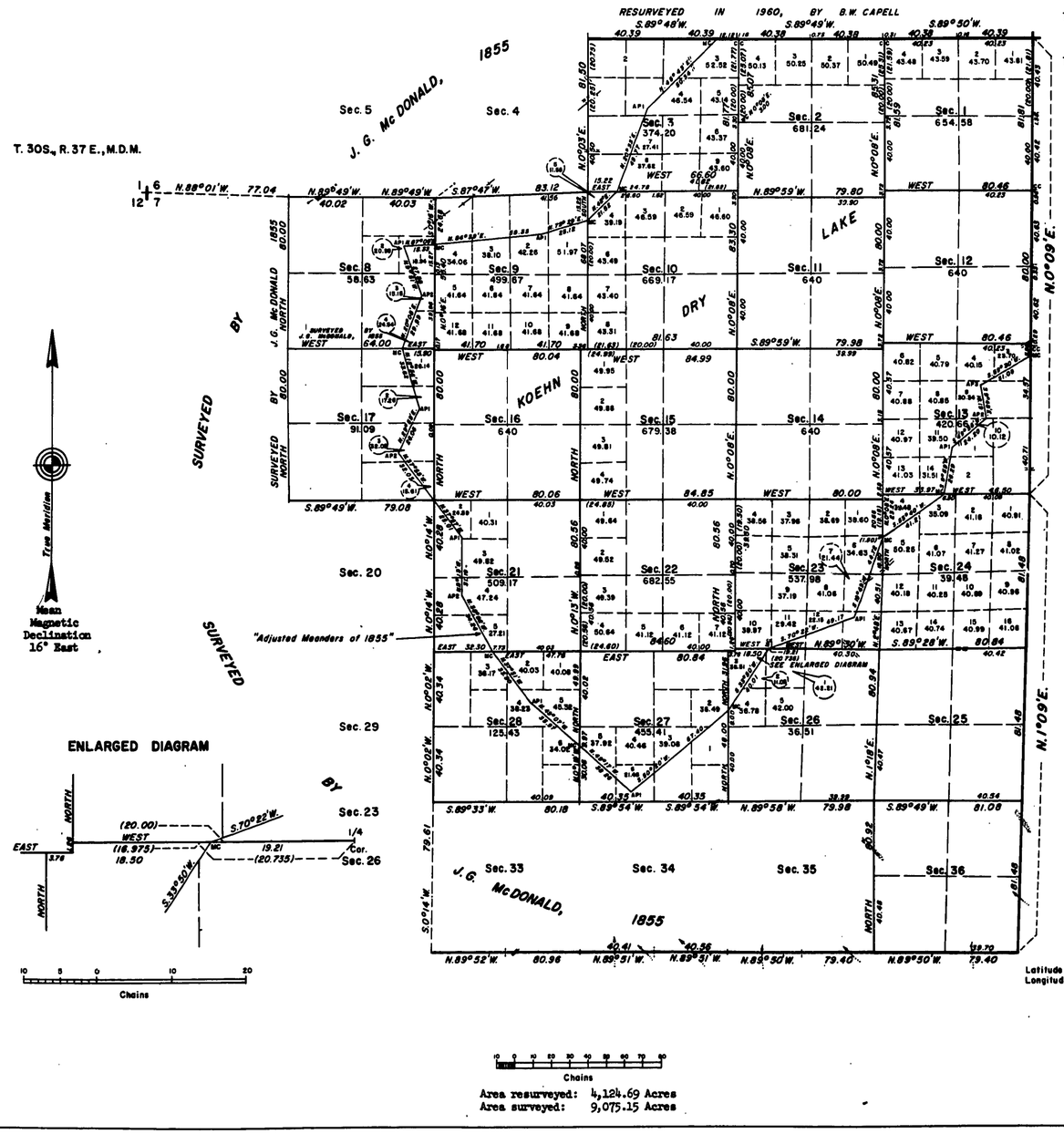
The fractional areas in section 3, as returned on the 1855 plat, are based on a length of 80.32 chains for the unsurveyed east boundary of section 3. In this resurvey the south and east boundaries of section 3 were properly completed. To properly protect the patented fractional areas in section 3, however, the corners on the east boundary of section 3 should have been proportioned on the basis of an 80.32 chain record mile, i.e., 20.36, 40.72, 61.08 and 81.77 chains. All of the (new) areas in section 3 would then be lotted with areas shown.

COMPLETIONS OF KOEHN DRY LAKE BED

T. 30 S., R. 38 E., M. D. M.

TOWNSHIP 30 SOUTH, RANGE 38 EAST, OF THE MOUNT DIABLO MERIDIAN, CALIFORNIA.

DEPENDENT RESURVEY AND SURVEY



A history of prior surveys is given in the field note record.

This plat represents the dependent resurvey of the east boundary and the meander lines of Koehn Dry Lake, a portion of the north and south boundaries and subdivisional lines, designed to restore the corners in their true original locations according to the best available evidence, and, the survey to complete the subdivision of T. 30 S., R. 38 E., Mount Diablo Meridian, California.

Except as indicated, the lottings and areas are as shown on the township plat approved January 19, 1856.

This survey was executed by Cadastral Surveyors, September 15, 1960, to December 2, 1966, under Special and Supplemental Special Instructions dated September 9, 1960, and November 2, 1966, respectively, for Group No. 464, California.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. July 30, 1971

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.

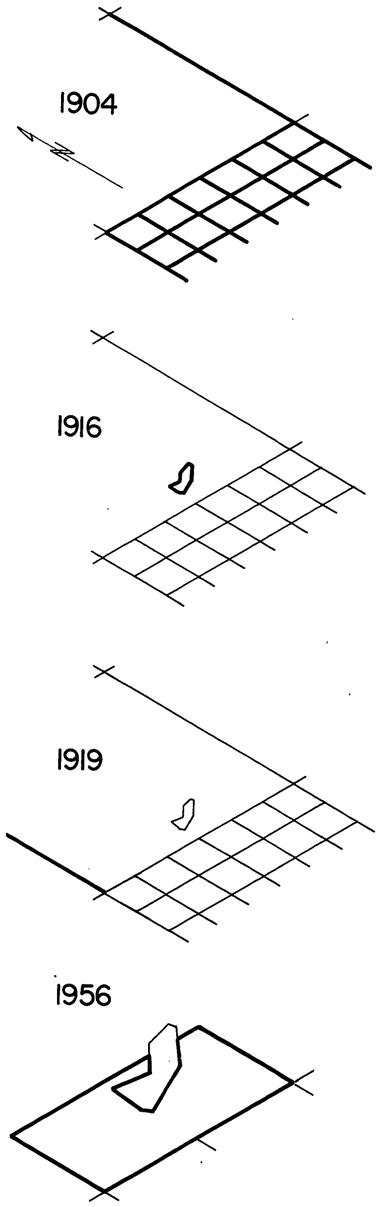
For the Director

Clark L. Thomas

Chief, Division of Cadastral Survey

Figure 8

SURVEY CONFORMING TO ERRONEOUS PATENT



History of Surveys

1904	Charles L. Campbell and Ivan E. Oakes surveyed the south boundary of T. 11 N., R. 10 E., and north boundary of T. 10 N., R. 10 E., as well as subdivisions of T. 10 N., R. 10 E.
1904	Charles L. Campbell surveyed the east boundary of T. 11 N., R.10 E.
1916	R.P.A. Johnson, Forest Service surveyor, surveyed Homestead Entry Survey No. 446.
1919	S.E. Blout surveyed the west boundary of T. 11 N., R. 10 E.
1956	Charles C. Doak, Forest Service surveyor, performed Exchange Survey No. 680.

Reasons for Request of this Survey

On May 15, 1967, Patent No. 02-67-0049 was issued by the Land Office in the Arizona State Office for the NE¼ SW¼, S½ NW¼ SW¼, S½ SW¼, W½ SE¼ of section 34, T. 11 N., R. 10 E. The patent was issued in exchange for privately owned lands elsewhere within the Tonto National Forest. Because the subdivisional lines of T. 11 N., R. 10 E. had never been surveyed, the described "section 34" did not actually exist.

A request was made to survey the land described in the erroneous patent which would require cancellation of the previous exchange survey which included the same area. This prior survey (Exchange Survey No. 680) had been accepted but no exchange of land had occurred and no patents had been issued.

This case is primarily concerned with the resurvey of the south boundary and survey of a portion of the subdivisional lines of T. 11 N., R. 10 E., and in particular with the survey of the lands in section 34, which are located within the Tonto National Forest.

Special Instructions

Exchange Survey No. 680 had to be cancelled by the Washington Office before work on this survey could begin. This cancellation was accomplished June 15, 1967.

On June 29, 1967, Special Instructions were approved for Group 456, Arizona. They provided for the resurvey of the south boundary and the south 2 miles of the east boundary, as well as the original survey of the subdivisional lines of sections 25 thru 36, and subdivision of section 34, T. 11 N., R. 10 E.

Conditions Found on the Ground

The south 2 miles of the east boundary and the entire south boundary of T. 11 N., R. 10 E., were retraced and resurveyed. The east boundary was well within limits for measurement but near the 14' "danger zone" for alinement. The south boundary was out of limits for both alinement and measurement, except the south boundary of section 36.

Corners for T. 11 N., R. 10 E., were established at 40 and 80 chain intervals in longitudinal position along the north boundary of T. 10 N., R. 10 E., counting from the corner of sections 1, 2, 35 and 36.

A sectional guide meridian was run north from the corner of sections 1, 2, 35 and 36. A sectional correction line was run west from the corner of sections 25, 30, 31 and 36 on the east boundary. At the point of intersection of these lines the corner of sections 25, 26, 35 and 36 was established. The line between sections 34 and 35 was run N. 0° 01' W., parallel to the sectional guide meridian. The sectional correction line was continued west between sections 26 and 35. At the point of intersection the corner of sections 26, 27, 34 and 35 was established. This pattern was continued until sections 31 through 36 were completed. The sectional correction line was terminated at a closing corner on the west boundary of the township. The excess or deficiency was placed in the lots against the township boundaries.

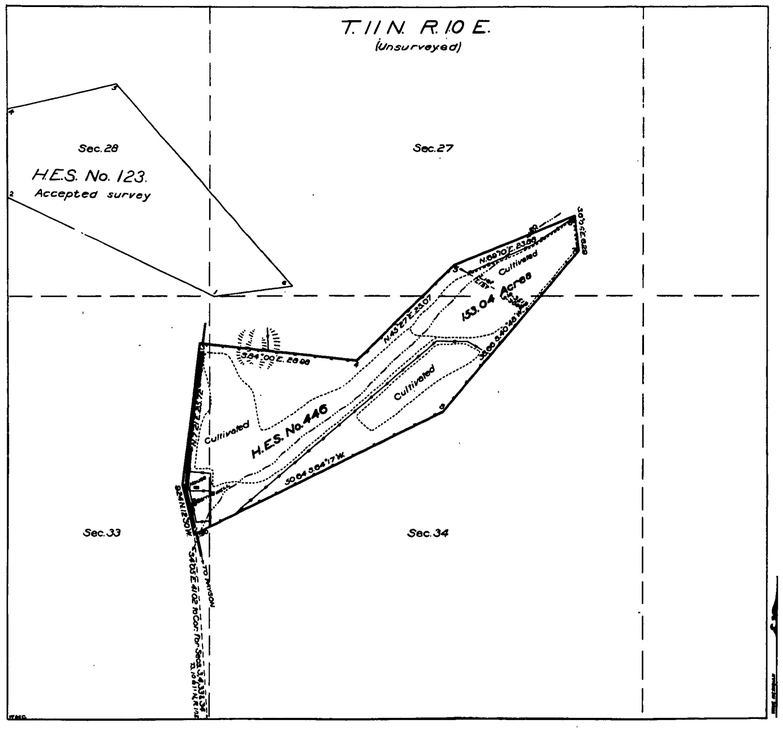


Figure 1 - H. E. S. No. 446

Sections 25 thru 30 were surveyed in the normal manner of the rectangular system, using the sectional correction line as an "auxiliary" south boundary. The excess in section 25 was placed in the lots against the east boundary of the township. Closing corners were established at the intersection of the section lines and the boundaries of all the Homestead Entry Surveys, and ties were made to the nearest angle point of each H.E.S. Figure 3 is the final accepted plat and illustrates the pattern of survey and lotting of the sections.

Section 34 was then subdivided in the normal manner as directed by the Special Instructions, as illustrated in figure 4, where the solid section subdivisional lines represent those run on the ground. A closing corner was established on the N-S centerline of the section at the intersection with line 1-8 of H.E.S No. 446.

The survey of section 34 established lots against the south boundary of the township. The above described procedure would not protect the area described in Patent No. 02-67-0049 because the S½ SW¼ of section 34 is nonexistent. Lots 6 and 7 would only approximate the same area as the S½ SW¼ of section 34, as shown in figure 4.

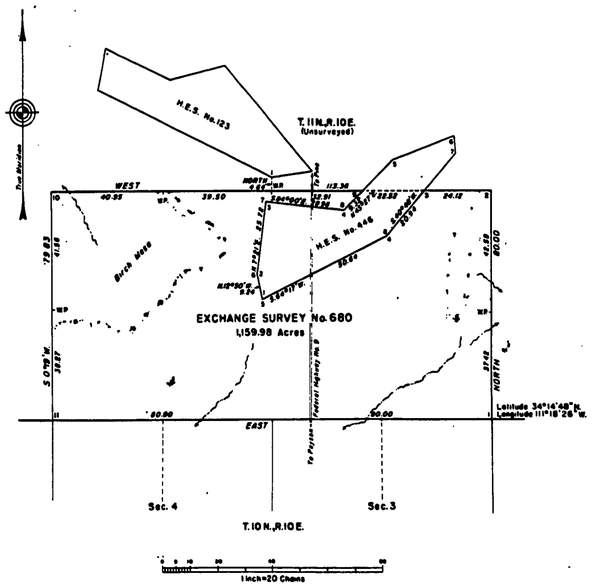


Figure 2 - Exchange Survey

Regulations

The case applys the following sections of the Manual of Surveying Instructions, 1973:

3-31 and 3-32	Retracements and resurveys
3-33 to 3-35	Rectangular limits
3-36 to 3-45	Defective exteriors
3-47 to 3-92	Subdivision of townships and sections
6-39 to 6-49	Metes and bounds surveys of private claims

SURVEY CONFORMING TO ERRONEOUS PATENT

TOWNSHIP 11 NORTH, RANGE 10 EAST, OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA

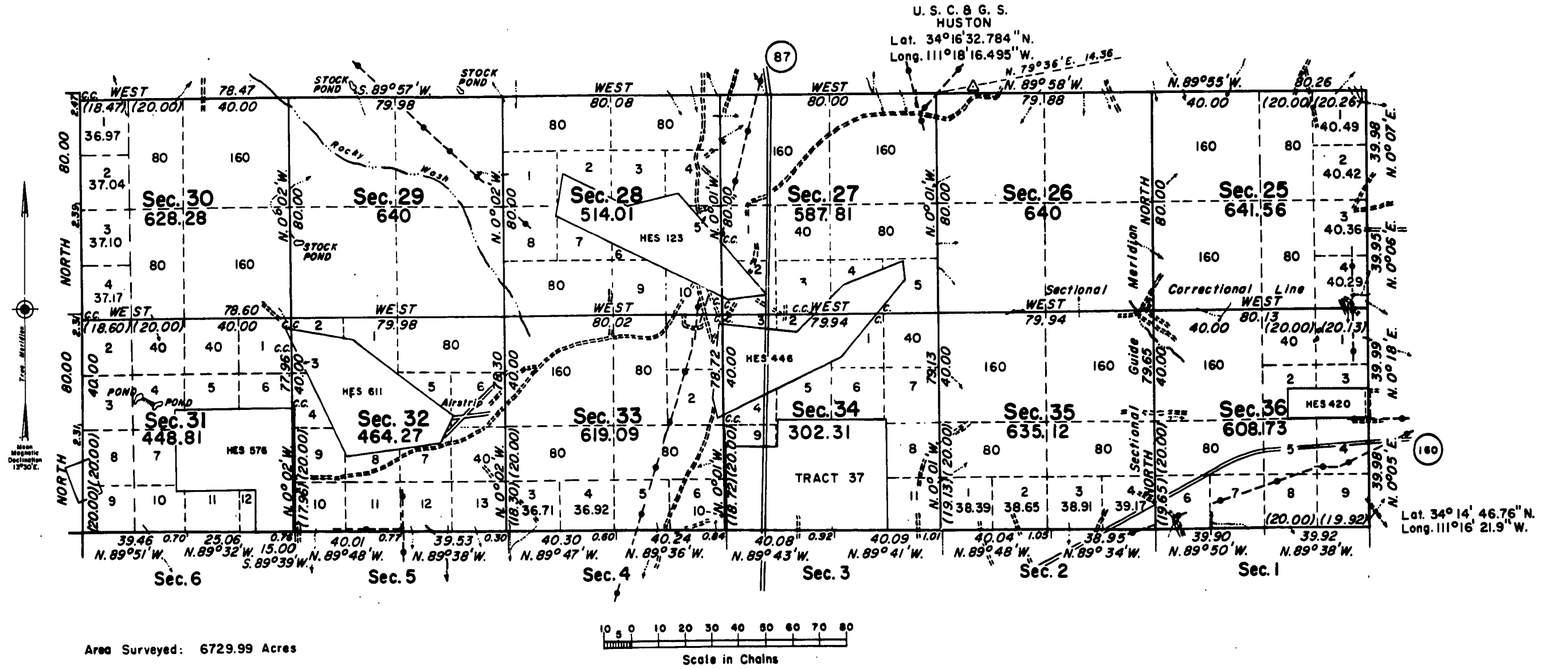


Figure 3 - Sheet 1 of Accepted Plat

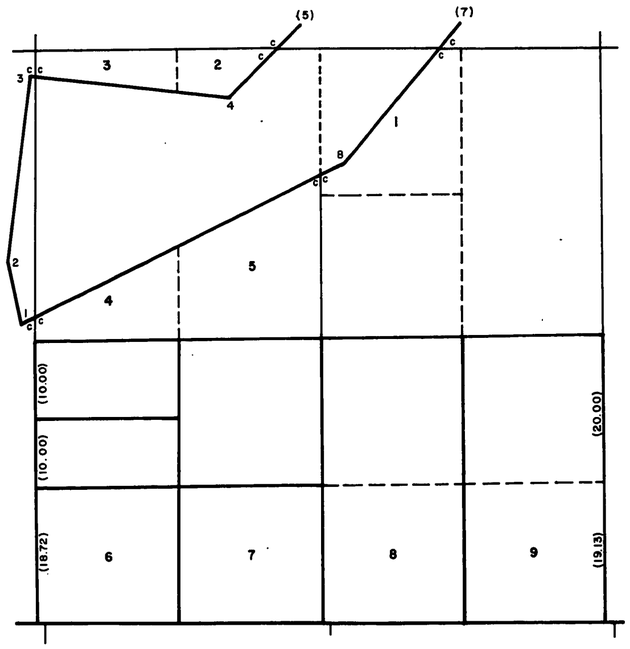


Figure 4 - Initial Subdivision

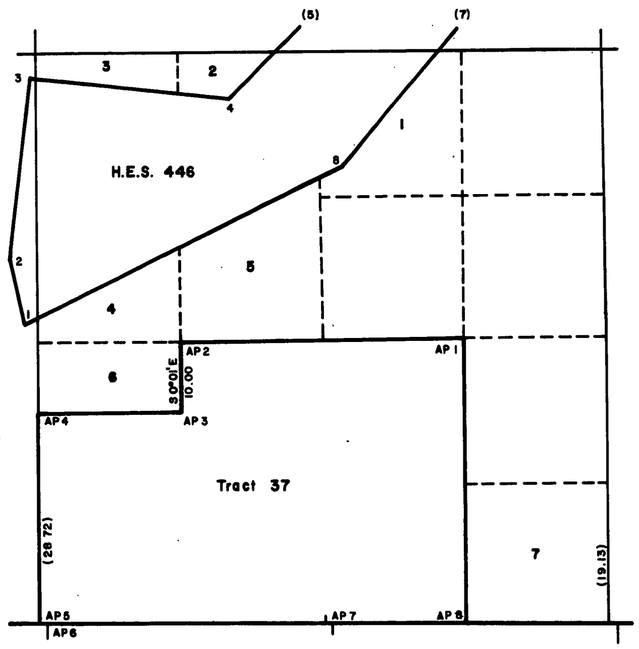


Figure 5 - Second Trial

SURVEY CONFORMING TO ERRONEOUS PATENT

Auxiliary Topic 1

Homestead Entry Surveys

Several Homestead Entry Surveys had been executed within the unsurveyed T. 11 N., R. 10 E., under the Act of June 11, 1906 (34 Stat. 233, 16 U.S.C. 506). The act provided for the survey of homesteads within a national forest where land had been classified by the Secretary of Agriculture as suitable for cultivation. These surveys were usually executed by Forest Service personnel under instructions from the BLM, and were examined and approved by the BLM. (The Enabling Acts were repealed by the Act of Oct. 23, 1962 (72 Stat. 1157) and these surveys are no longer made.)

H.E.S. No. 446 was executed in 1916 and accepted August 22, 1918. Corner No. 1 of H.E.S. No. 446 was tied to the existing corner of sections 3, 4, 33 and 34 on the north boundary of T. 10 N., R. 10 E. See figure 1.

Because patent had been issued on H.E.S. No. 446, that survey was not subject to cancellation and its boundaries were fixed.

Auxiliary Topic 2

Exchange Surveys

The Act of March 20, 1922 (42 Stat. 465) and amendments thereto, provides for the exchange of lands within National Forests, wherein the Forest Service exchanges public land for privately owned lands. The purpose is to aid in the administration of the forest lands. Patent may issue on the basis of the Exchange Survey. The Enabling Act apparently anticipated that the exchanges would be of parcels of surveyed lands described by aliquot parts of sections.

The Act of March 3, 1853 (10 Stat. 245) provided for the departure from the rectangular system of surveys of the public lands in specific areas. This was amended by the Act of April 29, 1950 (64 Stat. 93, U.S.C. 770) allowing departure from the rectangular system if used with discretion.

In 1956 the Forest Service attempted to effect an exchange of unsurveyed sections 33 and 34, T. 11 N., R. 10 E., for private lands elsewhere in the Tonto National Forest. They requested an Exchange Survey of the lands included within these theoretical sections. Special Instructions were written and approved on August 31, 1956, providing for Exchange Survey No. 680. The survey was executed by Charles C. Doak of the Forest Service in September, 1956. The survey was accepted on February 27, 1957. See figure 2. Angle points numbered 2, 9 and 10, and the four witness points were monumented. AP1 was the existing corner of sections 2, 3, 34 and 35. AP11 was the existing corner of sections 4, 5, 32 and 33. These latter corners were those established by Campbell and Oakes in 1904.

Final Statement of the Problem

Although Patent No. 02-67-0049 was issued for a described portion of section 34, no such section exists until it is surveyed, and the plat is accepted and filed in the Land Office. The land was identified by the patent but did not actually exist in fact.

From the very beginning of the rectangular system Congress did not permit the sale or disposal of the Public Domain until after it was surveyed. Most court cases dealing with patents or claims to unsurveyed lands treat the sale of unsurveyed lands as void.

In Buxton v. Traver, 130 U.S. 232 (1889) the Supreme Court said:

> No portion of the public domain, unless it be in special cases not affecting the general rule, is open to sale until it has been surveyed and an approved plat of the township embracing the land has been returned to the local land office.

Because the proposed exchange was still needed, a survey is required which would describe the land intended to be conveyed by the original (but void) description.

Solution

On August 28, 1967, Supplemental Special Instructions were written and approved. They provided for the survey of Tract 37 which was to include the approximate area described in the premature patent. The description of the tract was surveyed as outlined by the illustration in figure 5. AP1 is the C-E 1/16, AP2 is the C-W 1/16, AP5 is the corner of sections 34 and 35, AP7 is the ¼ corner of section 3, AP8 is the E 1/16 of section 34. The line of AP3 to AP4 is parallel to the E-W centerline of section 34.

The Washington Office did not accept this solution to the problem of protecting the premature patent because this Tract 37 was still controlled by the subdivision of section 34 as actually surveyed. Another solution was suggested.

On April 30, 1968, amended Supplemental Special Instructions were approved. They provided for the survey of Tract 37, section 34, based on the survey and subdivision of section 34 but using the corners established along the south boundary in 1904. Thus the survey of Tract 37 would be based on the method of surveying a partial section as outlined in sections 3-93 to 3-95 of the Manual of Surveying Instructions, 1973, using the 1904 corners as the basis of the survey. The original south boundary of section 34 is within limits for both alinement and measurement and could, in theory, be surveyed as an individual section.

The survey of Tract 37, as finally accepted, does define and create the boundaries of the land intended to be conveyed by the patent. The approved field notes contain the following memorandum preceding the survey of Tract 37:

Survey of Tract 37, Section 34
Township 11 North, Range 10 East

Comprising the following described lands:

1 NE¼ SW¼, S½ NW¼, S½ SW¼, W½ SE¼, Sec. 34, T. 11 N., R. 10 E., under Patent No. 02-67-0049, Arizona.

The location of this tract is based upon the subdivision of section 34, had the boundaries and section subdivision been run regular commencing at corners established on the south boundary of the township by Campbell and Oakes in 1905.

The N-S and E-W center lines of section 34 were run and temporary points set to control the survey of the tract.

The above explanatory comments regarding Tract 37 set forth the intent of the survey and protect the previously issued patent which calls for an area described by aliquot parts of a section. Those parts do not exist in fact and never will exist.

The retracement data already acquired served as the basis for protracting the theoretical survey and subdivision of section 34. The computed courses and distances around the exterior boundaries and subdivisional lines are illustrated by figure 6. Tract 37 was finally surveyed on the protracted, theoretical courses and distances of the boundaries of the subdivisions of section 34, described in the premature patent. The previously set corners of the tract were removed. The previously monumented angle and witness points of the cancelled Exchange Survey No. 680 were tied in and then removed and the accessories destroyed. The plat was accepted on February 5, 1969, in 6 sheets. Figure 7 is sheet number 5 and shows the final survey of section 34.

There may have been another way to protect the patent. Section 34 might have been surveyed individually, field notes and plat prepared and accepted. The township could then have been completed at a later date in a manner protecting the previously surveyed section 34. This method would, however, have created more lots and "double corners" than the plan which was used.

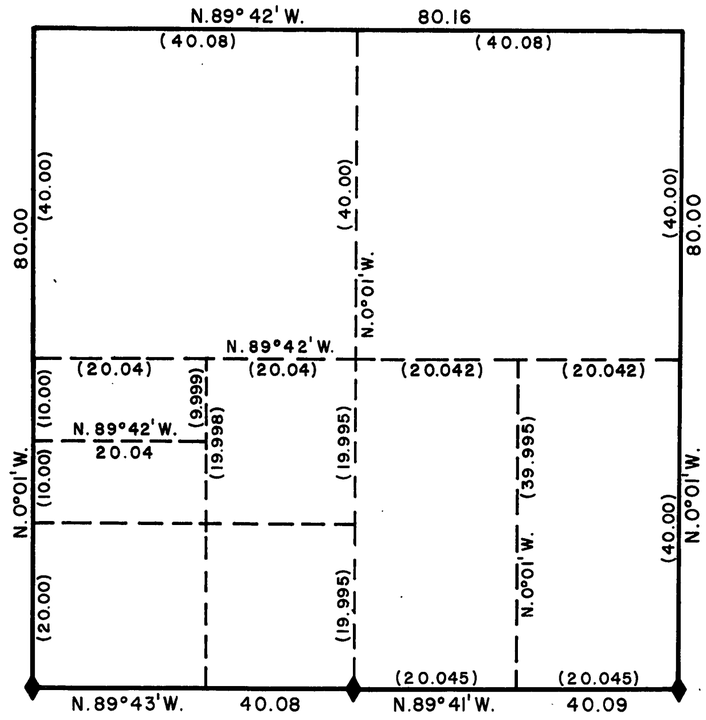


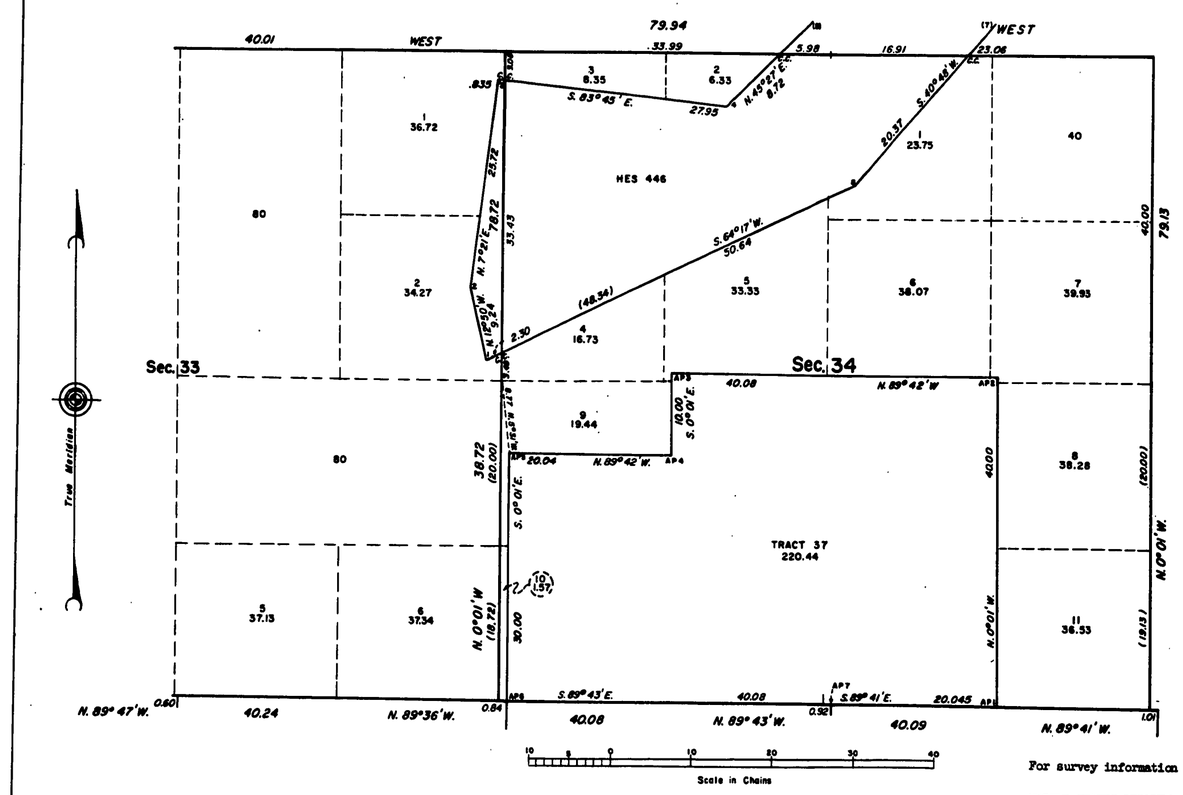
Figure 6 - Protraction of Section 34

SURVEY CONFORMING TO ERRONEOUS PATENT

Sheet 5 of 6

TOWNSHIP 11 NORTH, RANGE 10 EAST OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA

ENLARGED DIAGRAM OF SECS. 33 & 34



Index to Segregated Tract

No.	Entry and Status	Tp.	Rg.	Sec.	Subdvn.
37	Fx. Pat. 02-67-0049 Ariz.	11	10	34	NE1/4 SW1/4 S1/2 NW1/4 SW1/4 S1/2 SW1/4 W1/2 SE1/4

For survey information see Sheet No. 1.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. February 5, 1969

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.

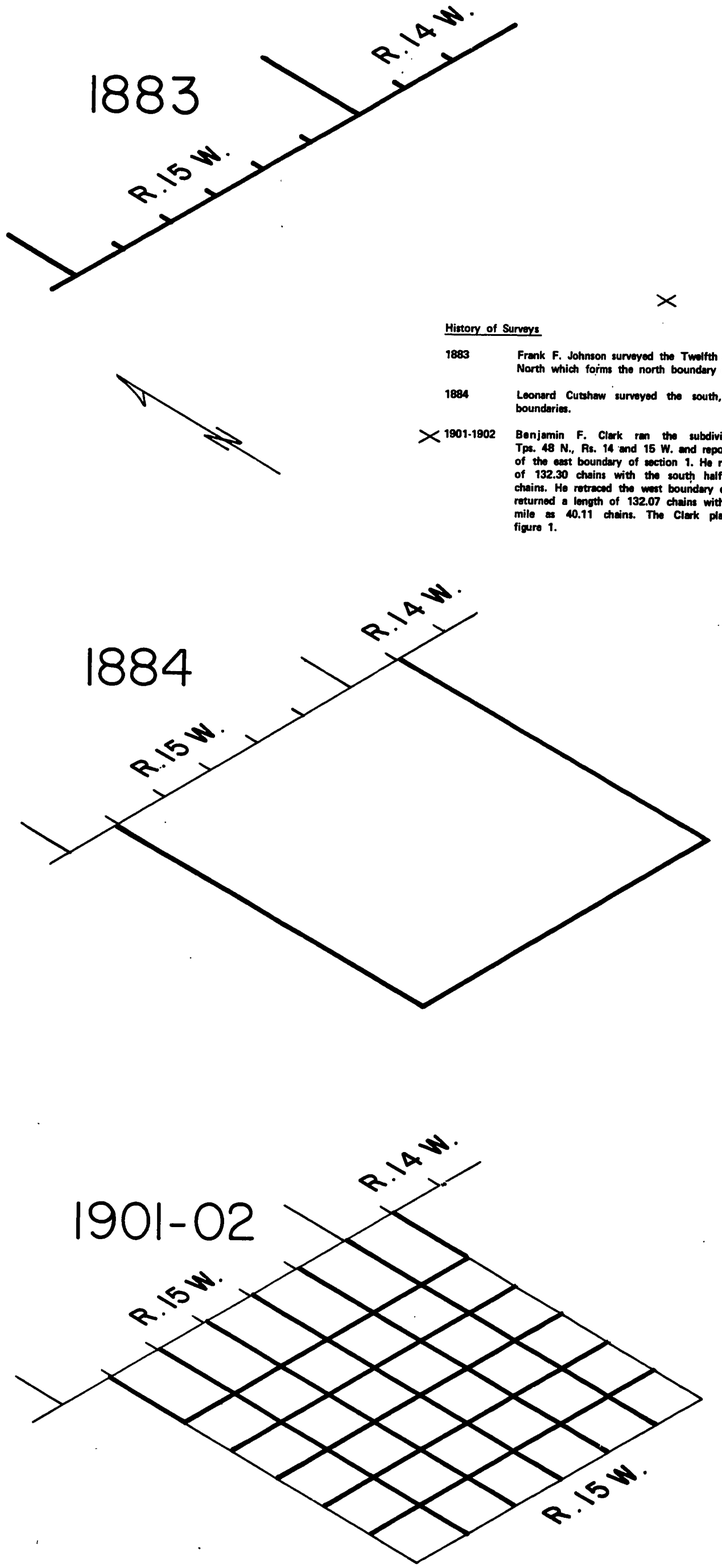
For the Director

Acting Chief, Division of Cadastral Survey

Figure 7 - Accepted Plat of Section 34

INDEPENDENT RESURVEY IN UNCOMPAHGRE FOREST

T. 48 N., R. 15 W., N. M. P. M.



History of Surveys

1883	Frank F. Johnson surveyed the Twelfth Standard Parallel North which forms the north boundary of the township.
1884	Leonard Cutshaw surveyed the south, east and west boundaries.
1901-1902	Benjamin F. Clark ran the subdivisional lines of Tps. 48 N., Rs. 14 and 15 W. and reported retracement of the east boundary of section 1. He returned a length of 132.30 chains with the south half mile as 40.08 chains. He retraced the west boundary of section 6 and returned a length of 132.07 chains with the south half mile as 40.11 chains. The Clark plat is shown in figure 1.

Reasons for Request of this Survey

Between 1906 and 1964, patents based on the Clark plat were issued for portions of sections 10, 19, 20, 21, 28, 29 and 30.

All the unpatented areas in the township except sections 19, 20 and 21 as well as 28 thru 33 were withdrawn from entry by Presidential Proclamation dated March 1, 1907. The withdrawn area became part of the Uncompahgre National Forest.

In 1921 E.H. Kimmell remonumented the closing corner of sections 5 and 6, which Clark had established on the standard parallel, 1.98 chains east of the standard corner of sections 32 and 33. Clark described the standard corner he found as being a spruce stump with scribe marks. In the original notes Johnson described the standard corner of sections 32 and 33 as a sandstone 20 x 15 x 6 inches without bearing trees.

In 1934 the U.S. Coast and Geodetic Survey extended the horizontal control net over the area. The remonumented closing corner of sections 5 and 6 was used as a station of the net and designated "G.L.O. No. 9." It was tied to station SPRUCE located on Spruce Mountain.

In 1944 local surveyors and the U.S. Geological Survey reported a tie from the properly marked corner of sections 3, 4, 9 and 10 to station SPRUCE. The relationship of the two original corners to original corners on the exterior boundaries of the township revealed a displacement of approximately one mile. The interior corners were nearly one mile too far east in relation to the boundaries.

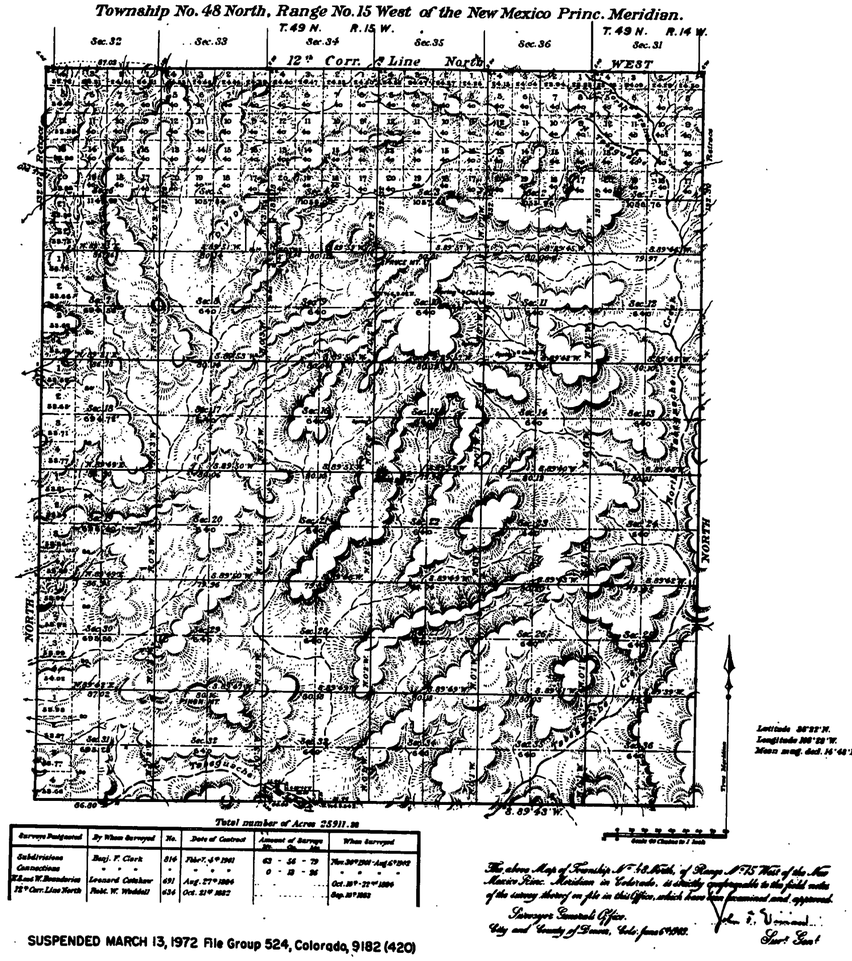
Cadastral Engineer John S. Knowles investigated the reported tie from station SPRUCE to the corner of sections 3, 4, 9 and 10 and found it correct.

In 1951 the U.S. Forest Service made a new base map of the Uncompahgre National Forest. This base map was controlled by the triangulation net and showed recovered original corners along the exterior boundaries and interior subdivision corners. This map also revealed the nearly one mile displacement of the interior corners.

In cooperation with the Forest Service a preliminary field investigation was made which verified the one mile displacement, that is: the corner marked as the corner of sections 3, 4, 9 and 10 occupies the theoretical position of the corner of sections 2, 3, 10 and 11.

The third meridional line and third latitudinal lines in the township define the south and west boundaries of a portion of the Uncompahgre National Forest.

Because the true position of the forest boundary is required to properly administer the forest lands, the resurvey of the township was requested by the Regional Forester, U.S. Forest Service in 1965.



Surveys Designated	By Whom Surveyed	No.	Date of Contract	Amount of Surveys	When Surveyed
Subdivisions Connections N.Bdry W.Boundaries 12th Corr. Line North	Benj. F. Clark " " " Leonard Cutshaw Robt. W. Waddell	816 " " 691 634	Feb'y. 4th 1901 " " " Aug. 27th 1884 Oct. 21st 1887	63 - 54 - 79 0 - 13 - 56	Nov. 30th 1901-Aug. 6th 1902 " " " Oct. 31st-22nd 1884 Sep. 21st 1887

SUSPENDED MARCH 13, 1972 File Group 524, Colorado, 9182 (420)

Figure 1 - Original Plat

Special Instructions

Special Instructions prepared for Group 524, Colorado, on April 27, 1965, provided for the resurvey of the exterior boundaries and subdivisional lines of T. 48 N., R. 15 W.

It was known from the preliminary investigation that adequate control was available for a dependent resurvey of the exterior boundaries and that these boundaries were deficient for alinement and measurement as a basis for an independent resurvey.

The surveyor was instructed to dependently resurvey the exterior boundaries, restoring lost corners by proper proportionate methods but marking the corners on the south, east and west boundaries as corners of minimum control for the townships to the south, east and west. The northeast and northwest corners of T. 48 N., R. 15 W., (both closing corners) were to be restored based on the Clark record, but no other closing corners along the north boundary between those points were to be restored.

The patented lands within the township were to be surveyed as tracts, based on the position these tracts actually occupied. It was anticipated that the patented lands in sections 19, 20, 21, 28, 29 and 30 had been located in relation to the west boundary of the township. If this were the case those lands would be located about one mile west of the position indicated by the Clark interior corners. The tract segregations would honor the actual location rather than the patent description, yet retain the areas and shapes as described.

After segregating the patented lands the township was to be independently resurveyed by establishing new corners along the east boundary at 40 and 80 chain intervals latitudinally along that boundary. 1/16 80, 1/16 100 and 1/16 120 section corners were to be established for section 1.

INDEPENDENT RESURVEY IN UNCOMPAHGRE FOREST

T. 48 N., R. 15 W., N. M. P. M.

New corners for T. 48 N., were to be established at 40 and 80 chain intervals in longitude along the south boundary, counting from the southeast corner of the township, with the excess in the south boundary of section 31.

From the new corner of sections 25 and 36 a sectional correction line would be run west across the township to a closing corner on the west boundary.

From the new corner of sections 35 and 36 on the south boundary a sectional guide meridian would be run N. 0° 01' W. to a closing corner on the north boundary. At the intersection of the sectional guide meridian and the sectional correction line the corner of sections 25, 26, 35 and 36 would be established with all corners further north at 40 and 80 chain intervals. This "pattern" would be followed throughout the remainder of the township with fractional lots placed against the north, east, south and west boundaries, creating as many new regular aliquot parts as possible.

It was anticipated that the patented lands were one mile out of position in relation to the old corners, as marked, and that those patent lines would conform to the new lines of the independent resurvey. If this were true the claim lines would be in conformity, by description, with the new section lines. If this was not the case the true conditions were to be reported when all information was fully developed.

Assignment Instructions

The field work was assigned on June 30, 1965. Work began on July 6, 1965.

Conditions Found on the Ground

Figure 2 illustrates the actual conditions found and the original corners recovered. Most of the Clark corners were recovered around section 10. The corner of sections 15, 16, 21, and 22, on Round Mountain, was a sandstone properly marked as described by Clark. From the corner of sections 15, 16, 21 and 22 the Cutshaw corner of sections 13, 18, 19 and 24, on the west boundary, was N. 89° 58' W., 307.07 chains distant, or 60 chains more than the record. From the corner of sections 15, 16, 21 and 22 a fence extended N. 89° 58' W. a distance of 2½ miles, along the posted national forest boundary. The occupied patented lands were located south of the fence. No other corners were recovered within the southwest quarter of the township. The old buildings of "Club Camp" are located in the patented S½ NE¼ section 10, as shown on Clark's plat. These conditions were reported, as directed by the Special Instructions.

Preliminary Statement of the Problem

The problem to be resolved is how to resurvey the township and protect the bona fide rights of the holders of the patented lands. The land owners in sections 19, 20, 21, 28, 29 and 30 are present and available for consultation. The owner of the patented land in section 10 is absent and unavailable.

Regulations

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

6-5	Independent resurvey
6-12 to 6-18	Bona Fide Rights of Claimants
6-33 to 6-56	Resurveys - independent resurvey
9-84 to 9-111	Resurvey plats

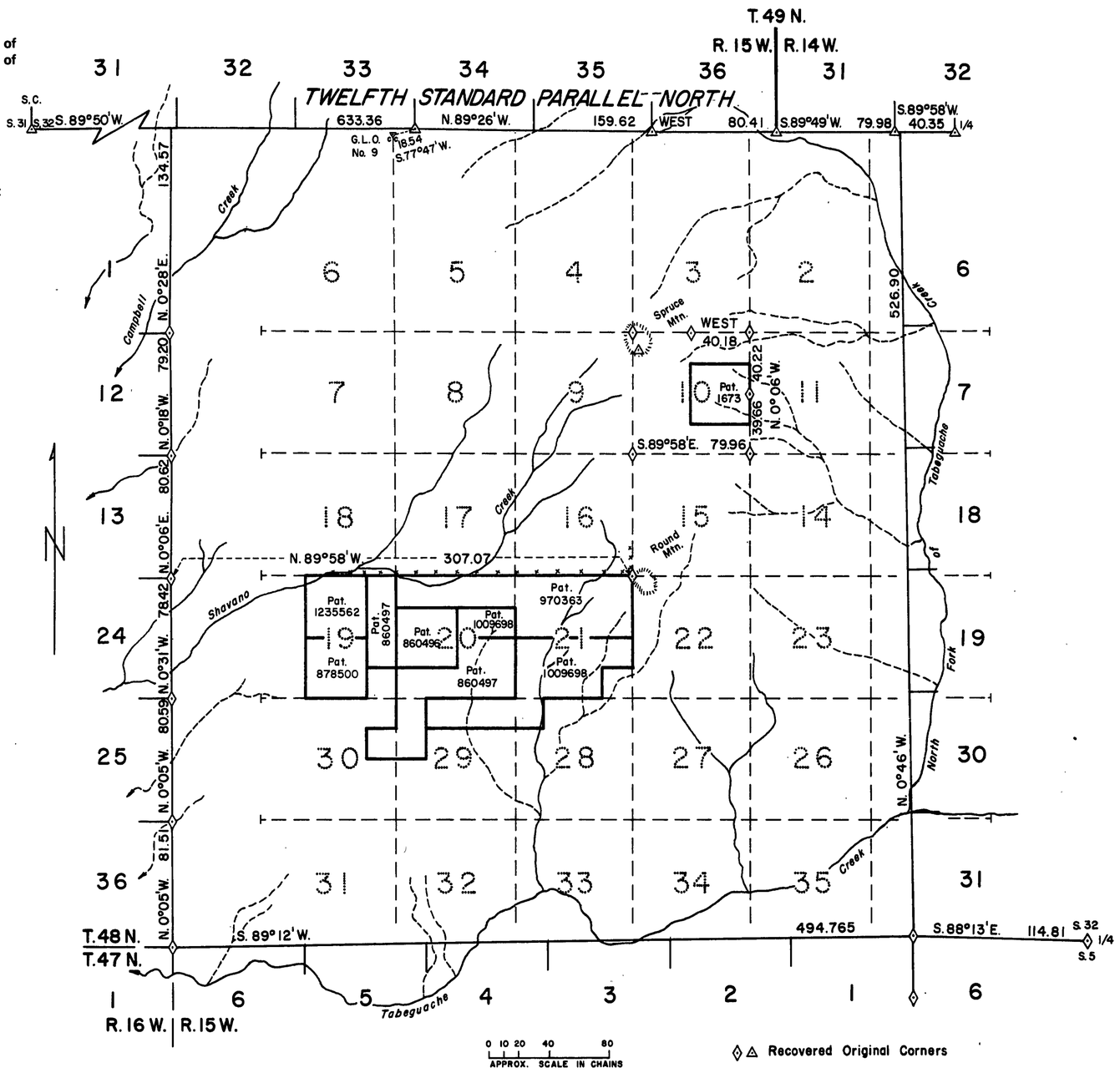


Figure 2 - Conditions Found

INDEPENDENT RESURVEY IN UNCOMPAHGRE FOREST

T. 48 N., R. 15 W., N. M. P. M.

Changes in Instructions

Amended Special Instructions, dated August 15, 1966, directed that the patented lands be segregated by metes and bounds (tract) surveys and excluded the resurvey of sections 1 through 18, 21 through 27 and 34 through 36.

Final Statement of the Problem

Perform the necessary surveys in compliance with the Manual of Surveying Instructions.

Solution

Figure 3 is the plat of the Independent Resurvey as accepted May 22, 1972.

Tract 37 is the identical parcel of land called for in the corresponding patent as defined by the dependent resurvey and subdivision of section 10 based on the recovered original corners. The N 1/16 section corner of sections 10 and 11 was monumented, designated and marked for Angle Point No. 1 of Tract 37. The center N 1/16 section corner of section 10 became Angle Point No. 2, the center S 1/16 section corner became Angle Point No. 3 and the S 1/16 section corner of sections 10 and 11 became Angle Point No. 4. The original corner monuments of the section were buried in place.

Metes and bounds surveys of Tracts 38 through 45 were made after consultation with and agreement between the owners of those tracts. All lines were based on the corner of sections 15, 16, 21 and 22 and the fence extending N. 89°58′ W. therefrom. The easterly and westerly tract boundaries were made north-south lines. The northerly and southerly lines were made parallel to the fence. Distances were fixed in units of 20 chains and multiples of 20 chains. Each tract contained the exact area of land called for in the corresponding individual patents. All angle points were numbered counterclockwise beginning with Angle Point No. 1 at the most northeasterly corner of the tract. All were monumented and appropriately marked for the corner or corners of adjoining tracts, if any. Section numbers were not added to the markings. The tracts were numbered in sequence from east to west and west to east in the manner normally used for lot numbering of fractional sections.

The exterior boundaries were dependently resurveyed as directed in the Special Instructions. New corners were established at 40 and 80 chain intervals on the east and south boundaries as anticipated. The sectional correction line was run, without monumentation, west from the corner of sections 25 and 36 to an intersection with the line run N. 0° 02′ W., between sections 33 and 34 where the corner of sections 27, 28, 33 and 34 was established and monumented. This pattern was continued in the survey of sections 32 and 33. The sectional correction line was terminated at a closing corner on the west boundary.

The line between sections 27 and 28 was terminated with a closing corner on the south boundary of Tract 45. A closing corner was set on each section line where the line entered or left patented lands. The excess length of section 19 and sections 30-33 was placed against the south and west boundaries as appropriate. See figure 3, the accepted plat.

The marginal data on the plat includes an "Index to Segregated Tracts." This index includes the tract number, type of patent, patent number, date of patent, serial register designation or number, township, range and section number and the subdivision of section description as given in the patent.

Prior to July 1, 1908, when the serial register numbering system came into use, the patents were designated by number and name of the issuing office. Tract 37 was Cash Entry patent number 1673, issued in the Ute Land District.

Prior to the acceptance of the independent resurvey the Washington Office was requested to suspend the 1901-02 Clark surveys and plat. The plat was suspended by memorandum dated March 13, 1972. The request for suspension of the plat should have been made prior to execution of the independent resurvey. This action is necessary to prevent any further entries, exchanges or other actions based on the old plat.

The Clark plat approved June 6, 1903, was cancelled upon acceptance of the independent resurvey plat on May 22, 1972.

Supplemental Topic No. 1

The tie given in the field notes and on the accepted plat, (figure 3) from Angle Point No. 2, Tract 37 to station SPRUCE is in error. This tie should be approximately N. 70° 56′ W., about 40.16 chains distant. The geographic position of station SPRUCE is:

Latitude 38° 26′ 03.386″ N.

Longitude 108° 30′ 09.193″ W.

The geographic position of the now cancelled closing corner of sections 5 and 6, which was re-marked and is now station GLO No. 9, only, is:

Latitude 38° 27′ 34.18″ N.

Longitude 108° 32′ 24.22″ W.

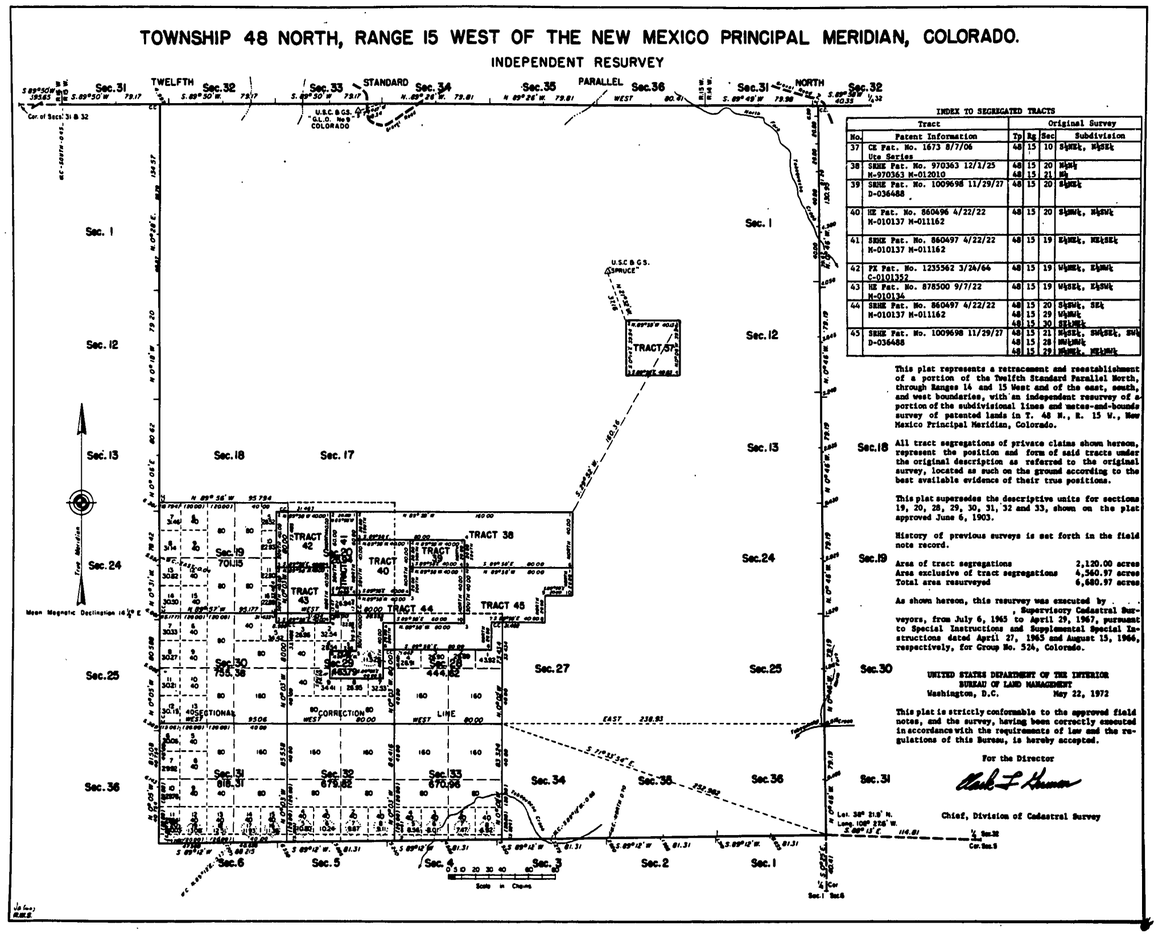
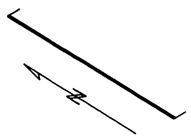


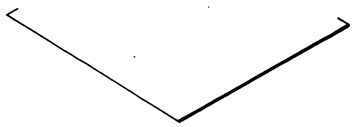
Figure 3 - Plat of Independent Resurvey

SUBDIVISION OF ELONGATED SECTION 4

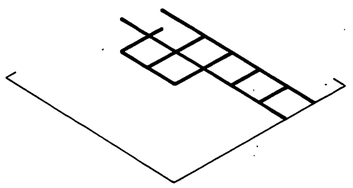
1867



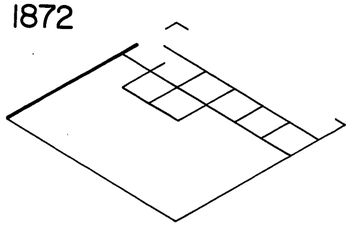
1867



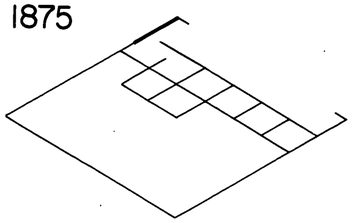
1869



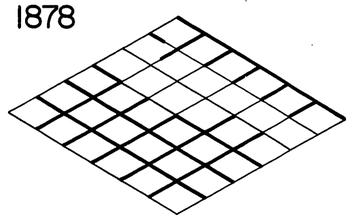
1872



1875



1878



History of Surveys

1867	W.F. Ingalls surveyed the west boundary.
1867	E.H. Dyer surveyed the south boundary.
1869	Thornton F. Battele surveyed a portion of the subdivisional lines. See figures 1a and lb.
1872	William Minto surveyed the west 4½ miles of the north boundary of the township. Minto's field notes made no reference to the Battele corner of sections 2, 3, 34 and 35.
1875	Edward A. Von Schmidt surveyed the east 1½ miles of the north boundary beginning his completion at the Minto ¼ section corner of sections 2 and 35.
1878	John A. Benson surveyed the east boundary of the township, running "random and true" between the Dyer southeast corner and the Von Schmidt northeast corner of the township. Benson then completed the subdivisional lines of the township, as partially illustrated in figures 2a and 2b. Benson found a gross error in the south half of Battele's line between sections 34 and 35, displacing the corner of sections 26, 27, 34 and 35 southerly. Benson accepted Battele's corners as common to his survey which forced a strong bearing into his lines.
1914	Benjamin L. McCoy, Butte County Surveyor, resurveyed in the SE¼ of section 3; he found and perpetuated the ¼ section corner of sections 3 and 10.
1957	Jesse A. Bumgarner, Registered Engineer No. 2435, resurveyed a portion of section 3, as shown by a map recorded in Book 22, page 26, Butte County records. Bumgarner's map indicates that he found the ¼ corner of sections 3 and 4. He also remonumented the corner of sections 9, 10, 15 and 16.
1963 & 1966	John W. Hamby, Land Surveyor No. 2843, surveyed portions of sections 3 and 10. Hamby's maps indicate that he did not use the McCoy perpetuation of the ¼ corner of sections 3 and 10 nor the Bumgarner ¼ corner of sections 3 and 4. Hamby did not use any proportionate method of restoring the lost corner of sections 3, 4, 9 and 10.

Reasons for Request of this Survey

Lots 2, 3 and 4 as well as the west half of lot 5 and the west half of lot 8 were the only Federal lands remaining unpatented within section 4, T. 22 N., R. 4 E. This survey was requested to identify those public lands.

Special Instructions

Special Instructions were issued for this survey in 1965 with Supplemental Special Instructions for Group 521, California, issued on May 9, 1966. The Supplemental Instructions provided for the dependent resurvey of the boundaries of section 4, T. 22 N., R. 4 E., and survey of the subdivisional lines to the extent necessary to mark the boundaries of Federal lands within the section.

Township N.º 22 North. Range N.º 4 East Mount Diablo Meridian

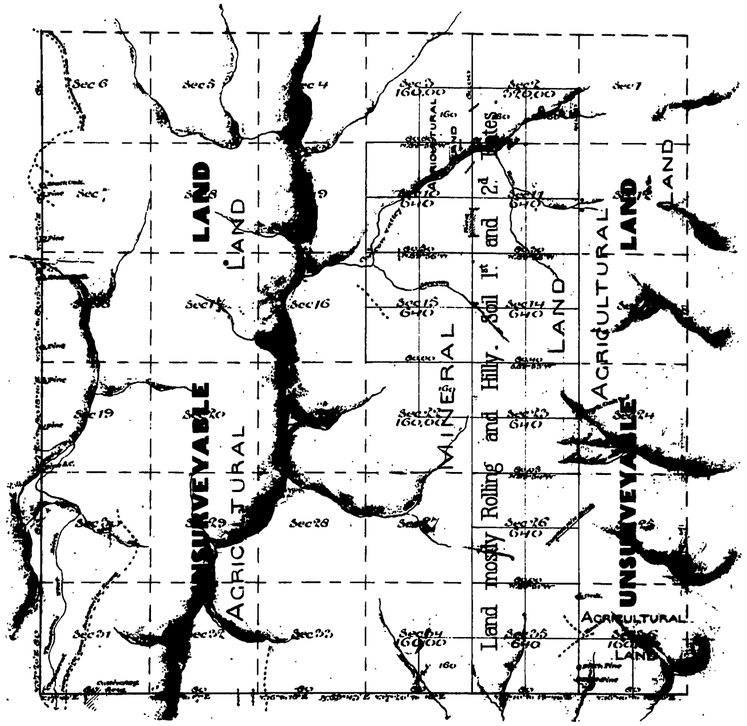


Figure 1a - Batelle Plat

T. 22 N., R. 4 E., M.D.M.

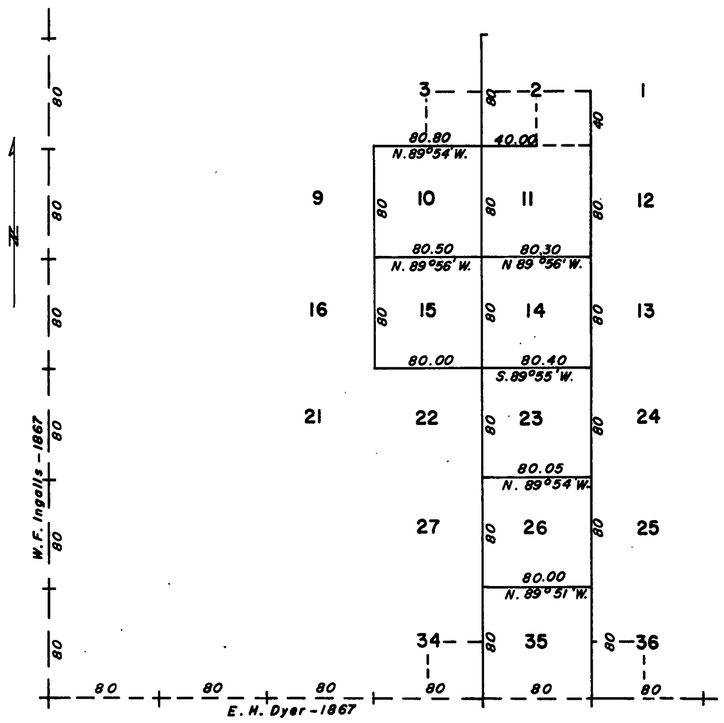
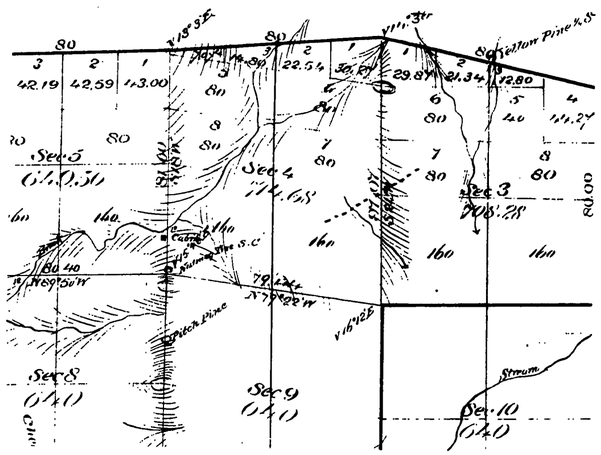


Figure 1b - Batelle's Subdivisional Lines

B7-1

SUBDIVISION OF ELONGATED SECTION 4



Township N° 22 North. Range N° 4 East. Mount Diablo Meridian.

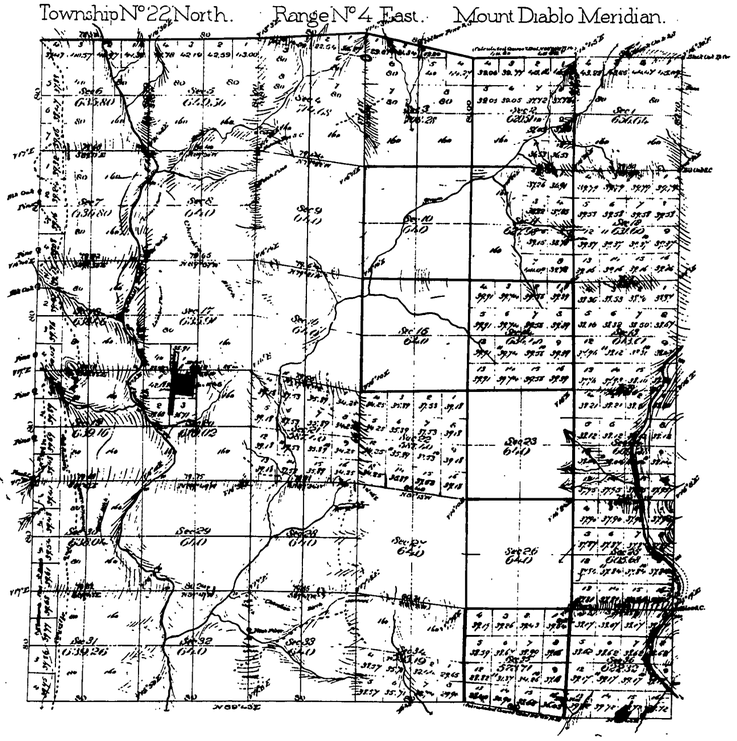


Figure 2a - Portion of Benson Plat

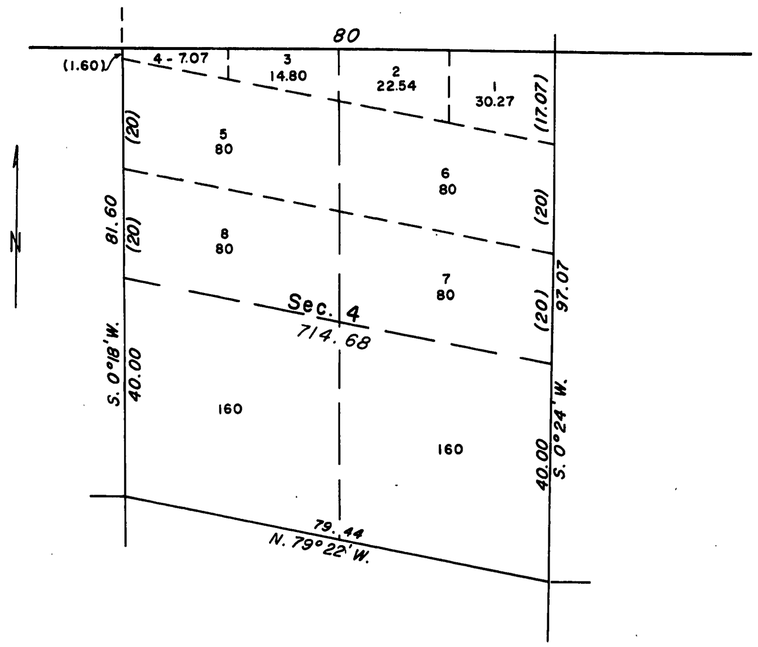


Figure 3 - Record of Section 4

T. 22 N., R. 4 E., M.D.M.

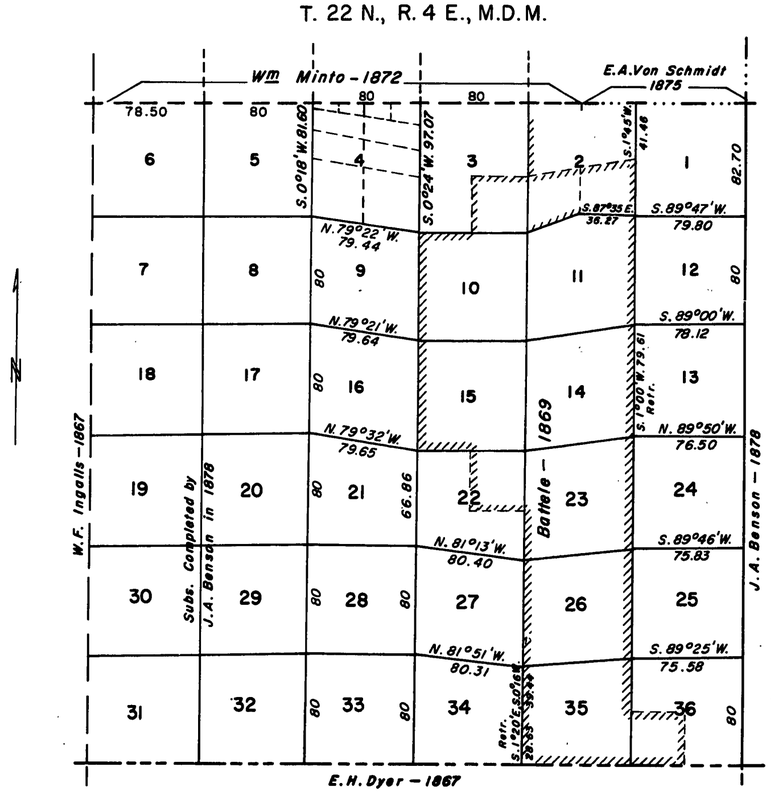


Figure 2b - Benson's Completions, 1878

SUBDIVISION OF ELONGATED SECTION 4

Conditions Found on the Ground

Figure 3 illustrates the record dimensions of section 4. The distances shown in parentheses have been added.

Upon retracement of the lines of section 4 and the control lines between sections 3 and 10 and between sections 9 and 10, considerable information was developed.

The corner of sections 3, 4, 33 and 34 was monumented with an iron pipe, wood post and mound of stone. There were two apparent bearing trees, not original, with opened blazes. The point was well correlated to the original nearby calls of topography - Concaw Creek to the east and a ravine to the north. This corner was readily acceptable.

The ¼ section corner of sections 4 and 33 was monumented with the stump of the original corner tree determined from one remaining original bearing tree.

The corner of sections 4, 5, 32 and 33 was monumented with an iron pipe and two remaining original bearing trees.

The corner of sections 9, 10, 15 and 16, determined from two original bearing trees, had been perpetuated with an iron pipe set by Bumgarner.

The point for the ¼ section corner between sections 3 and 10 was marked by two different monuments. One point was monumented with an iron pipe at the position described by County Surveyor McCoy in 1914. This point was witnessed by two rootholes, each near the 1869 Battele record values and conforming to the 1914 McCoy record. The point was also witnessed by the remains of two sawed pine stumps, one of which contained marks scribed by McCoy and in agreement with his record. The other monument was at a point 0.295 chains south and 0.055 chains west of the iron pipe set by McCoy. It was a concrete monument set by surveyor Hamby in 1963. Hamby's map does not indicate how he determined this point.

A concrete post set by Hamby in 1963 was found in the vicinity of the corner of sections 3, 4, 9 and 10. No evidence of the original corner was found. Neither the Battele notes nor the Benson notes described this corner. Presumably Battele set a monument but did not describe it at all. Hamby's map indicates that he placed his concrete monument on a line extended from the corner of sections 2, 3, 10 and 11 thru his ¼ corner of sections 3 and 10 an equal distance. His ¼ corner of sections 3 and 10 thus being at midpoint on the line.

Near the point for the ¼ section corner of sections 3 and 4, evidence of two possible corner positions was recovered. One piece of evidence was an iron pipe set by Bumgarner in 1957. As stated in the history, Bumgarner's map indicated a found corner but he did not show a description. A fence intersection is 1.551 chains south and 0.675 chains west of the iron pipe. The old, wire fences extended northerly, easterly and N. 79° W. From the fence corner a sawed pine stump, 21 inches in diameter, bears N. 79½° W., 20½ links distant. A blaze on this sturnp under 45 years of overgrowth had the scribe marks ¼ SBB facing the fence corner. The Benson record for this corner calls for an 8-inch nut pine, N. 65° E., 5 links, and an 8-inch black oak, S. 62° W., 21 links. The scribe marks are not similar to any found at other corners. There is no remaining evidence of the original (Benson) bearing trees, and there are no nearby calls of topography.

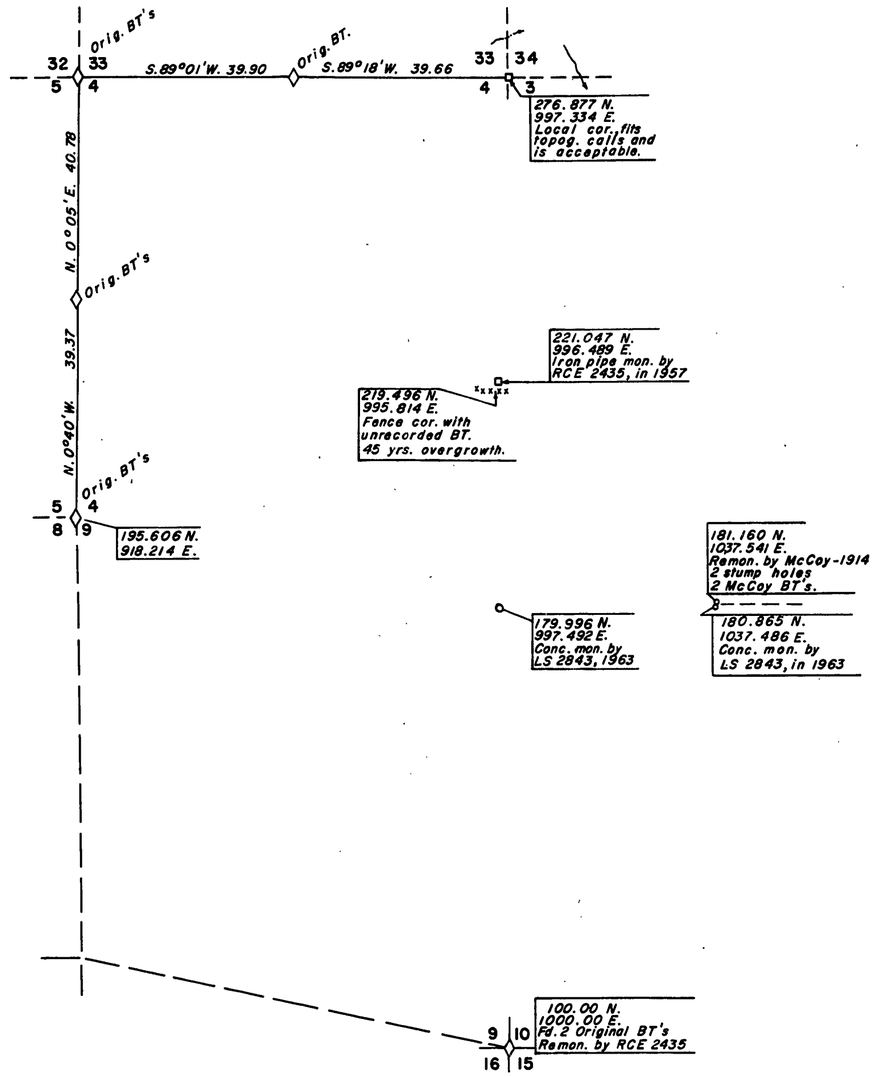


Figure 4 - Corner Evidence with Coordinates

The ¼ corner of sections 4 and 9 was a lost corner. Thorough search revealed no evidence at all of the two pine bearing trees described in the Benson notes.

The corner of sections 4, 5, 8 and 9 was monumented with an iron pipe and witnessed by two original tanoak bearing trees, called "nutmeg" by Benson.

The ¼ section corner of sections 4 and 5 was monumented with an iron bar, witnessed by the remains of two original bearing trees.

Figure 4, illustrates the conditions found, as described above, with relative coordinates of the pertinent points based on the original corner of sections 9, 10, 15 and 16.

Preliminary Statement of the Problem

Before any decisions on restoration could begin, the surveyor had to resolve all corner identification problems using the best available evidence.

After the original corner identification is complete, the surveyor must decide whether or not the monuments set by local surveyors are within acceptable distances from properly restored positions.

Regulations

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

6-25 to 6-28	Dependent resurvey
4-41	Elongated sections
7-8, 7-9, and 7-12	Subdivision of sections

Legal Constraints

While not a direct parallel to this problem, the land decision in 50 LD 402 had a distinct relation to this situation. 50 LD 402 is briefed as follows:

Algoma Lumber Company v. Kruger

The Algoma Lumber Company had a private survey made to establish the line between their section 13 and section 24 which was protracted on the original plat as running due west to a lake. The private survey line actually ran S. 89° 39' W., instead of West.

A later survey by the General Land Office placed the line S. 89° 57' W., and parallel to subdivisional lines to the south. The Government line intersected some buildings.

It was held in the Department hearing that the survey line ran by the local surveyor was executed within the allowable limit of error. It was further held that "No reason is apparent why the work of a local surveyor performing a service omitted by the Government should be held to closer scrutiny than that required in respect to official public-land surveys." The local survey mark was confirmed.

SUBDIVISION OF ELONGATED SECTION 4

Final Statement of the Problem

The surveyor must identify original corners and then determine the positions of the recovered corners as well as the private survey monuments involved. Once all the positions are known, a computation will determine whether or not the private survey corners are in agreement with positions determined by standard BLM practice.

If a private corner does not agree in position, the surveyor must make a judgmental determination as to acceptance or rejection of that particular corner. This requires serious consideration because one private surveyor's erroneous monument may have been the basis of proportionment for a later private survey.

Subdivision of an elongated section will require special consideration for marking the 1/16 section corners.

Solution

The cadastral surveyor visited Mr. Bumgarner. Mr. Bumgarner was 83 years of age but easily recalled his work in section 3. An affidavit was prepared and signed by Mr. Bumgarner, in which he swore that in April of 1957 he found the remains of the black oak bearing tree, with scribing visible, and a rotted pine log in the proper position of the Benson record at the ¼ section corner of sections 3 and 4. Therefore the iron pipe at this corner was accepted as marking the original corner point. A thorough search of the Butte County records and local inquiry revealed no evidence of who marked the pine stump near the old fence corner.

The 1914 McCoy location was accepted for the ¼ corner of sections 3 and 10. Even though only faint root holes now remain where the original Battele bearing trees once stood, the McCoy marked trees still remain. The area has been logged for many years and there was much mining activity at the time of the original surveys. The McCoy record constituted a valid perpetuation of the original. The concrete monument set by Hamby in 1963 was tied in but no further consideration was given to it.

The Hamby concrete monument near the corner of sections 3, 4, 9 and 10 was rejected as invalid. This point was apparently determined 80 chains north of the corner of sections 9, 10, 15 and 16 and about 80 chains west of the corner of sections 2, 3, 10 and 11. There is no indication on Hamby's maps that it was based on the official records by any acceptable method.

The corner of sections 3, 4, 9 and 10 was restored by double proportionate measurement using the original corner of sections 4, 5, 8 and 9, the original corner of sections 9, 10, 15 and 16, and the described McCoy and Bumgarner perpetuations of the ¼ section corner to the east and north. The latitudes and departures were based on the original field notes. Benson's notes for the line between sections 4 and 9, read in part:

S. 79½° E. on random line bet. secs. 4 & 9

40.00 set temp ½ sec. cor.

79.44 Intersect N. & S. line 19 lks. North of cor. to secs. 3, 4, 9 & 10 from which cor. I run N. 79° 22' W. on a true line bet. secs. 4 & 9.

39.72 set post .... for ½ sec. cor. ... (marked two yellow pine bearing trees)

79.44 The cor. of secs. 4, 5, 8, & 9.

In his original survey, Benson made no correction in his true line distance for the 19 links of falling. By the field notes, the random line departure between sections 4 and 9 is 78.11 chains. The true line distance should have been 79.47 chains. The plat shows an actual error of 3 links in the length of the true line and if used as the basis of proportioning, this would introduce an error of 2 links in departure in the position of the corner of sections 3, 4, 9 and 10.

A further example of this type of omission is in Benson's record of the east 1/2 mile between sections 2 and 11. In 1869 Battele had set the ¼ corner of sections 2 and 11 and the corner of sections 1, 2, 11 and 12. The east 1/2 mile was unsurveyed. Benson surveyed that half mile in 1878. His notes read in part:

From the cor. to secs. 1, 2, 11 & 12 I run West, on a random line bet. secs. 2 & 11.

36.27 To a point 152 lks. South of ½ sec. cor. bet. secs. 2 & 11 from which cor. I run S. 87° 35' E. on a true line bet. secs. 2 & 11.

36.27 The cor. to secs. 1, 2, 11 & 12.

The record departure for the half mile is 36.27 chains. The stated true line length shown on the plat computed at a bearing of S. 87° 35' E., would dictate a departure of 36.24 chains. The true line should have been S. 87° 36' E., 36.30 chains.

Benson's work would have been executed under instructions from the Manual of Surveying Instructions, 1855. In reference to random lines that manual reads,"...and stakes set at the trial, or random line at every ten chains, to enable the surveyor on his return to follow and correct the trial line, and establish therefrom the true line." The surveyor therefore was not expected to actually rechain the line on return although he could have done so.

The plat and field notes are a unit to be used together and never separately. In so doing the obvious errors, or conflicts, can usually be resolved and the correct data used to restore lost corners.

The 1/16 80 section corners on the east and west boundaries of section 4 were established at proportionate positions based on the Benson plat. The north 1/16 section corners were not established because they did not control the position of Federal lands.

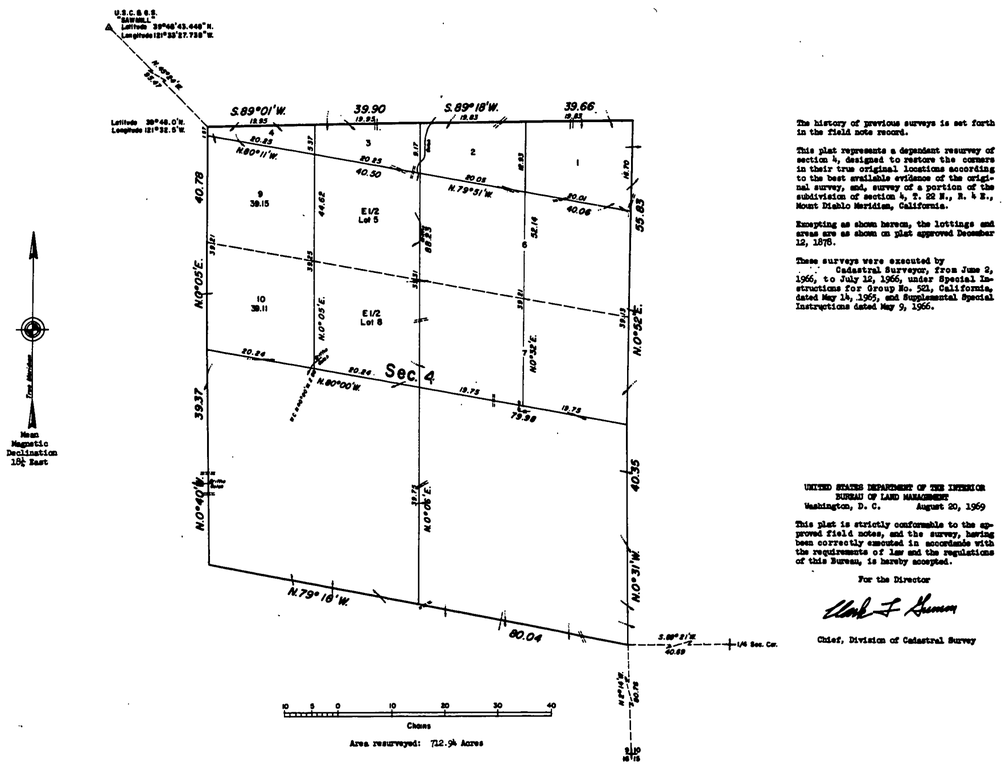
The east 1/16 and west 1/16 section corners on the north boundary of section 4 were established at midpoint positions between the ¼ section corner and the section corners.

Section 4 was subdivided in the normal manner, the center ¼ section corner being established at the intersection of the centerlines, but was not monumented. The center 1/16 80 corner was established on the north-south centerline at proportionate position, the record distance being a mean of the north "half miles" along the east and west boundaries, i.e., 49.335 chains, with the line between lots 2 and 3 being a record length of 9.335 chains. At the intersection of the north-south centerline of the NE¼ with the east-west 1/16 80 line, the east 1/16 80 corner was established. The west 1/16 80 corner was established in a like manner. The northeast 1/16 and northwest 1/16 section corners were not needed and therefore not established. The west half of lots 5 and 8 were unpatented and were given new lot numbers (9 and 10) and new acreage on the plat.

Figure 5 is a copy of the plat which was accepted August 20, 1969.

TOWNSHIP 22 NORTH, RANGE 4 EAST, OF THE MOUNT DIABLO MERIDIAN, CALIFORNIA.

DEPENDENT RESURVEY AND SUBDIVISION OF SECTION 4



The history of previous surveys is set forth in the field note record.

This plat represents a dependent resurvey of section 4, designed to restore the corners in their true original locations according to the best available evidence of the original survey, and, survey of a portion of the subdivision of section 4, T. 22 N., R. 4 E., Mount Diablo Meridian, California.

Excepting as shown hereon, the lottings and areas are as shown on plat approved December 12, 1876.

These surveys were executed by Cadastral Surveyor, from June 2, 1966, to July 12, 1966, under Special Instructions for Group No. 521, California, dated May 14, 1965, and Supplemental Special Instructions dated May 9, 1966.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. August 20, 1969

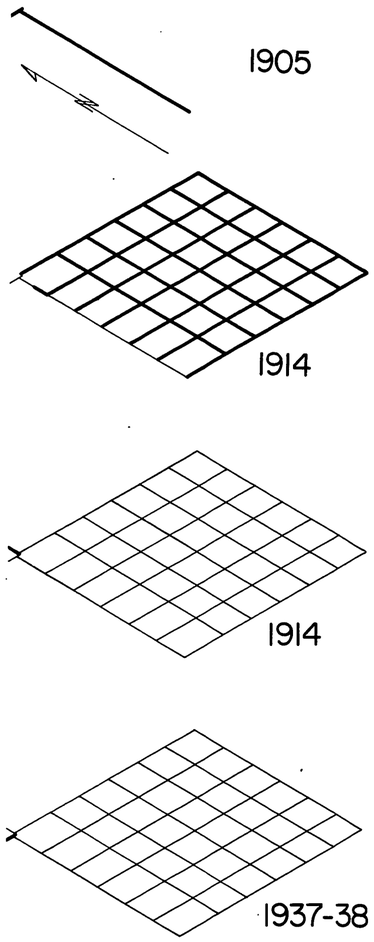
This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

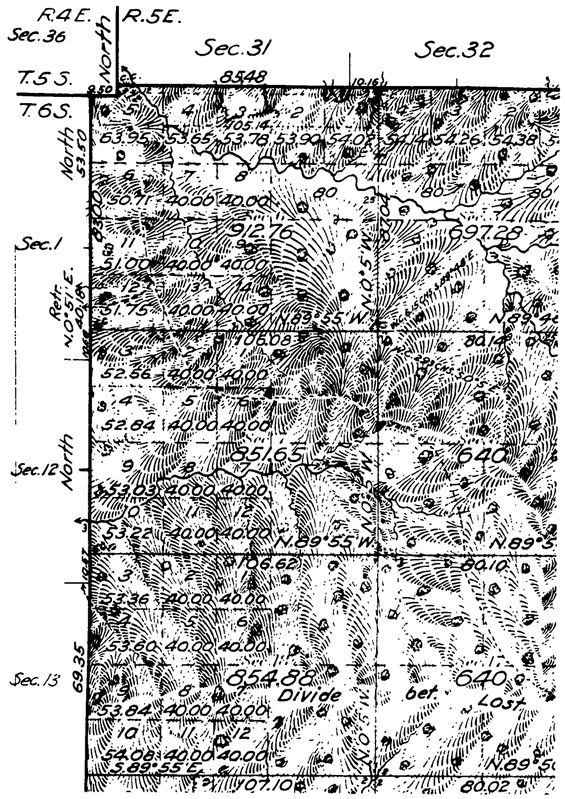
For the Director

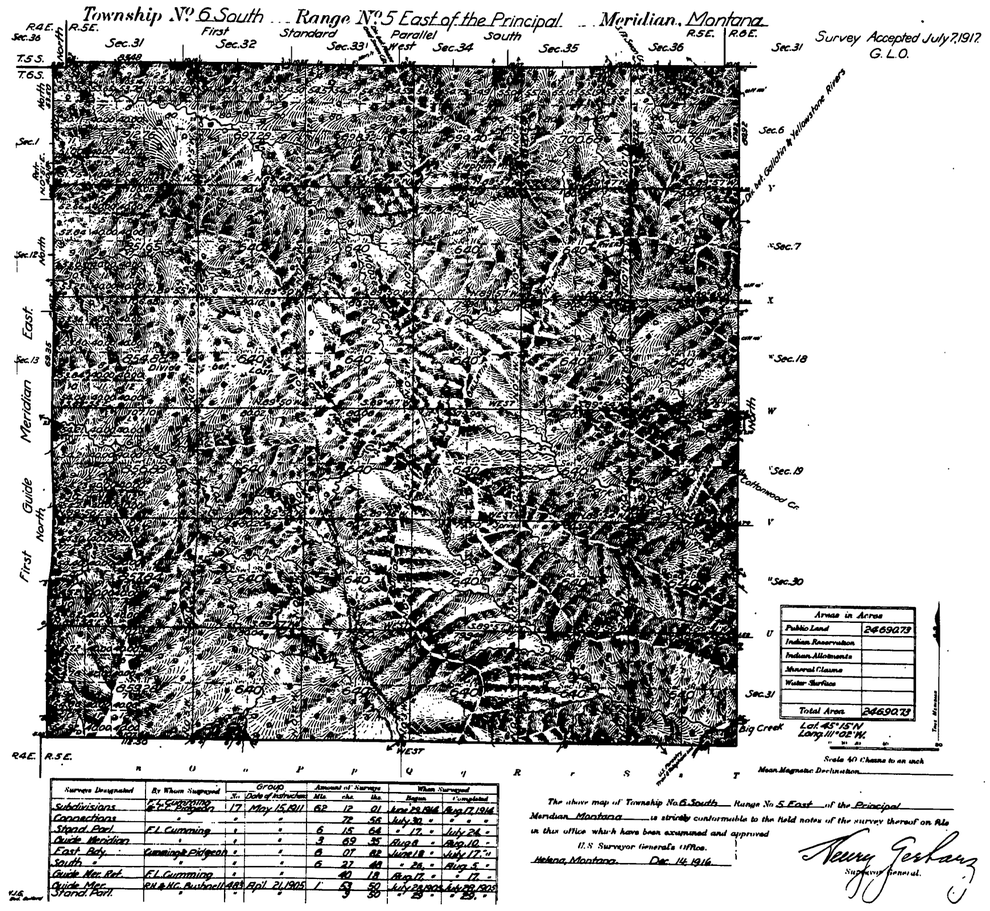
Chief, Division of Cadastral Survey

Figure 5 - Accepted Plat

SUBDIVISION OF ELONGATED SECTION 6







Areas in Acres	
Public Land	2469.79
Indian Reservation	
Indian Allotments	
Mineral Claims	
Water Surface	
Total Area	2469.79

Surveys Designated	By Whom Surveyed	Group No.	Date of Instructions	Amount of Surveys Mls.	chs.	lks.	When Surveyed Begun	Completed
Subdivisions	F.L. Cumming	17	May 15, 1911	62	12	01	June 25, 1914	Aug. 17, 1914
Connections	"	"	"	7	72	56	July 30, "	" " "
Stand. Par.	F.L. Cumming	"	"	6	15	64	" 17, "	July 24, "
Guide Meridian	"	"	"	3	69	35	Aug. 8, "	Aug. 10, "
East Bdy.	Cummings & Pidgeon	"	"	6	07	82	June 18, "	July 17, "
South "	"	"	"	6	27	89	" 28, "	Aug. 5, "
Guide Mer. Rel.	F.L. Cumming	"	"	40	18	00	Aug. 17, "	" 17, "
Guide Mer. Stand. Port.	R.H. & H.C. Bushnell	A685	April 21, 1905	1	93	50	July 29, 1905	July 29, 1905
				3	36	00	" 29, "	" 29, "

The above map of Township No. 6 South, Range No. 5 East of the Principal Meridian, Montana, is strictly conformable to the field notes of the survey thereof on file in this office which have been examined and approved

U.S. Surveyor General's Office,
Helena, Montana. Dec. 14, 1916

Figure 1 - Original Plat

History of Surveys

1905 Ralph H. and Howard C. Bushnell surveyed the west boundary, (the First Guide Meridian East) and set the closing corner of Tps. 6 S., Rs. 4 and 5 E., at a calculated distance. They then ran east, 9.50 chains, established the standard southeast corner of T. 5 S., R. 4 E., and then ran West, establishing the First Standard Parallel South.

1914 F.L. Cumming and C.C. Pidgeon surveyed the south and east boundaries of the township. They surveyed the First Standard Parallel South, running West to a "closing corner" which they established at a point 3.72 chains north of the standard southeast corner of T. 5 S., R. 4 E. Cumming and Pidgeon then subdivided T. 6 S., R. 5 E., and retraced the south half mile of the east boundary of section 1, T. 6 S., R. 4 E. The Cumming and Pidgeon plat was approved December 14, 1916, figure 1.

1914 Cumming and Sweeny surveyed the east boundary of T. 5 S., R. 4 E., north from the standard southeast corner of that township.

1937-38 W.R. Bandy rehabilitated the standard southeast corner of T. 5 S., R. 4 E., and resurveyed a portion of the standard parallel along the south boundary of that township, returning a distance of 10.13 chains to the closing corner of Tps. 6 S., Rs. 4 and 5 E.

SUBDIVISION OF ELONGATED SECTION 6

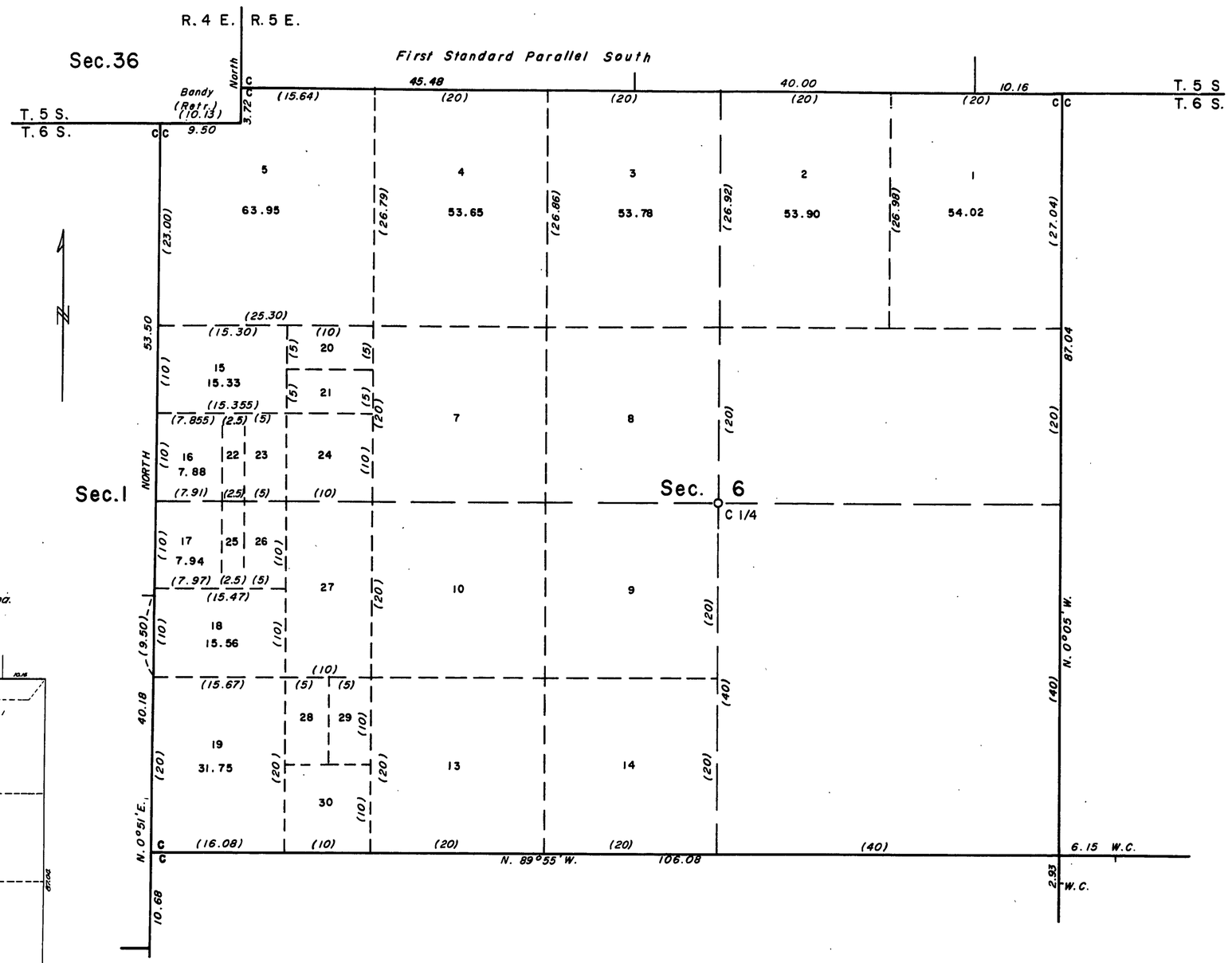
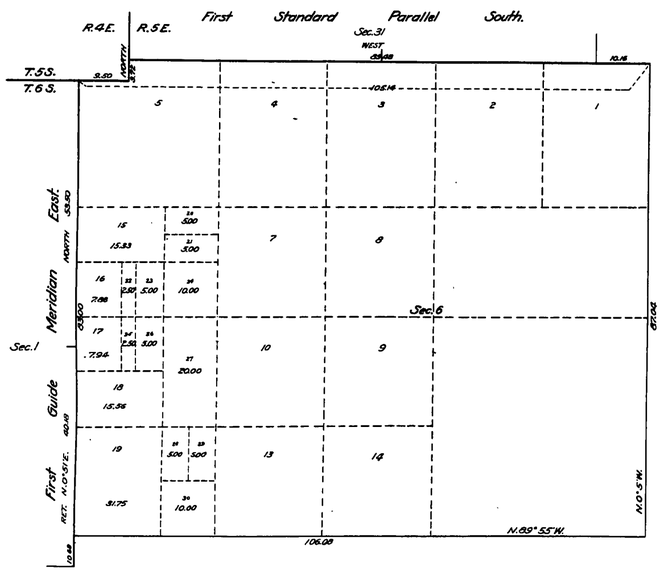


Figure 3 - Parenthetical Distances

Supplemental Plat of Sec. 6

Township No. 6 South Range No. 5 East, Principal Meridian Montana.



This supplemental plat correctly shows the subdivision of lots 6, 11 and 12, Sec. 6, T. 6 S. R. 5 E., Prin. Mer. Mont., plat approved Dec. 14, 1916, for the purpose of accommodating Bozeman 015303 of Edwin J. Durnam, which embraces portions of said lots.

Prepared in accordance with Commissioner's letter "E" No. 11, dated June 17, 1924.
U.S. Surveyor General's Office.
Helena, Mont. July 3, 1924.
Graham Bullard
U.S. Sur. Genl.

Figure 2 - Supplemental Plat

B8-2

SUBDIVISION OF ELONGATED SECTION 6

Reasons for Request of this Survey

On July 6, 1920, Edwin J. Durnam made application for entry on lands located in lots 6, 7, 10, 11, 12 and 13 of section 6. Section 6 is an elongated section and the lands applied for were not susceptible to an aliquot part description even though they were basically aliquot parts. On July 3, 1924, a supplemental plat of section 6 was approved, relotting lots 6, 11 and 12, as shown in figure 2. On January 8, 1926, patent was issued to Durnam for lots 21, 22, 23, 24, 25, 26, 27, and 29, plus the west half of lots 7, 10 and 13, section 6. No ground survey was made. These are the only patented lands in section 6, the remainder of the section is public lands within the Gallatin National Forest. The Forest Service requested a resurvey and subdivision-of-section survey to mark the boundaries of the patented lands, and therefore the forest boundary.

Special Instructions

Special Instructions for Group 513, Montana, were prepared on October 1, 1958. They provided for dependent resurveys and subdivision of sections in several townships, including T. 6 S., Rs. 4 and 5 E. The field work was assigned in two "stages" and began on May 25, 1959. This discussion is limited to the boundaries and subdivisions of section 6.

Conditions Found on the Ground

All of the original corners were recovered. The four closing corners of section 6 were all recovered on the controlling boundaries. The west boundary was resurveyed in 1959. The remaining boundaries and subdivisional lines were resurveyed in 1964. Controlling lines were resurveyed to assure that the closing corners were, in fact, on the line being closed upon. The resurvey was in close conformity with the record, i.e., no distortion existed.

Preliminary Statement of the Problem

The surveyor must establish the necessary corners on the north, south and west boundaries of the section, subdivide section 6 to the extent necessary to define the Forest boundary and monument and mark the corners, based on the approved plats shown in figures 1 and 2.

Regulations

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

3-83	Elongated sections
3-85 to 3-87, 3-89, 3-90 to 3-92	Subdivision of sections
4-38 to 4-41	Marks on subdivision-of-section and elongated section corners

Final Statement of the Problem

The surveyor must determine the parenthetical distances applicable to the lots and lot areas in section 6 on which to base the proportioning of the necessary corners. He must subdivide the section to the extent necessary to mark the Forest boundary and properly mark the corner monuments.

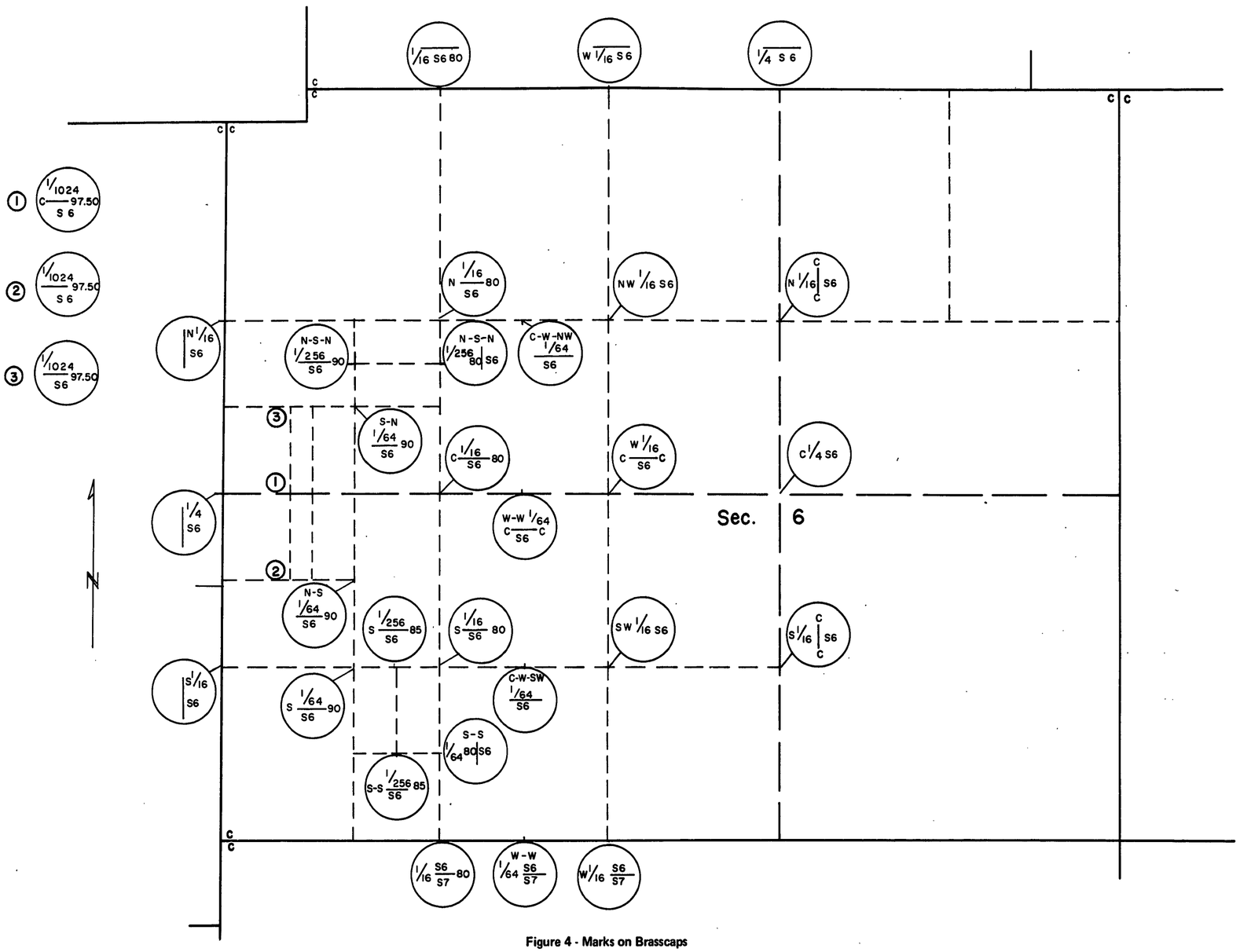


Figure 4 - Marks on Brasscaps

SUBDIVISION OF ELONGATED SECTION 6

Solution

Figure 3 indicates the proper parenthetical distances on which the subdivision of section must be based. All lot areas are compatible with the distances shown.

The ¼ section corners and 1/16 section corners on the north and west boundaries were proportioned and monumented, as were the 1/16 section corners and the 1/64 section corner on the south boundary.

The centerlines of the section and centerlines of the NW¼ and SW¼ were surveyed and all normal 1/16 section corners monumented. The N 1/16 80 and S 1/16 80 section corners were established in the same manner, at the intersection of lines. 1/64, 1/256 and 1/1024 section corners required along those lines were established at proportionate positions. The minor subdivision (1/64, 1/256 and 1/1024) corners not located on 1/16 section lines were established on calculated courses and distances.

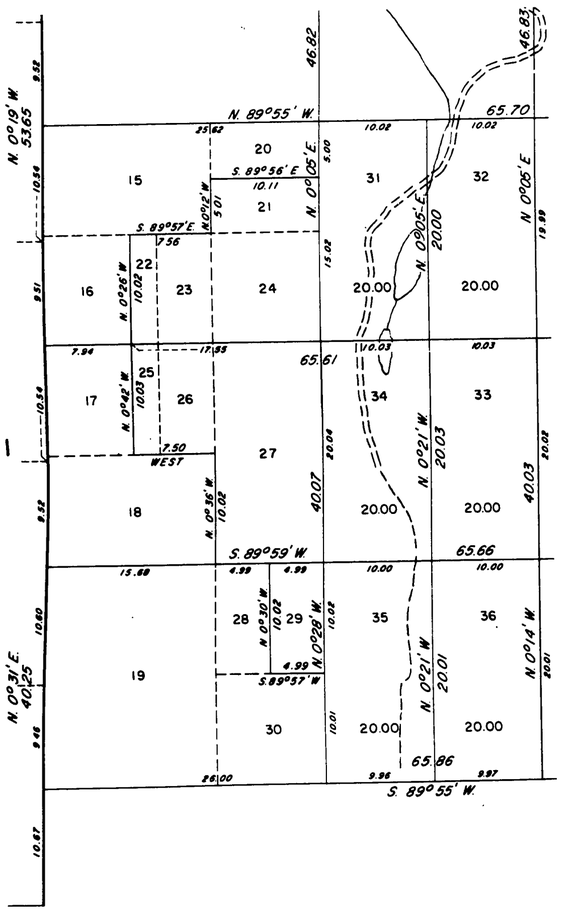
The corners established for section 6 (for the first time) and manner of corner markings are shown in figure 4.

The plat, accepted February 27, 1967, is shown in figure 5.

Auxiliary Topic - Assignment of Lot Numbers

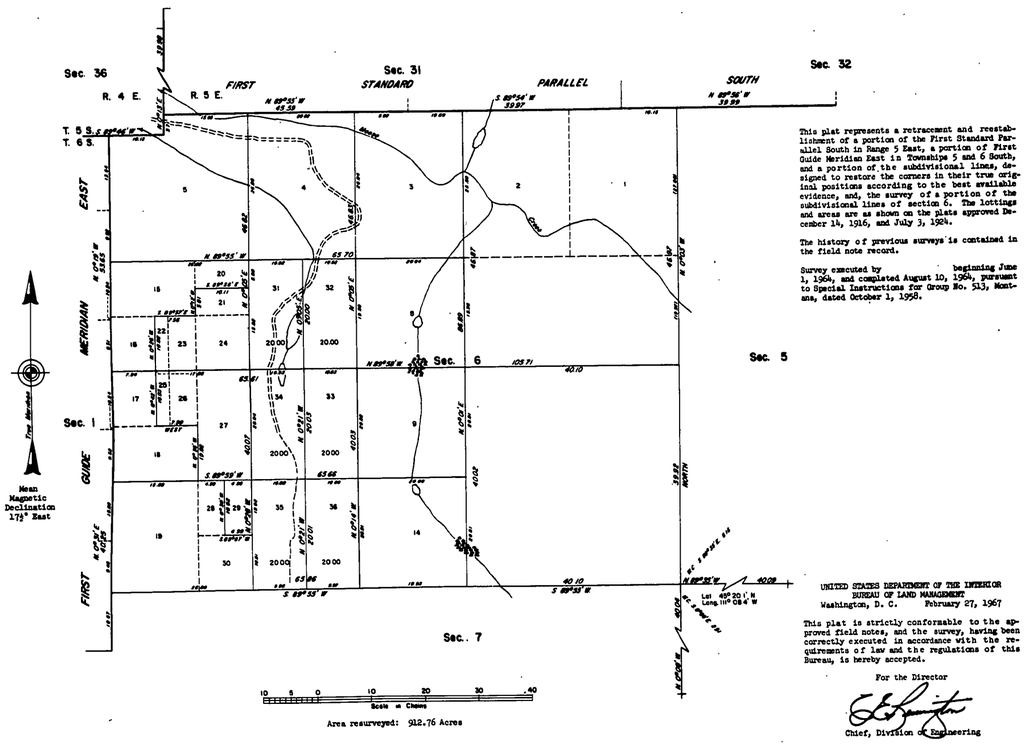
Errors appear on the accepted plat, figure 5. Because the west half of (old) lots 7, 10 and 13 are patented, the lines dividing those lots were surveyed. On the accepted plat the patented west half of lots 7, 10 and 13 are given new lot numbers, 31, 34 and 35, and areas. This practice affects the title of the patentee. Patented lands are never relotted, nor are new areas assigned to patented lots.

The line between lots 18 and 19 was made 15.68 chains in length. The proper proportionate length of that line is 15.66 chains. The north boundary of lots 28 and 29 each should have been 5.00 chains in length instead of 4.99 chains.



TOWNSHIP 6 SOUTH, RANGE 5 EAST OF THE PRINCIPAL MERIDIAN, MONTANA.

DEPENDENT RESURVEY AND SUBDIVISION OF SECTION 6



This plat represents a retracement and reestablishment of a portion of the First Standard Parallel South in Range 5 East, a portion of First Guide Meridian East in Township 5 and 6 South, and a portion of the subdivisional lines, designed to restore the corners in their true original positions according to the best available evidence, and, the survey of a portion of the subdivisional lines of section 6. The lottings and areas are as shown on the plats approved December 14, 1916, and July 3, 1924.

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

Survey executed by beginning June 1, 1964, and completed August 10, 1964, pursuant to Special Instructions for Group No. 513, Montana, dated October 1, 1958.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. February 27, 1967

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

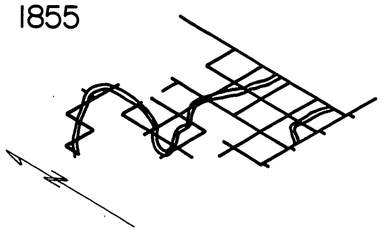
Chief, Division of Engineering

Figure 5 - Accepted Plat

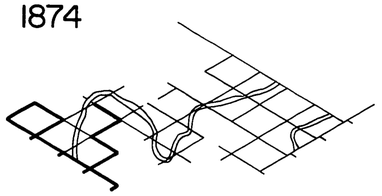
Form 9180-13, Markings for Corners on Subdivision Lines of Elongated Sections, has been compiled. This form is now an amendment to section 4-41 of the Manual of Surveying Instructions, 1973. See Instruction Memorandum No. 75-99, dated March 5, 1975.

SUBDIVISION OF SECTION WITH BROKEN CENTERLINE

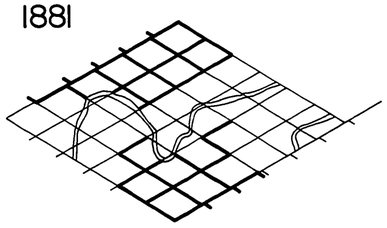
1855



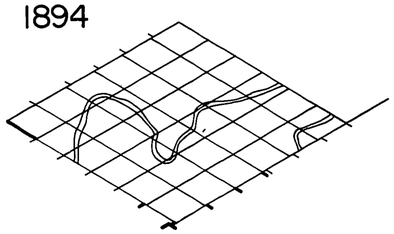
1874



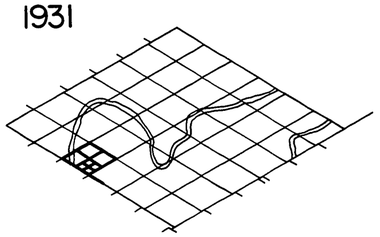
1881



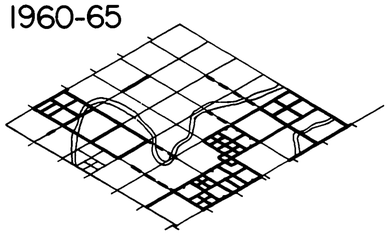
1894



1931



1960-65



History of Surveys

1855 Harvey Gordon and Charles T. Gardner surveyed the east three miles of the south boundary (the Fifth Standard Parallel South), the east boundary, a portion of the subdivisional lines and meandered the Umpqua River through the township. The north half mile of the west boundary of section 18 was also surveyed, and outlying areas in section 18 protracted on the Gordon and Gardner plat, approved February 20, 1856, see figure 1.

1856 Dennis Hathorn surveyed the boundaries of approximately twenty Donation Land Claims within the township. These claims are not directly pertinent to this discussion.

1874 William H. Byars surveyed the north four miles of the west boundary (resurveying the half mile of Gordon and Gardner's work), the boundaries of section 6, and the lines between sections 8 and 9, 8 and 17, 17 and 18, and 18 and 19. The northwest quarter of section 19 was protracted and listed as containing 161.64 acres. The Byars work was added to the Gordon and Gardner plat in blue ink and approved on August 20, 1875. This "composite" plat is shown in part in figure 2.

1881 William H. Byars completed the boundaries and subdivisional lines of the township, and resurveyed some of the previous Gordon and Gardner lines. The plat was approved on August 11, 1881, shown in figure 3.

1894 Elmer O. Worrick resurveyed the west boundary of section 6 and surveyed the line between sections 25 and 36, T. 22 S., R. 9 W., establishing a closing corner for those sections on the west boundary of section 30. This same year, Williams Whipple completed the surveys in T. 23 S., R. 8 W., and established closing corners along the west three miles of the south boundary.

1931 George F. Rigby dependently resurveyed the north half mile of the west boundary of section 19, boundaries of section 18, and subdivided section 18.

1960-65 Portions of the boundaries of sections 5, 25, 27, and 29 thru 33 were dependently resurveyed; sections 5, 25, 27, 32 and 33 were subdivided; portions of Donation Land Claim boundaries were resurveyed, and several corners remonumented under Groups 350, 436 and 514, Oregon. During this same period, many original corners in the township were remonumented by the Douglas County surveyor.

Township No. 22 South Range No. 8 West

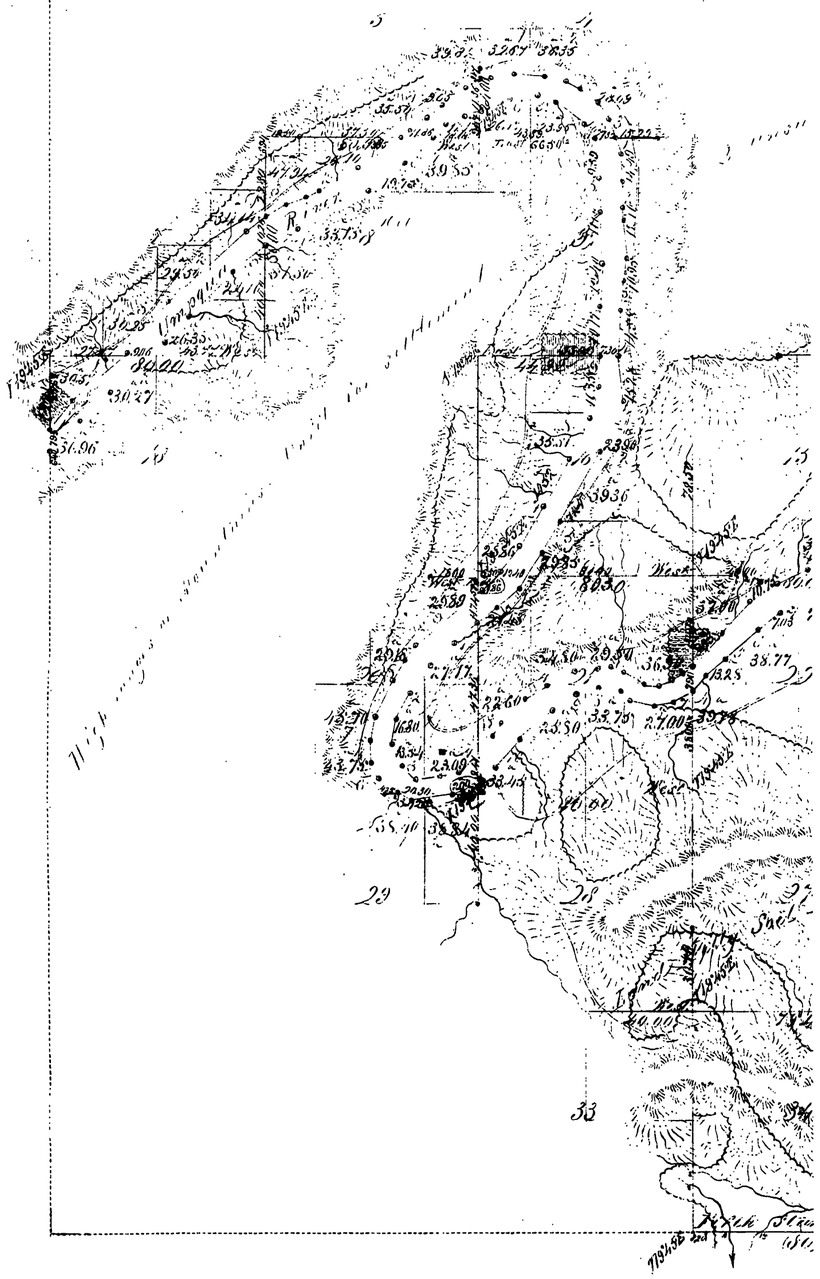
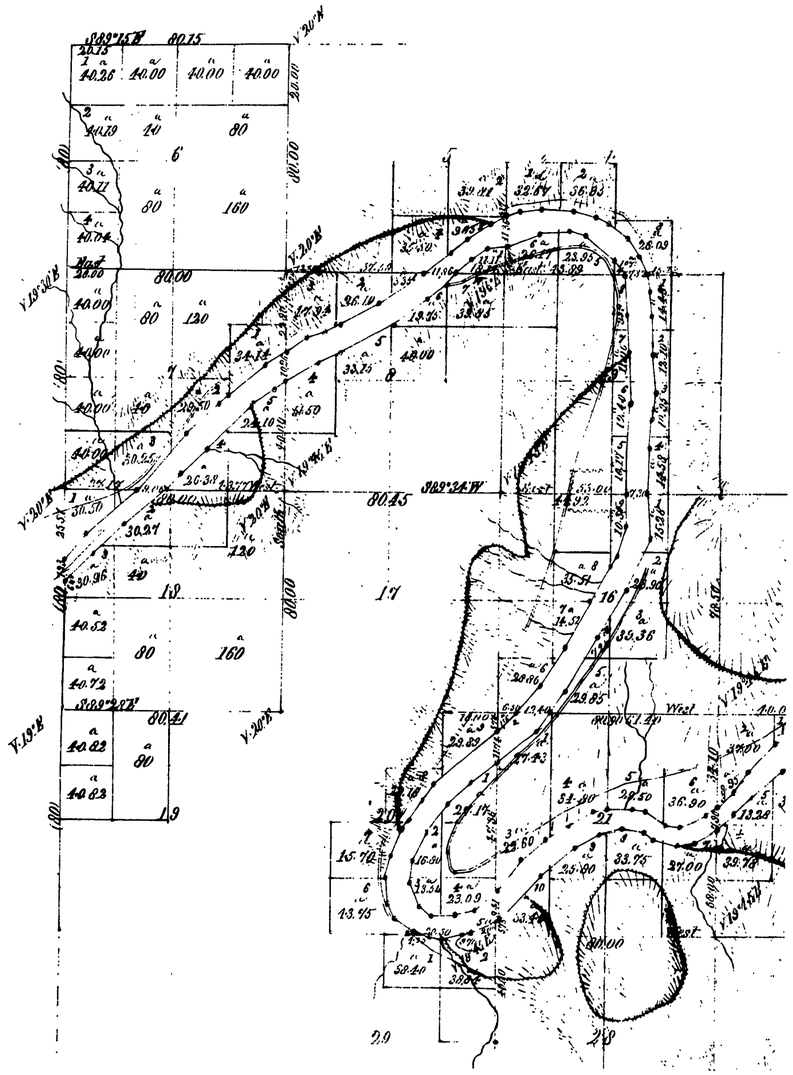


Figure 1 - Portion of 1856 Plat

SUBDIVISION OF SECTION WITH BROKEN CENTERLINE

Township 22 South, Range 8 West



Lines	Contractor	Contract No.	Contract Date	Amount Surveyed Miles	Chains	Links	Commenced	Completed
Subdivisions Blue lines indicate old surveys	W.H. Byars	202	March 11th 1874	6	00	86	Oct 29th 1874	November 1st 1874

Figure 2 - Composite Plat

Township No. 22 South **Range No. 8 West**

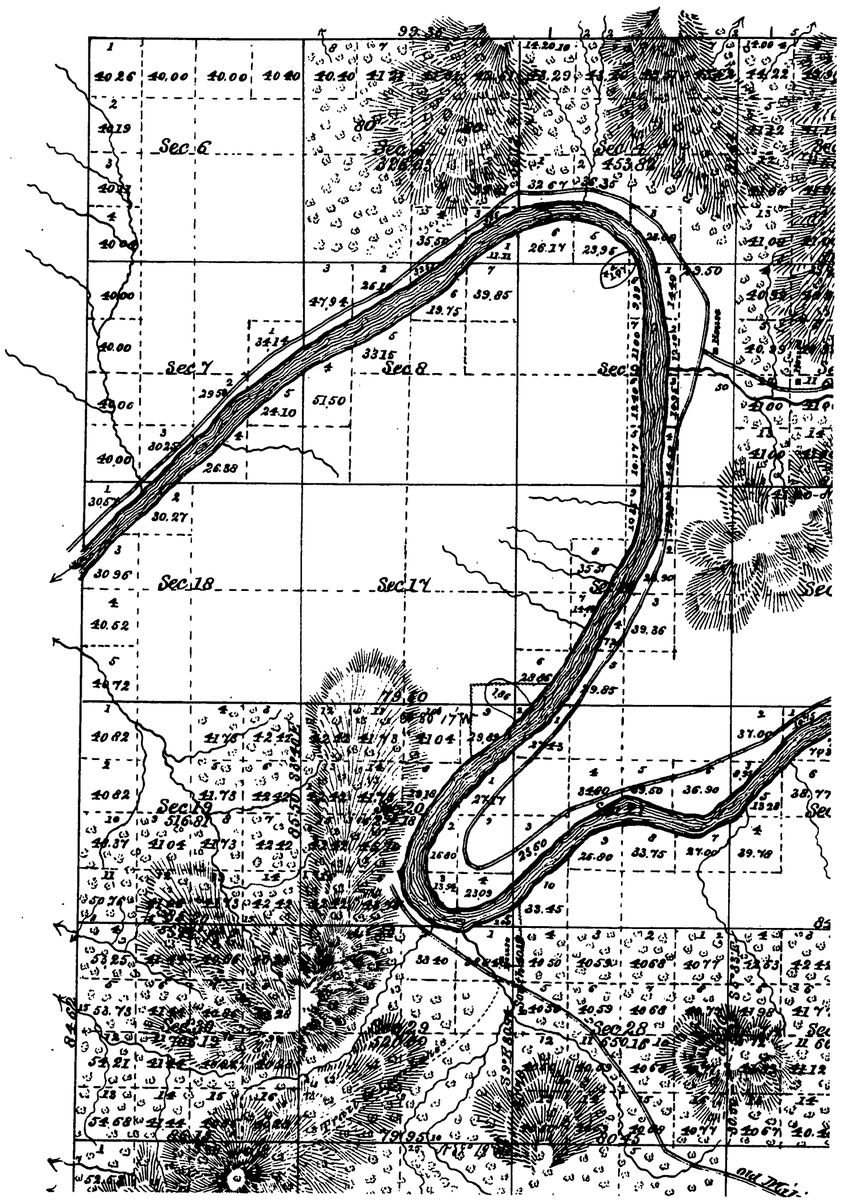


Figure 3 - Byars Completions

SUBDIVISION OF SECTION WITH BROKEN CENTERLINE

Reasons for Request of this Survey

This resurvey and subdivision of sections was requested by the Coos Bay District Manager to facilitate the settlement of a timber trespass and to lay out timber sales. The subdivision of section 19 is necessary because lot 14 (the SE¼ SE¼) was patented on January 27, 1929, "according to the official plat of the survey of said land, returned to the General Land Office by the Surveyor General." The remainder of section 19 and part of the westerly half of section 29 are O. & C. lands. (These are Federal lands revested to the United States under the Act of June 9, 1916, from the Oregon and California Railroad.) Sections 20 and 30 are all patented.

Special Instructions

Special Instructions for Group 595, Oregon, were prepared on August 3, 1965. They provided for the dependent resurvey of the boundaries of sections 19 and 29 and subdivision of both sections to the extent necessary to delineate the Federal lands within those sections. Special Instructions for Group 657, Oregon, were prepared on September 26, 1967. They provided for the resurvey of section 11. Both groups were eventually written in one set of field notes and drawn on one plat. Field work on Group 595 began on August 16, 1965.

Conditions Found on the Ground

Due to the piecemeal progress of the original surveys and later dependent resurveys, a careful examination of the field notes was made, revealing the following facts relating to the resurvey and subdivision of sections 19 and 29:

1. Gordon and Gardner surveyed the line between sections 20 and 29, running west. They set a meander corner at 9.70 chains, another meander corner at 30.00 chains (both on the left bank of the Umpqua River), and terminated the line at 34.25 chains at the foot of a bluff.

2. In 1881, Byars ran east between sections 20 and 29, intersecting the river at 41.50 chains. He could not find the Gordon and Gardner meander post or witness point, so he set a meander corner of his own. Byars returned west on a true line but did not establish a ¼ section corner. Thus the line(s) between sections 20 and 29 were never tied together, no ¼ section corner was ever set, but the Byars plat (figure 3) protracts the centerline of section 29 to a midpoint position and the areas are based on an 80 chain mile.

3. In 1881, Byars ran north between sections 32 and 33. He established the corner of sections 28, 29, 32 and 33 at 80 chains, then ran north on a random line between sections 28 and 29. At 80.94 chains, he fell 6.25 chains east of the Gordon and Gardner corner of sections 20, 21, 28 and 29. He then ran south (on true line) and at 40.15 chains intersected the Gordon and Gardner ¼ section corner. His notes then say he ran S. 5° 09′ E., and at 80.94 chains was back at the corner of sections 28, 29, 32 and 33. His plat shows S. 9° E., at 40.79 chains.

   This would be impossible. The south half mile should have measured along the hypotenuse, S. 8° 43′ E., 41.27 chains. If the ¼ section corner is lost, it must be restored by an irregular boundary adjustment, based on the field notes as the cardinal equivalent and not on the plat.

4. Byars surveyed the west boundary of section 19 and the line between sections 18 and 19 in 1874; the northwest ¼ of section 19 was protracted on the plat. In 1881 he surveyed the west boundary of sections 30 and 31 by extending the line south to an intersection with the Fifth Standard Parallel South, which he had extended west. He then ran north on his line, set the corner of sections 25, 30, 31 and 36 at 80 chains and placed the excess (4.62 chains) in the north half mile of the west boundary of section 30.

5. In 1881 Byars ran north between sections 31 and 32, 29 and 30, setting his corners at 40 and 80 chain intervals, and established the corner of sections 19, 20, 29 and 30.

6. After surveying the westerly portion of the line between sections 20 and 29 (item 2 above), Byars ran west on a random line between sections 19 and 30. At 85.20 chains he intersected his west boundary 5.10 chains south of the corner of sections 19, 24, 25 and 30. His notes then say that he ran S. 86° 13′ E., on true line, set the ¼ section corner at 45.20 chains and at 85.20 chains was back at the corner of sections 19, 20, 29 and 30; with that bearing and distance shown on the plat. The true line along the hypotenuse should have been S. 86° 34′ E., 85.35 chains. If the corner of sections 19, 20, 29 and 30 is lost, it must be restored on the basis of the field notes as representing the cardinal equivalent, not the plat.

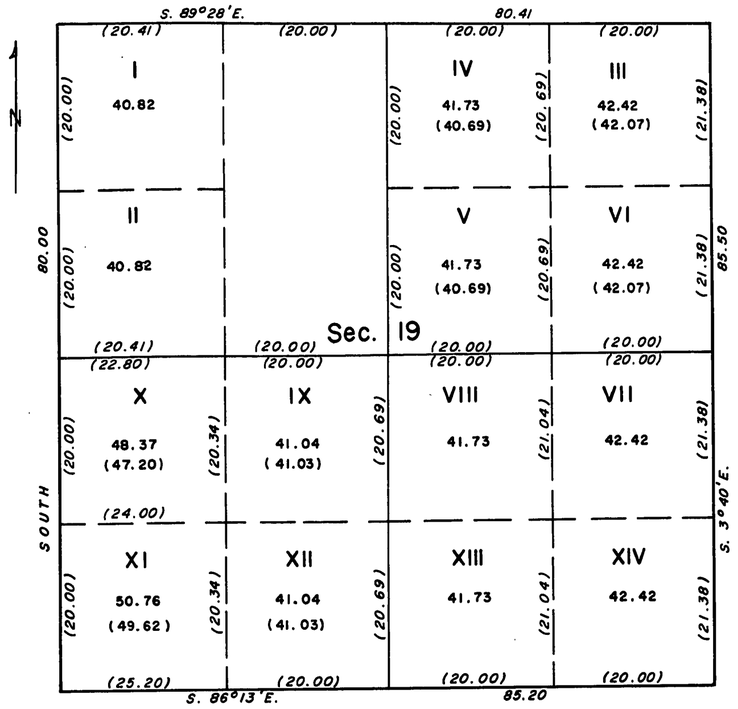


Figure 4 - Areas and Parenthetical Distances, Section 19

7. Next Byars ran north on a random between sections 19 and 20. At 85.50 chains he fell 5.50 chains east of the corner of sections 17, 18, 19 and 20. He then says he ran S. 3° 40′ E., on true line between sections 19 and 20, set the ¼ corner at 42.75 chains and was back at the corner of sections 19, 20, 29 and 30 at 85.50 chains. The true line should have been S. 3° 41′ E., 85.68 chains. Lost corners along the fifth meridional line would likewise be restored on the basis of the random line, not the erroneous true line distance shown on the plat.

8. The areas of lots in section 19 are unreconcilable with the distances returned by Byars in 1874 and 1881, shown on the plat, (figure 3). Figure 4 is an enlarged sketch of section 19 showing the original areas and distances. The parenthetical distances have been added and the correct area of the lot shown in parenthesis where the record plat is in error, i.e., lots 4 thru 6 and lots 9 thru 12.

9. The exterior lines of sections 19 and 29 were retraced with thorough search for all original corners. Where necessary, additional section lines were retraced to obtain control for lost corners. The corners recovered during this and other assignments (relevant to this discussion) during the period 1960-65 are shown in figure 5.

Preliminary Statement of the Problem

The surveyor must restore the lost corners of sections 19 and 29, establish the necessary 1/16 section corners at proportionate positions and subdivide both sections to the extent necessary to mark the boundaries of O. & C. lands.

Regulations

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

3-92	Protection of areas and subdivisions as shown on the original plat
5-25 to 5-28	Double proportionate measurement
5-29	Three point control
5-34	Single proportionment along a range line
5-36	Irregular boundary adjustment
5-45	One point control

SUBDIVISION OF SECTION WITH BROKEN CENTERLINE

Final Statement of the Problem

The surveyor must restore the lost corners, establish 1/16 section corners and subdivide sections 19 and 29. The subdivision of sections must be based upon the areas returned on the original plat (figure 3) to protect the bona fide rights of the patented lands, figure 5.

Solution

The corner of sections 19, 24, 25 and 30 on the west boundary was restored by single proportionate measurement between the recovered ¼ corner of sections 19 and 24 and the corner of sections 30 and 31, based on the Byars record of the west boundary.

The closing corner of sections 25 and 36, T. 22 S., R. 9 W., had been remonumented by the County Surveyor and was recovered on true line, 6.20 chains north of the corner of sections 30 and 31. The ¼ section corner of section 25, only, was established at midpoint between the closing corner and the corner of sections 19, 24, 25 and 30. The west ¼ section corner of section 30 was not reestablished because section 30 is all patented lands.

The corner of sections 29, 30, 31 and 32 was restored by double proportionate measurement using the Byars field notes for the cardinal record length of the south half mile between sections 19 and 20.

Since the line between sections 20 and 29 had never been connected through by Byars, there was no basis for a double proportionate measurement of the corner of sections 19, 20, 29 and 30. That corner was restored by three point control, at proportionate position for latitude and at record distance in departure east of the restored corner of sections 19, 24, 25 and 30, based on the Byars field note (random) record. This resulted in a very close relationship between the record bearing and resurvey bearing of the east and south boundaries of section 19.

The line between sections 20 and 29 was resurveyed by one point control from both directions. The line was extended due west, the Gordon and Gardner record distance of 34.25 chains from the recovered corner of sections 20, 21, 28 and 29. The westerly portion was resurveyed by extending the line due east, the Byars record distance of 41.50 chains. The terminus of each segment was tied together by bearing and distance. The ¼ corner of sections 20 and 29 was established on the Byars line at midpoint in departure between the corner of sections 20, 21, 28 and 29, and the restored corner of sections 19, 20, 29 and 30.

The ¼ corner of sections 19 and 30 was restored by single proportionate measurement, based on the Byars random length of the line. The east 1/16 section corner was then established at midpoint between the ¼ section corner and section corner.

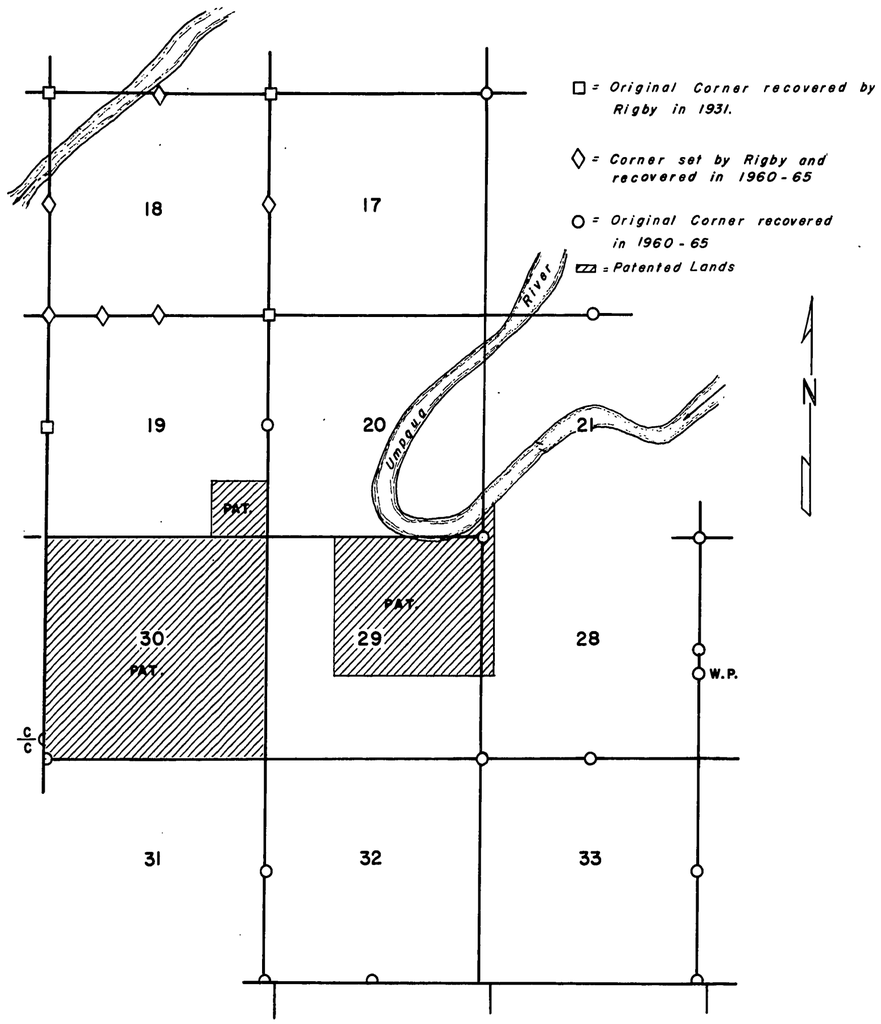


Figure 5 - Corner Recovery & Status

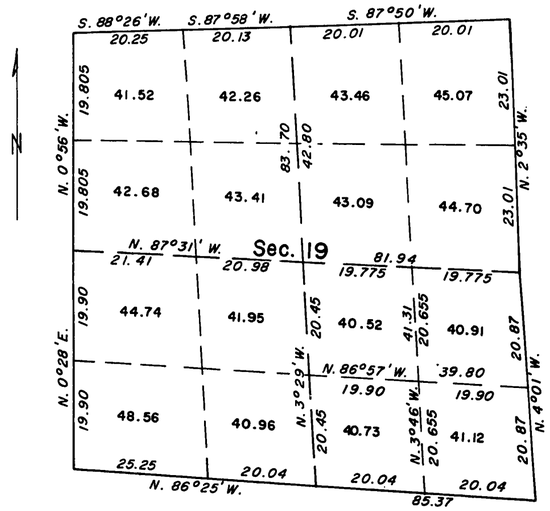


Figure 6 - Normal Subdivision, Section 19

Section 29 was subdivided normally with straight centerlines.

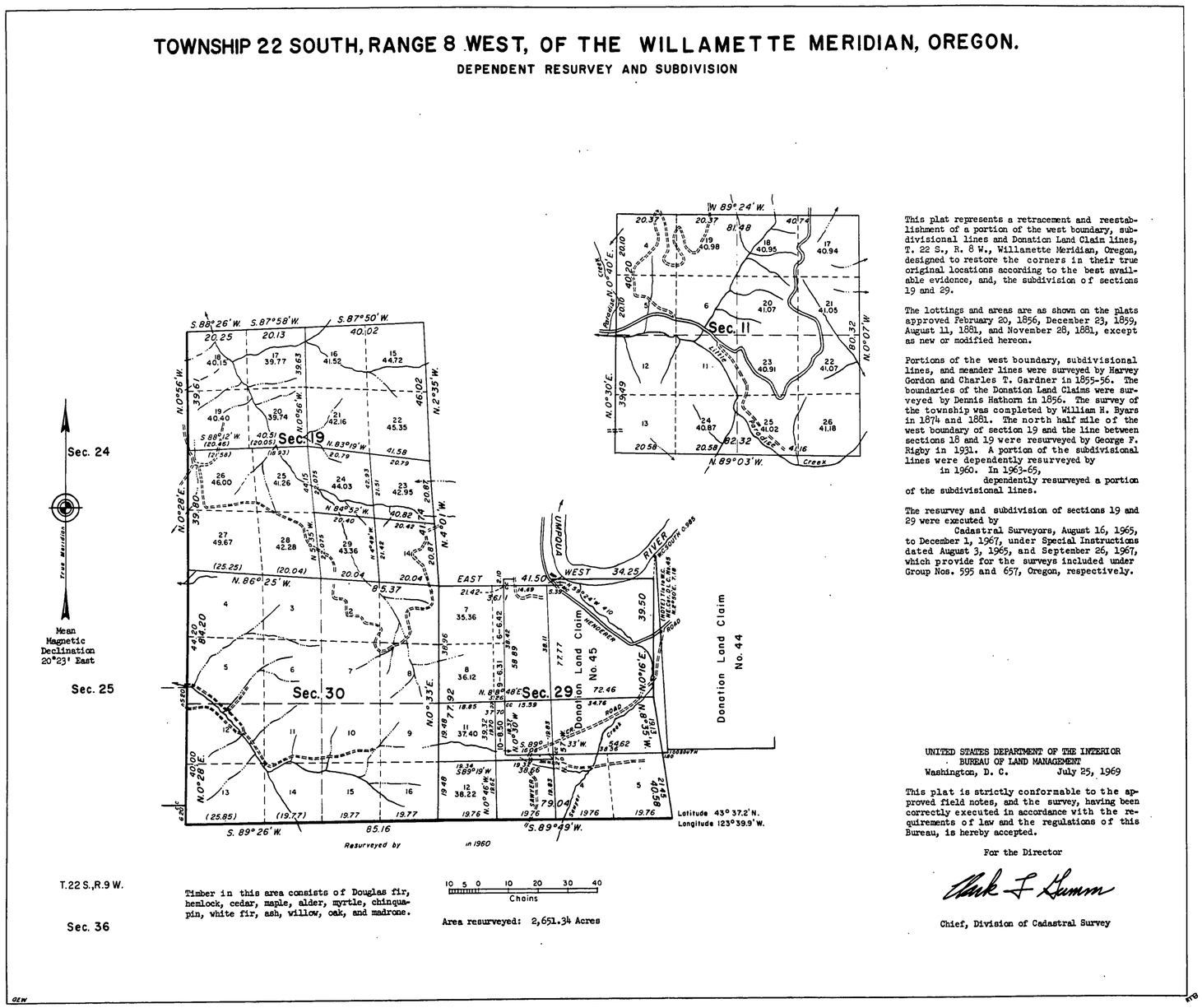
Since lot 14, section 19 is patented, that section had to be subdivided in a manner which would "protect the areas" represented on the original plat, shown in figure 4. The NW¼ of section 19 had been protracted in 1874 with the centerlines of the section parallel to the north and west boundaries. When Byars completed the section in 1881 with distorted south and east boundaries, the remaining three fourths of the section was lotted, creating an abnormal situation.

If section 19 was subdivided with straight centerlines connecting ¼ section corners, the result would be approximately as shown in figure 6.

Section 19 was subdivided by surveying the north half of the N-S centerline southerly, parallel to the north half of the west boundary and the E-W centerline easterly, parallel to the mean bearing of the west half of the north boundary. The center ¼ section corner was established where these two lines intersected. The east half of the E-W centerline and the south half of the N-S centerline were then surveyed on connecting courses. The southeast quarter of the section was subdivided normally from 1/16 section corners established at midpoint positions.

Because of the areas shown on the original plat, a "double" center W1/16 section corner would be necessary if required to delineate public lands. In this survey, the center W1/16 section corners were not required on the ground. The areas of lots in the west half of the section and parenthetical distances are shown on the plat accepted July 25, 1969, figure 7.

SUBDIVISION OF SECTION WITH BROKEN CENTERLINE



This plat represents a retracement and reestablishment of a portion of the west boundary, subdivisional lines and Donation Land Claim lines, T. 22 S., R. 8 W., Willamette Meridian, Oregon, designed to restore the corners in their true original locations according to the best available evidence, and, the subdivision of sections 19 and 29.

The lottings and areas are as shown on the plats approved February 20, 1856, December 23, 1859, August 11, 1881, and November 28, 1881, except as new or modified hereon.

Portions of the west boundary, subdivisional lines, and meander lines were surveyed by Harvey Gordon and Charles T. Gardner in 1855-56. The boundaries of the Donation Land Claims were surveyed by Dennis Hathorn in 1856. The survey of the township was completed by William H. Byers in 1874 and 1881. The north half mile of the west boundary of section 19 and the line between sections 18 and 19 were resurveyed by George F. Rigby in 1931. A portion of the subdivisional lines were dependently resurveyed by
in 1960. In 1963-65,
dependently resurveyed a portion of the subdivisional lines.

The resurvey and subdivision of sections 19 and 29 were executed by
Cadastral Surveyors, August 16, 1965, to December 1, 1967, under Special Instructions dated August 3, 1965, and September 26, 1967, which provide for the surveys included under Group Nos. 595 and 657, Oregon, respectively.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. July 25, 1969

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

Clark F. Gumm

Chief, Division of Cadastral Survey

Figure 7 - Accepted Plat

Supplemental Topic

The Washington Office accepted the plat, and by memorandum dated July 25, 1969, made the following comment:

> "We are accepting this plat with some reservations as to the method of subdivision of sec. 19. The plat of August 11, 1881, showed the centerlines of the section as straight lines although admittedly the areas could not be reconciled. The survey of the NW¼ could have been annuled, as returned on the plat of August 20, 1875, since the area is in public ownership. The effect on the SE¼ SE¼, the only privately owned portion, would be small if the subdivision had been regularly made."

Lot 14 would have been diminished by about 1.16 acres had the Washington Office's suggested procedure been used. The areas would have been approximately as shown in figure 6.

SUBDIVISION OF SECTION WITH BROKEN CENTERLINE

Supplemental Topic No. 2

The areas returned on the Byars plat, approved August 11, 1881, were based on a "normal" subdivision of section 19, disregarding the protracted northwest quarter of the section as shown on the 1875 plat. The only parenthetical distances which will result in the areas shown on the 1881 plat, are shown in Figure 8. The length of the west half of the east-west centerline of the southwest quarter (25.13 chains) is unexplainable, except as a blunder by the draftsman.

Since the 1875 plat was approved with the northwest quarter protracted, containing 161.64 acres, and the remainder of the section was completed as containing 516.81 acres (the individual areas of lots 4 thru 14 total 517.81 acres) the original northwest quarter was not superseded by the 1881 plat. Under the policy of the Bureau of Land Management, the surveys or protractions of the O & C lands are not superseded. Those lands were once patented, are now revested, and did not revert to a full Public Domain status.

It would not be possible to "protect" the protracted NW¼ of section 19 and also "protect" lots 4 thru 14 at the same time when subdividing the section. The draftsman had manifestly blundered when constructing the 1881 plat. By holding the protracted northwest quarter and subdividing the section with a "broken" centerline, the representations on the 1881 plat are more closely adhered to than could be done in any other method of subdivision.

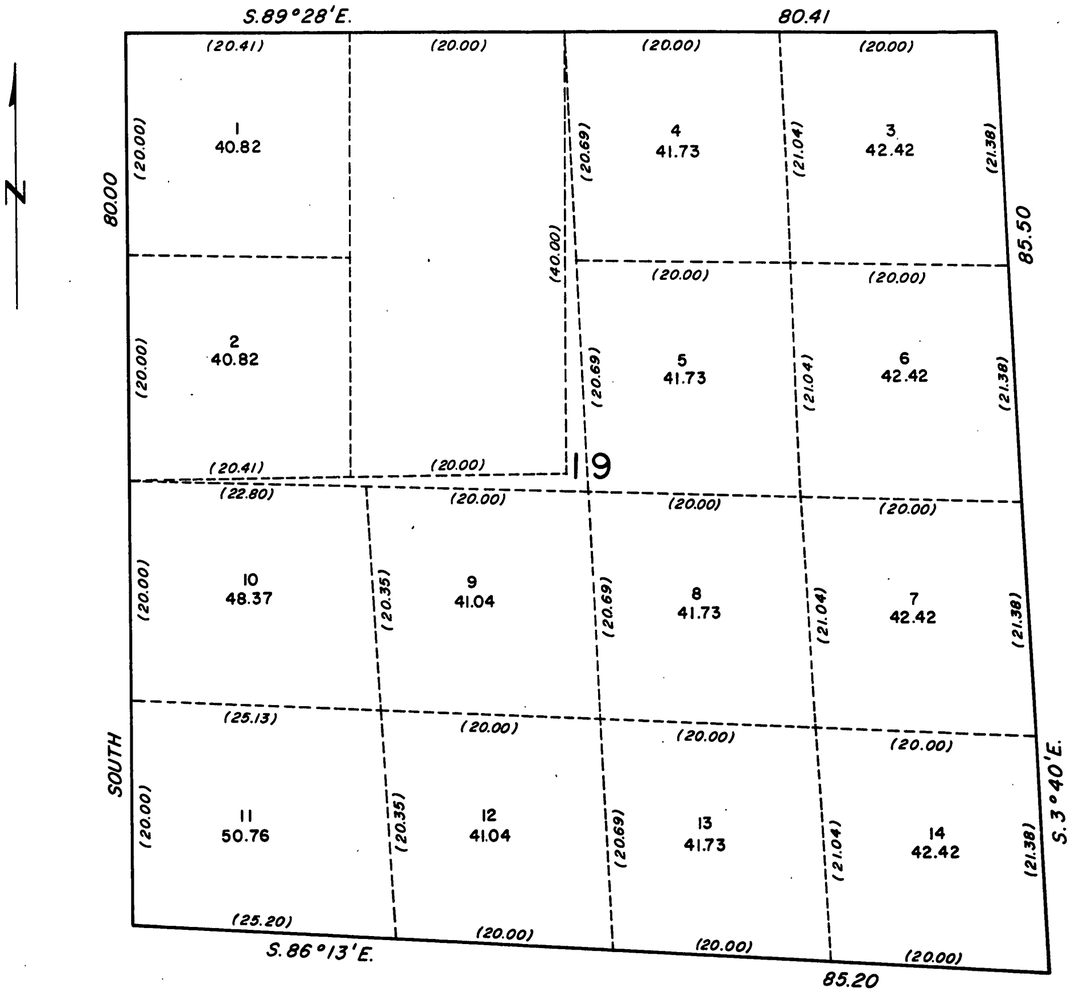


Figure 8 - Reconciliation of Areas

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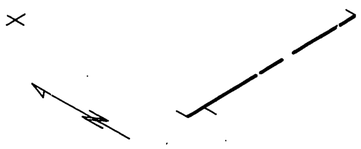
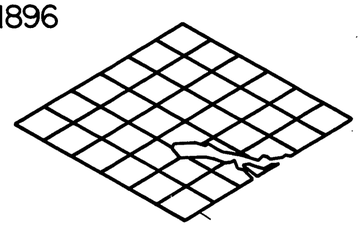
SUBDIVISION OF FRACTIONAL SECTIONS, SEELEY LAKE

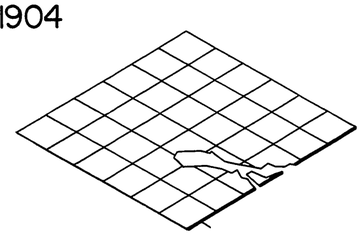
1890



1896



1904



History of Surveys

1890	Angus McGilloray surveyed the Fourth Standard Parallel North along the south boundary of the township in September, 1890.
1896	W.W. McElroy retraced the south boundary and surveyed the east, west, and north boundaries as well as surveyed the subdivisional lines of of the township as shown on the plat approved January 29, 1897. See figure 1.
1904	W.H. Thorn retraced and resurveyed the Fourth Standard Parallel North along the south boundary of the township. Thorn was surveying the boundaries of what was then the Lewis and Clark Forest Reserve. He set Forest Reserve boundary posts on the standard parallel at a distance of 6 links either east or west of each standard section corner.
1960-63	The Forest Service Remonumentation Program was instrumental in remonumentation of many corners in this township.

Reasons for Request of this Survey

Most of the lands within the township are in the Lolo National Forest, intermingled with public lands, reconveyed lands, withdrawals and patented lands. The Forest Service requested a resurvey and subdivision of sections to identify the intermingled ownership and status.

Township No. 17 North Range No. 15 West of the Principal Meridian Montana.

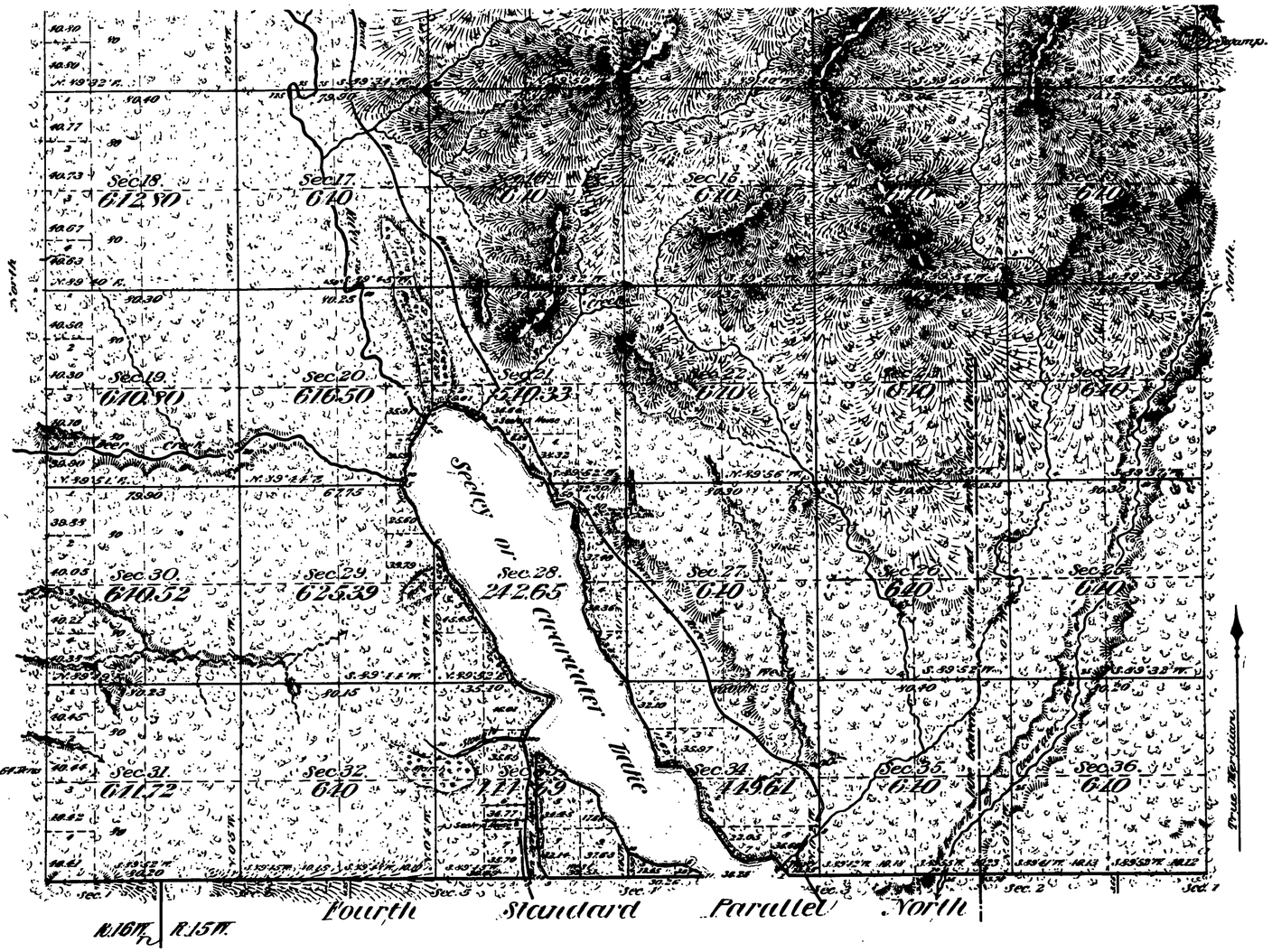


Figure 1 - Portion of Accepted Plat

B10-1

SUBDIVISION OF FRACTIONAL SECTIONS, SEELEY LAKE

Special Instructions

Special Instructions for Group 534, Montana, were prepared on June 24, 1964. They provided for the dependent resurveys and partial subdivision of sections in six different townships, including T. 17 N., R. 15 W. This discussion is limited to the sections in T. 17 N., R. 15 W., surrounding Seeley Lake. Field work began in this township on July 12, 1966.

Conditions Found on the Ground

Figure 2 shows the recovered original corners and land status in the sections immediately surrounding Seeley Lake. In figure 2 all lands not given special symbols are administered by the Lolo National Forest. Of the corners searched for, only four that are pertinent to this discussion were lost. Figure 3 combines the survey records of the 1890 original survey, the 1896 subdivisional survey by McElroy and 1904 resurvey of the Standard Parallel by Thorn.

Preliminary Statement of the Problem

The surveyor must restore four lost corners and subdivide sections 20, 27, 29, 32, 33 and 34 to the extent necessary to mark and define the boundaries of the National Forest Lands.

Regulations

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

3-77 to 3-92	Subdivision of sections
4-42	Special meander corners
5-30, 5-31 and 5-38	Single proportionate measurement
5-40	Meander corners
5-43	Broken boundary adjustment
5-45	Single point control
7-9 and 7-12	Subdivision of sections

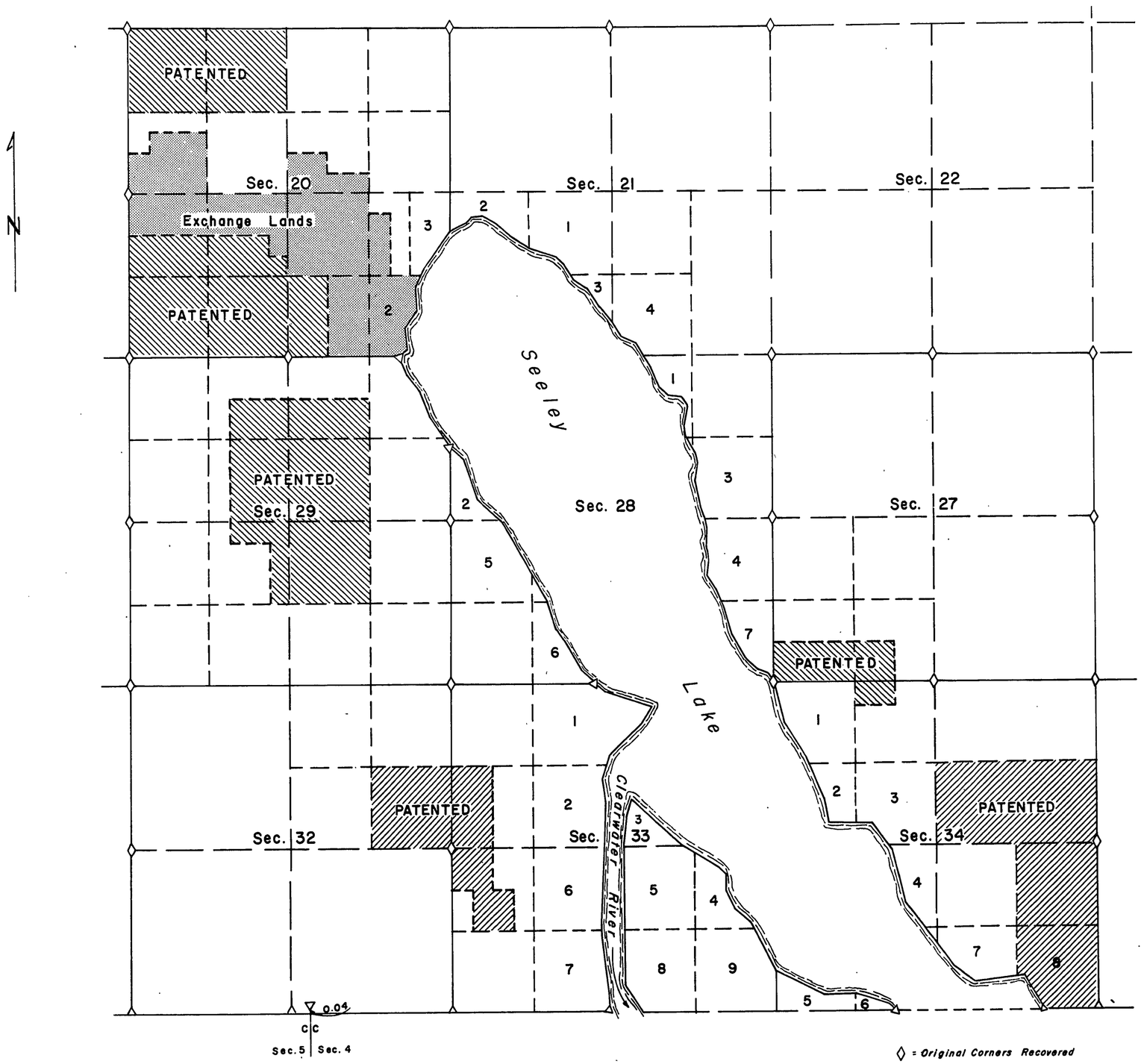


Figure 2 - Status and Corner Recovery

B10-2

SUBDIVISION OF FRACTIONAL SECTIONS, SEELEY LAKE

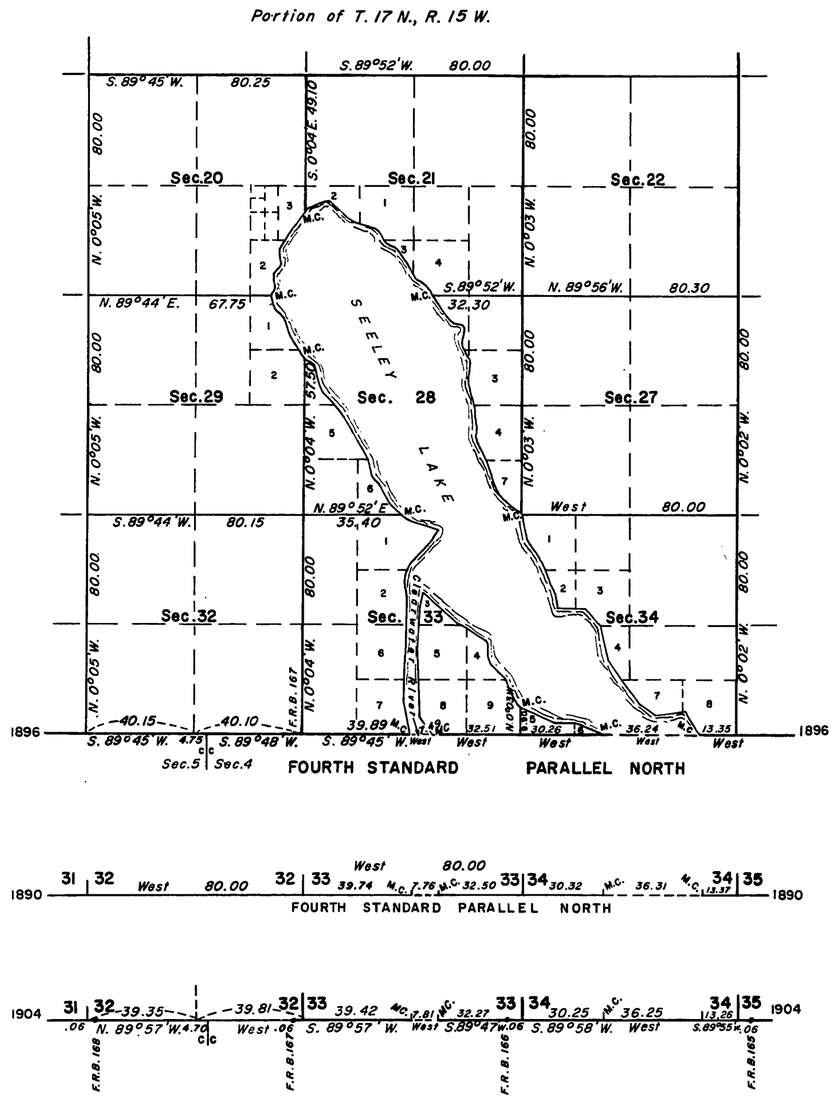


Figure 3 - Combined Survey Record

Changes in Instructions

While the field work was still in progress, the Forest Service made additional requests. Supplemental Special Instructions dated October 11, 1966, added the dependent resurvey of several sections, including the subdivision of sections 29 and 32.

On August 16, 1966, the Forest Service requested the survey of lands in section 20 that had been reacquired through an exchange agreement. The lands were described in the request as follows:

> Section 20, T. 17 N., R. 15 W., PMM, containing 173.09 acres, more or less: Lot 2, S½S½SW¼NE¼, N½SW¼SW¼NE¼, SE¼NW¼SW¼NW¼, S½NE¼SW¼NW¼, S½SW¼NW¼, N½N½SW¼, NE¼SE¼NE¼SW¼, NW¼SE¼, SW¼NW¼NE¼SE¼, W½SW¼NE¼SE¼, E½SW¼SE¼.

On October 14, 1966, the Forest Service made further requests. On May 4, 1967, Supplemental Special Instructions were prepared. They provided for the subdivision of sections 21, 27, 33 and 34 (and others) to the extent necessary to define the forest boundaries.

Final Statement of the Problem

The lost corners must be restored by proper methods, all necessary 1/16 and 1/64 section corners along the section lines established and the sections subdivided by proper methods to the extent necessary to define the boundaries of the Lolo National Forest lands, including the boundaries of the recently acquired lands in section 20. The status is shown in figure 2 as exchange lands.

Solution

Figures 4 and 5 are the final plats accepted April 13, 1972, and show the solution.

The ¼ section corners of sections 17 and 20, 29 and 32 were restored at midpoint between controlling section corners by single proportionate measurement.

The ¼ section corner and meander corner of sections 20 and 21 were restored at record bearing and distance (single point control.)

All necessary 1/16 (and lower order) section corners on the section lines were established at midpoint or single proportionate positions.

In section 20, the record meanders were retraced and closing error adjusted by the broken boundary method (compass rule.) The centerlines of the section and centerlines of the NE¼, SW¼ and NW¼ were surveyed between opposite corners in the normal procedure. The N-S centerline of the SE¼ was surveyed normally. The E-W centerline of the SE¼ was surveyed easterly on a mean bearing between the E-W centerline of the section and easterly portion on the south boundary of the section and terminated at a special meander corner on the adjusted original meander line. All minor subdivisional lines were run on calculated courses and distances. All 1/16 section corners were monumented. Only necessary minor subdivision corners were monumented.

Section 29 was subdivided in a manner similar to that used in section 20.

Section 32 is not fractional and was subdivided in the normal manner.

In section 33, all of lots 1 thru 9 are in the National Forest. The portion of the Standard Parallel between Seeley Lake and the Clearwater River was not resurveyed, nor was the short line between sections 33 and 34. Section 33 has only one ¼ section corner.

The E-W centerline of section 33 was surveyed easterly on a mean bearing between the controlling north and south boundaries of the section, with the C-W 1/16 section corner established at a mean distance. The N-S centerlines of the SW¼ and NW¼ were then surveyed, resulting in bearings which were (coincidentally) parallel to the west boundary of the section.

The E-W centerlines of the NW¼ and SW¼ sections were surveyed on mean bearings, easterly to intersections with the N-S centerlines of those ¼ sections and the NW 1/16 and SW 1/16 section corners established. The minor subdivision-of-section lines were surveyed on connecting courses or calculated courses and distances.

In section 27, the centerlines of the section and centerlines of the SW¼ were surveyed normally. The minor subdivision-of-section lines in the SW¼ were surveyed as connecting lines or on calculated courses and distances.

Lots 5 and 6 of section 34 were in the National Forest. The meander corner on the standard parallel on the westerly shore of Seeley Lake had been remonumented in 1963. This corner was flagged and a bearing determined for the segment of the standard parallel across the lake.

The N-S centerline of section 34 was surveyed southerly on a bearing parallel to the mean bearing of the east boundary of the section. The E-W centerline was surveyed westerly on a bearing which was a mean between the mean bearings of the north and south boundaries of the section. The center ¼ section corner was established at the intersection of the centerlines.

Based on the resurvey of the south, east and north boundaries of section 34, the record meanders were adjusted by calculation, using the compass rule and the first two calculated courses run on the ground.

The N-S centerline of the SE¼ of section 34 was surveyed southerly on a mean bearing between the N-S centerline and the south half of the east boundary of the section to an intersection with the calculated adjusted meander line, where a special meander corner was established.

The E-W centerline of the NE¼ of section 34 was surveyed on a connecting course.

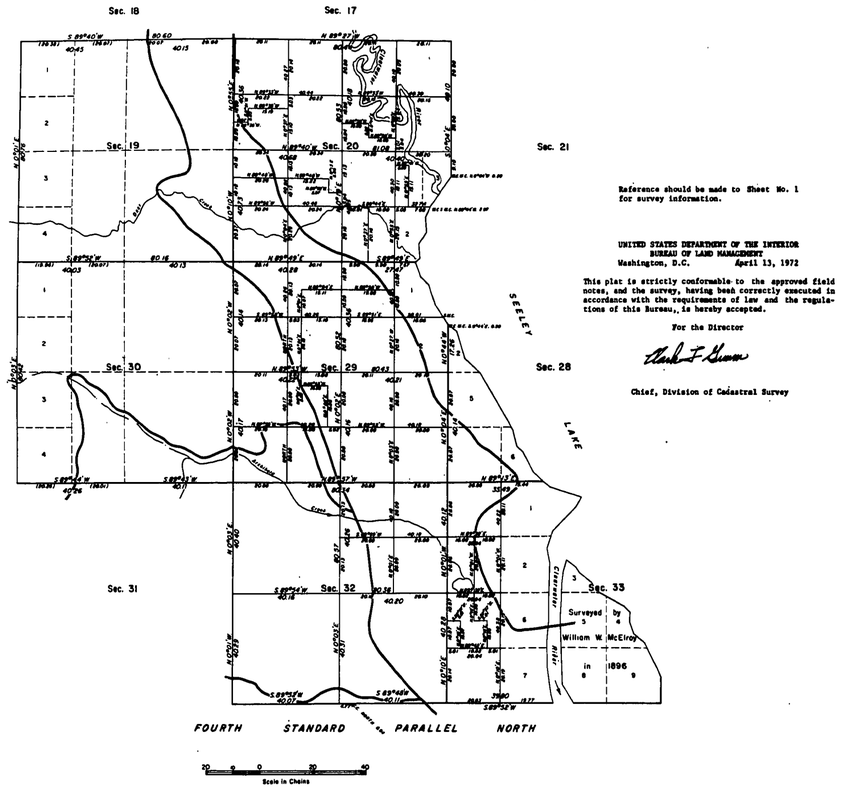
The minor subdivision-of-section lines in the NW¼ were surveyed on calculated courses and distances.

Sections 21 and 28 were not completely resurveyed nor subdivided because they are all National Forest lands.

SUBDIVISION OF FRACTIONAL SECTIONS, SEELEY LAKE

TOWNSHIP 17 NORTH, RANGE 15 WEST OF THE PRINCIPAL MERIDIAN, MONTANA.
DEPENDENT RESURVEY AND SUBDIVISION

Sheet 2 of 3



Reference should be made to Sheet No. 1 for survey information.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. April 13, 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

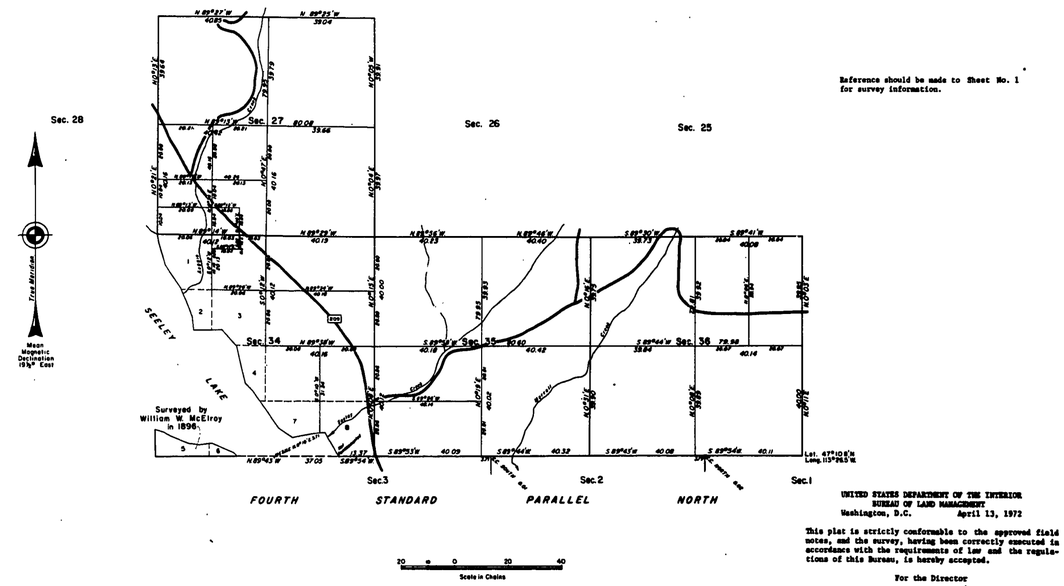
Clark F. Human

Chief, Division of Cadastral Survey

Figure 4 - Portion of Accepted Plat

TOWNSHIP 17 NORTH, RANGE 15 WEST OF THE PRINCIPAL MERIDIAN, MONTANA.
DEPENDENT RESURVEY AND SUBDIVISION

Sheet 3 of 3



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For the Director

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Chief, Division of Cadastral Survey

Figure 5 - Portion of Accepted Plat

Supplemental Topic

No areas were returned based on the 1890 survey by McGilloray of the Standard Parallel, nor on the 1904 resurvey by Thorn. The areas of lots 1, 2, 6 and 7 in section 33 are based on the 1896 retracement of the standard parallel by McElroy, shown in figure 1.

The original 1890 survey returned the distance from the standard corner of sections 32 and 33 to the meander corner on the west bank of the Clearwater River as 39.74 chains.

The 1896 retracement returned this same distance as 39.89 chains (figure 1 and figure 3.)

The 1904 resurvey returned a distance of 39.42 chains, (figure 3.)

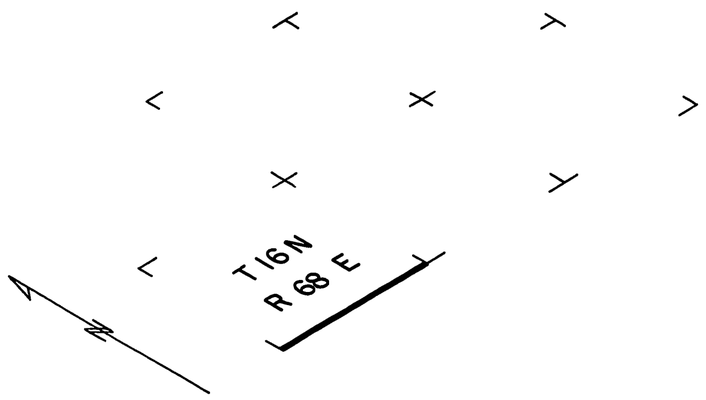
The areas of lots 6 and 7, section 33, are based on the west 1/16 corner being at 20.00 chains with the remainder (to the meander corner) of 19.89 chains.

In the present dependent resurvey the standard W 1/16 section corner was established, based on the original 1890 record (39.74 chains) instead of the 1896 retracement (39.89 chains) and was therefore technically in error. The proportionate distances should have been 19.955 chains and 19.845 chains.

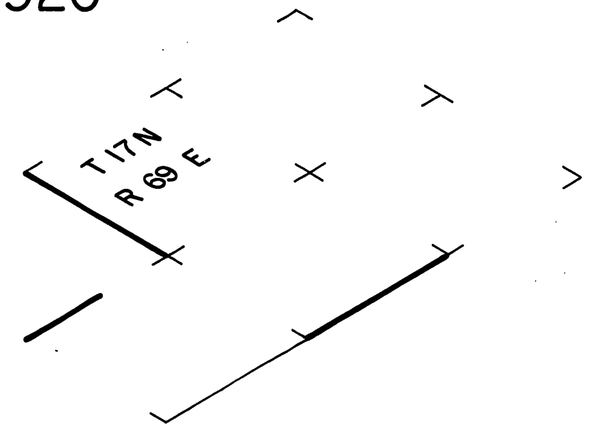
The center W 1/16 section corner of section 33 was established at a distance which was the mean of the distances to the W 1/16 section corners on the north and south boundaries of section 33. This resulted in the N-S centerlines of the NW¼ and SW¼ being parallel to the west boundary, but only because the standard W 1/16 section corner was established in error. Had the standard W 1/16 section corner been properly placed, the center W 1/16 section corner would have been set at 20.00 chains (in this case) instead of 20.04 chains. The centerlines of the NW¼ and SW¼ would not then be parallel to the west boundary of the section.

NEVADA SURVEY BASED ON A PROTRACTION DIAGRAM

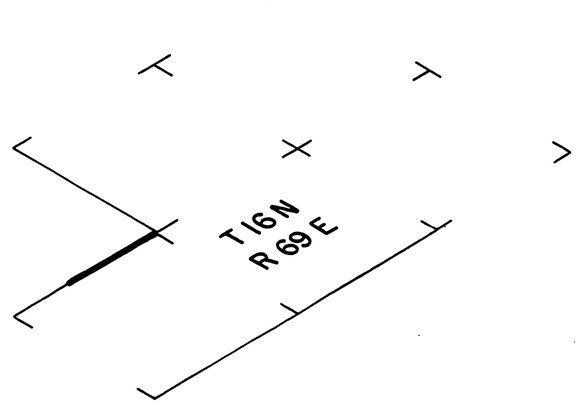
1918



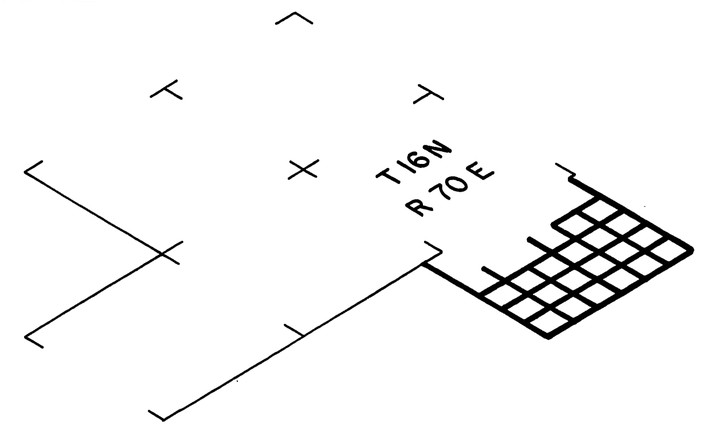
1920



1922



1942



History of Surveys

The previous survey records are indicated on the protraction diagrams accepted October 12, 1962, shown in figure 1 and figure 2. Part of T. 15 N., R. 70 E., was subdivided in 1942. The Third Standard Parallel North was surveyed through Range 69 E. in 1920. The east boundary of T. 17 N., R. 68 E., was surveyed in 1920. All corners of the existing surveys are monumented with brass capped iron posts.

Reasons for Request of this Survey

The Mt. Moriah Division of the Humboldt National Forest is a separated portion of the forest, extending approximately 7 miles east, 9 miles south, 7 miles west, and 7 miles north from Mt. Moriah, a 12,000 ft. high peak. The Division boundary is described by section lines. Most of the east and north boundaries of the Mt. Moriah Division are unsurveyed. The Forest Service requested a survey of the unsurveyed portion of the boundary to mark the boundary on the ground.

Special Instructions

On August 27, 1969, Special Instructions were prepared for Group 465, Nevada. They provided for the survey of the following:

T. 15 N., R. 70 E.; The east and west boundaries of section 2.

T. 16 N., R. 70 E.; The Third Standard Parallel North to be surveyed west from the closing corner of sections 1 and 2 to the standard corner of sections 33 and 34, and the second meridional line of the township.

T. 17, N., R. 70 E.; The south 4 miles of the second meridional line; the line between sections 10 and 15; the north two miles of the third meridional line; the west three miles of the north boundary.

T. 17 N., R. 69 E.; The north boundary of the township.

The survey of these lines was to be based upon the protraction diagrams (figures 1 and 2) and controlled by triangulation stations established by the Forest Service. These stations were established by extension of the existing Coast and Geodetic Survey and Geological Survey net, using EDM equipment and third order triangulation methods. The geographic position of the stations are as follows:

SE. cor. T. 16 N. R. 69 E.,
39° 12'00.289" N.
114° 09'10.422" W.

SE. cor. sec. 2, T. 15 N., R. 70 E.,
39° 11'43.510" N.
114° 04'29.493" W.

MM2-005-1 (near the protracted cor. of secs. 10, 11, 14, 15, T. 16 N., R. 70 E.,
39° 15'23.993" N.,
114° 04'41.515" W.

MM2-006-1 (near the protracted cor. of secs. 10, 11, 14, 15, T. 17 N., R. 70 E.,
39° 20'41.507" N.
114° 04'34.1755" W.

MM2-007-1 (near the cor. of secs. 3 and 4, N. bdy of T. 17 N., R. 70 E.
39° 22'27.036" N.
114° 05'45.995" W.

SE. cor. T. 18 N., R. 68 E.,
39° 22'25.959" N.
114° 15'49.503" W.

Field work was begun on October 13, 1969.

B11-1

NEVADA SURVEY BASED ON A PROTRACTION DIAGRAM

Conditions Found on the Ground

The corners of section 2, T. 15 N., R. 70 E. and corner of Tps. 17 and 18 N., Rs. 68 and 69 E. were recovered in good condition. The triangulation stations were also recovered without too much difficulty.

Preliminary Statement of the Problem

Using the geographic positions furnished by the Forest Service, the following computations must be made prior to beginning the survey:

1. Length of the line between sections 1 and 2, T. 15 N., R. 70 E., to be run N. 0° 01′ W., to a point due east of the southeast corner of T. 16 N., R. 69 E.

2. The length of the standard parallel from the closing corner of sections 1 and 2 to the southeast corner of T. 16 N., R. 69 E.

3. The distance from the closing corner of sections 1 and 2 along the Standard Parallel to the standard corner of sections 33 and 34.

4. When the second meridional lines in Tps. 16 and 17 N., R. 70 E. are surveyed, at what position should the corner of sections 10, 11, 14 and 15 fall, in relation to stations MM 2-005-1 and MM 2-006-1, to be within limits and thus preclude errors in the lines surveyed?

5. The corner of sections 3 and 4 on the north boundary of T. 17 N., R. 70 E. must be established at the intersection of the line between sections 3 and 4 and a line due east of the corner of Tps. 17 and 18 N., Rs. 68 and 69 E. How far south of station MM 2-007-1 should the corner be established and also what departure should be used to remain within limits?

6. After the corner of sections 3 and 4 is acceptably established, the north boundary of T. 17 N., Rs. 69 and 70 E. must be surveyed on the latitudinal curve. The line must run to the corner of Tps. 17 and 18 N., Rs. 68 and 69 E., setting corners (referring to T. 17 N. only) every 40 and 80 chains, with the deficiency in the last half mile. It is desirable to run the line (approximately 9 miles) on the long chord of the curve and make the offsets south to the curve. What should the initial bearing of the chord be at the corner of sections 3 and 4 and what are the required offsets?

Regulations

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

2-74 to 2-82	Geodesy of large-scale cadastral surveys
3-24 and 3-25	Irregular Order on partial surveys

This survey must be made in conformity with the protraction diagrams, as nearly as possible, based on the available data.

Final Statement of the Problem

The surveyor must compute the courses and lengths of lines to be surveyed.

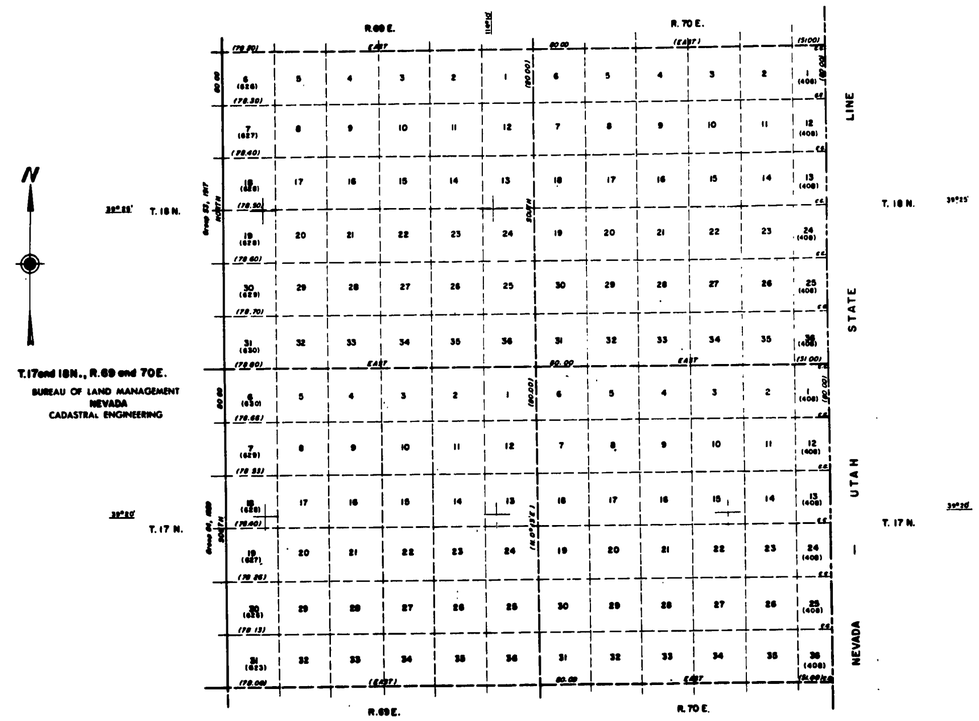


Figure 1 - Protraction Diagram

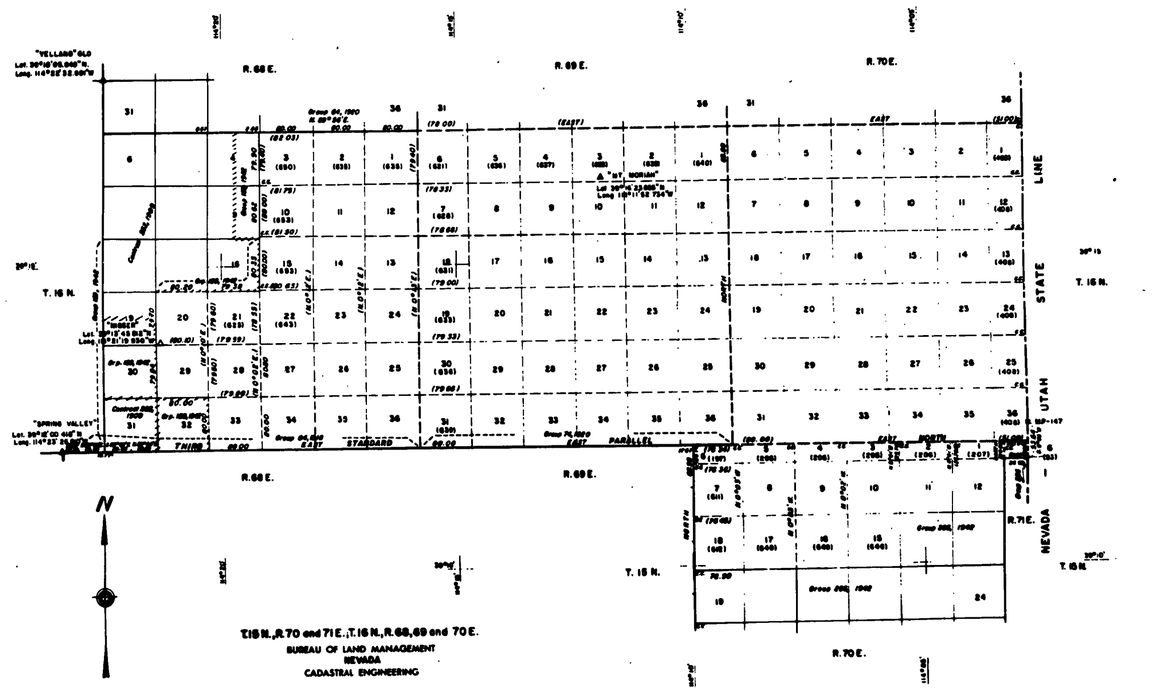


Figure 2 - Protraction Diagram

NEVADA SURVEY BASED ON A PROTRACTION DIAGRAM

Solution

Figure 3 illustrates the overall solution. Using the geographic positions of the control points and the "M and P" factor tables to determine line lengths, the surveys were made in the following order:

1. The line between sections 1 and 2, T. 15 N., R. 70 E., was run N.° 01′ W., 25.73 chains and the closing corner of sections 1 and 2 established. From the closing corner, the Third Standard Parallel was run due west 15.22 chains and the standard corner of sections 34 and 35 established. The standard parallel was extended west to the standard corner of sections 33 and 34. The line between sections 2 and 3 was run N. 0° 01′ W., to a closing corner on the standard parallel. The north ¼ section corner of section 2 was established at midpoint between closing corners.

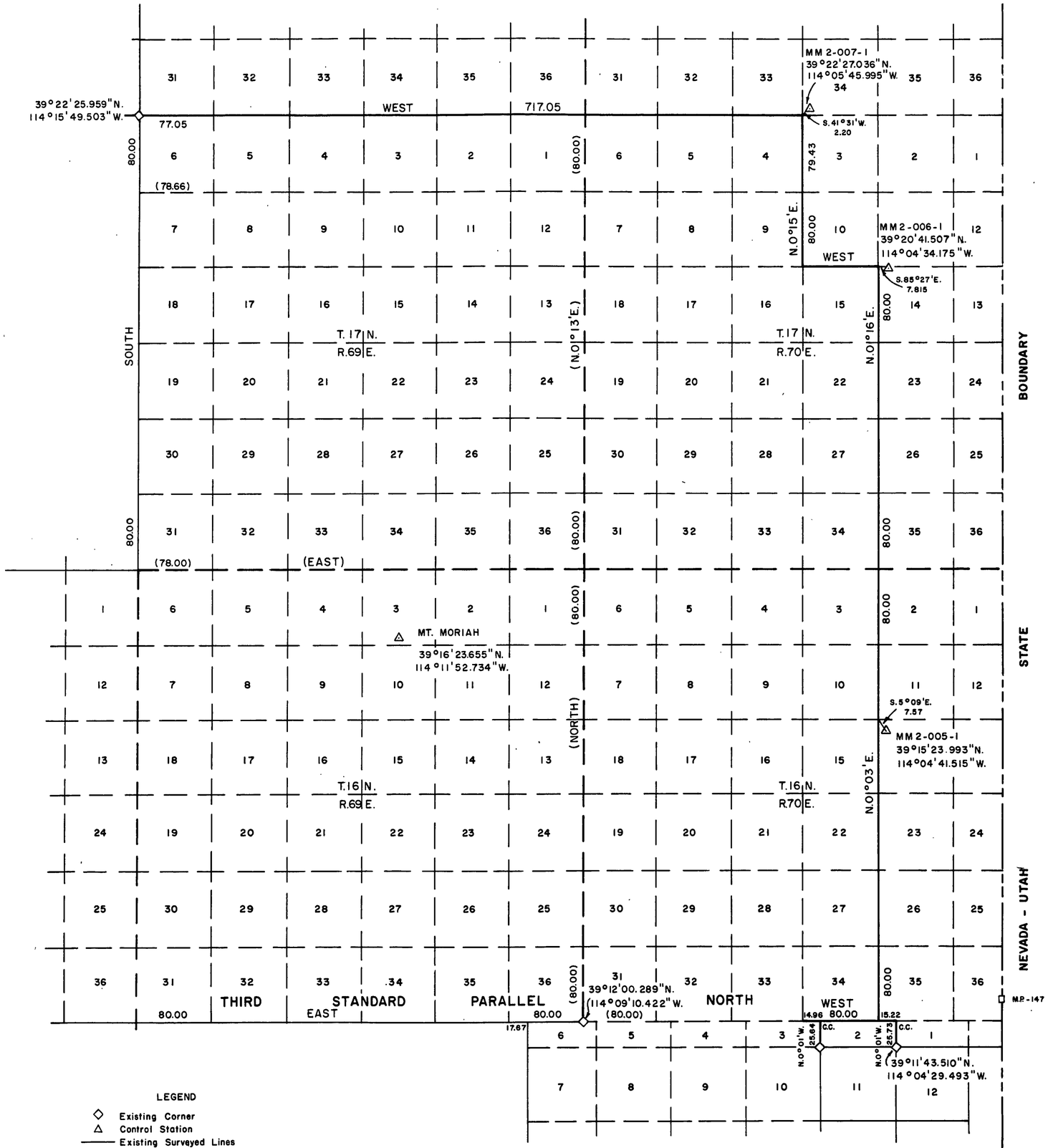
2. The second meridional line in T. 16 N., R. 70 E. was surveyed N. 0° 03′ E. (parallel to the protracted west boundary of the township), establishing corners every 40 and 80 chains. A tie was made to station MM 2-005-1, which verified the ground survey.

3. The second meridional line in T. 17 N., R. 70 E. was surveyed N. 0° 16′ E. (parallel to the protracted west boundary of the township), establishing corners every 40 and 80 chains, to the corner of sections 10, 11, 14 and 15. The tie to station MM 2-006-1 verified all work up to this point. The line between sections 10 and 15 was surveyed due west, 80 chains. The third meridional line was run N. 0° 15′ E. (parallel to the protracted west boundary of the township), establishing corners every 40 and 80 chains, with the deficiency in the last half mile between sections 3 and 4.

4. The corner of sections 3 and 4 was established on the line between sections 3 and 4, at a point 1.65 chains, in latitude, south of station MM 2-007-1.

5. The long chord of the latitudinal curve was computed, with initial bearing, offsets, etc., as shown in figure 4. These values were run on a random line, setting temporary points at each ¼ corner and section corner. The deficiency was placed in the last half mile on the north boundary of section 6, T. 17 N., R. 69 E. A small "falling" at the established corner of Tps. 17 and 18 N., Rs. 68 and 69 E., was then distributed pro-rata, back through the temporary points and the corners then monumented and marked referring to T. 17 N., only.

A plat was made of the work in each township, which required four plats. These plats were accepted on February 3, 1972. The bearings and distances returned on the accepted plat are shown in figure 3.



LEGEND

- ◇ Existing Corner
- △ Control Station
- ——— Existing Surveyed Lines
- - - - - Protraction Lines
- ——— Lines Surveyed, This Assignment

Figure 3 - Solution

NEVADA SURVEY BASED ON A PROTRACTION DIAGRAM

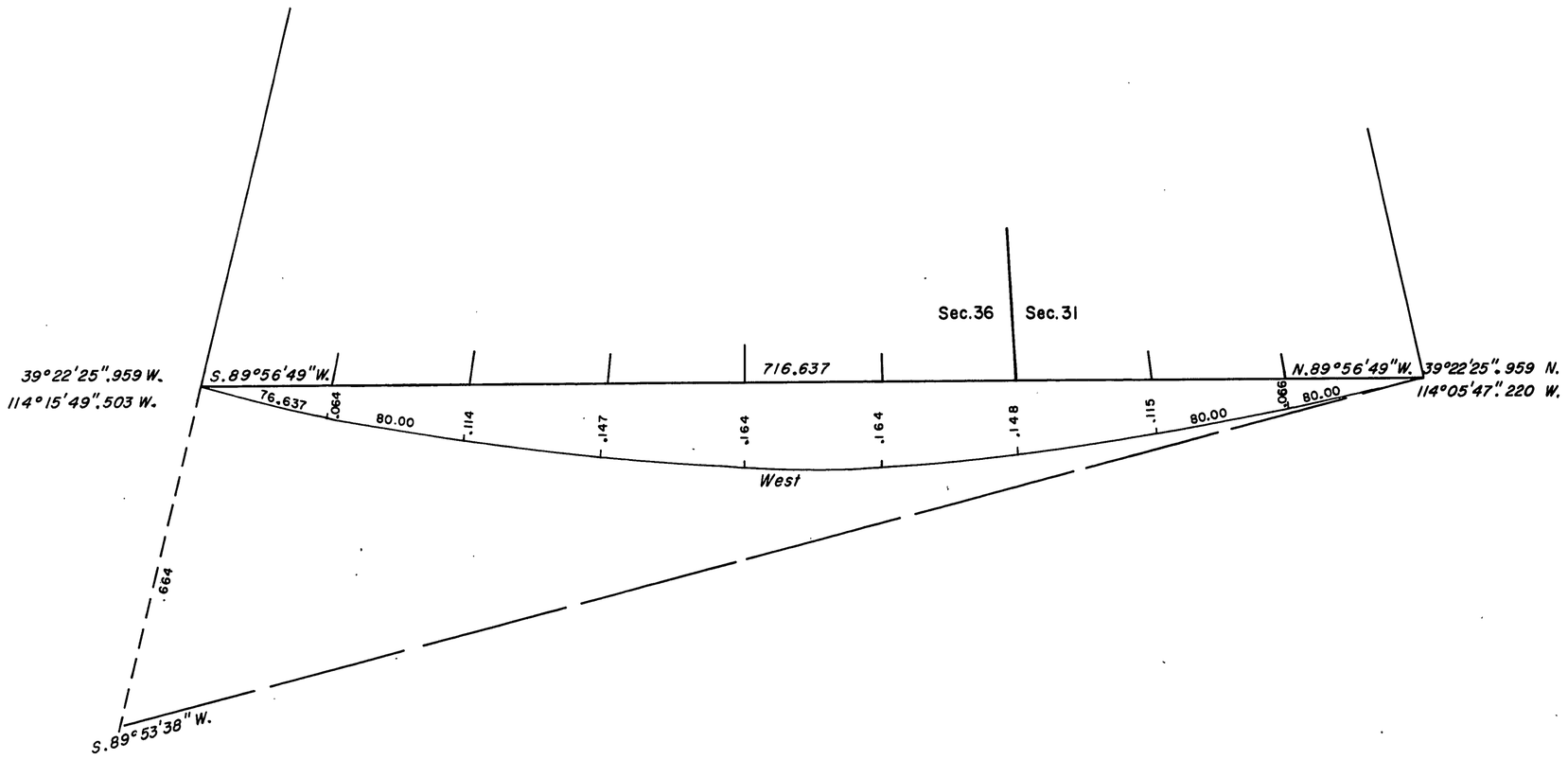


Figure 4 - Latitudinal Curve

FUNDAMENTALS OF PROPERTY RIGHTS AND BOUNDARIES

Introduction

The special boundary problems includes what is commonly referred to as "hiatuses," "overlaps," Junior-Senior" corners, "Junior-Senior" surveys and state boundaries.

There is no anticipation in the system of rectangular surveys that a hiatus or overlap would (or could) occur; the various manuals of surveying instructions do not mention them at all. In strictly legal contemplation they do not and cannot exist because all the land must have an ownership, there is no such thing as "no-man's land." Conversely, it is not possible for two different persons to hold a clear fee title to the same tract of land. Hiatuses and overlaps are therefore as much legal problems as they are problems for the surveyor. Every land surveyor has been confronted by small hiatuses or overlaps (junior-senior conflicts in title descriptions) and may at some time be confronted with a larger descrepancy which is then termed either a hiatus or an overlap. He must make a surveying decision and follow some course of action or he must make a recommendation for a surveying solution to the problem. Since hiatuses and overlaps are property ownership problems, the final decision is vested in higher governmental authority or in a court of competent jurisdiction. There is no statutory law pertaining to these problems, except that no survey or resurvey may be executed in a manner that will adversely affect vested rights of the land owners. The surveyor can and must develop the facts, relationships and evidence; and make his decisions based on sound knowledge of the precedents of case law.

Hiatus

Hiatus is a latin word meaning "to gape," such as to yawn. As used in surveying it is a gap or open space where none was supposed to exist. A hiatus may occur where the first surveyor in an area surveyed and monumented a tract of land and a later surveyor surveyed an adjoining tract with the intent of having a common boundary with the first, but in fact monumented another line some distance away (not in conflict) and, after title has passed, it is discovered that there are in fact two separately monumented lines. The space, or gap between the two lines is called a hiatus.

In the public land states, all of the land was public domain belonging to the United States. In the plan of the rectangular system of surveys the townships and sections were surveyed as boundary lines. Thus: the east boundary of one township was to be also the west boundary of the township adjoining it to the east; the north boundary of one section was to be the south boundary of the section north of it, and so on. It was soon discovered that land surveying was not an exact science. What could be done in theory could not be transferred exactly to the land surface. Because of poor instrumentation, rough terrain and human frailities, errors occurred in placing the survey monuments on the ground. If a settler bought land from the government, he relied upon the survey monuments for making his improvements. If an error was discovered and the monuments were "corrected" or moved, he would have title to a tract of land but would never know for sure where the boundaries of that tract were located on the ground. The Act of Congress dated February 11, 1805, 2 Stat. 313, 43 U.S.C. 752, fixed the corners and monuments established as the true corners of the sections and subdivisions thereof, regardless of whether they were in the "correct" place or not.

The government has the right to make and correct surveys of its public lands, but once a private right has been acquired, based on an official survey, the corners are unchangeable even though a better job might have been done. In the case of Haydel v. Dufresne, (1855) 58 U.S. 23, the Supreme Court said, "This construction of the law is altogether necessary, as great confusion and litigation would ensue if the judicial tribunals, state and federal, were permitted to interfere and overthrow the public surveys on no other grounds than an opinion that they could have the work in the field better done-------than the Department of Public Lands could do." In the now famous case of Cragin v. Powell, (1888), 128 U.S. 691, it was said, "That the power to make and correct surveys of the public lands belongs to the political department of the government, and that, whilst the lands are subject to the supervision of the General Land Office, the decisions of that bureau in all such cases,------are unassailable by the courts, except by a direct proceeding,------." It was also stated, "It is a well settled principle that when lands are granted according to an official plat of the survey of such lands, the plat itself, with all its notes, lines, descriptions and landmarks, becomes as much a part of the grant or deed by which they are conveyed, and controls so far as limits are concerned, as if such descriptive features were written out upon the face of the deed or grant itself." (emphasis added). See also Lindsey v. Hawes, (1863), 67 U.S. 554.

It is now a well settled principle of law that the monuments established by a government surveyor, along with the plat and field notes absolutely control the boundaries of lands patented on the basis of those monuments, plat and notes.

Two comparatively recent judicial decisions dealt specifically with the question of ownership of hiatus lands and are as clear as to interpretation. One was United States v. Weyerhaeuser Company and the other was United States v. Macmillan.

United States v. Weyerhaeuser Company, 392 F. 2d 448 (1967) Certiorari denied 393 U.S. 836.

This case dealt with a hiatus between Tps. 27 and 28 S., R. 8 W., Willamette Meridian, Oregon. Briefly, the facts are: The Sixth Standard Parallel South was surveyed by Dennis Hathorn in 1855, through ranges 8, 9 and 10 west. Hathorn set his standard corners to refer to T. 28 S., R. 8 W., and subdivided that township with the standard corners referring to sections 1 through 6. The line was reported as being surveyed due west. The plat and field notes were approved July 7, 1856.

In 1896 William Heydon received a contract to survey T. 27 S., R. 8 W. Heydon's instructions were to retrace the Standard Parallel through range 8 west and establish corners for sections 31 through 36, T. 27 S., and subdivide that township. Heydon reported finding the Hathorn standard corners of sections 1 and 2, 2 and 3, but did not find Hathorn's corners along the north boundaries of sections 3 and 4. He reported finding the standard ¼ corner of section 5 and the standard corner of sections 5 and 6, and the standard corners west of there. Heydon set his corners for T. 27 S., at 40 and 80 chain intervals varying distances west of Hathorn's standard corners. Heydon subdivided T. 27 S., R. 8 W. and his survey was approved September 10, 1897.

Beginning in 1876 patents were issued for sections 3, 4 and 5, T. 28 S., R. 8 W. Patenting of sections 31 through 36, T. 27 S., R. 8 W. began in 1899.

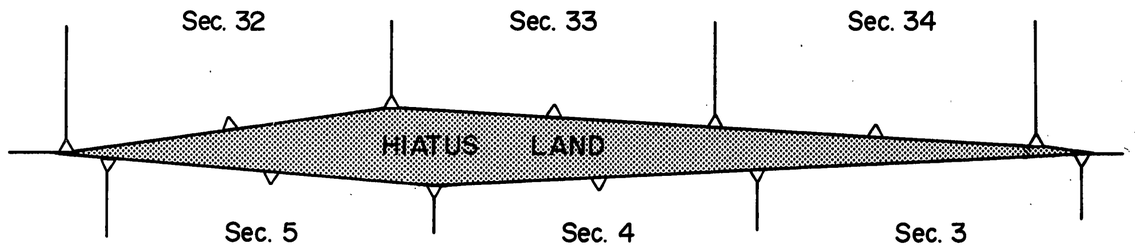
In 1961 it was discovered that the lines marked by the Hathorn and Heydon monuments along the Sixth Standard Parallel, and north boundary of sections 3, 4 and 5, T. 28 S., R. 8 W., did not coincide. All of the 1896 Heydon monuments for sections 32, 33 and 34 were found, and all of the 1855 Hathorn standard corners for sections 3, 4 and 5, except the standard ¼ corner of section 3. The Hathorn line deviated southerly from a true west line, whereas the Heydon line deviated northerly, leaving a gap or hiatus between the two lines as evidenced and proven by the original monuments. The Bureau of Land Management resurveyed the two lines and surveyed the hiatus, designating it as sections 32, 33 and 34, T. 27½ S., R. 8 W. The plat was approved on February 6, 1962. This "half" township varies from zero to a maximum of 4.65 chains in latitudinal width over the 3 miles from the Hathorn standard corner of sections 2 and 3 to the Heydon corner of sections 31 and 32, and contains 45.95 acres. See the accompanying sketch.

The Weyerhaeuser Company was the successor in title to sections 32, 33 and 34, T. 27 S., R. 8 W. Weyerhaeuser filed suit in U.S. District Court for recovery of damages for the timber cut in the right-of-way of a BLM road and to clear title to the hiatus. They argued that Heydon was supposed to have retraced the Hathorn line, and should have done so. Further, that the plat on which their title was based showed the south boundary of T. 27 S., R. 8 W., was the Sixth Standard Parallel South. Since Hathorn had already surveyed the Standard Parallel, Heydon could not survey another one, creating two standard parallels. The government argued that the monuments on the ground marked the boundary of lands conveyed, that the hiatus was public land and that the government could survey and dispose of it as it saw fit.

The United States District court ruled in favor of Weyerhaeuser and the government appealed to the U.S. Court of Appeals, 9th Circuit. The Circuit Court reversed the District Court, ruling that the limit of Weyerhaeuser's title was the Heydon line as marked by his monuments. As to the argument that there could be only one Sixth Standard Parallel the Circuit Court said, "---we think that it cannot be said that there is but one sixth parallel until we have a combination of the ideal surveyor, using ideal instruments in an ideal terrain. Until that combination is available, land titles will be dependent upon the deficiencies and uncertainties which afflict the world as it is."

A writ of certiorari was denied by the Supreme Court, October 14, 1968, 393 U.S. 836. The 9th Circuit Court decision thus carries the same judicial weight as though it were rendered by the Supreme Court of the United States.

T. 27 S., R. 8 W.
Surveyed by Heydon in 1896



△ = Original corners recovered in 1961

T. 28 S., R. 8 W.
Surveyed by Hathorn in 1855

FUNDAMENTALS OF PROPERTY RIGHTS AND BOUNDARIES

United States v. Macmillan, 331 F. Supp. 435 (1971)

This case dealt with a hiatus between Tps. 32 and 33 N., R. 49 E., Mt. Diablo Meridian, Nevada. Though somewhat more complex and created by different circumstances than in the Weyerhaeuser case, the decision by the U.S. District Court for the District of Nevada follows the Weyerhaeuser decision. Briefly the facts are:

In 1869 A.J. Hatch surveyed the exterior boundaries and subdivisional lines of T. 33 N., R. 48 E., establishing the southeast and northeast corners of that township. In 1871 Hatch surveyed the west and south boundaries, west two miles of the north boundary, and surveyed the subdivisional lines of the west two ranges of sections in T. 32 N., R. 49 E. In 1872 Hatch surveyed the south and east boundaries and subdivisional lines of T. 34 N., R. 49 E. In 1874 Hatch surveyed the remaining east four miles of the north boundary, the east boundary and additional subdivisional lines in T. 32 N., R. 49 E., including the line between sections 1 and 2, but not the remaining lines of sections 2, 3 and 4. In the same year (1874) Hatch surveyed the westerly part of the north and south boundaries and west range of sections in T. 33 N., R. 50 E. The plats were all approved, those for T. 33 N., R. 50 E. and T. 32 N., R. 49 E. on October 14, 1874.

Therefore at that time (1874) Hatch had surveyed what was intended to be (under the rectangular system) the four exterior boundaries of T. 33 N., R. 49 E., and most of the subdivisional lines adjoining.

In 1893 H.B. Maxson received a contract to subdivide T. 33 N., R. 49 E. Maxson's field notes indicate that he retraced the Hatch east boundary of T. 33 N., R. 48 E., and did not find the southeast corner of that township nor any corners in the south 3 miles. He did find the corner of sections 13, 18, 19 and 24 and the corners north of there. Maxson reported resurveying the south 3 miles by surveying due south, 40 and 80 chains and "reestablished" the corner of Tps. 32 and 33 N., Rs. 48 and 49 E. He then "resurveyed" the "south boundary," running East, setting corners at 40 and 80 chains. He reported finding "traces" of a few of the Hatch corners and "destroyed" them. Maxson set his own corner for Tps. 32 and 33 N., Rs. 49 and 50 E., reported finding the Hatch township corner and destroying it. He then ran North, setting his own corners for T. 33 N., Rs. 49 and 50 E., reported finding some Hatch corners but again destroying them. Maxson repeated this same procedure along the north boundary. He then subdivided T. 33 N., R. 49 E. from the corners he had himself established. The Maxson plat of T. 33 N., R. 49 E., was approved on December 23, 1893.

On June 20, 1902, most of the odd numbered sections in these townships were patented to the Central Pacific Railway Company. Macmillan (and others) are successors in title to section 31, T. 33 N., R. 49 E.

From 1914 to 1920 retracements of the Maxson and Hatch surveys (in the course of completion surveys in adjacent townships) revealed the following situation:

The Hatch corner of Tps. 32 and 33 N., Rs. 48 and 49 E. was lost. This corner was restored by double proportionate measurement between recovered original Hatch corners 3 miles north, 2 miles east, 3 miles south and 1 mile west. From the restored corner the southwest corner of T. 33 N., R. 49 E. established by Maxson was located N. 16° 49' E., 2.32 chains distant. The field notes indicate that Maxson corners were found along the south 3 miles of the west boundary but none of the Hatch corners. Most of the Hatch corners along the north boundary of T. 32 N., R. 49 E. were recovered. All of the Maxson corners along the south boundary of T. 33 N., R. 49 E. were found, located from about 2 chains to more than 12 chains north of the Hatch corners. From the Hatch corner of Tps. 32 and 33 N., Rs. 49 and 50 E., the Maxson southeast corner of T. 33 N., R. 49 E., was located 11.60 chains north and 2.27 chains east.

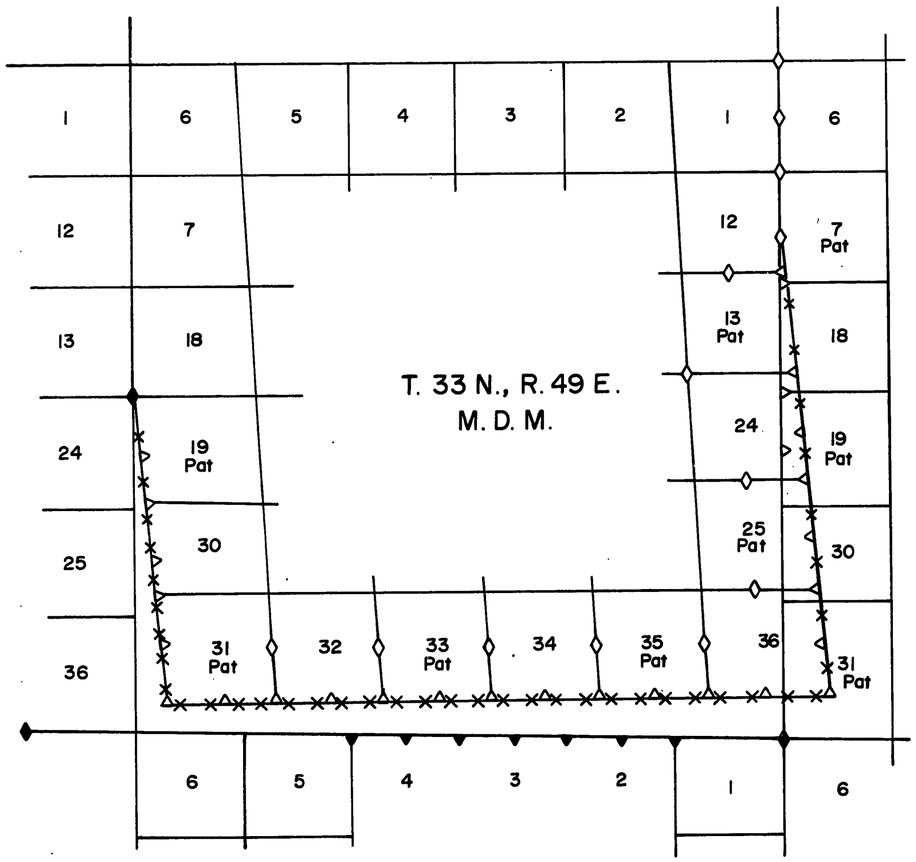
The original Hatch ¼ corner of sections 7 and 12 on the east boundary was found and at the same point the corresponding Maxson ¼ corner of the same sections. Northerly therefrom, only the Maxson corners were found. In the south 4½ miles of the east boundary the recovered Maxson corners were found to the north and east of the recovered Hatch corners. Thus the Maxson survey overlapped the previously surveyed T. 33 N., R. 50 E., as monumented by Hatch, in the south 4½ miles. See the accompanying sketch.

The General Land Office surveyed the hiatus lands by extending the Maxson section lines southerly to an intersection with the Hatch north boundary of T. 32 N., R. 49 E., where closing corners were established. The south "half" of sections 32, 34 and 36 were lotted because those sections were still public domain. The hiatus lands south of the Maxson south boundary of the patented sections 31, 33 and 35 were lotted and were given appropriate areas and lot numbers pertaining to those sections.

The Maxson lines between sections 12 and 13, 13 and 24, 24 and 25, 25 and 36 were resurveyed but terminated with closing corners on the Hatch west boundary of T. 33 N., R. 50 E. Lots and areas were created in the vacant sections 12, 24 and 36 against the Senior Hatch line, eliminating the overlap of the Maxson survey of those sections into the patented sections in T. 33 N., R. 50 E.

In instructions for the method of survey to resolve the hiatus and overlap, the Commissioner of the General Land Office made the following comment:

> "The only rights affected by this revision or extension survey in T. 33 N., R. 49 E. are those of the Central Pacific Railway Company in sections 13, 25, 31, 33 and 35. In sections 13 and 25 the railroad suffers a certain decrease in area, but this is more than offset by the increase obtained in sections 31, 33 and 35, and the adjustment, therefore, is not only equitable, but is advantageous to the railroad company."



U.S. v. Macmillan - Conditions Found

FUNDAMENTALS OF PROPERTY RIGHTS AND BOUNDARIES

The plat of survey was approved October 18, 1921 and is approximately as indicated in the accompanying sketch.

On August 4, 1964, the Bureau of Land Management issued a permit to the State of Nevada for removal of gravel from lot 5, section 31. Macmillan challenged the right of the Bureau to issue the permit on the grounds that it was patented land. In an action in the U.S. District Court, District of Nevada, the United States asked the court to declare lot 5 public domain. Macmillan argued that all of section 31 was patented land and that since lot 5 was in section 31 it was patented, and that the letter from the Commissioner of the General Land Office proved this contention. The government argued that title had passed to the railroad for only the section 31 surveyed by Maxson and that his survey, monuments, plat and notes marked the boundaries of the patented lands.

The court ruled that the hiatus was public land, subject to survey and disposal as the government saw fit, and that the letter from the Commissioner did not and could not pass title. If the government chose to survey the hiatus as additional lots appended to T. 33 N., R. 49 E. it had the right to do so, or survey those lands in any way they saw fit.

Even though only title to lot 5, section 31 was involved, the decision should extend to all of the hiatus lands south of the Maxson boundary. See also Rust-Owen Lumber Co., 52 L.D. 228 (1927).

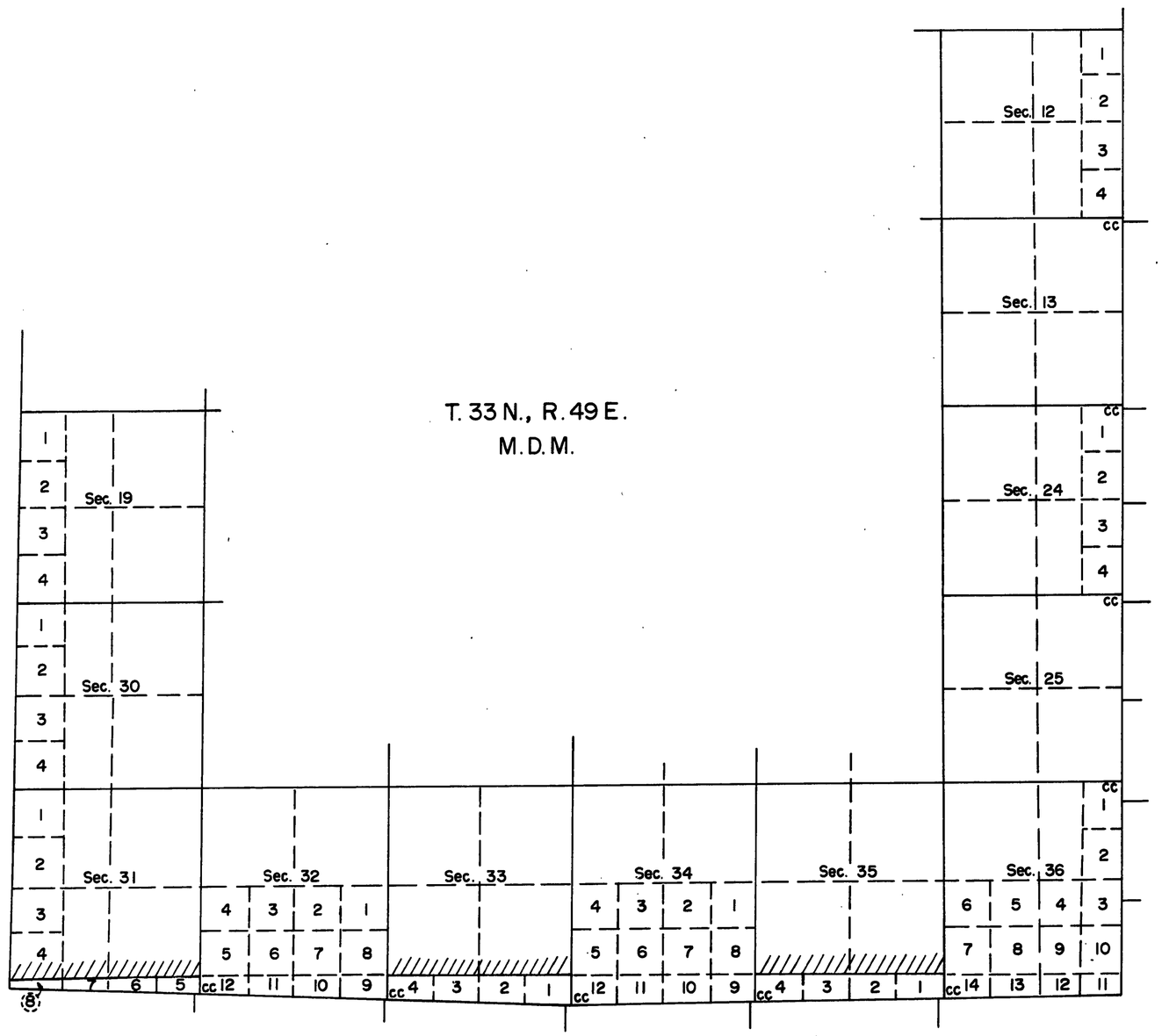
After deciding the issue of lot 5 the court then indulged in dicta concerning the overlap along the east boundary. Their findings on the east boundary were dicta, because that matter was not argued before the court, nor was it really part of the action. The court said "We find the law to be that when two officially accepted surveys conflict and result in an overlap, the survey which is Senior in time controls." Later in the decision the court stated, "While overlaps are controlled by the survey which is Senior in time, hiatus lands remained in the public domain," and quoted from the concurring opinion in the Weyerhaeuser case. While it is generally true that a senior survey controls the limits of a junior survey (as will be seen later in this discussion), in this case the patents to the railroad were all issued on the same date and all of the lands were public domain immediately prior to the patent. Lands in T. 33 N., R. 49 E. were patented based on the Maxson plat while those in R. 50 E. were based on the Hatch plat. The 1921 survey plat only relotted the public lands in sections 12, 24 and 36, limited on the east by the Hatch monuments. It does not pretend to resolve the limits of the patented lands in sections 1, 13 and 25; that matter has not been decided and was not at issue in the Macmillan case.

In both Weyerhaeuser and Macmillan the monuments of both surveys existed on the ground, presenting conclusive evidence of the position of the lands surveyed. In Weyerhaeuser the hiatus was caused by human error in running the survey lines; in Macmillan the cause was an improper procedure (and some fiction) on the part of the second surveyor. But in both cases the monuments were found on the ground. It sometimes occurs that the field note record may be such that a hiatus is suspected. Or perhaps an excessively long distance from found subdivisional corners within the township to corresponding corners on the exterior boundaries may lead one to suspect a hiatus.

A suspected hiatus based on some conflicting distances in the field note record was the subject of an unreported land decision, MMW Land Company, et al., A-30544 dated January 17, 1967. The argument was that a hiatus existed adjacent to a township corner near Morro Bay, California. It was held in the decision that the government had no lands remaining to be surveyed (no hiatus) and the following statement made, "A true hiatus can only be shown by two separate lines, each supported by original evidence or a chain of evidence reaching back to the original monuments." (emphasis added).

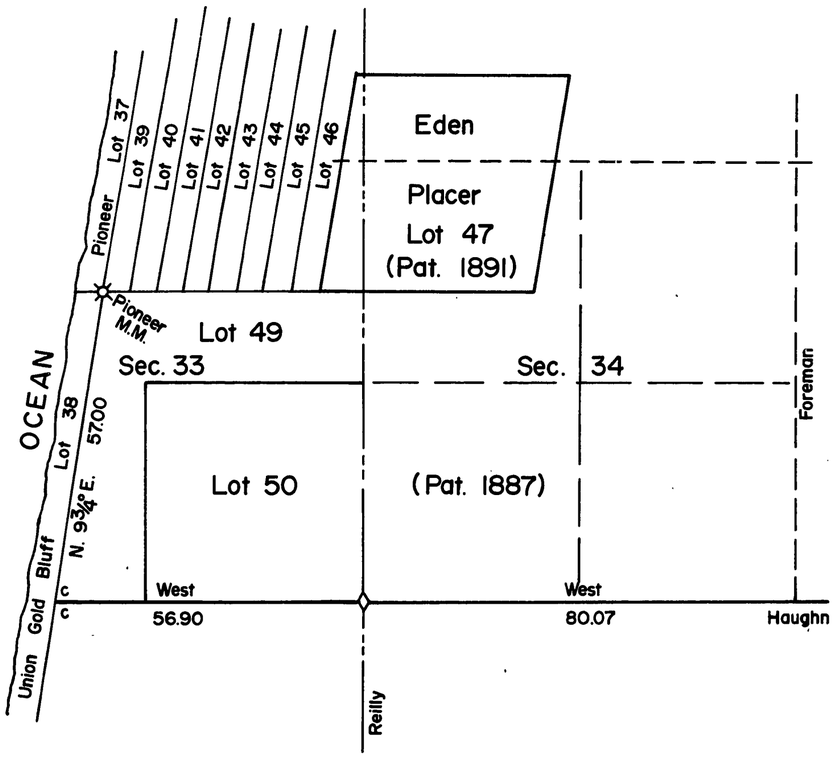
As to excessive distances alone, the same evidence would be necessary. Although the case of Vaught v. McClymond, (1945) 155 P. 2d. 612 had nothing to do with a hiatus, the Supreme Court of Montana made the following observation, paraphrased in the KEY statement, "The points where official federal government survey established corners and set monuments of survey for section, prevail over both course and distance in determining boundaries of section." Later in that decision the court said, "The fact that the location of the corner in accordance with an inaccurate government survey will set awry the shapes of the sections and subdivisions affected thereby does not affect the conclusiveness of the survey." (emphasis added).

The conclusion to be made is that when a hiatus exists, as proven by two separately monumented lines, the land is public domain, subject to survey and disposal by the government. Any hiatus must be based on evidence and cannot be based on conflicting field notes and/or excessive distances or areas alone.

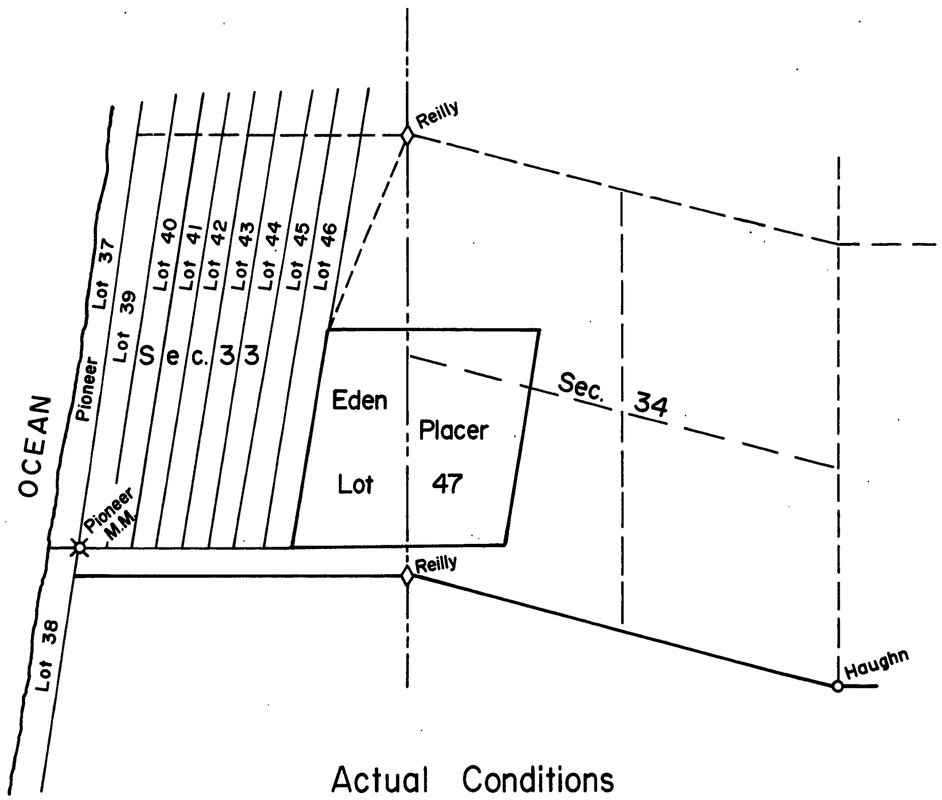


Sketch of Approved Plat

FUNDAMENTALS OF PROPERTY RIGHTS AND BOUNDARIES



Purported Conditions



Actual Conditions

Overlaps

Title to hiatus lands is now governed by fairly well settled principle of land law. That is not the situation when dealing with the overlap problem. Many more considerations are involved, both as surveying problems and (ultimately) legal title problems concerning the lands that were surveyed in conflict. There are very few clear cut judicial decisions related to overlaps. The law on the subject is still in a stage of being developed and as a result the surveyor must proceed with much more caution and consider many more elements. Some of the elements he must consider are:

1. What is the evidence of location of the first (senior) survey? Is the evidence conclusive as to the location of the senior line? Do the monuments exist?

2. What is the evidence of location of the second (junior) survey? Is its location conclusive?

3. Was the junior survey executed and platted in a manner with its boundaries being expressly limited by the senior survey? Did the junior survey close against the senior survey (closing corners)? Did the junior survey adopt the senior corners (random and true line principle)?

4. Is the difference in location of the junior survey materially different from that of the senior survey, or is the conflict merely a technical difference caused by slight errors in executing the second survey?

5. What is the ownership status?

   a. Is all of the land in the public domain?
   b. If partially patented, when was entry first made and when was patent issued? On what survey plat was the patent based?
   c. What is the sequence of patents in the area of conflict? Was patent issued to lands based on the junior survey prior to a patent (in conflict) based on the senior survey?
   d. Is a patent based on the junior survey only in conflict with public lands as marked or determined by the senior survey?

6. Was the junior survey executed at a time when all of the lands in both townships were vacant public land, and if so did the junior survey supersede the senior survey?

7. Was the junior survey a dependent resurvey and therefore expressly limited by the boundaries of the senior survey?

These questions have to be considered and the true facts developed before a surveying solution can be determined. Often there is no survey solution, but there will be a preferable survey procedure. And in the end the most well-thought-out solution may be challanged and the final decision made by the courts.

Four court decisions illustrating overlap disputes follow:

Adams v. C.A. Smith Timber Co., (1921) 273 F. 652

This case arose because of a conflict between a patented mining claim and patented quarter section, both surveyed and monumented on the ground.

In 1873 the Pioneer Mineral Monument was established at the southeast corner of the Pioneer Placer Mine, lot 37, and northeast corner of the Union Gold Bluff Placer Mine, lot 38. In 1878 U.S. Mineral Surveyor Reilly surveyed an offset of the Humboldt Meridian northerly through Tps. 11 and 12 N., R. 1 E., establishing the northwest and southwest corners of section 34, T. 12 N., R. 1 E., as well as the other corners along that meridional section line. In 1882 John Haughn surveyed the north boundary and subdivisional lines of T. 11 N., R. 1 E. Haughn reported his north boundary as passing through the Reilly corner of sections 3, 4, 33 and 34 and closed the line between sections 4 and 33 against the Union Gold Bluff Placer, lot No. 38. From this closing corner Haughn reported a tie of N. 9¾° E., 57 chains, to the northeast corner of lot 38. Also in 1882 S.W. Foreman surveyed T. 12 N., R. 1 E. Foreman's notes, distances, and ties to mining claims conform to the ties allegedly made by Haughn. In 1888 A.T. Smith, Deputy Mineral Surveyor, surveyed the Eden Placer Mine, lot 47. His plat shows the Pioneer Mineral Monument to be due West, 39.98 chains from the southwest corner of the Eden Placer, but also ties to the northwest corner of section 34. The Eden Placer was located June 21, 1886. The southwest quarter of section 34 was patented in 1887 and was owned by the C.A. Smith Timber Co. The Eden Placer was patented in 1891 to Edson Adams. The survey plats indicated no conflict. (See accompanying sketch.)

It was later discovered in the process of surveying T. 13 N., R. 1 E., and in subsequent investigations that the Haughn and Foreman surveys were largely fictitious and grossly in error. The true relationship of the section lines and mineral surveys were approximately as indicated in the accompanying sketch. The Pioneer Mineral Monument was really only about 270 feet north of the line between Tps. 11 and 12 N., R. 1 E., instead of 57 chains. The patented Eden Placer, lot 47, overlapped the patented SW¼, section 34.

Adams sued to quite title to the Eden Placer on the grounds of the Haughn and Foreman surveys and the mining claim location in 1886. Smith claimed all of the SW¼, section 34 on the basis of senior patent and senior survey. The District Court held in favor of Smith. Adams appealed but the 9th Circuit Court of Appeals upheld the lower court, holding that the Senior patent controlled and that a mining claim location and assessment work did not constitute adverse possession. Adams received clear title to only the portion of the Eden Placer outside the SW¼ of section 34. (For complete detail the reported case should be read.)

This case was decided on the basis of the senior patent. There is little doubt that had the Eden Placer been patented first, prior to valid entry on the SW¼ of section 34, the Senior patent would have controlled, and the title quieted to the placer claim. The primary factor was the time in which valid rights were acquired. The next case is indicative of this critical factor.

FUNDAMENTALS OF PROPERTY RIGHTS AND BOUNDARIES

Lindsey v. Hawes, (1863) 67 U.S. 554

This case was decided on the basis of both date of entry and the position as determined by the original survey, and concerns ownership of a part of a fractional section in Illinois.

The section was originally surveyed in 1833 and the plat approved. In April 1839 Thomas Lindsey made application on the southwest part of the fractional northeast quarter of section 36, made fractional by the Mississippi River. On June 3, 1839, Lindsey paid for the land on a cash entry and received a certificate entitling him to a patent. Lindsey then moved to Iowa and died in September 1839. His heirs did not present the certificate for patent.

In 1844 it was discovered that the original 1833 survey contained errors and a resurvey was made and approved. By this "new" survey the improvements made by Lindsey were not located on the same land by description. In 1845 Hawes made a cash entry for the same described parcel for which the previous certificate to Lindsey had been issued, with knowledge of the Lindsey entry. In August 1845 the Land Office set aside and cancelled the Lindsey entry, without a hearing. In 1848 Hawes received patent to the parcel, based on the 1844 survey.

Subsequently Lindsey's heirs sued for recovery of the land entered by Thomas Lindsey in 1839. The lower courts ruled in favor of Hawes and Lindsey's heirs appealed to the U.S. Supreme Court.

The Supreme Court overuled the lower courts and awarded the parcel to Lindseys heirs, ruling that the 1839 Lindsey entry was valid, the land office could not set aside that entry without proper cause, and that the location on the ground must be based on the original survey in effect at the time the valid entry was made. The 1844 "corrective" resurvey could not affect the valid rights acquired under the original survey.

This decision may be the basis for the procedures followed in independent resurveys, in which boundaries of all valid entries are based on the position as determined by the original survey. It also fixes the time of entry as the basis of acquired rights over the date of patent. However, the date of patent may be the deciding factor in title disputes if entry is no part of the case.

Branson v. Wirth, (1873) 84 U.S. 32
Wirth v. Branson, (1878) 98 U.S. 118

In December 1817 a military land warrant was issued to Giles Edgerton for 160 acres of land in a military reserve in Illinois. On January 7, 1818, a patent was issued to James Durney for the southeast quarter of section 18. On January 10, 1818, a patent was issued to Edgerton for the northeast quarter of section 18. Apparently Edgerton thought his patent was for the southeast quarter of the section. On July 29, 1819, Edgerton deeded the southeast quarter of section 18 to Thomas Hart, "according to the patent---- dated January 10, 1818." Hart discovered the mistake and sought relief from Congress. On March 3, 1827, Congress passed "An Act for the relief of the legal representatives of Giles Edgerton." This act granted Edgerton's assignee the right to select another quarter section of land "in lieu of the quarter patented to the said Giles, on the tenth day of January, one thousand eight hundred and eighteen, which had been previously patented to James Durney---." Edgerton's assignee was issued patent to another quarter section within the reserve in 1838. The land office placed a memorandum notation on the margin of the Edgerton patent: "This patent was issued for the SE¼ instead of the NE¼ as recorded; sent a certificate of that fact to E.B. Clemson, at Lebanon, Ill., see his letter of 19th May, 1826." It is evident that at that point the land office thought the error in Edgerton's patent was cleared up; i.e., Durney had patent to the southeast quarter, Edgerton's assignee could (and eventually did) select another quarter section in lieu of the southeast quarter and therefore the northeast quarter of section 18 (named in Edgerton's patent) was once again vacant land. (The record does not reveal why Edgerton's assignee did not just take possession of the northeast quarter.)

On January 20, 1868, patent was issued to Edward F. Leonard for the northeast quarter of section 18. Leonard later sold the northeast quarter to Wirth. Branson claimed title to the northeast quarter as successor in title from Edgerton and through a tax title (deed) issued in 1843. In the lower court, Wirth argued that the original patent to Edgerton was in error and that Branson was estopped from claiming the northeast quarter by the act of Congress granting a lieu selection to Edgerton's assignee. Branson claimed title based on the wording in the original patent and on the tax deed, since, if the northeast quarter was really vacant land, it could not be taxed and could not be sold in default of failure to pay taxes. The lower court awarded title to Wirth and Branson appealed to the Supreme Court. The Supreme Court overruled the Circuit Court and awarded title to Branson, 84 U.S. 32. The case went before the Supreme Court again in Wirth v. Branson, 98 U.S. 118, with the first verdict upheld. Basically the Supreme Court ruled that the Edgerton patent to the northeast quarter was valid "---and that it thereby became exempt from further location until the first location should be set aside." The court further stated that "the government could not have reclaimed that quarter against its own patent, whatever deed Edgerton may have given to a third party for a different lot." Branson was not estopped against claiming title because of Edgertons assignees being granted the right to select a lieu lot by Congress. No action was ever taken to cancel Edgerton's patent to the northeast quarter, therefore the patent to Leonard was invalid and Branson was the legal owner of the northeast quarter of section 18.

The Wirth v. Branson case is fundamentally a "First in Time, First in Right" decision and quite firmly establishes that once the government has issued a valid patent to a tract of land it cannot convey that land again to a second party. For a similar case see Shepley v. Cowen, (1876) 91 U.S. 330. Both Wirth v. Branson and Shepley v. Cowan were favorably cited in the case of Waldron v. U.S. (1905) 143 F. 413, a well stated decision based on the first in time, first in right principle.

A second survey which overlaps a senior survey is invalid for passing title if the land has already been patented on the basis of the senior survey. This principle has already been demonstrated in Adams v. C.A. Smith Lumber Co. previously discussed, but that case dealt with fictitious surveys. Two other cases deal with different circumstances. The first in which the senior survey did not control.

Russell v. Maxwell Land Grant Co. (1895) 158 U.S. 253

In 1871 the rectangular surveys were made of T. 33 S., R. 68 W., 6th P.M., Colorado and the plat was approved. Prior to this survey, on January 11, 1841, the territorial governor of New Mexico (at that time part of the Republic of Mexico) granted a tract of land to Charles Beaubien and Guadalupe Miranda, known as the Maxwell Land Grant. This grant was confirmed (with specified boundaries) by an Act of Congress on June 21, 1860. On April 6, 1874, Richard Russell filed entry on the W½ SE¼, NE¼ SW¼ and SW¼ NE¼ of section 20, T. 33 S., R. 68 W. Patent was issued to Russell on September 5, 1876. The boundaries of the Maxwell Grant were surveyed and plat approved in 1878. Patent to the Grant was issued, based on the plat, on May 19, 1879. As surveyed and monumented on the ground, the parts of section 20 patented to Russell were within the boundaries of the Maxwell Land Grant.

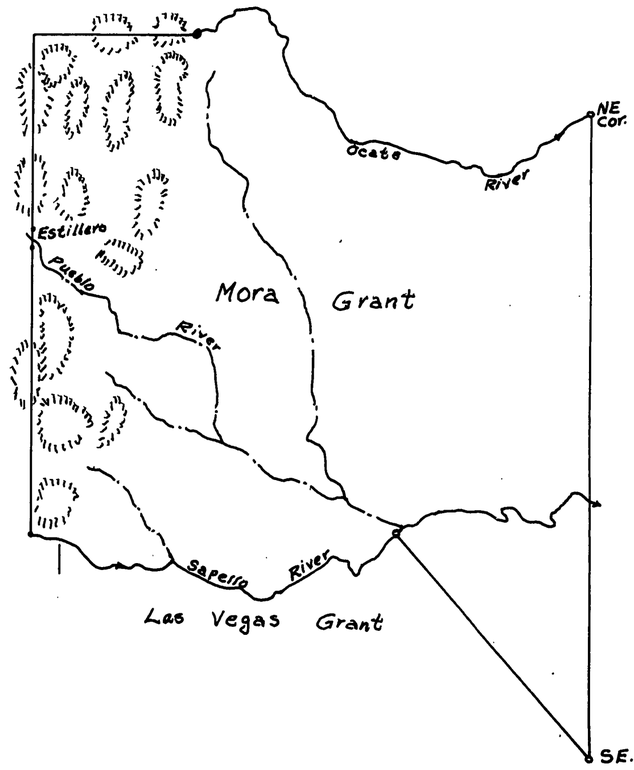
The U.S. Supreme Court ruled that the Maxwell Land Grant had a valid senior title. The act of Congress had confirmed title to the Maxwell Grant in 1860, the rectangular surveys on which Russell's patent was based were not made until 1871, after title to the land had passed even through the boundaries of the Grant were not surveyed until 1878. The Court stated, "A survey does not create title; it only defines boundaries."

U.S. v. State Investment Co. (1924) 264 U.S. 206, 68 L. Ed. 639.; 285 F. 128 (Eight Circuit Court)

This case dealt with the Mora Grant boundary in New Mexico.

The grant was made in 1835, and the boundaries loosely described as: On the north the Ocate River; on the south to where the Sapello empties; on the east the Aguage de la Yegua, and on the west the Estillero. The grant was confirmed by Congress on June 21, 1860. In 1861 Thomas Means surveyed the grant boundaries. Means began at the southeast corner, ran north on the east boundary to the Ocate River, thence west up the Ocate to the base of the mountains where he raised a large mound of earth and stated that this mound was 10 miles, 40.54 chains east of the northwest corner of the grant, the northwest corner being in the inaccessible mountains. Means had located the Estillero at a gap in the mountains. He ran a traverse from the mound of earth southwesterly to the Estillero and set three stone monuments on a north-south line which crossed the Pueblo River. He then traversed along the base of the easterly side of the mountains southerly to the Sapello River, thence up that river to a position which he calculated to be due south of the monuments at the Estillero, and set a stone monument for the southwest corner of the grant. He stated that the southwest corner of the Mora Grant was 2 miles, 3.10 chains west of the northwest corner of the Las Vegas Grant. Thus the only monuments ever established by Means along the west boundary of the Mora Grant were the three stones at the Estillero, which were later found, and the stone at the southwest corner, which was supposedly in line with the Estillero monuments, and which has never been found.

In 1882 Compton extended the rectangular township surveys and closed against what he thought was the west boundary of the Mora Grant; after the patent to the grant had been issued in 1876, based on the Means survey and plat. But the exact location of the west boundary of the Grant was is dispute. In 1909 Compton was directed to resurvey that west boundary. Compton accepted as the southwest corner of the Mora Grant, an unmarked stone which he found 199.55 chains west and 73.16 chains north of the northwest corner of the Las Vegas Grant. He ran the west boundary of the Mora Grant north from there to the Ocate River. The Compton boundary, as so surveyed, was located about 3 miles east of the recovered stone monuments at the Estillero, set by Means. So the rectangular surveys overlapped the "Means line" by those 3 miles. The overlap area was claimed by the government. State Investment Company, owners of the Mora Grant, contested the claim in U.S. District Court. The District Court held that the true west boundary was a line drawn through the recovered Means monuments at the Estillero, because they were the monuments on which the plat and patent were based, and that monuments hold over courses and distances and (in this case) courses hold over distances. This decision was upheld by the Circuit Court of Appeals and finally by the U.S. Supreme Court. Even though the Compton survey and rectangular surveys were approved, they were junior in time to the Moro Grant survey and patent and created an overlap of surveys, but did not determine title to the lands within the overlap. The Supreme Court said, "A resurvey by the United States after issuance of a patent does not affect the rights of the patentee;---."



Both the Maxwell and Mora Land Grant cases are discussed here to illustrate the fact that a senior survey does not necessarily control the position or boundaries of land titles, and that calls for certain distances from given points do not control boundary positions. Distance calls by themselves cannot create an overlap.

If a township boundary was surveyed, the township subdivided and the plat approved, and a second surveyor subdividing the township adjoining expressly states that he ran his subdivisional lines to an intersection with the senior township line, then that senior line becomes the boundary of the junior survey; even though there may be ample circumstantial evidence that the closings were never made and that by extending the lines the recorded distance, an overlap (or a hiatus) would result. This principle is quite well stated by the U.S. Supreme Court in Newson, v. Pryor's Lessee, (1822) 7 Wheat. 10, 5 L. Ed. 382, and by the Fourth Circuit Court of Appeals in Ewart v. Squire (1916) 239 F. 34. Offline closing corners were part of the dispute in See Ben Realty Co. v. Gothberg, (1941) 109 P. 2d 455, in which the Wyoming Supreme Court held that an offline closing corner controlled the subdivisional lines of the sections involved.

FUNDAMENTALS OF PROPERTY RIGHTS AND BOUNDARIES

Junior-Senior Surveys and Corners

The treatment of monuments set during a "junior" survey, which were intended to be on the "senior" survey line is based on the principles laid down in the judicial decisions discussed above. If a township line was previously surveyed and approved and, during the course of executing a "junior" survey which is expressly bounded by the senior survey, the surveyor placed the junior monuments small distances off the senior line, the true points may be moved to the senior line during a resurvey. If the junior monument creates a conflict (or overlap) of the junior survey into the senior survey, the true point would have to be moved to the senior line in light of the decisions. Since the differences in position are usually small, the errors are more technical in nature rather than being truly errors or mistakes. The government does not usually claim very small hiatuses if in fact a junior monument has been placed a small distance off the senior line, but not in conflict with the senior survey. It should be remembered, however, that the junior survey has resulted in an approved plat and areas returned based on the junior monuments. Therefore the original position of the junior monument must be used to control the direction of lines, proportions, etc. within the junior survey; i.e., it is treated in a manner similar to an "offline" closing corner.

A junior corner located slightly inside (and in conflict with) the senior survey was the subject in Van Amburgh, v. Hitt (1893) 22 SW. 636. The case involved a junior corner of Survey No. 188, slightly in conflict with the senior Survey No. 212. The Supreme Court of Missouri held, (syllabus):

1. Of two overlapping surveys, the one first made has priority, particularly where the second is bounded with express reference to the first. (emphasis added).

2. Any calls of the second survey conflicting with monuments and calls of the first must yield thereto.

The court ruled that the junior monument, which the surveyor had expressly stated (in the junior survey) was on the senior line, could not and did not create a bend in the senior line, depriving the senior survey of about 64/100 of an acre of land. They then concluded by saying "We have carefully considered the case, but have been impressed with the view that the maxim, "de minimis lex non curat" might very well have been applied."

Black's Law Dictionary defines "de minimis lex non curat": The law does not care for, or take notice of, very small or trifling matters. The law does not concern itself about trifles.

Most junior-senior survey overlaps and hiatuses are so small as to bring them within the scope of the "de minimis" definition.

In the event of extensive obliteration or loss of the senior corners, the junior corners, if existent, may be the best available evidence of the position of the senior line. This principle was stated by Justice Straup of the Utah Supreme Court in his concurring opinion in Washington Rock Co. v. Young, (1905) 80 P. 382. In this case the court also favorably quoted from Clement v. Packer, 125 U.S. 309, in which it was said: "It is unquestionably true that a junior survey cannot control or enlarge the dimensions of a senior survey. We understand this to mean that, when the location of a survey is or can be ascertained or determined by its own marks upon the ground----its own calls and courses and distances----it cannot be changed or controlled or enlarged or diminished by the marks or lines of an adjoining junior survey; but when, from the disappearance of the original landmarks, caused by time and other agencies from the senior survey, the location of a particular line or the identity of a corner is left in uncertainty or becomes the subject of controversy, then the original and well established marks found upon a later survey made by the same surveyor about the same time, and adjoining the one in dispute, are regarded as legitimate evidence, not to contest or control, but to elucidate, throw light upon, and thus aid the jury in discovering the exact location of the older survey."

These cases must be considered in their own light. However, they can be interpreted to mean that the junior survey cannot affect the monumented boundaries of the senior survey, but if the senior survey monuments have been destroyed, the junior survey monuments can be used to establish where the senior monuments were originally located. It would also be logical that in extreme cases of obliteration of a senior line (say a standard parallel) that the existent closing corners (junior), could be the best evidence available to prove the original position of the senior line, (the Standard Parallel). To be acceptable, such use of closing corners would have to be thoroughly substantiated by surrounding recovered corners and complete investigations of all evidences of both surveys.

Consider the following situation: Suppose that the boundaries and subdivisional lines of T. 5 N., R. 10 E. were surveyed and plat approved in 1870. In 1871 a contract was let for the survey of the north, south and east boundaries and subdivisional lines of T. 5 N., R. 11 E. When the second surveyor ran his line between sections 30 and 31 he misclosed, falling some distance north of the original corner of sections 25, 30, 31 and 36. The second surveyor then proceeds to resurvey the east boundary of T. 5 N., R. 10 E., returning new bearings and distances between the original corners (which he finds) and setting new corners at 40 and 80 chain intervals marked for T. 5 N., R. 11 E., and changing the original corners to refer to T. 5 N., R. 10 E., only. He then runs his lines between sections 30 and 31, 19 and 30, etc. on random and true lines into his new corners along the range line. The approved field notes and plat of T. 5 N., R. 11 E., clearly show the second surveyors bearings and distances between the original corners and that he placed his new (junior) corners on the senior (original) alignment. No valid entries of any kind were made in either township until after both plats were approved. Subsequently, an entry resulting in patent, is made for (say) the west half of section 19, T. 5 N., R. 11 E., and after that for the NE¼ of section 24, T. 5 N., R. 10 E., leaving the remainder of section 24 as vacant public land. The patent in section 24 was of course based on the plat of T. 5 N., R. 10 E., which shows only the original (senior) survey.

During a current dependent resurvey of the public land in section 24, all of the monuments along the range line are recovered in their original positions and it is discovered that the junior corners, set in 1871 for section 19, are actually located a few links west of a straight line between the senior 1870 monuments. Where is the true boundary between the patented land in section 19 and the public land in section 24? The arguments might be presented in this order:

1) The senior survey of 1870 fully controls and the junior 1871 monuments should be moved easterly to that line. (Senior survey controls).

2. The senior patent in section 19 controls and the junior corners mark the boundary of that patent. (First in time, First in right).

3. All corners along the range line have equal weight because the second (1871) survey supersedes the first (1870) survey; the line should be run from corner to corner. (This based on the argument that since no valid rights had been acquired until after the second survey was approved, the government could, and did, survey its own land in any way it saw fit; and that an official government survey of public land does not ascertain boundaries, it creates them.)

Argument number (3) is the correct procedure. Although the specific example is hypothetical, the same problem is widely confronted in actual situations. The solution would be different if:

1. The second survey of the range line was merely a retracement instead of a resurvey.

2. The second (junior) corners on the range line were in fact closing corners.

3. Patents or valid entries had been made in T. 5 N., R. 10 E., prior to approval of the plat of T. 5 N., R. 11 E.

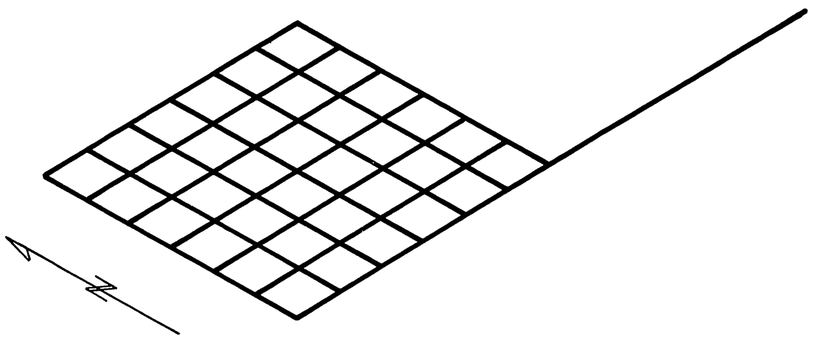
4. An obvious hiatus or overlap existed instead of small differences usually termed as a junior-senior corner situation, that is; two separate lines instead of a technical difference.

5. No public land remained immediately bounded by the range line. If only the SW¼ of section 24 was public land (the rest being patented) the government has no interest in the line between private lands except insofar as it controls the remaining public land.

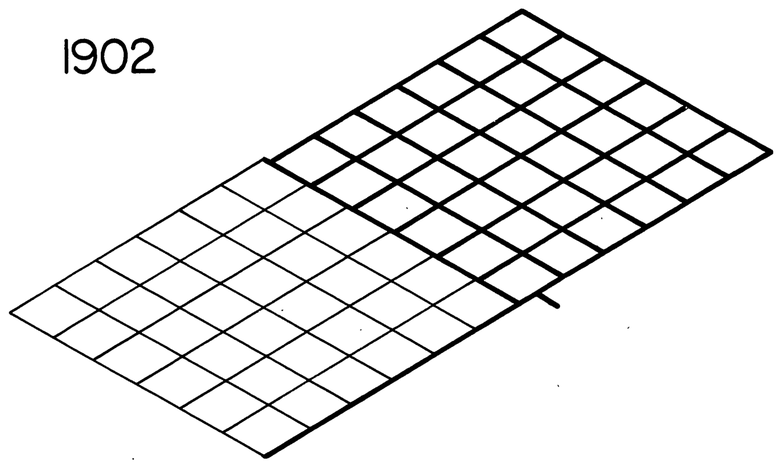
And the list could go on to many more possible conditions which would affect the treatment of the junior monuments.

JUNIOR-SENIOR SURVEY LINES

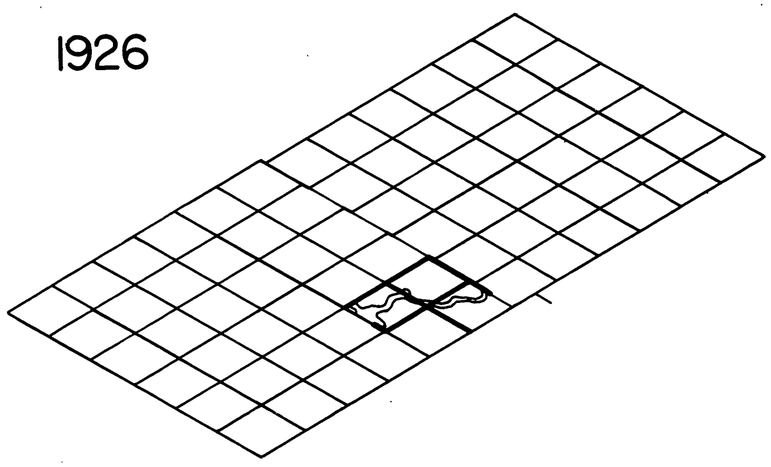
1892-93



1902



1926



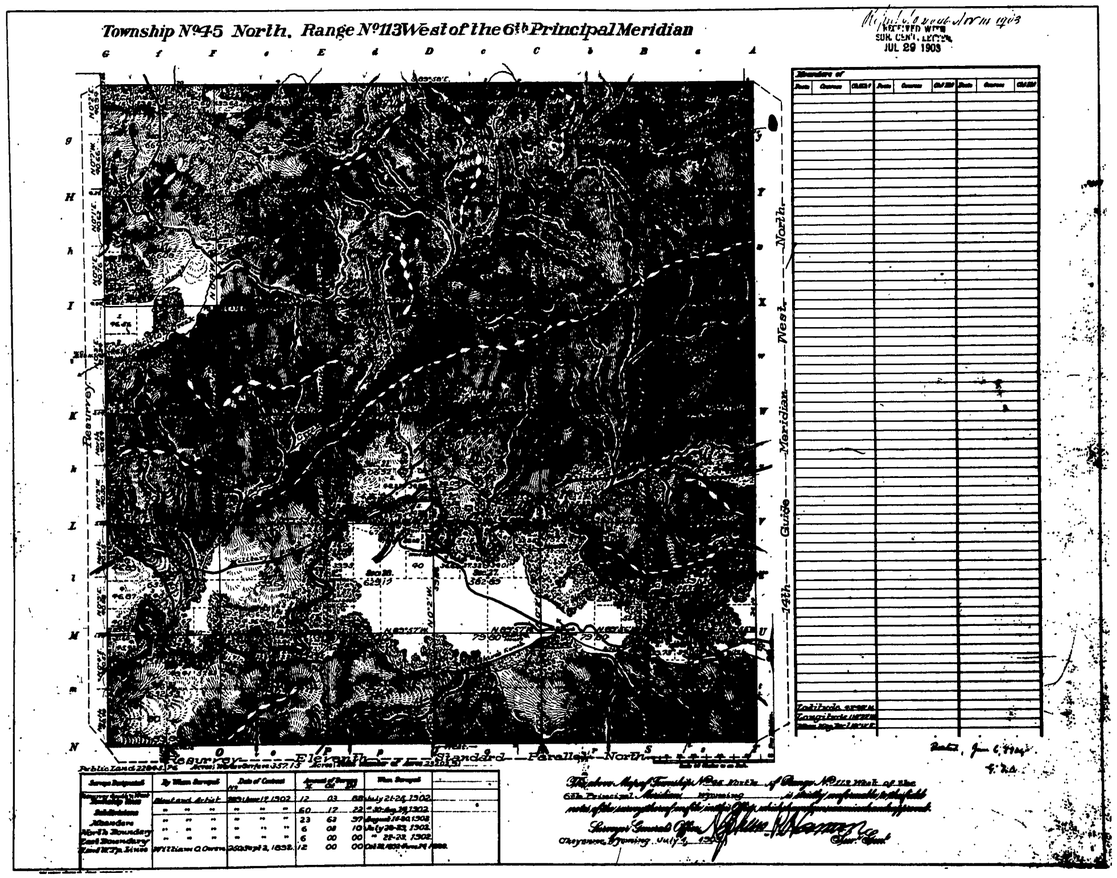


Figure 1a - Original Plat

History of Surveys

1892-93 William O. Owen surveyed the Eleventh Standard Parallel North, through ranges 113 and 114 west as well as the east, west and north boundaries and subdivisional lines of T. 45 N., R. 114 W.

1902 Blout and Artist retraced the Eleventh Standard Parallel through range 114 west. They also independently resurveyed the standard parallel through range 113 west, retraced and resurveyed the east boundary of T. 45 N., R. 114 W., and surveyed the east and north boundaries and subdivisional lines of T. 45 N., R. 113 W., as shown on the plat approved July 1, 1903, in figure 1a and figure 1b.

Blout and Artist retraced the east boundary of T. 45 N., R. 114 W., returning distances and fallings to each of Owen's corners. The Owen corners could not be superseded because of the subdivisions in T. 45 N., R. 114 W. Blout and Artist then resurveyed the boundary on the Owen alinement, setting new (junior) corners at 40 and 80 chain intervals for T. 45 N., R. 113 W. The Blout and Artist resurvey notes do not agree with their own retracement notes in several instances. Figures 2a and 2b indicate the Owen record and the Blout and Artist retracement record for this range line. A comparison of figure 1 with figure 2b will reveal the discrepancies.

1926 Clyde W. Atherly resurveyed a portion of the east boundary of T. 45 N., R. 114 W., a portion of the subdivisional lines and meandered Buffalo Creek. Atherly found the Owen (senior) corner of sections 24 and 25 and the ¼ corner of section 36. He found the Blout and Artist (junior) corner of sections 19 and 30. Atherly made no attempt to restore the missing corners on the Blout and Artist record alinement. He placed the lost corners on a direct line between the corner of sections 19 and 30 and the ¼ corner of section 36, at single proportionate positions based on Blout and Artist's resurvey distances. Atherly also set new meander corners on Buffalo Creek, but not at the proportionate positions as returned by Blout and Artist. Atherly's plat, as approved February 15, 1927, is shown in Figure 3. Lands in sections 25 and 36, T. 45 N., R. 114 W., are patented, based on both the Owen and Atherly plats.

1962 The corner of sections 19 and 30 was remonumented by Andrew Nelson, under the Remonumentation Program.

Reasons for Request of this Survey

Lands in T. 45 N., R. 113 W., are intermingled patented lands, and lands within the Grand Teton National Park and the Teton National Forest. The Park and Forest boundaries are along section subdivisional lines. The Park Service and Forest Service requested a resurvey and subdivision of sections to define and mark the boundaries. This discussion is limited to the line between T. 45 N., Rs. 113 and 114 W.

Special Instructions

Special Instructions for Group 301-2, Wyoming, were prepared on May 6, 1966. They provided for the dependent resurvey of and subdivision of sections in several townships, including T. 45 N., R. 113 W. Field work on this township began on August 8, 1967.

JUNIOR-SENIOR SURVEY LINES

Figure 1b - Portion of Original Plat

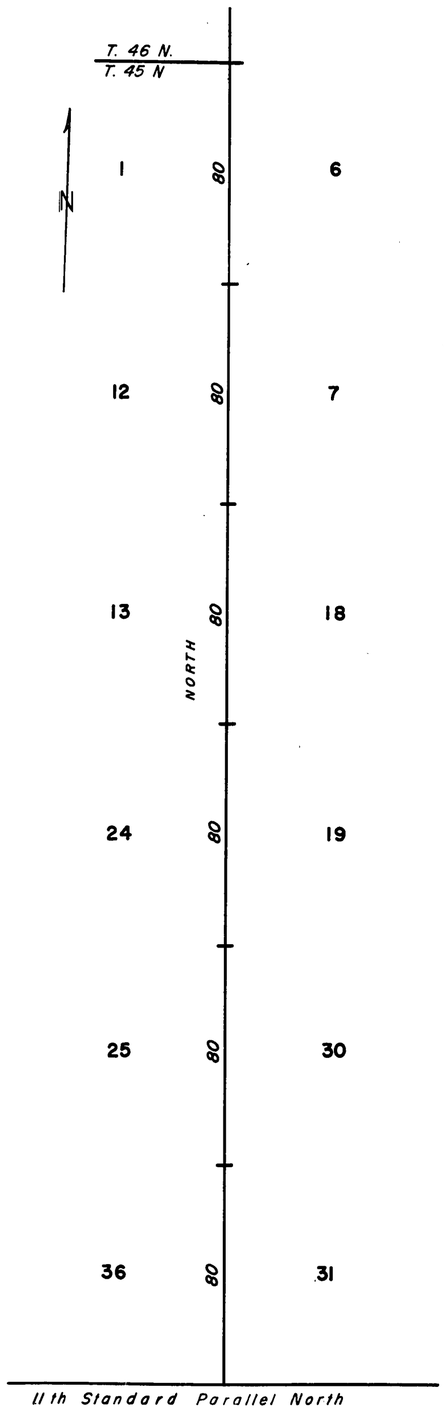


Figure 2a - 1892-93 Record by Wm. Owen

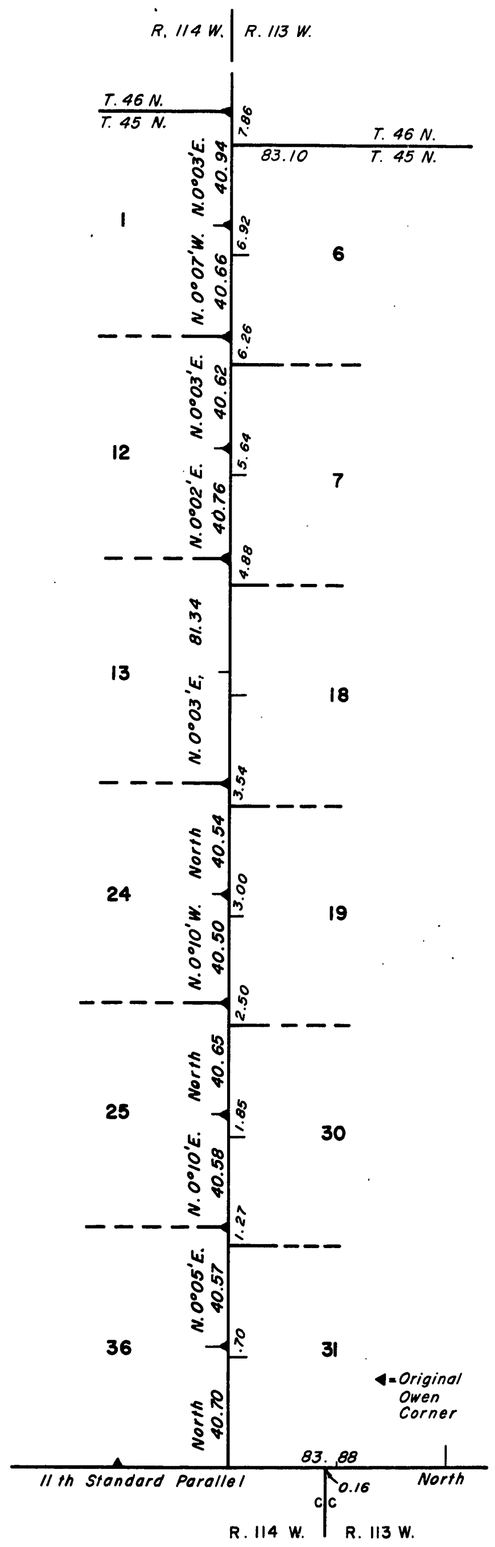


Figure 2b - 1902 Retracement by Blout and Artist

Conditions Found on the Ground

Figure 4a indicates the recovered corners along the range line and the bearings and distances between them as derived from the field tablets. Only four original Owen (senior) corners were recovered. Eight Blout and Artist corners were found. There are no large discrepancies between the present retracement and the Blout and Artist retracements.

Preliminary Statement of the Problem

The surveyor must restore the lost section and ¼ section corners along the range line by the proper methods.

Regulations

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

5-35	Junior-Senior lines
5-36	Irregular boundaries

JUNIOR-SENIOR SURVEY LINES

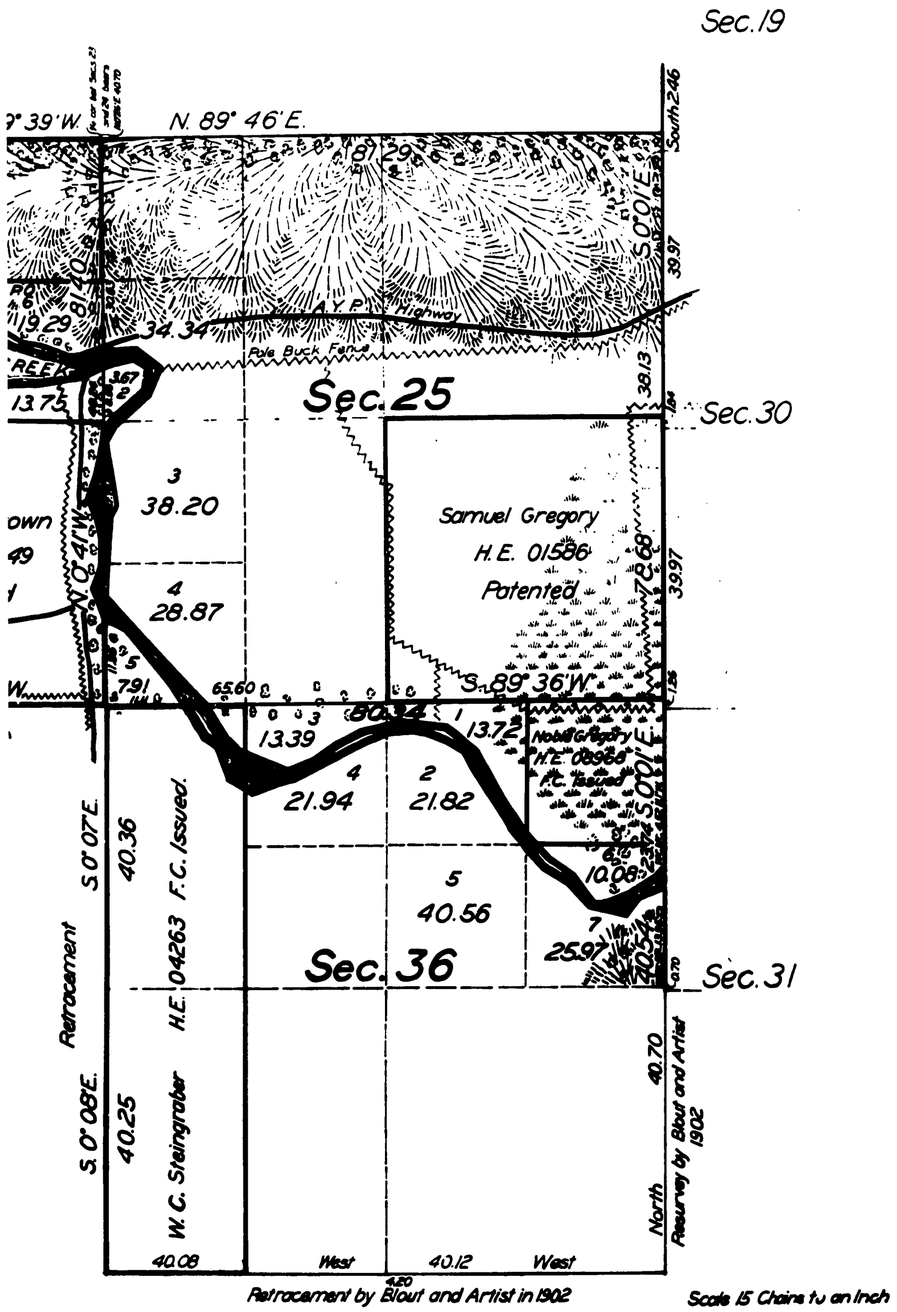


Figure 3 - Portion of Atherly's Plat

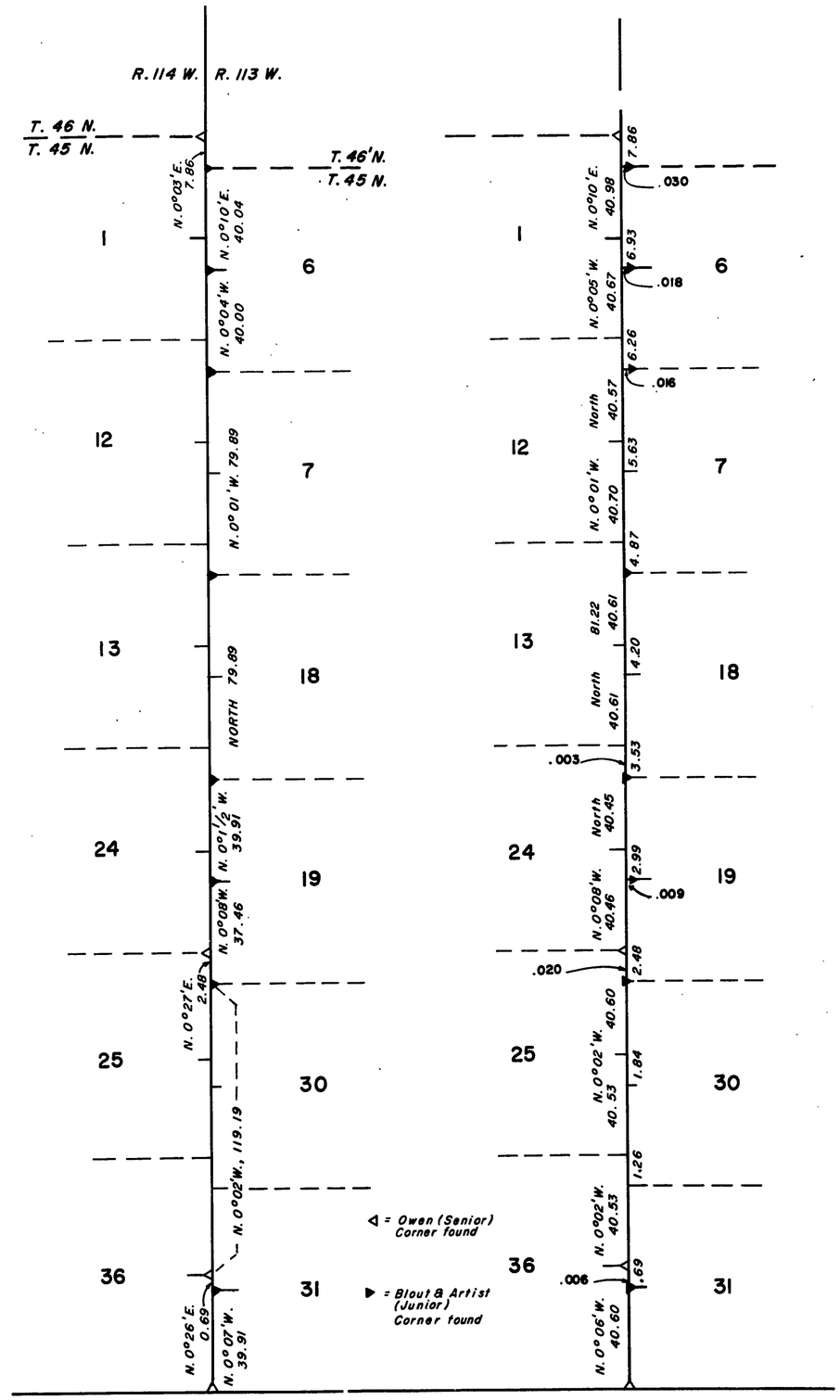


Figure 4a - Retracement Data for This Resurvey

Figure 4b - Dependent Resurvey Based on Blout and Artist Retracement and Atherly Resurvey

JUNIOR-SENIOR SURVEY LINES

Amended Information

The Manual of Surveying Instructions, 1947, in effect at the time of this resurvey does not contain "Junior-Senior" line provisions. Initially this resurvey was submitted to the Washington Office for approval with the line resurveyed from one recovered corner to the next, the missing corners being placed at single proportionate positions as returned by Blout and Artist, and Atherly. The "break" in bearing occurred at each recovered corner. The Washington Office returned the plats and field notes with the following memorandum, reproduced in part:

The field notes of the resurvey of the west boundary of this township indicate that the controlling cors. along the east boundary of R. 114 W., have not been reestablished during the resurvey of this line. The location of the east boundary of R. 114 W. cannot be ignored because of the possibility of a hiatus between the west boundary of R. 113 W. and the east boundary of R. 114 W.

The west boundary of this township was surveyed by Wm. Owen, Deputy Surveyor, in 1892-93 as the east boundary of T. 45 N., R. 114 W. In 1902 Blout and Artist, Dep. Surveyors, resurveyed this boundary in conjunction with the survey of T. 45 N., R. 113 W. In their preliminary statement, at the top of page 16 of their field notes of the resurvey of the west boundary of T. 45 N., R. 113 W., they say: "The west boundary of T. 45 N., R. 113 W., being defective in measurement, I resurvey this boundary on the old alignment...". They then proceed to set the cors. for T. 45 N., R. 113 W., at 40 and 80 chs. but on line between found original cors. which are marked for minimum control to the west. They break measurement at the new cors. but break alignment only at the found original cors. The plat of the Blout and Artist survey of T. 45 N., R. 113 W., was prepared to indicate that the east boundary of T. 45 N., R. 114 W., was the controlling (Senior) boundary.

In 1926 C. W. Atherly, U.S. Cadastral Engineer, resurveyed a portion of the east boundary of T. 45 N., R. 114 W., from the cor. of secs. 24 and 25, southerly to the ¼ sec. cor. of sec. 36. He appears to have used the distances between the senior cors., as reported by Blout and Artist, in restoring intermediate cors. at proportionate distance. However, he ignored the breaks in bearings between the controlling cors., as reported by Blout and Artist, and returned a single course from the cor. of secs. 19 and 30, T. 45 N., R. 113 W., to the ¼ sec. cor. of sec. 36, T. 45 N., R. 114 W. Atherly reports that the evidence he found of the original cor. of secs. 19 and 30, T. 45 N., R. 113 W., indicates that it was marked as a closing cor. by Blout and Artist. He remonumented this corner with a sandstone but does not indicate that he marked it as a closing cor. In 1962 A. Nelson remonumented this cor. under the Forest Service Corner Remonumentation Program as a closing cor. because he reports that he found an original sandstone at the cor. point marked with a "cc" on the east face.

Patents issued along the west boundary of T. 45 N., R. 113 W., are based on the Blout and Artist 1903 plat. At the time of the Atherly resurvey, patents along the east boundary of T. 45 N., R. 114 W., were based on the W. Owen 1894 plat. How many recent patents in secs. 25 and 36 that have been issued and based on the Atherly Survey is unknown as we have no land status for T. 45 N., R. 114 W.

The history of surveys along the boundary between Tps. 45 N., Rs. 113 and 114 W. tends to indicate that it was the intention of all previous surveys to make the east boundary of T. 45 N., R. 114 W., the controlling boundary.

In view of the foregoing it appears that the west boundary of T. 45 N., R. 113 W., should have been resurveyed as the east boundary of T. 45 N., R. 114 W., and the notes rewritten between the cors. of R. 114. W.

Corners from the E-¼ sec. cor. of sec. 36 to the cor. of secs. 24 and 25, T. 45 N., R. 114 W., should be restored according to the Atherly resurvey. Corners of R. 114 W., north of the cor. of secs. 24 and 25 may be restored from the best available evidence of these cors. which is found in the Blout and Artist resurvey.

The following described method is suggested for restoring the missing original senior cors:

1. Determine the positions of the missing senior cors. by the method of irregular boundaries (Section 375 of the Manual) between recovered junior cors. This will result in "dog legs" in the senior half miles.

2. Reduce the "dog leg" senior half mile to one course and adjust senior courses.

3. Compute how much the junior cors. would have to be moved to be on adjusted senior line. Our computations indicate that the moves ranged from 0 to 1.5 links.

Auxiliary Topic

Blout and Artist established meander corners on both banks of Buffalo Creek on the west boundary of section 31. The meander corner on the left bank at 14.15 chains north of the ¼ corner of section 36, with the meander corner on the right bank at 21.11 chains. The Blout and Artist meanders in section 31 and areas of lots 4 and 5 are based on those distances.

Atherly did not restore the Blout and Artist meander corners on Buffalo Creek. He established new meander corners for section 36 at 13.95 chains and 16.80 chains north of the ¼ corner of section 36. The areas of lots 6 and 7, section 36, are based on Atherly's meander corners and meanders of Buffalo Creek.

The riparian rights to any accretion caused by movement of Buffalo Creek would have to be based on two sets of meander corners. The field notes of this resurvey restore the meander corners on Buffalo Creek based on the Atherly resurvey, (see Figure 5a) without remonumentation, but describe the points as the "point for the meander corner of sections 31 and 36". The positions shown on Figure 5a are the proportionate positions for the meander corners of section 36 only.

Final Statement of the Problem

The surveyor must restore the lost corners along the range line in accordance with the Washington Office memorandum, the principles of which are now described in sections 5-35 and 5-36 of the 1973 Manual of Surveying Instructions.

Solution

Figure 4b shows the true bearings and distances as computed, based on the retracement data taken from the field tablets and on the Blout and Artist retracement notes. The senior (Owen) corners are held fixed. The missing senior corners are restored based on the position of the junior corners and retracement (rather than resurvey) record by Blout and Artist. The missing corners in the north four miles are restored by the irregular boundary adjustment. The corners of sections 25, 30, 31 and 36 are restored on a straight line between senior corners. The junior corners are off the senior line by the calculated amount shown in Figure 4b.

Figures 5a and 5b are the plats accepted March 17, 1971, which are based on the Blout and Artist (junior) resurvey record. There are minor differences because of the conflicts between the Blout and Artist retracements and resurvey notes.

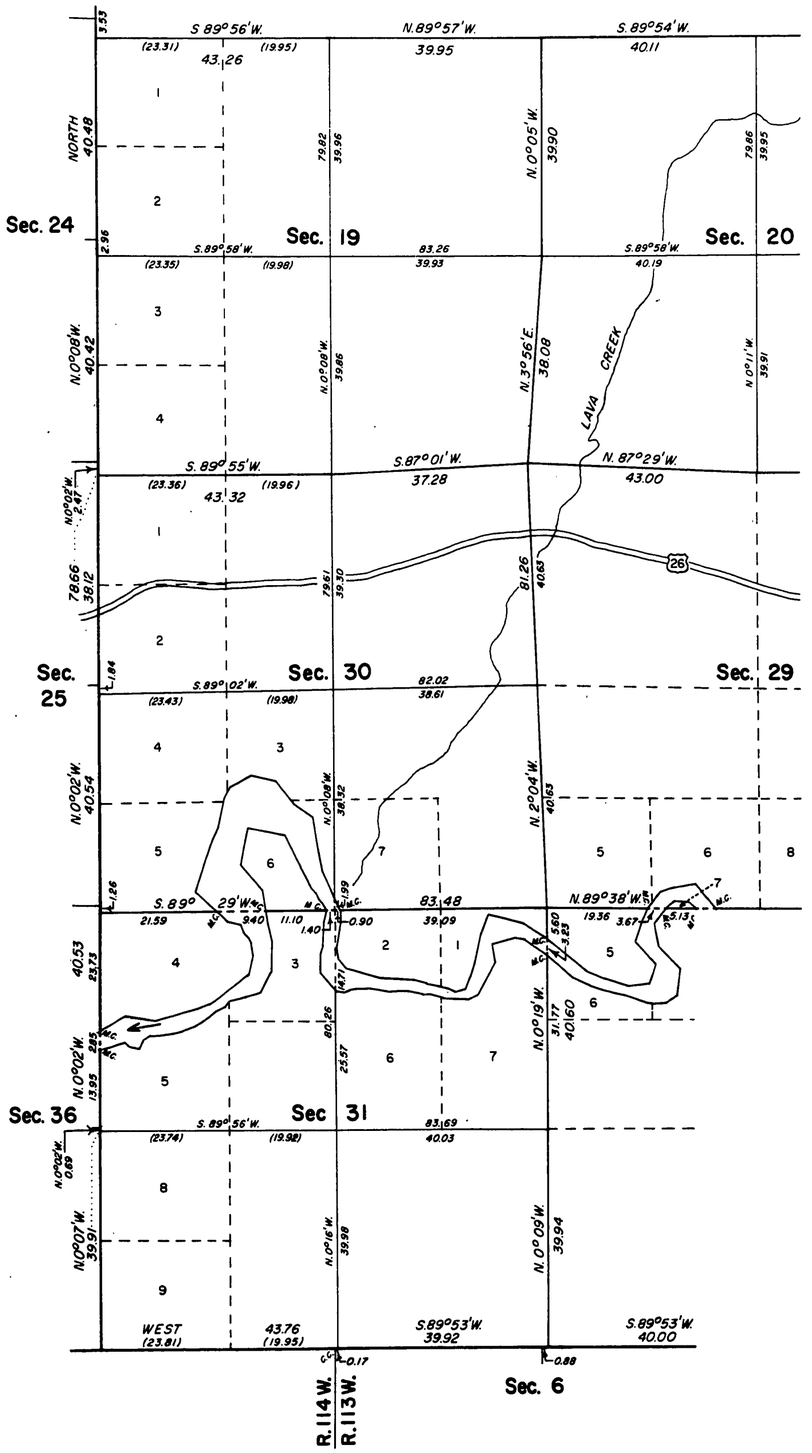


Figure 5a - Portion of Accepted Plat

JUNIOR-SENIOR SURVEY LINES

TOWNSHIP 45 NORTH, RANGE 113 WEST OF THE SIXTH PRINCIPAL MERIDIAN, WYOMING

DEPENDENT RESURVEY AND SUBDIVISION

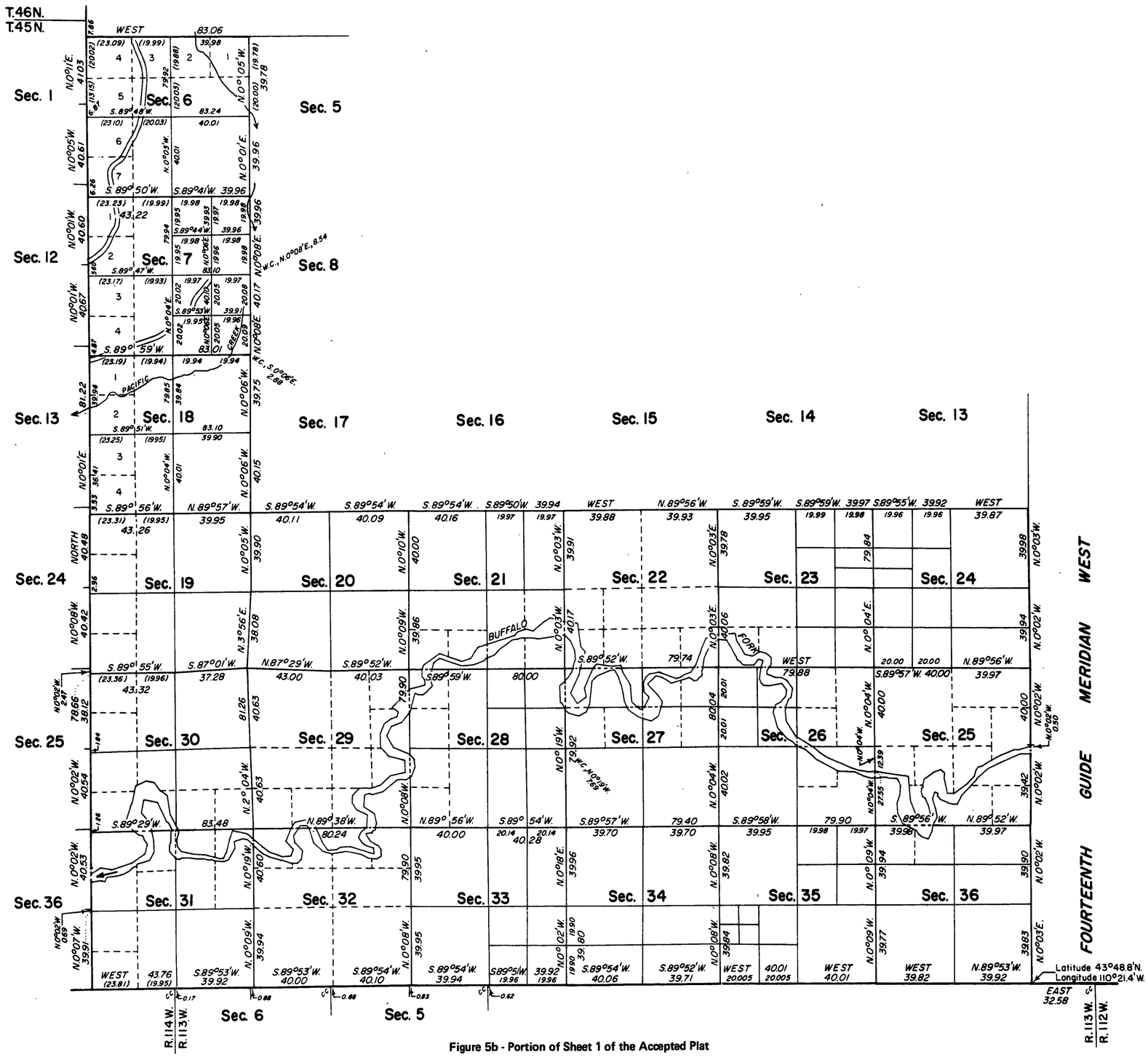


Figure 5b - Portion of Sheet 1 of the Accepted Plat

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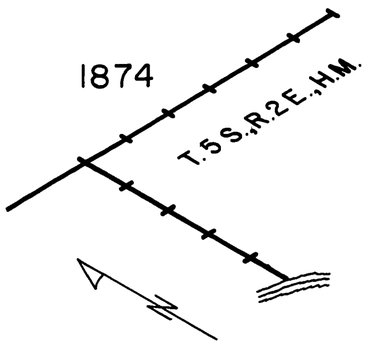

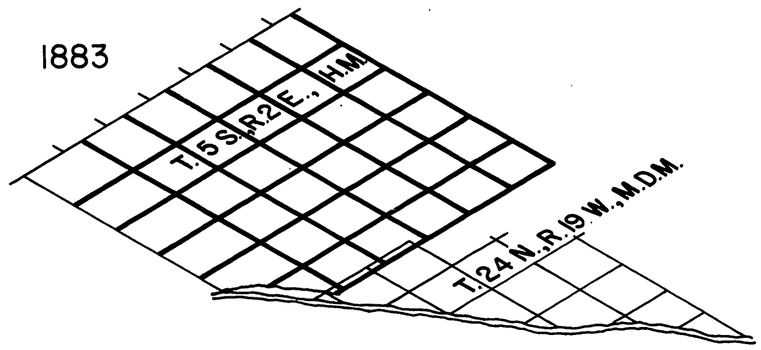

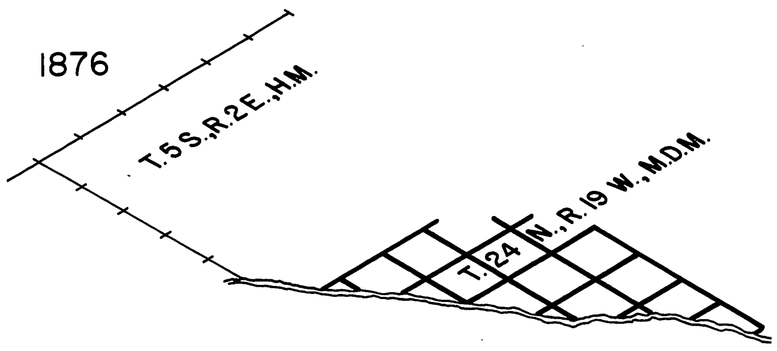

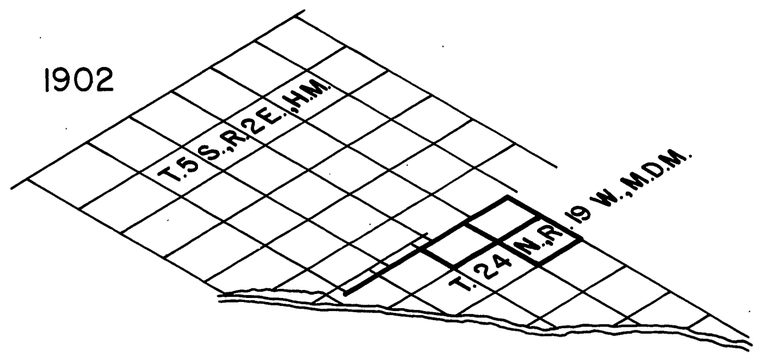

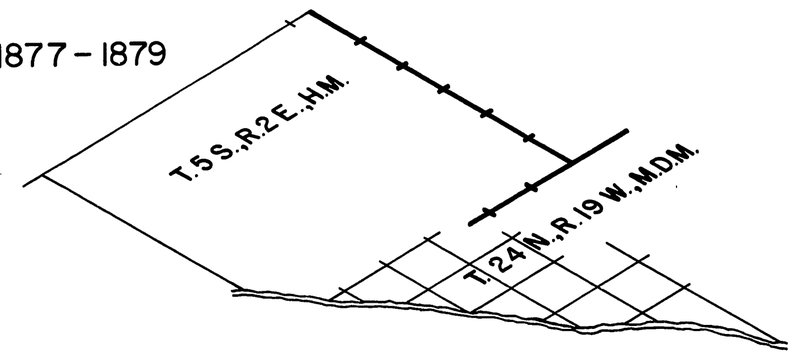

History of Surveys

1874 S. W. Foreman surveyed the First Standard Parallel South through Ranges 1 and 2 East, Humbolt Meridian. He then surveyed the east boundary of T. 5 S., R. 1 E., South from the standard corner of Tps. 4 and 5 S., Rs. 1 and 2 E., and reported intersecting the Pacific Ocean at 4 miles, 65 chains and established a meander corner of fractional sections 25 and 30. See figure 1.

1876 George H. Perrin was given the contract to survey T. 24 N., R. 19 W., M.D.M. Perrin was directed to close T. 24 N., R. 19 W. against the south boundary of T. 5 S., R. 2 E., H.M., which was not yet surveyed. Perrin reportedly began at the Forman meander corner, meandered along the Ocean shore until he was 95.00 chains south in latitude and was then 58.20 chains east, at which point he set a meander corner on the south boundary of section 31. He then ran due East, set the corner of sections 31 and 32, a post in a mound of stone. He marked no bearing trees. Perrin reportedly continued this line east, called a spur at 4.00 chains, ridge at 18.00 chains and marked a leaning madrone for the ¼ corner of section 32 with two bearing trees at 40.00 chains. He continued the line and established corners over to the ¼ corner of section 34 where he suspended the line. All the corners were posts in the mounds of stone, except the ¼ corner of section 32.

Perrin then surveyed most of the subdivisional lines in fractional T. 24 N., R. 19 W., closing against his south boundary of T. 5 S., R. 2 E. All closing corners were posts and mounds of stone with no bearing trees. Perrin did not complete sections 1 and 2. The Perrin plat was approved April 15, 1876, see figure 2. A sketch of the pertinent Perrin surveys is shown in figure 2a.

1877 J. R. Glover was given the contract to survey the south boundaries of Tps. 5 S., Rs. 2, 3 and 4 E., H.M., on which the Mt. Diablo surveys would close. Glover reported beginning at the southeast corner of T. 5 S., R. 4 E., ran a random line west and at 14½ miles fell 4.35 chains north of the Perrin ¼ section corner of section 34, T. 5 S., R. 2 E. Glover then reported returning on true line, setting corners for sections 34, 35 and 36, at 40 and 80 chains, and thus established the corner of Tps. 5 S., Rs. 2 and 3 E., H.M.

It was eventually revealed that Glover's tie to the Perrin ¼ corner of section 34 was fictitious. The theoretical Glover position for that ¼ section corner is approximately 30 chains south and 40 chains east of the theoretical position of the Perrin ¼ section corner of section 34.

1879 J. E. Woods surveyed the east boundary of T. 5 S., R. 2 E. Woods ran north from the Glover township corner and intersected the Foreman First Standard Parallel South at 500 chains, 38.75 chains east of Foreman's standard corner of Tp. 4 S., Rs. 2 and 3 E. The record thus indicated that the township was then 20 chains too long and nearly 40 chains too wide. The Glover and Woods records are indicated in figure 3.

1883 S. W. Foreman was given the contract to survey the subdivisional lines of T. 5 S., R. 2 E. Foreman reportedly retraced the east boundary, the south boundary, the south 65.00 chains of the west boundary and the meanders of the Pacific Ocean in sections 30 and 31. Foreman's notes are a duplicate of the preceding record except for small differences in distances, and the addition of one meander course fronting section 30. Foreman made the first meander course S. 62½° E., 43.00 chains and repeated the Perrin meanders thereafter. On the record this placed the Perrin south boundary 19.86 chains further south and 38.14 chains further east. Foreman then reportedly subdivided the township normally, placing the excess against the north and west boundaries. The Foreman plat was approved on July 26, 1883, see figure 4.

It was eventually revealed that the Foreman retracements and most of his subdivisional lines were fictitious and that if the lines were as reported, the southwesterly portion of T. 5 S., R. 2 E., H.M., would overlap sections 2 thru 5 of T. 24 N., R. 19 W., M.D.M., about as shown in figure 4a.

1891 A new boundary between Humboldt County and Mendocino County was to follow the 40th parallel of latitude. To survey the new county boundary, Sam Rice, a surveyor, began at a point 69.14 chains south of "the old triangulation station on Chemise Mountain," ran due west to the ocean, and then meandered along the beach southeasterly, and tied into what he described as the corner of sections 31 and 32, a redwood post, and described two bearing trees. Rice also tied into the old county boundary a few chains south of the section corner.

1892 Charles C. Taylor, a licensed land surveyor, was hired to survey a patented claim in sections 32 and 33, T. 5 S., R. 2 E., H.M. Taylor found the Perrin ¼ corner of sections 3 and 4, T. 24 N., R. 19 W., M.D.M., ran north the record distance and set a closing corner for those sections. He stated that the old closing corner had been destroyed. Taylor also reported finding the Perrin closing corner of sections 2 and 3, with 2 bearing trees (Perrin reported none) and then ran the north boundary of section 3 between the two "corners." Taylor found the Foremen ¼ corner of sections 20 and 21, ran due south from it, intersected his north boundary of section 3 midway between the closing corners and used the point of intersection as the corner of sections 32 and 33. He laid out his clients' claim in those sections accordingly. Taylor's survey was never accepted as correct.

Taylor's notes revile the Perrin and Foreman surveys, insisting that most of the work was fictitious and the corner of sections 31 and 32 (tied to by Rice) was a fake "set by an outsider." Taylor says he reported all these things to the Land Office in Washington but was told that that office could no nothing to correct the situation. Taylor called the original surveys and the restoration of the corner of sections 31 and 32 "a Bensonian procedure from first to last." (Foreman, Perrin, Glover and Woods were all members of the then infamous Benson Syndicate.)

1892 Joseph A. Shaw, a licensed land surveyor, was hired by seven different claimants to survey their lands in the southern part of T. 5 S., R. 2 E., H.M. One client was Frank H. McKee, the patentee of the W½ SW¼, SE¼SW¼, SW¼NW¼, section 32, T. 5 S., R. 2 E., patent issued November 24, 1888.

Shaw began his retracements at the corner of sections 19, 24, 25 and 30 on the east boundary. He retraced southerly and westerly, finding the township corner, the corner of sections 35 and 36 and the corner of sections 34 and 35 as set by Glover. Shaw tied in some of the corners of the Taylor survey, including the alleged Perrin closing corner of sections 2 and 3, but did not use any of them. Shaw found the alleged Perrin corner of sections 31 and 32, tied in by Rice (and ridiculed by Taylor.) Shaw obtained sworn affidavits from Frank H. McKee and James Yates in which they stated that they had set the post and marked the bearing trees under the direction of S.W. Foreman in 1883. They also stated that Foreman had determined that point as due West, 16.20 chains distant from Perrin's closing corner of sections 4 and 5, which was still in existence at that time. Shaw found no evidence of any other corners along the south boundary. He single proportioned the "lost" corners between the Glover corner of sections 34 and 35 and the "Perrin-Foreman" corner of sections 31 and 32.

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Shaw found the east ¼ section corner of section 13, T. 5 S., R. 1 E., ran due south from it but found no original corners. He intersected the ocean at 210.10 chains where he set a meander corner. He then single proportioned the missing corners for range 1 east (against the record of 185 chains) but set new closing corners for R. 2 E., at Foreman's record distance south of his proportioned corners for R. 1 E.

Shaw then ran west from the corner of sections 31 and 32, intersected the ocean at 22.96 chains (record was 21.80) and set a meander corner for section 31. He then ran the meanders of the ocean between his meander corners.

Shaw ran extensive random lines through T. 5 S., R. 2 E. recovering several original Foreman corners near the main arteries of access. He found a house which Foreman reported to be 23.00 chains north of the corner of sections 21, 22, 27 and 28. After developing all the control corners he could, Shaw double proportioned the missing section corners based on the Foreman record. Shaw found no original corners along the first latitudinal line so he used the actual position of the ocean for his east-west proportionate positions. He found no original corners along the fifth meridional line and used the latitudinal position of the recovered closing corner of sections 4 and 5 on the north boundary. He used the old house for control on the third meridional line. Shaw also tied in the new and old county boundary lines.

After reestablishing all of the section corners he needed, Shaw then surveyed the boundaries of his client's claims on calculated courses and distances.

The pertinent record of Shaw's resurveys, corner recovery, etc. are shown in figure 5.

1894 Richard York, Mendocino County Surveyor, was employed by J.L. Stewart to survey his claim in sections 30 and 31. The available records indicate that York began his survey at the southeast corner of T. 5 S., R. 2 E., and ran west the Foreman record distance which placed him on top of a ridge above the ocean and about a quarter mile east of the shore. York found a burned stake at what he thought was the ¼ section corner of section 32, set a new post, went on west ½ mile, set a corner of sections 31 and 32 and then surveyed the Stewart claim on record bearings and distances based on the Foreman plat. York's survey would have placed the Stewart claim almost directly on top of the Mckee patent as based on Shaw's survey.

On February 10, 1896, patent was issued to John L. Stewart for lots 1, 3 and 4, section 31 and the SW¼ SE¼ section 30, T. 5 S., R. 2 E. Stewart subsequently sold the patented land to J.A. Kimball.

1899-1900 Kimball (or Stewart) hired a surveyor named Sandow to survey the Stewart patent in sections 30 and 31, T. 5 S., R. 2 E. The records does not include the exact dates. Sandow began at the original (Foreman) ¼ section corner of sections 20 and 21, ran south for 2½ miles, and west for 1 mile to the record position of the corner of sections 31 and 32. He then surveyed the claim. A man named Champagne who lived in section 35 helped sandow and later testified that Sandow's survey very nearly agreed with York's positions.

1901 Kimball hired a surveyor named Chapman to survey lots 1, 3 and 4, section 31 and the SW¼ SE¼ section 30, T. 5 S., R. 2 E. Chapman began at what he believed to be the ¼ corner of section 32, as pointed out to him by "an old settler." Chapman ran west 40 chains, set a corner of sections 31 and 32, and a meander corner at 61.80 chains, on top of the bluff along the ocean, about ¼ mile from the shore. Chapman also surveyed out the Kimball lands based on the Foreman record.

Kimball sued Frank H. McKee for $5,000 trespass damages. McKee had cut tanoak trees and stripped them for the bark (used in tanning leather), based on Shaw's survey. This was much the same land claimed by Kimball based on Chapman's survey. The Superior Court verdict awarded damages to Kimball. McKee appealed to the California Supreme Court.

1902 While the "McKee Trespass Case" was still in litigation the Commissioner of the General Land Office ordered Henry L. Chandler, Examiner of Surveys, to investigate and resurvey the south boundary of T. 5 S., R. 2 E. On May 10, 1902, Chandler began at the positively identified Glover corner of sections 34 and 35, ran a random line west and at 260.00 chains fell 1.95 chains south of what he believed to be the meander corner of section 31, a wood post, located on top of the bluff above the ocean. He reported finding no other corners in those 260.00 chains. Chandler then single proportioned the "lost" corners, based on the Perrin-Glover record. The "meander corner" used by Chandler was the post set by Chapman.

1902 Alfred Bannister, Deputy Surveyor, completed T. 24 N., R. 19 W., M.D.M. Late in May and early June 1902, Bannister resurveyed the Glover south boundary of sections 34, 35, and 36 and the Chandler line to the ¼ corner of section 33. He resurveyed portions of the Perrin subdivisional lines of sections 1, 2, 11 and 12 and completed the township, closing against the Glover-Chandler line. The protracted outlying part of the NW¼ of section 2, shown on the Perrin plat was ignored. The Bannister plat was approved April 7, 1903, see figure 6. A sketch of the Chandler survey and pertinent portions of the Bannister survey are shown in figure 6a.

1906 On July 12, 1906, the California Supreme Court affirmed the McKee appeal and ordered a new trial. (See Kimball v. McKee, 86 P. 1089). In the majority decision the Supreme Court ridiculed the Chapman survey as being totally in error in that the "Old Settler" corner (¼ corner, section 32) used by Chapman was actually the point set by York; Chapman should have used the ocean shore as an identified monument, and that since Foreman's notes and plat showed that he had surveyed the lines it must be presumed that he had done so. Basically the ruling upheld the Shaw survey and threw out Chapman's.

A strong dissenting opinion upheld Chapman's work. On rehearing, court costs and attorney's fees were awarded to McKee.

1944 Oscar G. Larson, Registered Engineer No. 1754, of Eureka, California wrote to the Washington Office, briefly explaining that much confusion existed in the southern part of T. 5 S., R. 2 E., that no original corners had been found along the first latitudinal line and asked advice on the proper method of restoring corners along that line considering the great excess distance to the ocean. He was advised to use "three point control," record distance from the east boundary and proportion from the south boundary to the nearest authentic corner to the north.

1944-55 From 1947 into the mid 1950's, Oscar Larson, A.B. Bones, J.K. Richardson and Donald E. Bushnell, all licensed engineers or land surveyors, performed extensive resurveys in T. 5 S., R. 2 E., and T. 24 N., R. 19 W. They recovered all of the original Foreman corners reported found by J.A. Shaw in 1892, many of the corners established by Shaw and nearly all of the Glover-Chandler–Bannister corners along the south boundary. The Perrin-Foreman corner of sections 31 and 32, used by Shaw, was also recovered. These private surveys were executed according to the Washington Office memorandum in apparent good faith and proper execution. None of the Shaw corners in the south two tiers of sections (25 thru 36) were honored. Since the only corners in the north four tiers that had existed since 1892 were either original Foreman corners or Shaw restorations, land ownership in those tiers were based on Shaw's work and had been stable for over 50 years. The private surveyors honored the Shaw corners, (wherever recovered) in sections 1 thru 24. The pertinent records of these private surveys are shown by a composite sketch, figure 7.

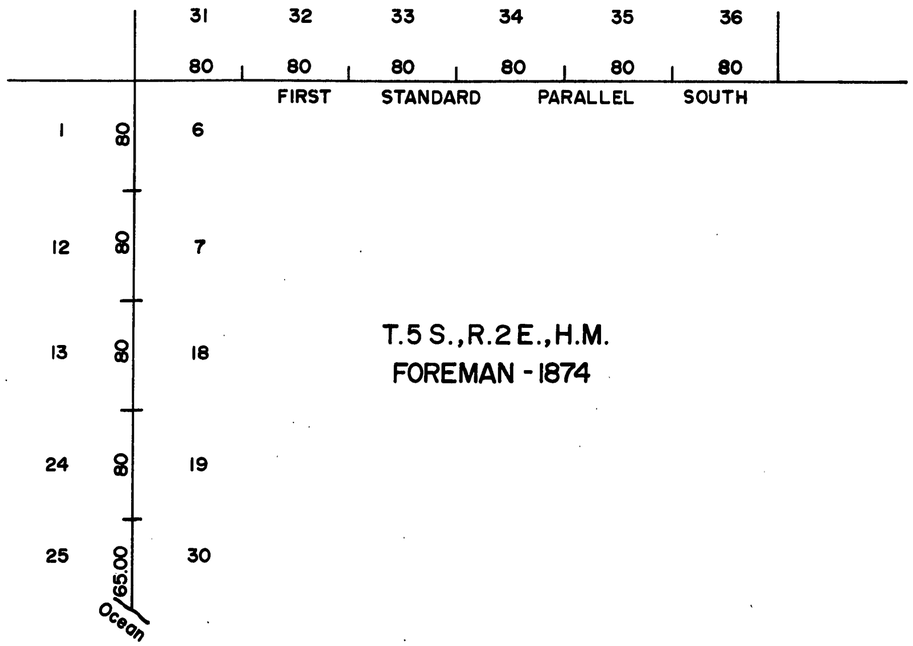

Figure 1 - Sketch of 1874 Foreman Record

Reasons for the Request of this Survey

The Bureau of Land Management received several letters of inquiry from private owners in both townships requesting an investigation and resolution of the complex survey situation. Initial investigation was made in 1951 and revealed the history as already outlined in History of Surveys. Timber was being logged in the overlap area by private loggers, allegedly in trespass on both privately owned land and on public lands. The land ownership status is indicated by figure 8.

Further investigations were made in 1952 during which most of the existing original corners, many of the Shaw corners, and most of the recent private survey corners were found and correlated.

In 1954-55 logging activities in section 30, T. 5 S., R. 2 E., H.M., were suspected of being in trespass on public lands. On April 25, 1955, the State Supervisor (Director) requested a resurvey to resolve the dispute and mark the boundaries of the public lands.

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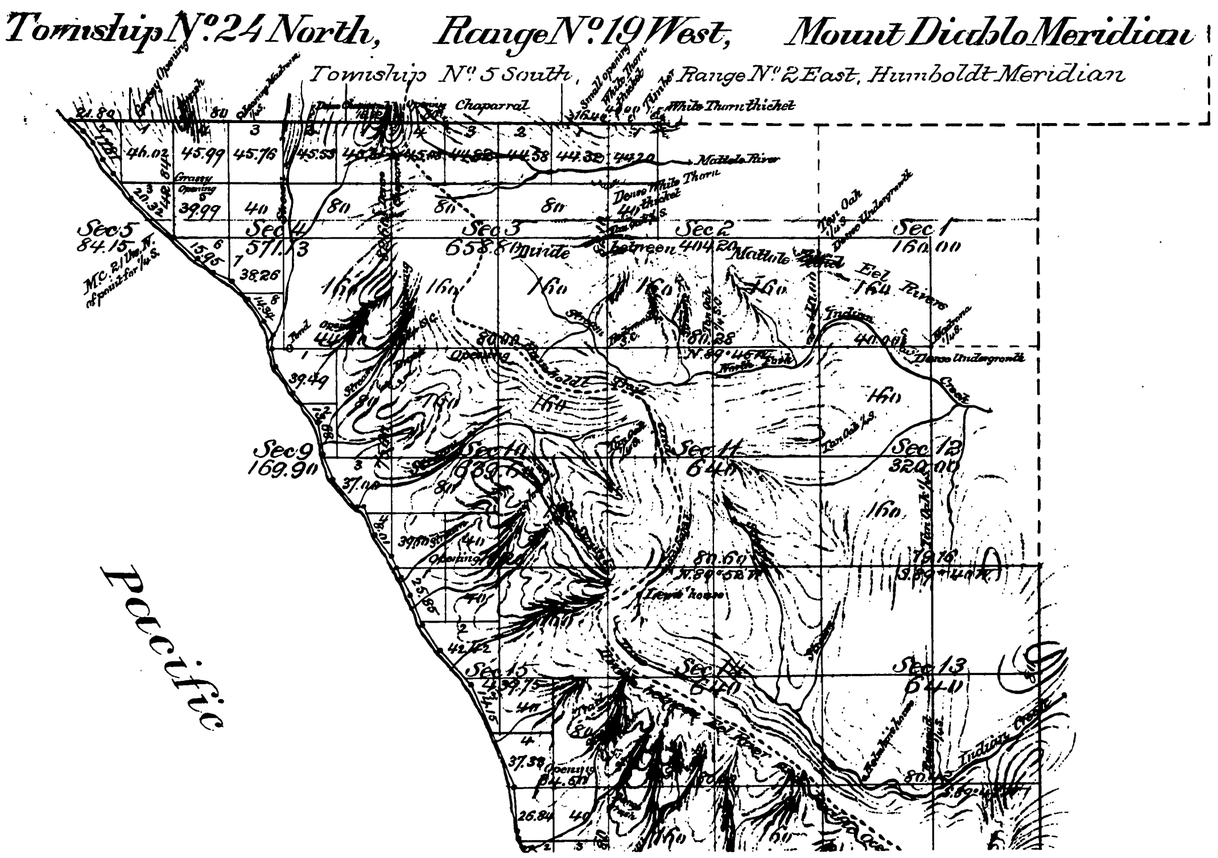


Figure 2 - Portion of the Perrin Plat

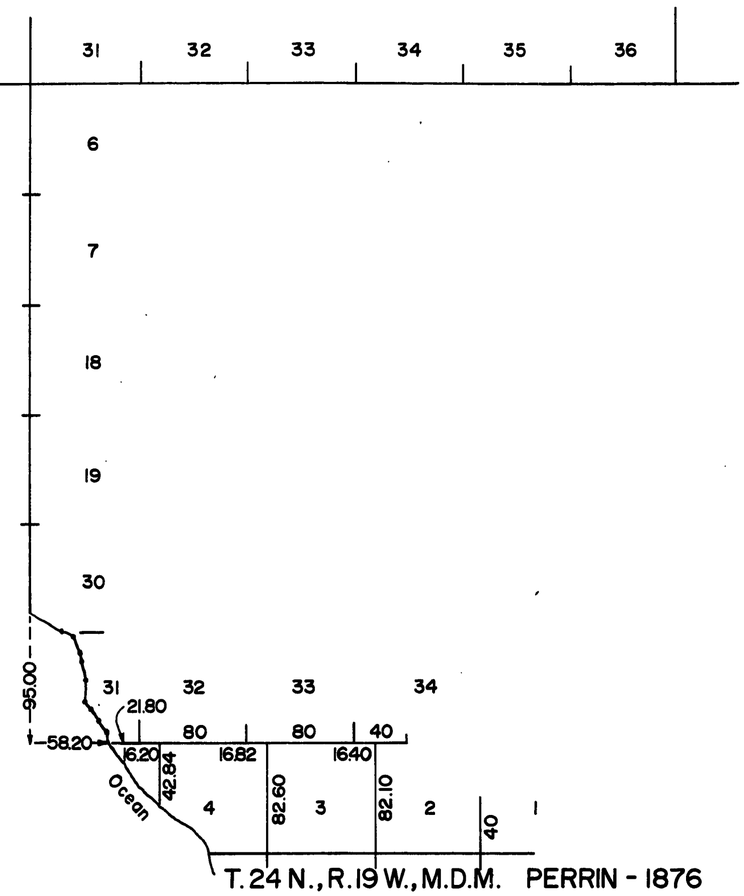


Figure 2a - Sketch of 1876 Perrin Record

C3-3

HUMBOLDT & M.D.M. OVERLAP

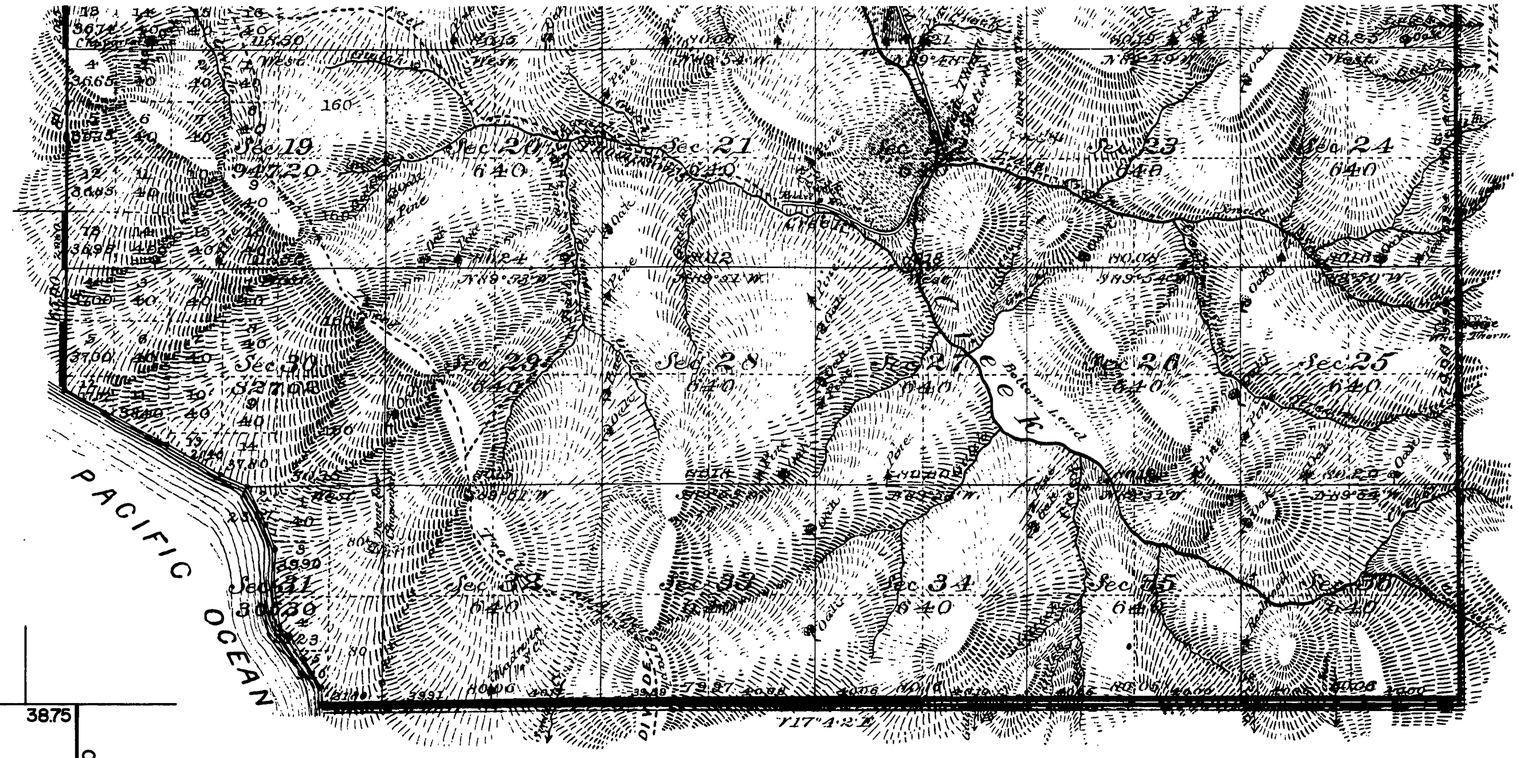


Figure 4 - Portion of Foreman Plat

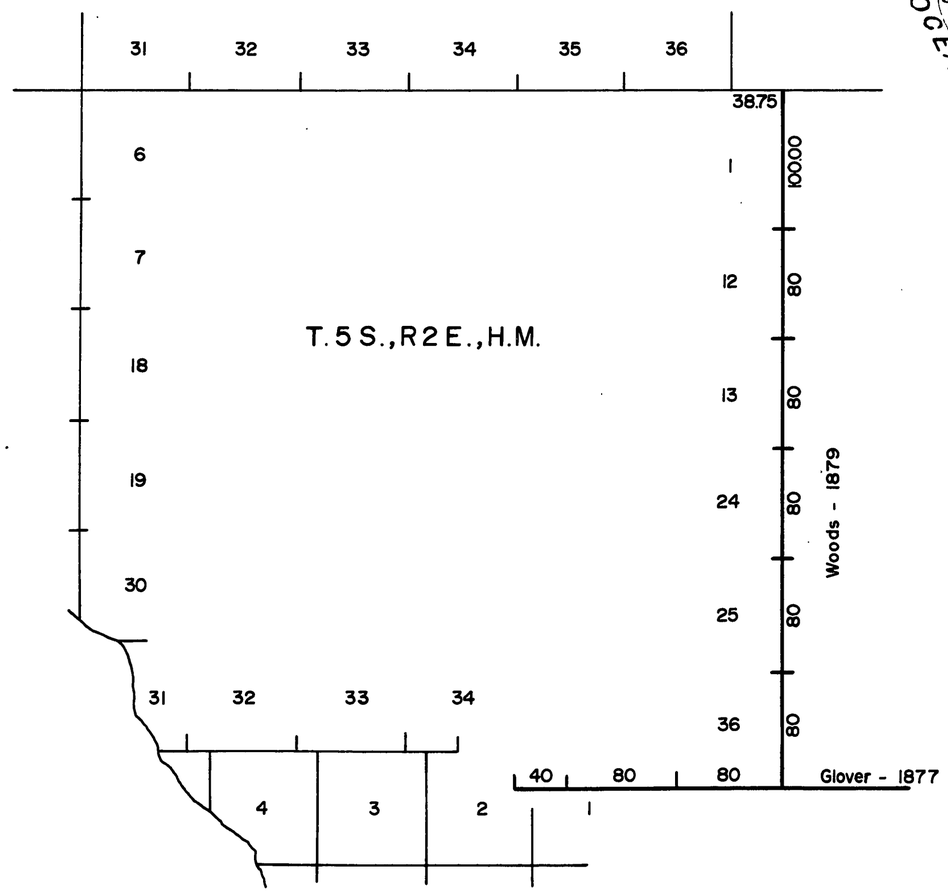


Figure 3 - Sketch of Glover and Wood Record

HUMBOLDT & M.D.M. OVERLAP

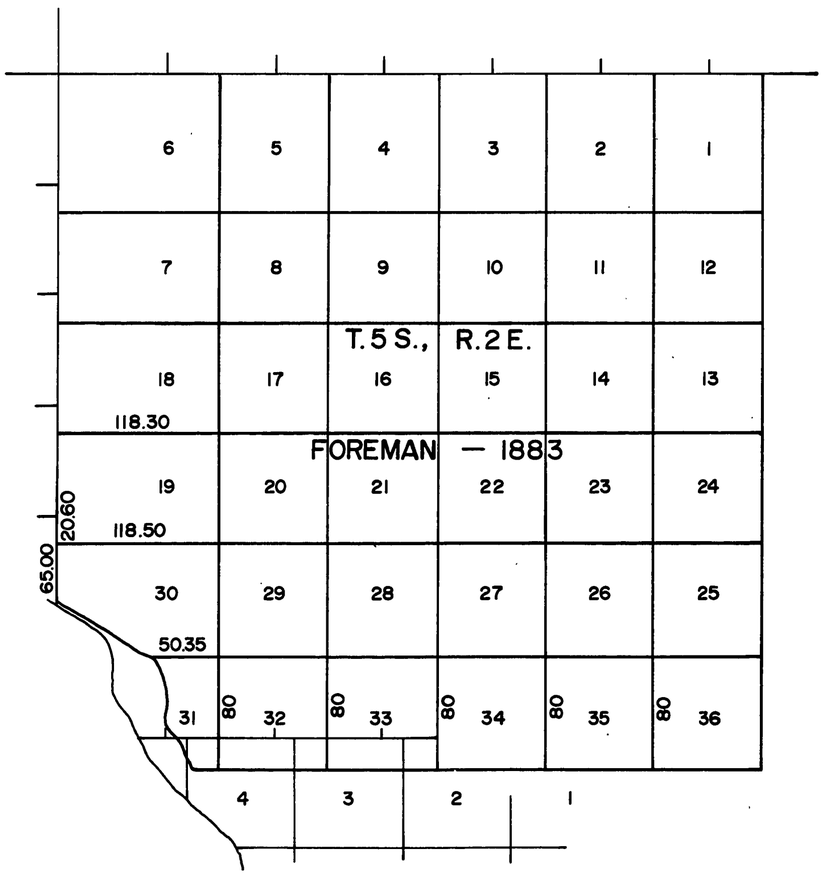


Figure 4a - Sketch of Foreman Record

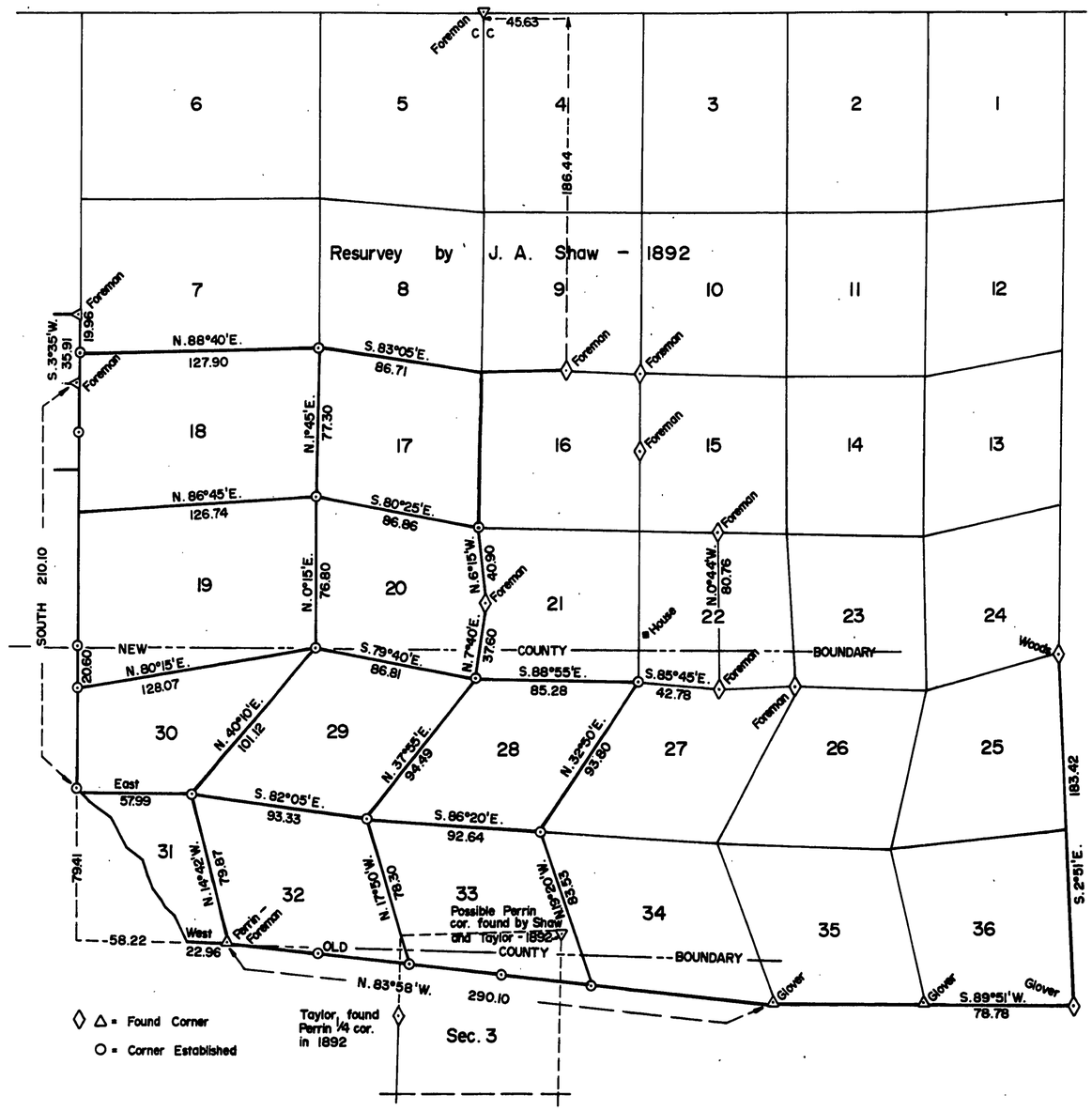


Figure 5 - 1892 Record of C.C. Taylor and J.A. Shaw Resurveys

HUMBOLDT & M.D.M. OVERLAP

Township No. 24 North, Range No. 19 West, Mount Diablo Meridian, California.

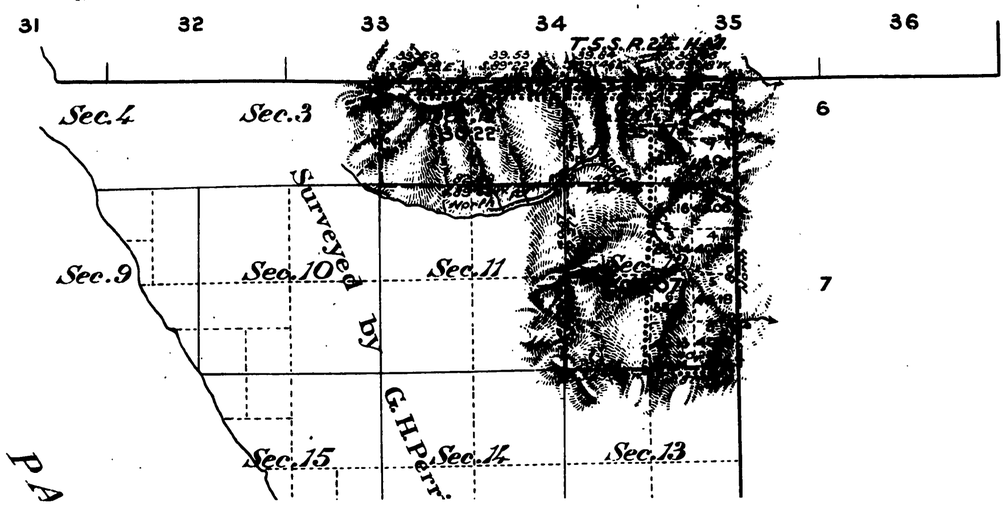
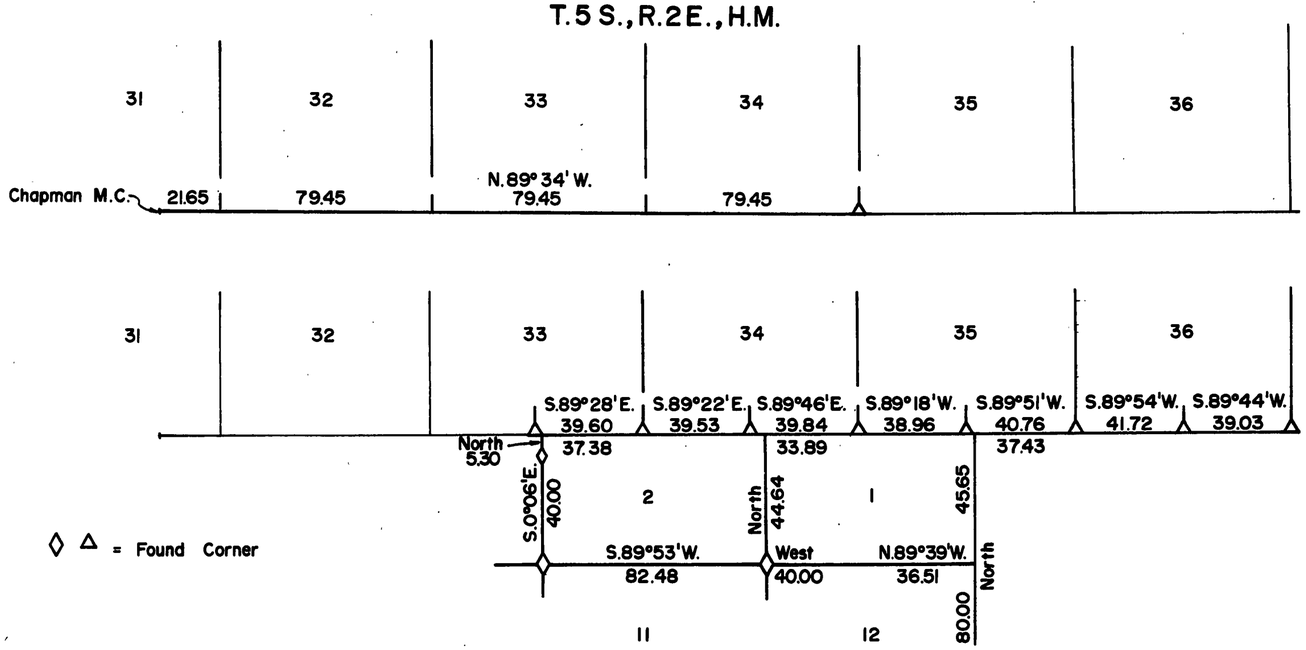


Figure 6 - Portion of Bannister Plat

CHANDLER - MAY 10, 1902

T. 5 S., R. 2 E., H.M.



ALFRED BANNISTER - MAY & JUNE, 1902

T. 24 N., R. 19 W., M.D.M.

Figure 6a - Sketch of Chandler and Bannister Record

HUMBOLDT & M.D.M. OVERLAP

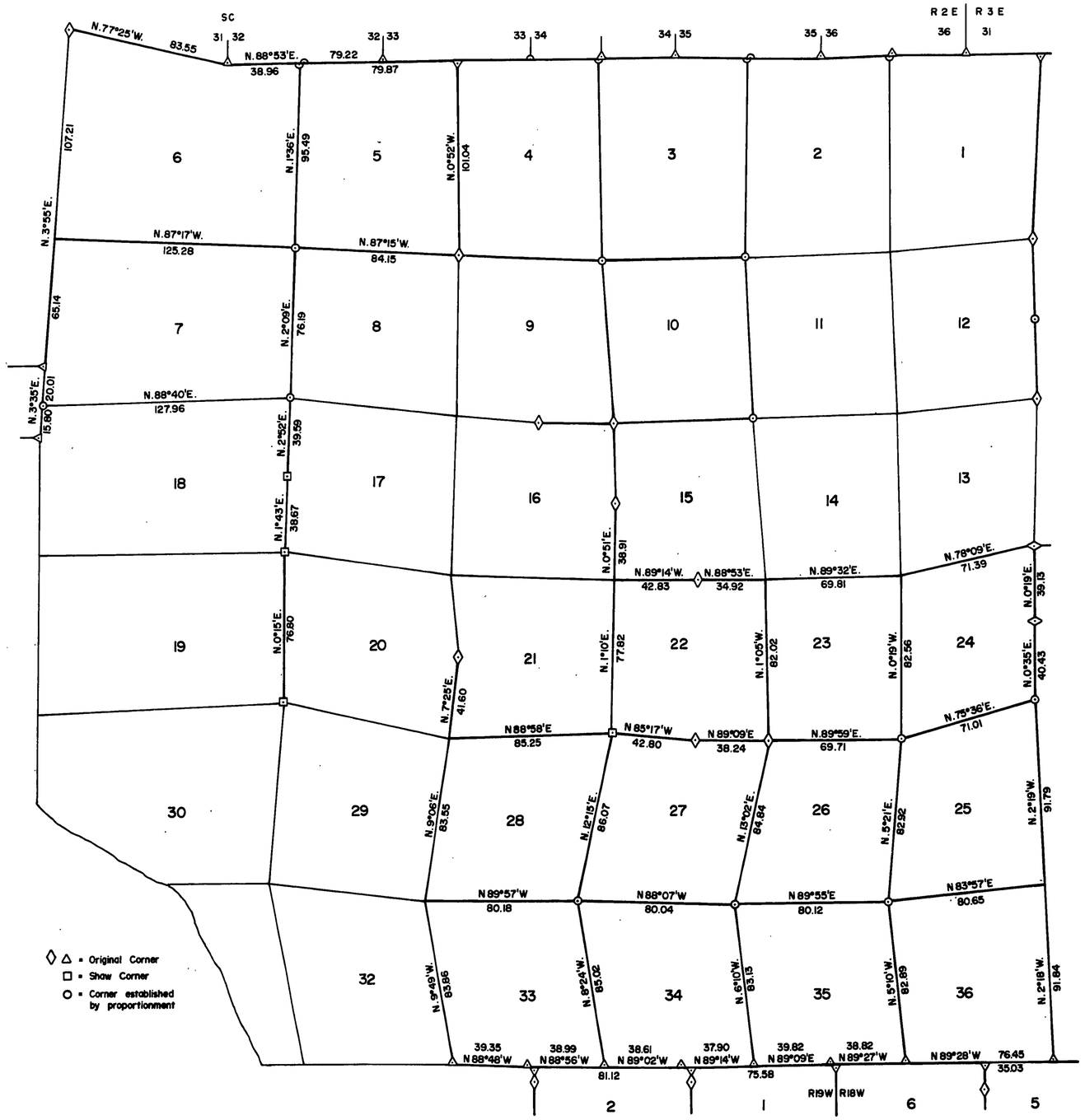


Figure 7 - Sketch of Private Surveys

HUMBOLDT & M.D.M. OVERLAP

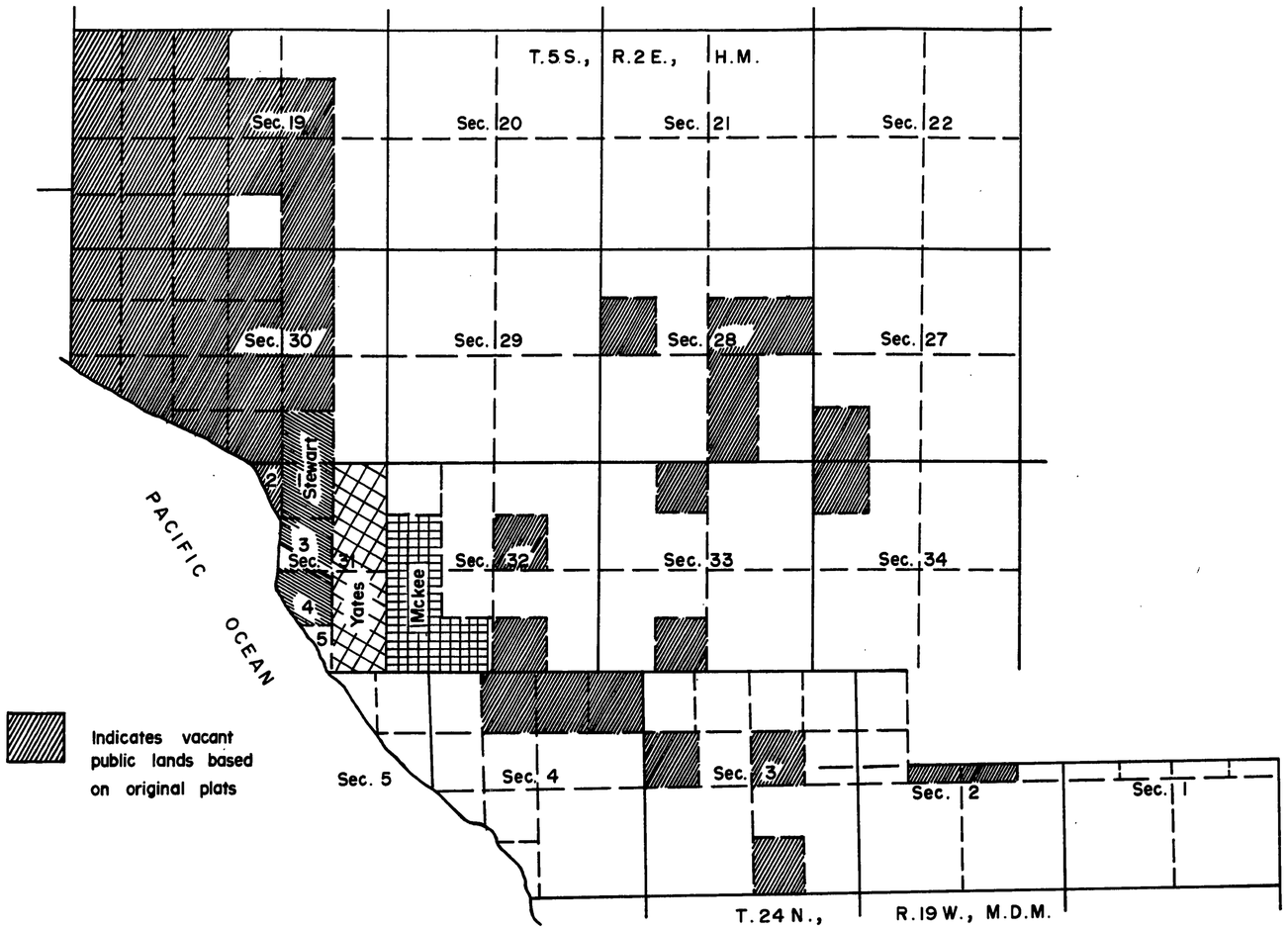


Figure 8 - Ownership Status

HUMBOLDT & M.D.M. OVERLAP

Special Instructions

Special Instructions for Group 388, California, were prepared on June 13, 1956. They provided for the dependent resurvey of sections 19, and 28 thru 33, T. 5 S., R. 2 E., H.M., and sections 2 thru 5, T. 24 N., R. 19 W., M.D.M. The lines of these sections were to be resurveyed and the areas in conflict and overlap determined. The work under the Special Instructions was assigned to a surveyor on July 6, 1956, with all results of the previous investigations furnished.

Conditions Found on the Ground

Figure 9 indicates the corner recovery and approximate relative positions after all retracements and investigations were completed. Search of available records, local inquiry and the retracement data revealed the following facts:

a) Perrin's field notes state that after meandering southeasterly along the ocean and setting his meander corner for the south boundary of T. 5 S., R. 2 E., that he ascended a steep rocky slide and set his corner of sections 31 and 32 at 21.80 chains, a post in a mound of stone. Going east on his south boundary of section 32 he ascended the steep slide, at 4.00 chains - top of slide and enter grassy opening, at 18.00 chains ridge bears NW and SE, at 19.00 chains - enter brush, at 26.00 chains, enter timber, at 40.00 chains, marked a leaning madrone for ¼ section corner with two bearing trees, at 64.40 chains, stream in deep gulch, (Whale Gulch) course south, at 66.00 chains - enter dense chaparral, at 80.00 chains - set post in mound of stone for corner of sections 32 and 33.

In comparison the retracements east from the found corner for sections 31 and 32 (described by Rice and Shaw) found the following; Ascend SW slope of slide, at 4.00 chains - top of slide on spur, slopes south, enter timber, at 7.20 chains, ravine, course S. at 17.60 chains - Chemise Ridge, at 43.00 chains - Whale Gulch, course S. 10° E.

b) Except for the west 18 chains, none of the topography called by Perrin along the south boundary of sections 32, 33 and 34 vaguely resembles actual ground conditions.

c) The alleged Perrin corner of sections 31 and 32 is very nearly 290 chains south and 83 chains east of the positively identified Foreman ¼ corner of section 13. The Perrin record indicates it to be 280 chains south and 80 chains east of that ¼ section corner.

d) The alleged Perrin corner of sections 31 and 32 is 75 chains north and 93.73 chains west of the positively identified Perrin corner of sections 3, 4, 9 and 10. The Perrin record indicates it to be 82.60 chains north and 96.82 chains west.

e) On November 24, 1888, patent was issued to Frank H. McKee for the W½SW¼, SE¼SW¼, and SW¼NW¼, section 32. On February 16, 1891, patent was issued to James S. Yates for the E½NE¼, E½SE¼, section 31.

f) On September 7, 1892, James S. Yates and Frank H. McKee signed sworn affidavits in which they state that they set the redwood stake at the (found) corner of sections 31 and 32, in 1883, as authorized by S.W. Foreman; 16.20 chains west of the closing corner of sections 4 and 5, and 21.80 chains east of the shore of the Pacific Ocean. That in 1883, the stake was standing in an open prairie. The stake was standing on a bluff slide to the ocean. The affidavit describes the two bearing trees, reported by Sam Rice in 1891 and by J.A. Shaw in 1892. The wording and text of the affidavits imply that Yates and McKee were working for Foreman in 1883.

g) Foreman's field notes list "A. McKee" as a chainman. The name James S. Yates is not listed as a member of Foreman's crew at all.

h) E.M. McKee, son of Frank H. McKee has lived in the vicinity of T. 5 S., R. 2 E., for many years. When interviewed, E.M. McKee stated that his father had worked for S.W. Foreman and had related his activities over the years before his death: Foreman began his subdivisions in T. 5 S., R. 2 E. at a corner on the north boundary, traversed southerly along the Mattole River, setting some corners adjacent to the traverse until he reached Thompson Creek in section 22. He then traversed along a trail up Thompson Creek and tied into a corner somewhere along the west boundary of the township. Frank H. McKee told his son that he had set the corner of sections 31 and 32 while working for S.W. Foreman.

i) C.C. Taylor's map of his 1892 survey shows the corner of sections 31 and 32, with the notation: "Cor ested by McKee not legal." Taylor did not accept the corner.

j) J.A. Shaw accepted the corner of sections 31 and 32 based upon McKee and Yates affidavits and used it to restore the south boundary of T. 5 S., R. 2 E., and restore corners within that township as shown in figure 5. The Shaw corners (and original Foreman corners found by Shaw) in the north four tiers of sections have been honored and used to control property boundaries by most private land owners since 1892.

k) The 1891 Rice meanders of the ocean and 1892 Shaw meanders were faithfully and accurately made. The shoreline is still in very nearly the same configuration. The 1906 earthquake shook the loose surface soil into the ocean leaving very steep bluff slopes, now impossible to climb, but Shaw and Rice both climbed them in 1891 and 1892. The Perrin meanders of 1876 conform very nearly with the actual shoreline in T. 24 N., R. 19 W. They conform for a short distance northwesterly from a point 22 chains west of found corner of sections 31 and 32, but then depart inland and up along the bluffs. Perrin could not have meandered the Ocean shore as he said he did in front of sections 30 and 31. The Foreman meanders along the ocean are entirely fictitious.

l) Perrin's calls of topography on his lines between sections 1 and 2, 2 and 3, 3 and 4 agree quite well with actual ground conditions. Perrin must have actually surveyed those lines, at least for most of their length, but did not close against a south boundary of T. 5 S., R. 2 E., for that line was surely fictitious, except the west half mile.

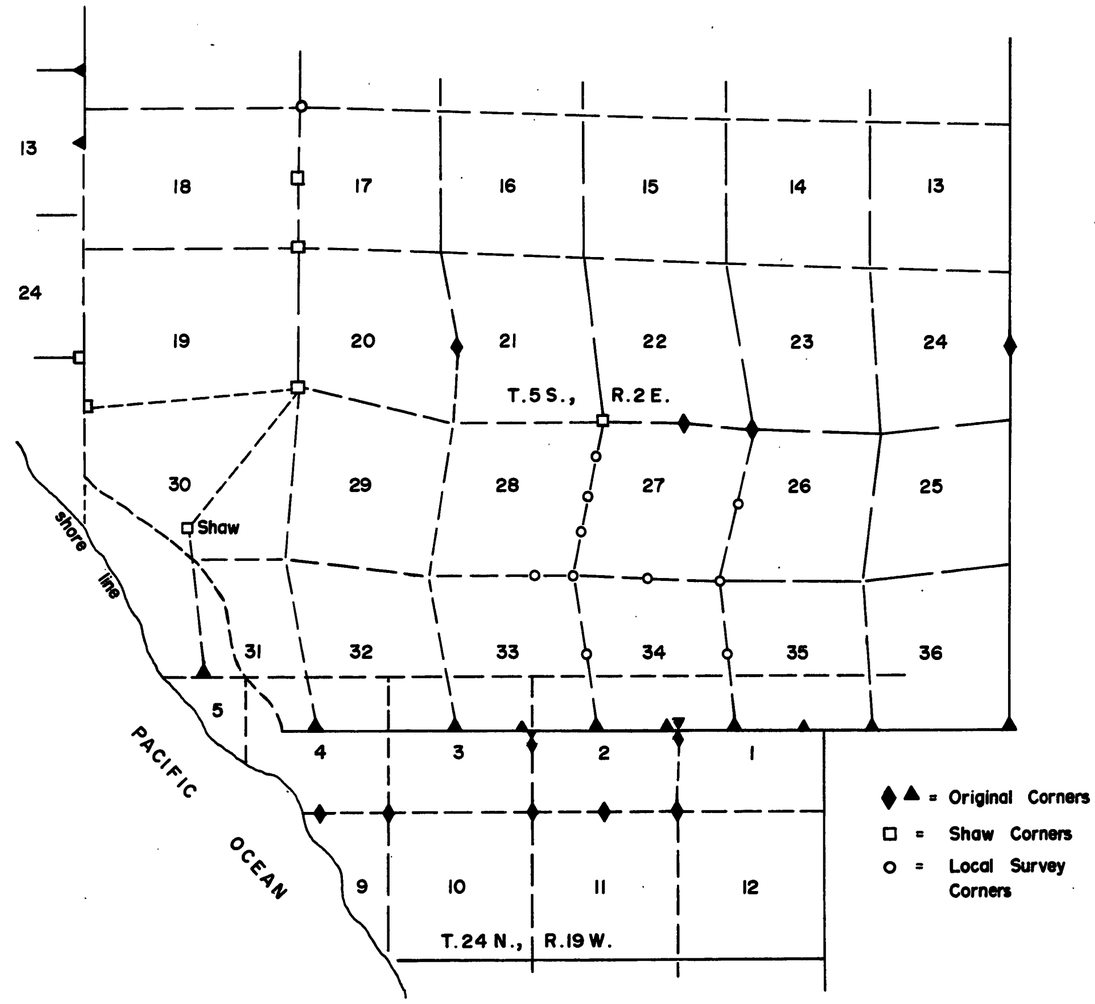


Figure 9 - Corner Recovery

m) Glover's tie to the Perrin ¼ corner of section 34 had to be fictitious. The Foreman retracements of the record Glover and Perrin south boundary of T. 5 S., R. 2 E. had to be fictitious.

n) Perrin must have made a tie between the Foreman ¼ corner of section 13 and his (Perrin's) work in T. 24 N., R. 19 W. The Perrin corner of sections 3, 4, 9 and 10 is 364.91 chains south and 176.40 chains east of the Foreman ¼ corner of section 13; compared to the record of 362.60 chains south and 176.82 chains east. These relationships are close to record; the positions cannot reasonably be said fortuitous. The U.S.C & G.S. triangulation stations along Chemise Ridge and on Chemise Mountain were established in 1872 and 1873. It is possible that Perrin tied the Foreman ¼ corner of section 13 to station "Chemise Mountain" and also tied one of his corners in T. 24 N., R. 19 W. to a triangulation station. He could have then computed the theoretical distances between sections 2 and 3, 3 and 4, 4 and 5, ran north between those sections and set "closing corners" at computed distances. He could have run west from his "closing corner" of sections 4 and 5, a computed distance of 16.20 chains to establish the corner of sections 31 and 32. Having run that portion of the line, he could, and did accurately describe it.

o) No patents have ever been issued nor any areas ever returned based on the Perrin survey of the south boundary of T. 5 S., R. 2 E. All areas and patents in that township are based on the Foreman plat. The Foreman plat places the south boundary of T. 5 S., R. 2 E. along the alinement surveyed by Glover and extended by Chandler. All areas in T. 24 N., R. 19 W. are based on the Perrin and Bannister plats.

p) The recent resurveys by private surveyors in T. 5 S., R. 2 E., are based on a latitudinal proportionate measurement position between the Glover-Chandler line and the recovered Foreman and Shaw corners two miles (or more) to the north. The longitudinal position was determined at the Foreman record distance from the east boundary. So far as they have been executed, these private surveys were in conformance with the Washington Office memorandum to Oscar Larson, and have been accepted by the private property owners affected by them. The retracements revealed minor technical errors in private surveys but no procedural errors.

q) Logging, bark strippers and repeated fires have destroyed many of the Shaw corners as well as the closing corner of sections 2 and 3, reported by Taylor and Shaw in 1892.

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Preliminary Statement of the Problem

The surveyor must make a report of his findings, based on the evidence and ground conditions, recommending a procedure for resurveying and monumenting the corners of the remaining public lands within sections 19, and 28 thru 33, T. 5 S., R. 2 E., H.M., and sections 2 thru 5, T. 24 N., R. 19 W., M.D.M.

Regulations

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

5-1 to 5-38, 5-40 to 5-47	Restoration of lost or obliterated corners
6-1 to 6-32	Dependent resurveys
7-4 to 7-15	Special surveys

Particular attention is called to sections: 5-1 to 5-3, 5-10, 5-13, 5-35, 5-46, 6-16, 6-28, 7-5 and 7-11.

Legal Constraints

The Bureau of Land Management has no authority to "correct" an original survey once the plat(s) have been approved and lands patented based on the approved plat(s). As pointed out in section 5-13 of the Manual, the surveyor cannot make legal or judicial decisions. He can only execute a resurvey based on the evidence and not decide the equities of the results.

Final Statement of the Problem

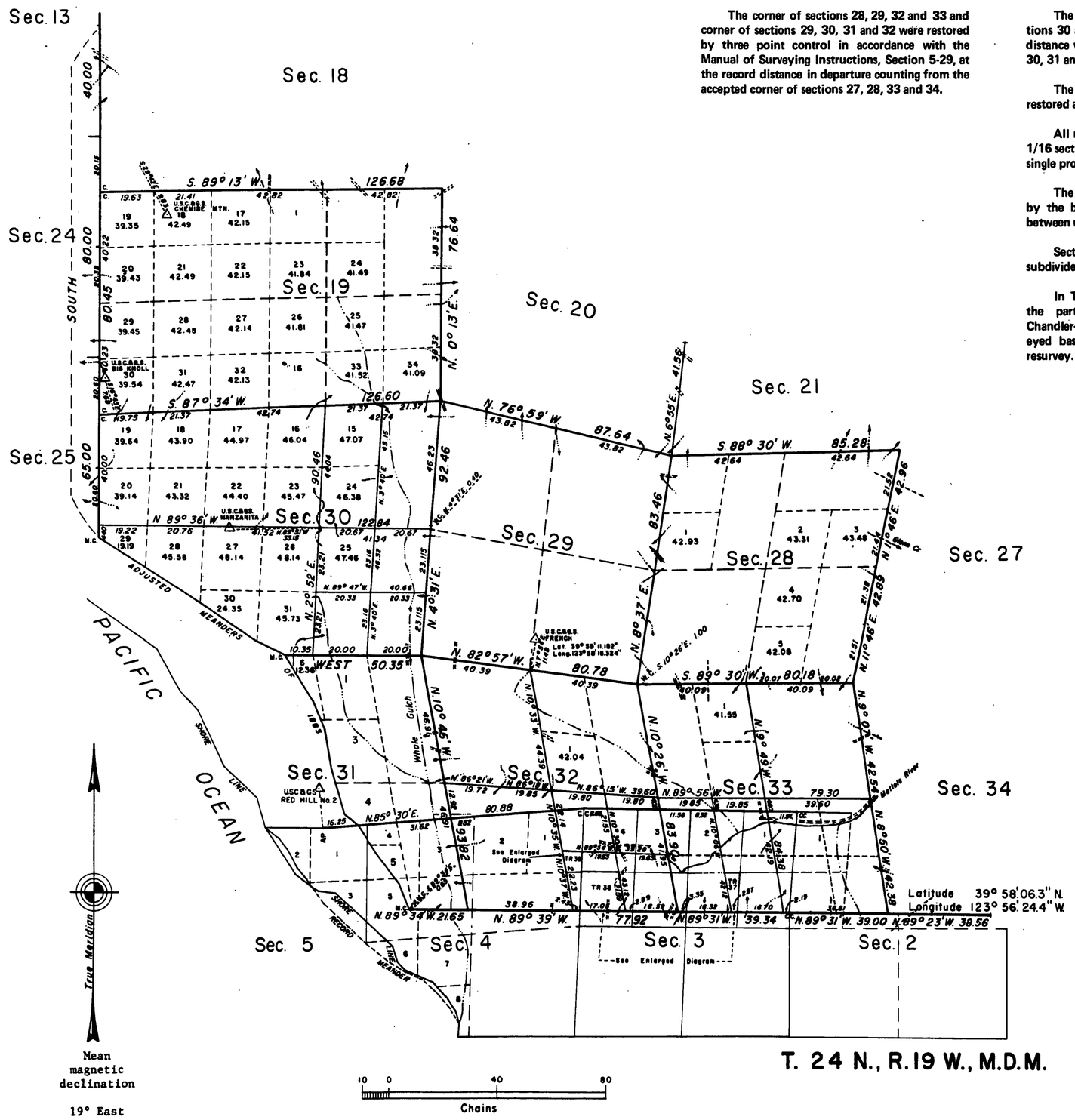
How should the surveys shown on the Perrin and Foreman plats be restored and how are the remaining public lands within the overlap area to be identified?

Solution

The Chandler south boundary of T. 5 S., R. 2 E. was resurveyed based on the Chandler record. The terminal meander corner of section 31 was restored at the Chandler record bearing and distance from the recovered corner of sections 31 and 32. This point fell on top of the ridge about 21 chains east of the actual shore of the Pacific Ocean. The east 1/16 corner of section 32 and west 1/16 corner of section 33 were established.

The west boundary was resurveyed on the Foreman record, due south from the recovered east ¼ corner of section 13 with all corners and closing corners restored at record distance. The terminal meander corner fell near the top of a ridge, about 25 chains north of the actual shore of the ocean.

The 1892 Shaw corners of sections 17, 18, 19 and 20; 19, 20, 29 and 30; and 21, 22, 27 and 28 had been accepted by the private surveyors and were therefore accepted as the best evidence of the position of the original corners. The original Foreman ¼ corner of sections 20 and 21 controlled latitudinal proportions along the fourth meridional line. The Shaw corner of sections 29, 30, 31 and 32 was rejected. The private survey corners between sections 33 and 34, 27 and 28, were accepted, having been properly restored.



T. 24 N., R. 19 W., M.D.M.

Figure 10 - Portion of Accepted Plat, T. 5 S., R. W. E., H.M., California.

The corner of sections 28, 29, 32 and 33 and corner of sections 29, 30, 31 and 32 were restored by three point control in accordance with the Manual of Surveying Instructions, Section 5-29, at the record distance in departure counting from the accepted corner of sections 27, 28, 33 and 34.

The terminal meander corner between sections 30 and 31 was restored at record bearing and distance west of the restored corner of sections 29, 30, 31 and 32.

The corner of sections 20, 21, 28 and 29 was restored at double proportionate distances.

All remaining ¼ section corners and necessary 1/16 section corners were restored or established at single proportionate positions.

The Foreman record meanders were adjusted by the broken boundary (compass rule) method between restored meander corners.

Sections 30, 32 and 33 were initially subdivided normally as though no overlap existed.

In T. 24 N., R. 19 W., sections 3, 4, 5 and the part of section 2 lying south of the Chandler-Bannister line were dependently resurveyed based on the Perrin survey and Bannister resurvey.

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The found (Perrin) corner of sections 31 and 32 was accepted. Rice and Shaw had accepted it in 1892. The McKee and Yates affidavits testified to how the point was restored and the bearing trees became marked and recorded. The topography adjacent to the corner fits the Perrin description. The preponderance of these factors and the relationship of the point to indisputably identified Perrin corners made acceptance of the corner mandatory.

Since no areas in T. 5 S., R. 2 E. were ever based on the Perrin corner of sections 31 and 32, it did not control anything in that township, therefore it was remonumented and marked as an angle point controlling the north boundary of T. 24 N., R. 19 W.

The closing corner of sections 3 and 4 was restored by two point control (Manual, Section 5-29) record distance in departure east of the angle point and record distance in latitude north of the recovered corner of sections 3, 4, 9 and 10.

The closing corner of sections 2 and 3 was also restored by two point control, record distance in latitude north of the recovered ¼ corner of sections 2 and 3.

The closing corner of sections 4 and 5 was restored at single proportionate distance.

The north ¼ corner of section 4, north ¼ corner of section 3, and the east and west 1/16 section corners on the north boundary of section 3 were established at midpoint positions between restored closing corners.

The terminal meander corner on the north boundary of section 5 was restored at record bearing and distance from the angle point. The point fell on the face of a bluff and could not be monumented.

The Bannister closing corner of sections 1 and 2 was recovered 10 links north of the Chandler south boundary of T. 5 S., R. 2 E. The true point of intersection was monumented.

The ¼ corner of sections 3 and 10 and ¼ corner of sections 3 and 4 were restored at single proportionate distances.

The meander corner of sections 4 and 9 was restored at record bearing and distance west of the recovered ¼ corner of sections 4 and 9.

The line between sections 4 and 5 was resurveyed on record bearing due south from the restored closing corner of sections 4 and 5, and terminated at the actual shoreline of the ocean. Record distance fell out in the ocean.

The north 1/16 corners between sections 2 and 3, and sections 3 and 4 were established at record distances in latitude.

Section 3 was subdivided by surveying the centerlines, and centerlines of the northeast and northwest quarters.

During the resurveys and surveys in T. 24 N., R. 19 W., all intersections of lines conflicting with T. 5 S., R. 2 E. were determined.

All of the vacant lots 2 and 3, section 4 had been patented to McKee, Yates and others in T. 5 S., R. 2 E.

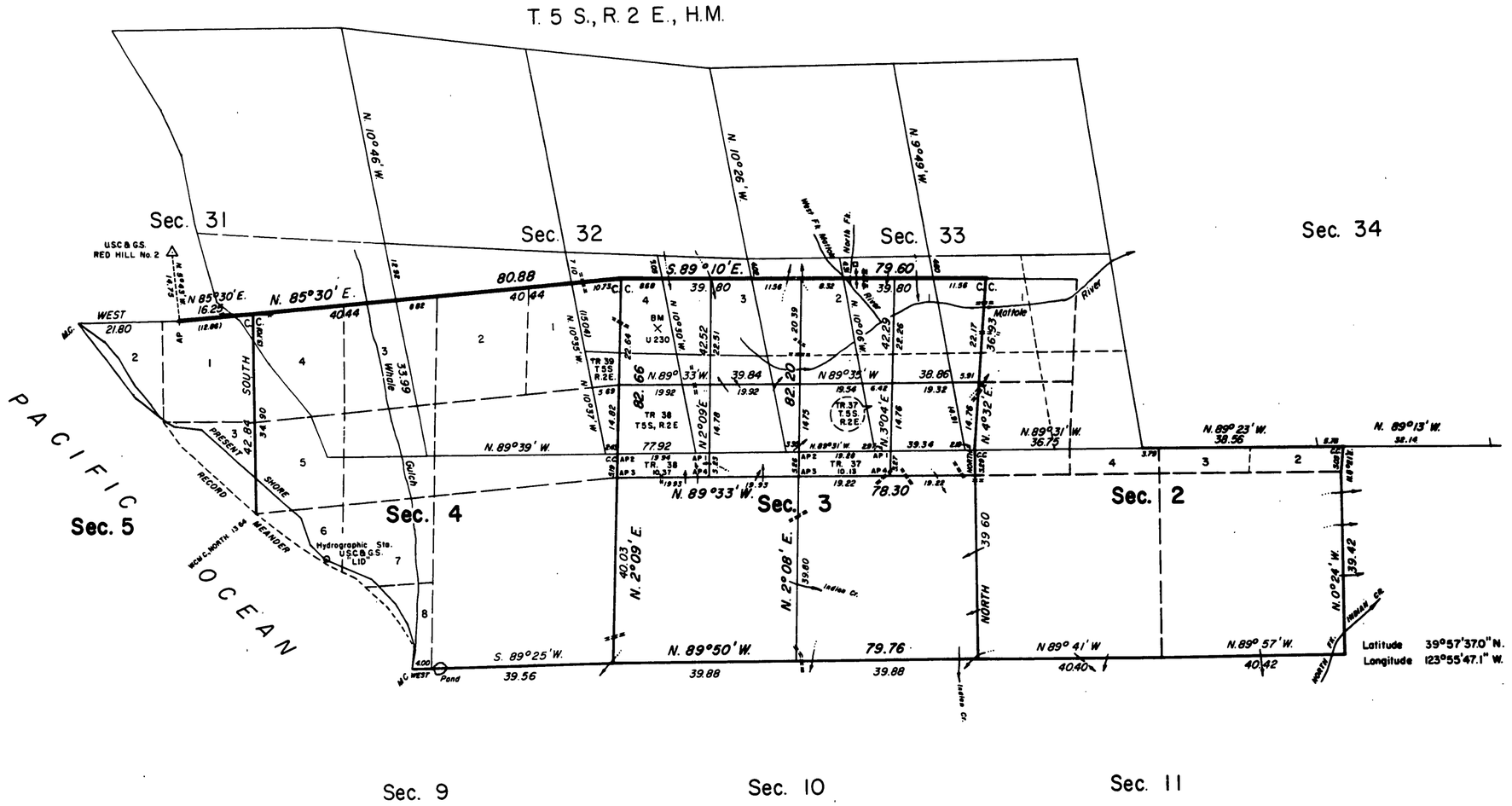

Figure 11 - Portion of Accepted Plat, T. 24 N., R. 19 W., M.D.M., California.

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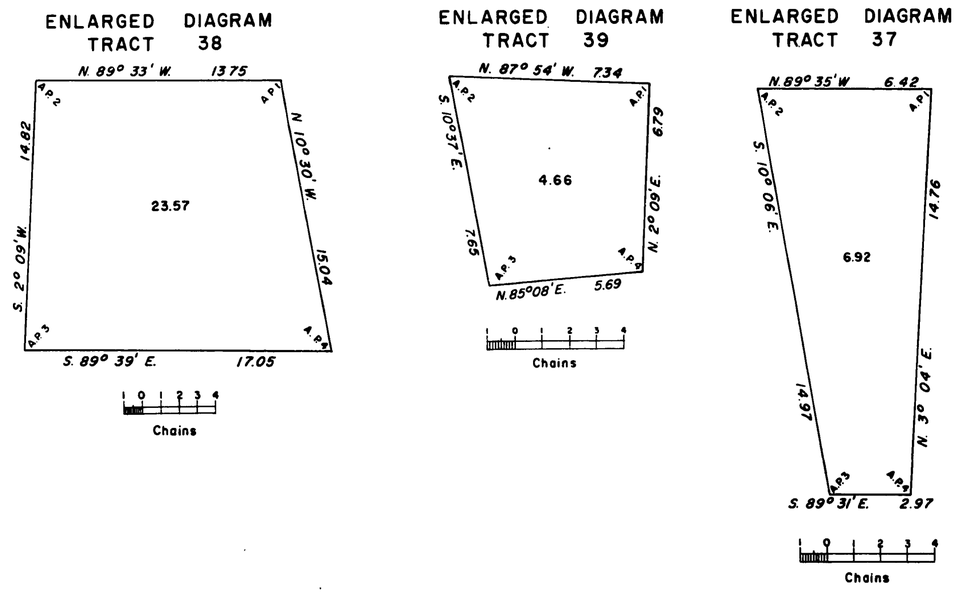


The history of prior surveys is given in the field note record.

This plat represents a dependent resurvey of portions of the south and west boundaries, a portion of the subdivisional lines and the record meanders of the shore of the Pacific Ocean through sections 30 and 31, designed to restore the corners in their true original locations according to the best available evidence, and the survey of the subdivision of sections 30, 32, 33, the survey of Tract 37 in section 33 and Tracts 38 and 39 in section 32, and remonumentation of two corners of section 9, T. 5 S., R. 2 E., Humboldt Meridian, California.

Figure 11a Portion of Accepted Plat,
T. 24 N., R. 19 W., M.D.M., California.

Part of vacant lot 1, section 4, overlapped part of the vacant SW¼SE¼, section 32. This parcel was surveyed and designated Tract 39, T. 5 S., R. 2 E.

Part of the vacant SW¼ NW¼, section 3, overlapped part of the vacant SW¼ SE¼, section 32. This parcel was surveyed and designated Tract 38, T. 5 S., R. 2 E.

The part of the vacant SW¼ NW¼, section 3, lying south of the Chandler line was surveyed and designated Tract 38, T. 24 N., R. 19 W.

The remainder of the vacant SW¼ NW¼ section 3, had been patented in the E½ SE¼, section 32.

Part of the vacant SE¼ SW¼, section 33, overlapped the vacant SW¼ NE¼, section 3. This parcel was surveyed and designated Tract 37, T. 5 S., R. 2 E.

The remainder of the SE¼ SW¼, section 33, had been patented with lots 1 and 2, and the SE¼ NE¼, section 3.

The part of the vacant SW¼ NE¼, section 3, lying south of the Chandler line was surveyed and designated Tract 37, T. 24 N., R. 19 W.

The remainder of the vacant SW¼NE¼, section 3, had been patented in the W½SW¼, section 33.

Direct ties were made to all triangulation stations within the area of the resurvey.

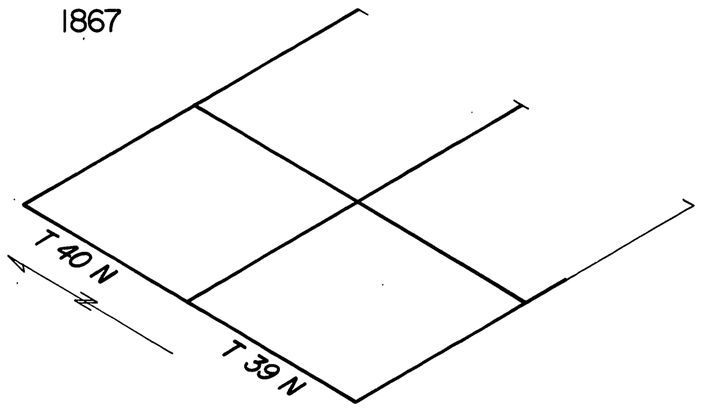
The plats were drafted showing the area of overlap and conflict. The plats were accepted on April 13, 1972 and are shown in figures 10 and 11.

Supplemental Topic

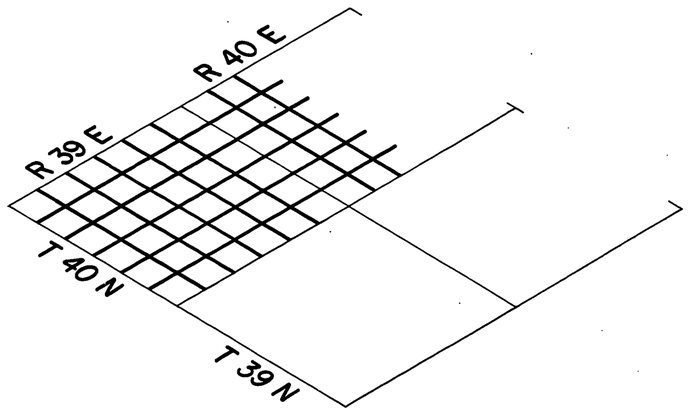
As indicated on the accepted plat of T. 5 S., R. 2 E., figure 10, a substantial area of unsurveyed land exists, lying between the adjusted Foreman meander line and the actual shore of the ocean. Even though it consists of steep slopes and bluffs, all but inaccessible, it is nevertheless public land and subject to survey.

MAXSON OVERLAP IN NEVADA

1867



1868



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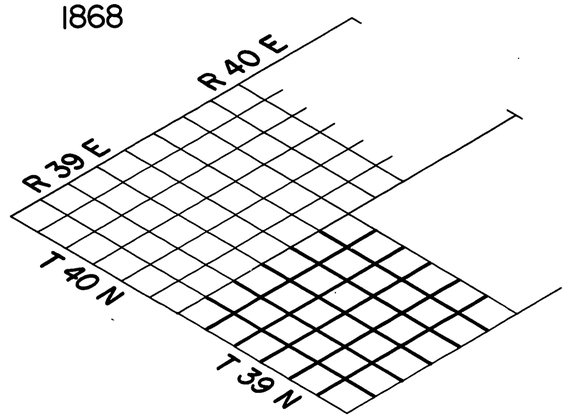
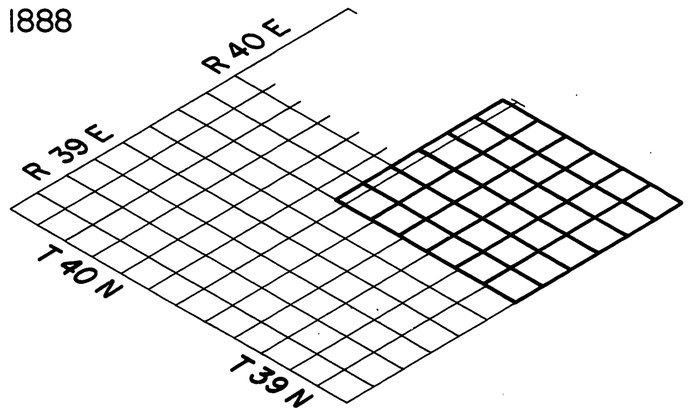


1888



History of Surveys

1867 William Epler surveyed the west and north boundaries and west 1½ miles of the south boundary of T. 39 N., R. 40 E. Under the same contract Epler also surveyed the exterior boundaries of Tps. 39 and 40 N., R. 39 E., and the Eighth Standard Parallel North through Range 40 East.

1868 O.A. Palmer surveyed the subdivisional lines of T. 40 N., R. 39 E., and the west 2½ ranges of subdivisional lines in T. 40 N., R. 40 E. In the same year A.J. Hatch surveyed the subdivisional lines of T. 39 N., R. 39 E. These surveys were all based on Epler's township boundaries. The Palmer plat of T. 40 N., R. 40 E., is illustrated by figure 1.

1888 H.B. Maxson reportedly could not find Epler's corners along the north boundary and north 2 miles of the west boundary of T. 39 N., R. 40 E. Maxson surveyed the south and east boundaries of the township (without mention of Epler's corners along the west 1½ miles of the south boundary) and established his own corner for the northeast corner of the township. Maxson then reportedly began at the Epler corner of sections 7, 12, 13 and 18 on the west boundary, (which he reported as being at a fence corner) and independently resurveyed the north 2 miles of the west boundary and all of the north boundary. He then surveyed the subdivisional lines of the township. The Maxson plat of T. 39 N., R. 40 E., is illustrated by figure 2.

Maxson also surveyed the boundaries and subdivisional lines of T. 39 N., R. 41 E., in 1888.

1962 T. 40 N., R. 39 E., was partially dependently resurveyed under Group 402, Nevada. The Epler corner of Tps. 39 and 40 N., Rs. 39 and 40 E., was recovered and remonumented.

Reasons for Request of this Survey

These surveys and resurveys were requested by the Winnemucca District Manager for administrative needs in connection with a range improvement project. The resurveys were also needed for control of Nevada protraction diagrams.

Special Instructions

Special Instructions for Group 421, Nevada, were issued on February 20, 1964. They provided for the dependent resurvey and survey of several townships, including the dependent resurvey of the north boundaries of T. 39 N., Rs. 40 and 41 E., and the survey of T. 40 N., R. 41 E. Field work began on May 11, 1964.

Conditions Found on the Ground

During the course of the retracements of the north boundary of T. 39 N., Rs. 40 and 41 E., two sets of corners were recovered for the north boundary of T. 39 N., R. 40 E. Maxson's northeast corner of the township was found about 8½ chains west and 12 chains north of the Epler corner. A total of 6 Maxson corners were eventually recovered and a total of 5 Epler corners, including Epler's NE and NW corners of the township and Maxson's NE corner of the township. The Maxson line was about 11 to 12 chains north of the Epler line, creating an overlap of surveys.

The east 3½ ranges of sections in T. 40 N., R. 40 E., were unsurveyed public domain. All of sections 32 and 33 were public domain but the south half of section 31 was patented, based on the Epler boundary and Palmer subdivisional lines of 1868. In T. 39 N., R. 40 E., both sections 5 and 6 were patented based on the Maxson plat. Sections 2 and 4 and the north half of sections 1 and 3 were vacant public domain.

Figure 3 illustrates the history of surveys, land status and corner recovery.

Preliminary Statement of the Problem

The surveyor must first verify that an overlap actually exists, and then recommend a procedure of survey to resolve the conflicts (overlap) between the Epler and Maxson surveys.

Regulations

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

5-35	Junior-Senior lines (final paragraph)
6-2 and 6-4	Resurveys
6-12 to 6-18	Bona fide rights of claimants
6-19 to 6-24	Reports of field investigations

Legal Constraints

Although this resurvey was executed earlier, it must be based upon the legal principles outlined in United States v. Macmillan, 331 F., Supp 435 (1971), a Nevada case which involved conflicting surveys executed by H.B. Maxson in 1893.

In that case the court stated that "We find the law to be that when two officially accepted surveys result in an overlap, the survey that is senior in time controls." The court also approvingly cited 50 CJ 914, "CONFLICTING SURVEYS. Of two overlapping surveys, the one first made has priority, particularly where the second is bounded with express reference to the first. An accepted survey covering lands in a particular township, has been regarded as controlling as against a subsequent conflicting survey which purports to cover land in another township."

See also 43 USCA 772, and cases cited.

MAXSON OVERLAP IN NEVADA

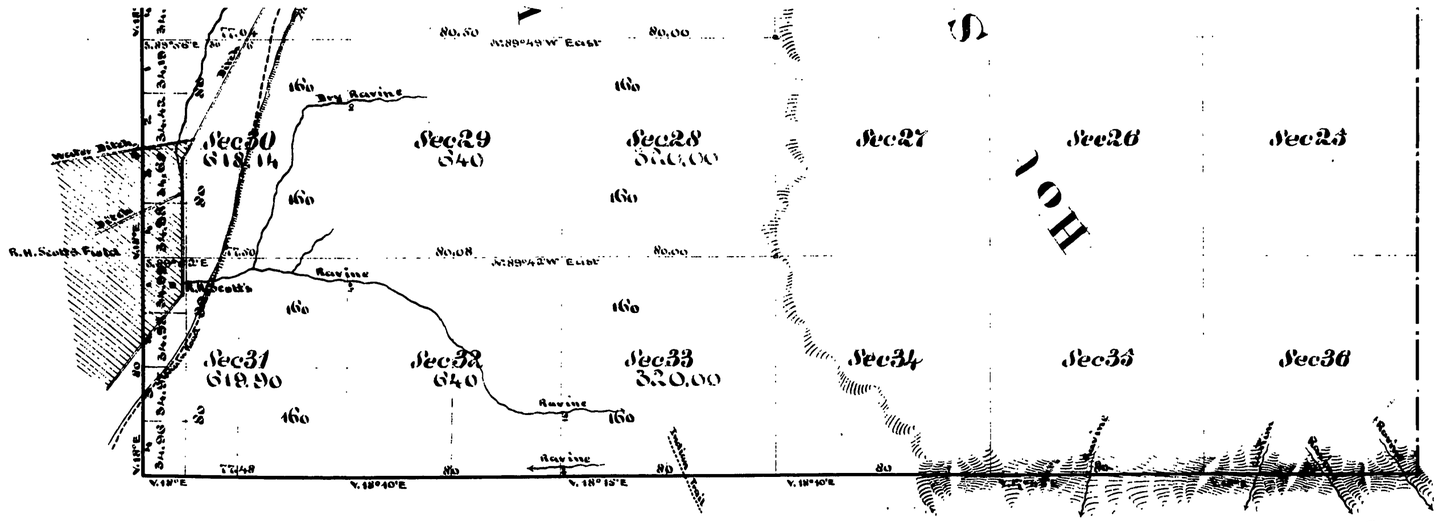


Figure 1 - Portion of Epler's and Palmer's Plat, 1868

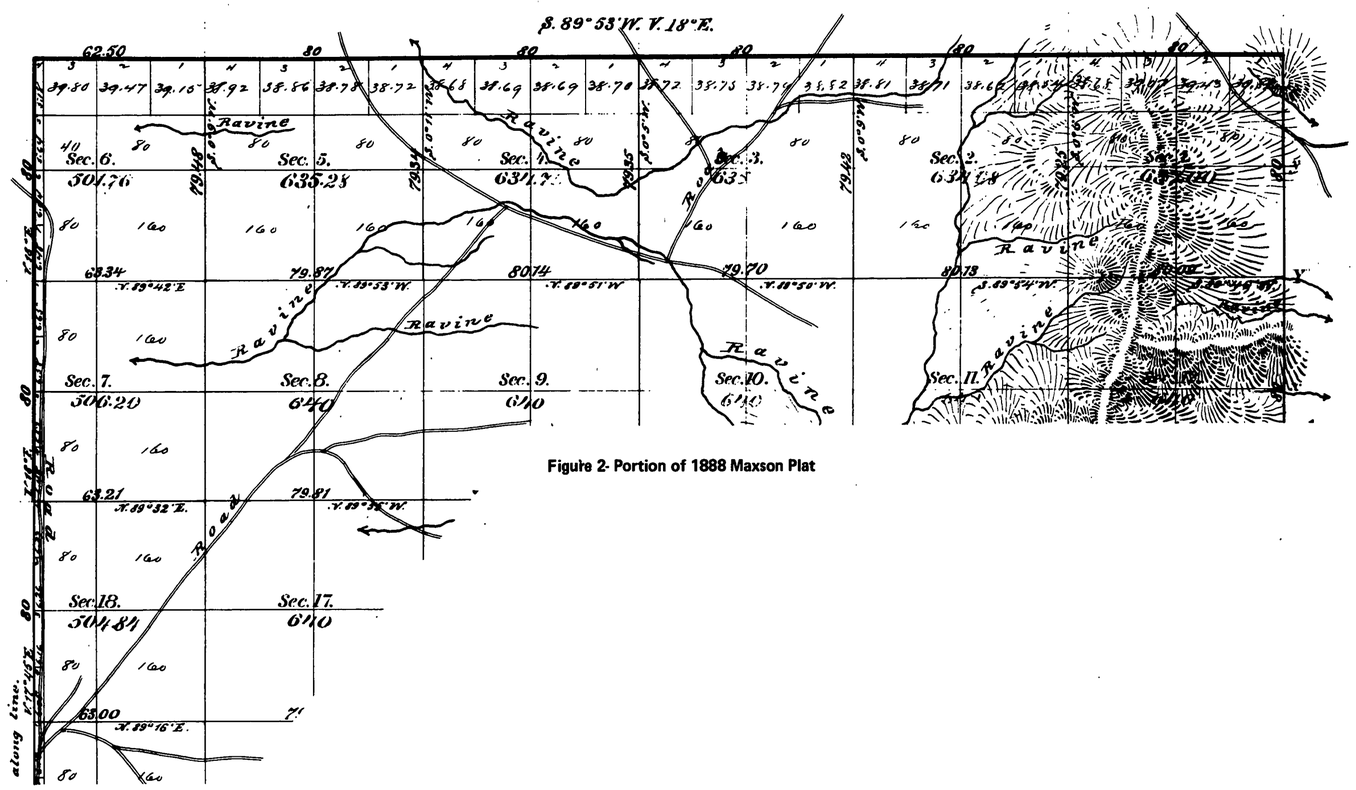


Figure 2- Portion of 1888 Maxson Plat

Changes in Instructions

On May 27, 1965, Supplemental Special Instructions were issued under Group 421. They provided for the original survey of the easterly portion of T. 40 N., R. 40 E. Further Supplemental Special Instructions, dated July 12, 1966, provided for the dependent resurvey of section 32 in that township.

Special Instructions for Group 432, Nevada, were issued on November 5, 1965, providing for the dependent resurvey of the east five tiers of sections in T. 39 N., R. 40 E.

Final Statement of the Problem

The surveyor must positively identify the senior line by its remaining monuments and locate points for missing corners on both the junior and senior lines. The line which should be monumented is chosen according to the survey which created the lands which were patented first in time. The surveyor usually makes a decision on the procedure and makes a recommendation to his supervisor for final decision.

MAXSON OVERLAP IN NEVADA

Solution

A full report of the situation, with diagrams, was made to the Washington Office with the recommendation that the Maxson (Junior) line be held as controlling the east 5 miles of the township line. The Maxson line would be closed against the east boundary of patented section 31.

The Washington Office directed that the Epler (Senior) line be resurveyed as the controlling line, the patented lands protected and overlap eliminated according to the plan illustrated by figure 4.

Epler's line between Tps. 39 and 40 N., R. 40 E., was therefore dependently resurveyed and all lost corners temporarily restored by single proportionate measurement. The Maxson line was resurveyed from the recovered Maxson corner of Tps. 39 and 40 N., Rs. 40 and 41 E., to the recovered Maxson ¼ section corner of sections 6 and 31. All lost Maxson corners were also temporarily restored by single proportionate measurement.

The north and west boundaries of T. 39 N., R. 41 E., were resurveyed and all lost corners restored and remonumented at single proportionate positions. Since sections 6 and 31 were both patented, nothing could be done by any BLM surveying procedure to correct the conflict between those two sections. Section 5 was patented based on the Maxson survey which overlapped the public lands in section 32. This conflict could be eliminated by holding the Maxson corners of section 5. No patented lands were in conflict in sections 1 thru 4 and the west half of section 33.

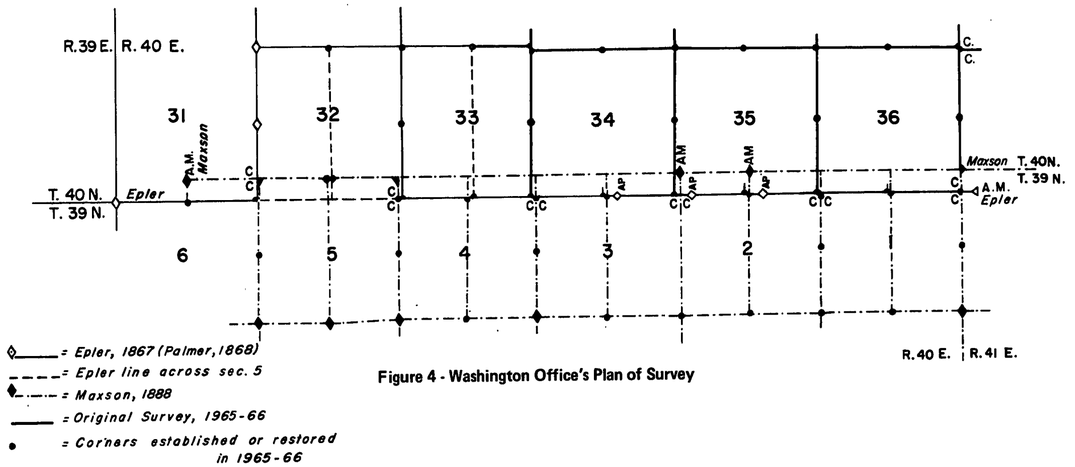


Figure 4 - Washington Office's Plan of Survey

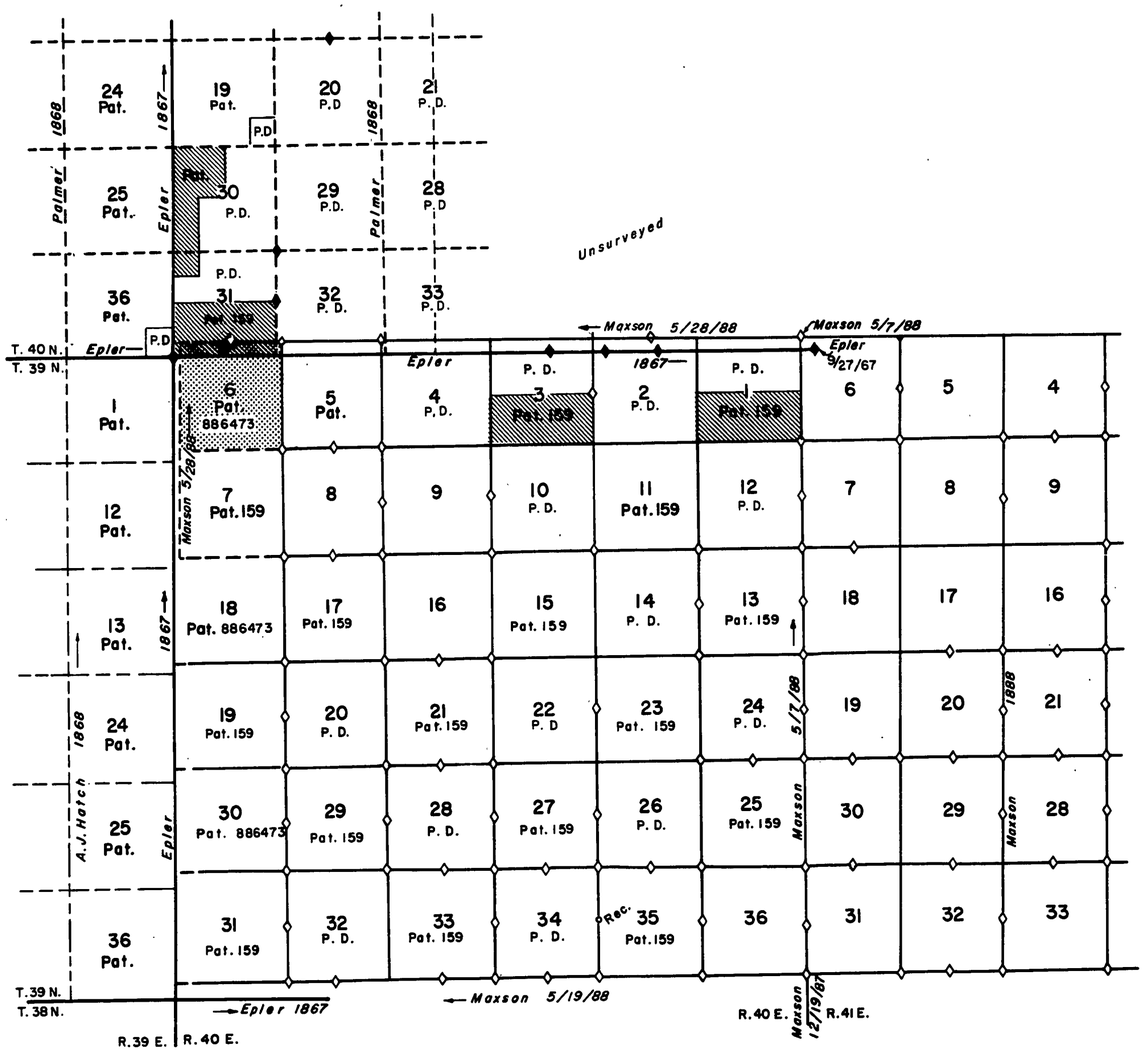


Figure 3 - Status and Corner Recovery

As instructed, the Epler (Senior) line controlled the alinement of the south boundary of T. 40 N., R. 40 E., and the position of sections 31, 32 and 33, but the Maxson survey controlled patented section 5.

The Maxson corner of Tps. 39 and 40 N., Rs. 40 and 41 E., was converted to the corner of Tps. 39 and 40 N., R. 41 E., only. The Epler line was terminated with a closing corner at the intersection of the west boundary of section 6, T. 39 N., R. 41 E. The Epler township corner became an amended monument. The closing corner became the corner of Tps. 39 and 40 N., R. 40 E., only.

The Epler ¼ section corner of sections 6 and 31 was reestablished, remonumented and marked for both sections. The Epler corner of sections 31 and 32 was reestablished, remonumented and marked for the SE corner of section 31 only. The Epler corners for sections 32 and 33 and ¼ section corner for section 33 were reestablished, remonumented and marked for those sections only. The recovered original Epler ¼ section corners of sections 3 and 34, 2 and 35; and corner of sections 2, 3, 34 and 35 were remonumented and marked as angle points controlling the alinement of the township boundary. Corners for the survey of sections 34, 35 and 36 and the corner of sections 33 and 34 were established at 40 and 80 chains in departure from the Maxson corner of Tps. 39 and 40 N., R. 41 E., and on the Epler line, providing for the basis for the meridional lines to complete the survey of T. 40 N., R. 40 E.

The recovered original Maxson corner of sections 4, 5, 32 and 33 was remonumented and marked for the NE corner of section 5, only. The restored original Maxson corner of sections 5, 6, 31 and 32 was remonumented and marked for the corner of sections 5 and 6, only. The proportionate position of the Maxson ¼ section corner of sections 5 and 32 was remonumented and marked for the ¼ section of section 5, only. The remaining recovered original Maxson corners were made amended monuments.

The boundaries of sections 1 thru 5 and sections 31 and 32 were resurveyed. Where the lines between sections 1 and 2, 2 and 3, and 3 and 4 intersected the Epler line, closing corners were established and monumented. Where the center-lines of sections 1 thru 4 intersected the Epler line, ¼ section corners of those sections were established and monumented. Thus the Maxson survey was terminated in sections 1 thru 4 at the Epler line.

At the intersection of the Epler line with the east boundary of section 5, a closing corner of sections 4 and 32 was established and monumented. At the intersection of the Maxson line with the east boundary of section 31, a closing corner of sections 6 and 32 was established and monumented.

At the intersection of the north-south centerline of section 32 with the Maxson line, a ¼ section corner for section 32 was established and monumented, marked for section 32, only.

The range line between Tps. 40 N., Rs. 40 and 41 E., was surveyed north from the Maxson corner of Tps. 39 and 40 N., R. 41 E., and the corner of sections 25 and 36, only, established 80 chains in latitude north of the closing corner on the Epler line which was established for the corner of Tps. 39 and 40 N., R. 40 E. The south boundary of section 36, T. 40 N., R. 40 E., was within limits for alinement. From the newly established corner of sections 35 and 36 the line between sections 35 and 36 was surveyed N. 0° 01′ W., 80 chains to establish the corner of sections 25, 26, 35 and 36. From this corner a sectional correction line was surveyed due west. The lines between sections 34 and 35, and 33 and 34 were run N. 0° 02′ W., to an intersection with the sectional correction line, where regular corners were established. The line between sections 28 and 33 was resurveyed and surveyed due east to a closing corner on the new third meridional section line. The lottings were placed against the south boundary of the township and east half of section 33. From the sectional correction line the survey of T. 40 N., R. 40 E., proceeded in the normal manner and on the established plan for completion of the fourth range of sections.

Since all four townships were dependent to at least some extent on each other the field notes and plats were submitted for approval as a package. They were all accepted on the same date, January 18, 1968. The accepted plats are shown in figures 5 and 6.

MAXSON OVERLAP IN NEVADA

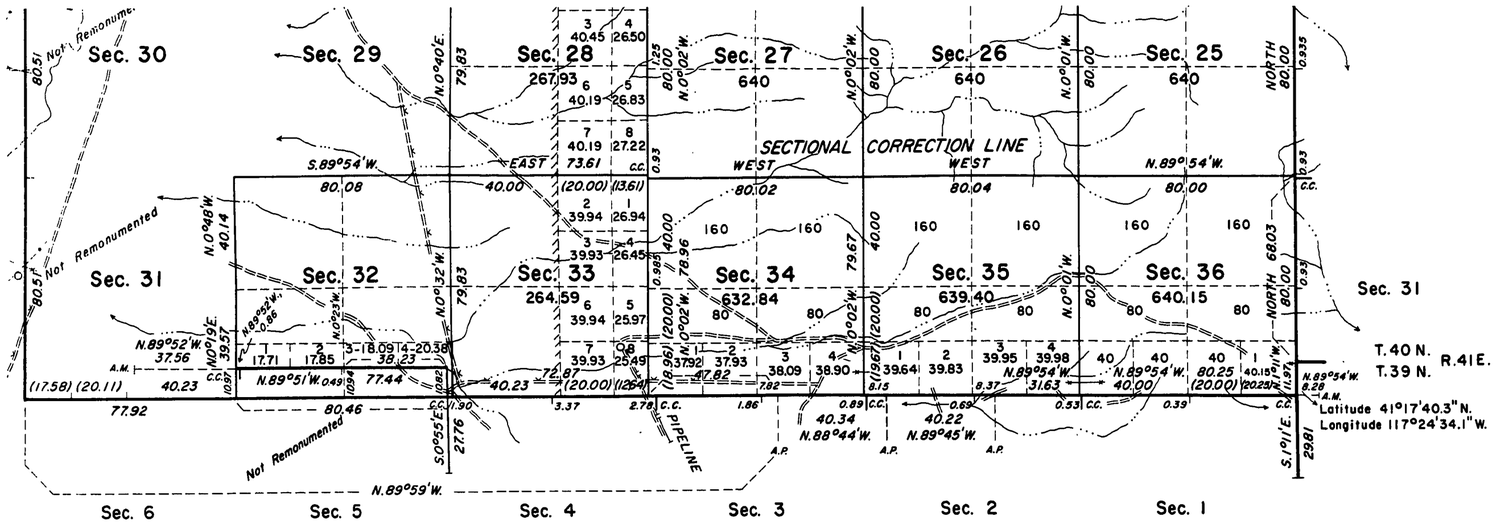


Figure 5 - Portion of Accepted Plat,
T. 40 N., R. 40 E.

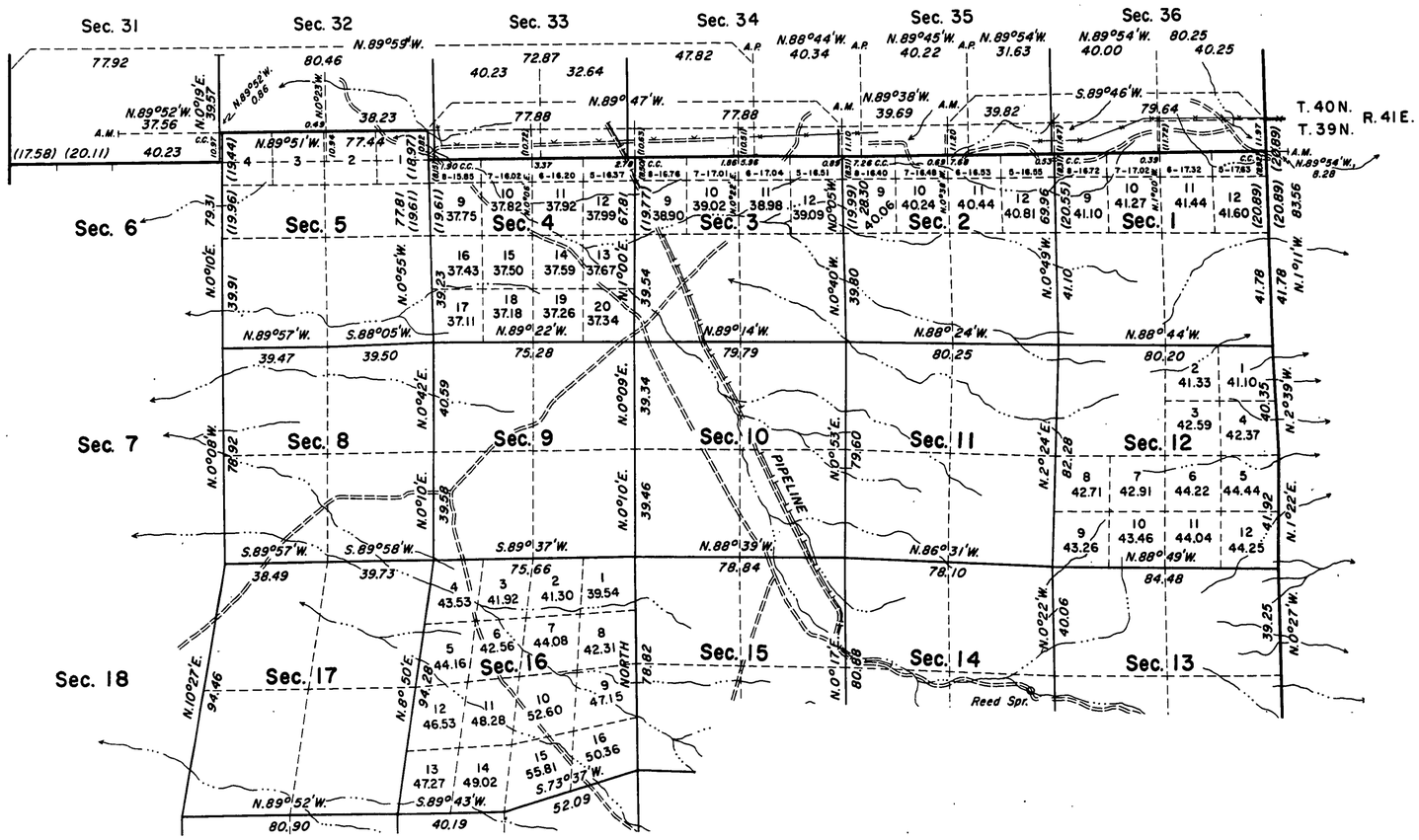
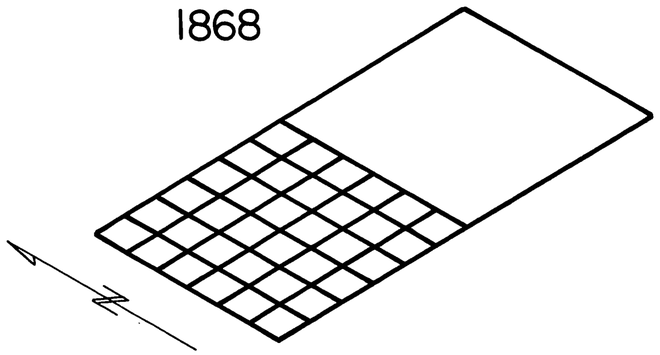


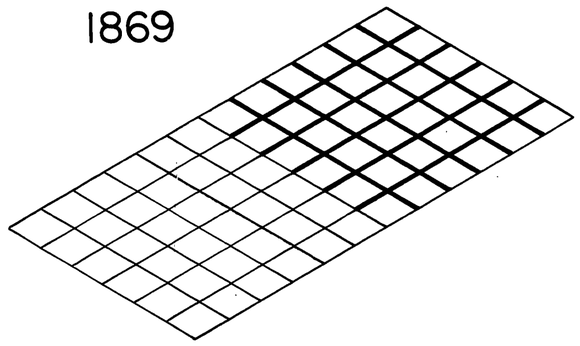
Figure 6 - Portion of Accepted Plat,
T. 39 N., R. 40 E.

HIATUS IN NEVADA

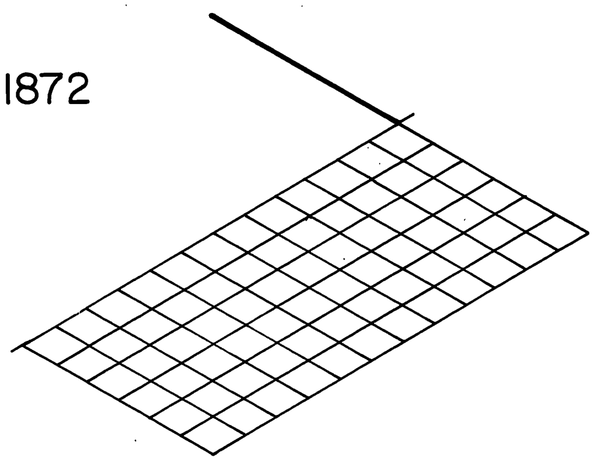
1868



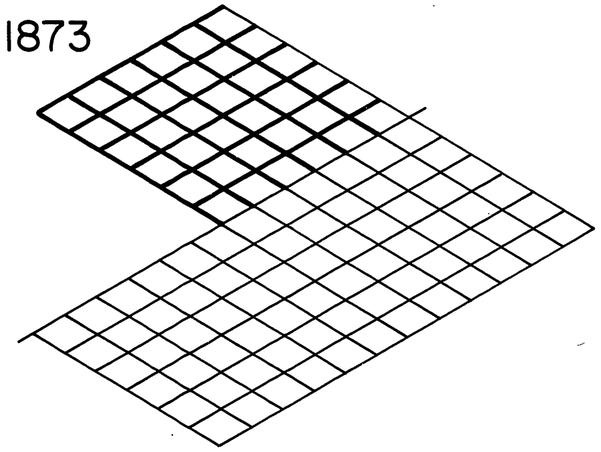
1869



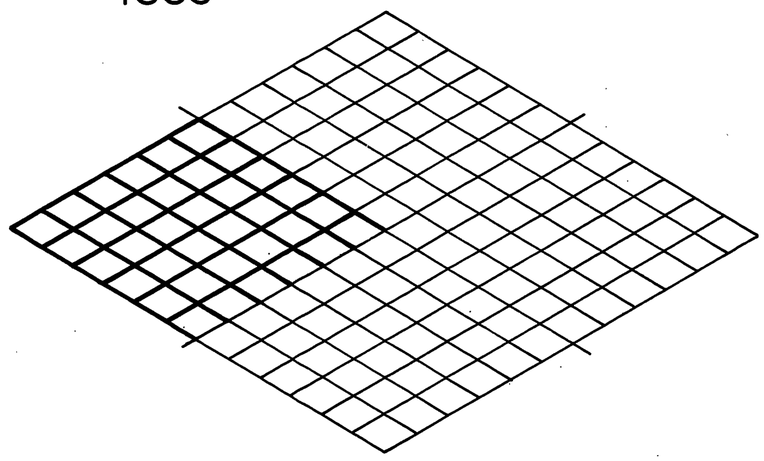
1872



1873



1888



History of Surveys

1868 A.J. Hatch surveyed all of the exterior boundaries of T. 37 N., Rs. 42 and 43 E., and surveyed the subdivisional lines of T. 37 N., R. 42 E., Mt. Diablo Meridian, Nevada.

1869 A.J. Hatch and J.H. Eston surveyed the subdivisional lines of T. 37 N., R. 43 E.

1872 A.J. Hatch and J.C. Smyles surveyed the east boundary of T. 38 N., R. 43 E. This line was reported as being surveyed north from the northeast corner of T. 37 N., R. 43 E., established by Hatch in 1868.

1873 W.W. Skinner, G.W. Garside and C.S. Preble surveyed the west and north boundaries of T. 38 N., R. 43 E. These surveys were reported as being initiated at the corners established by Hatch in 1868, (south boundary) with the east boundary being the line established by Hatch and Smyles in 1872.

1888 H.B. Maxson surveyed the west and north boundaries and subdivisional lines of T. 38 N., R. 42 E. Maxson reportedly retraced the Skinner, Garside and Preble west boundary of T. 38 N., R. 43 E., and that it was his east boundary of T. 38 N., R. 42 E.

Based on the record of these surveys, all corners are common and are corners of maximum control, a "normal" condition.

Reasons for Request of this Survey

The Winnemucca District Manager requested these resurveys to identify and mark the boundaries of intermingled ownership and for administrative needs.

Special Instructions

The Special Instructions for Group 411, Nevada, were approved on March 19, 1963. They provided for the dependent resurvey of government owned lands in T. 37 N., R. 41 E., Tps. 36, 37 and 38 N., R. 42 E., and Tps. 37 and 38 N., R. 43 E., M.D.M.

This discussion is limited to the four townships indicated in the history of surveys.

Field work began on October 7, 1963.

Conditions Found on the Ground

The ownership pattern is basically one in which the odd number sections are patented and the even numbered sections are public lands, with a few exceptions not relevant to this discussion.

The retracements of Tps. 37 N., Rs. 42 and 43 E., were made without particular difficulty, resulting in recovery of about 43% of the original corners established by Hatch in 1868-69, see figure 1.

The retracements were extended into T. 38 N., R. 42 E. The west boundary of this township is approximately along the top of the Osgood mountains and is very rough terrain. The corner of sections 1, 6, 7 and 12 and the northwest corner of the township were recovered on good alinement and reasonably precise measurement.

Initially, none of the corners on the east boundary of T. 38 N., R. 42 E., could be found but 46% of the corners on the north boundary and subdivisional lines were eventually recovered, including the northeast corner of that township.

After extensive search in T. 38 N., R. 43 E., the subdivisional lines were discovered about ¼ mile north (in latitude) of the corresponding lines in T. 38 N., R. 42 E. After retracing the subdivisional lines out to the exterior boundaries all four corners of T. 38 N., R. 43 E., were recovered as well as a second set of corners along the south boundary. The corners along the south boundary of T. 38 N., R. 43 E., were located nearly ¼ mile north of the corners along the north boundary of T. 37 N., R. 43 E.

Eventually 37% of the corners for T. 38 N., R. 43 E., were recovered, all about ¼ mile north of their theoretical position in relationship to T. 37 N., R. 43 E., and Maxsons' corners in T. 38 N., R. 42 E.

After thorough investigations, retracements and corner search, the following conclusions were drawn:

1. Hatch had properly and faithfully executed the surveys of the exterior boundaries and subdivisional lines of Tps. 37 N., Rs. 42 and 43 E., in 1868-69.

2. For some unexplainable reason J.C. Smyles, in 1872, established a new corner on the range line for the southeast corner of T. 38 N., R. 43 E., about 16 chains north and 2½ chains west of the northeast corner of T. 37 N., R. 43 E., (established by Hatch in 1868). Smyles surveyed the east boundary of T. 38 N., R. 43 E., North from his "new" corner.

HIATUS IN NEVADA

3. In 1873 Skinner found the Smyles township corner and range line but couldn't find the south boundary (the Hatch line) of T. 38 N., R. 43 E., so he ran a new south boundary, set a new southwest township corner and then surveyed his west and north boundaries and subdivisional lines. Why Skinner did not report surveying new a south boundary cannot be determined.

4. A Hiatus of about ¼ mile in latitude exists between the Hatch north boundary of T. 37 N., R. 43 E., and the Skinner south boundary of T. 38 N., R. 43 E. This hiatus is unsurveyed public domain.

5. Maxson initiated the west boundary of T. 38,N., R. 42 E., at the Hatch township corner, ran north for 6 miles, set the northwest corner of T. 38 N., R. 42 E., and then ran east for 6 miles along the north boundary. He couldn't find the Skinner township corner so he set one of his own.

6. Maxson's reported retracement of the Skinner west boundary of T. 38 N., R. 43 E., was wholly fictitious.

7. Maxson began his subdivisional lines of T. 38 N., R. 43 E., at the Hatch corners along the north boundary of T. 37 N., R. 42 E., and ran the first meridional line in much the same manner as a sectional guide meridian might be surveyed.

8. Maxson never ran the east half mile of the latitudinal lines in the first range of sections in T. 38 N., R. 42 E. He merely "stubbed" those lines east for ½ mile, set the ¼ section corners, and never closed over to the allegedly retraced east boundary.

9. If a straight line is produced from the Hatch northeast corner of T. 37 N., R. 42 E., to the Maxson established northeast corner of T. 38 N., R. 42 E., (to form an east boundary of T. 38 N., R. 42 E.) the line will create a very narrow overlap with the Skinner line in the south 2 miles and a very narrow hiatus in the north 4 miles. At the present time only one set of corners exist along the lines; those set by Skinner for T. 38 N., R. 43 E. All of Skinner's corners are approximately ¼ mile north of the Maxson corners ½ mile (or mile) to the west.

10. Except for the ¼ mile hiatus created by the displacement of T. 38 N., R. 43 E., and fictitious work by Maxson, all of the original surveys were well executed. No excessive distortion exists.

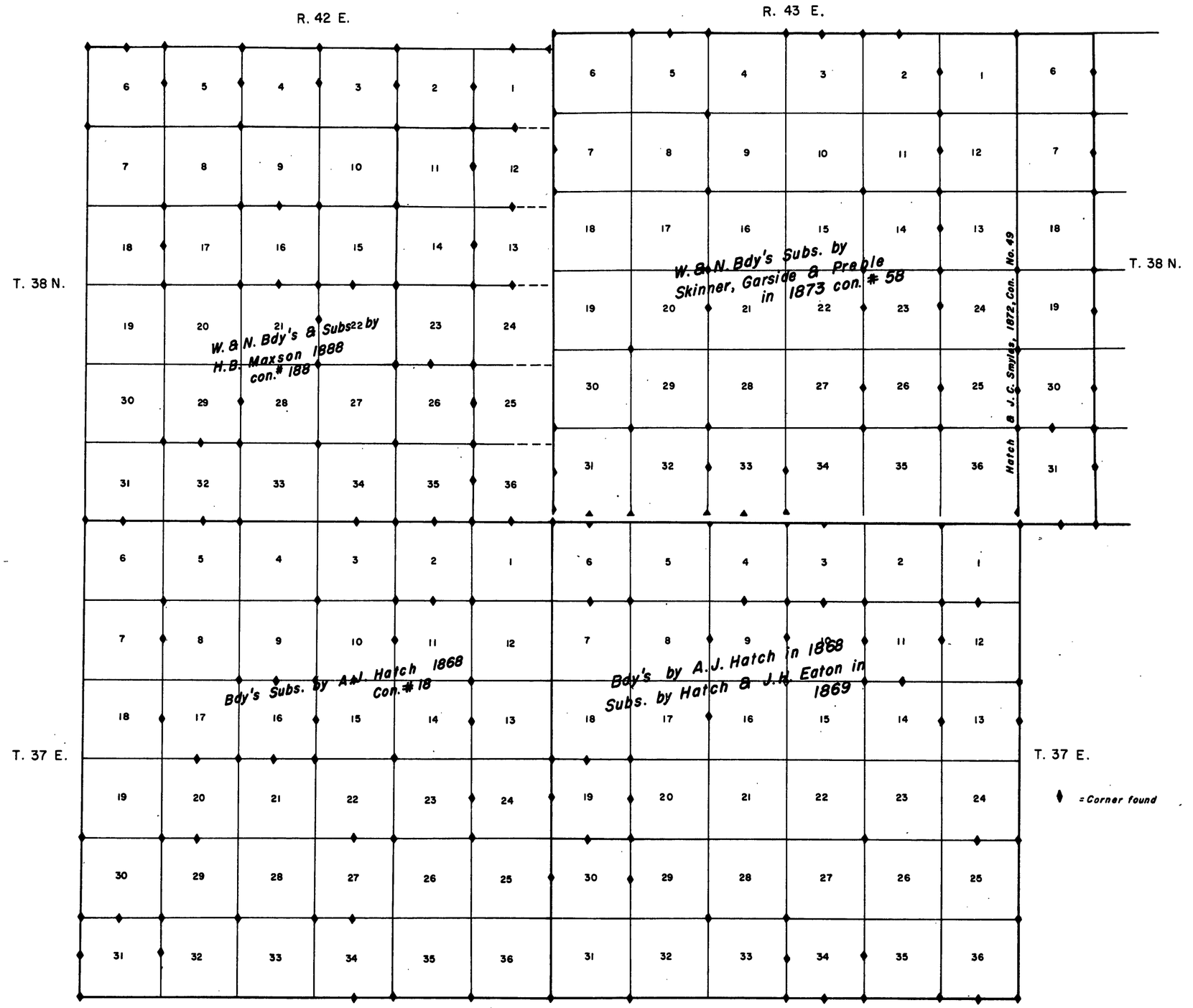


Figure 1 - History and Corner Recovery

HIATUS IN NEVADA

Preliminary Statement of the Problem

The surveyor must report the conditions found on the ground and recommend a surveying procedure to resolve the problems involved. How should the hiatus be surveyed and how should the first range of sections in T. 38 N., R. 42 E., be resurveyed?

Regulations

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

5-35	Junior-Senior lines (final paragraph)
6-2 and 6-4	Resurveys
6-12 to 6-18	Bona fide rights of claimants
6-19 to 6-24	Reports of field investigations

Legal Constraints

Although this resurvey and survey was executed earlier, it must be based upon the legal principles outlined in Unites States v. Macmillan, 331 F. Supp. 435 (1971), a Nevada case which involved a hiatus created in 1893.

See also United States v. Weyerhaeuser Company, 392 F. 2d 448 (1967, Ore.) which is cited in the U.S. v. Macmillan case.

Changes in Instructions

Supplemental Special Instructions for Group 411 were approved on November 3, 1963. They provided for the survey of the hiatus, designated T. 37½ N., R. 43 E.

The existing conditions along the west boundary of T. 38 N., R. 43 E., were reported to the Washington Office along with a recommended procedure, which was approved.

Final Statement of Problem

The surveyor is to survey and monument T. 37½ N., R. 43 E., the hiatus, as well as resurvey the west boundary of T. 38 N., R. 43 E., and establish corners for the east boundary of T. 38 N., R. 42 E., in compliance with the approved instructions.

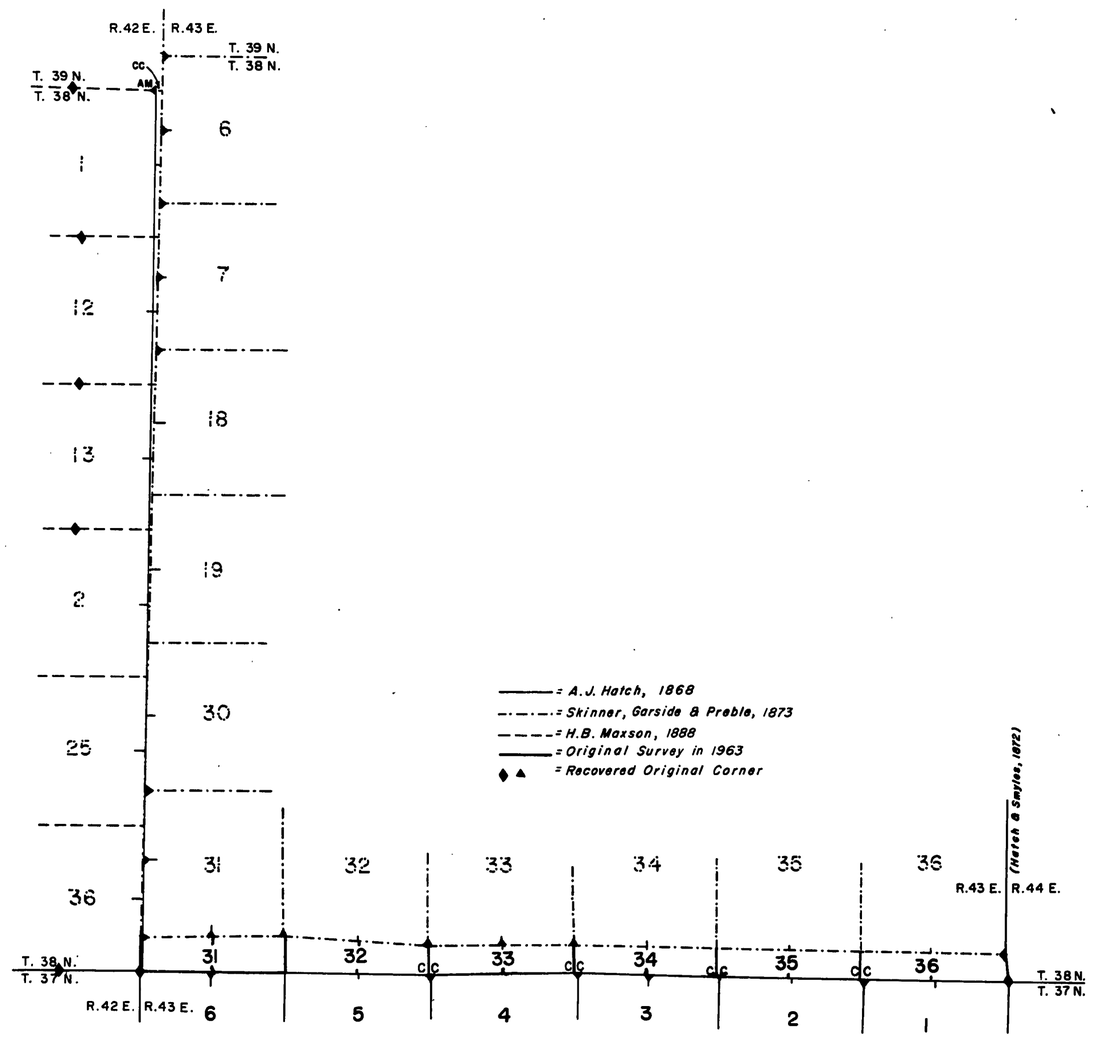


Figure 2 - Survey Procedure

Solution

As shown in figure 2, Survey Procedure, the hiatus between Tps. 37 and 38 N., R. 43 E., was surveyed as T. 37½ N., R. 43 E., with Skinner's south boundary of T. 38 N., R. 43 E., as the controlling boundary of the subdivisional lines of the fractional township. The southeast corner of T. 38 N., R. 43 E., is the corner set by Hatch and Smyles in 1872. The southwest corner of T. 38 N., R. 43 E., is the corner evidently established by Skinner in 1873, as are the other corners recovered along the south boundary of that township. Lost corners along this boundary were replaced by single proportionate measurements based on the Skinner plat.

The south boundaries of sections 34, 35 and 36 were within limits for both alinement and measurement. The corners of these three sections were marked for both sides, i.e., corners of maximum control. The south boundary of sections 31, 32 and 33 were out of limits for both alinement and measurement. New corners of minimum control were established at 40 and 80 chains in departure westerly from the corner of sections 33 and 34 on the Skinner line, standing for the corners of sections 31, 32 and 33, T. 37½ N., R. 43 E.

The north boundary of T. 37 N., R. 43 E., is the line surveyed by Hatch in 1868. The lost corners along this line were restored by single proportionate measurements, based on the Hatch and Eaton plat.

From the corner of sections 35 and 36, on the Skinner line, the line between sections 35 and 36 of T. 37½ N., was run due South to a closing corner on the Hatch line. From the Skinner corners of sections 33 and 34, 34 and 35, the lines between these sections were run south, parallel to the line between sections 35 and 36, to closing corners on the Hatch line. From the newly established corner of sections 32 and 33, a parallel line was surveyed south to a closing corner on the Hatch line. From the newly established corner of sections 31 and 32 on the Skinner line, the line between sections 31 and 32 was surveyed S. 0° 09' W., to the Hatch corner of sections 5 and 6, because the 0° 09' is well within the 21' limit for rectangularity.

The ¼ section corners on what is now the south boundary of T. 37½ N., for sections 32 thru 35 were placed at midpoint in departure between closing corners. The ¼ section corner for section 36 was placed 40 chains east, in departure from the closing corner of sections 35 and 36. The ¼ section corner of section 31 was placed 40 chains west, in departure from the corner of 5, 6, 31 and 32.

All six of the fractional sections of T. 37½ N., were lotted in the normal manner, placing the excess or deficiency in lot 1 of section 36 and lot 4 of section 31.

This completed the survey of the Hiatus, T. 37½ N., R. 43 E. Notice of the survey of this township was duly published in the Federal Register as an original survey.

The apparent conflict between T. 38 N., Rs. 42 and 43 E., was resolved by holding the Skinner west boundary of T. 38 N., R. 43 E., as the Senior line and the alleged retracement by

HIATUS IN NEVADA

Maxson as a Junior survey. The north boundary of section 1, T. 38 N., R. 42 E., was extended through the Maxson township corner to an intersection with the Skinner line on the west boundary of section 6, and a closing township corner established. Thus the Maxson corner was treated as an "offline" closing corner. Corners of minimum control, referring to T. 38 N., R. 42 E., were then established at proportionate distance in latitude, between the Hatch northeast corner of T. 37 N., R. 42 E., and the new closing township corner, and on the Skinner west boundary of T. 38 N., R. 42 E. The proportions were based on the Maxson plat. The lost corners along the Skinner west boundary of T. 38 N., R. 43 E., were restored by single proportionate measurement based on the Skinner plat. All of the original and restored corners along the Skinner line were marked to refer to T. 38 N., R. 43 E., only.

The subdivisional lines of the first range of sections in T. 38 N., R. 42 E., were resurveyed to the newly established corners along the east boundary of the township. In this way any question of a conflict or hiatus was eliminated and the areas shown on the Maxson plat were "protected" and prevented on unwarranted gross distortion of the east range of sections.

The accepted plats of survey and resurvey of Tps. 37½ and 38 N., R. 43 E., and T. 38 N., R. 42 E., are shown in Figures 3a, 3b and 3c.

TOWNSHIP 37 1/2 NORTH, RANGE 43 EAST, OF THE MOUNT DIABLO MERIDIAN, NEVADA

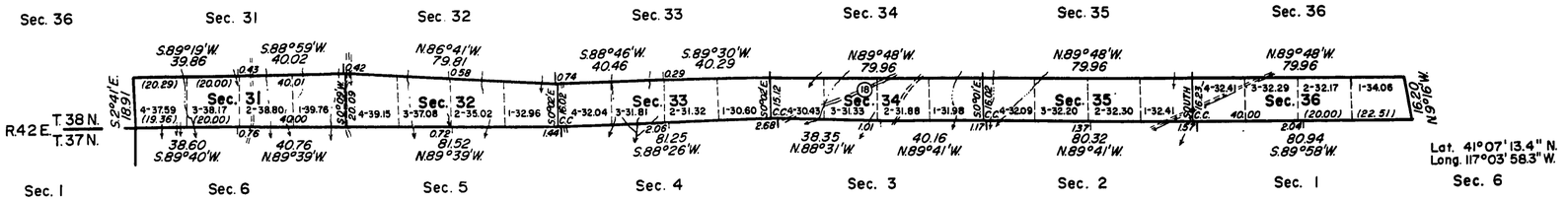
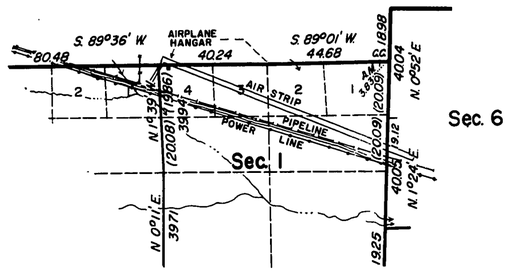


Figure 3a - Portion of Accepted Plat



TOWNSHIP 38 NORTH, RANGE 42 EAST, OF THE MOUNT DIABLO MERIDIAN, NEVADA

DEPENDENT RESURVEY

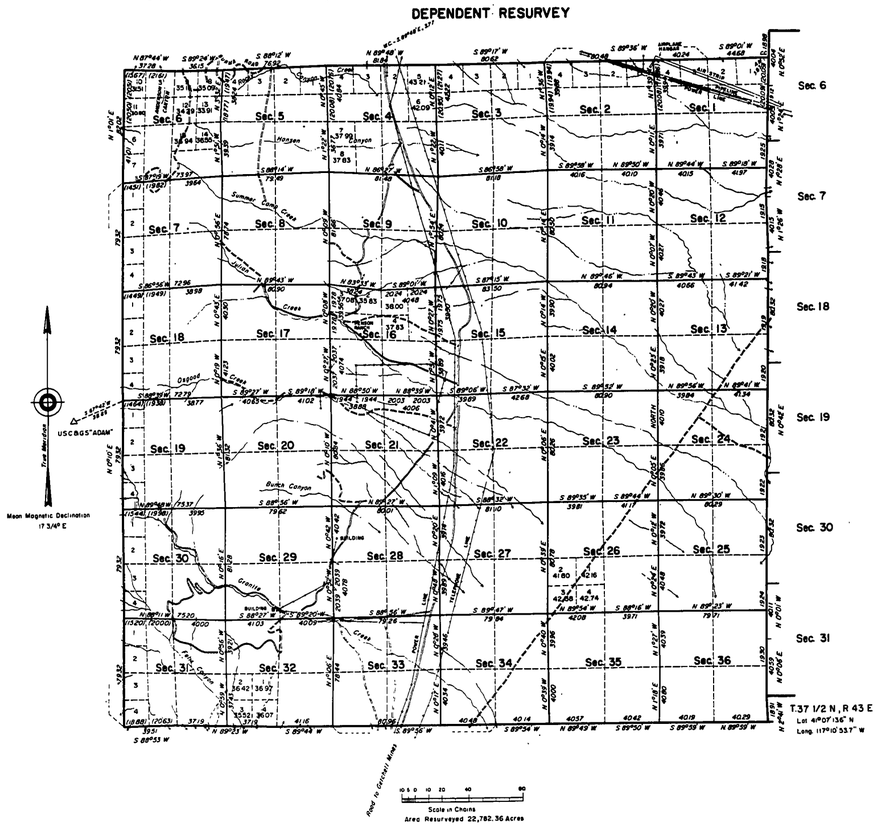


Figure 3b - Portion of Accepted Plat With Detail Above

TOWNSHIP 38 NORTH, RANGE 43 EAST, OF THE MOUNT DIABLO MERIDIAN, NEVADA

DEPENDENT RESURVEY

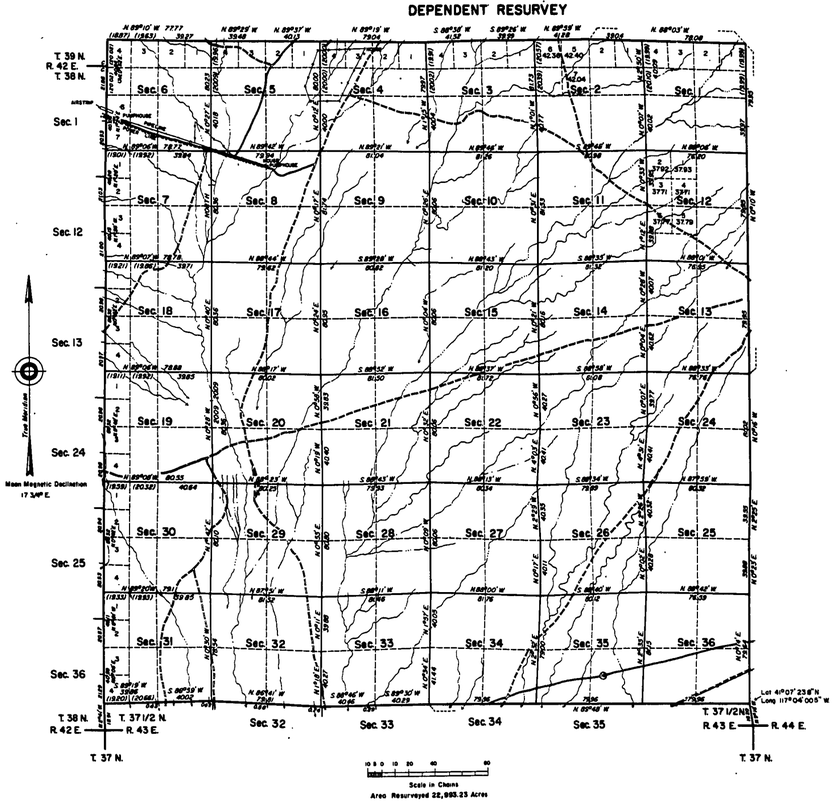
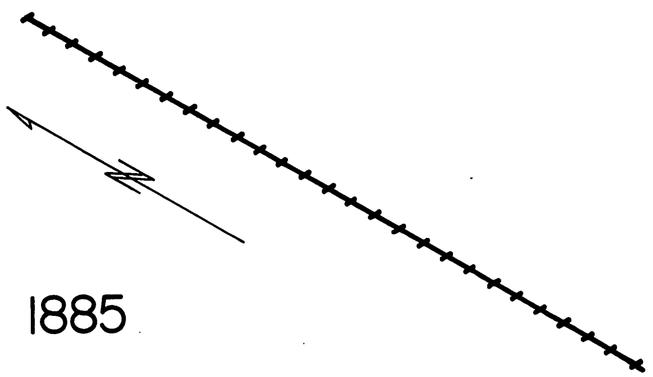
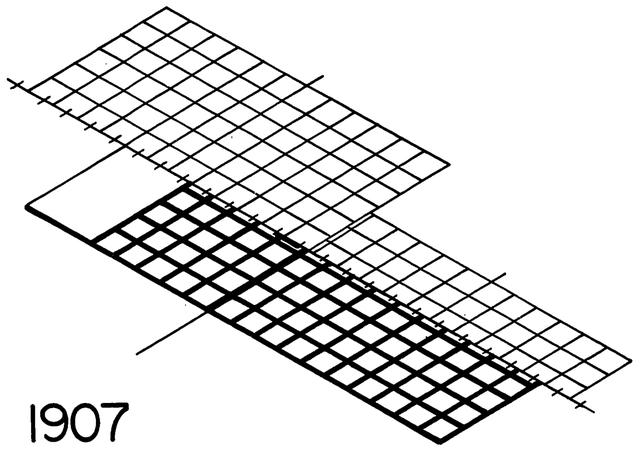


Figure 3c - Portion of Accepted Plat

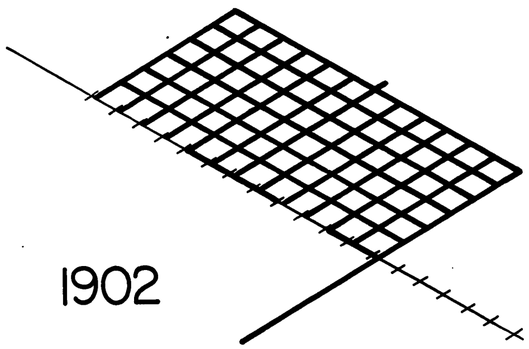
STATE BOUNDARY LINE RETRACEMENT



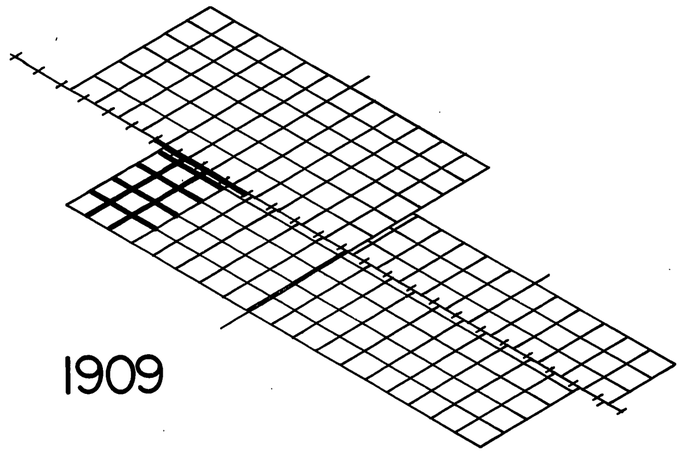
1885



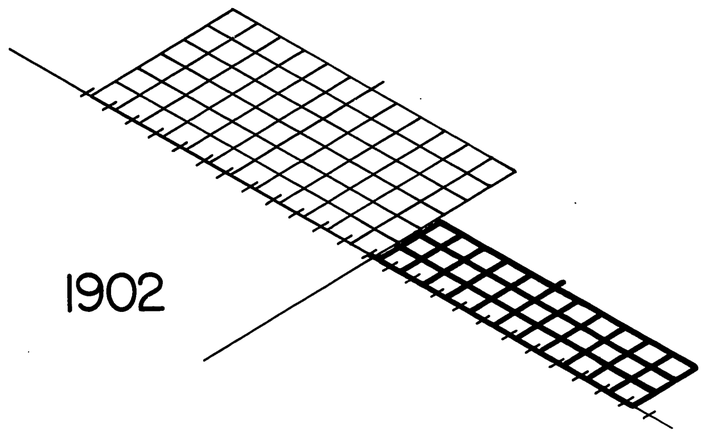
1907



1902



1909



1902

History of Surveys

1885 Daniel G. Major surveyed the Montana-North Dakota State boundary. Major ran the line North, along the 27th meridian west of Washington, D.C., and set a mile post every 80 chains.

1902 George K. Dike surveyed the Eighth Standard Parallel, exterior boundaries and subdivisional lines of Tps. 133 and 134 N., R. 106 W., 5th P.M., North Dakota. Dike retraced the state boundary between the 89-91 and 93-97 mile posts.

1902 Hiram A. Soule surveyed the exterior boundaries and subdivisional lines of Tps. 131 and 132 N., R. 107 W., 5th P.M., North Dakota. Soule retraced the stats boundary between the 78-89 mile posts.

1907 R.F. Scott and H.E. Fearnall surveyed the exterior boundaries and subdivisional lines of Tps. 5 and 6 N., R. 61 E., and the south half of T. 7 N., R. 61 E., Principal Meridian, Montana, as shown on the plats approved February 2, 1909, figures 1, 2 and 3. Scott and Fearnall retraced the state boundary between the 89-90 mile posts. The remainder of the boundary retracements were taken from the North Dakota record executed by Dike and Soule.

1909 Lewellyn D. Lyman completed T. 7 N., R. 61 E., as shown on the plat approved April 9, 1910, figure 4. Lyman retraced the state boundary between the 93-97 mile posts.

Reasons for Request of this Survey

T. 6 N., R. 61 E., contains intermingled public and patented lands. Many of the original corners are lost or obliterated. The state boundary is uncertain. The Miles City District Manager requested a resurvey to identify the public lands in the township.

Special Instructions

Special Instructions were approved on June 13, 1966, for Group 542, Montana. They provided for the dependent resurvey of T. 6 N., Rs. 60 and 61 E. All section corners, ¼ section and 1/16 section corners necessary to define the boundaries of public lands were to be reestablished or established. This discussion is limited to the mile posts and corners along the state boundary.

Assignment Instructions

Assignment instructions were issued on July 25, 1966. Field work began on August 23, 1966.

Conditions Found on the Ground

Most of the mile posts and closing corners along the state boundary were lost. After retracements and search the 83 and 96 mile posts were recovered. Only five original closing corners were recovered. One of these was the closing corner of the Eighth Standard Parallel, 5th P.M., North Dakota. Figure 5 shows the latest record courses and distances between mile posts, record distances from mile posts to closing corners, the recovered corners (on each side of the state line) and the relative coordinates of mile posts 83 and 96 as determined by the present retracements.

STATE BOUNDARY LINE RETRACEMENT

Township Nº 7 North Range Nº 61 East of the Principal Meridian Montana.

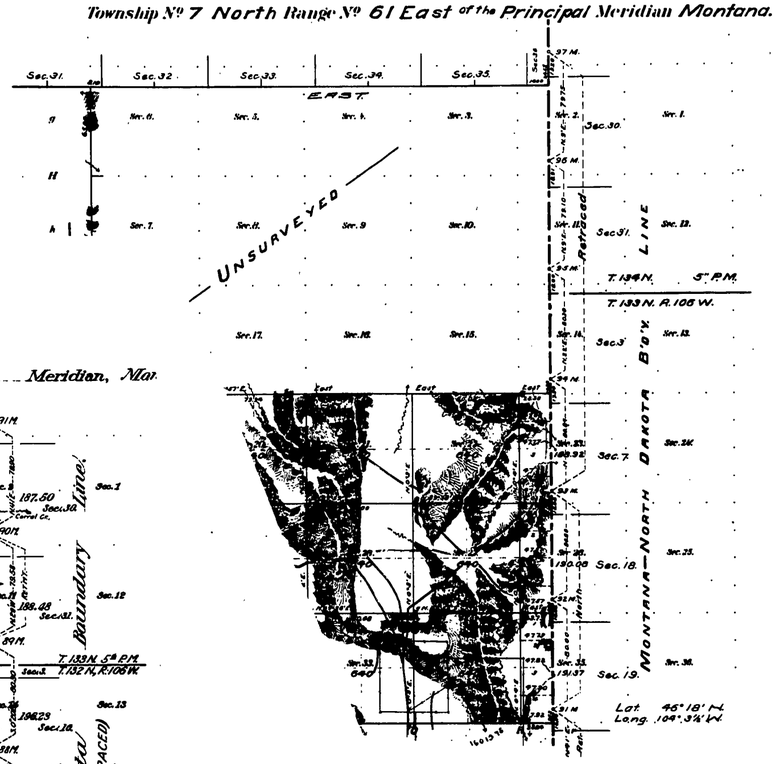


Figure 3 - Portion of Original Plat

Township Nº 6 North Range Nº 61 East of the Principal Meridian, Mon.

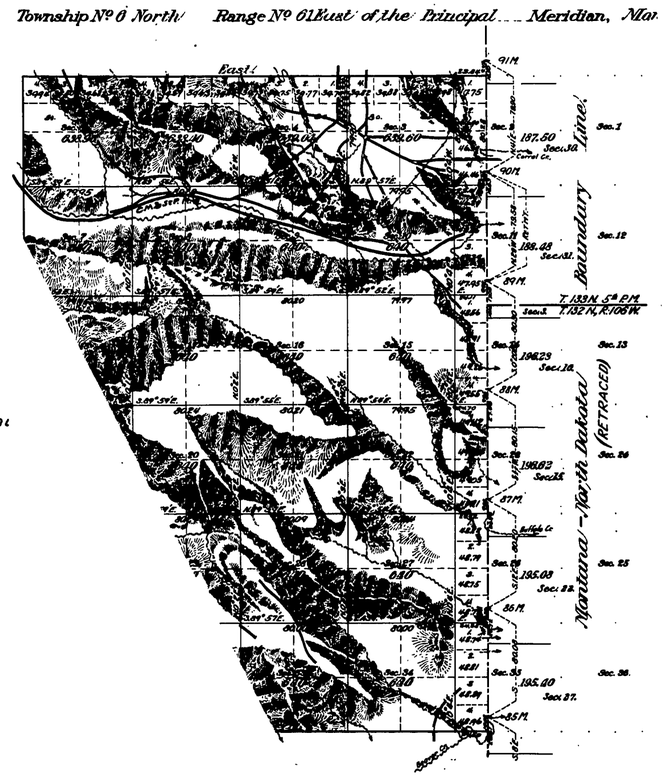


Figure 2 - Portion of Original Plat

Township Nº 5 North Range Nº 61 East of the Principal Meridian Montana

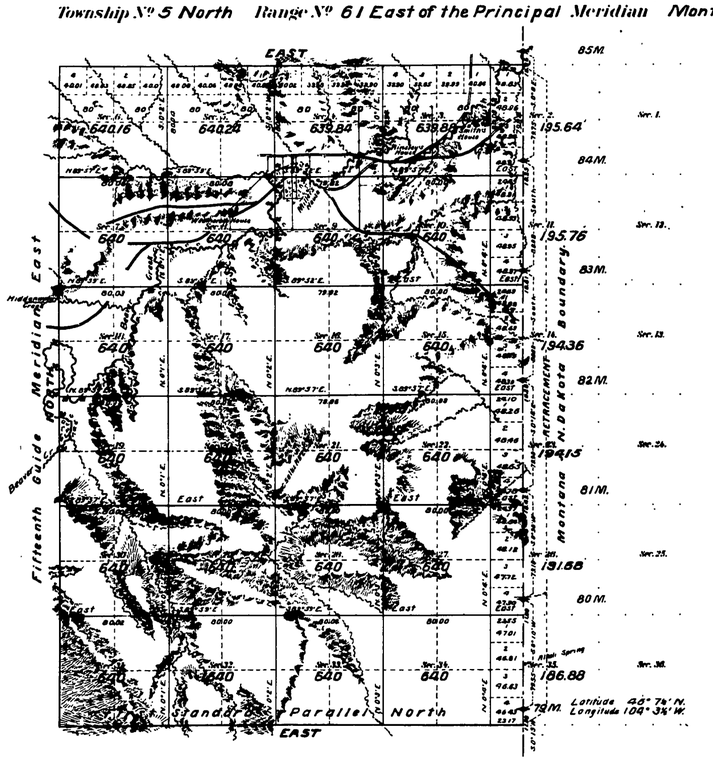
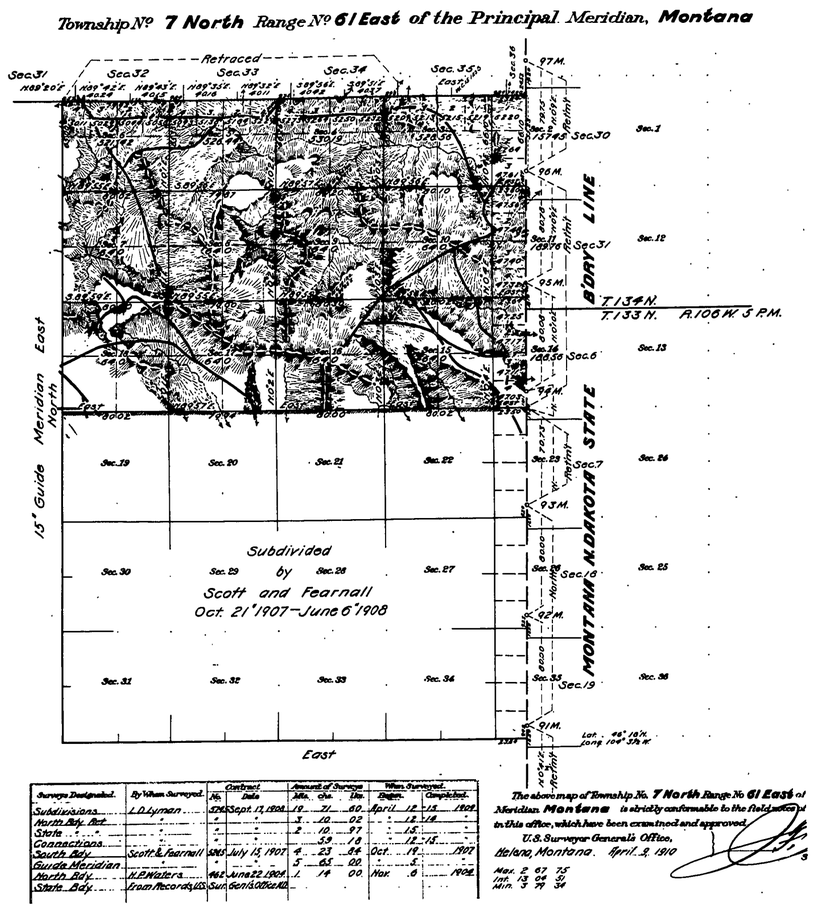


Figure 1 - Portion of Original Plat

STATE BOUNDARY LINE RETRACEMENT



Surveys Designated	By Whom Surveyed	Contract No.	Contract Date	Amount of Drainage Mls.	Amount of Drainage Chs.	Amount of Drainage Lks.	When Surveyed: Begun	When Surveyed: Completed
Subdivisions	J.D. Lyman	1245	Sept. 17, 1908	19	71	60	April 12 '15	1907
North Bdy. Ret.	"	"	"	3	10	02	" 12 '16	"
State "	"	"	"	2	10	97	" 15	"
Connections	"	"	"		29	19	" 12 '15	"
South Bdy.	Scott & Fearnall	1265	July 15, 1907	4	23	84	Oct. 19	1907
Guide Meridian	"	"	"	5	65	00	" 5	"
North Bdy.	H.P. Waters	1412	June 22 1904	1	14	00	Nov. 6	1904
State Bdy.	From Records U.S. Surv. Gen'l's Office							

Max. 12 67 75
Int. 13 04 51
Min. 3 79 34

Figure 4 - 1909 Completion Survey

Legal Constraints

The present (1966) preferred view of the Washington Office is that the Bureau of Land Management has no statutory authority to resurvey a state boundary. The surveyor may remonument a recovered boundary monument and he is allowed to set the rectangular survey corners on the boundary but is not allowed to restore and remonument a lost state boundary monument or mile post. (The Manual of Surveying Instructions, 1973, prohibits the establishment of quarter section corners on state boundaries, see section 3-70).

Preliminary Statement of the Problem

The surveyor must restore the points for the missing mile posts to determine the alinement of the state boundary and determine the proportionate position of the lost closing corners. He must determine the true point of intersection of the closing lines at the found closing corners (if necessary) and place the new ¼ section corners in the proper positions on the state boundary, based on the plat of T. 6 N., R. 61 E., shown in figure 2.

Regulations

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

3-68 to 3-73, 5-41	Closing corners
3-87	Quarter corners between closing corners
4-25, 4-46, 5-19	Corners on state boundaries and state boundary monuments
5-36	Irregular boundary adjustment

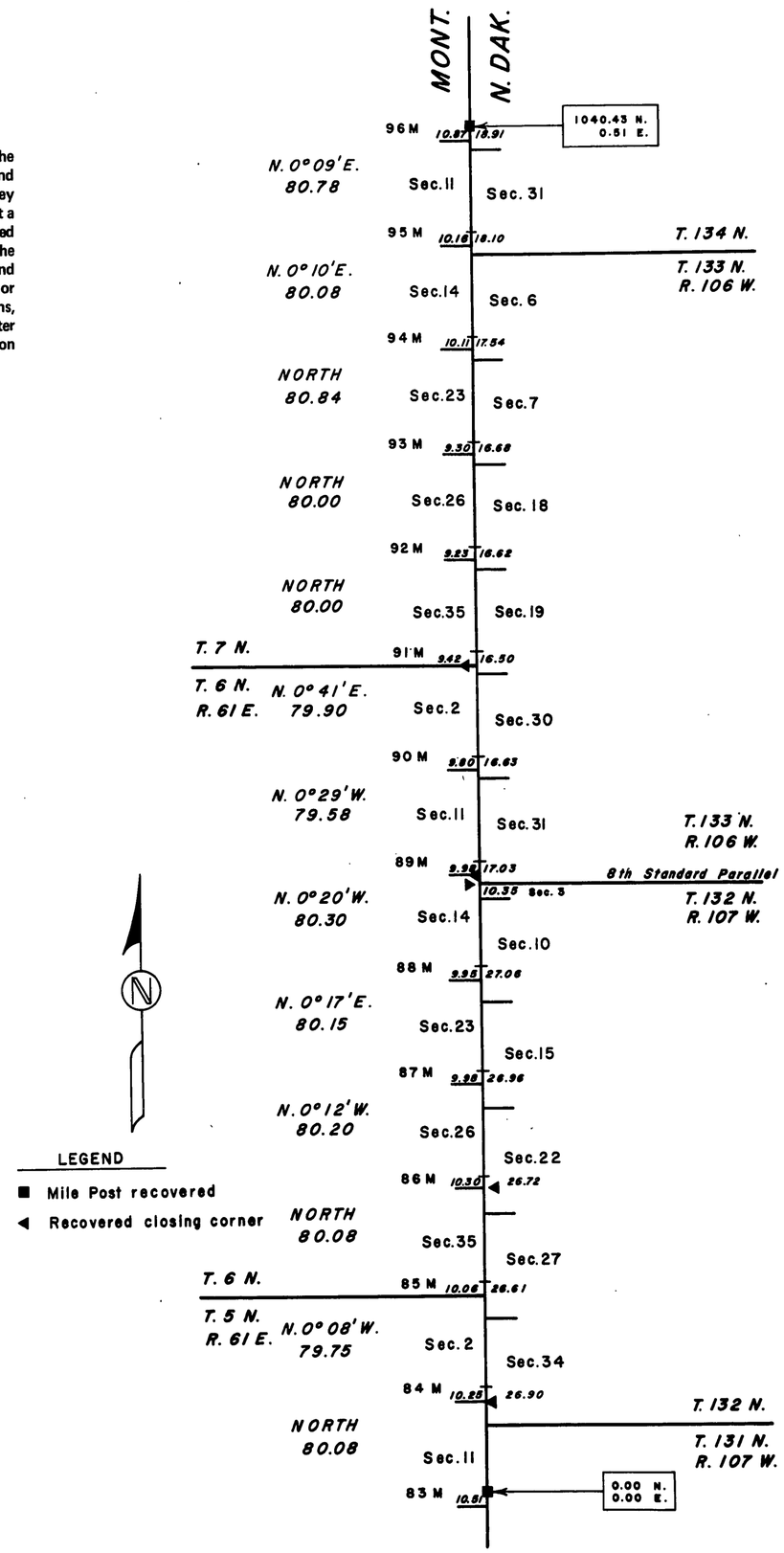
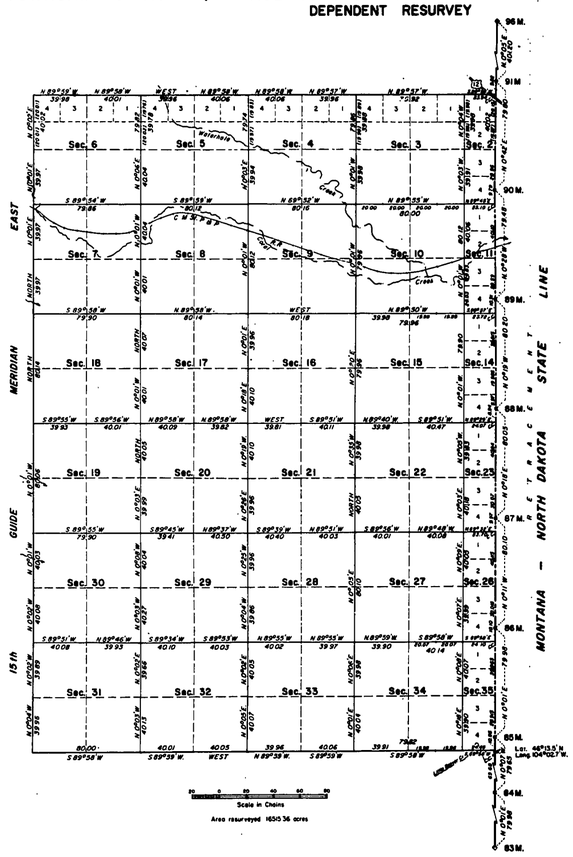


Figure 5 - Record Courses and Recovery Diagram

STATE BOUNDARY LINE RETRACEMENT

TOWNSHIP 6 NORTH, RANGE 61 EAST OF THE PRINCIPAL MERIDIAN, MONTANA.
DEPENDENT RESURVEY



History of the previous surveys is contained in the field notes.

The dependent resurvey of the Fifteenth Guide Meridian East (west boundary), was executed concurrently under T. 6 N., R. 60 E.

This plat represents the retracements of the MONTANA - NORTH DAKOTA State Line from the 83rd to the 96th mile post; the dependent resurvey of the south and north boundaries and subdivisional lines, designed to restore the corners in their true original locations according to the best available evidence.

Lottings and areas are as shown on the plat approved February 2, 1909.

The resurvey was executed by Cadastral Surveyor, August 23, 1966, to September 19, 1966, under Special Instructions dated June 13, 1966, for Group No. 542, Montana.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. September 5, 1969

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

Clark F. Stumm

Chief, Division of Cadastral Survey

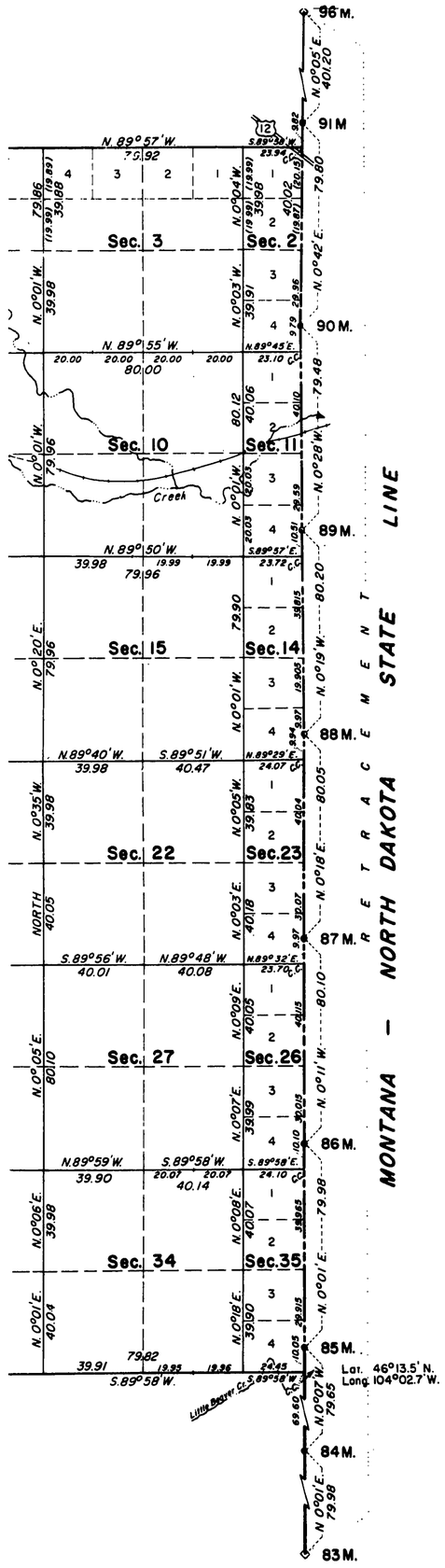


Figure 6 - Accepted Plat with Details on Right

Final Statement of the Problem

The surveyor must restore the alinement of the state boundary and set points for the missing mile posts, and then place the rectangular survey corners in the correct positions on the state boundary.

Solution

The plat accepted September 5, 1969, figure 6, illustrates the final solution.

The points for the missing mile posts were restored by the irregular boundary method of proportioning. Only the 83 and 96 mile posts were remonumented. After temporary points were established for the missing mile posts the lost closing corners were restored by single proportionment measurement between mile posts. The ¼ section corners were established at midpoint between closing corners, except the East ¼ corner of section 2, which was placed proportionately 40 chains north of the closing corner of sections 2 and 11, based on the record plat, figure 2.

The line between Tps. 6 and 7 N., R. 61 E., was extended through the off-line original closing corner to the true point of intersection.

The closing corner of sections 11 and 14 was found to be on the restored state boundary.

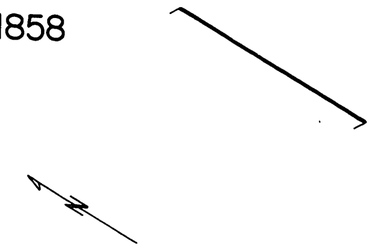
The line between sections 26 and 35 was run toward the off-line closing corner but terminated at the restored state boundary.

The off-line closing corner of sections 2 and 11, T. 5 N., R. 61 E., and the off-line closing standard corner of T. 133 N., R. 106 W., were called in the field notes, at falling points. They were not remonumented.

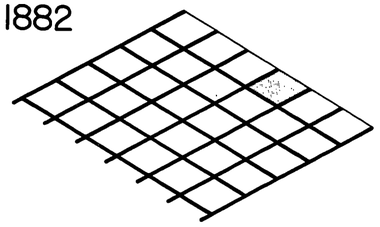
The only 1/16 section corner required was at the S 1/16 section corner of section 14. This corner was established on the state boundary at midpoint between the East ¼ corner of section 14 and the closing corner of sections 14 and 23.

FOREST EXCHANGE TRACT SURVEY, NEW MEXICO

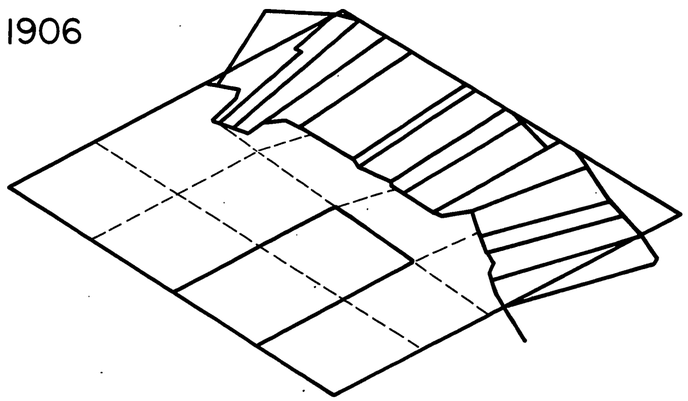
1858



1882



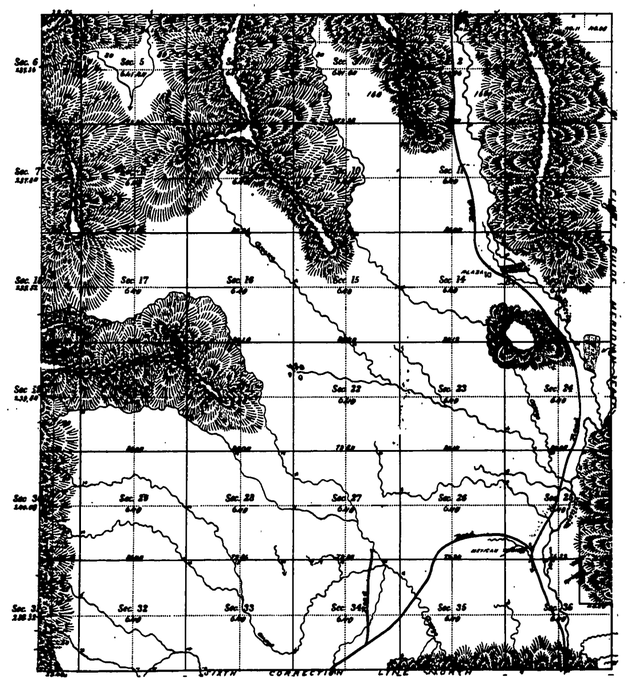
1906



History of Surveys

1858	A.P. Wilbur surveyed the First Guide Meridian East, the east boundary of the township.
1882	Curry and Jones surveyed the Sixth Standard Parallel North (south boundary of the township), the north boundary and subdivisional lines as shown on the plat approved March 12, 1883. See figure 1.
1906	Wendell V. Hall retraced a portion of the east boundary, subdivisional lines and surveyed Small Holding Claims within the township, in accordance with the provisions of the Act of March 3, 1891 (26 Stat. 854), as shown on the plats approved November 5, 1908. See figures 2 and 3.
1932	Everett H. Kimmell surveyed Tracts 37, 38 and 39 in section 2. Therefore the next higher tract number in the township would be number forty.
1962	Certain corners of the Small Holding Claims were remonumented under the Forest Service Remonumentation Program.

TOWNSHIP Nº 25 NORTH RANGE Nº 8 EAST of the N.M. PRINCIPAL MERIDIAN



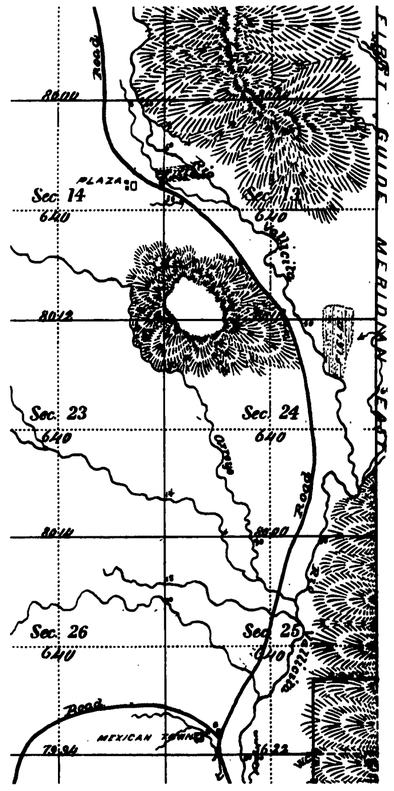


Figure 1 - Original Plat with Detail, Right

Reasons for Request of this Survey

Most of the public lands within T. 25 N., R. 8 E., are in the Jemez National Forest. The Forest Service had accepted proposals for land exchanges within the forest for administrative purposes and consolidation of ownerships. One such exchange parcel is located in section 24 with others in sections 2 and 14. A tract survey is needed to properly describe the lands to be patented under the exchange agreement(s).

Special Instructions

Special Instructions were prepared on May 19, 1971. They provided for the dependent resurvey of portions of five townships, including the resurvey of irregular Small Holding Claims, and the survey of several tracts. One such tract, located in section 24, T. 25 N., R. 8 E., was described in the Forest Service request as follows:

Sec. 24
Tract 9
A parcel of land more particularly described as:

Beginning at the NW corner of S.H.C. No. 499 thence along the west boundary of the claim, S. 60° 17′ E., 0.97 chains; S. 54° 02′ E. 1.77 chains; S. 07° 15′ E., 3.14 chains to the SW corner of S.H.C. No. 499 and the NW corner of S.H.C. No. 4190; thence along the west boundary of S.H.C. No. 4190, S. 01° 17′ E., 3.28 chains; S. 01° 13′ W., 9.35 chains to the SW corner of the claim and the NW corner of Tract 1 S.H.C. No. 1147; thence along the west boundary of Tract 1, S. 22° 44′ W., 2.31 chains to the SW corner and the NW corner of S.H.C. No. 982; thence along the west boundary of the claim S. 08° 35′ E. 6.47 chains to the SW corner and the NW corner of Tract 2 S.H.C. No. 1147; thence along the west boundary of the claim S. 34° 38′ W., 1.69 chains; S. 01° 14′ E., 2.61 chains to the SW corner of Tract 2 S.H.C. No. 1147 and the NW corner of Tract 1, S.H.C. No. 1130; thence along the west boundary of Tract 1, S. 02° 31′ W. 2.84 chains; S. 00° 27′ W., 4.59 chains to the SW corner of the claim and the NW corner of Tract 3 S.H.C. No. 1147; thence along the west boundary of Tract 3, S. 19° 00′ E., 1.85 chains; S. 55° 31′ E., 2.19 chains; S. 69° 10′ E., 2.82 chains to the NW corner of Tract 1 S.H.C. No. 985; thence along the west boundary of Tract 1, S. 26° 26′ W. 4.75 chains; S. 26° 58′ W., 6.81 chains to the SW corner of the claim and the NW corner of Tract 1 S.H.C. No. 1132; thence along the west boundary of S.H.C. No. 1132, S. 39° 21′ W., 5.02 chains to the SW corner; thence N. 01° 50′54″ E. 55.44 chains to the NW corner of S.H.C. No. 499 and the point of beginning, containing 18.31 acres, more or less.

The surveyor was instructed to resurvey the necessary boundaries of the Small Holding Claims and survey the described tract. The field work was assigned to a cadastral surveyor and work began on May 24, 1971.

FOREST EXCHANGE TRACT SURVEY, NEW MEXICO

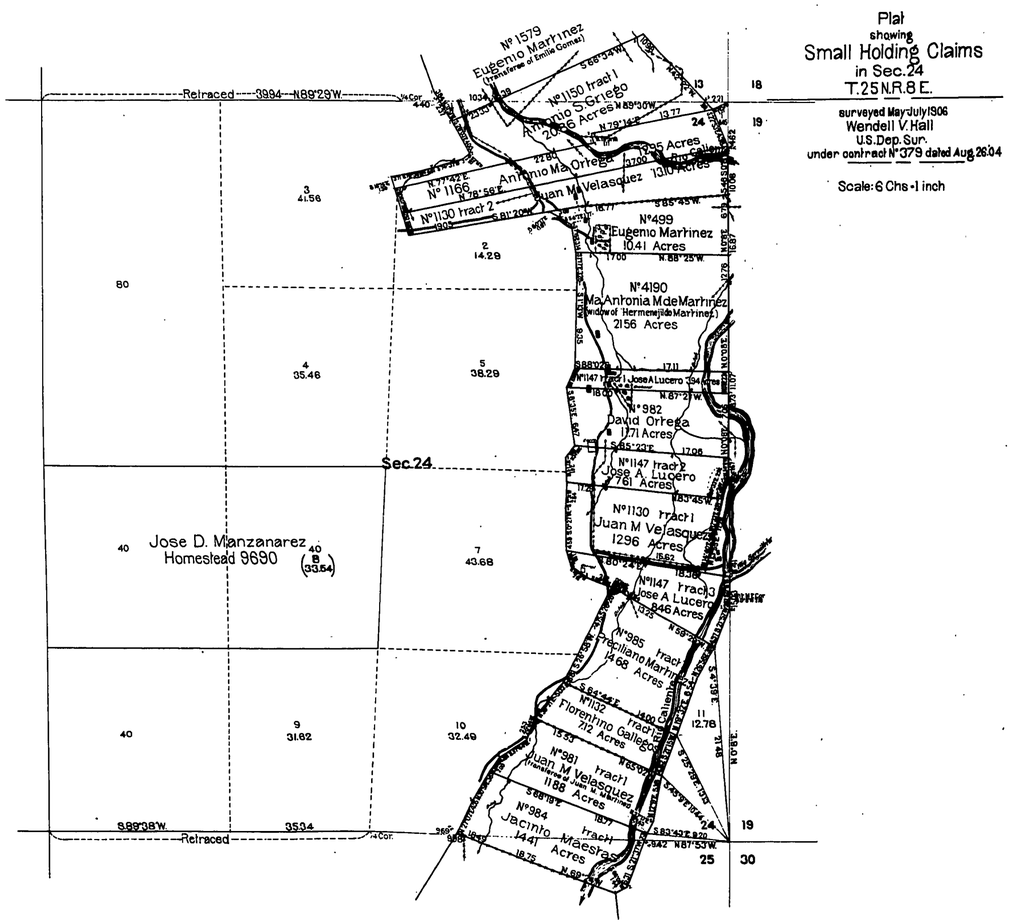


Figure 2 - Small Holding Claims in Section 24
With Detail

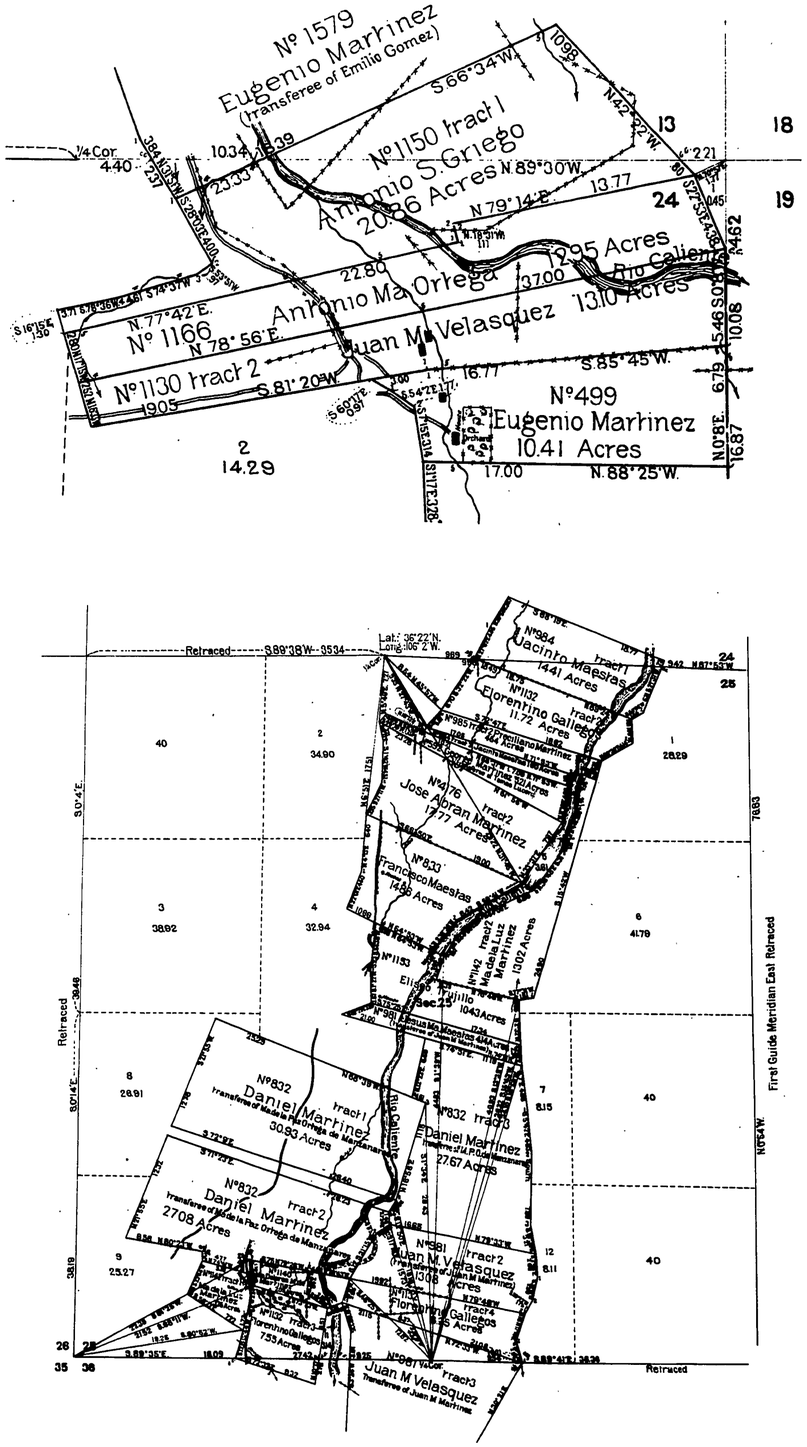


Figure 3 - Small Holding Claims in Section 25

FOREST EXCHANGE TRACT SURVEY, NEW MEXICO

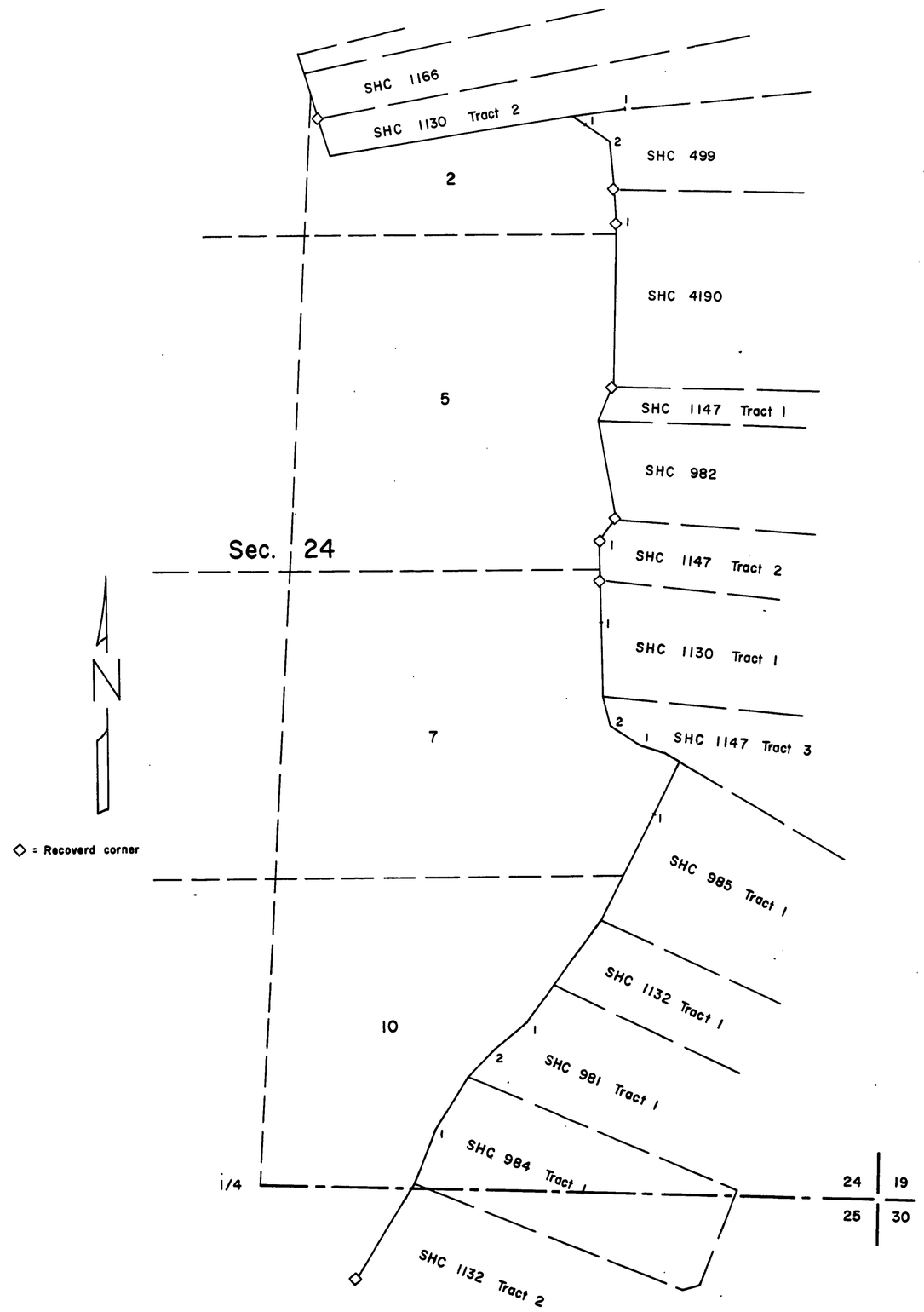


Figure 4 - Corner Recovery Diagram

Conditions Found on the Ground

Figure 4 shows the boundaries of the small holding claims which were retraced and the original corners which were recovered. Most of the recovered corners had been remonumented in 1962. The record courses and distances were retraced and the recovered corners were found within a few links of the record position, as measured from the previously recovered corner. The 1906 survey had been carefully executed. The village of La Madera, New Mexico, is located on the Small Holding Claims and most of the lost corners were probably lost due to fence and building construction.

Preliminary Statement of Problem

The lost corners of the small holding claims must be restored before the described exchange tract can be surveyed.

Regulations

The following sections of the Manual of Surveying Instructions, 1973, are directly applicable.

5-44	Grant boundaries
7-16	Metes and bounds surveys

Legal Constraints

The restoration of the lost corners of the Small Holding Claims must not in any way impair the bona-fide rights of the claimants.

Final Statement of the Problem

The surveyor must restore the lost corners by proportionment and then survey the described tract.

Solution

The record courses and distances of the Small Holding Claims were closely verified by the recovered original monuments. In most instances the linear measurements were the same, with only a few minutes rotation in bearing to effect a closure.

The lost corners were restored by the Grant Boundary adjustment. After the adjustment, further search for evidence of the original monuments was made. At the northwest corner of SHC No. 499, an old railroad spike was found a few inches below the surface of the ground. This was accepted as conclusive evidence of the original corner point on the southerly line of SHC No. 1130, Tract 2. That point was remonumented with the brass cap marked for Angle Point No. 1 of Tract 41, and the corner of SHC 1130, Tract 2 and SHC 499. (Tract No. 40 was assigned to an exchange tract surveyed in section 2).

A straight line was surveyd from Angle Point No. 1 to the restored northwest corner of SHC No. 981, Tract 1, identical with the southwest corner of SHC No. 1132, Tract 1. This SHC corner was remonumented and marked for the corners of the SHC's and Angle Point No. 2 of Tract 41. The corners and angle points of the SHC's were designated as angle points of Tract 41, in numerical order.

A witness point was set at midpoint on the line between AP1 and AP2 of Tract 41.

The plat was accepted April 5, 1973 and is shown in figure 5.

FOREST EXCHANGE TRACT SURVEY, NEW MEXICO

TOWNSHIP 25 NORTH, RANGE 8 EAST, OF THE NEW MEXICO PRINCIPAL MERIDIAN, NEW MEXICO
DEPENDENT RESURVEY AND SURVEY

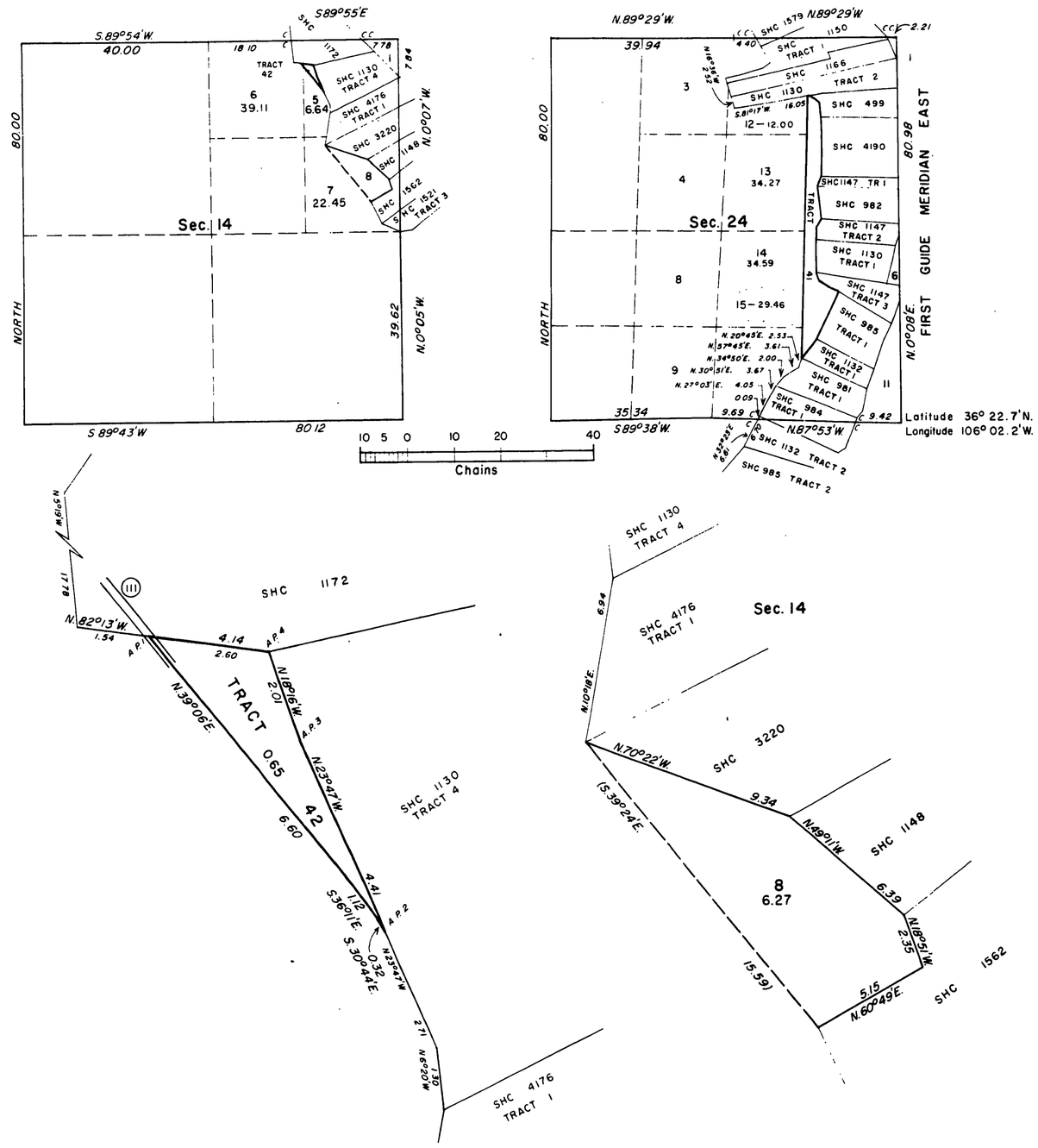
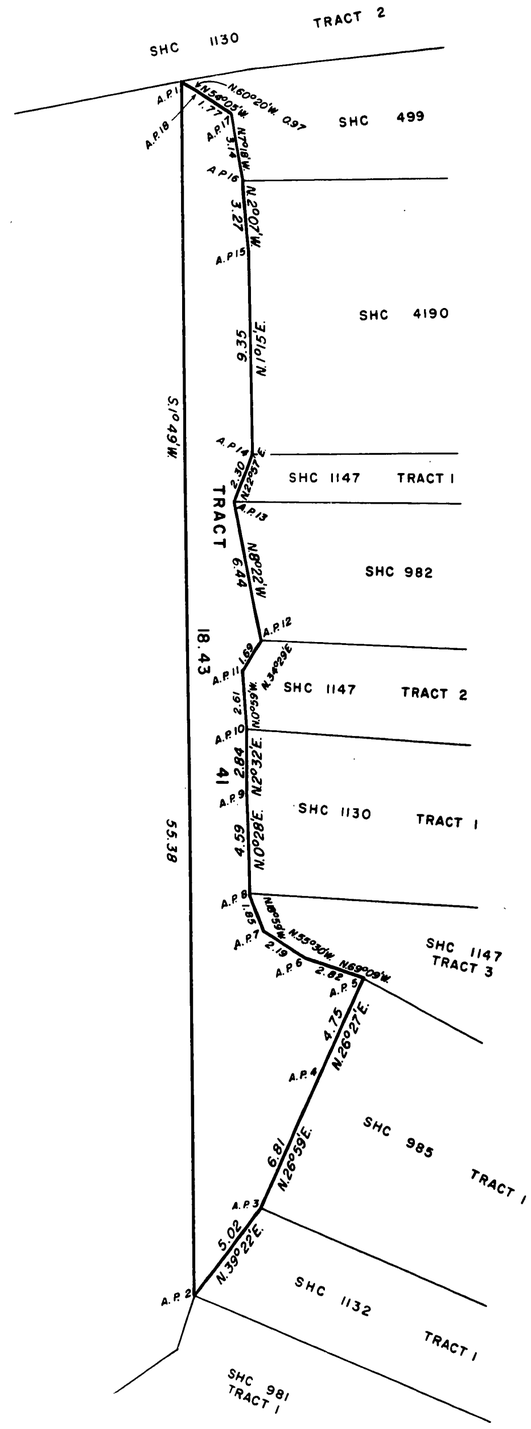


Figure 5 - Portion of Accepted Plat



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.

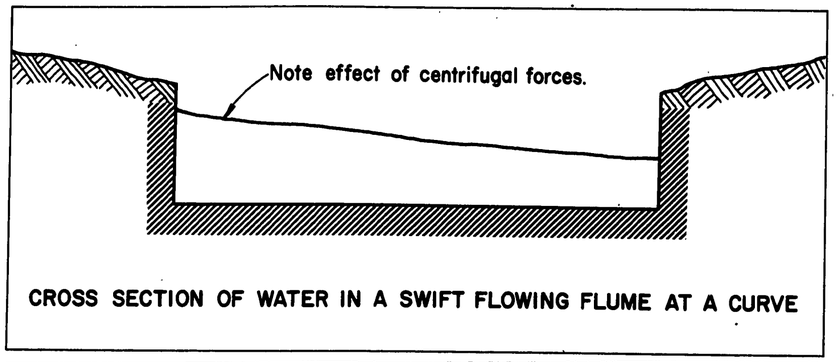
A littoral owner is one who owns land abutting a sea or ocean where the tide regularly rises and falls. Littoral is derived from the Latin "litus" meaning seashore or coast. In common usage the word riparian is often used instead of littoral to include seashore boundaries as well as inland water boundaries.

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.

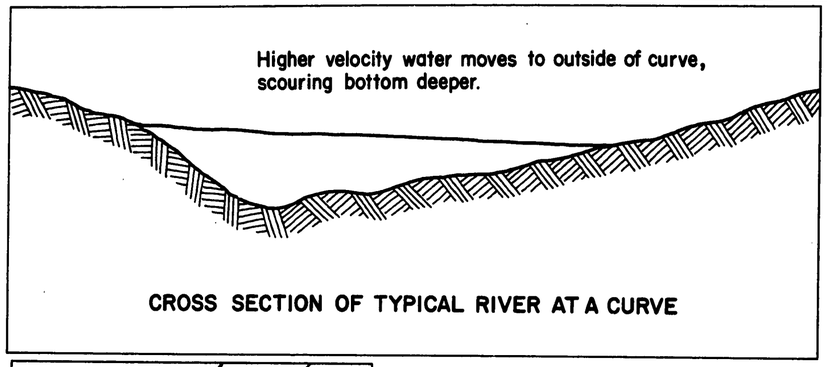
Reliction is dry land formed by the withdrawal of water from the shores of a river, lake or sea. For example: a twin channel stream in which one channel degrades sufficiently to cause the gradual withdrawal of water from the other channel until it becomes a waterless relic. The process of the water withdrawal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

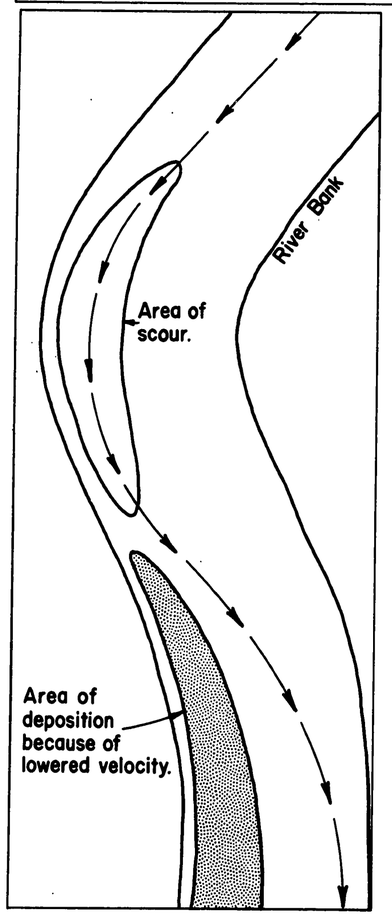
Avulsion is the sudden and perceptible action of water which causes the removal of a considerable quantity of soil from the land of one owner and its deposit upon or annexation to the dry land of another. This may be a sudden or rapid change in the course and channel of a river or the sudden creation 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).

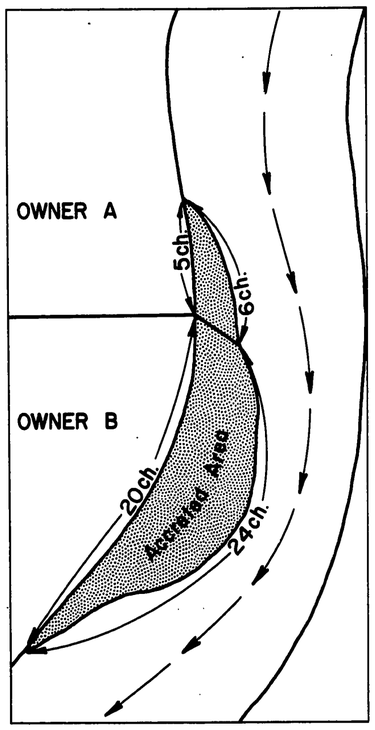
Apportioning the Accretion By Survey

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).

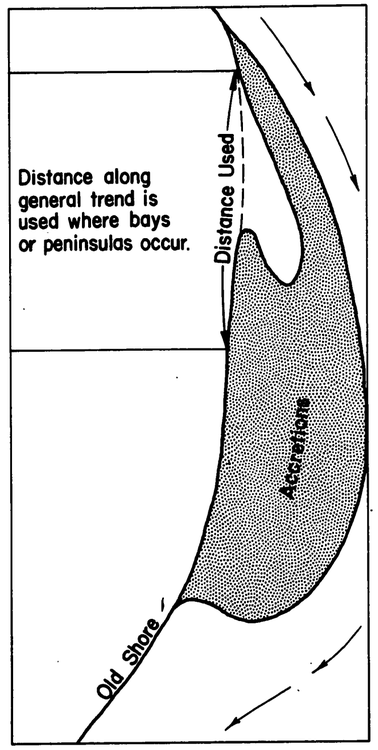
All courts that have been called upon to decide the ownership and division of accretion have subscribed to the doctrine of equity and justice. The four basic methods formulated to achieve equity and justice among the various claimants are:

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.

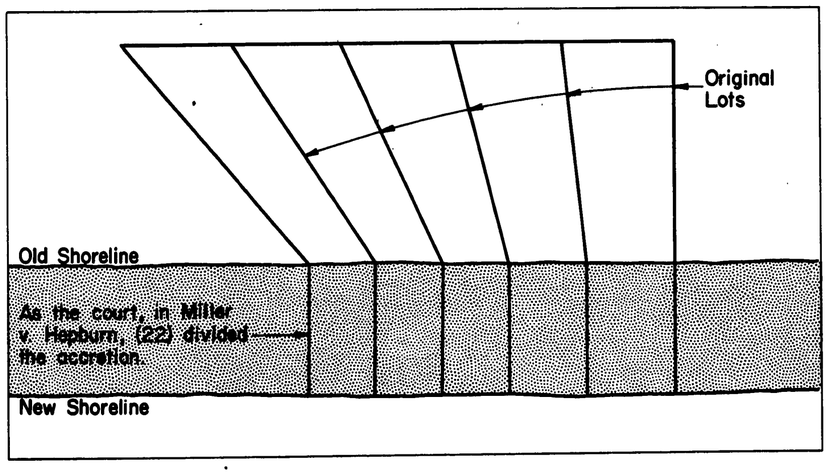


Certain modifications may be required under particular circumstances where peninsulas or bays would make strict apportionment inequitable.

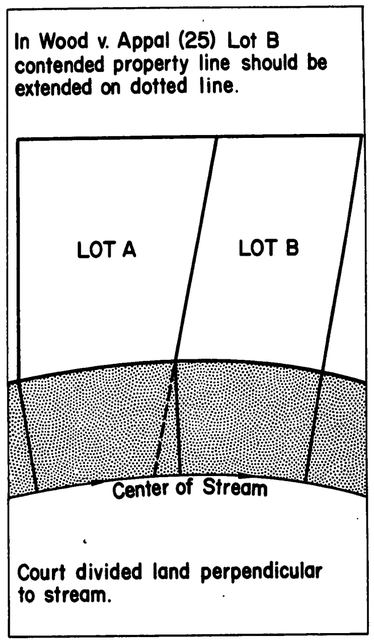


A beginning and ending point for apportionment may have to be established by one of the other methods before the affected land can be apportioned.

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.



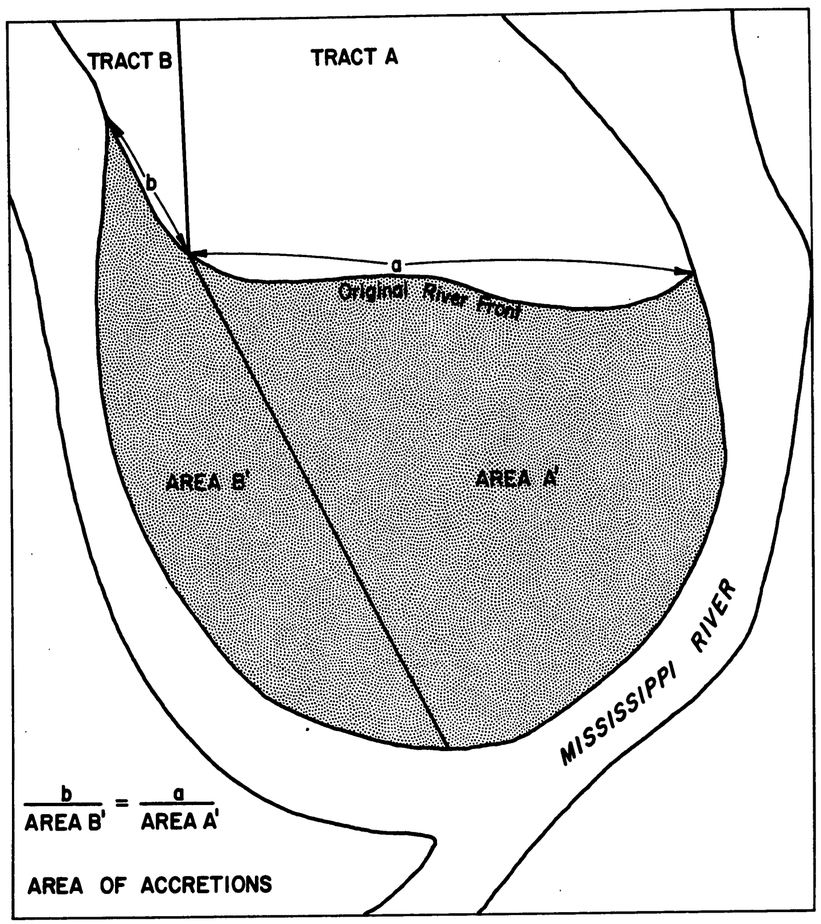
In the absence of accretion, the perpendicular method is preferred to divide the stream bed when the riparian owners own the stream bed also (25).



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

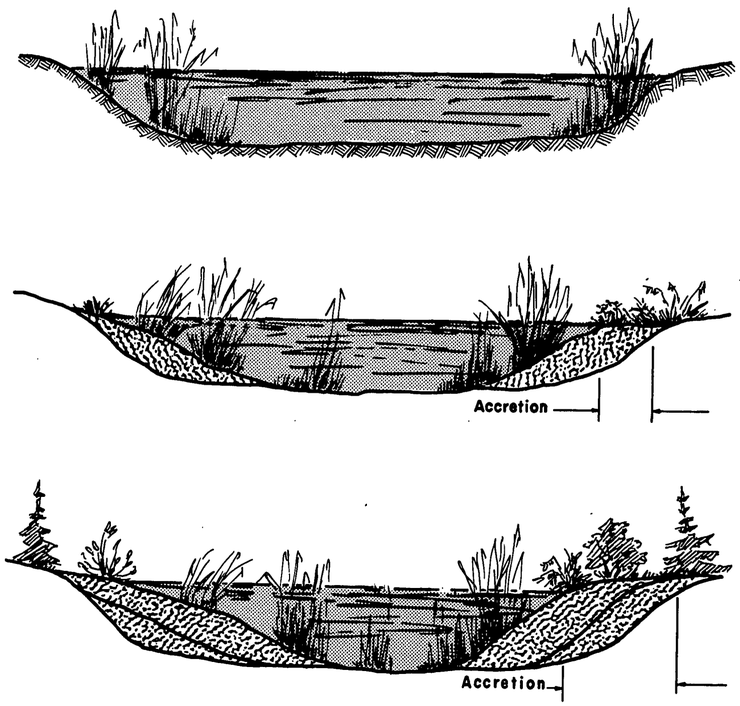
*Under the terms of the Act of April 29, 1898 (the Arkansas Swamp Lands Compromise Act), Arkansas relinquished all right, title and interest to the remaining unappropriated swamp and overflowed lands within its boundaries (43 U.S.C. sec. 987).

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.

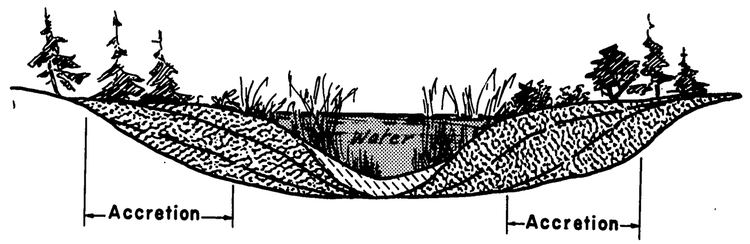
SWAMP EVOLUTION



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 DESCRIPTION AND FORMATION.

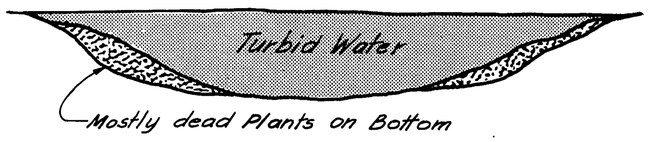
Swamps do not have floating mats of vegetation which help distinguish them from bogs and muskegs. The water may be somewhat aerated such that fallen vegetation decays and falls to the bottom. Some silting normally occurs, which mixes with the vegetation falling to the bottom. As this process continues,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

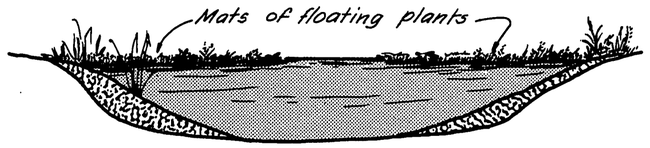
BOG EVOLUTION

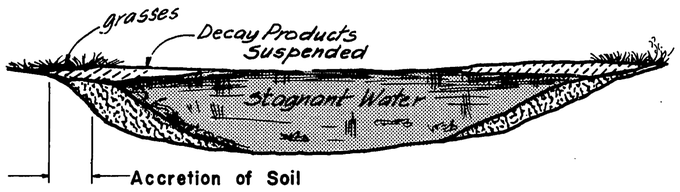
CONDITION AT SPRING THAW



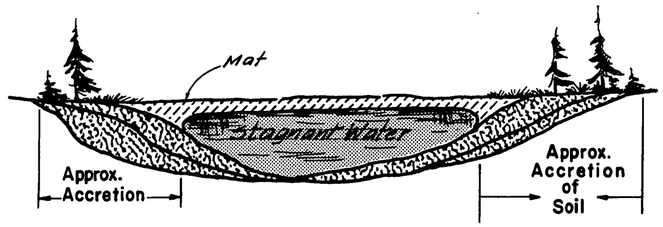
1st STAGE

CONDITION AT LATE SUMMER

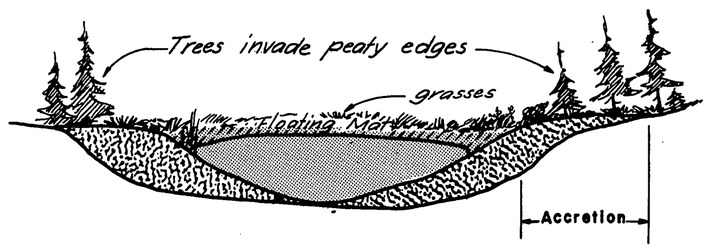




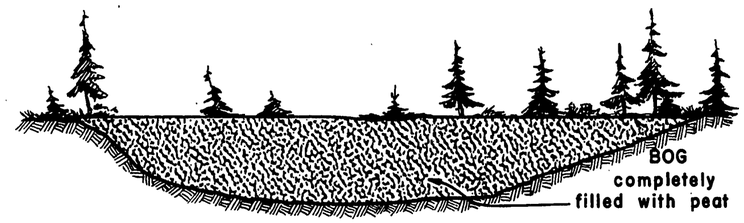
2nd STAGE



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)

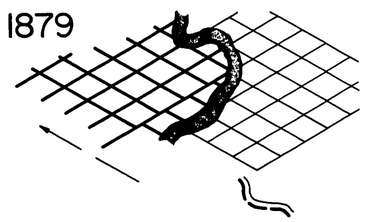
(54) Benjamin E. Peterman
14 L.D. 115 (1892)
Patrick Brazil
17 L.D. 326 (1893)

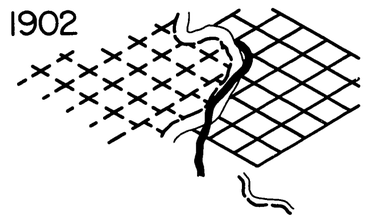
(55) Group 84, Nebraska
Letter 1606475 "E" EGH (3-23-38)

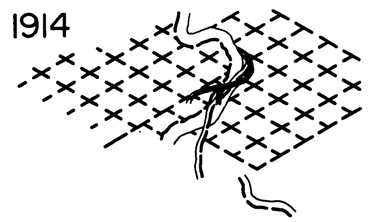
(56) United States v. Mission Rock Co.
189 U.S. 391 (1903)

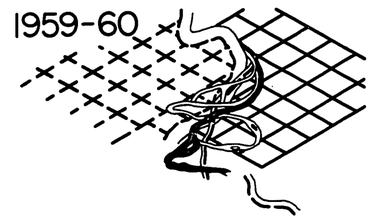
DIVISION OF COLORADO RIVER ACCRETIONS

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.

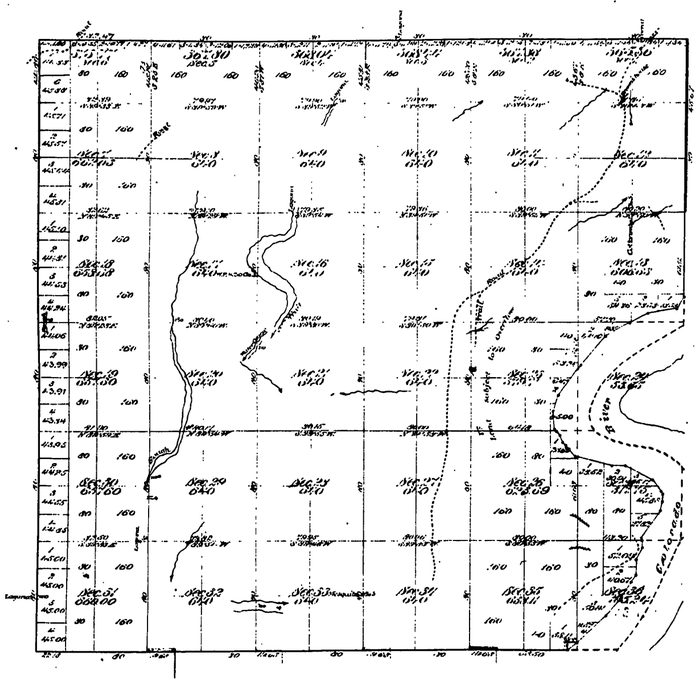
This survey involved laws concerning riparian rights and water boundaries, including accretion, avulsion, land reemergence and methods of equitably dividing accretion. Land reemergence in this survey had to be treated according to California law.

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.

Township No. 8 South. Range No. 22 East. San Bernardino Meridian.



Aggregate Area of Public Land 10,040.18 Acres
Estimated " " Colorado River 600.00 "
Aggregate 10,640.18 "

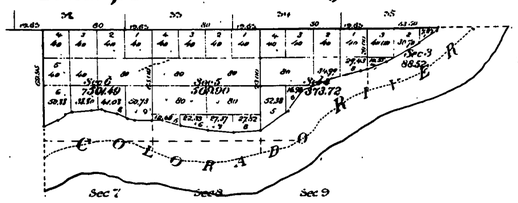
Surveyed, approved by Hansen 31st Dec. 1868

The above Map of Township No 8 South, Range No 22 East San Bernardino Meridian is strictly conformable to the field notes of the Surveys thereof on file in this Office which have been examined and approved.
Surveyor Generals Office
San Francisco, California
May 22d 1879

Surveyor General

Figure 1 - Original Plat - California

Township No 9 South Range No 22 East. San Bernardino Mer.



Red. with Sur. Genl. letter of May 22, 1879
Ref. to 133635
Posted in Backbook Oct 21 1879 GA

Sec 7 Sec 8 Sec 9

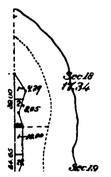


Figure 2 - Original Plat - California

Fract. Township No 1 North Range No 23 West, Gila and Salt River Meridian Ariz.

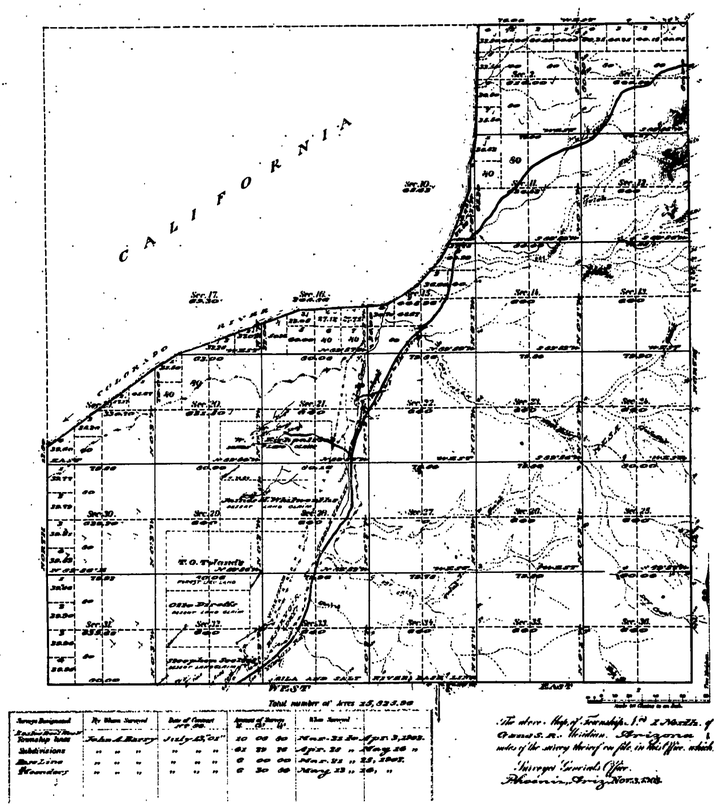


Figure 3 - Original Plat - Arizona

D 2 - 2

DIVISION OF COLORADO RIVER ACCRETIONS

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

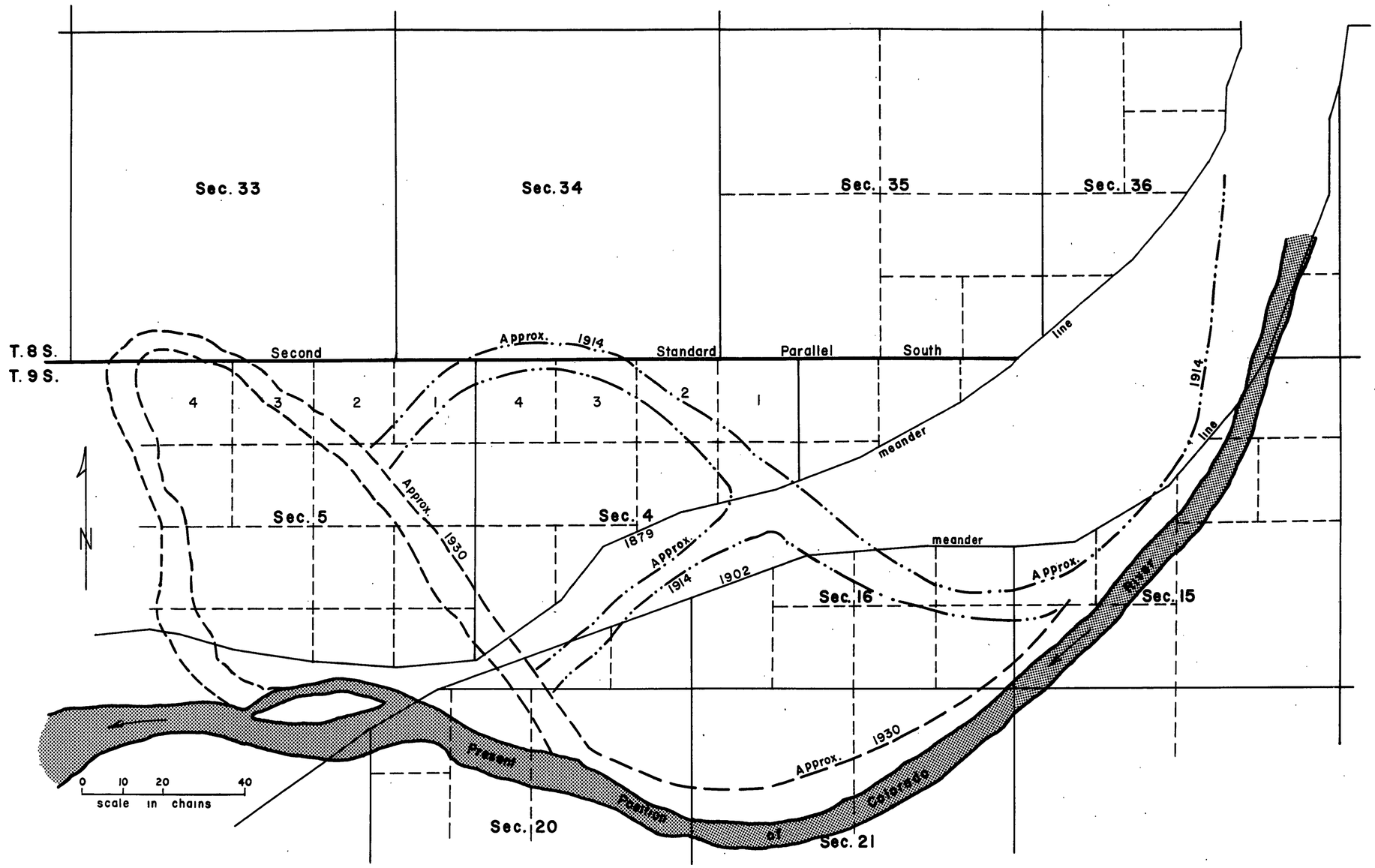


Figure 4 - History of River Position

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 1, 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.

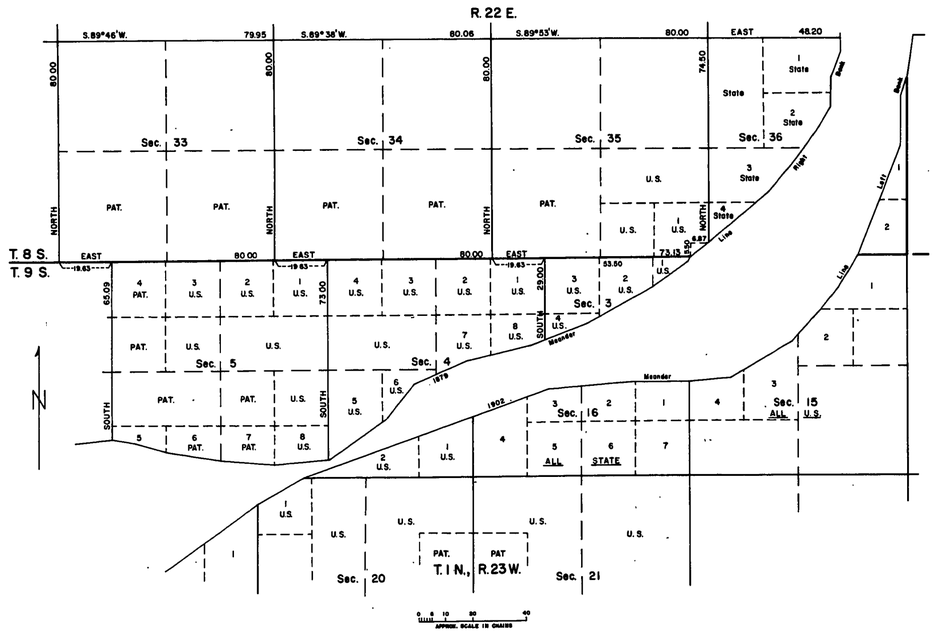


Figure 5 - Record Surveys and Status

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)

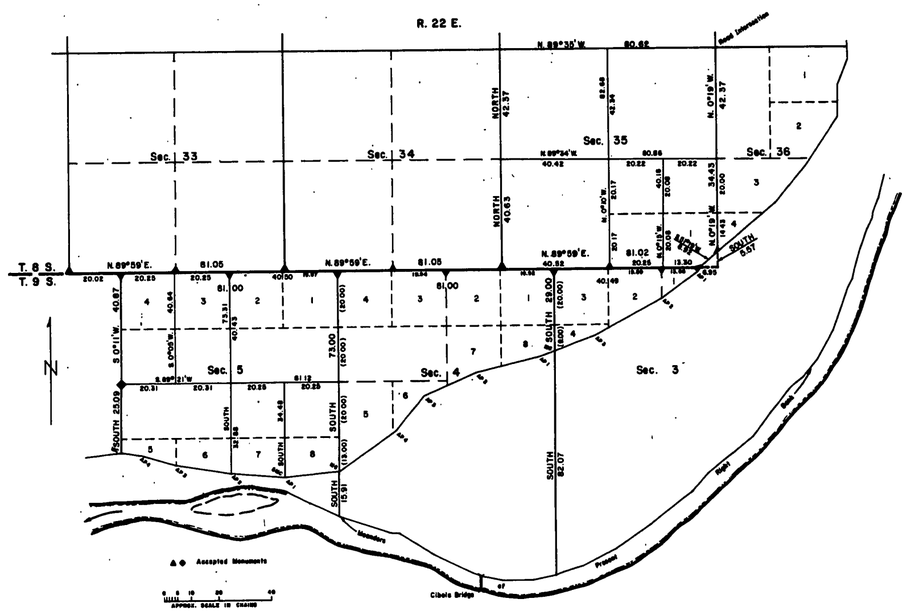


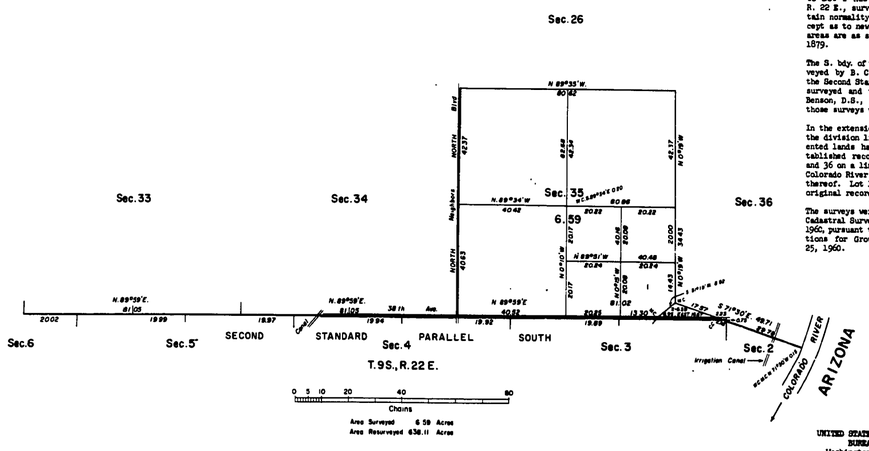
Figure 6 - Dependent Resurvey and Subdivisions

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. Matthewson, 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.

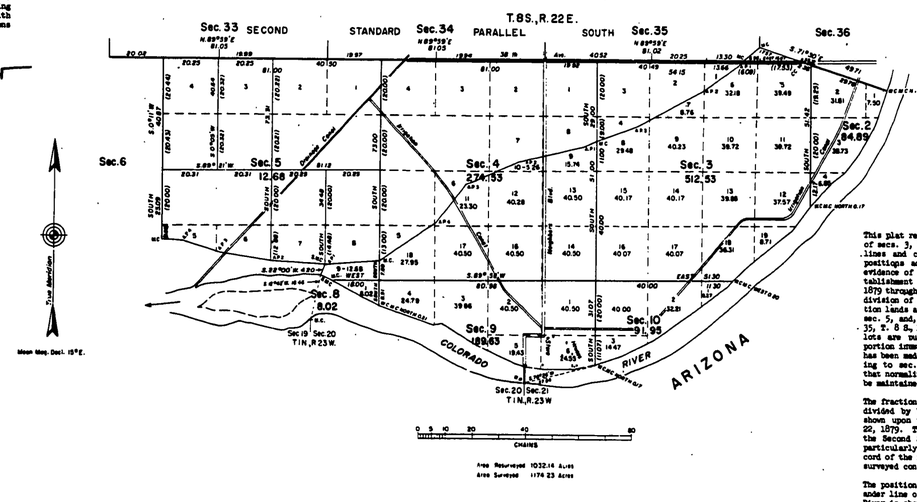
For the Director

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

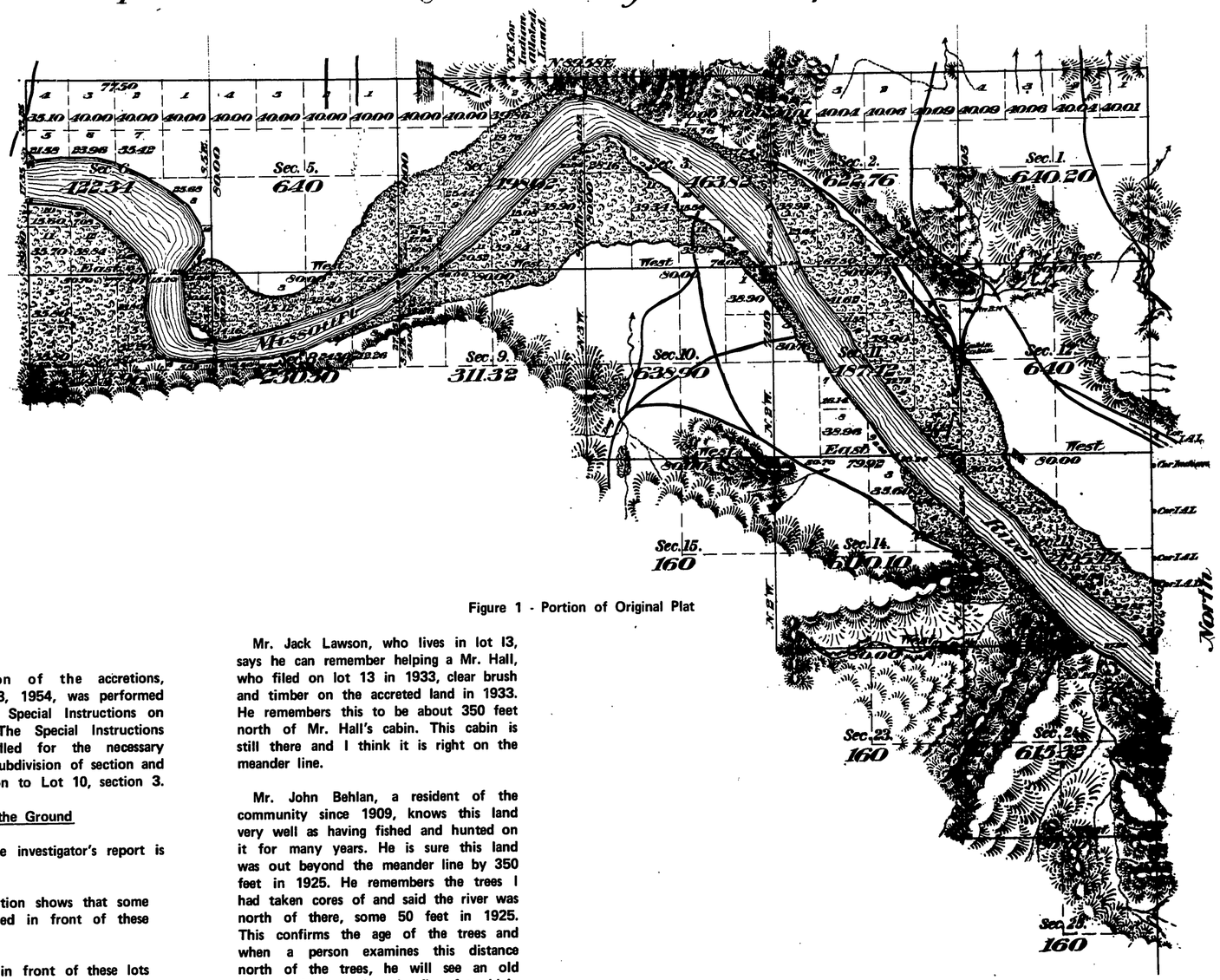
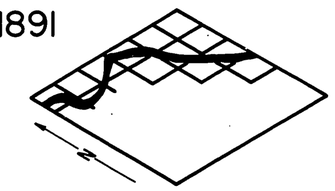
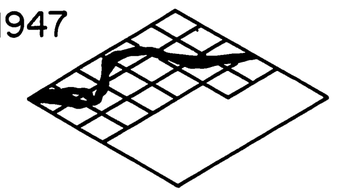


Figure 1 - Portion of Original Plat

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.

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 reliction [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

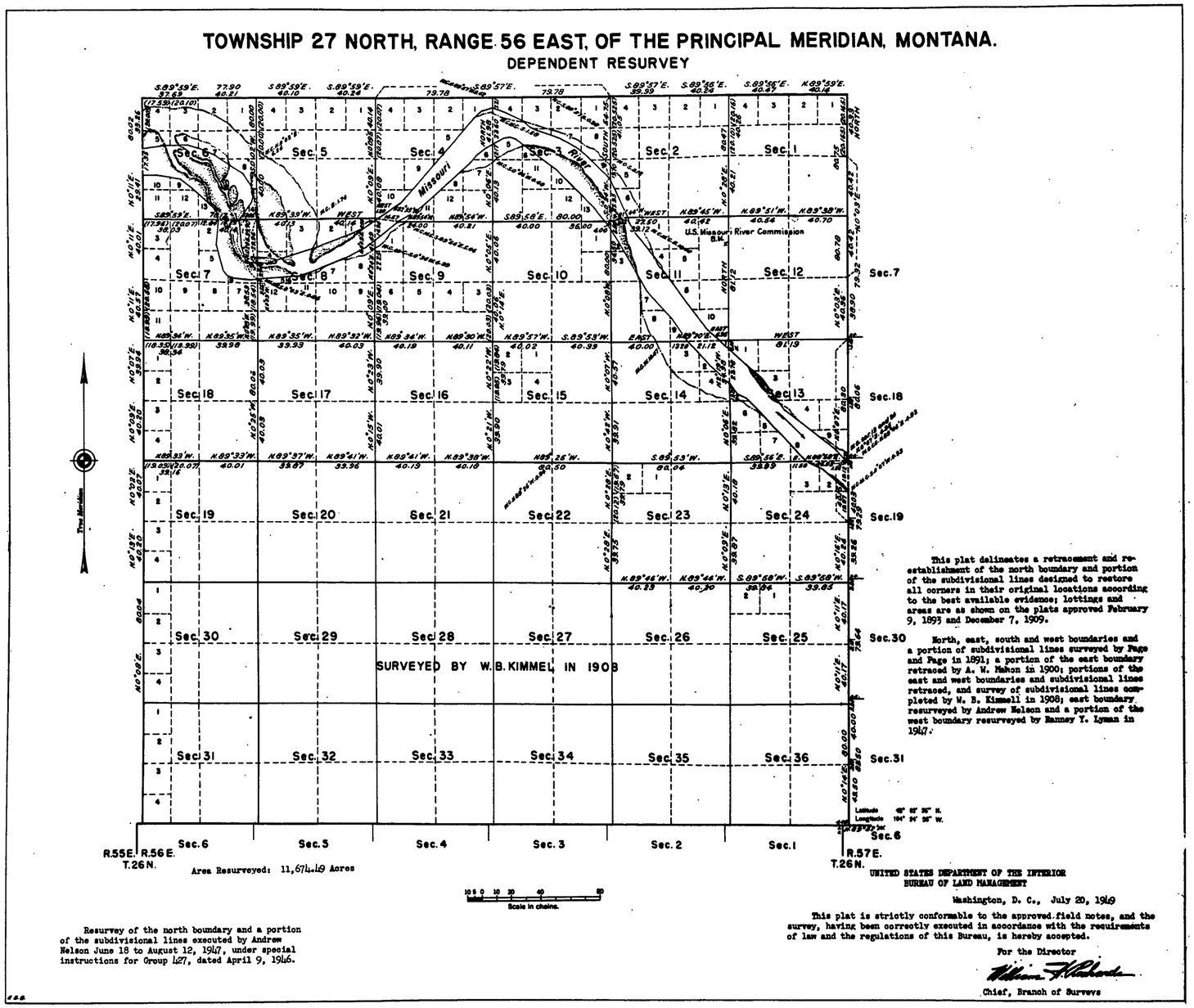


Figure 2 - Dependent Resurvey in 1947

NONSUBSTANTIAL MISSOURI RIVER ACCRETIONS

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

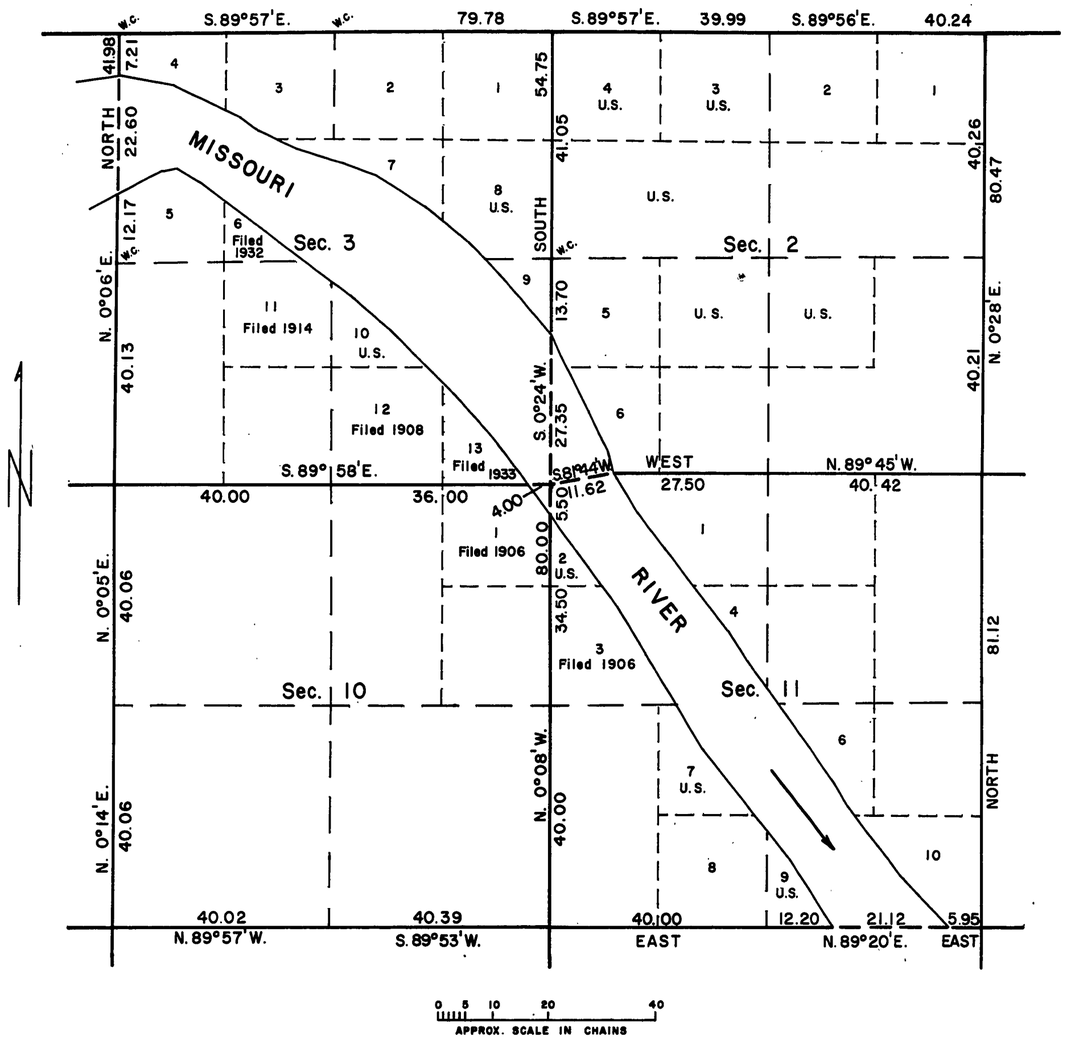


Figure 3 - Survey Records and Status

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

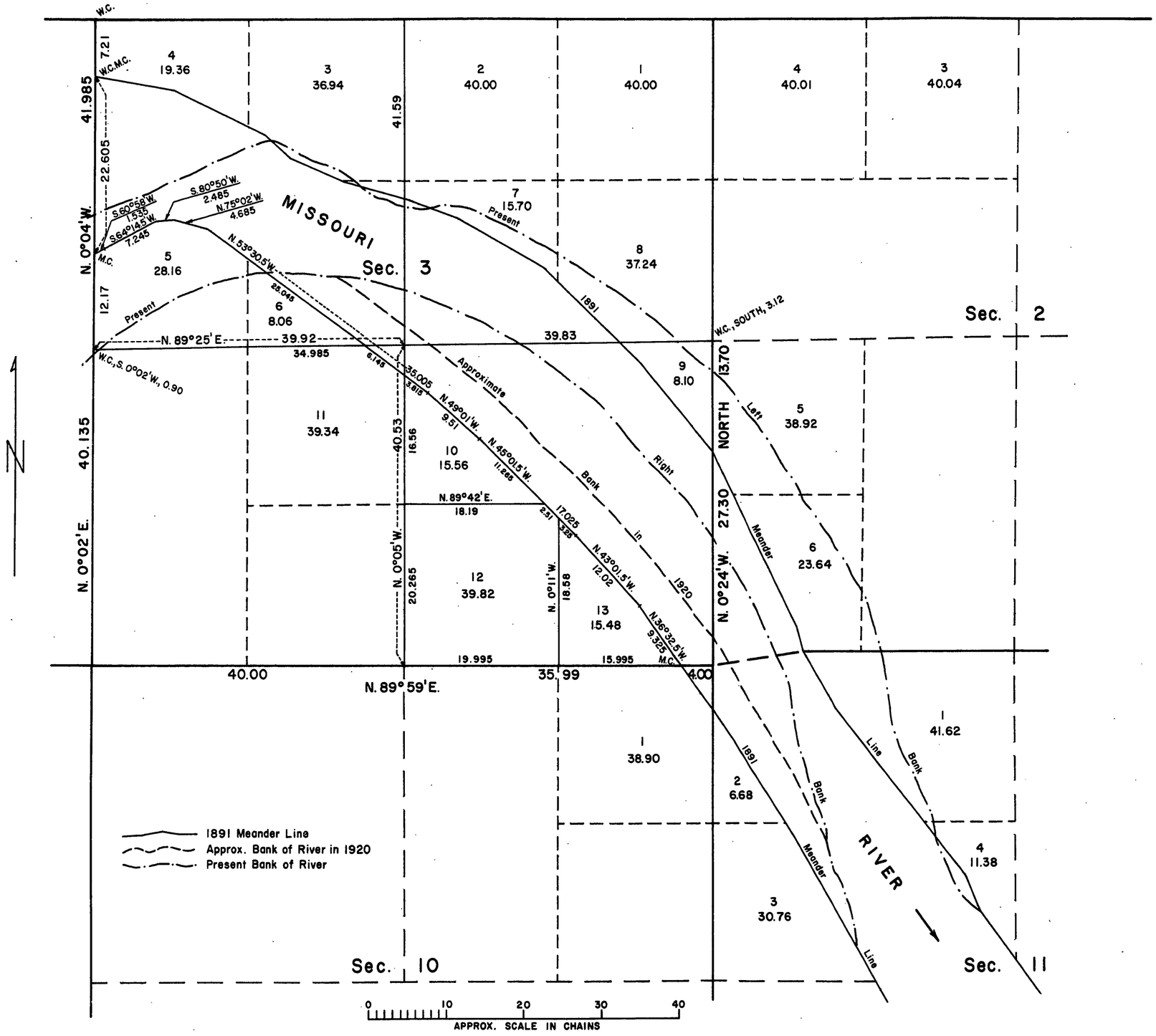


Figure 4 - Present Conditions and Resurvey Data

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

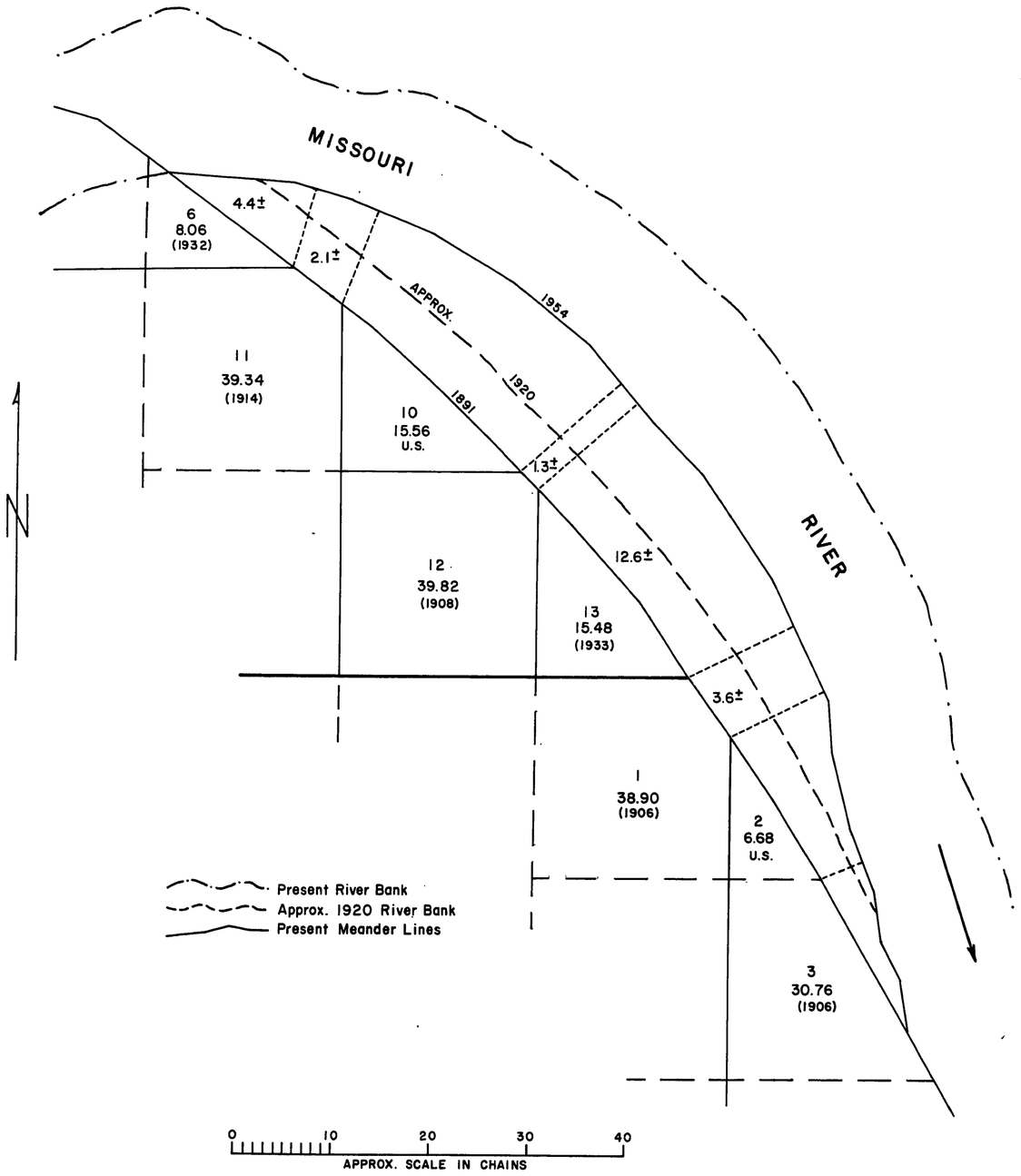


Figure 5 - Areas of Accretions

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.

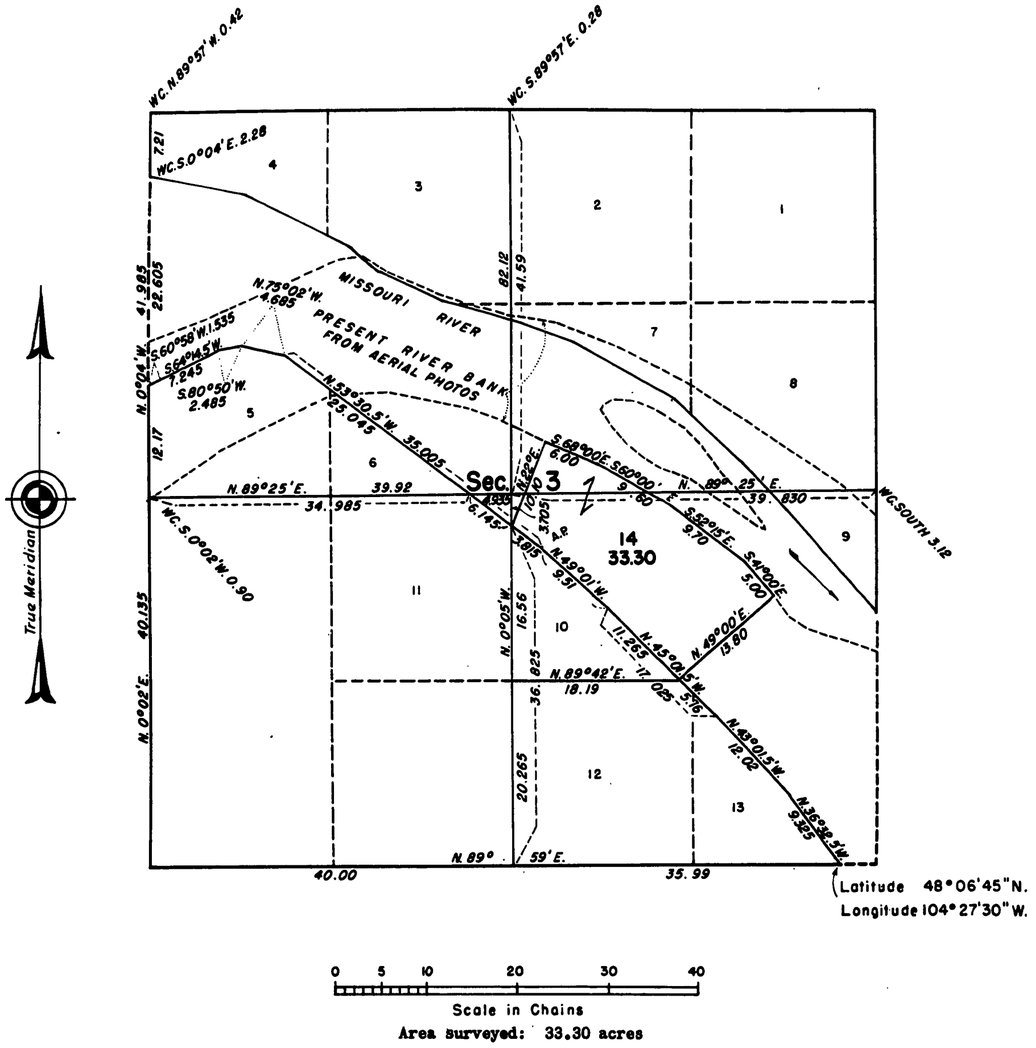
The survey was not rejected by the memorandum in figure 8 but more conclusive evidence was requested. No evidence was produced in 1957 and the new survey remains unapproved. The monuments have been removed from the ground.

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

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
5.04b

July 31, 1958

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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. M. 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 relliction 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

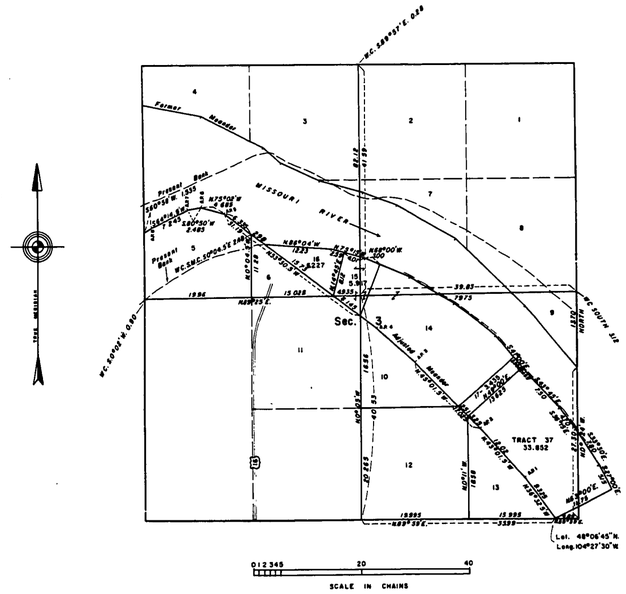
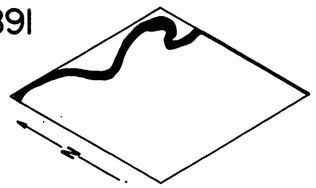


Figure 7 - Unapproved Survey of Accretions

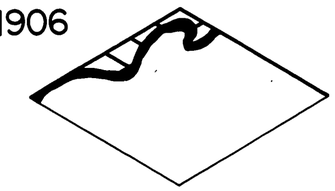
OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

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

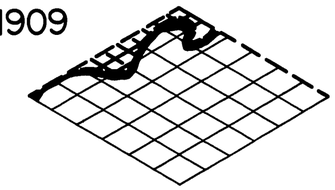
1891



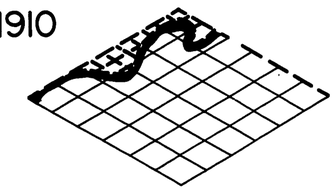
1906



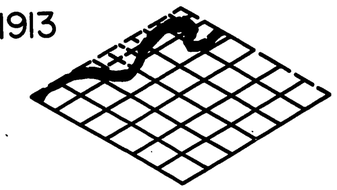
1909



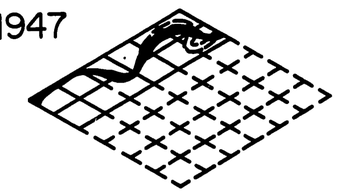
1910



1913



1947



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

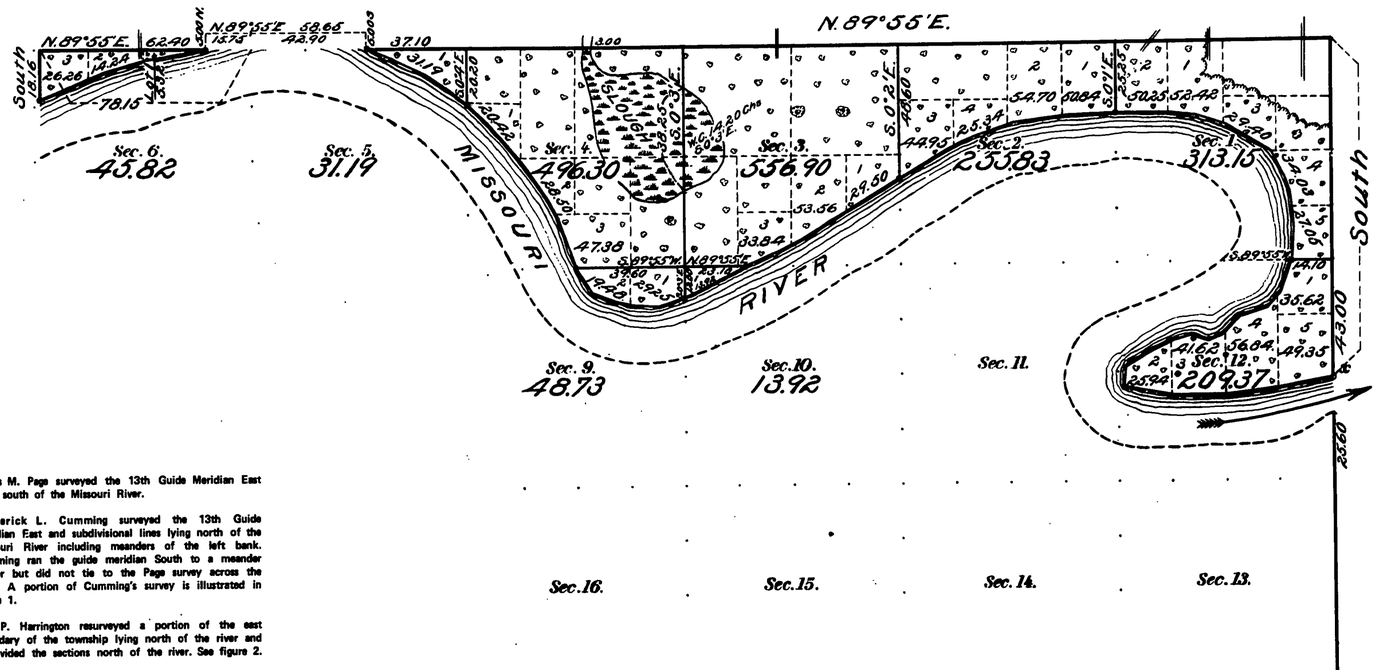


Figure 1 - Portion of Original Plat

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.

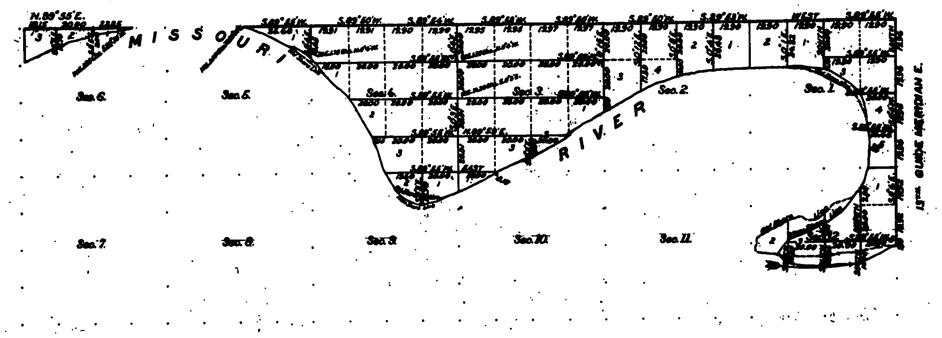


Figure 2 - 1909 Subdivisions

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.

D4-1

OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

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

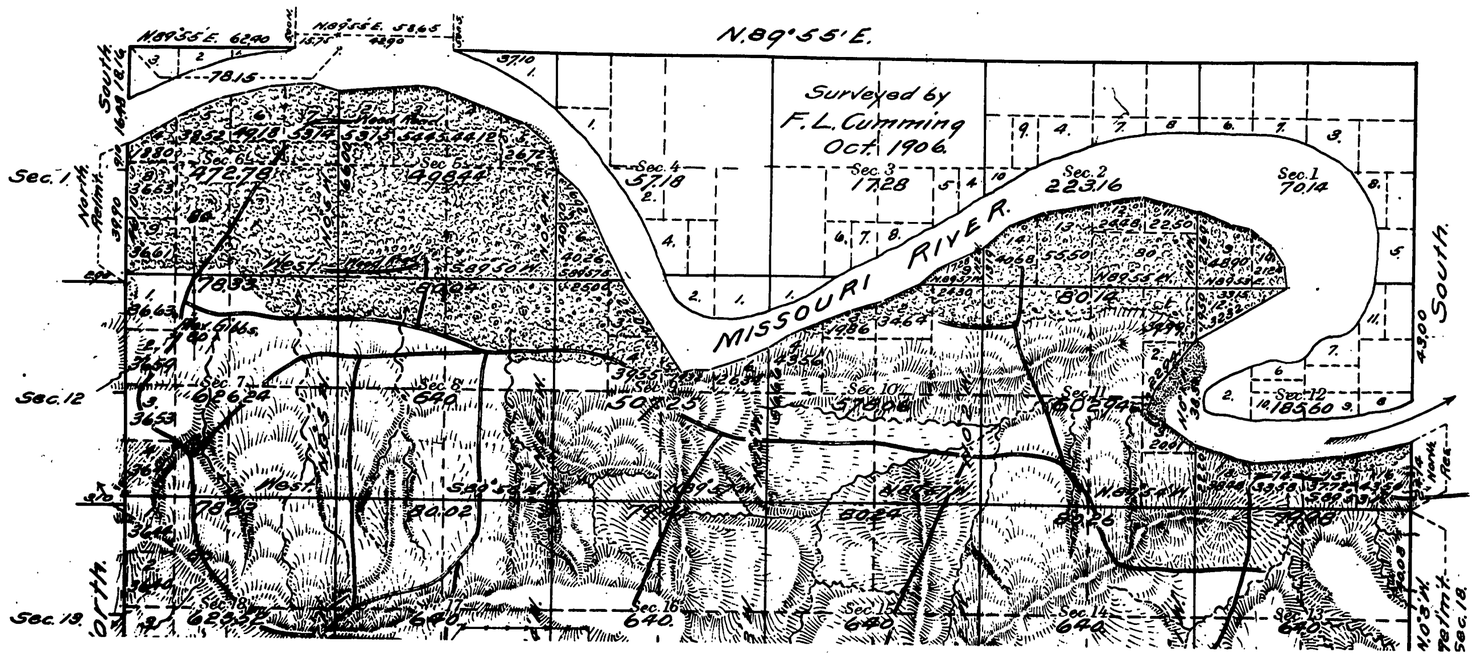


Figure 3 - Portion of 1913 Plat

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

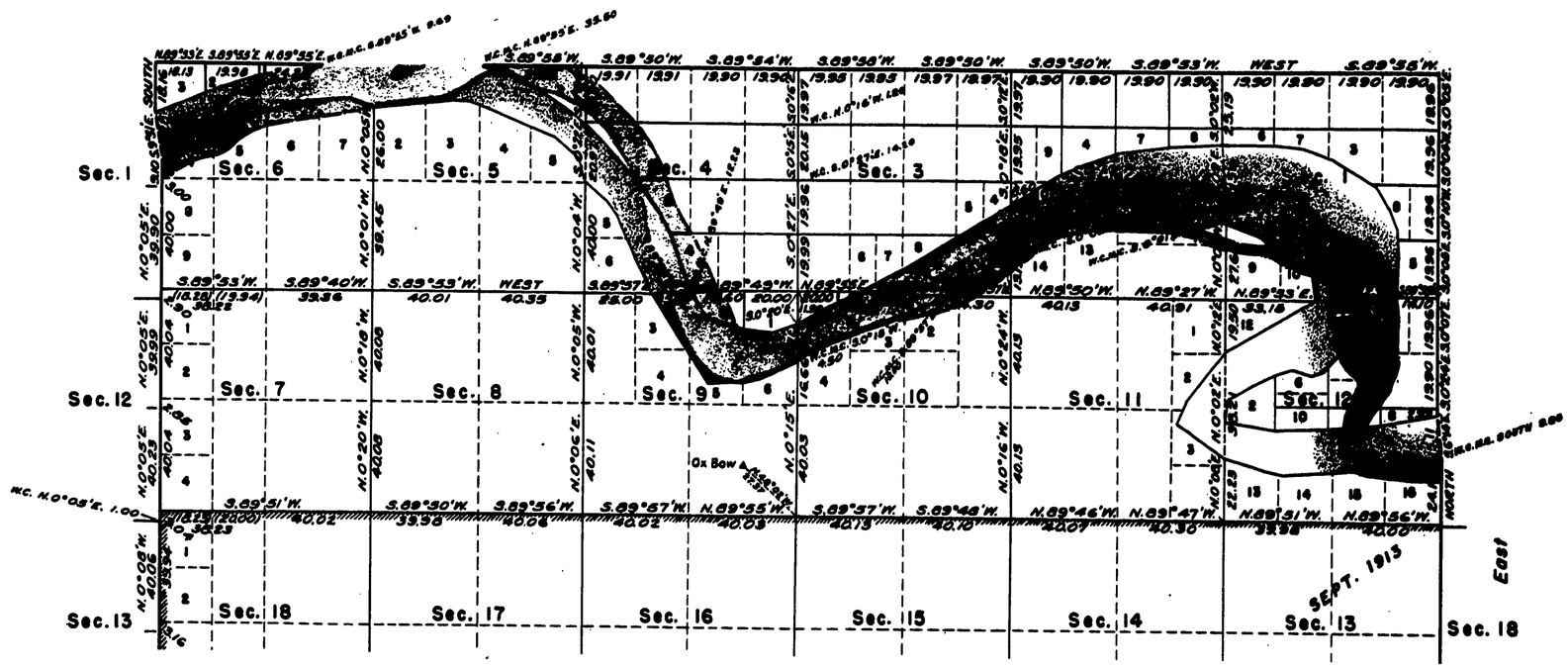


Figure 4 - Portion of 1947 Resurvey Plat

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

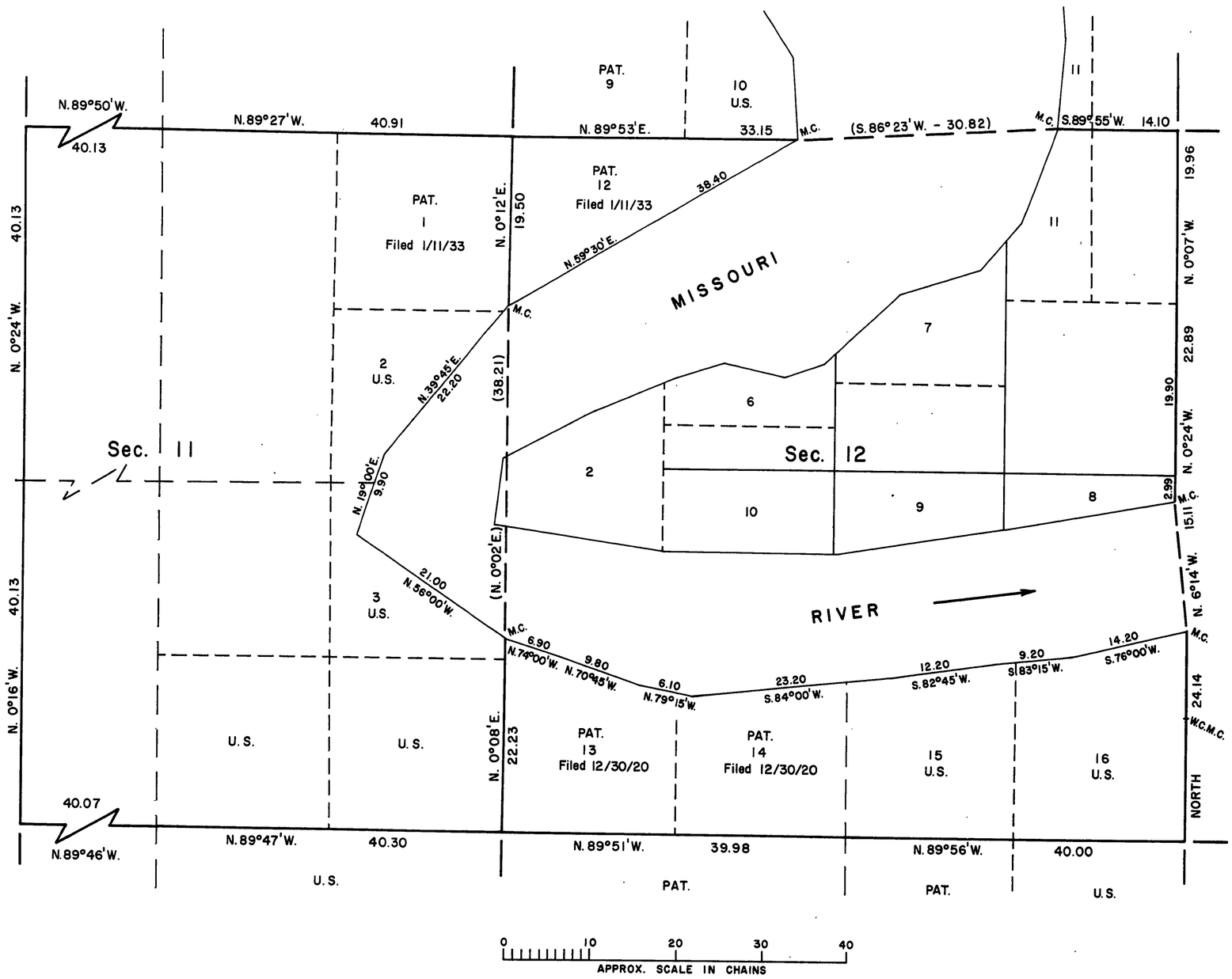


Figure 5 - Composite of Plats with Status

OWNERSHIP AND DIVISION OF MISSOURI RIVER ACCRETIONS

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

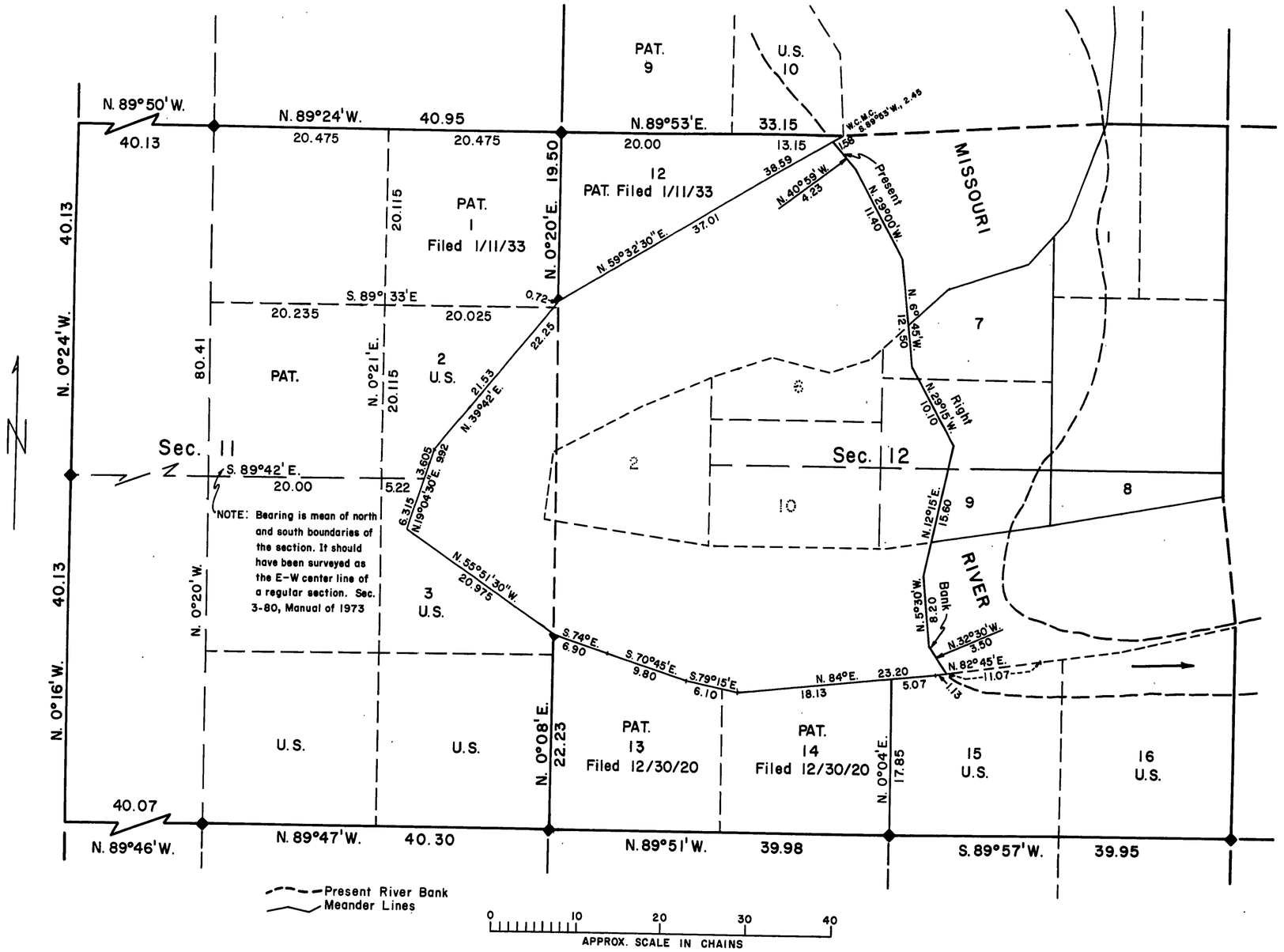


Figure 6 - Existing Conditions and Dependent Resurvey

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.

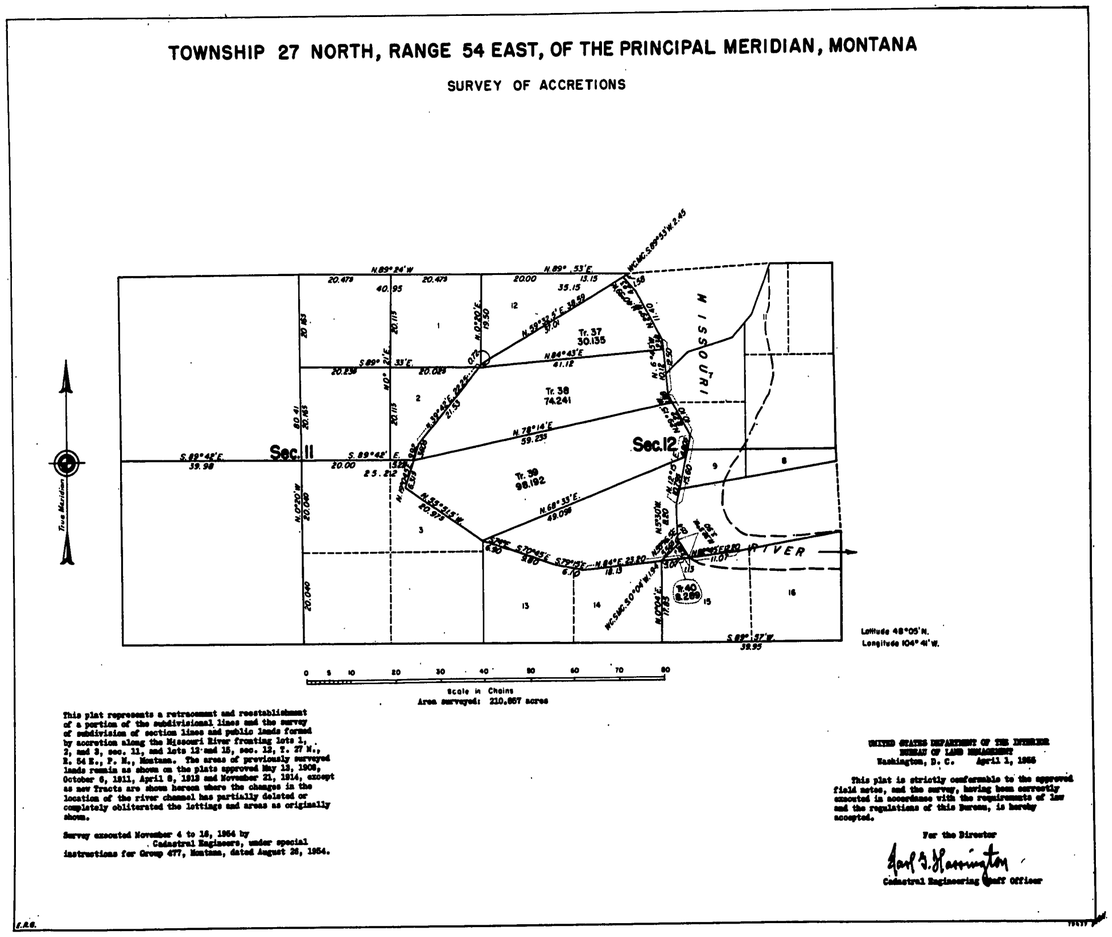
The accretion in front of both lot 1, section 11 and lot 12, section 12, all public lands, was surveyed as Tract 37 for purposes of simplicity but the apportionment was based on the frontage of both lots, 37.73 chains.

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.



TOWNSHIP 27 NORTH, RANGE 54 EAST, OF THE PRINCIPAL MERIDIAN, MONTANA

SURVEY OF ACCRETIONS

This plat represents a retracement and reestablishment of a portion of the subdivisional lines and the survey of subdivision of section lines and public lands formed by accretion along the Missouri River fronting Lots 1, 2, and 3, sec. 11, and lots 12 and 15, sec. 12, T. 27 N., R. 54 E., P. M., Montana. The areas of previously surveyed lands remain as shown on the plats approved May 13, 1908, October 6, 1911, April 8, 1913 and November 21, 1914, except as new tracts are shown hereon where the changes in the location of the river channel has partially deleted or completely obliterated the lottings and areas as originally shown.

Survey executed November 4 to 18, 1954 by Cadastral Engineers, under special instructions for Group 477, Montana, dated August 26, 1954.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. April 1, 1955

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

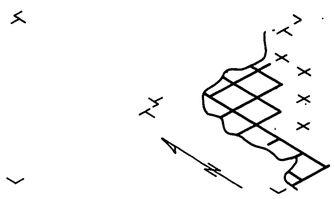
Earl S. Harrington
Cadastral Engineering Staff Officer

Figure 7 - Accepted Plat

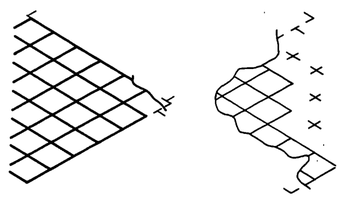
RELICTION OF FLAGSTAFF LAKE

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

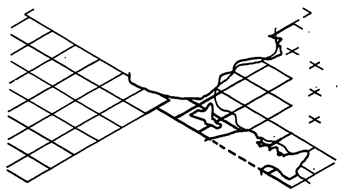
1880



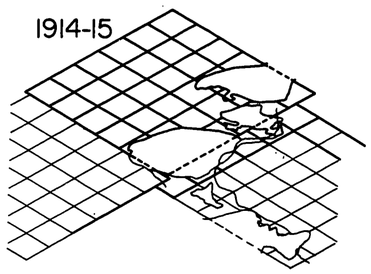
1881



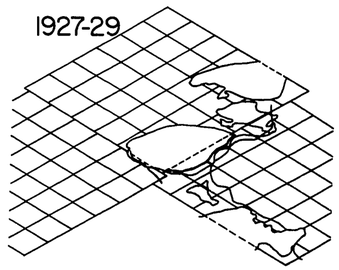
1887



1914-15



1927-29



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 Lakes" 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

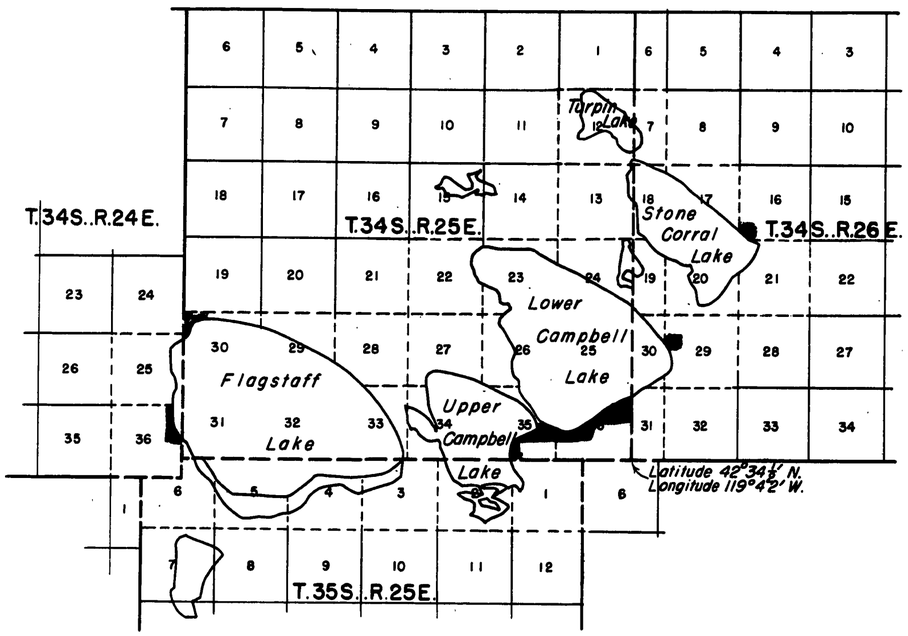
to accompany

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.



----- *Lines to be resurveyed.*

Patented.

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.

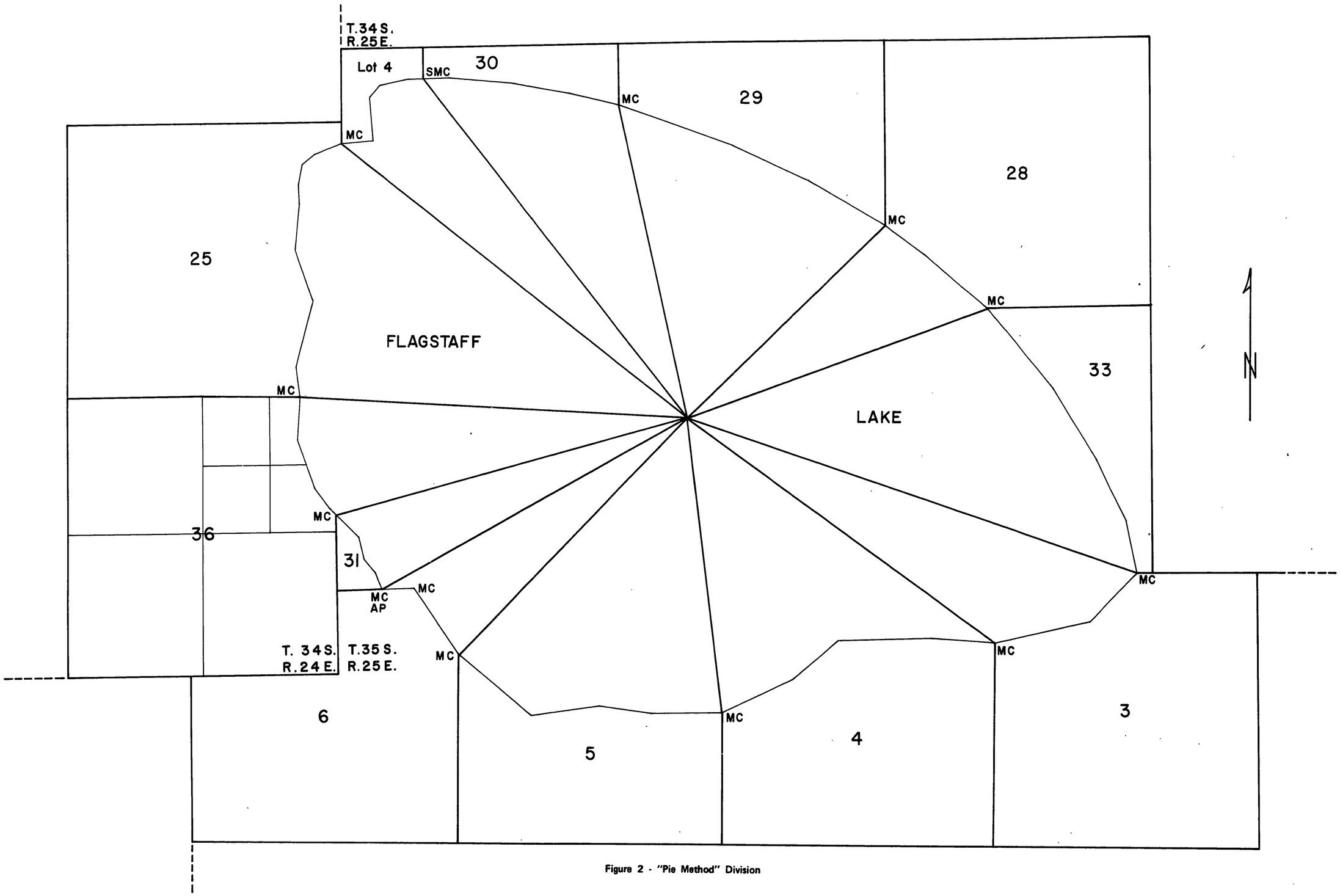


Figure 2 - "Pie Method" Division

RELICTION OF FLAGSTAFF LAKE

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

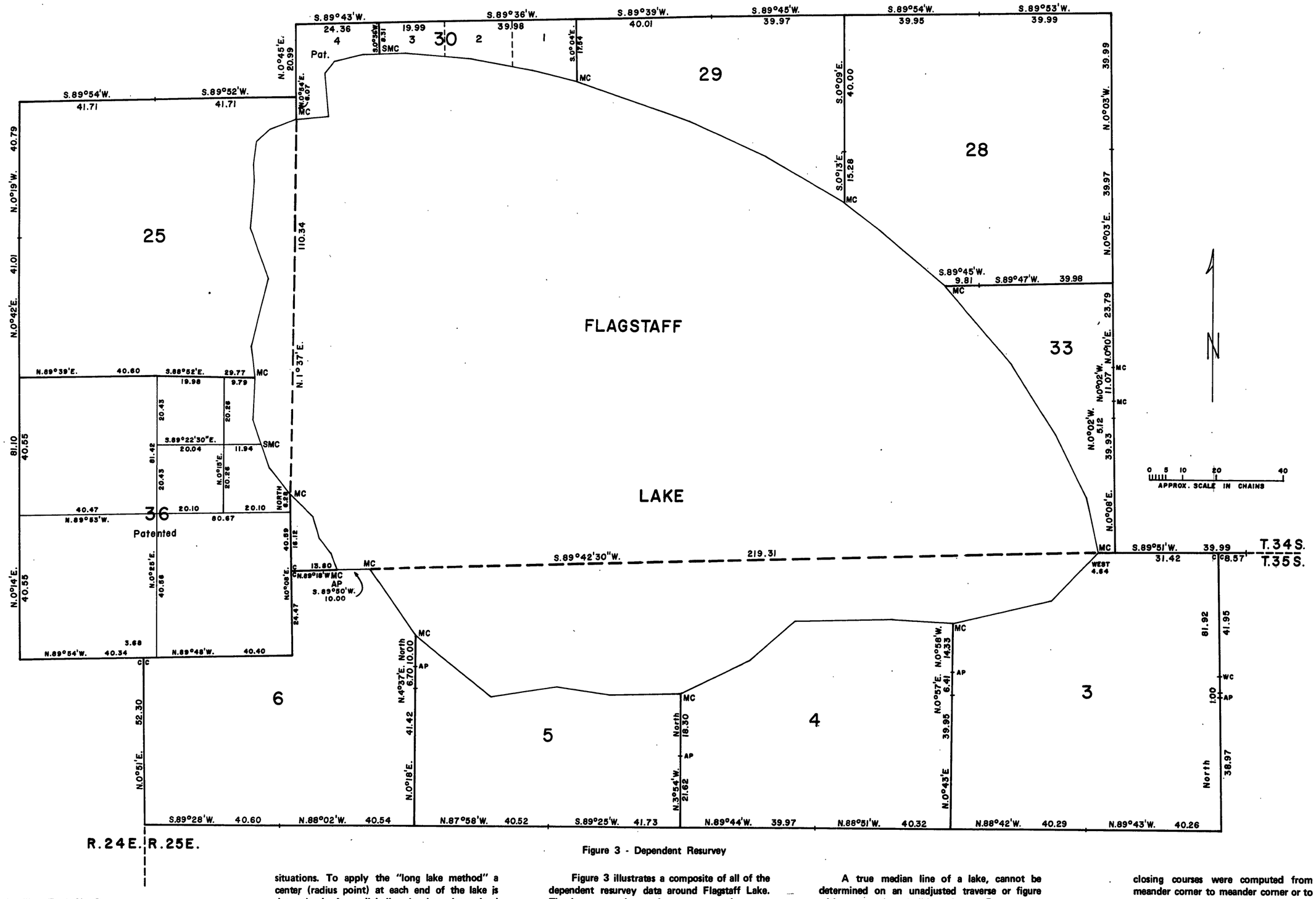


Figure 3 - Dependent Resurvey

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.

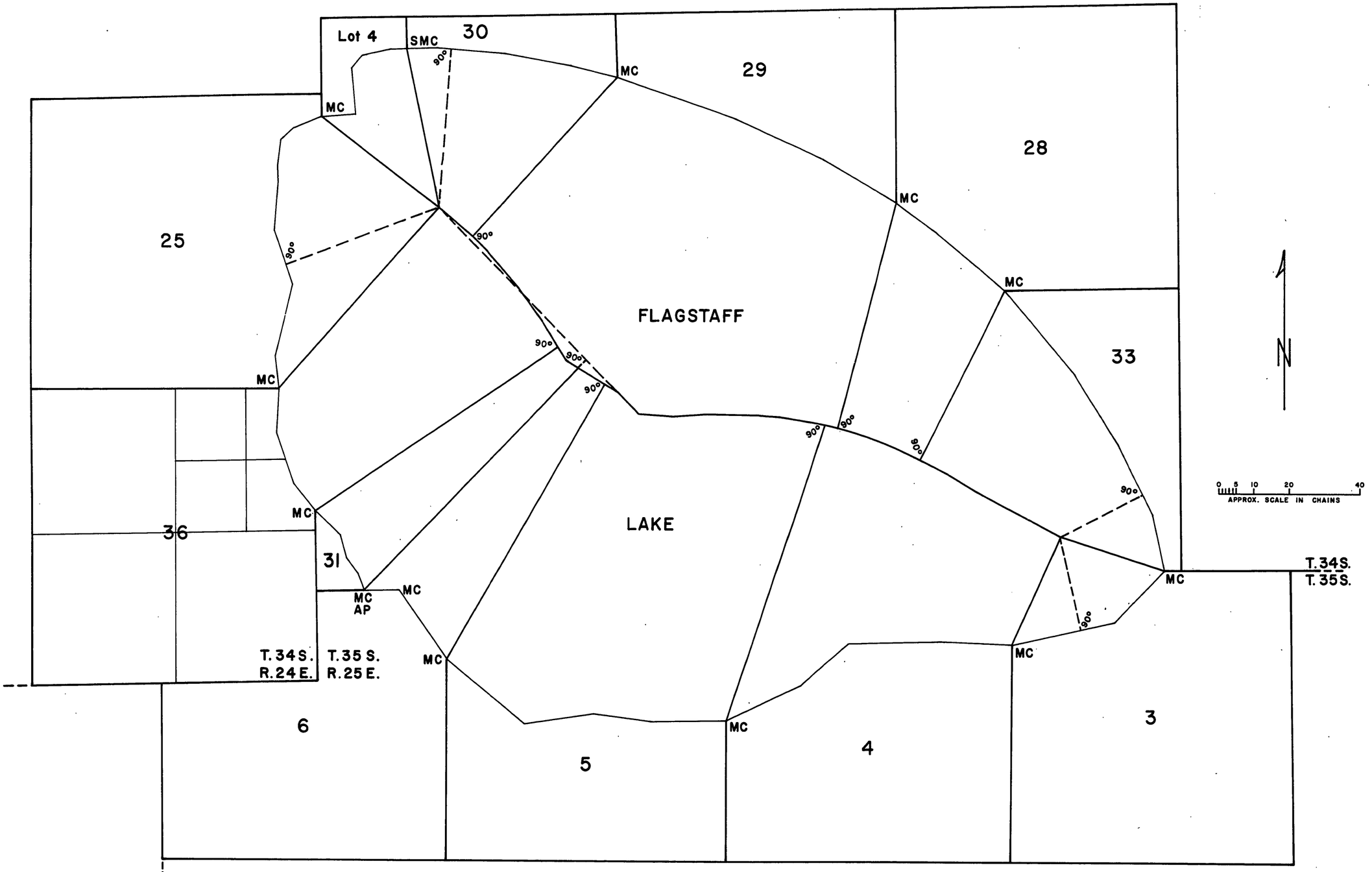


Figure 4 - "Long Lake Method" Division

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.

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.

RELICTION OF FLAGSTAFF LAKE

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

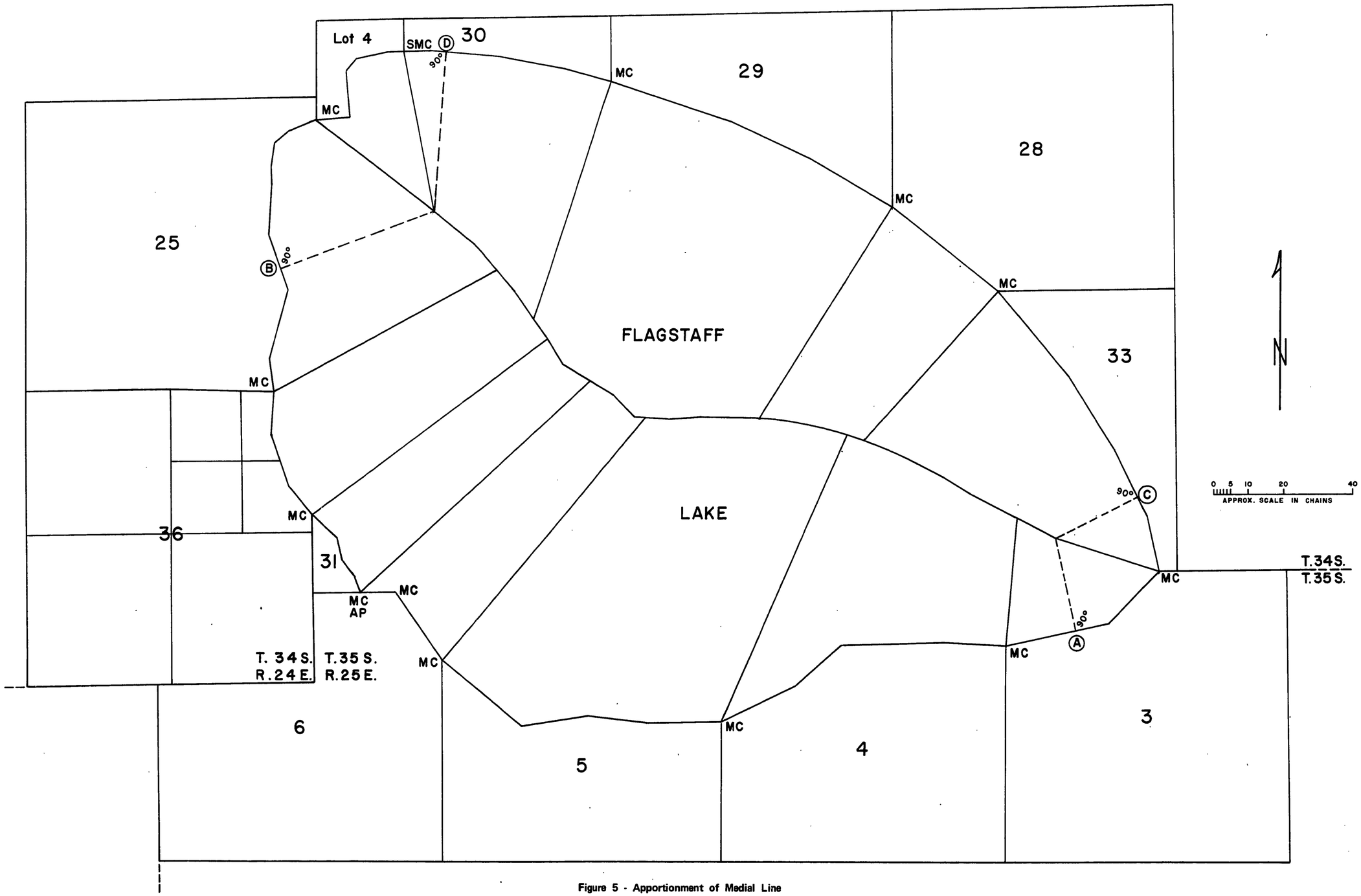


Figure 5 - Apportionment of Medial Line

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.

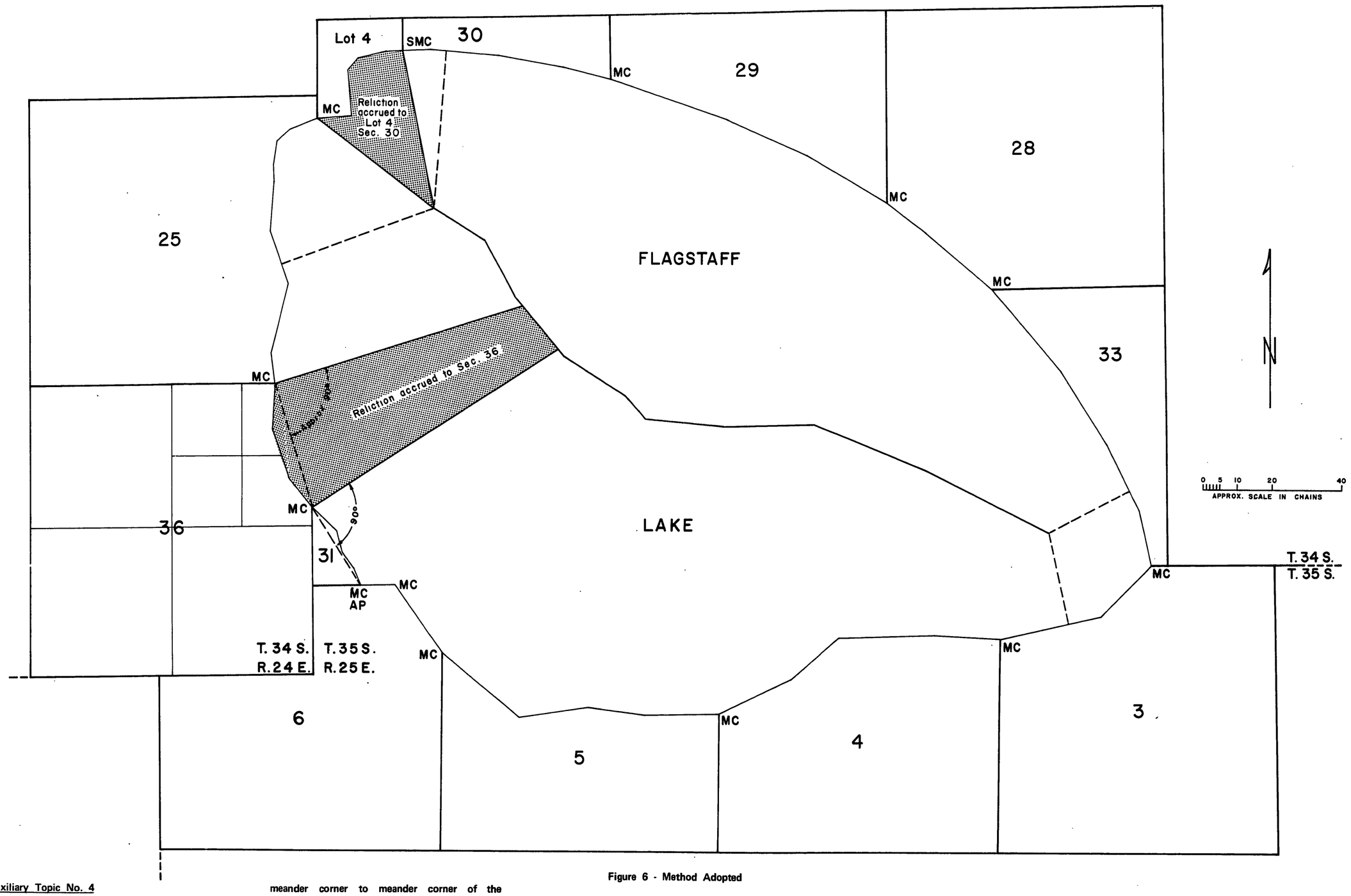


Figure 6 - Method Adopted

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

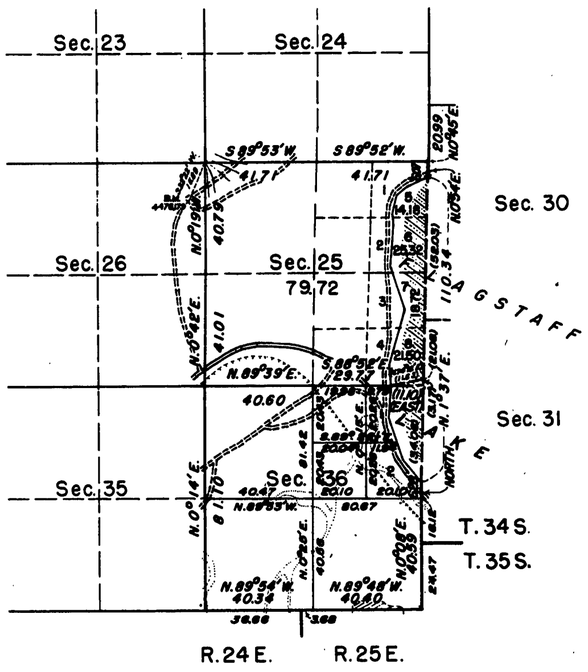
N. 77° 53' E., 8.588

N. 88° 24' E., (4.422 to SMC) 12.978

S. 84° 05' E., 19.961

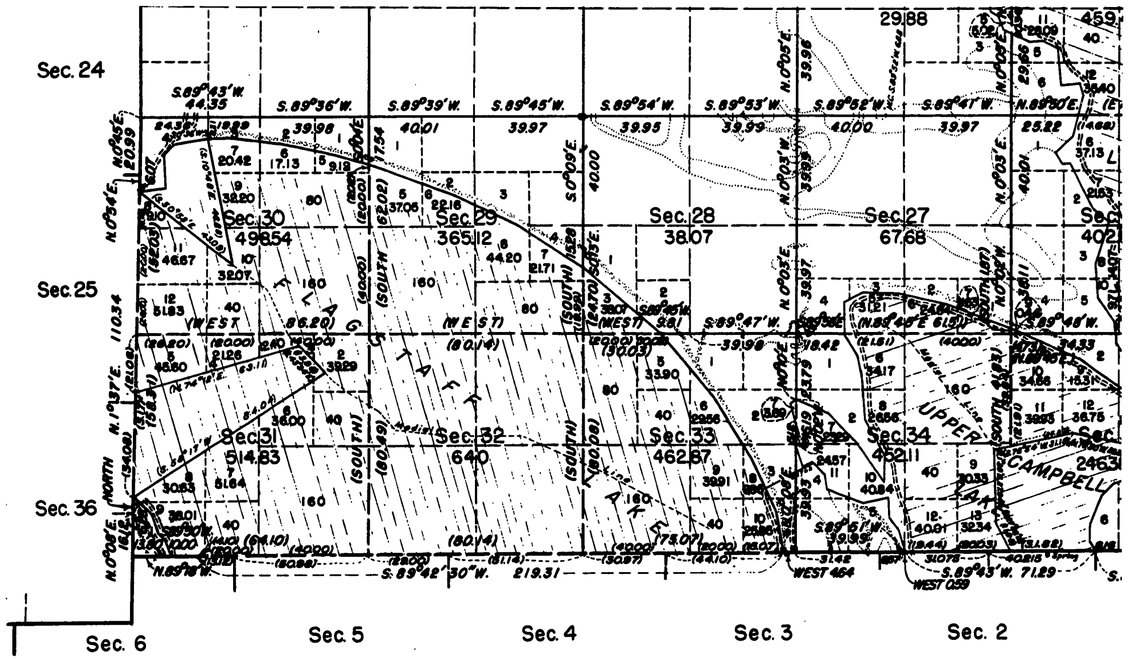
S. 78° 49' E., 20.958

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



RELICTION OF FLAGSTAFF LAKE

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



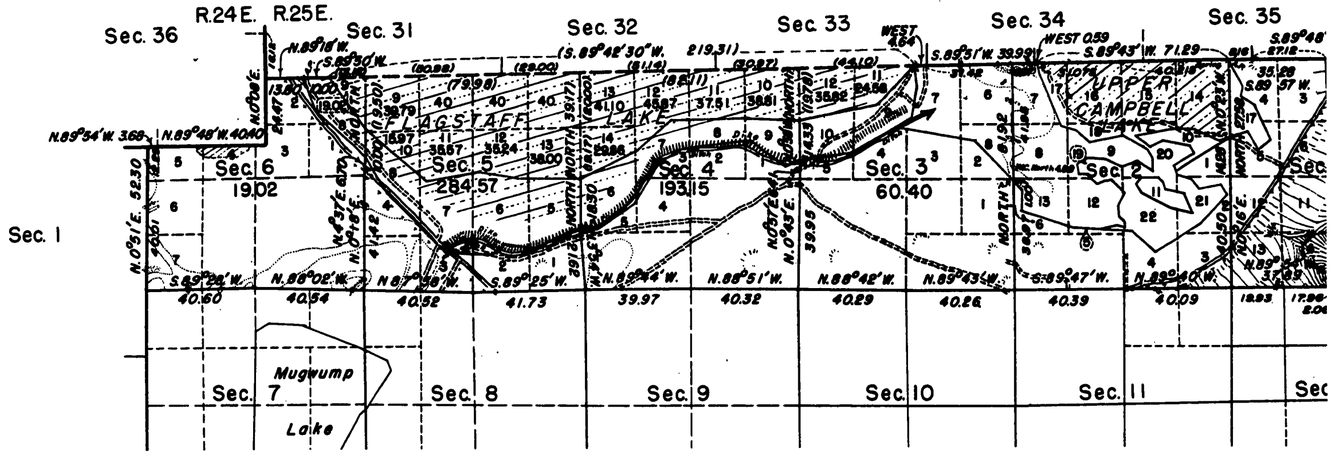
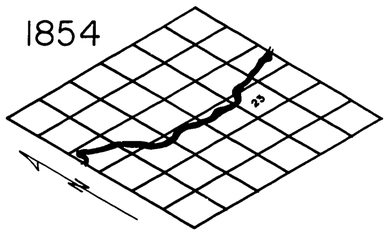


Figure 7 - Portions of Accepted Plats

(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.

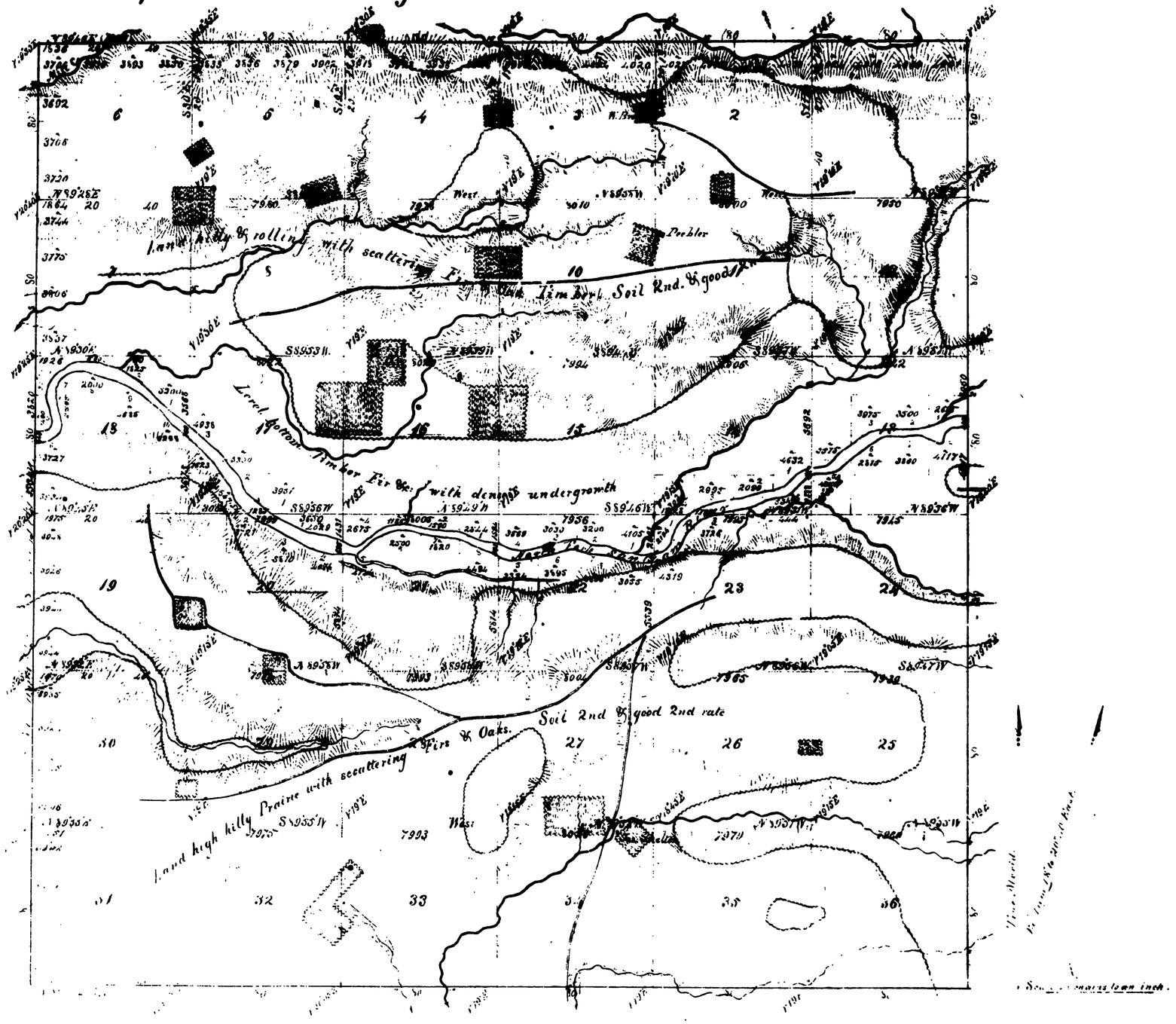


Figure 1 - Original 1854 Plat

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
N. 57° E., 3.50	S. 83° 15' W., 2.86
N. 64° E., 5.00	S. 79° W., 1.20 to MC 22 & 23 Thence in Sec. 22
N. 73° 45' E., 10.00	S. 79° W., 6.21
N. 84° E., 10.00	N. 80° W., 7.80

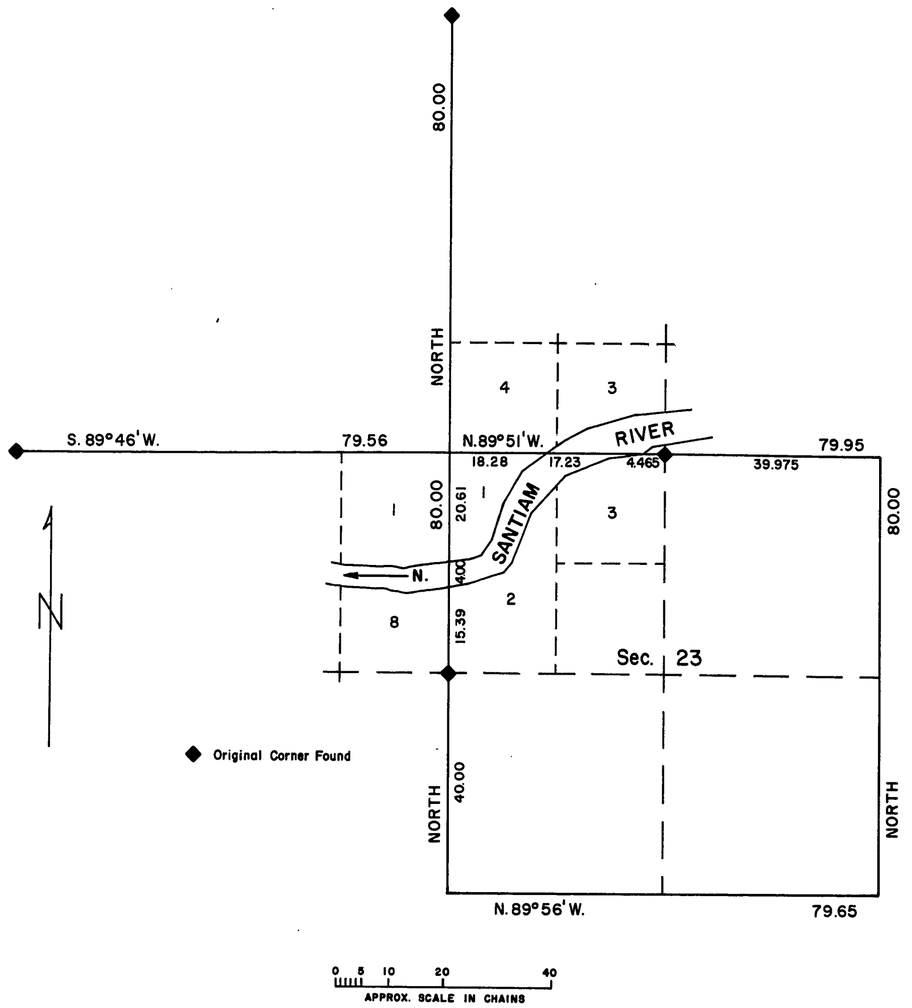


Figure 2 - Original Record and Corner Recovery

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.

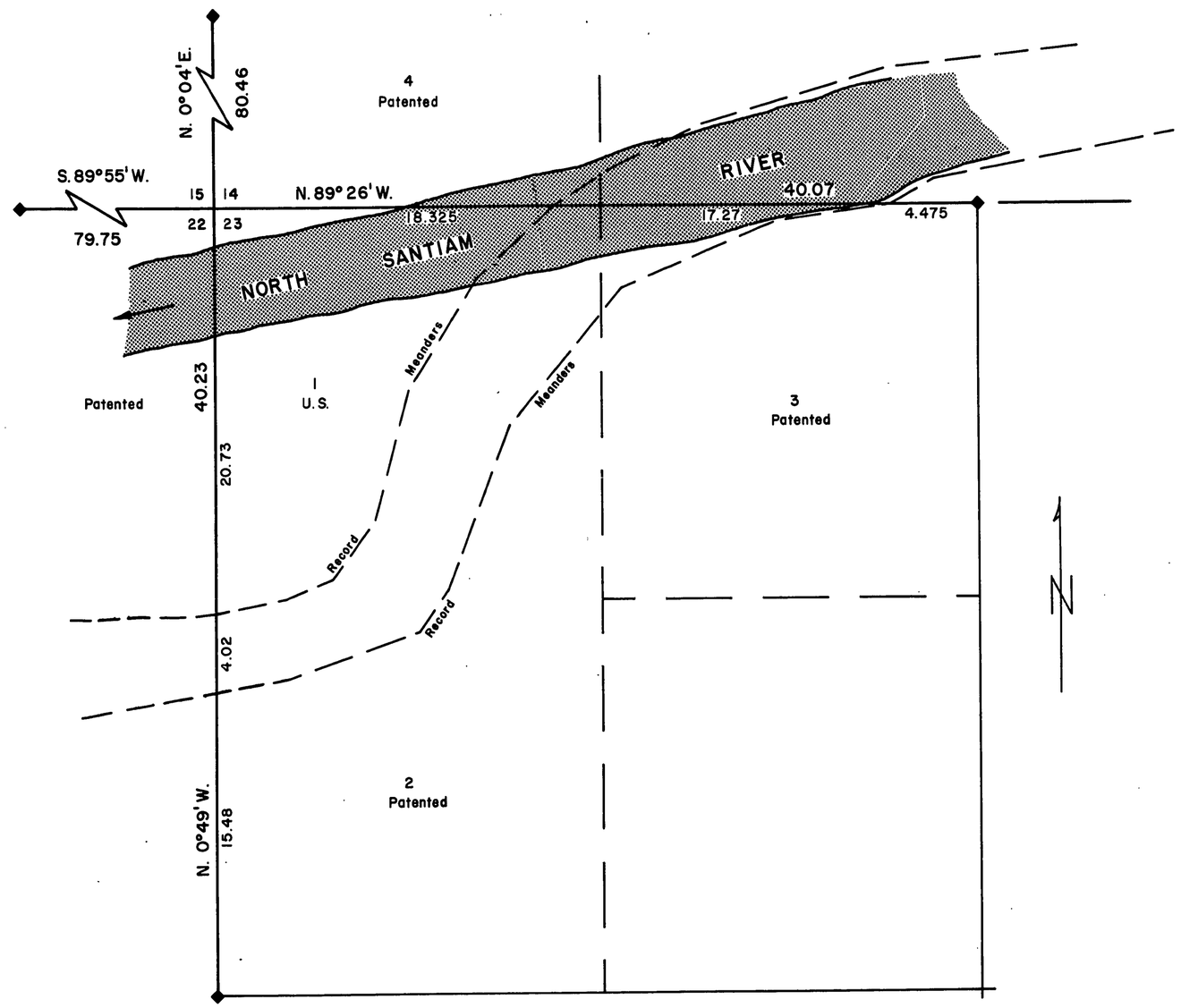


Figure 3 - Dependent Resurvey and Present Conditions

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. 79¼° 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.

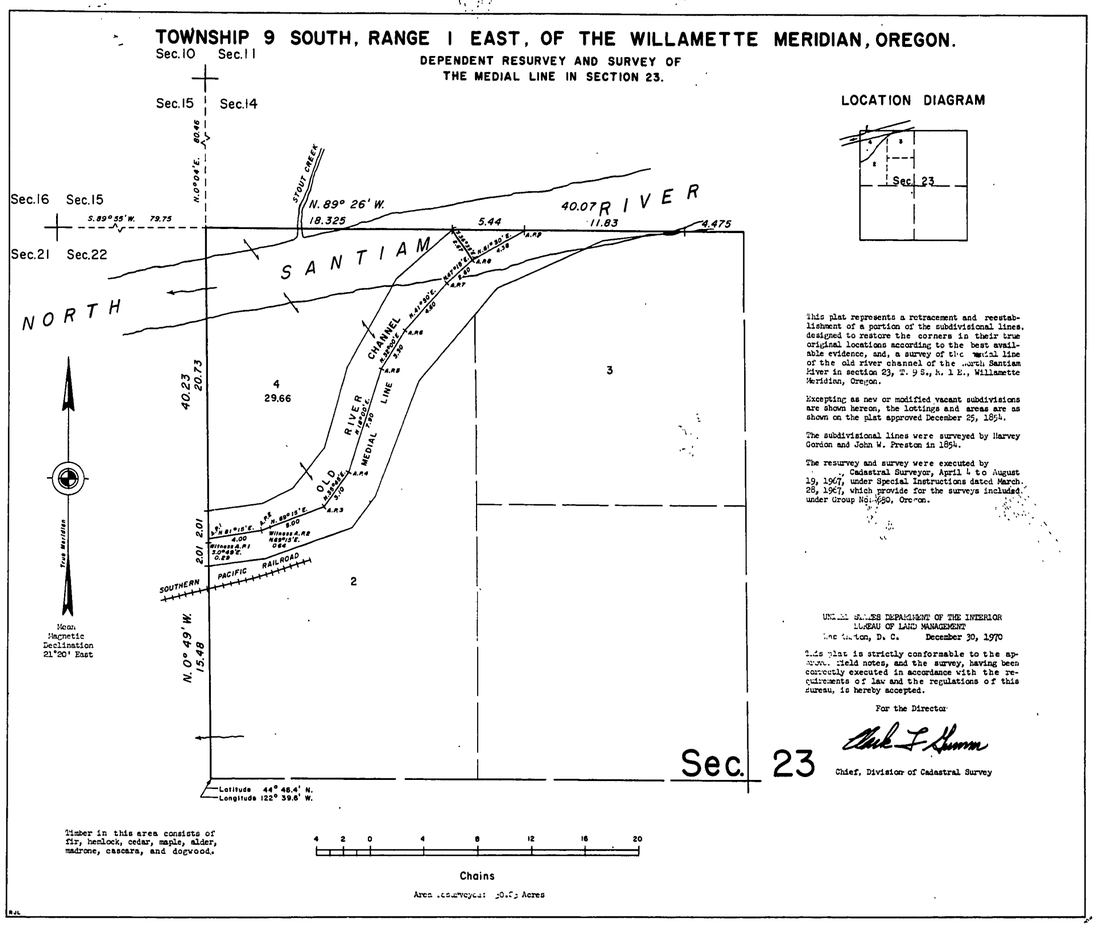


Figure 4 - Accepted Plat

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.

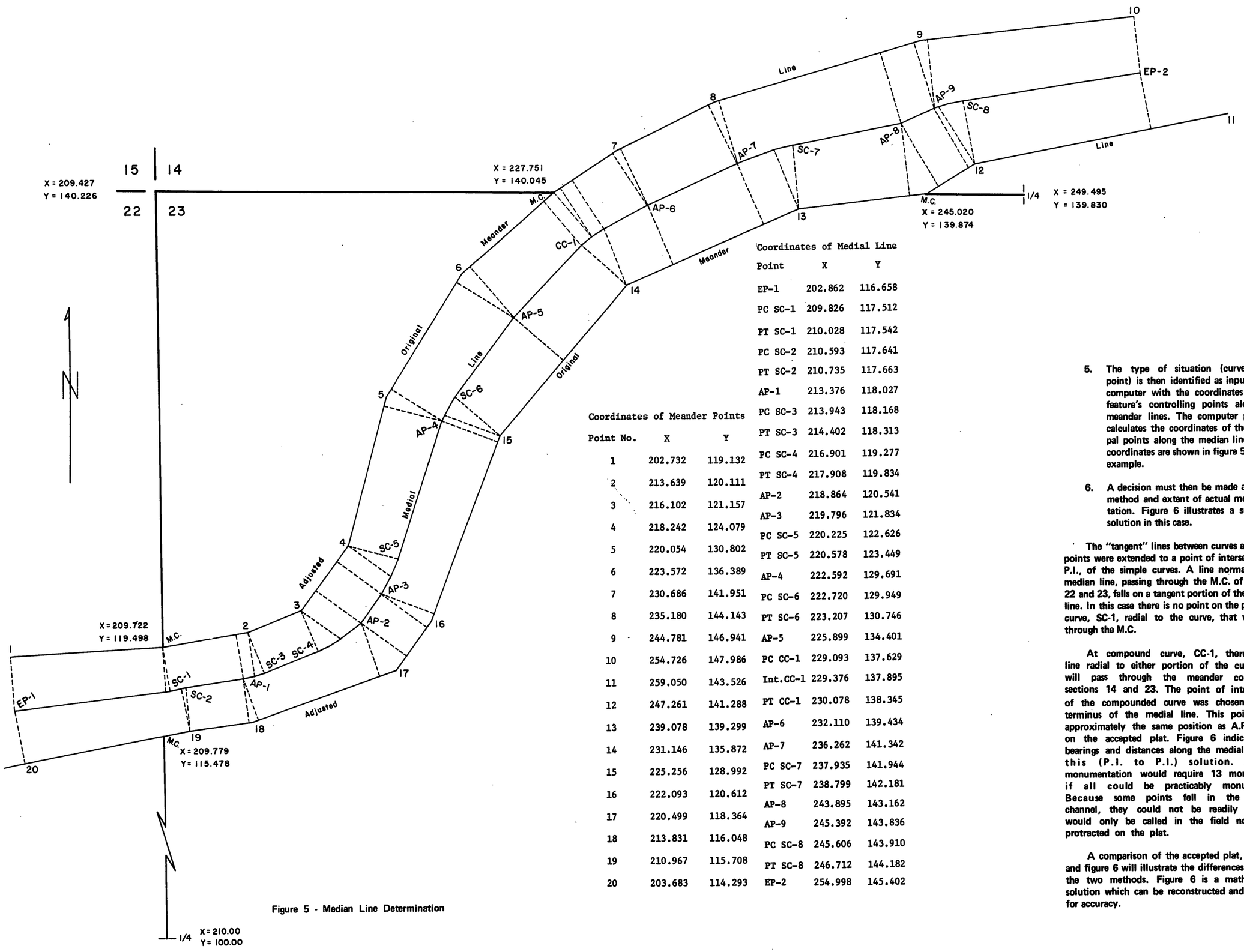


Figure 5 - Median Line Determination

Coordinates of 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

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

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.

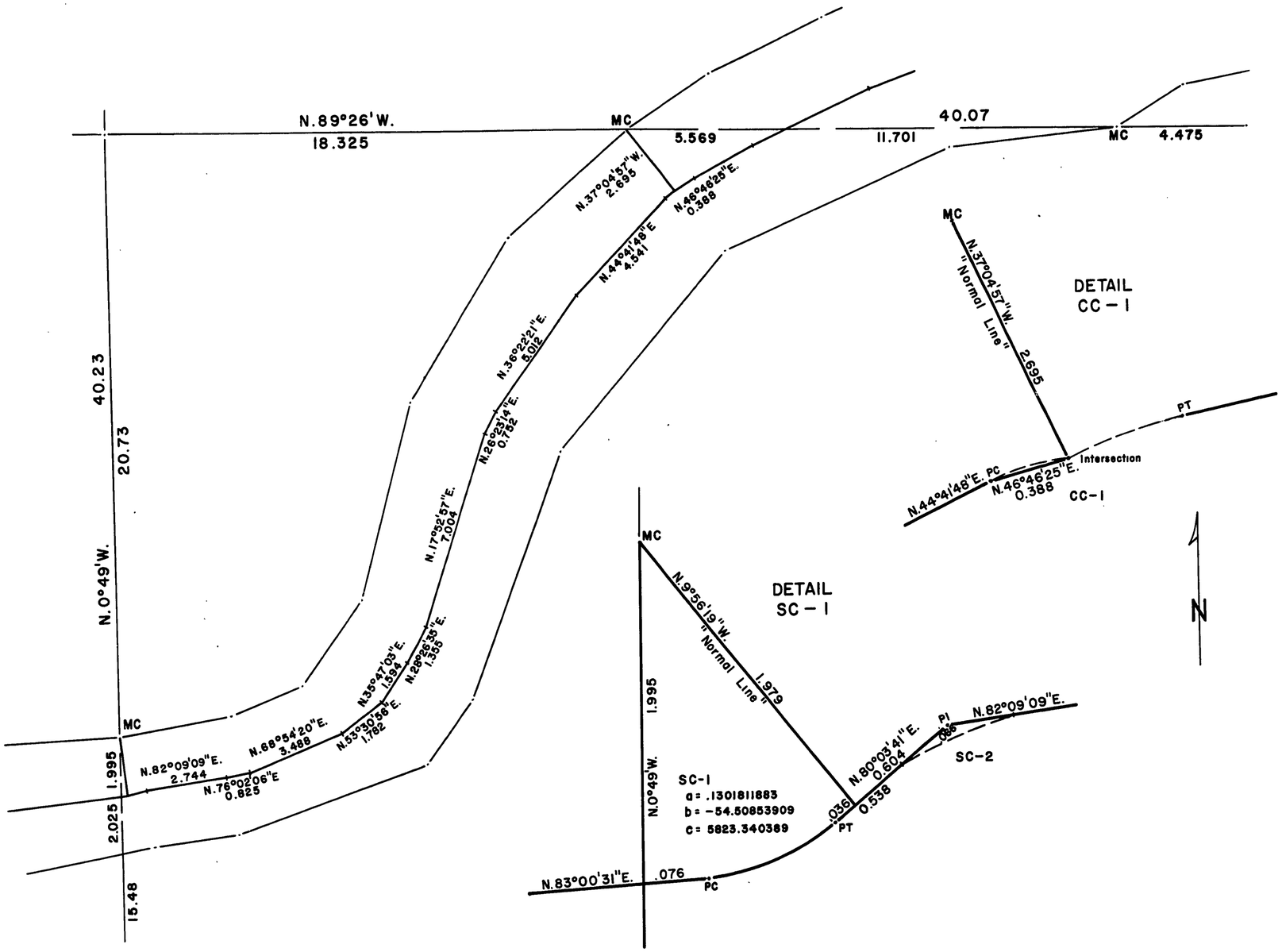
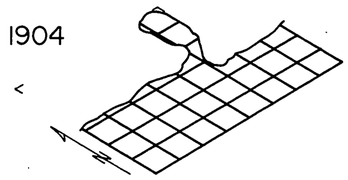
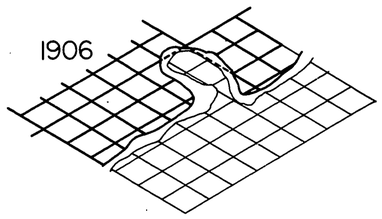


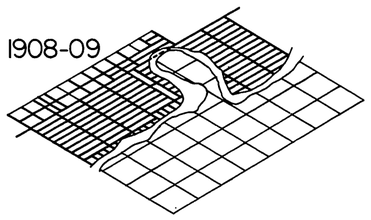
Figure 6 - Computed Medial Line

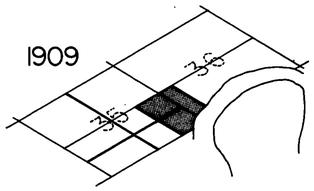
AVULSION ON THE MISSOURI RIVER

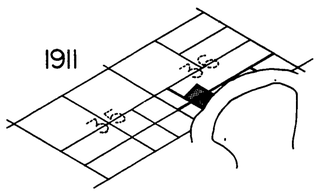
T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA

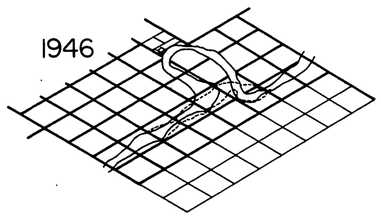












History of Surveys

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."

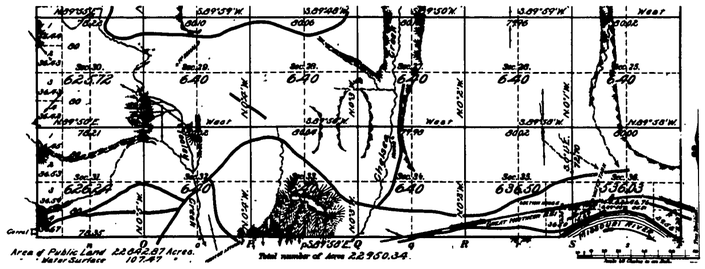
During the execution of these dependent resurveys ties were made across the river, but were described in the field notes and shown on the plats as section lines, connecting the Page and Cumming surveys.

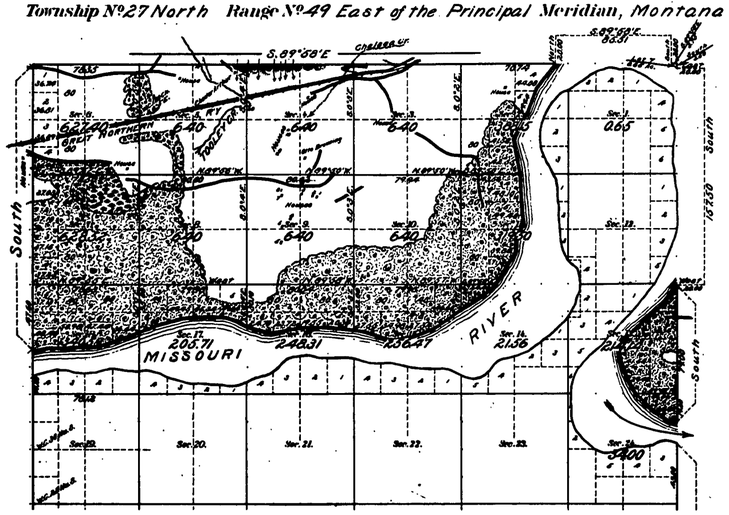
Pertinent portions of these surveys are illustrated in figure 4.

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.





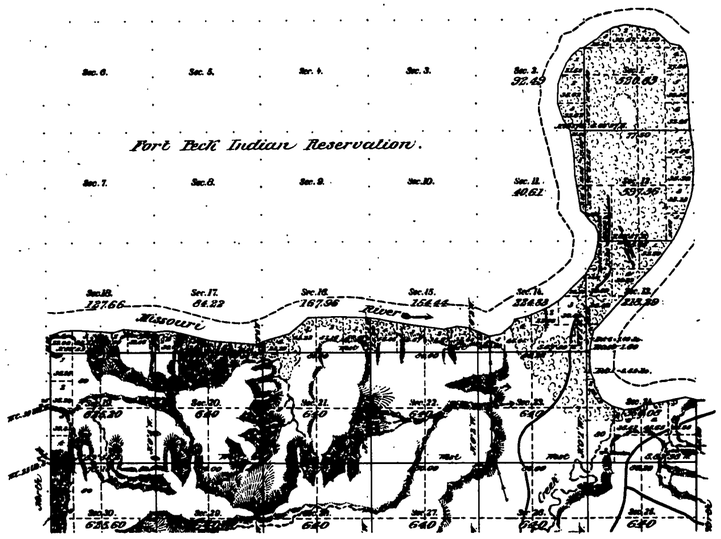
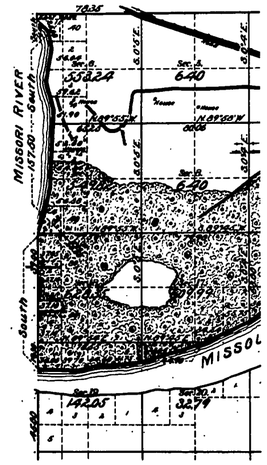


Figure 1 - Portions of Original 1904 and 1906 Plats



Special Instructions

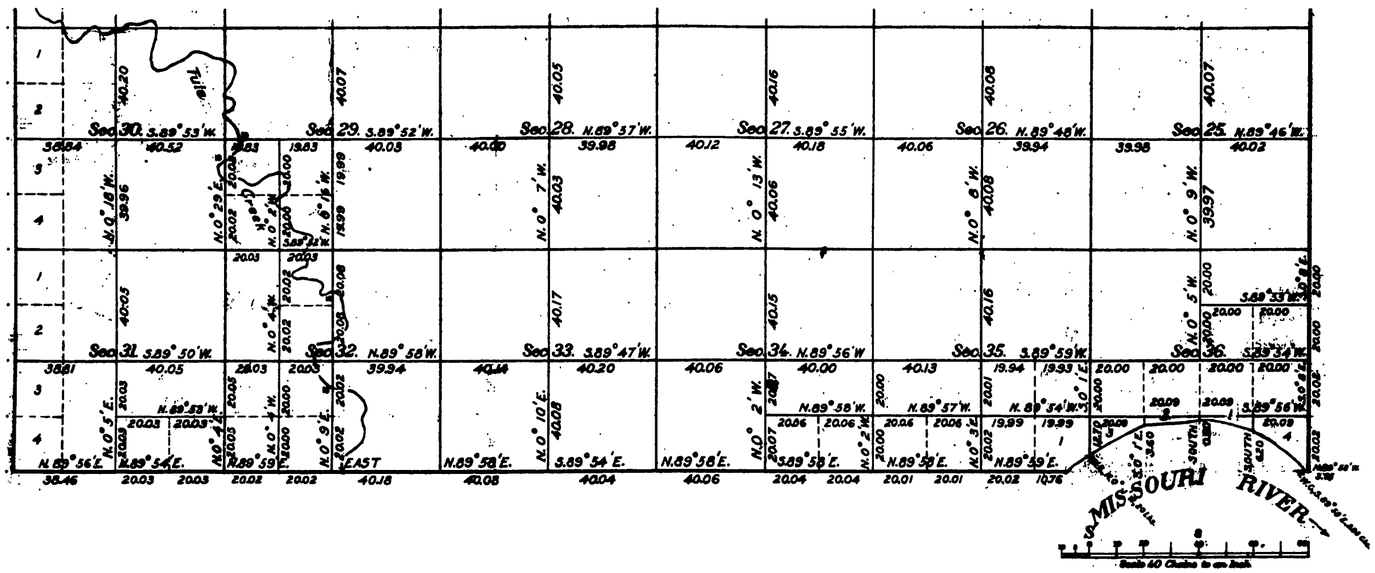
Instructions for an investigation of possible changes issued on November 16, 1953 asked the following questions:

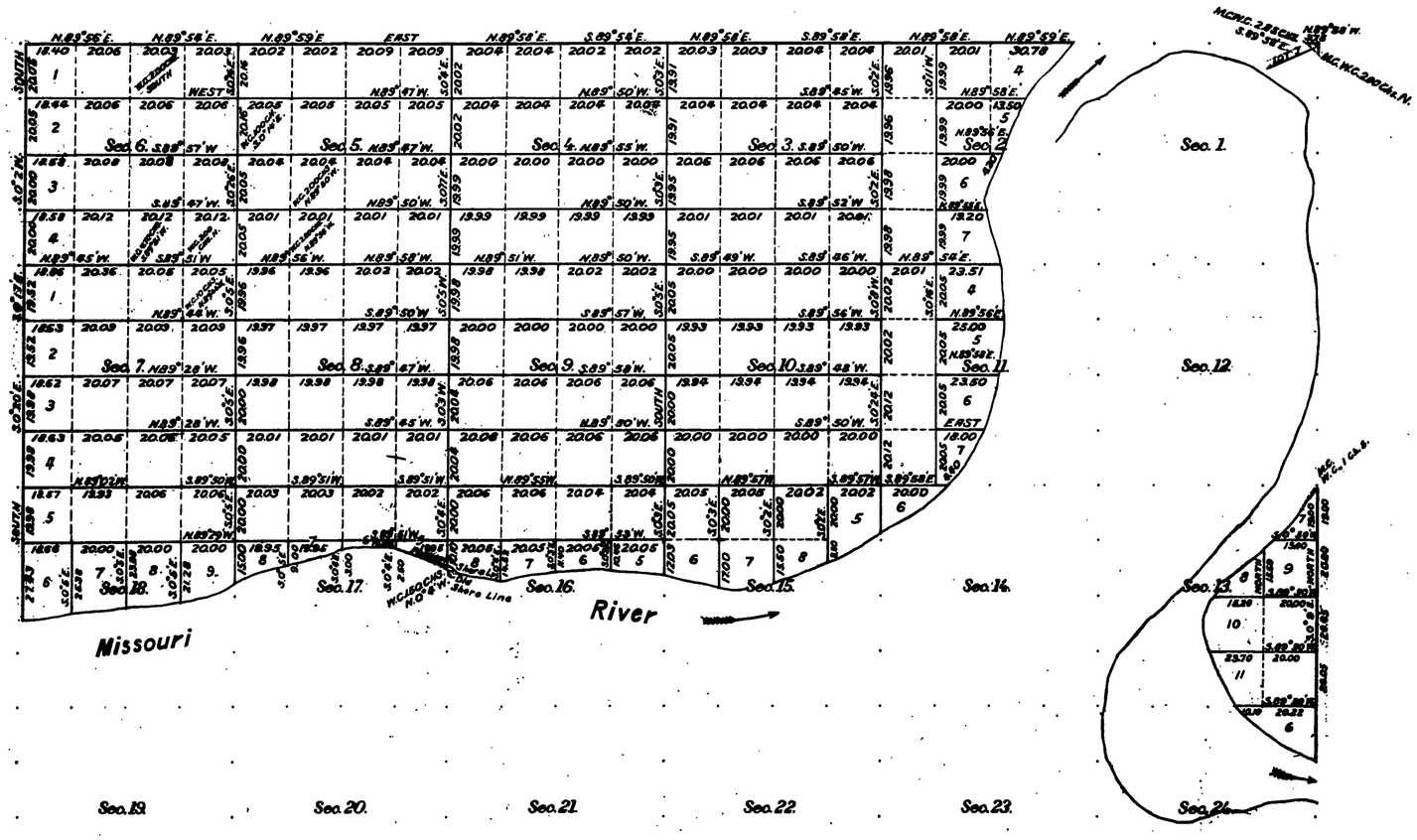
1. Was it an avulsive change?
2. If the change was avulsive, when did the river cut across the base of the ox-bow loop?
3. Did the entire flow of the river change to the new channel within one season, or did the old channel continue to carry a portion of the flow for a few years?
4. If the river, after 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 extant of accretions at the time of the avulsive change?

D7-1

AVULSION ON THE MISSOURI RIVER

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





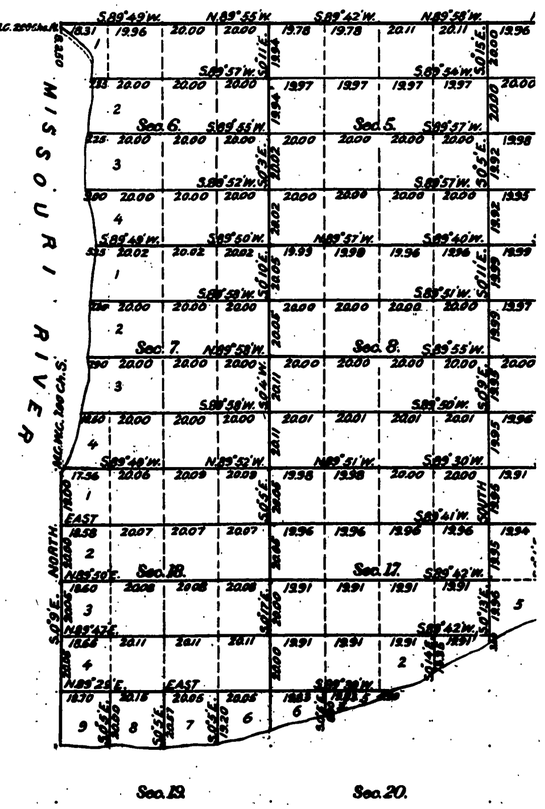


Figure 2 - 1908-1909 Harrington Subdivisions

D7-2

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.

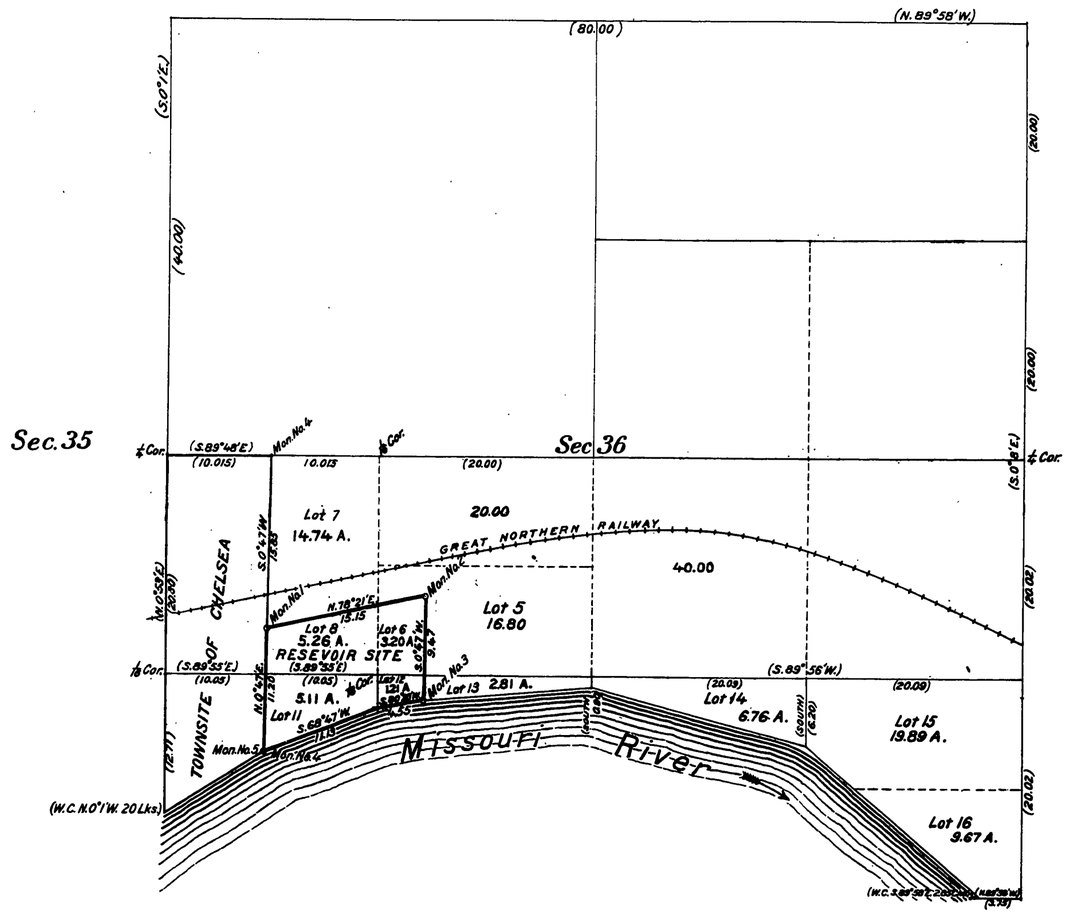
Dated and signed at Fort Peck Agency, Montana, on the twenty-eighth day of December, eighteen hundred and eighty-six.

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.

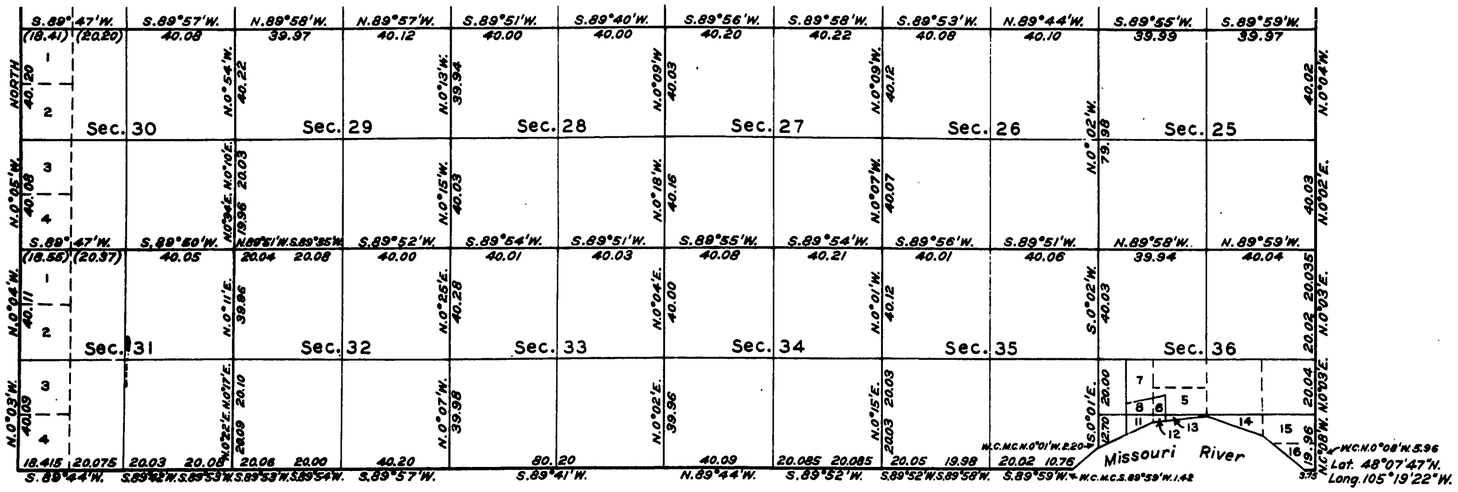
Surveyed June 20, 1911.

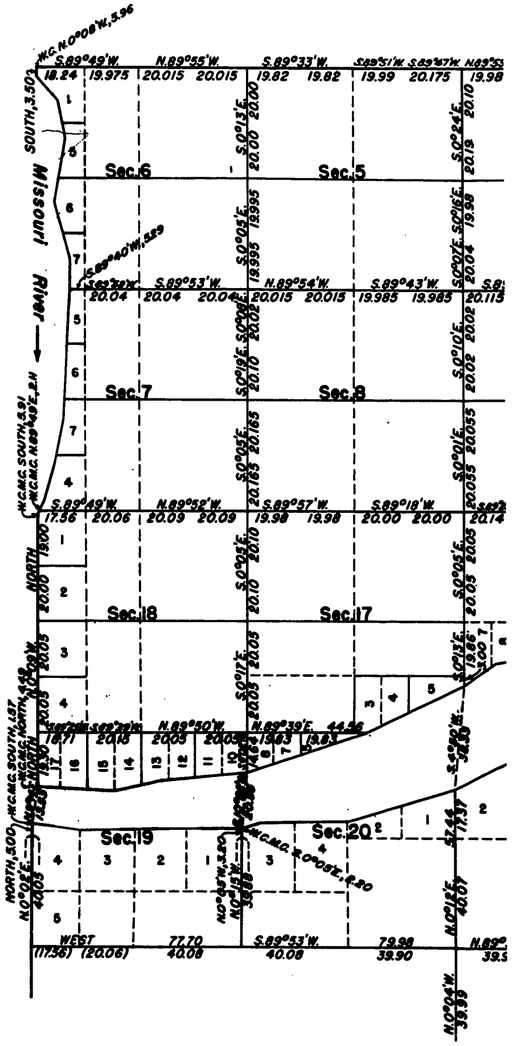
Figure 3 - Reservoir Site, 1911

D7-3

AVULSION ON THE MISSOURI RIVER

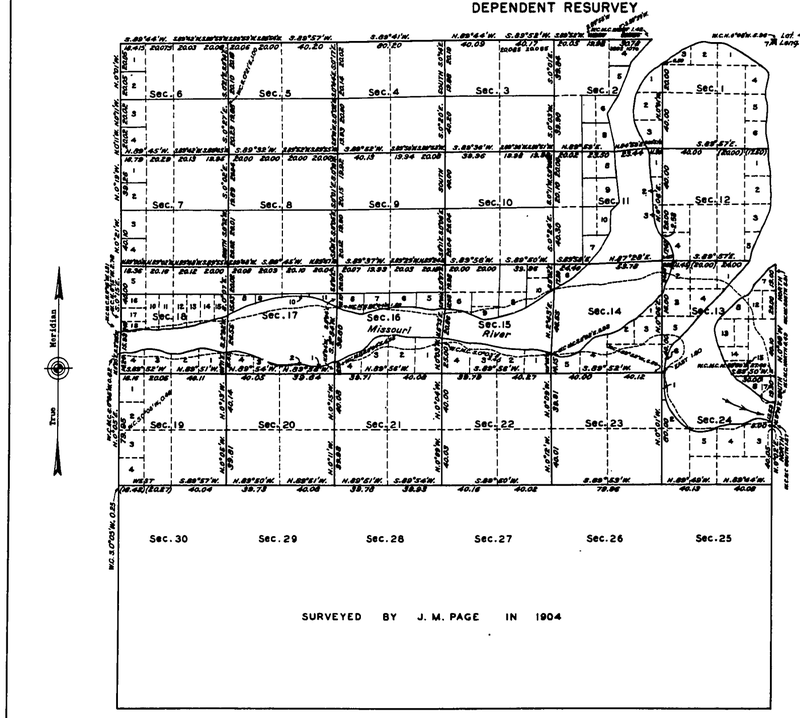
T. 27 N., R. 49 E., PRINCIPAL MERIDIAN, MONTANA





TOWNSHIP 27 NORTH, RANGE 49 EAST, OF THE PRINCIPAL MERIDIAN, MONTANA

DEPENDENT RESURVEY



This plat represents a retracement and reestablishment of portions of the original township boundary and subdivisional lines designed to restore the corners in their original locations according to the best available evidence. The lottings and areas are as shown on formerly approved plats.

10 0 10 20 40 80

Scale in Chains

Area Resurveyed: 12,898.83 Acres

A portion of the north boundary was resurveyed by A. W. Brown and a portion of the west boundary by Emil Voigt and Andrew Nelson and a portion of the east boundary by Marvin J. Lytle in 1946.

A portion of the subdivisional lines was resurveyed by William H. Teller May 16 to June 4, 1947 under Special Instructions for Group 427 Montana dated April 9, 1946.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C., June 24, 1952

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

William F. Richards

Chief, Branch of Surveys

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.

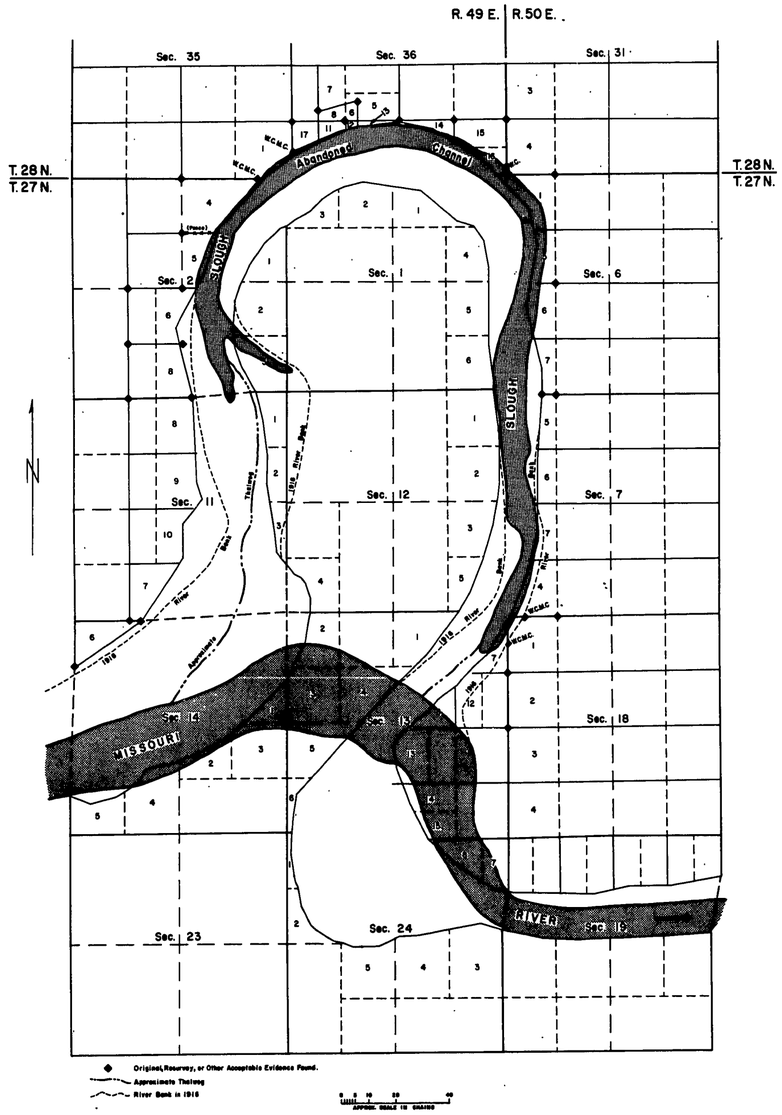


Figure 5 - Existing Conditions

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. 43⅜° 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

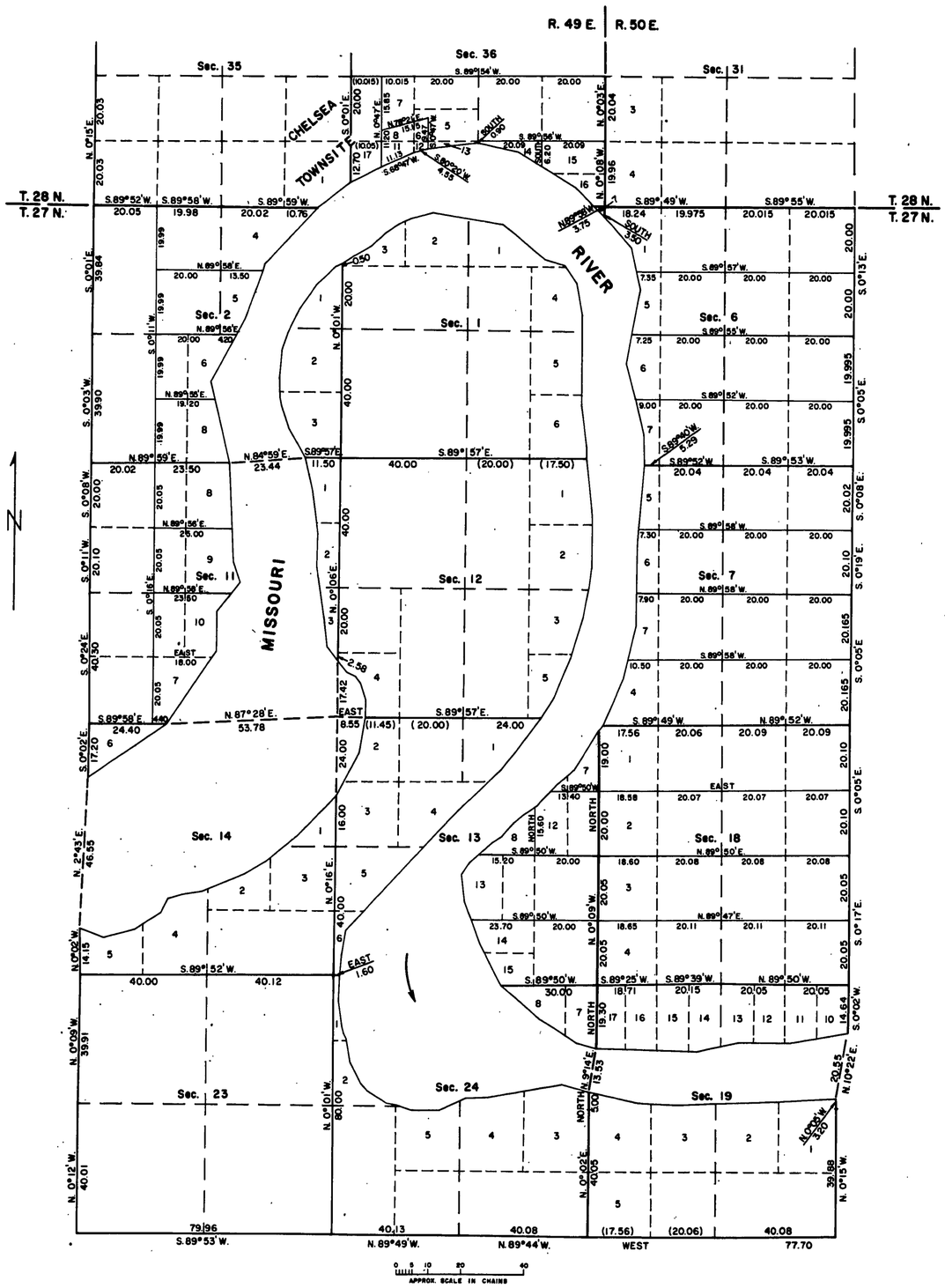


Figure 6 - Composite of Latest Survey Records

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.

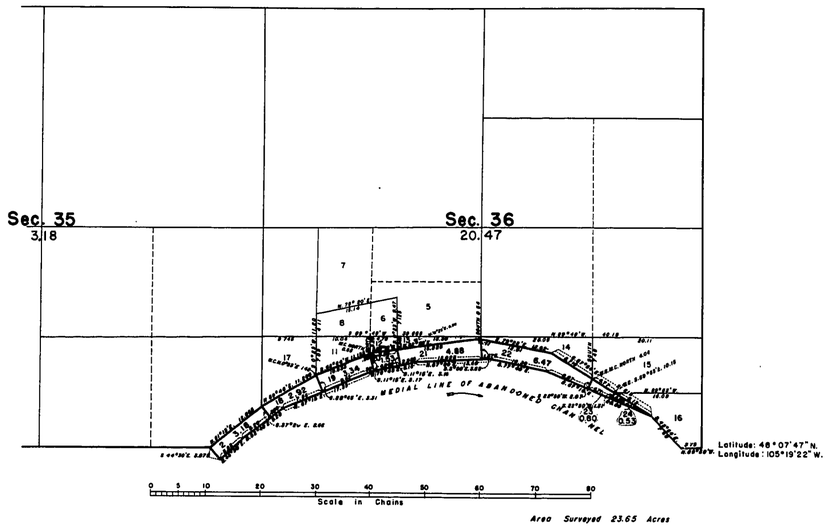
The thalweg and middle of the old channel was surveyed, with angle points creating a fixed boundary.

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.

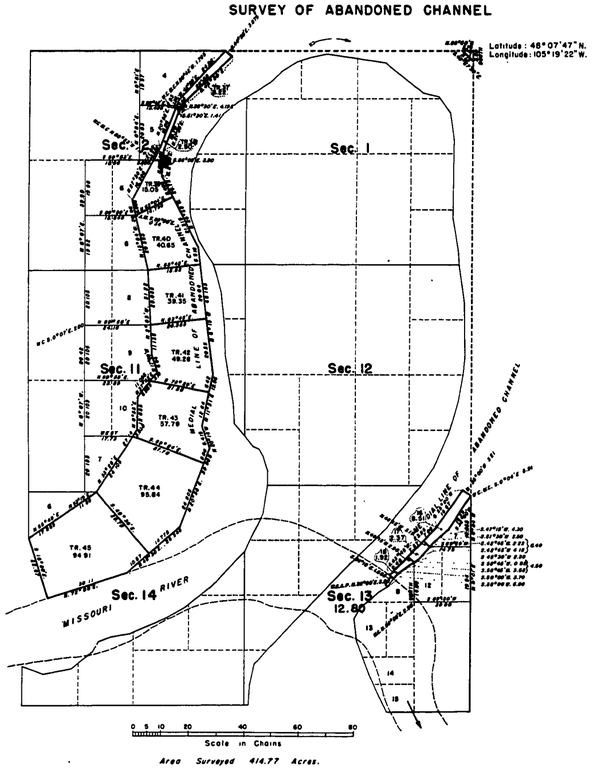
AVULSION ON THE MISSOURI RIVER

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

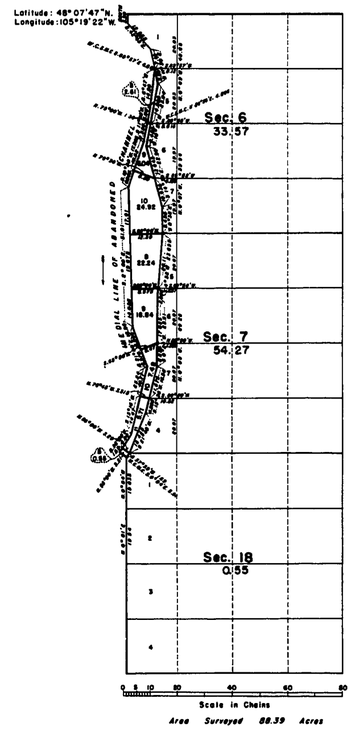


Figure 7 - Portions of Accepted Plats

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

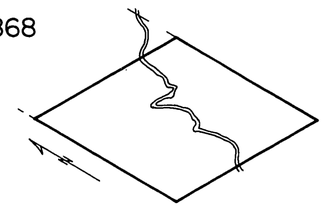
Boundary of Riparian Tract

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.

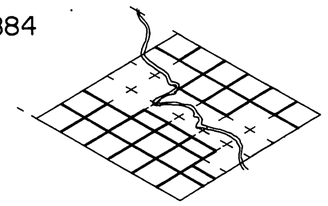
PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

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

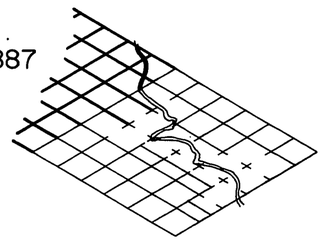
1868



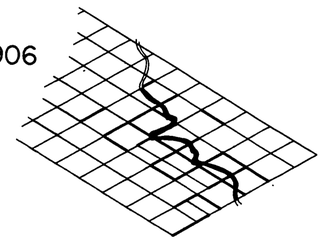
1884



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.

Township No 2 South, Range No 1 East

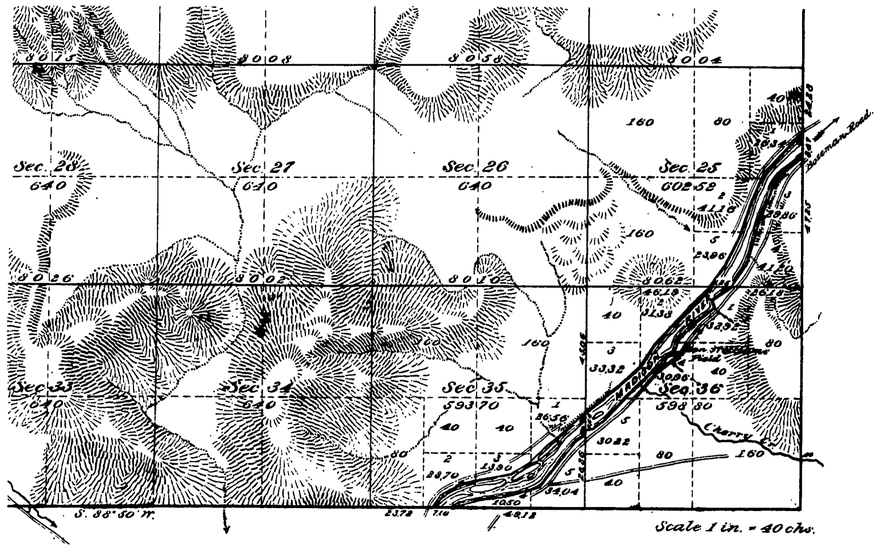


Figure 2 - Portion of 1887 Original Plat

Township No 3 South Range No 1 East of the Principal Meridian Montana

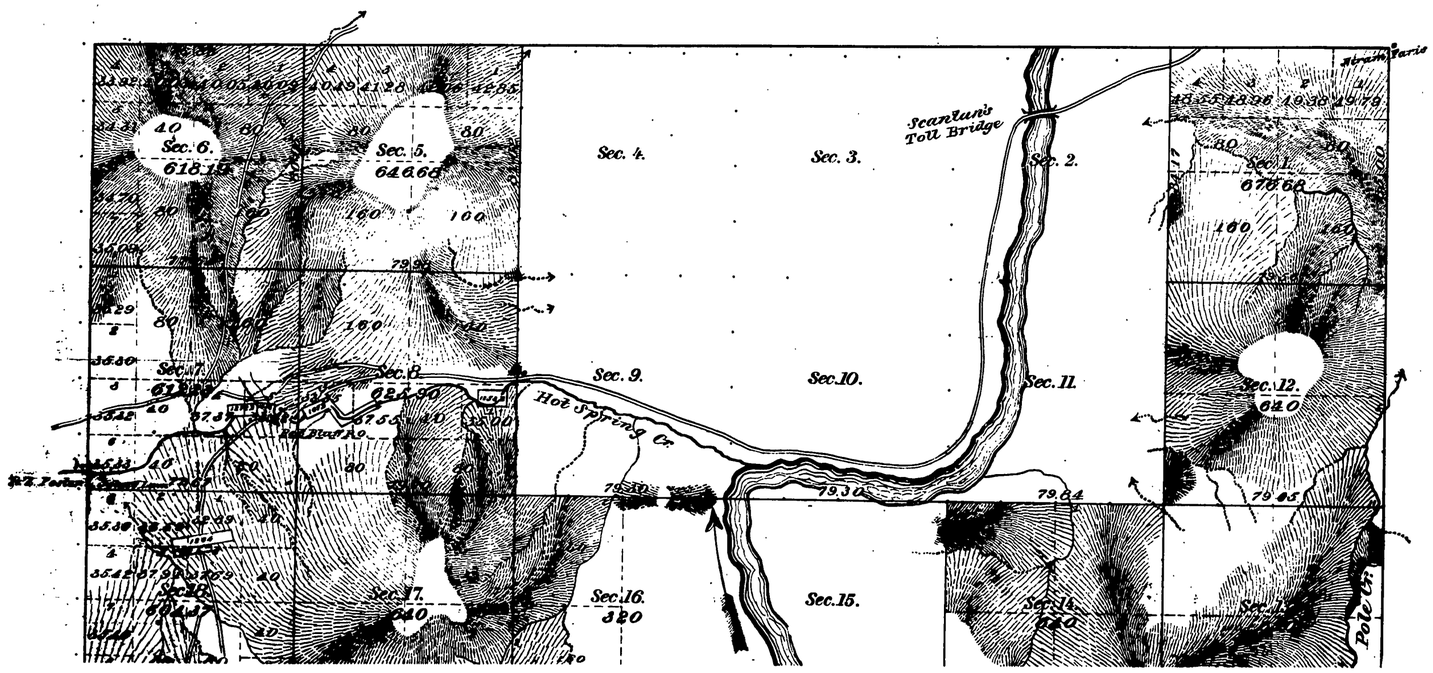


Figure 1 - Portion of Original 1884 Survey Plat

D8-1

PARENTHETICAL DISTANCE & MEANDERS-MADISON R.

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

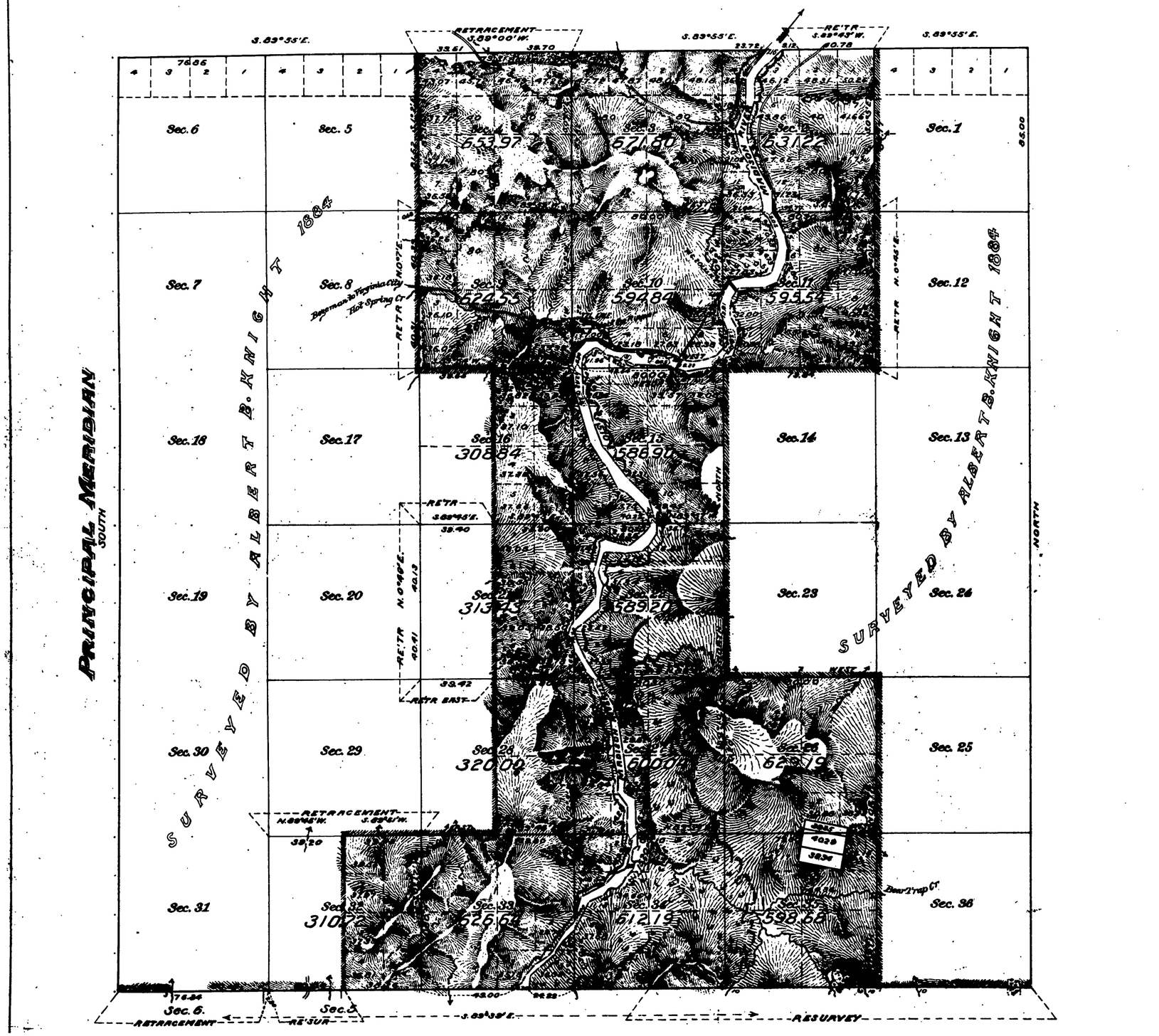


Figure 3 - 1906 Completion Survey

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

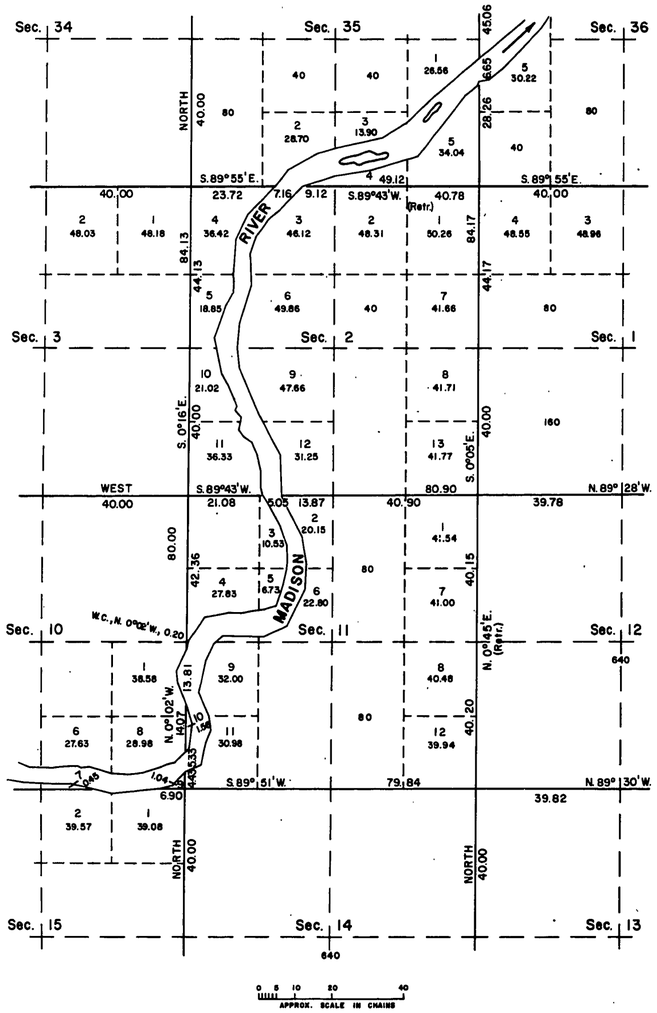


Figure 4 - Composite of Record Surveys

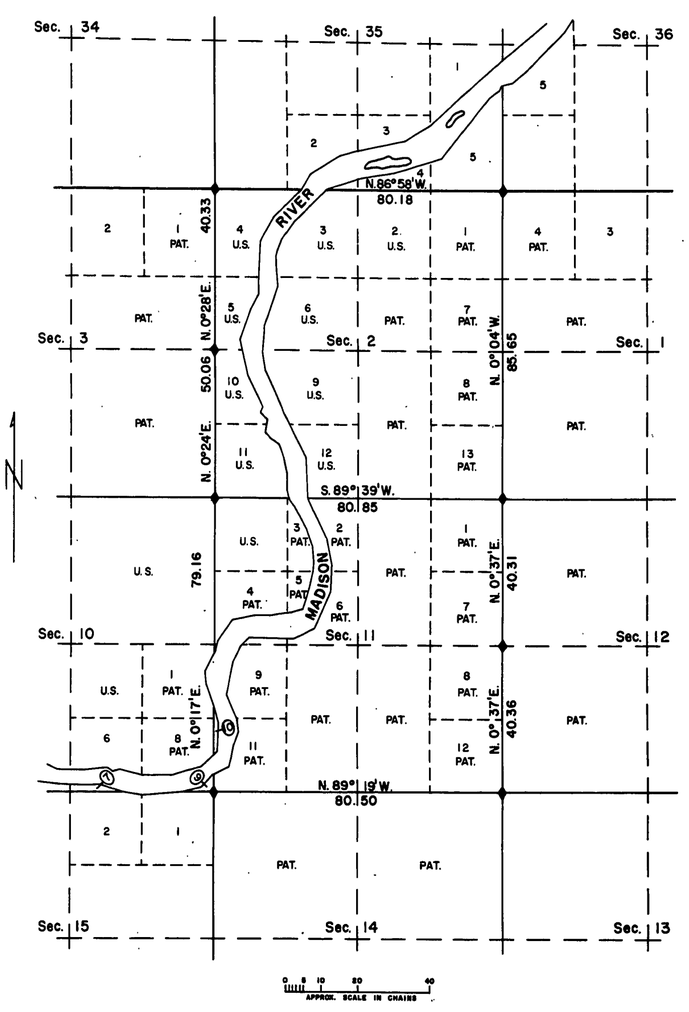


Figure 5 - Retracement Data and Status

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.

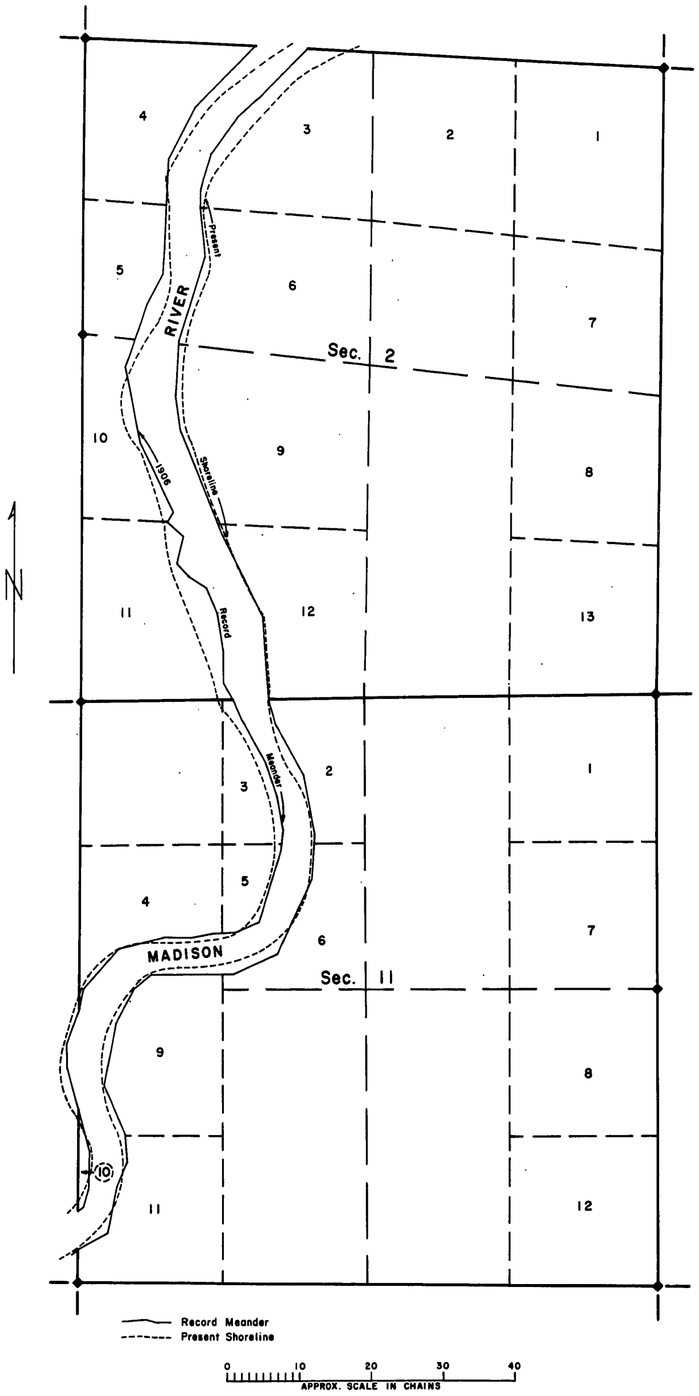


Figure 6 - Actual River Location

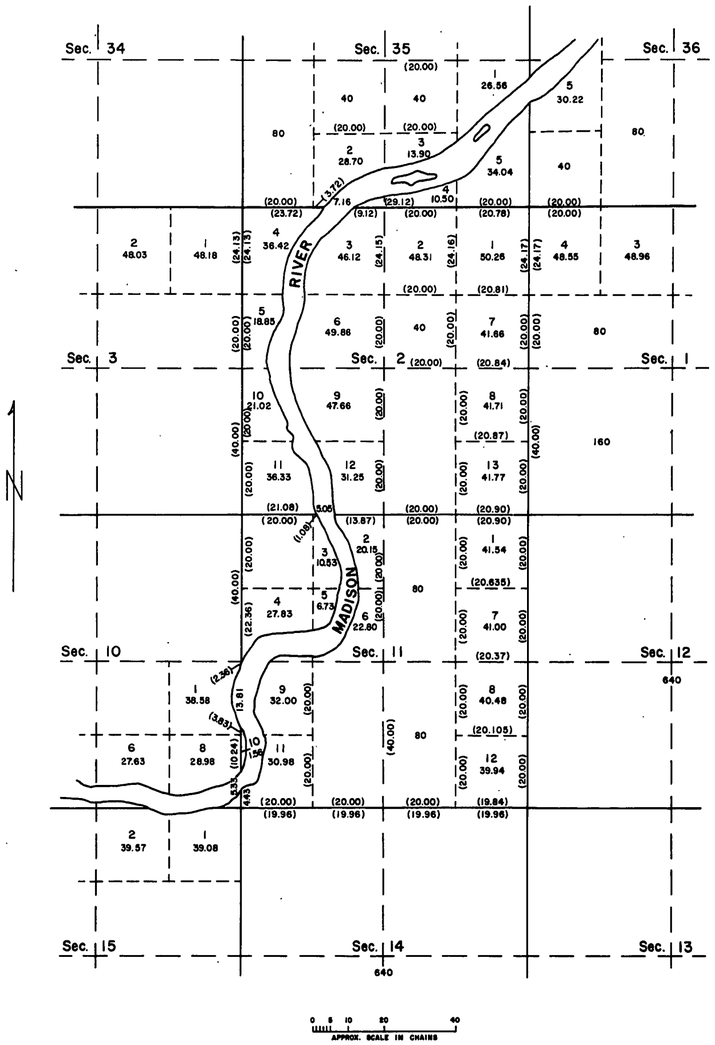


Figure 7 - Areas and Parenthetical Distances

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

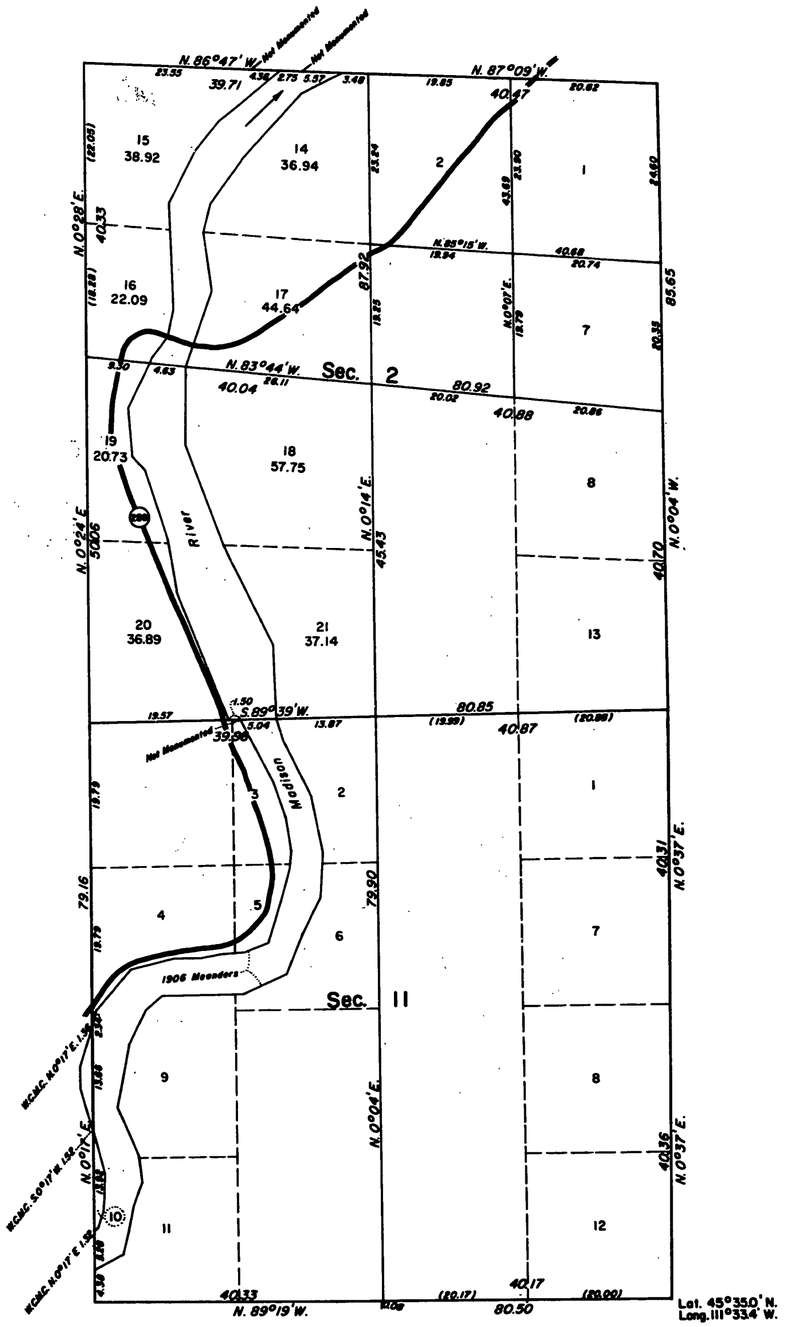
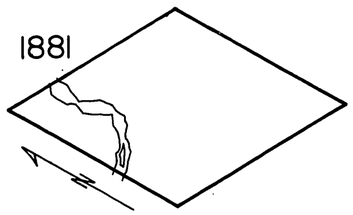


Figure 8 - Portions of Accepted Plat

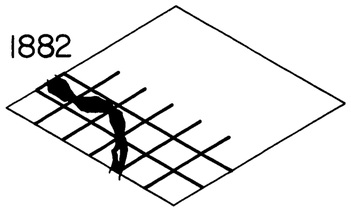
OMITTED LANDS ALONG YELLOWSTONE RIVER

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

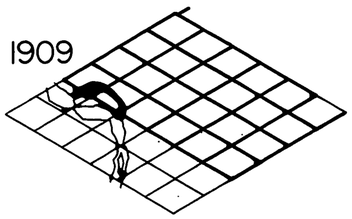
1881



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.

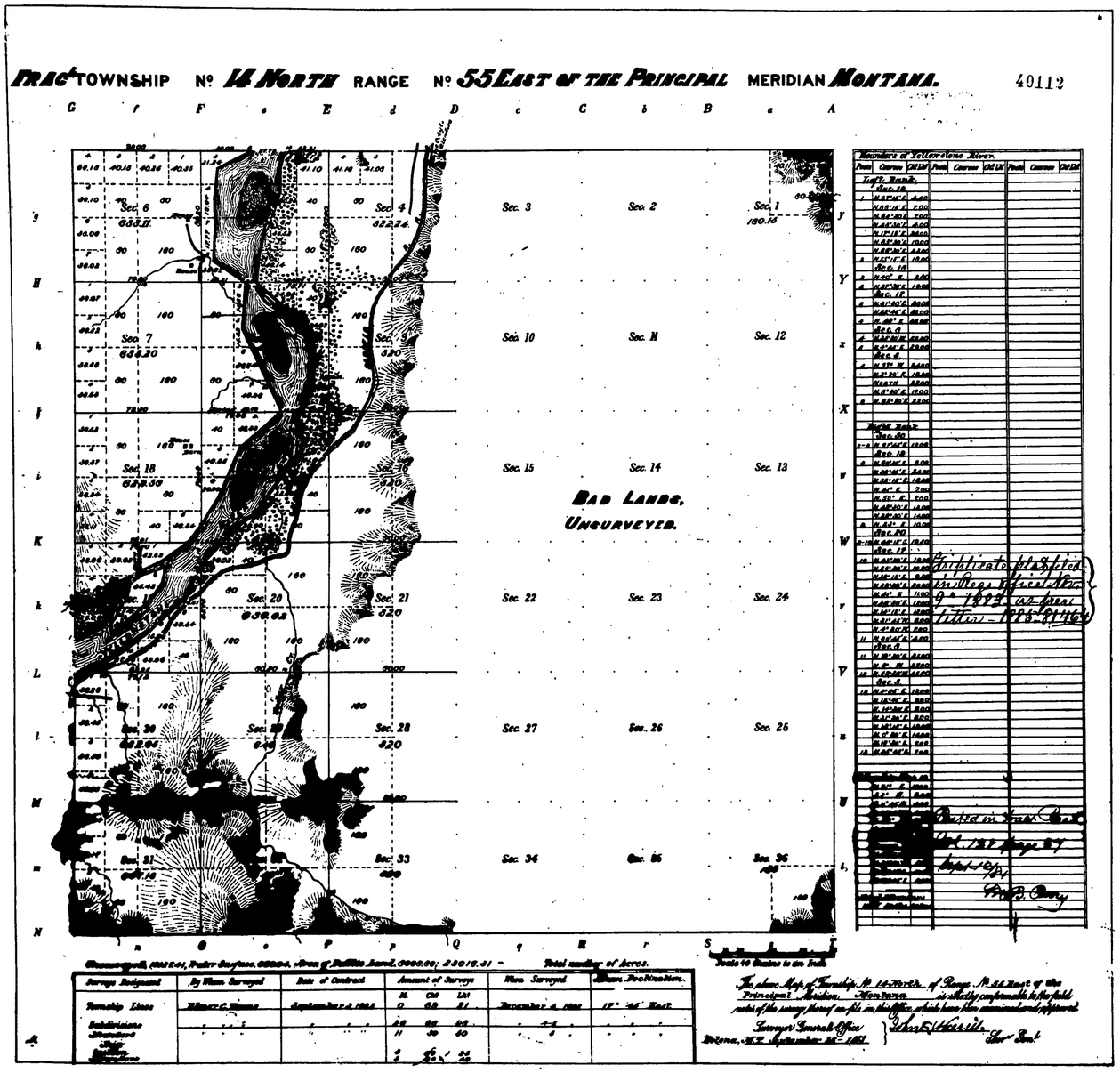


Figure 1 - Original 1882 Survey

OMITTED LANDS ALONG YELLOWSTONE RIVER

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

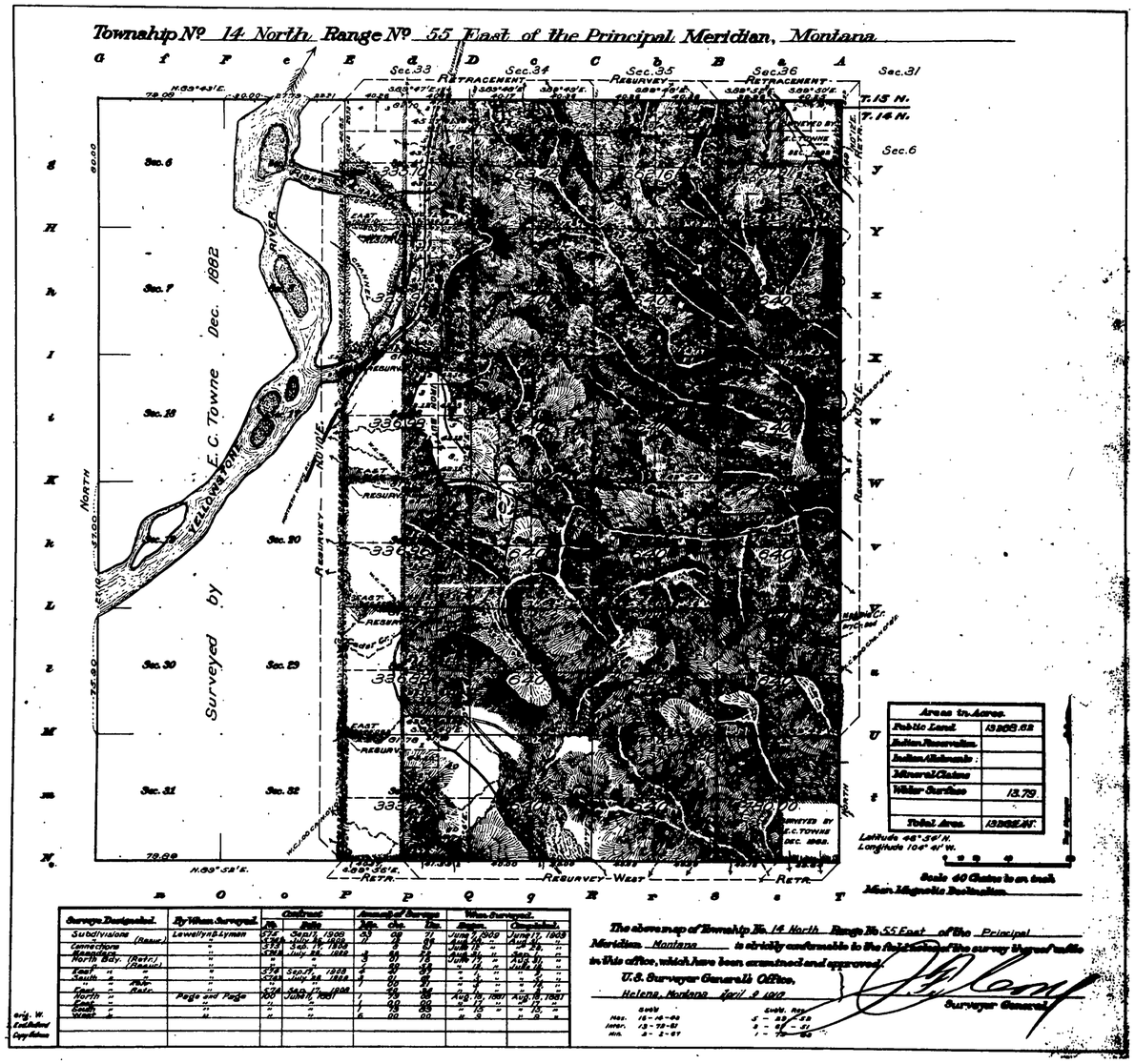


Figure 2 - 1909 Completion Survey

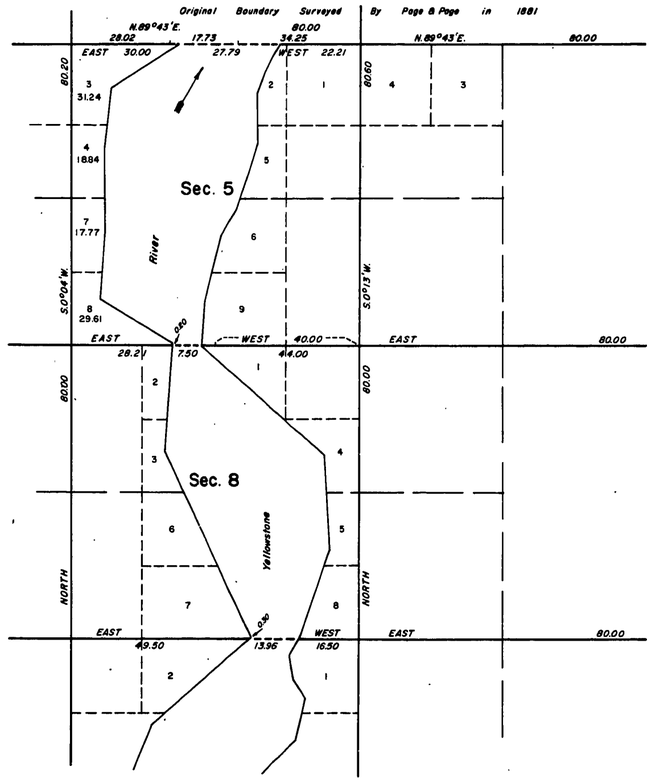


Figure 3 - 1882 Survey Record

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

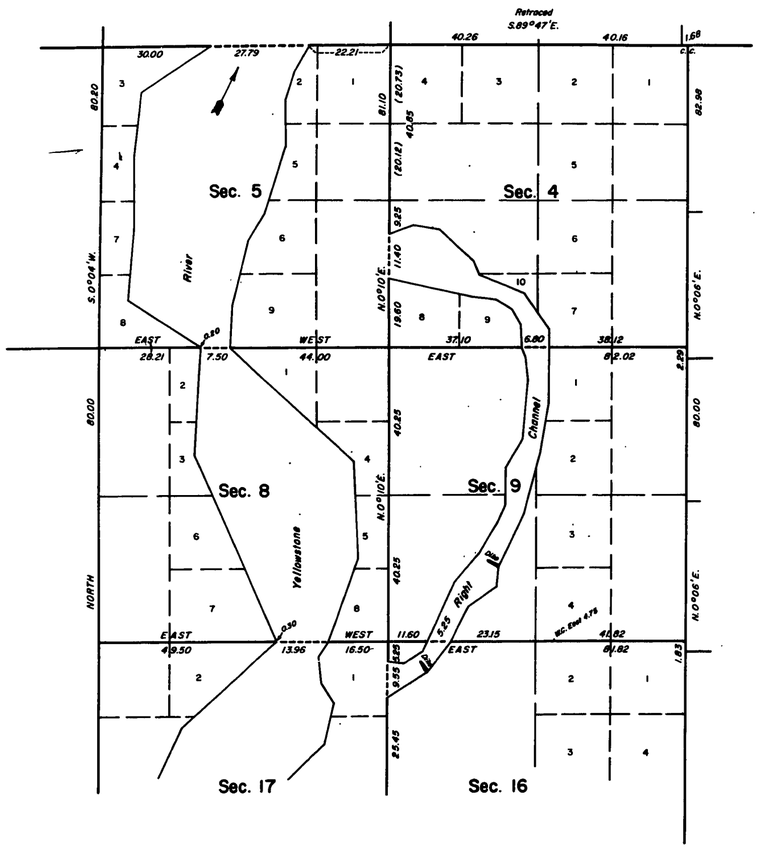
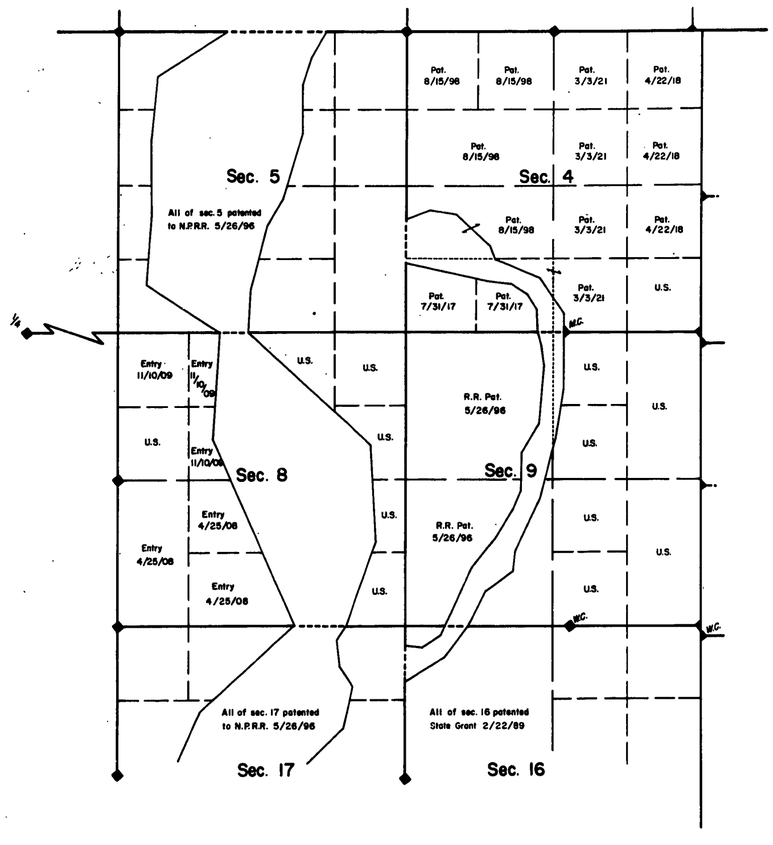


Figure 4 - Composite of Survey Records



◆ = Corner Recovery and Land Status in 1940

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.

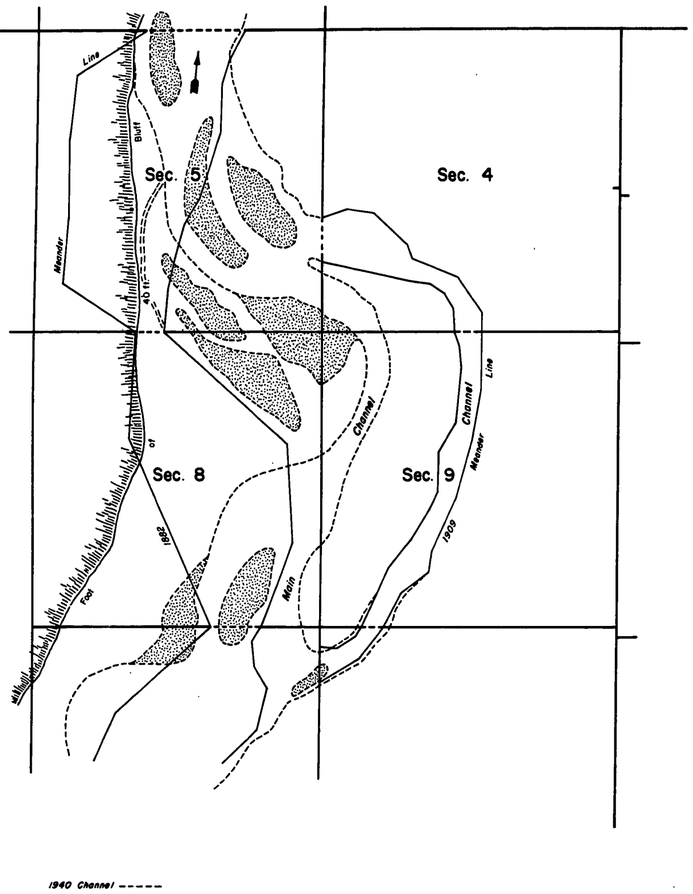


Figure 6 - Existing Conditions in 1940

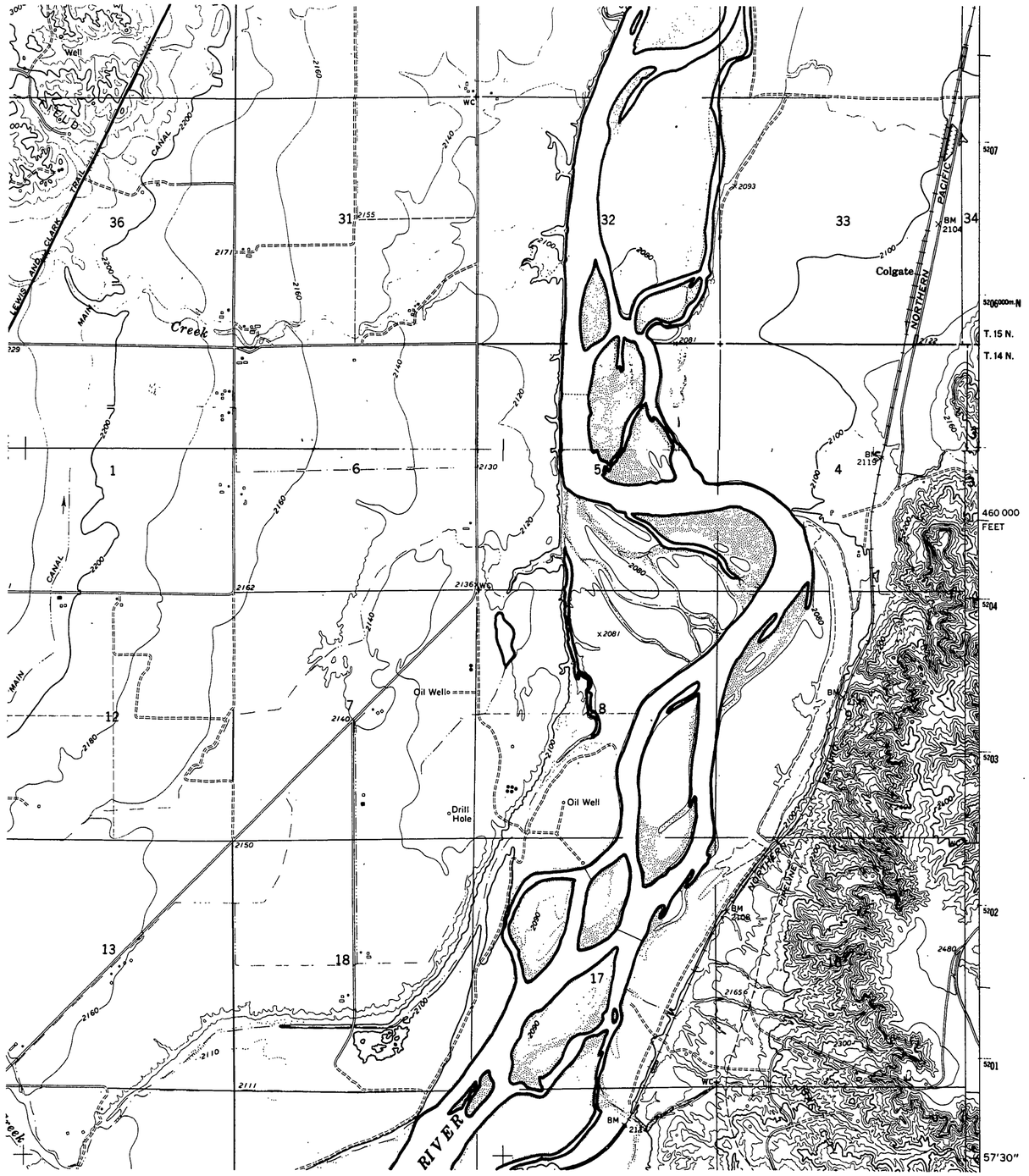
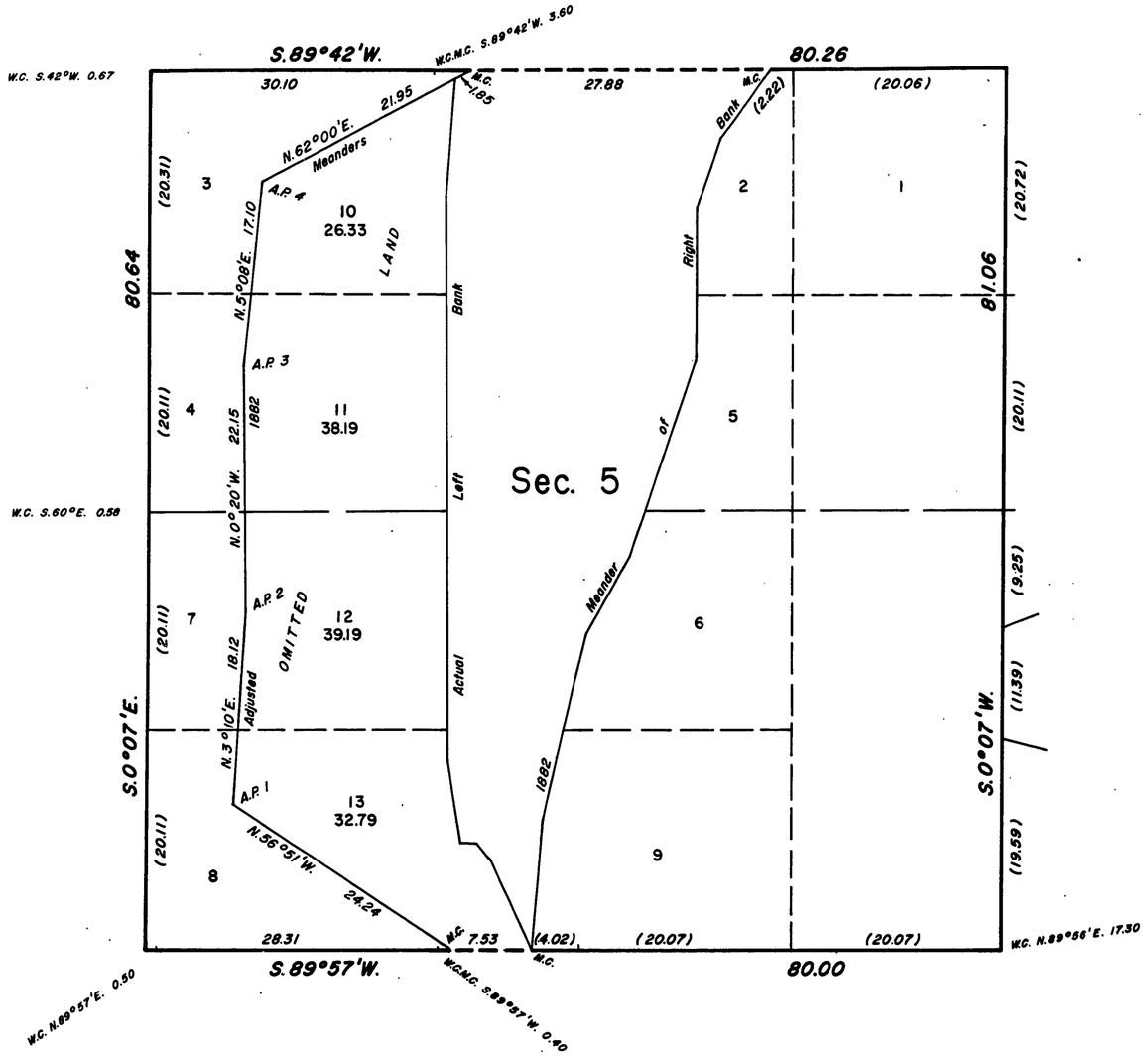


Figure 7 - Hoyt and Forest Park Quads, USGS

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.	9.50
N.35°00'W.	1.50
N.84°00'W.	1.75
N.6°45'W.	7.60
N.0°15'E.	10.60
N.1°00'W.	41.20
N.2°30'E.	10.64

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.

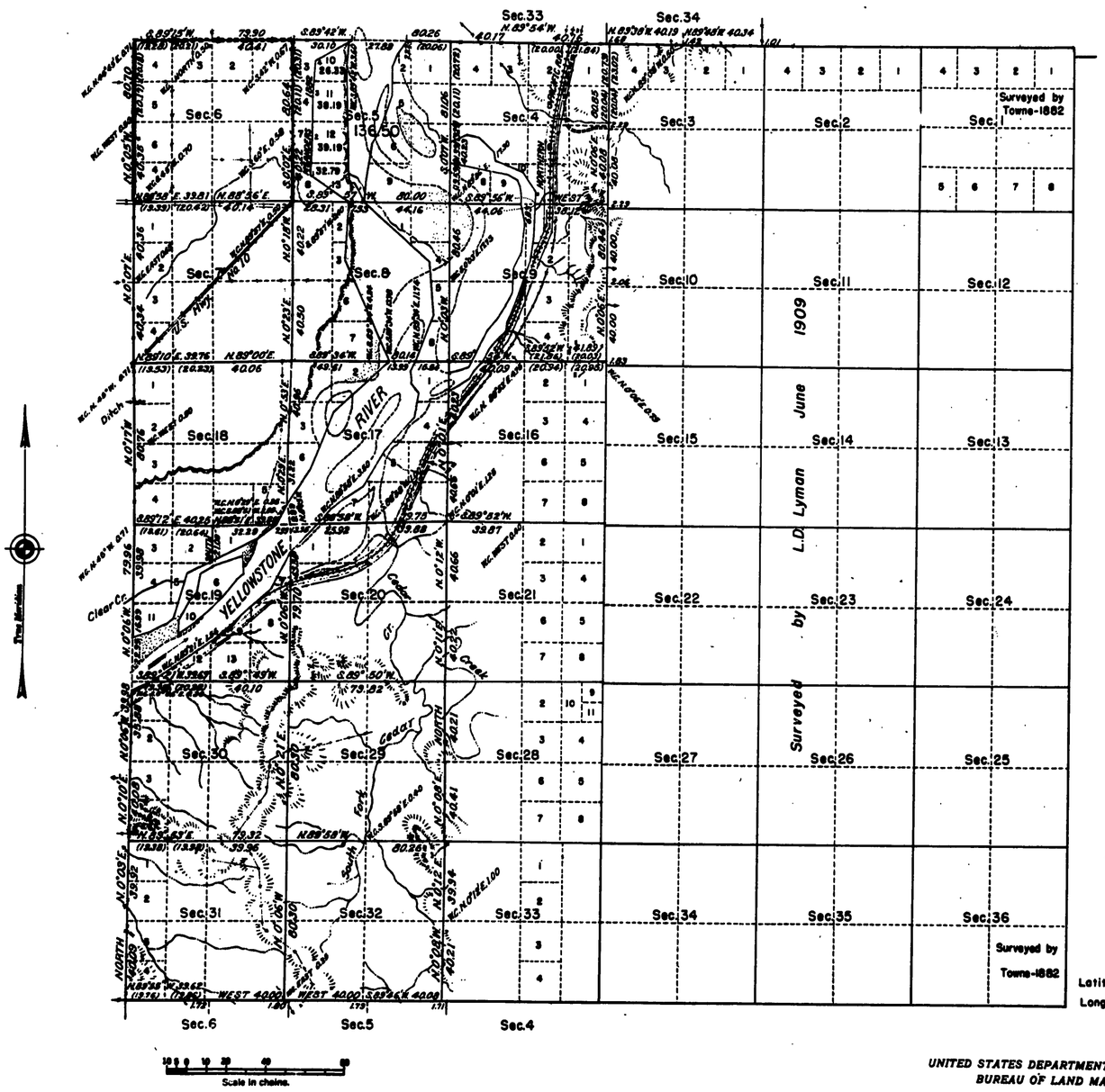
When the accretion survey in section 8 was dropped, a division of accretion line, normal to the left bank (or channel) of the river opposite the restored meander corner of sections 5 and 8, was actually required.

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, 1889, 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: 8,406.48 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 accured 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 "additional" 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

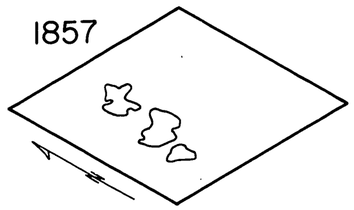
Acting

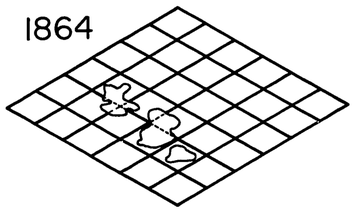
References:

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.

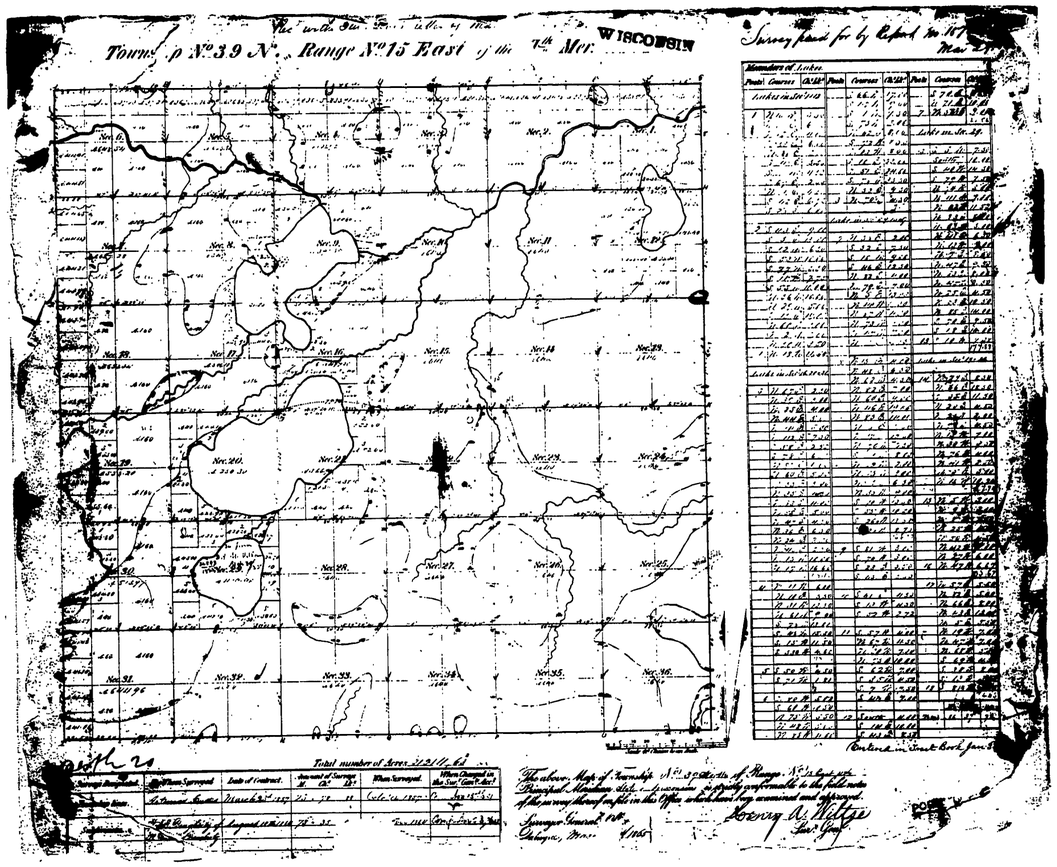
Conditions Found on the Ground

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.



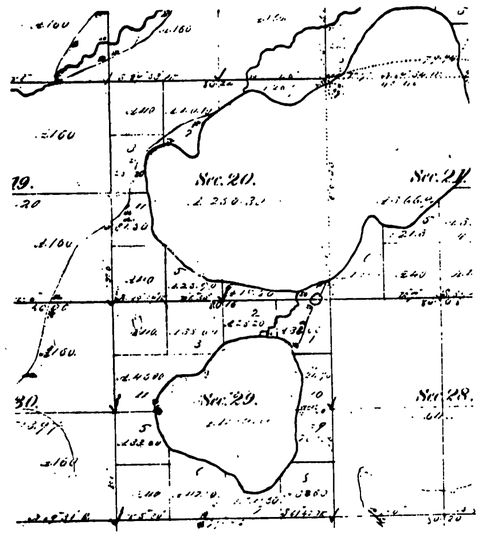


Figure 1 - Original 1864 Survey

OMITTED AND SWAMP LANDS IN HALSEY LAKE

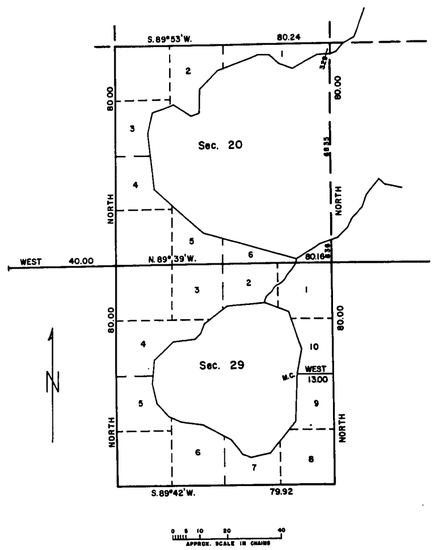


Figure 2 - Survey Record

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	

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

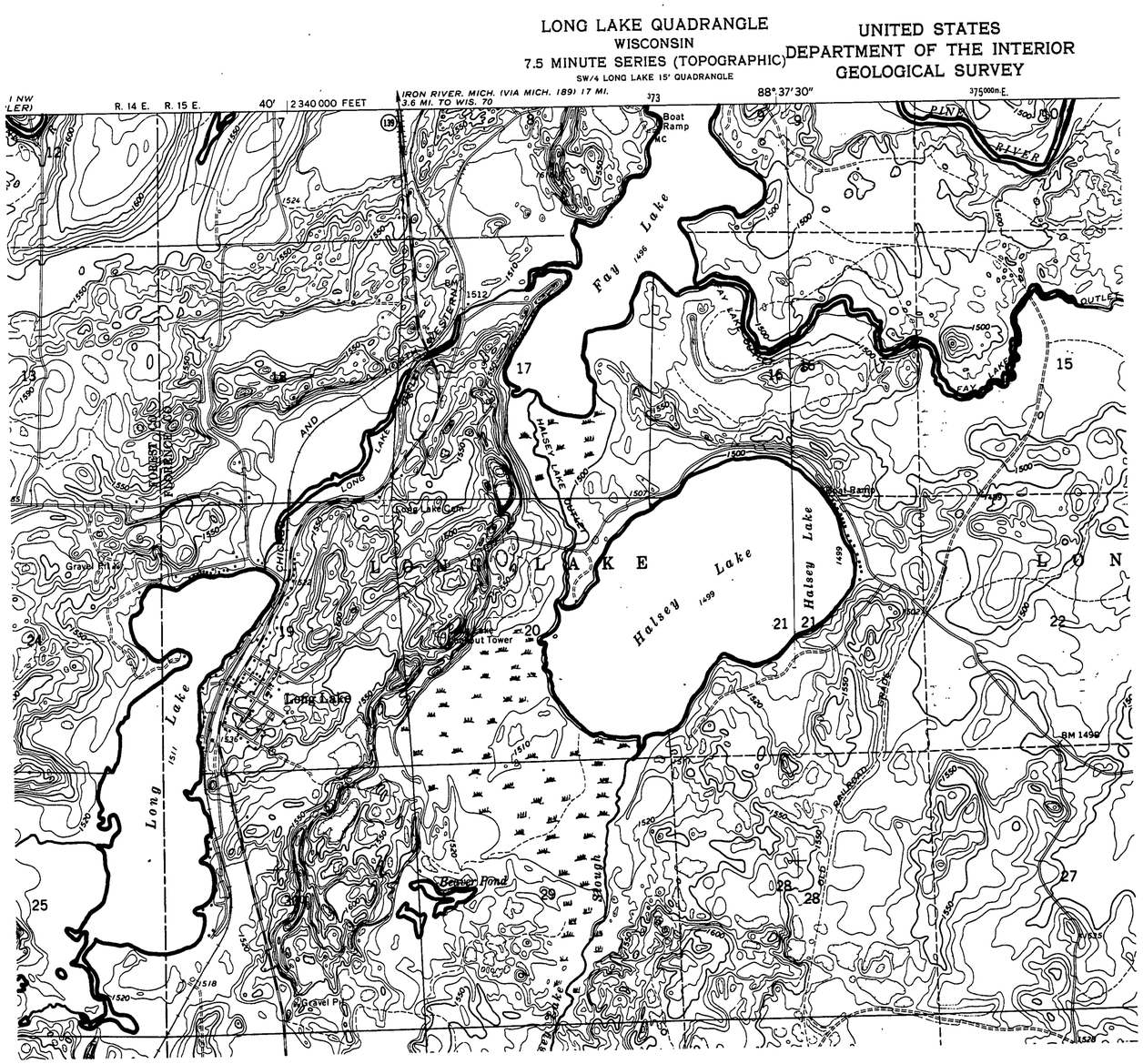


Figure 3 - Long Lake and Long Lake SE Quads, USGS

OMITTED AND SWAMP LANDS IN HALSEY LAKE

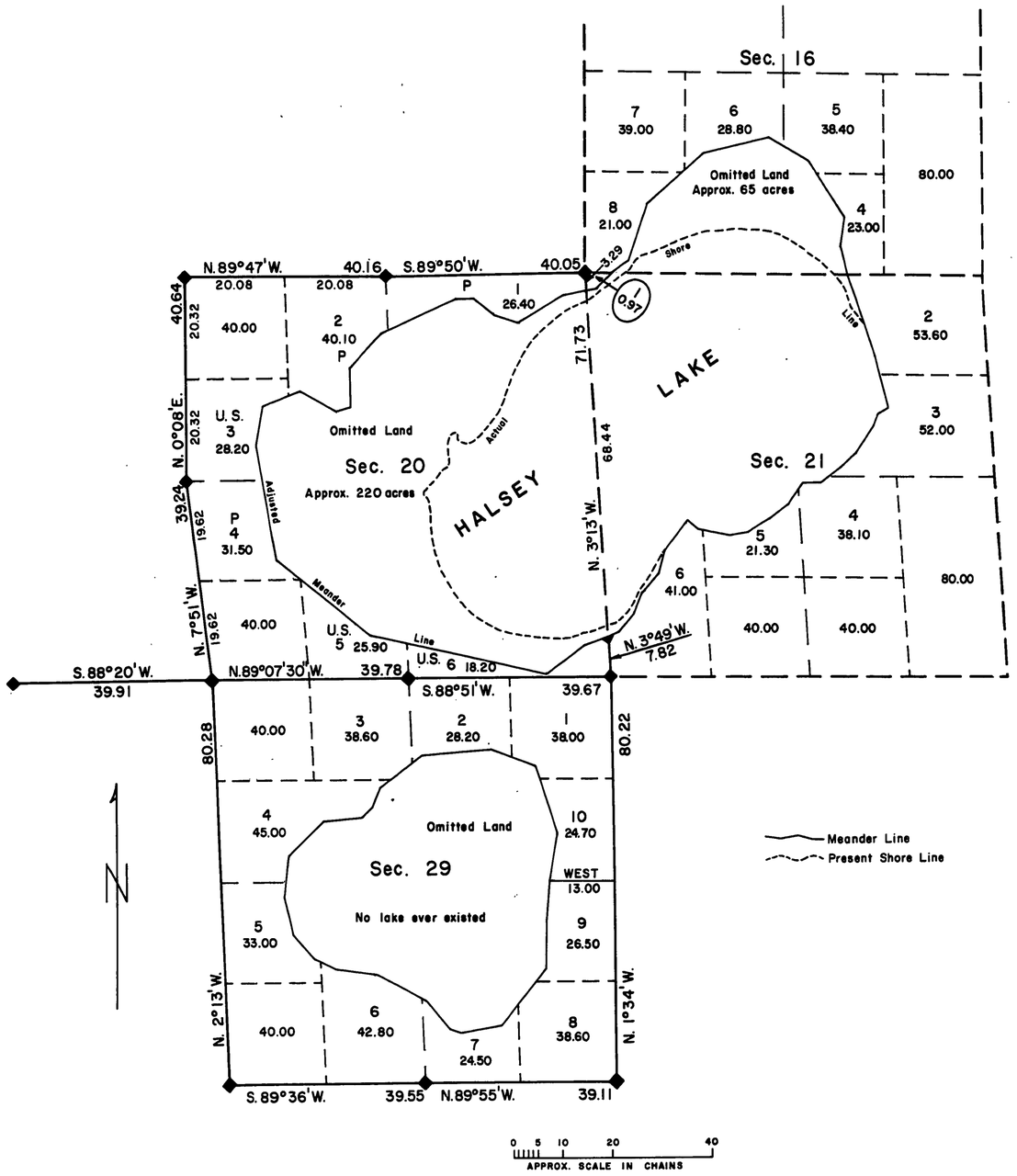


Figure 4 - Retracement, Status and Conditions Found

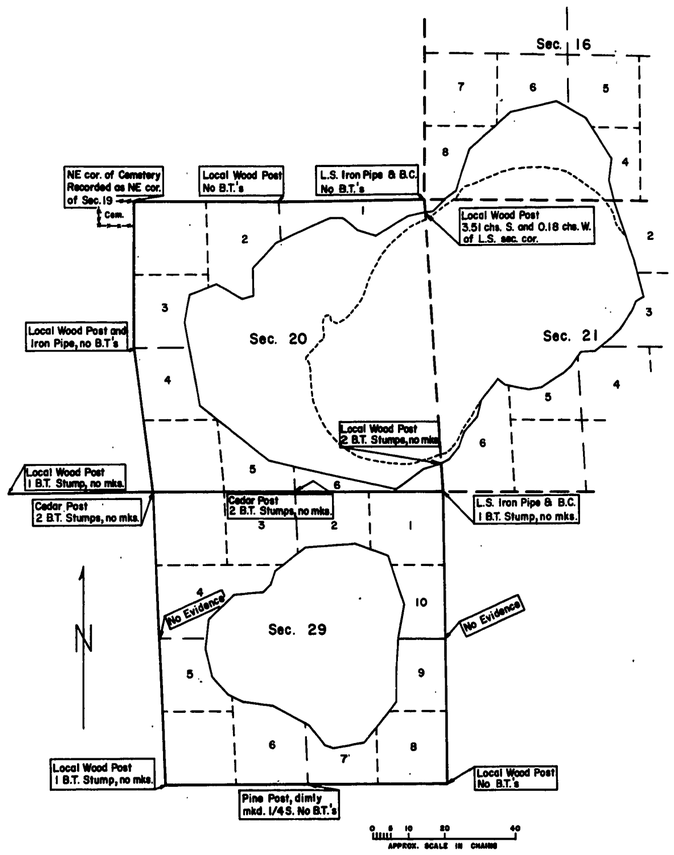


Figure 5 - Corner Evidence

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 resurvey) 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.

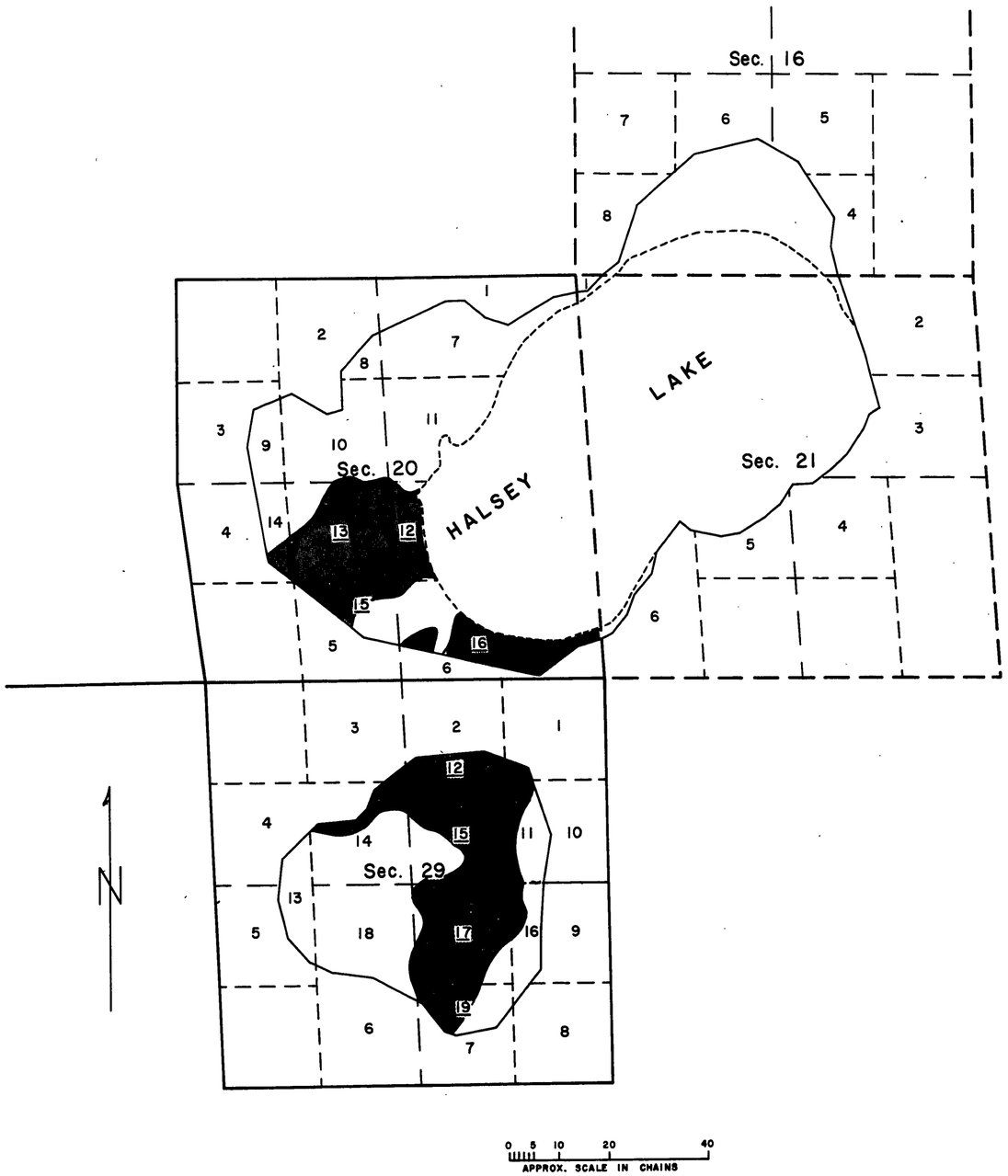
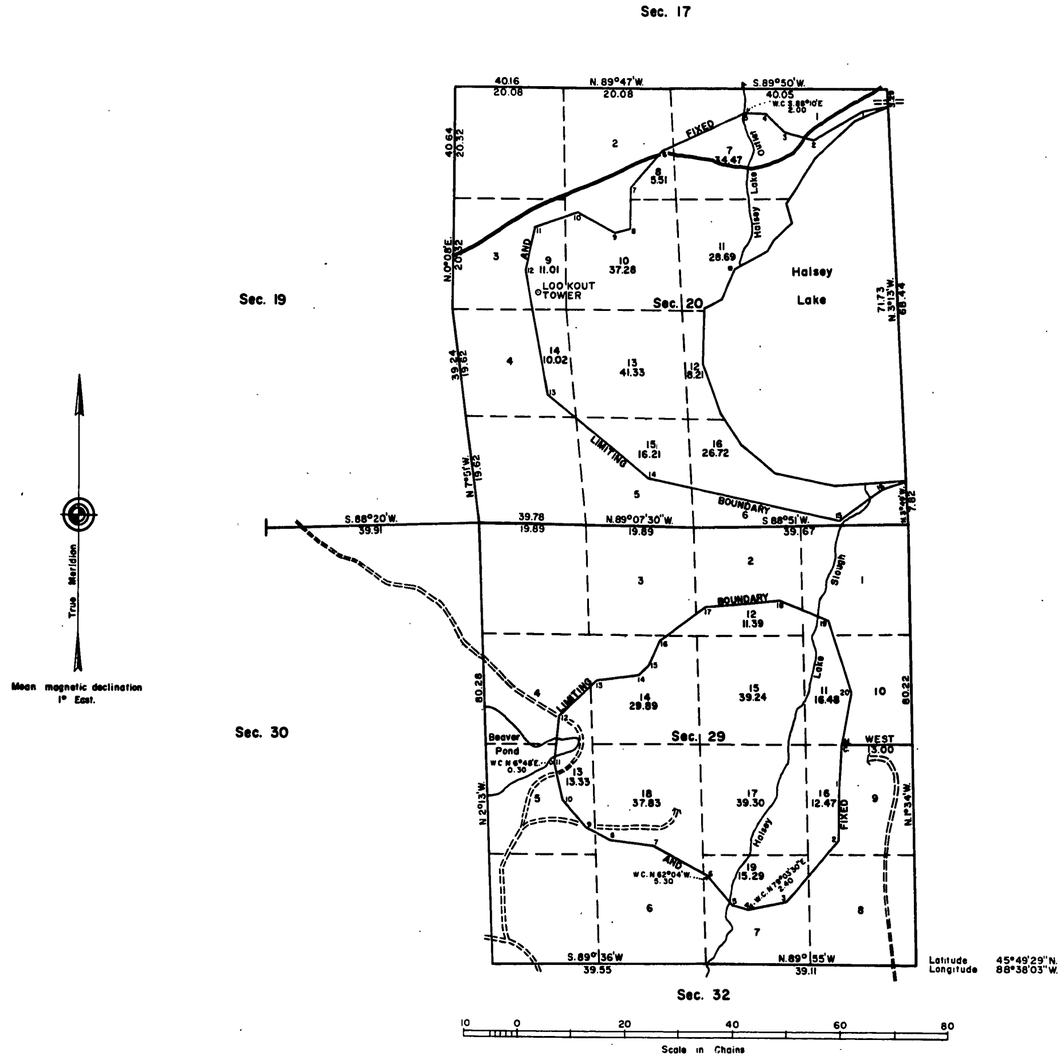


Figure 6 - Swamp and Overflowed Lands

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



Area Surveyed 434.67 Acres

Area Resurveyed 670.20 Acres

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

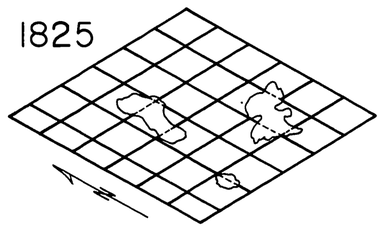
Clark F. Gleason

Chief, Division of Cadastral Survey

Figure 7 - Accepted Plat

SWAMPS AND OMITTED LANDS IN MICHIGAN

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

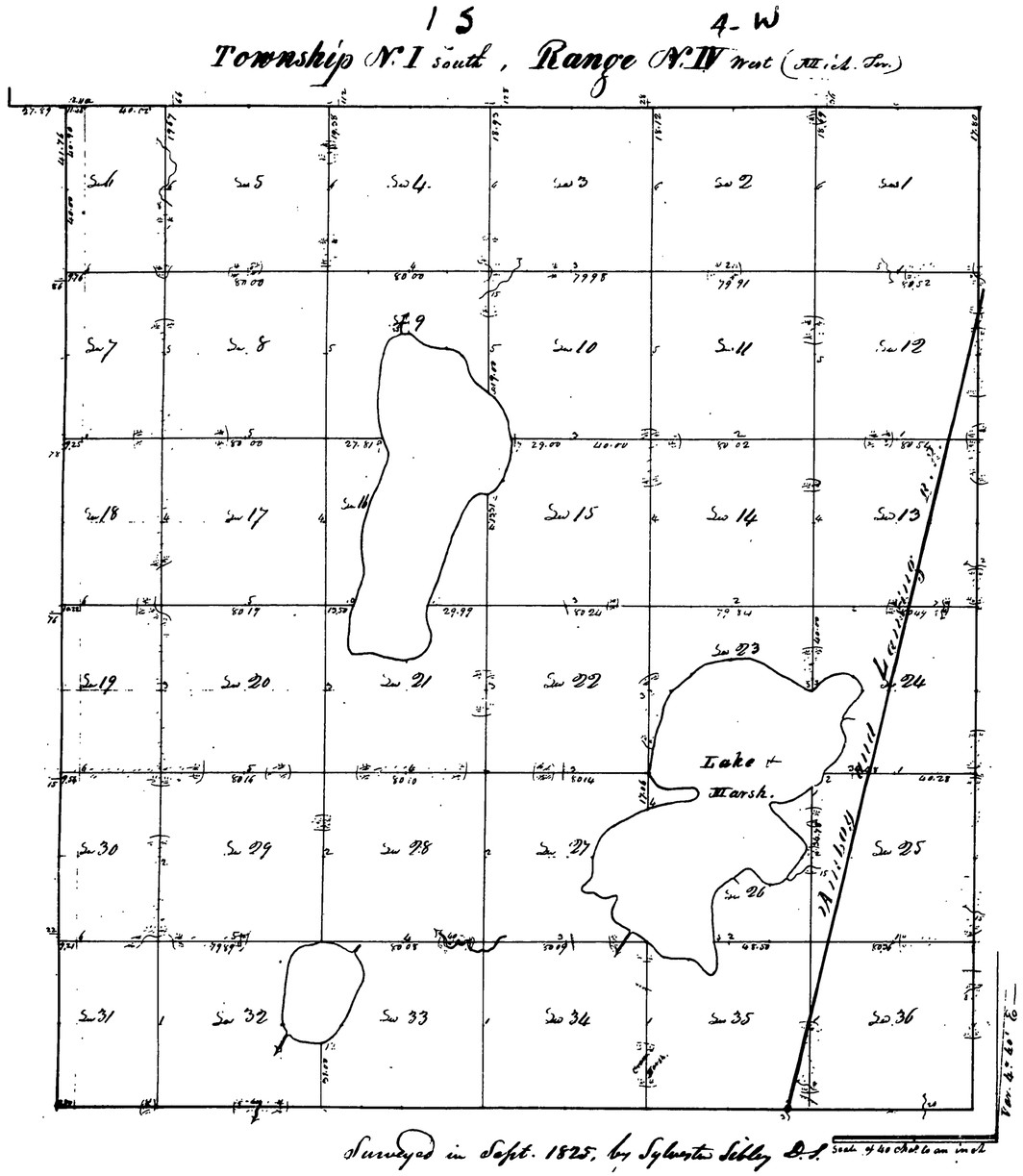


History of Surveys

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	Contents Rds
N½ N E 1	12	42
S½ " "	80	
N½ N W "	74	23
S½ " "	80	
S½ " "	320	
N½ N E 2	73	16
S½ " "	80	
N½ N W "	72	51
S½ " "	80	
S½ " "	320	
N½ N E 3	74	52
S½ " "	80	
N½ N W "	76	19
S½ " "	80	
S½ " "	320	
N½ N E 4	76	02
S½ " "	80	
N½ N W "	76	94
S½ " "	80	
S½ " "	320	
N½ N E 5	77	41
S½ " "	80	
N½ N W "	78	
S½ " "	80	
S½ " "	320	
N½ N E 6	79	28
S½ " "	80	
N W "	44	94
S E "	160	
S W "	40	72
E½ 7	320	
N W "	38	52
S W "	37	52
Sec. 8	640	
E½ N E 9	93	11
N½ "	70	
E½ N W "	71	10
N½ " "	80	
S W "	106	25
N½ 10	320	
S E "	160	
N½ S W "	79	96
S½ " "	65	40
Sec. 11	640	
Sec 12	640	
Sec 13	640	
Sec 14	640	
E½ 15	320	
N½ N W "	57	
S½ " "	77	42
S W "	160	
S E cor. 16	101	96
W part "	167	55
Sec. 17	640	
	9733	67

Sect	Contents Acres	Contents Rds
E½ 18	320	
NW "	37	96
S W "	39	92
E½ 19	320	
NW "	40	20
S W "	38	84
Sec. 20	640	
N E 21	135	07
NW "	89	57
S½ "	320	
Sec. 22	640	
N E 23	119	91
E½ N W "	57	
N½ " "	76	
S W "	16	75
E½ 24	320	
E½ N W "	78	11
N½ " "	68	45
S W "	98	20
E½ 25	320	
E½ N W "	80	
N½ " "	77	42
S W "	160	
W E 26	31	94
N W cor. "	18	95
E½ S E "	69	24
N½ " "	88	04
N E 27	118	23
S E "	80	37
N½ "	320	
Sec. 28	640	
Sec. 29	640	
E½ 30	320	
N W "	37	84
S W "	37	16
E½ 31	320	
N W "	36	12
S W "	34	72
N E 32	93	57
E½ S E "	67	47
N½ " "	80	
N½ "	320	
E½ 33	320	
N W "	98	65
E½ S W "	80	
N½ " "	75	86
Sec. 34	640	
E½ 35	320	
E½ N W "	65	67
N½ " "	67	84
Sec. 36	640	
	9755	13
	9722	67
	19477	70 Acres.

* See Genl's letter Nov 25, 1858

A true copy of the Original plat in this office
Surveyor Generals' Office
Cincinnati 14. Jan. 1826 S. Edward Tiffin Surv Genl

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.

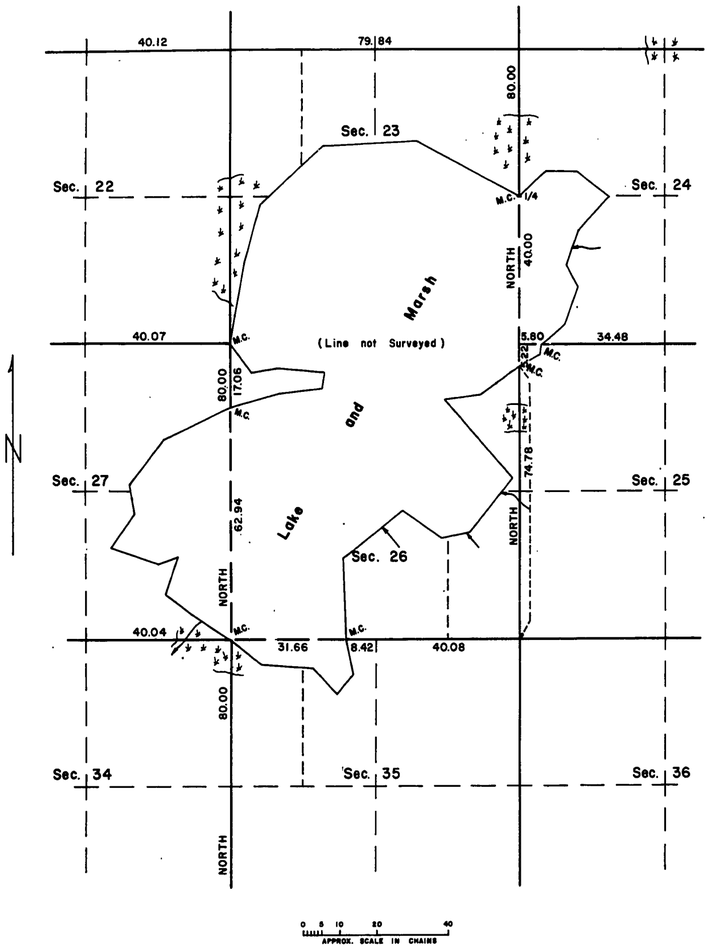


Figure 2 - Original Survey Record

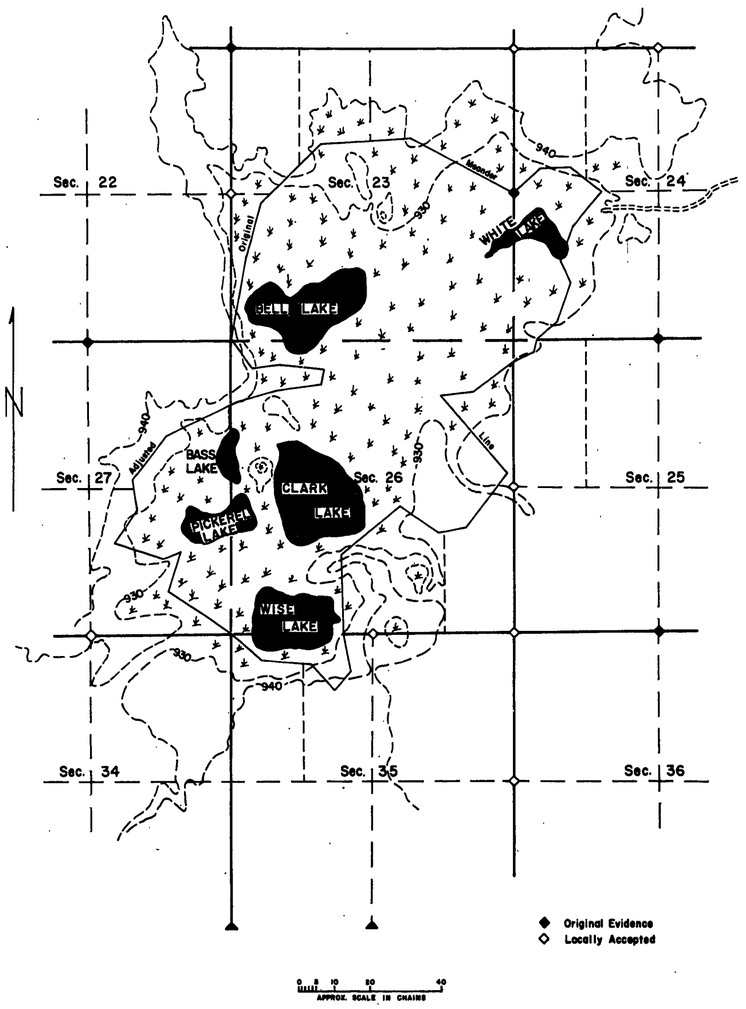


Figure 3 - Existing Conditions

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.

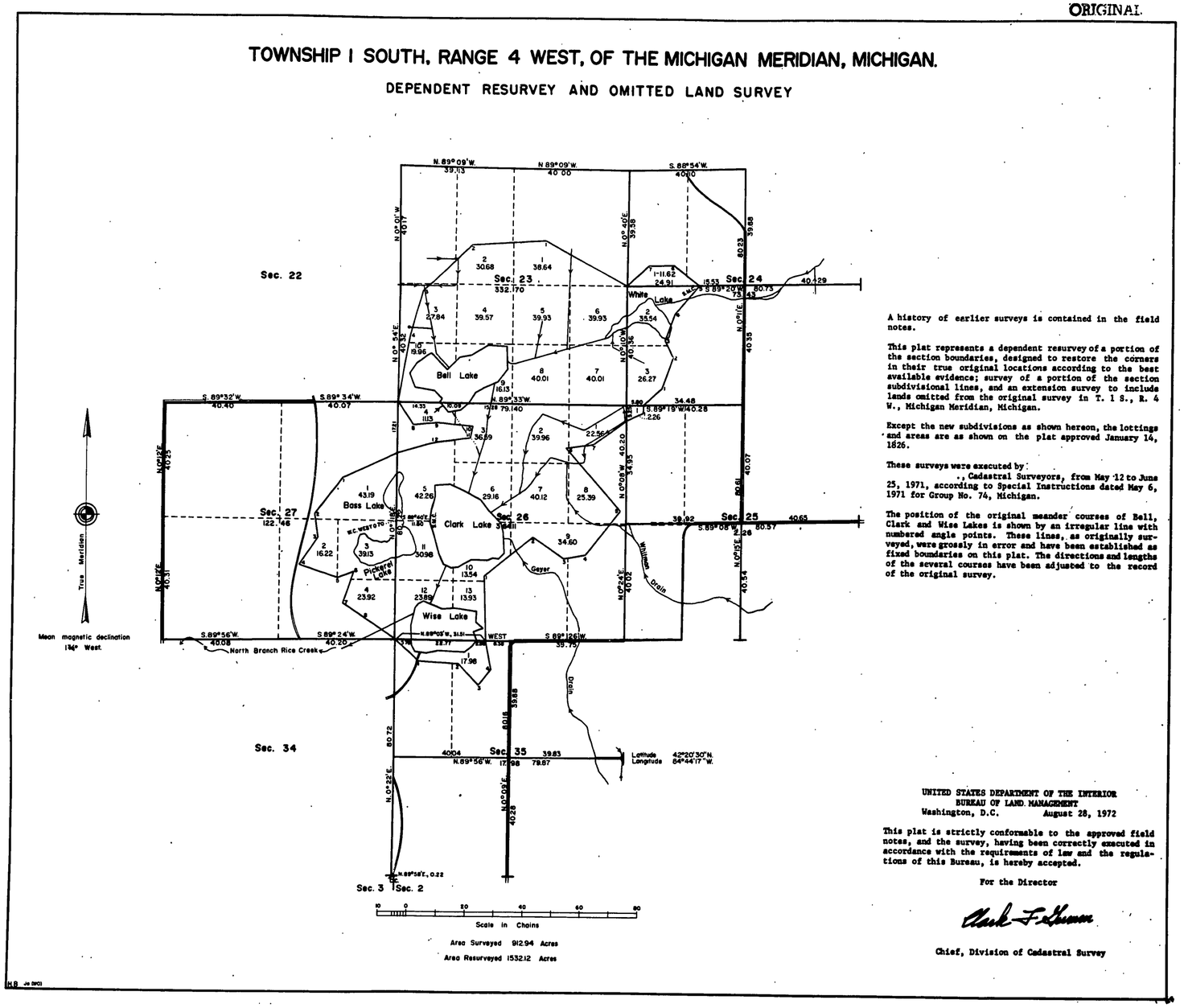


Figure 4 - Accepted Plat

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.

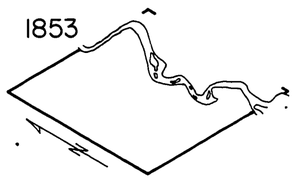
2. The area within Sybley's meanders could not have been a frozen lake. Sybley's meander line crosses above the 940 foot contour line. Had this area been a lake, the greater part of the whole township would have been covered with water.

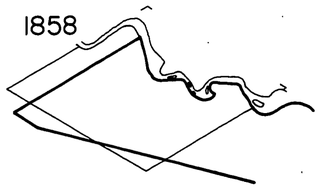
3. The oldest available maps are the Springport and Marshall quadrangles published by the U.S. Geological Survey in 1919 and 1921. These maps show the lakes and swamp substantially the same as they are now, minus the recently constructed drainage ditches. No change has occurred in the past 50 years.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

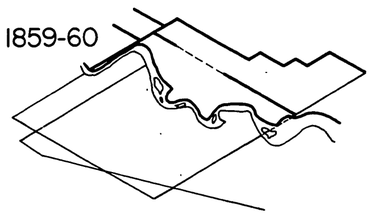
4. The original meander line did not traverse the borders of a body of water. No riparian rights inured to the fractional lots because the condition required for riparian rights did not exist. The "meander line" was grossly in error in that it

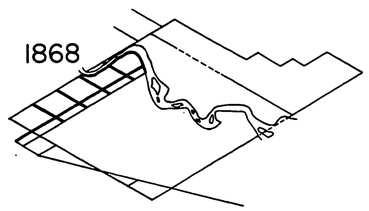
FOSTER ISLAND OMITTED LANDS

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









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."

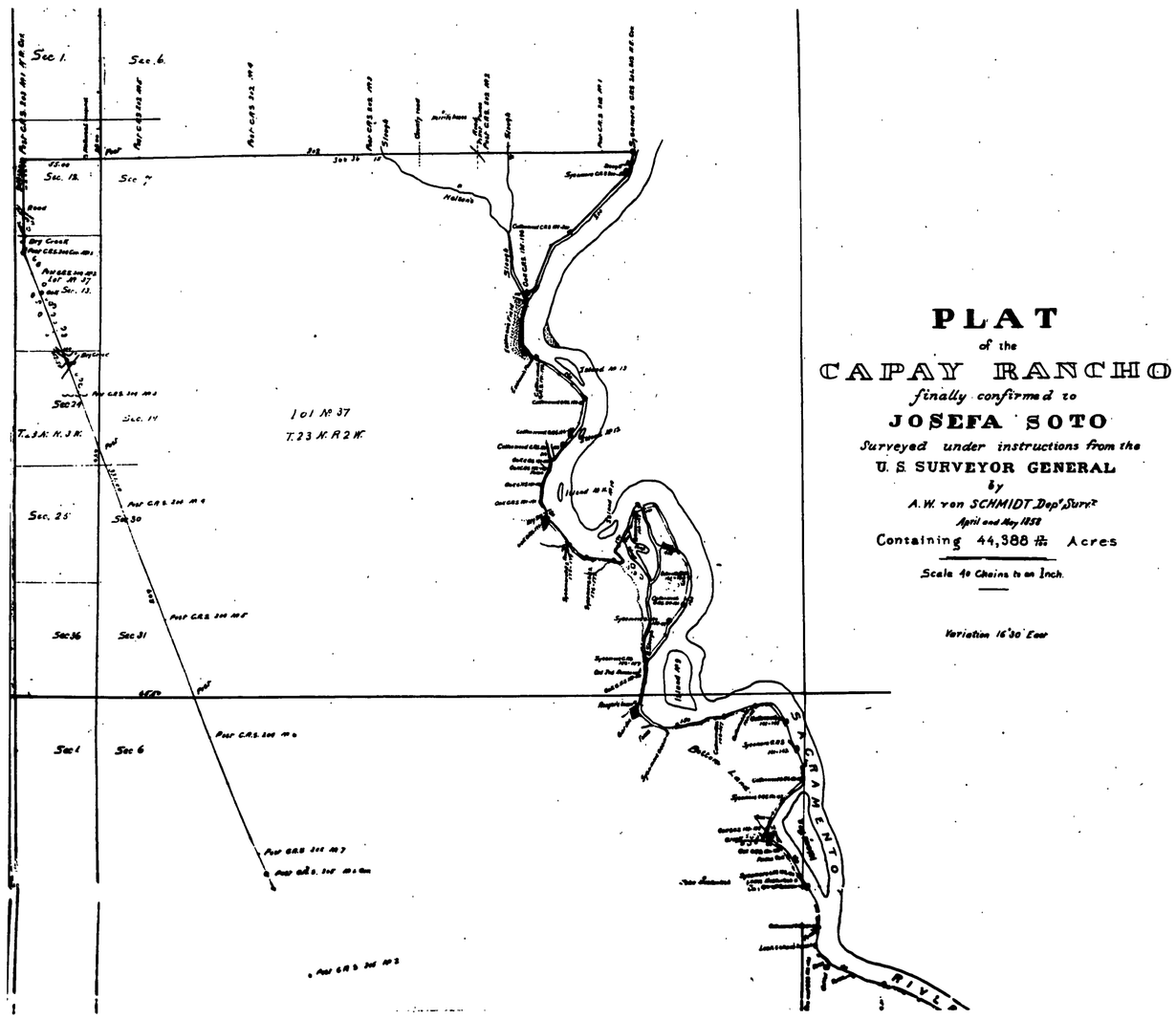


Figure 1 - Northern Portion of Capay Rancho, 1858

D12-1

FOSTER ISLAND OMITTED LANDS

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

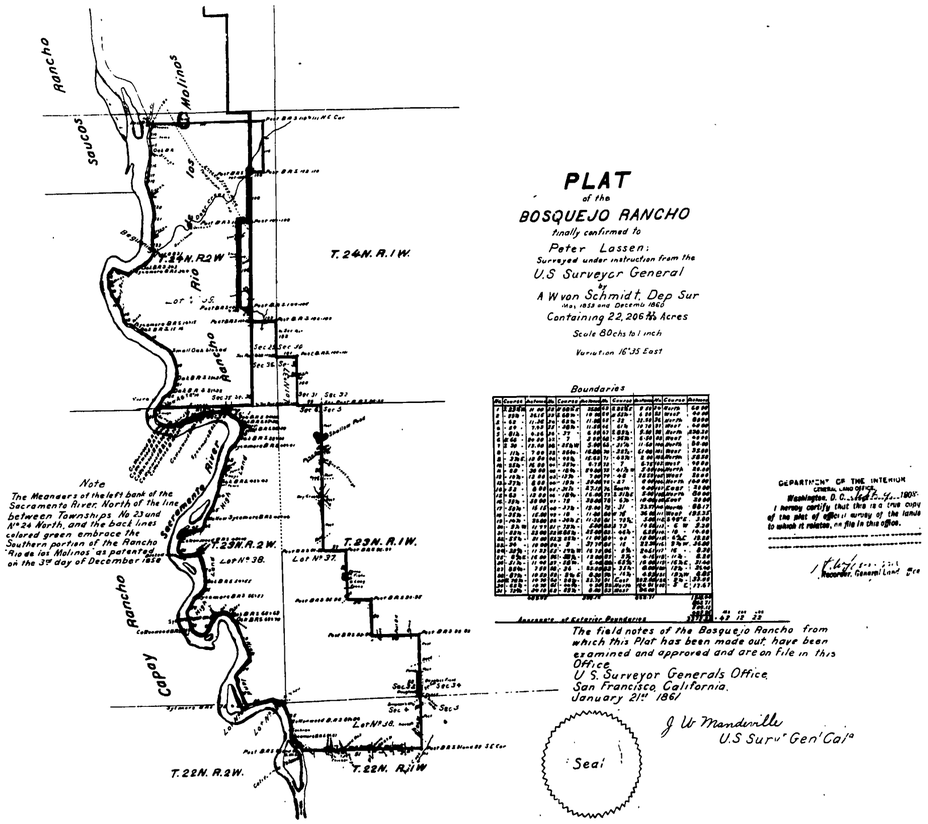


Figure 2 - Bosquejo Rancho, 1859-1860

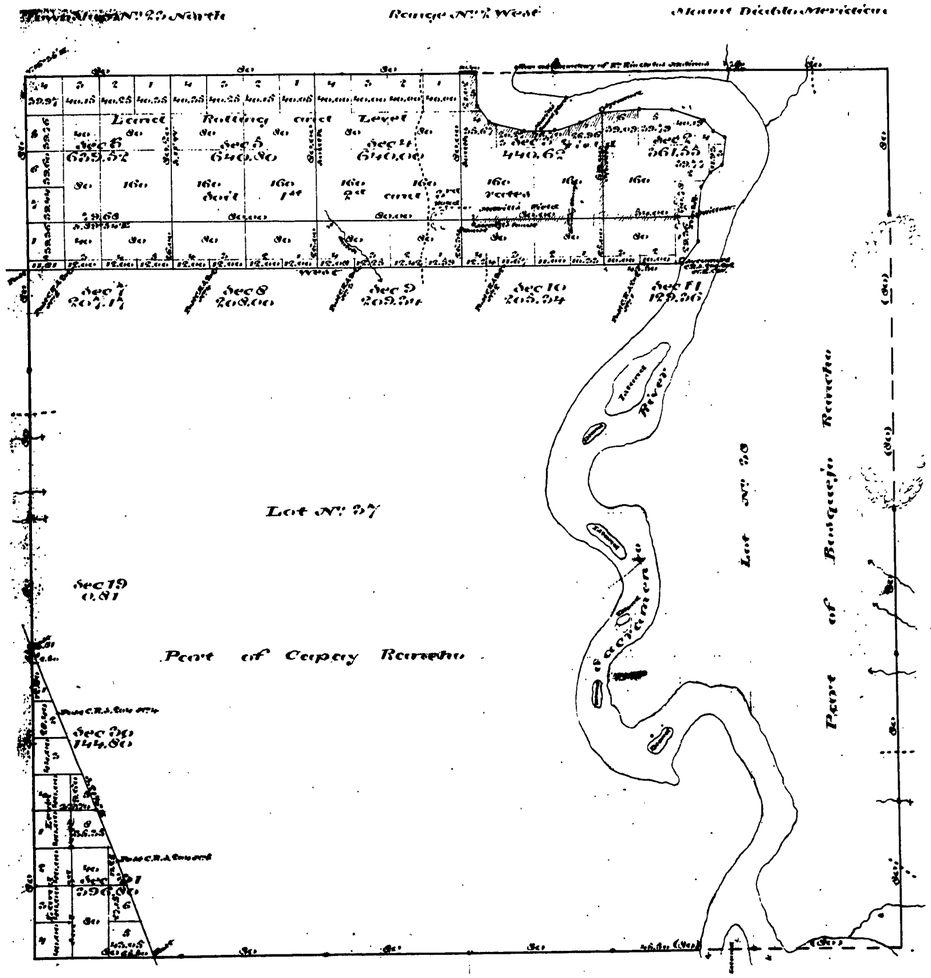


Figure 3 - 1868 Magee Survey of T. 23 N., R. 2 W., M. D. M.

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.

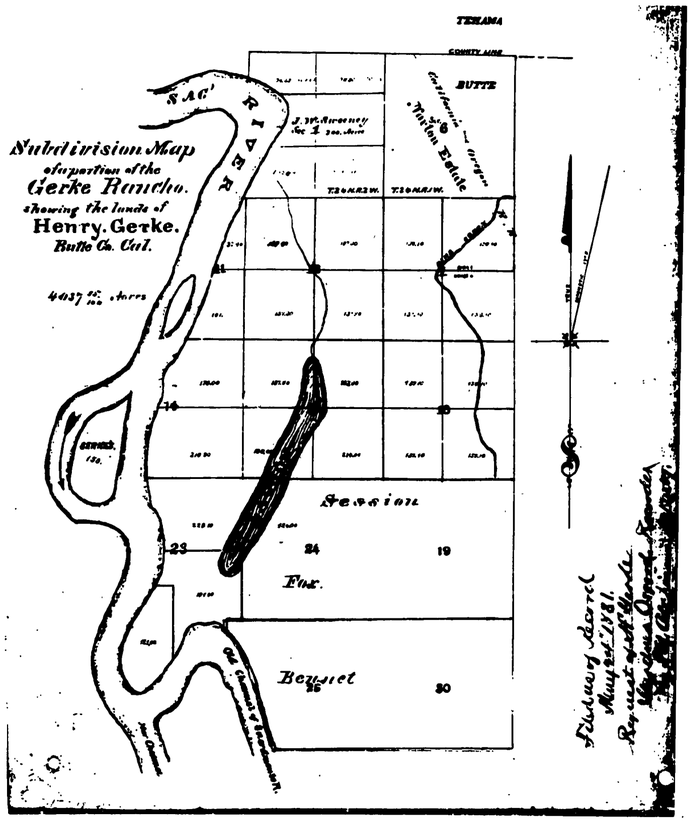


Figure 4 - Gerke Rancho, 1881

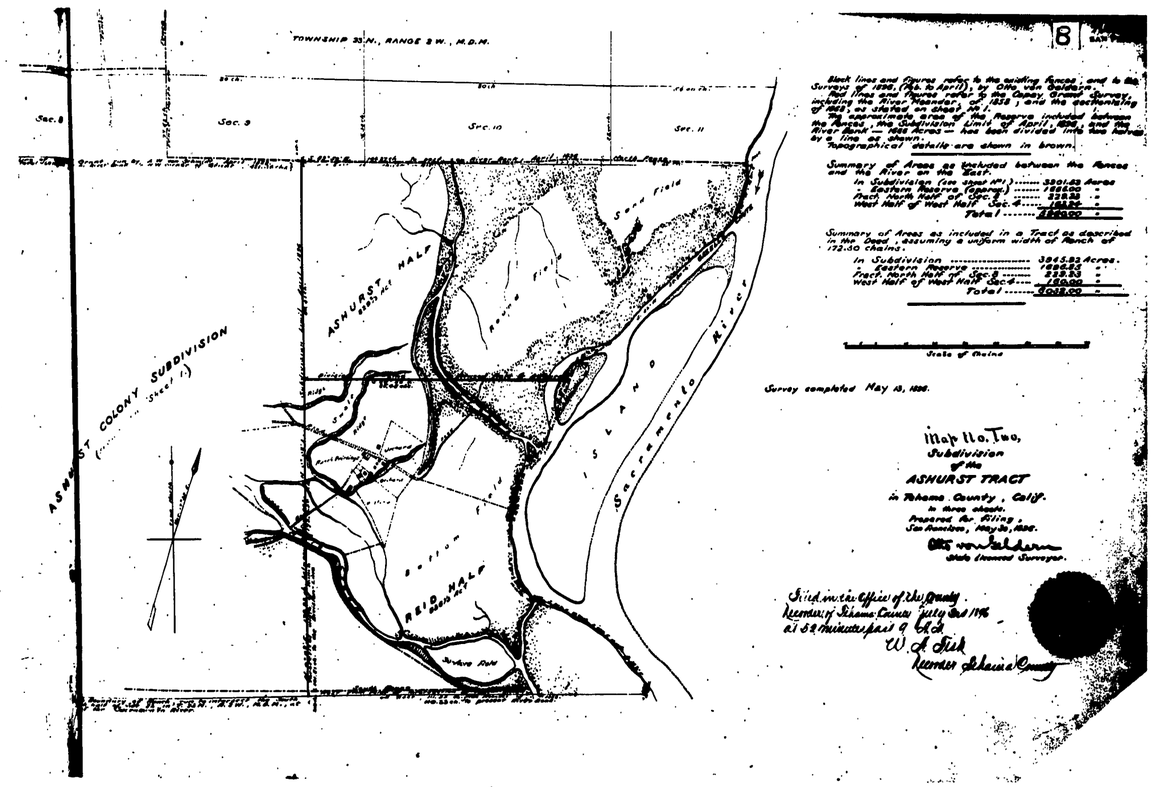


Figure 5 - Map No. 2 of the Ashurst Tract

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 "Capay 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. 2½	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.

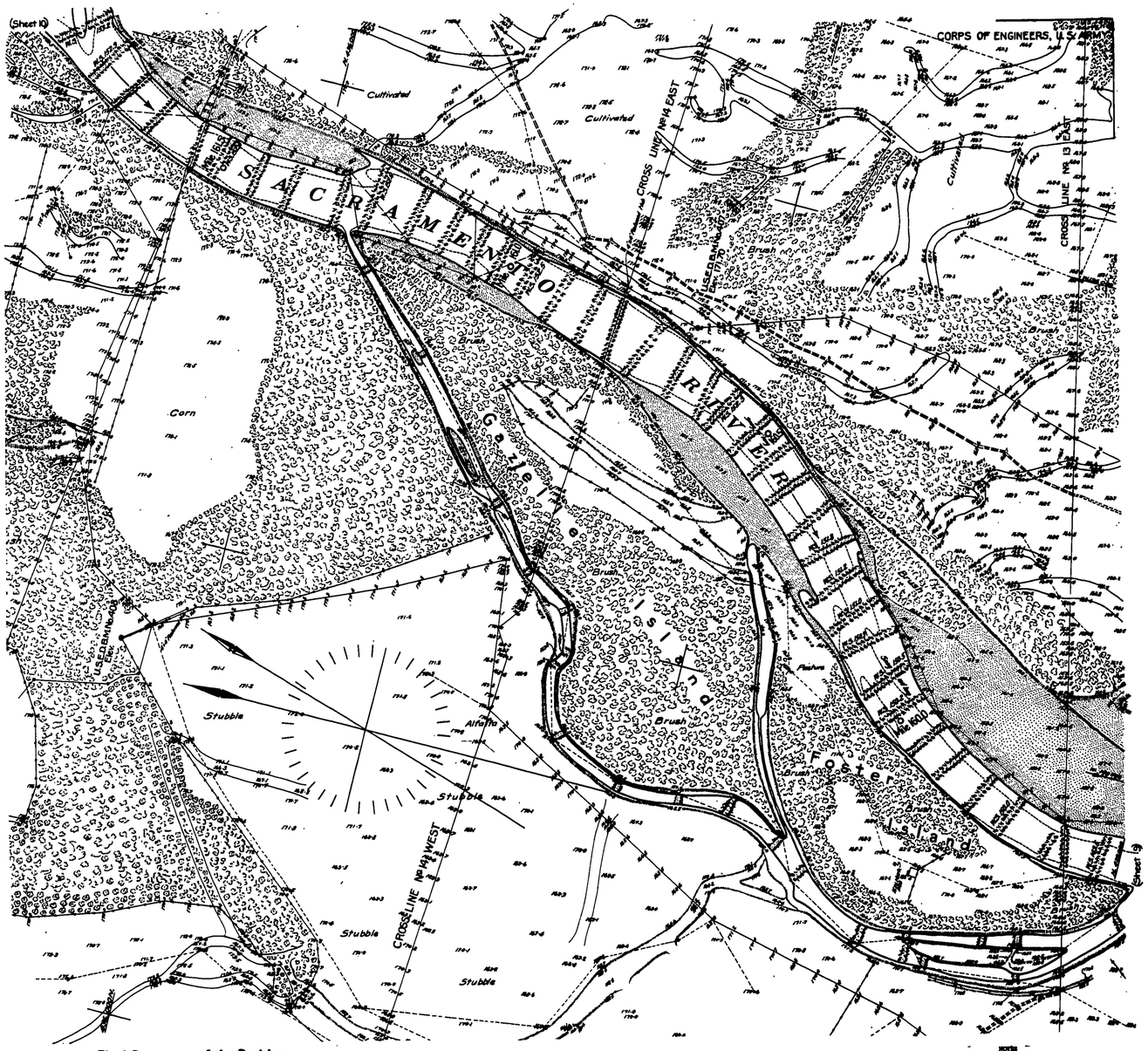
Regulations

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.



SACRAMENTO RIVER, CALIFORNIA
FROM
CHICO LANDING TO RED BLUFF.

Field work by Junior Engineer H. M. Rich and Inspector E. L. Chase from 1917 to 1923.

IN TWENTY SIX SHEETS — SHEET II — SCALE: 1 IN=400 FT.

400 0 400 800 1200 1600 2000

U. S. ENGINEER OFFICE, 2ND S. F. DIST., SAN FRANCISCO, CAL.

Submitted; Approved;

Assistant Engineer. Major, Corps of Engineers, U. S. Army

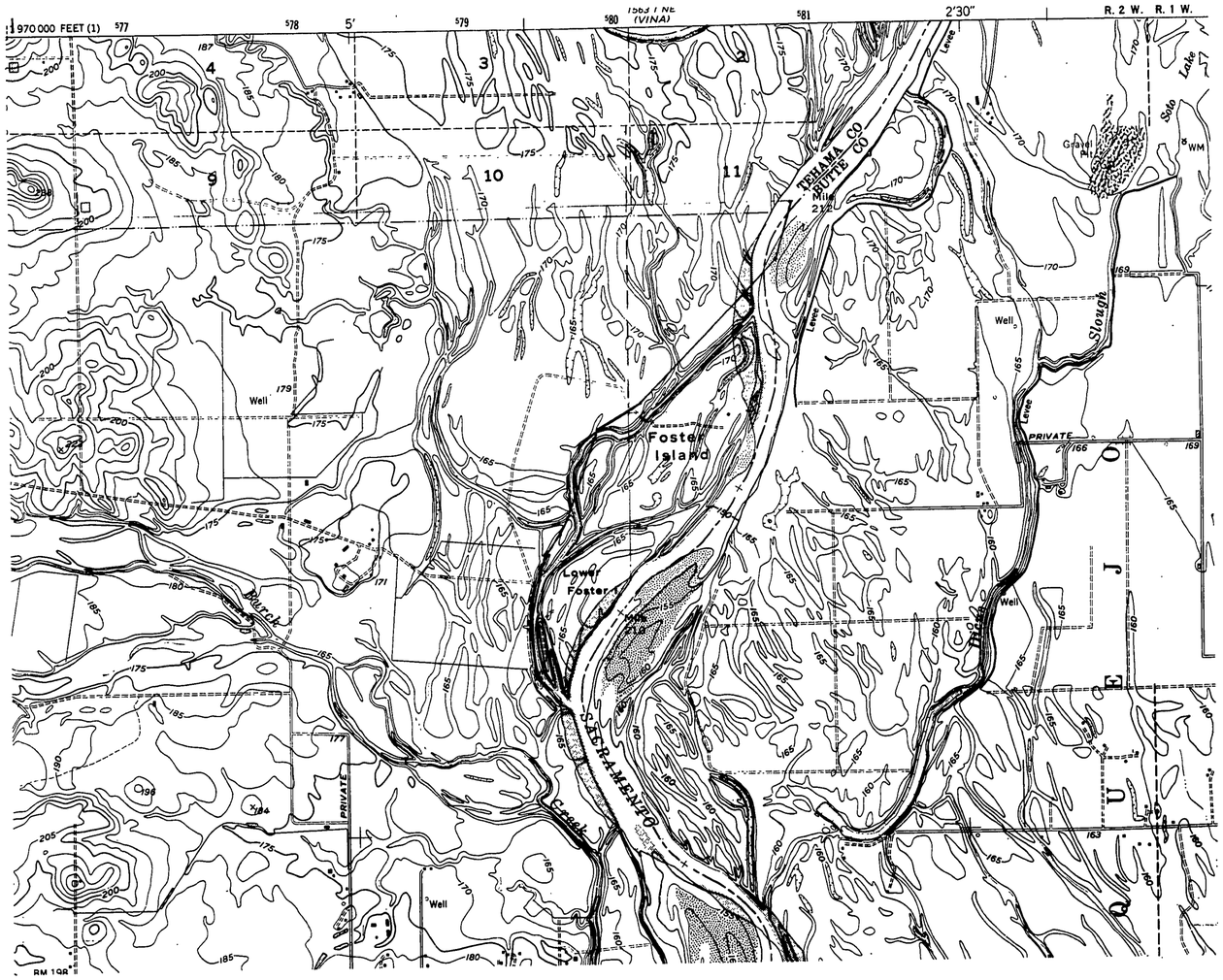
Traced by E.R.S.
FILE NO. 6-13-593

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.

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.

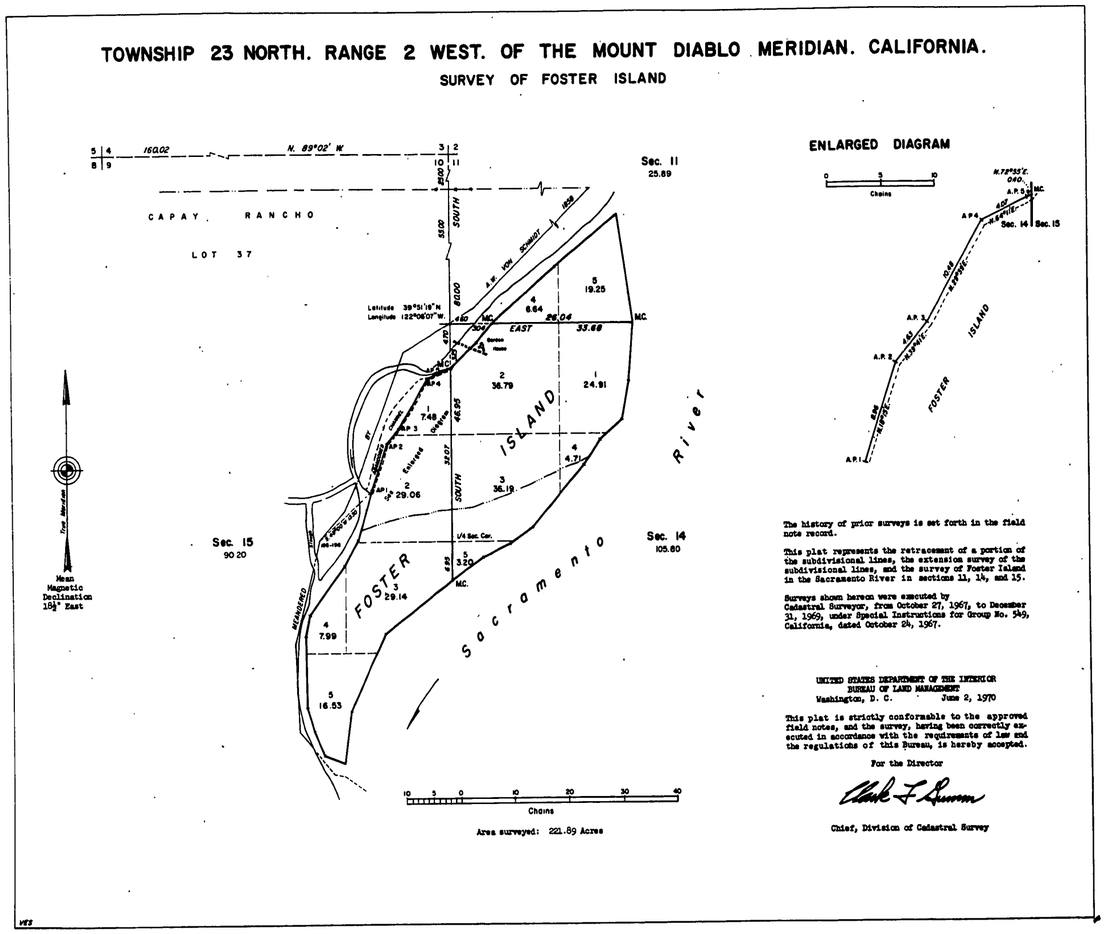
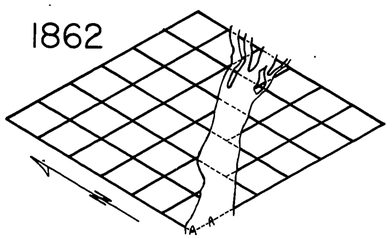


Figure 9 - Accepted Plat

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.

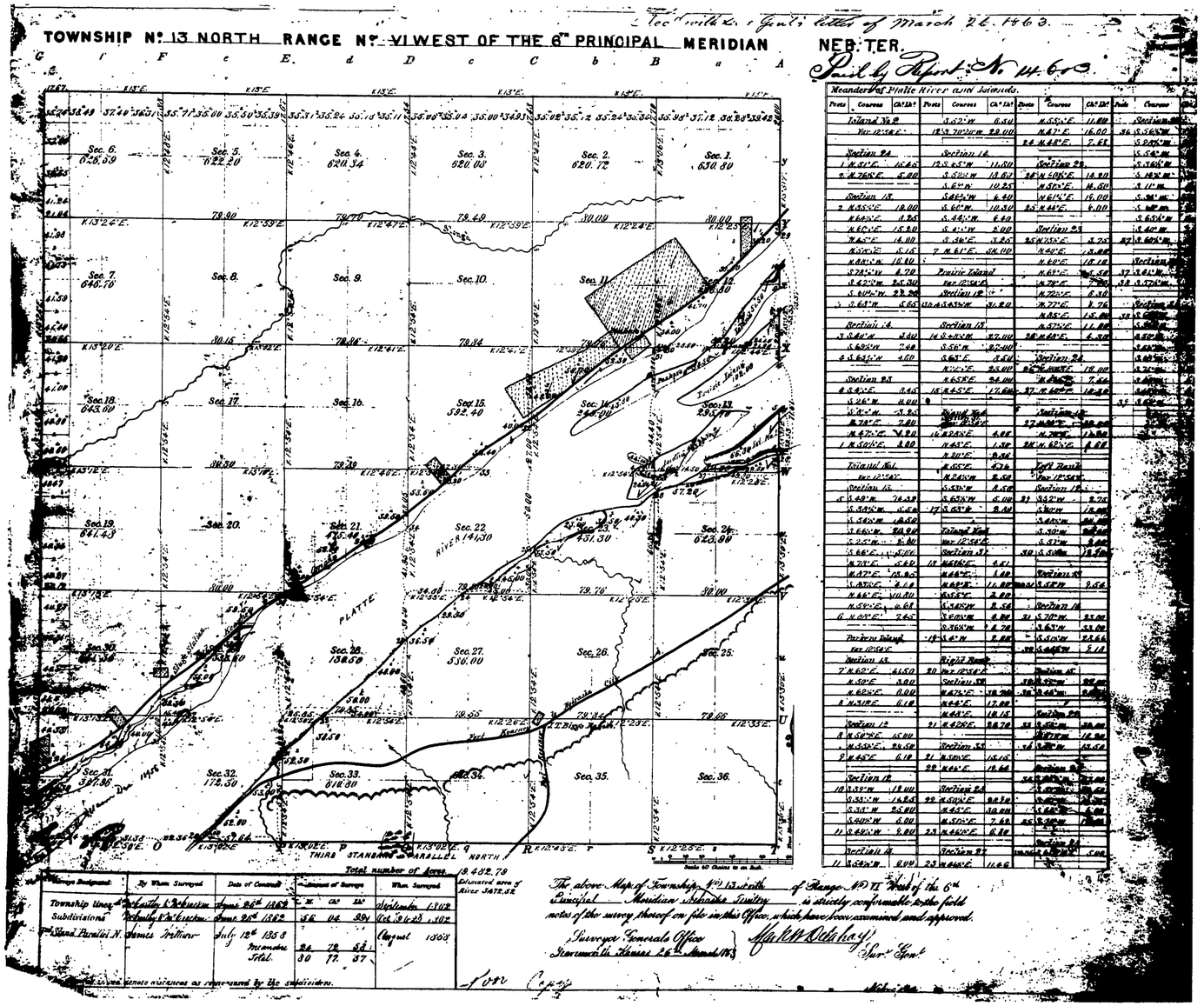


Figure 1 - Original 1862 Survey

OMITTED ISLAND IN NON-NAVIGABLE PLATTE RIVER

T. 13 N., R. 6 W., 6TH PRINCIPAL MERIDIAN

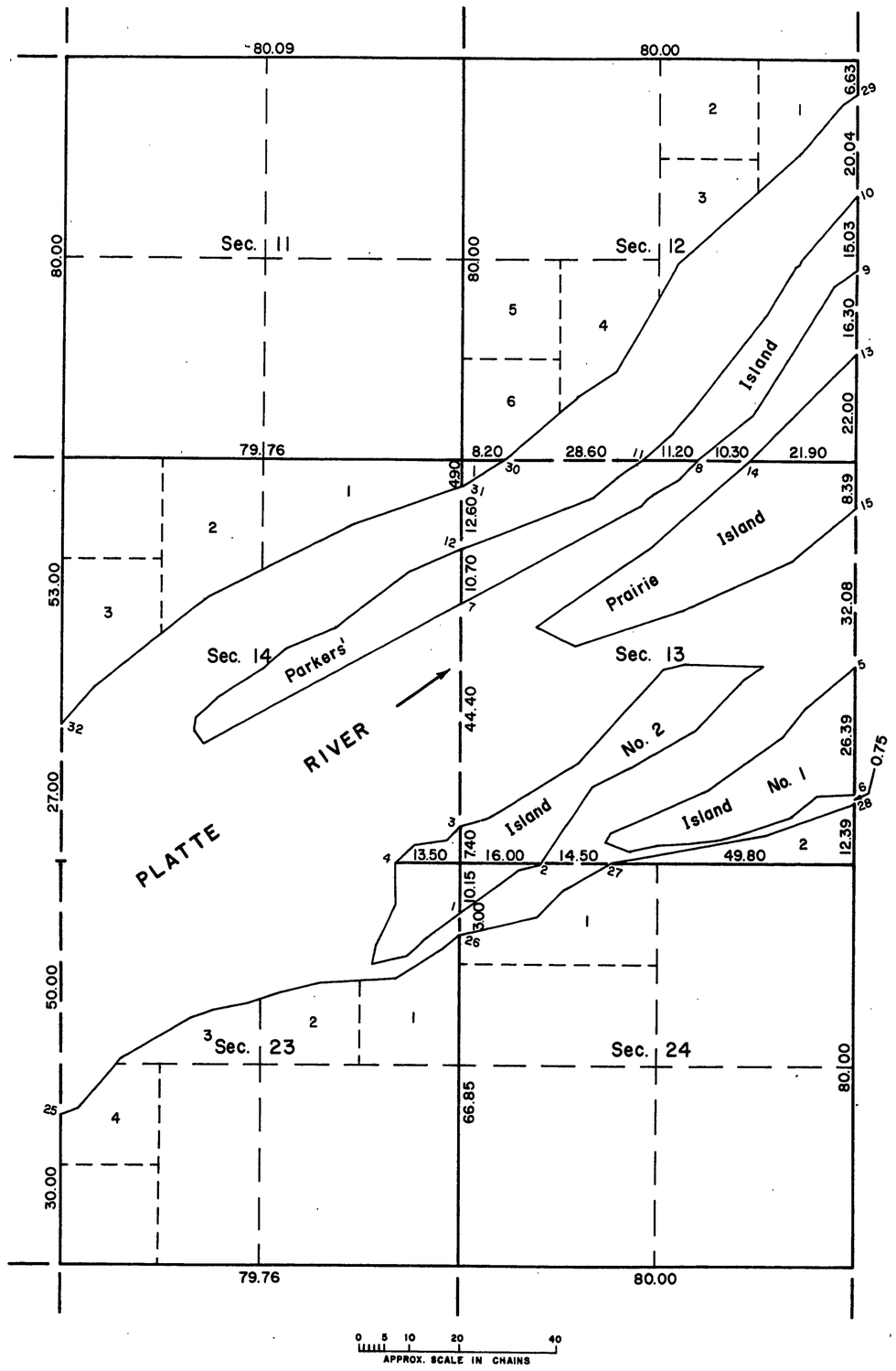


Figure 2 - Portion of Original Record

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.

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

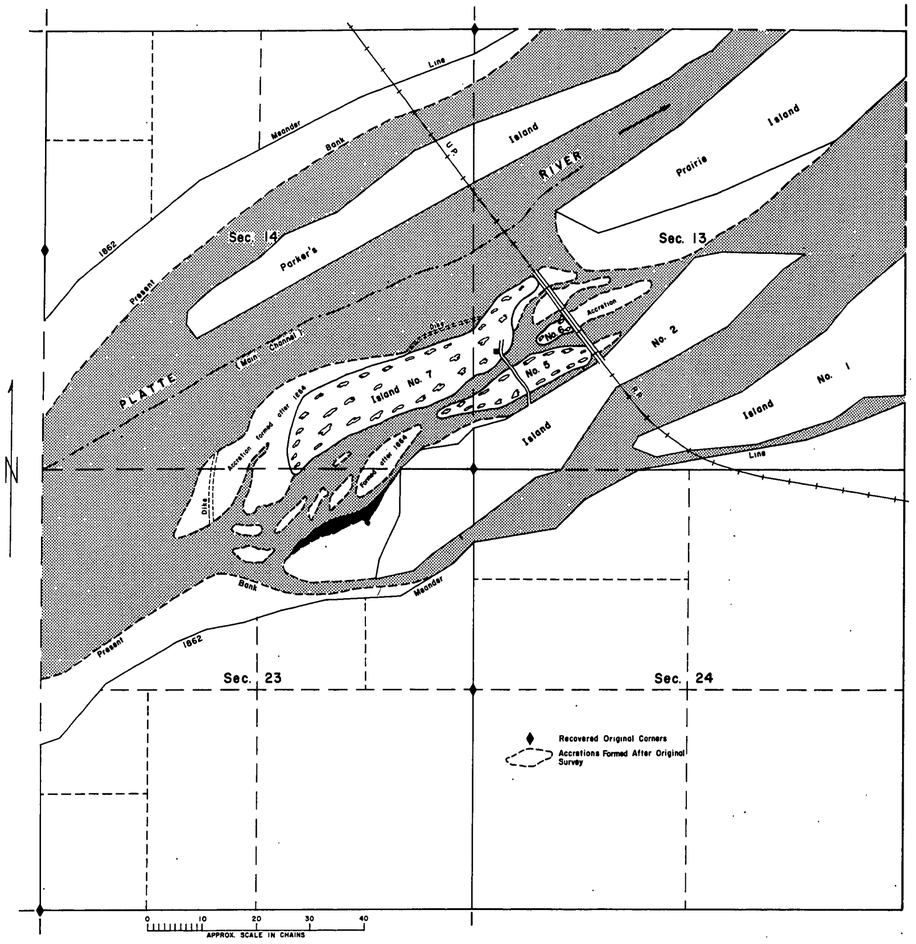


Figure 3 - Conditions Found

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.

TRUE MERIDIAN

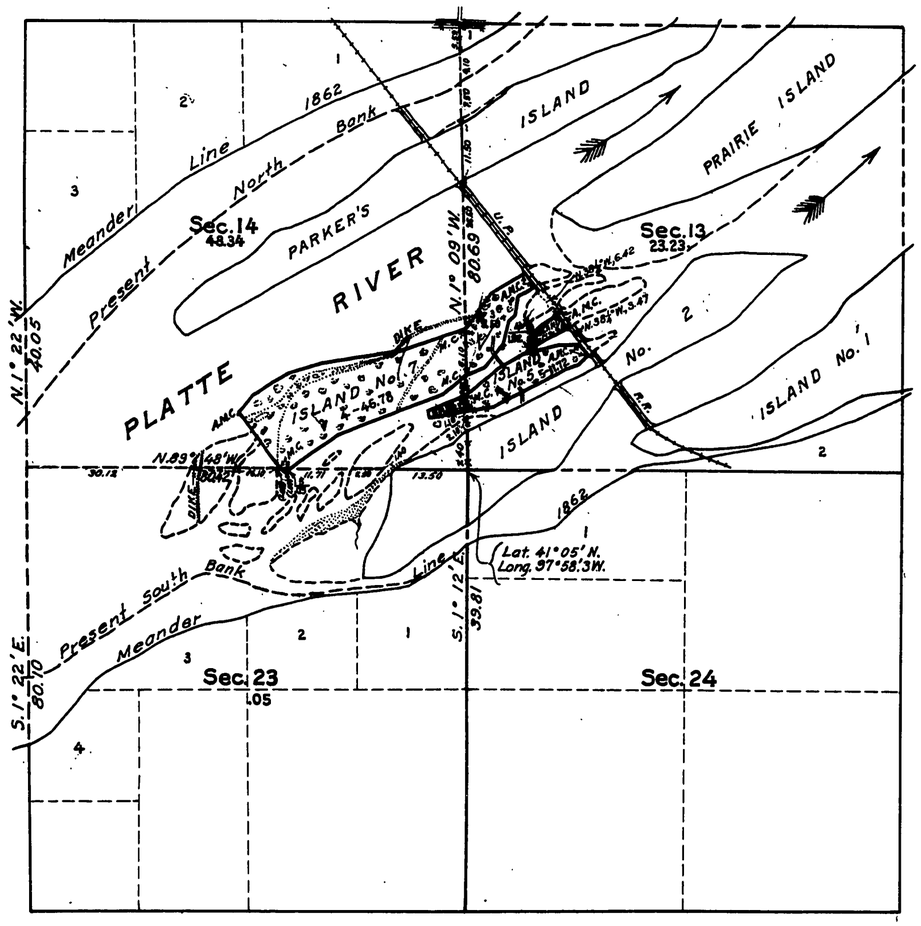


Figure 4 - Portion of Accepted Plat

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.

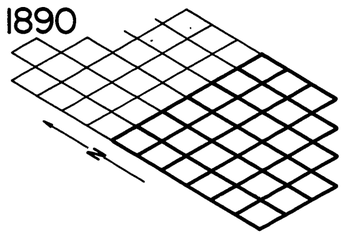
Auxiliary meander corners were established on the downstream end of the original portion of each island and on both sides of each island. These AMC's were set on a line perpendicular to the thread of the main channel. This perpendicular line was also along the railroad right-of- way. Direct ties were made between the AMC's on each island.

D13-3

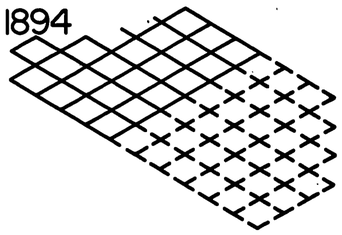
FRAUDULENT MEANDERS OF CUMMINGS LAKE

T. 63 N., R. 14 W., 4TH PRINCIPAL MERIDIAN

1890



1894



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.

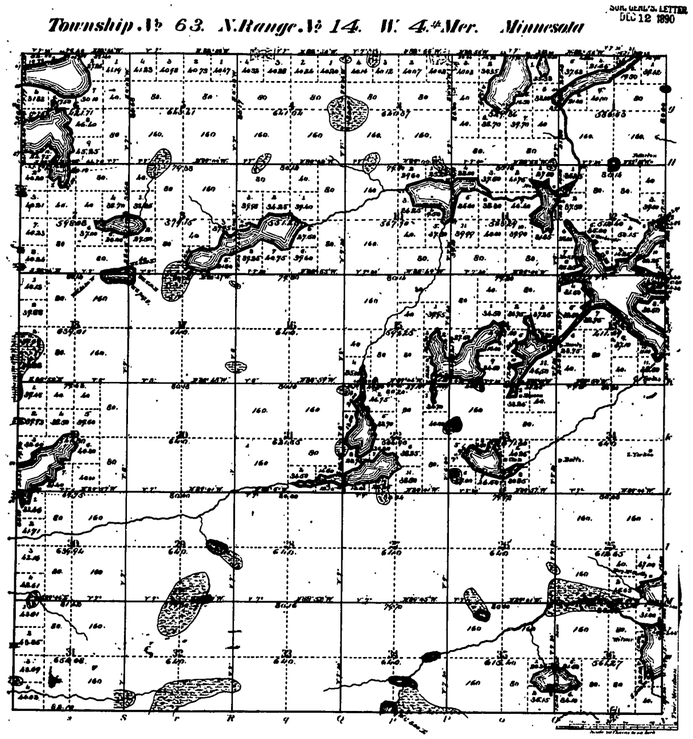


Figure 1 - Original 1890 Survey

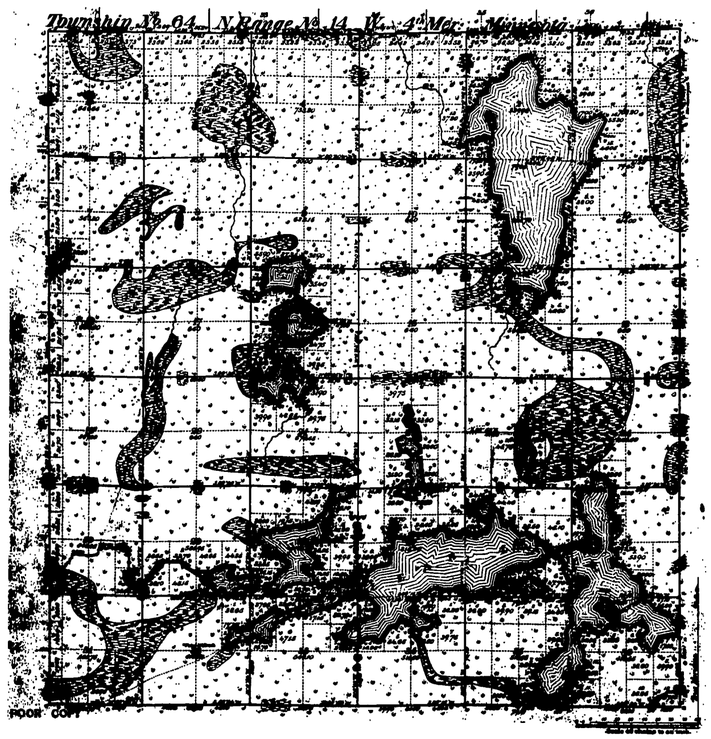


Figure 2 - Original 1894 Survey

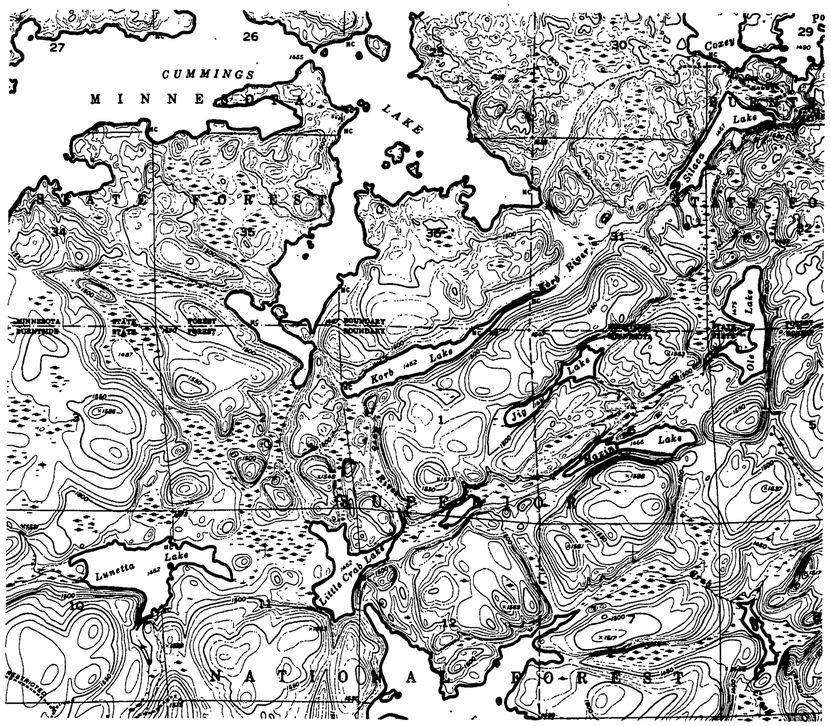


Figure 3 - Crab Lake, 1956 Quad, USGS

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.

JAN 26 1999

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.

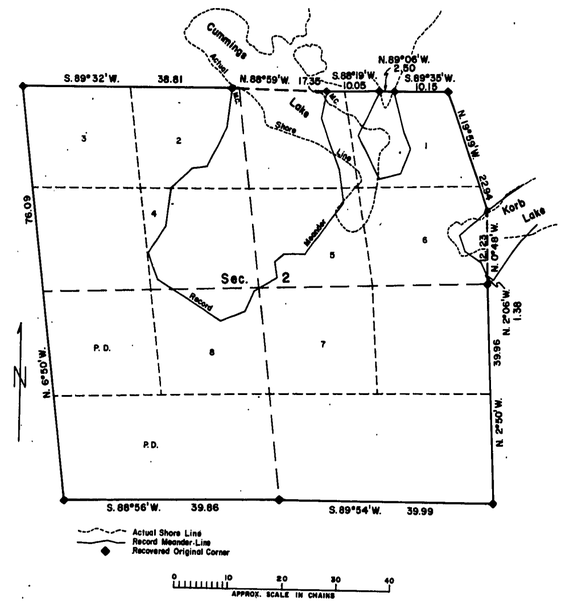
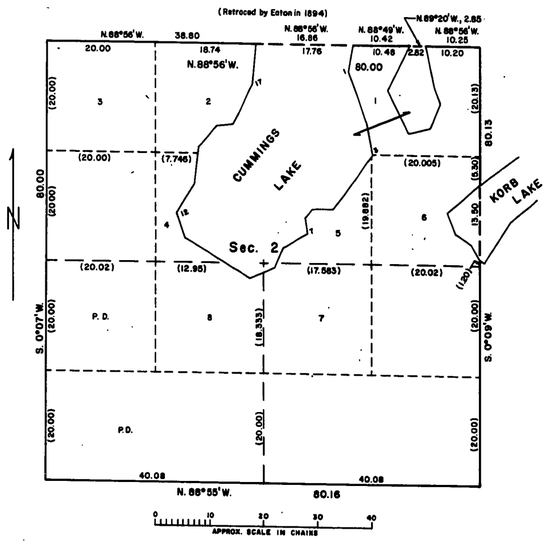


Figure 4 - Conditions Found



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., 3.00
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

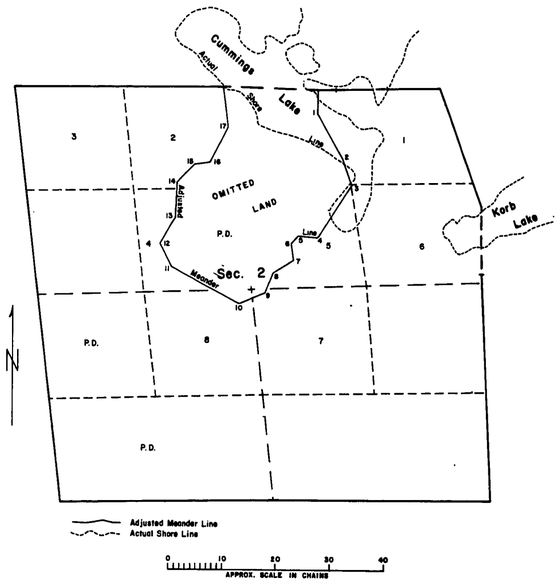


Figure 6 - Adjusted Meanders

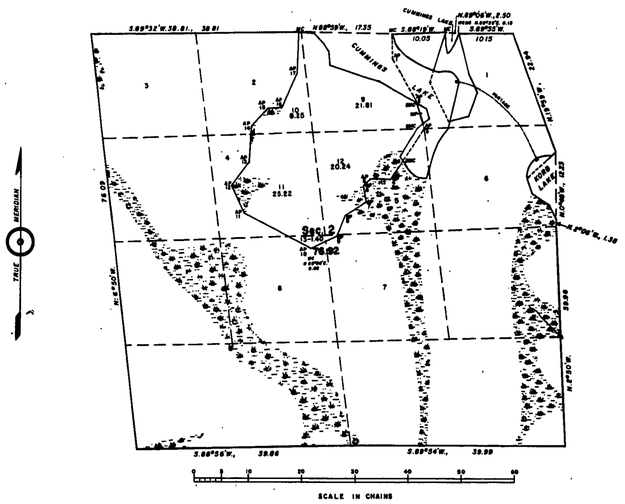
Supplementary Topic

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.

TOWNSHIP 63 NORTH, RANGE 14 WEST, FOURTH PRINCIPAL MERIDIAN, MINNESOTA

DEPENDENT RESURVEY AND EXTENSION SURVEY, SECTION 2



Area Surveyed: 76.92 Acres

Area Resurveyed: 589.86 Acres

This plat represents a retracement and reestablishment of the original subdivisional lines designed to restore all corners on the boundaries of section 2 in their original locations according to the best available evidence, and the survey of omitted lands which were erroneously omitted from the original survey as shown upon the plat approved December 8, 1890.

The position of the original meander of Cummings Lake is shown by an irregular line with numbered angle points. This line, as originally reported, was grossly in error. Those portions shown by the solid lines between numbered angle points have been established as the fixed boundary with the directions and lengths of the several record-meander courses adjusted to the re-established position of the original survey.

Surveyed by Hugh B. Crawford, Cadastral Surveyor, from October 3 to November 19, 1963, under Special Instructions for Group 96, Minnesota, dated September 24, 1963.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. April 30, 1964

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.

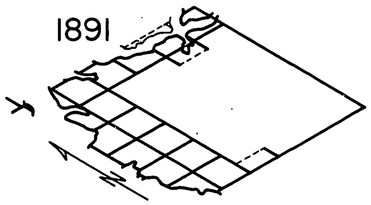
For the Director

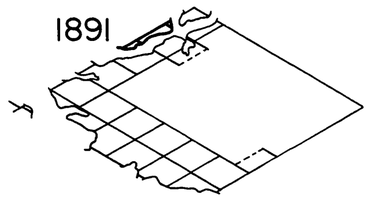
Chief, Division of Engineering

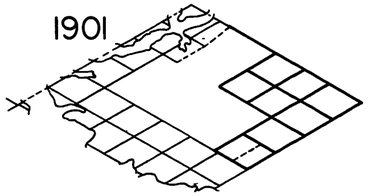
Figure 7 - Accepted Plat

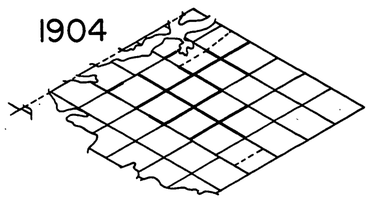
RESTORATION OF MC'S ON BEAUTY BAY

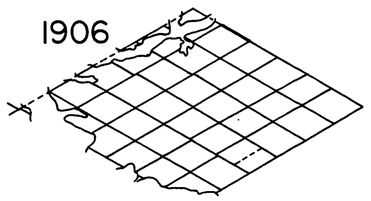
T. 49 N., R. 3 W., BOISE MERIDIAN











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.

Township No. 49 North Range No. 3 West of the Boise Meridian

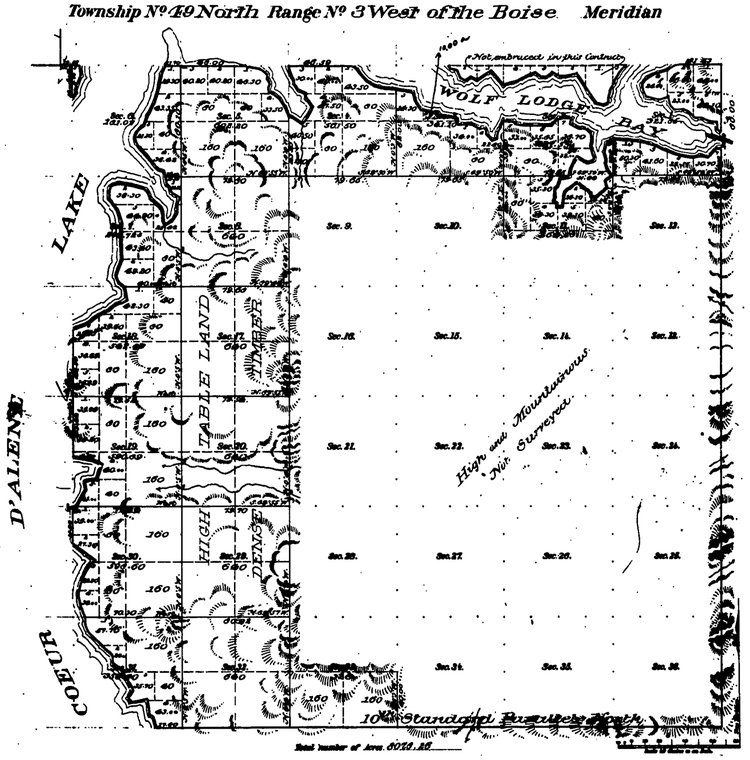


Figure 1 - 1891 Miller Survey

Township No. 49 North Range No. 3 West of the Boise Meridian

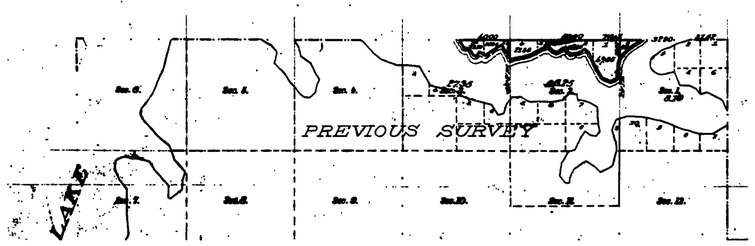


Figure 2 - 1891 Sonnenkalb Survey

D15-1

RESTORATION OF MC'S ON BEAUTY BAY

T. 49 N., R. 3 W., BOISE MERIDIAN

Township No 49 North, Range No 3 West of the Boise Meridian, Idaho.

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.

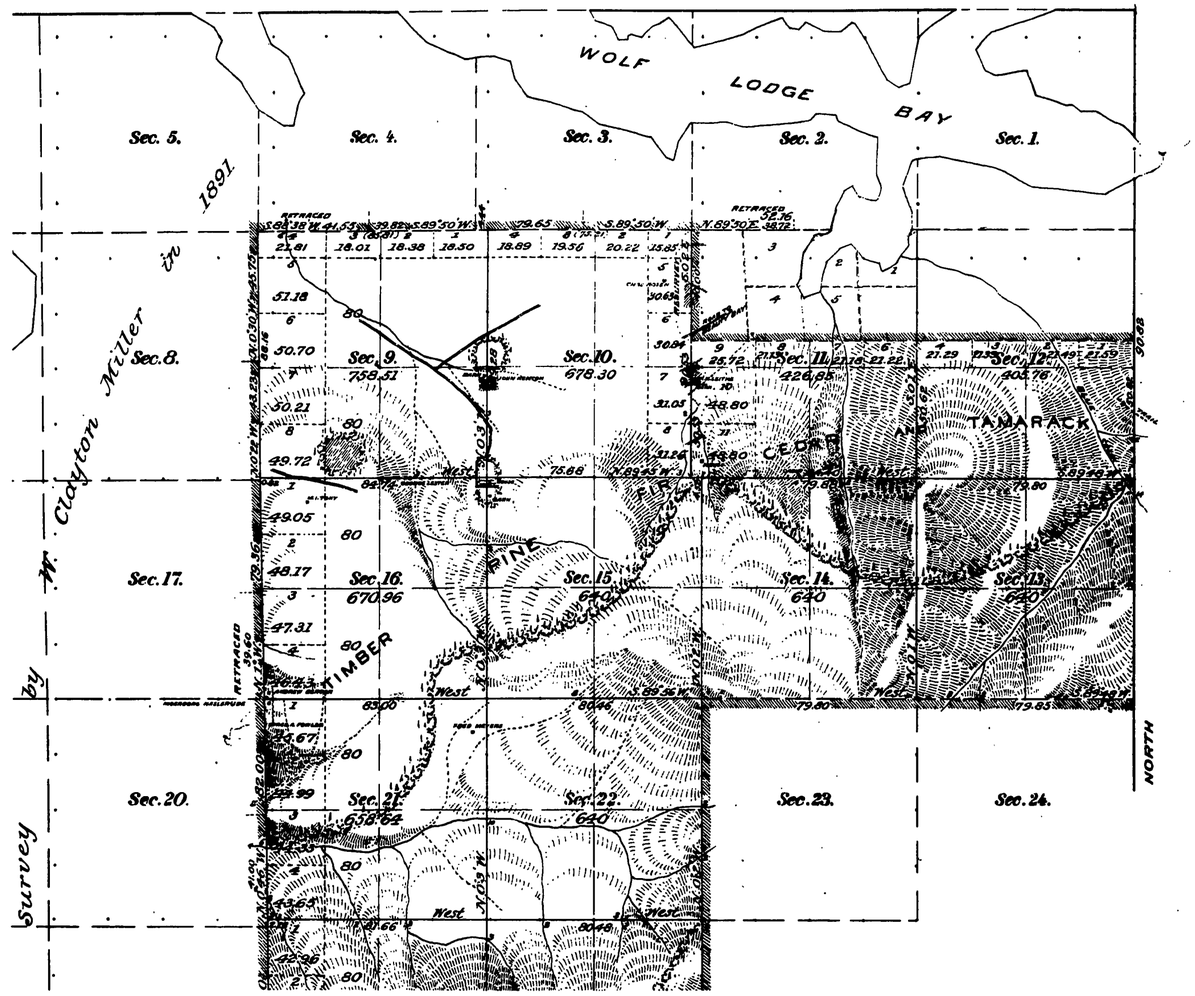


Figure 3 - 1904 Rands Completion Survey

D15-2

RESTORATION OF MC'S ON BEAUTY BAY

T. 49 N., R. 3 W., BOISE MERIDIAN

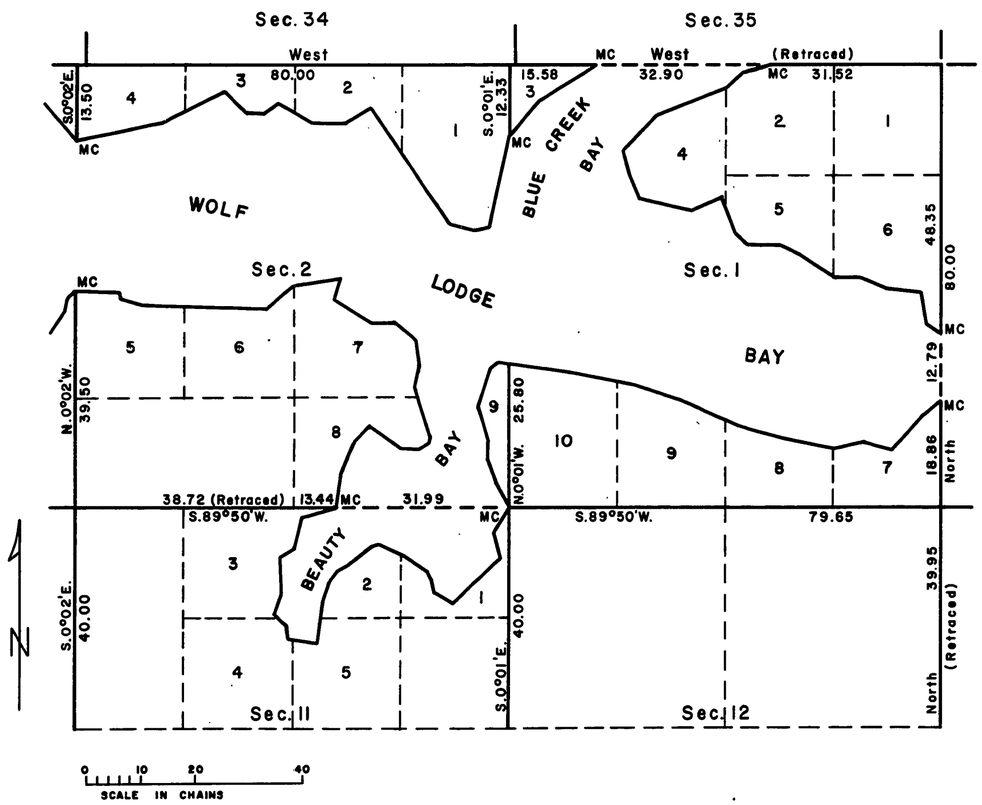


Figure 4 - Composite Survey Record

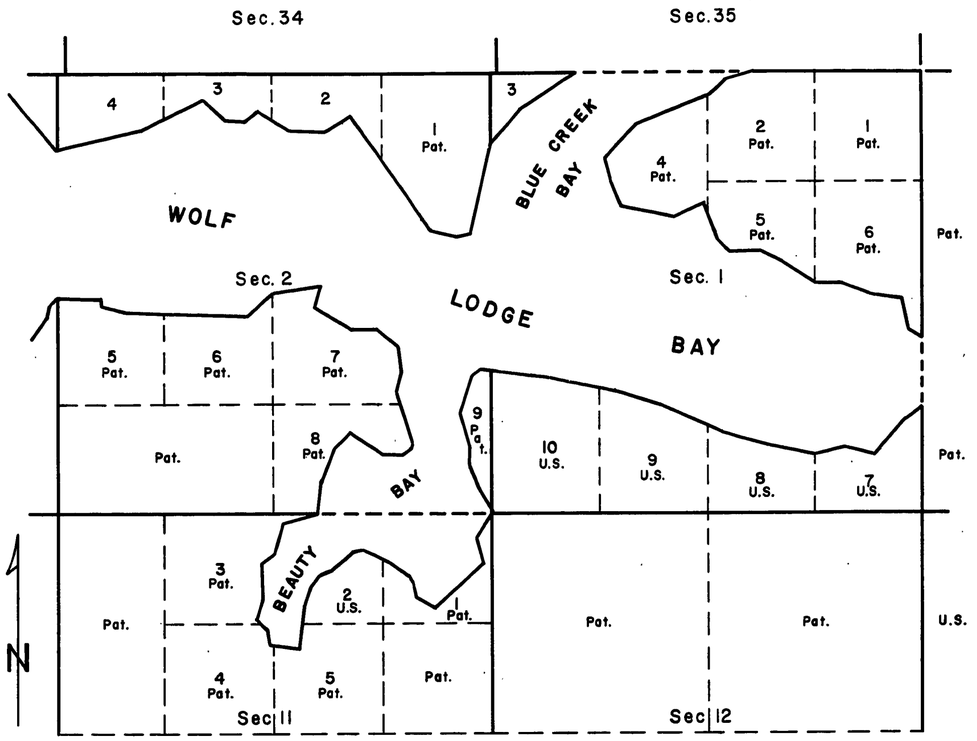


Figure 5 - Ownership Status

D15-3

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.

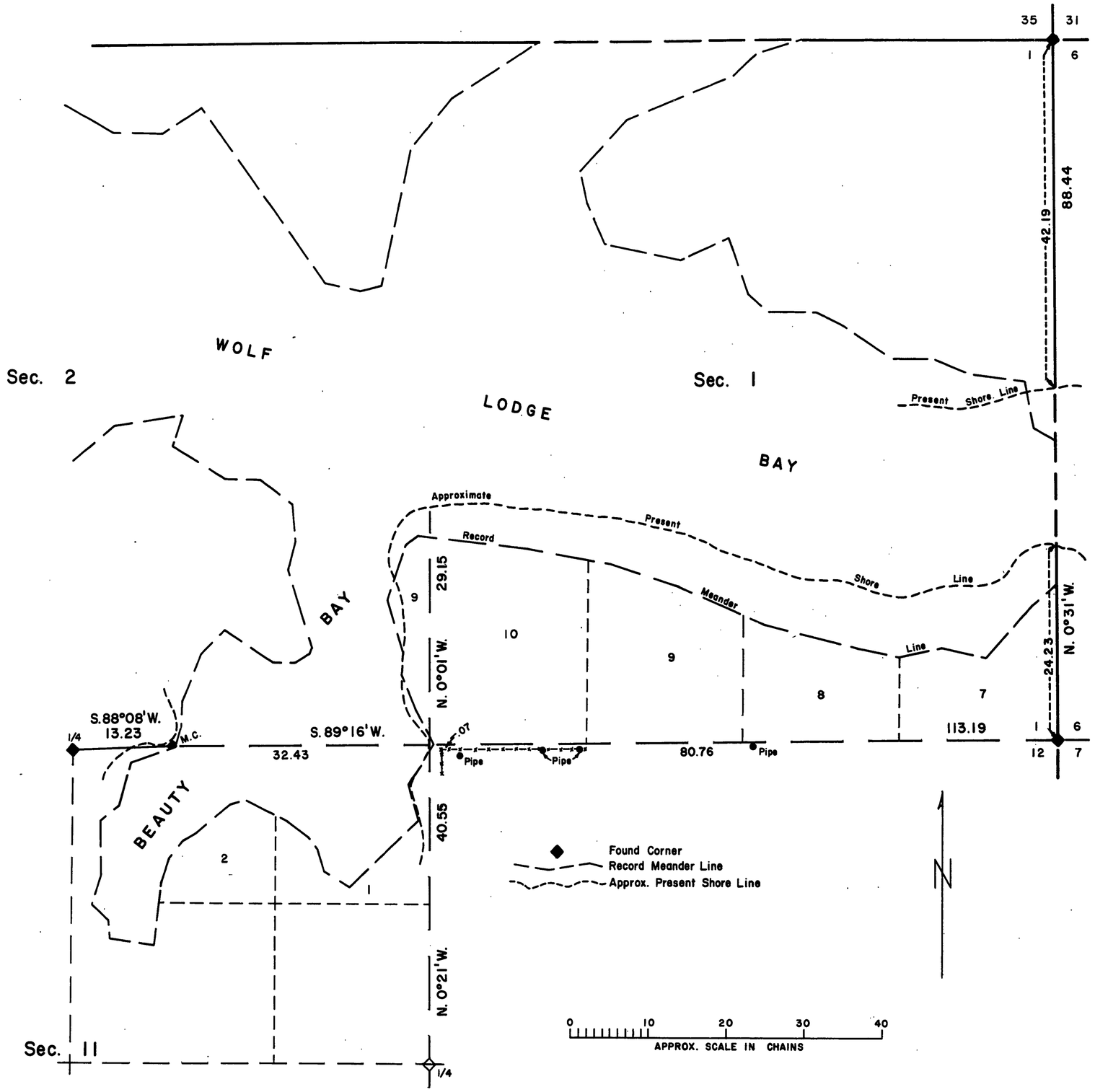


Figure 6 - Conditions Found and Corner Recovery

D15-4

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.

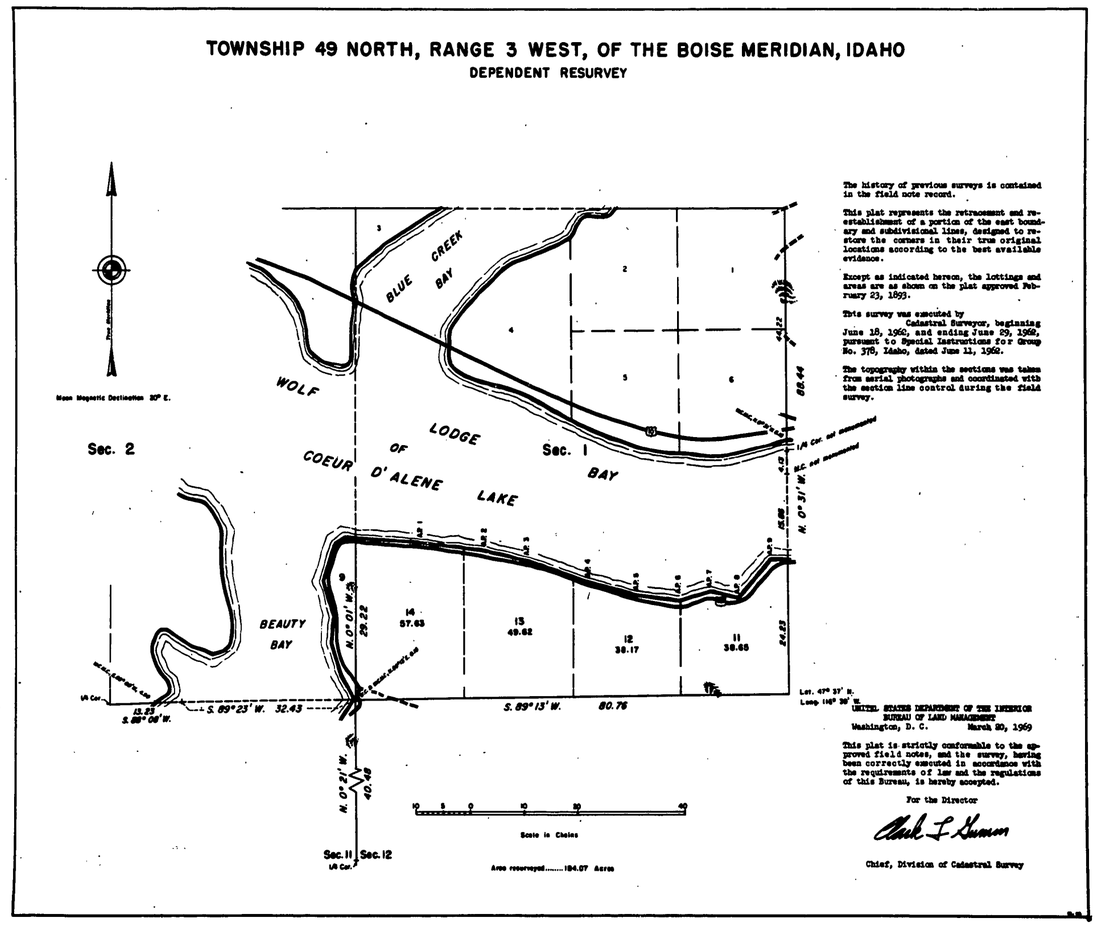
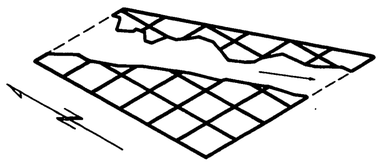

TOWNSHIP 49 NORTH, RANGE 3 WEST, OF THE BOISE MERIDIAN, IDAHO
DEPENDENT RESURVEY

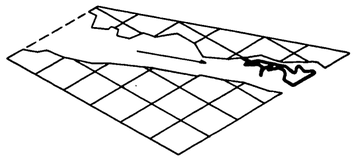
Figure 7 - Accepted Plat

OMITTED & SWAMP LANDS, PELICAN ISLAND

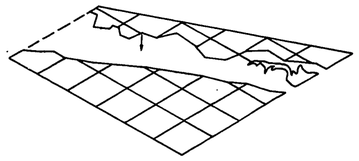
1859

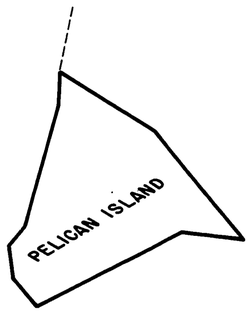


1886



1903





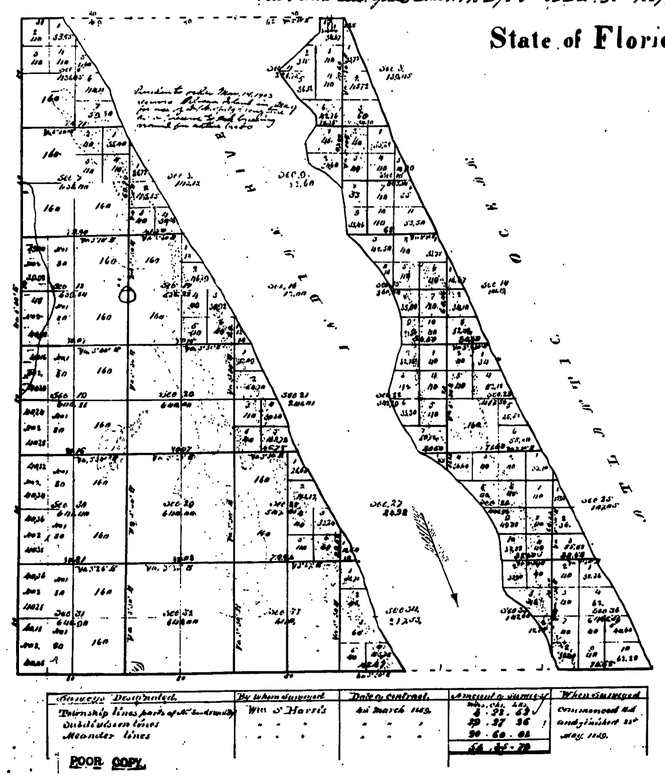


Figure 1 - Portion of Original Plat

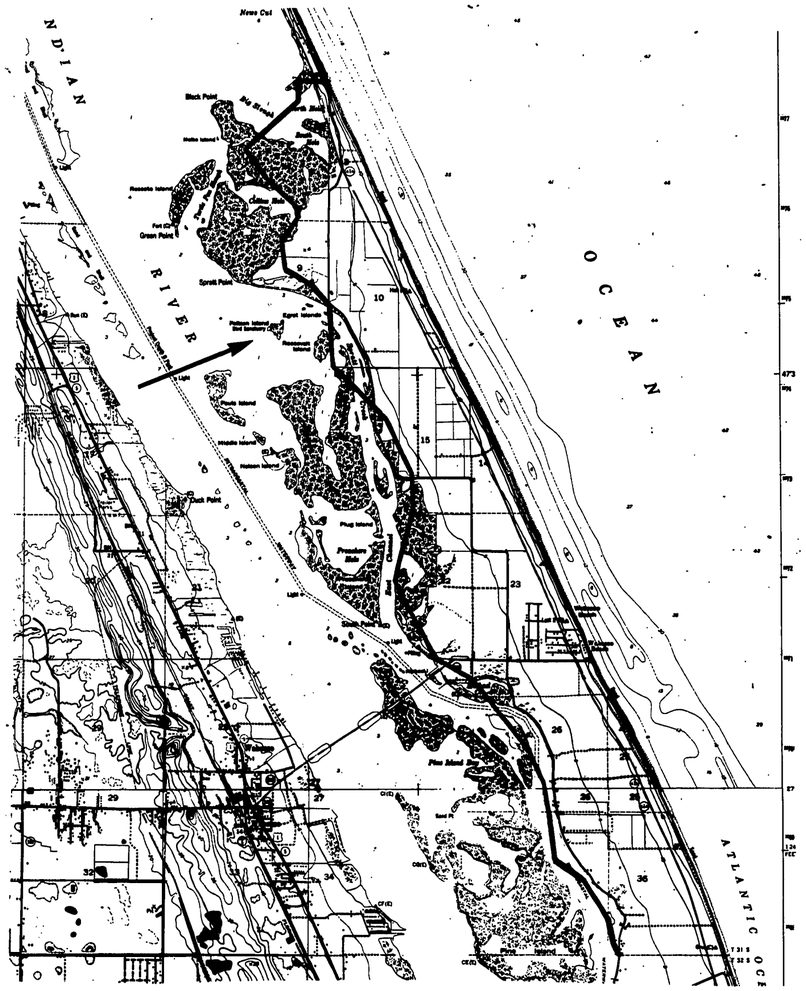


Figure 2a - Portion of Topographic Map With Record Meanders

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

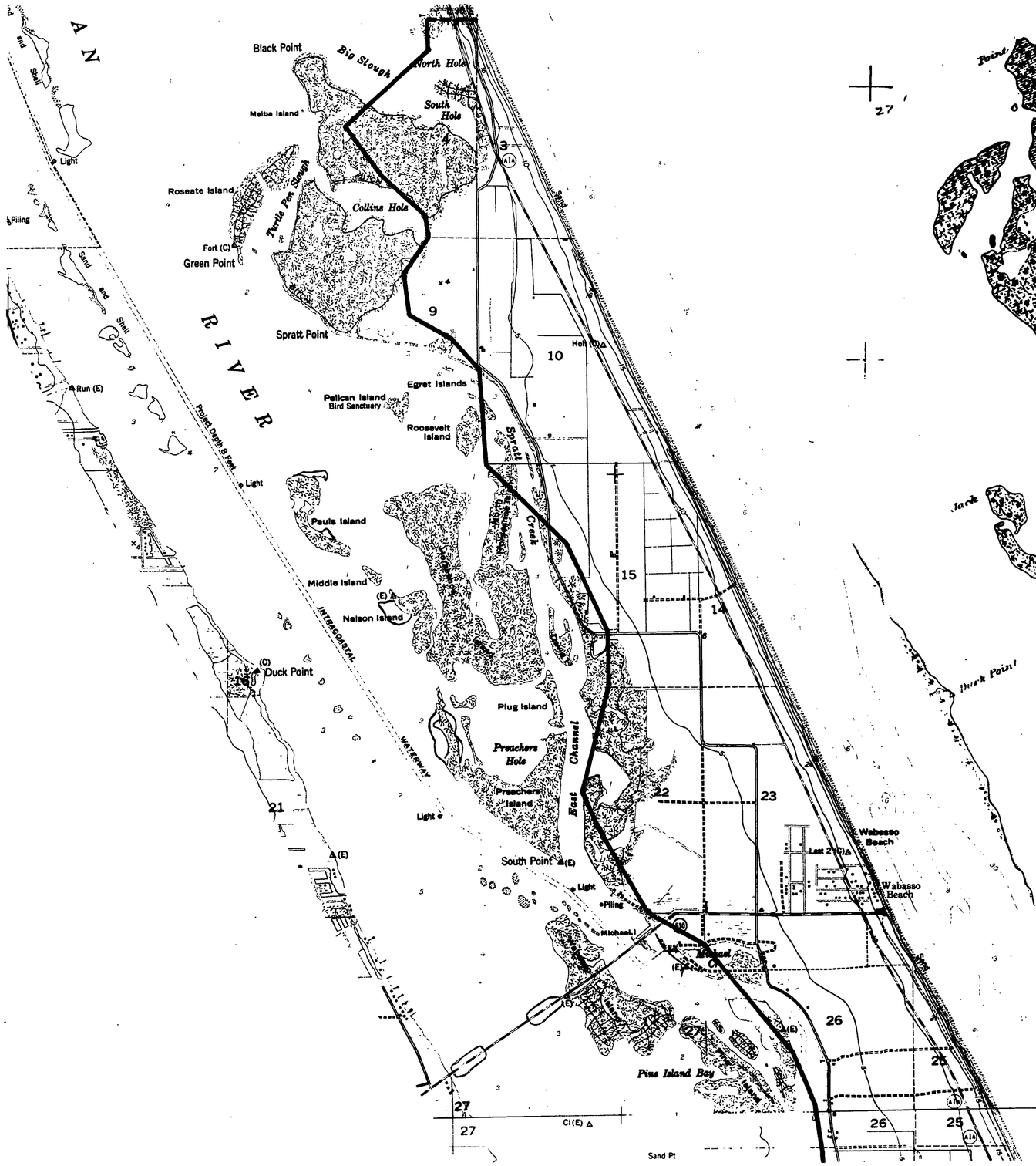


Figure 2b - Portion of 1949 U.S.G.S. Map at 1:24,000

Figure 3 - Portion of 1880 Chart at 1:20,000

D16-2

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

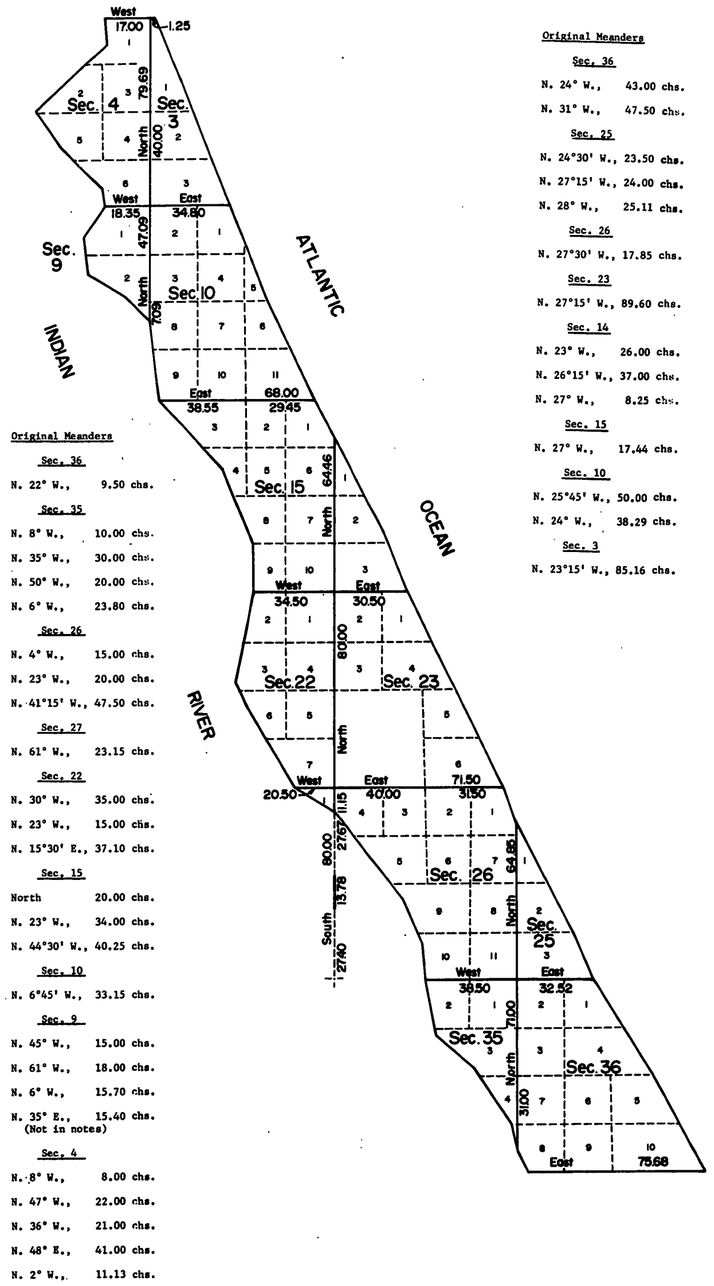
On April 8, 1965, Special Instructions were prepared for Group 146, Florida. They provided for the dependent resurveys necessary and examination and conditional survey of any omitted lands and islands in sections 4, 5, 9, 10, 15, 16, 21, 22, 26, 27, 34 and 35, T. 31 S., R. 39 E. Careful examination was 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. 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.

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.

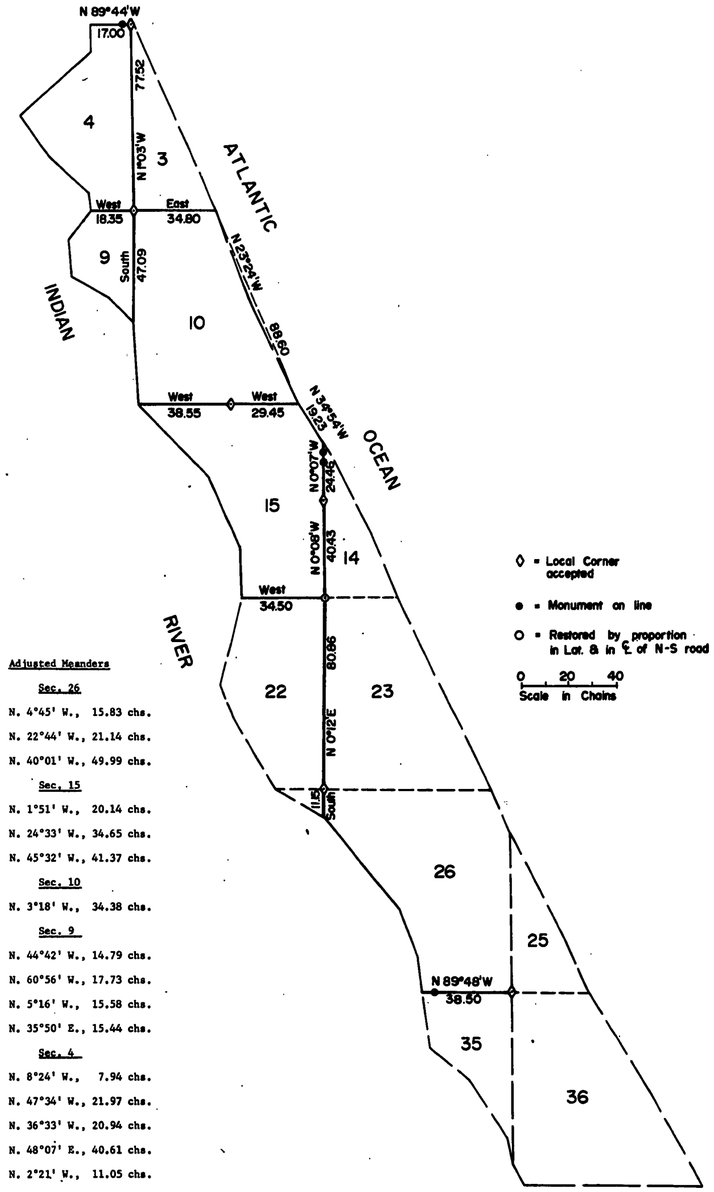
N. 47° W., 22.00 chs.

N. 36° W., 21.00 chs.

N. 48° E., 41.00 chs.

N. 2° W., 11.13 chs.

Figure 4 - Sketch Showing 1859 Survey and 1886 Extension



◊ = Local Corner accepted

● = Monument on line

○ = Restored by proportion in Lat. & in ℄ of N-S road

0 20 40 Scale in Chains

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.

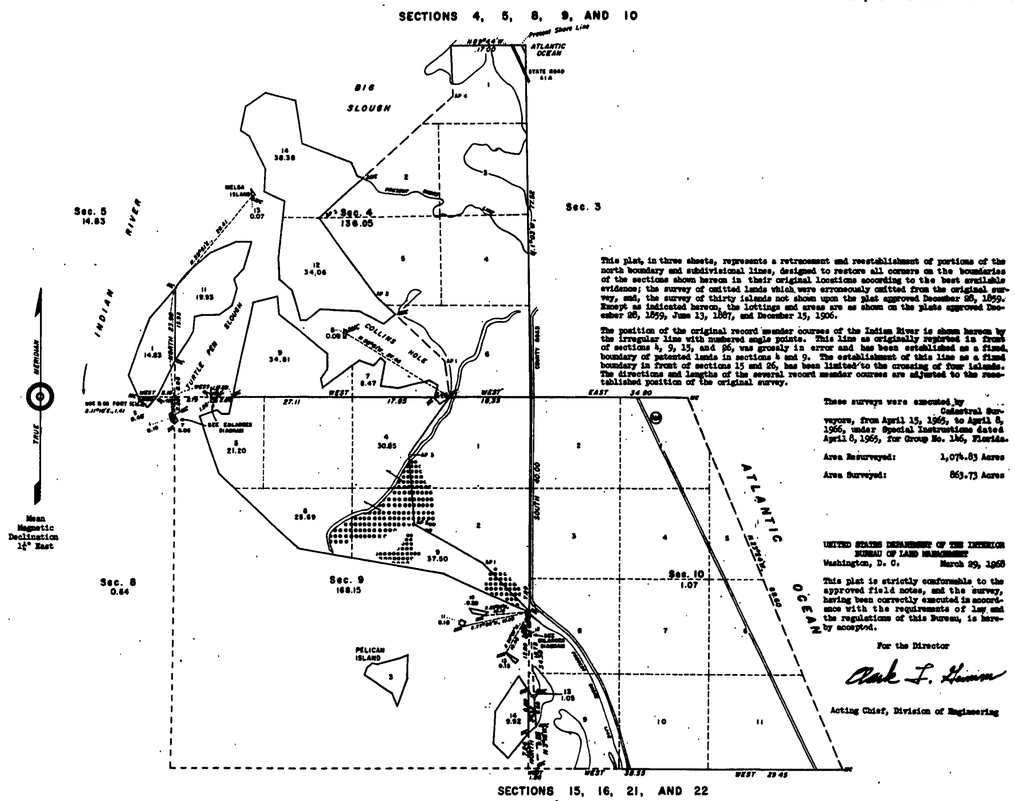
Subsequently the mangrove island and swamp areas were patented to the State of Florida under the Swamp Land Act. Those lands were then leased from the State by the Bureau of Sports Fisheries and Wildlife as part of the Pelican Island Refuge. Lot 9, section 9 was withdrawn for possible inclusion into 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, 1867, 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 16, 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 16, 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

Clark L. Hamm

Acting Chief, Division of Engineering

SECTIONS 15, 16, 21, AND 22

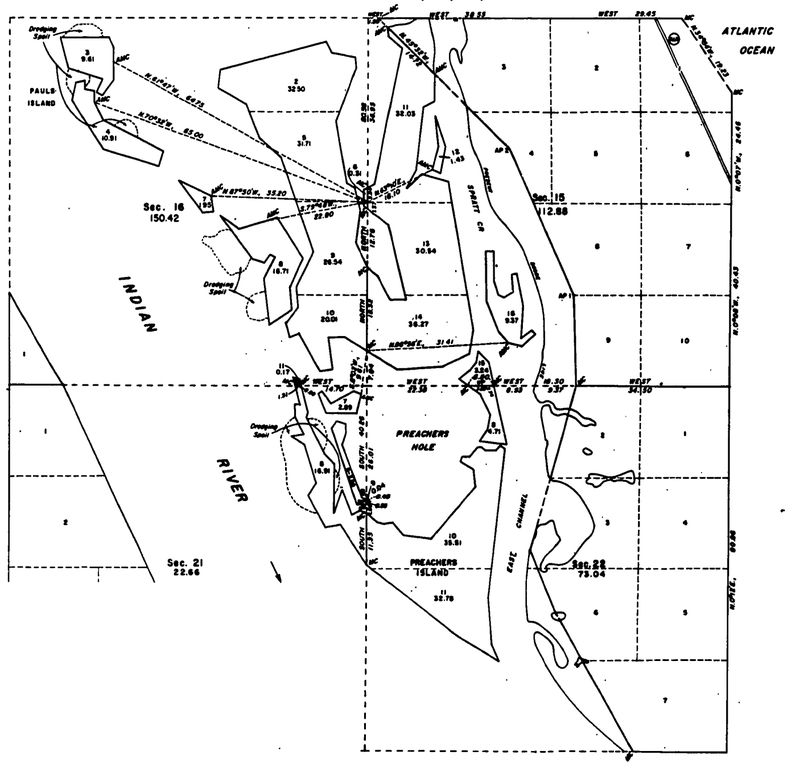
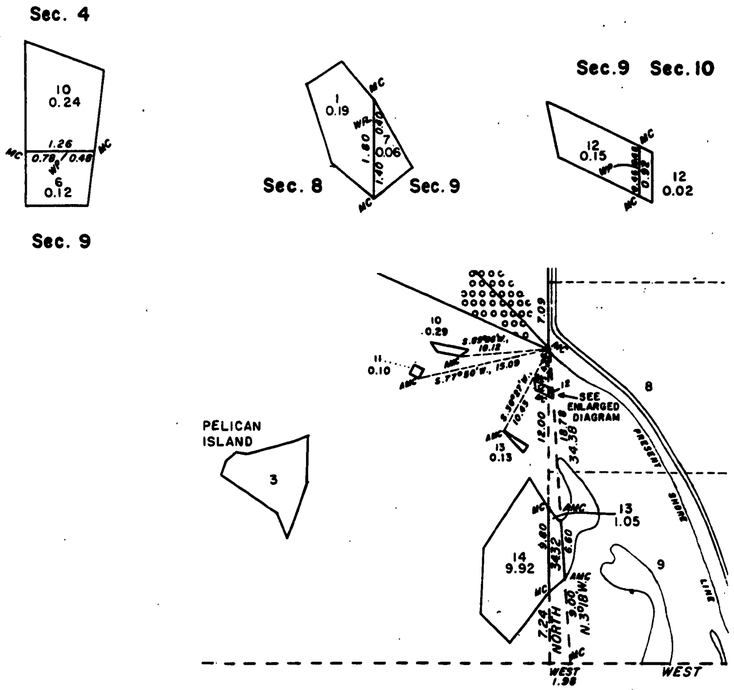


Figure 6 - Portions of Sheets 1 and 2 of the Accepted Plat

ENLARGED DIAGRAMS



SECTIONS 26, 27, 34, 35, AND 36

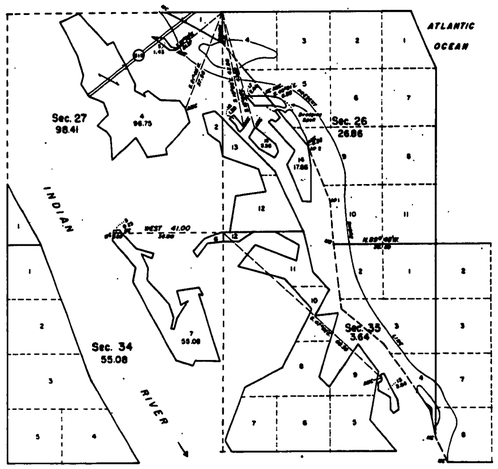


Figure 7 - Portions of Sheet 3 of the Accepted Plat

D16-5

FUNDAMENTALS OF NON-CONVENTIONAL CADASTRAL SURVEYS

The Mining Laws - Historical Background

The Land Ordinance passed by the Continental Congress on May 20, 1785, contains a proviso reserving from the townships "...one-third part of all gold, silver, lead and copper mines, to be sold, or otherwise disposed of as Congress shall hereafter direct."

Except for a somewhat unsuccessful attempt to lease the lead mines in Missouri, Illinois and Wisconsin, Congress did very little "hereafter directing" until 1866. Early day surveyors of the public lands were required to make note of mineral and salt deposits, among other things, but there is little evidence that this information was used to any extent in the disposal of the minerals. Large iron and copper deposits were known to exist in Michigan, Wisconsin and Minnesota, yet most of these lands were disposed of on the same cash-entry basis as the normal agricultural lands. The usual price of $5 per acre hardly reflected the value of the minerals contained on and under these lands.

Though some small deposits of placer gold were discovered and mined near Los Angeles in 1820, and near Gold Hill, North Carolina, in 1842, the first great mining activity in this country was the 1849 Gold Rush to the placer mines in California.

The thousands of American and foreign citizens who flocked to the gold fields in hope of becoming rich were all trespassers on the public domain. Since Congress had enacted no laws preventing the taking of gold from the public lands, those engaged in mining took the silence on the matter as acquiescence, or even tacit approval.

In the absence of statutory mining laws, and the absence of law enforcement officers, the miners made their own laws. They formed vigilante committees and enforced their rules with ropes and gun powder. Their methods proved, generally, to be effective.

Under these "miner's laws," which were based primarily on the "right of possession" and the Spanish laws of discovery and development, the first person to discover and stake claim to a mine, and then proceed to work that mine, was in possession. To the miners, possession was nine-tenths of the law.

If a miner abandoned his claim by failure to actively work it, the claim could be re-staked by someone else. This led to claim jumping and other problems. In order to deal with these problems, the miners formed "mining districts." They elected officials who accepted claims, kept records, made rules and heard disputes. Although the rules sometimes varied from one district to another they soon came to be much the same as the miners moved rapidly from one district to another in search for greater riches.

As states came into the Union or territories were created by Congress, the respective legislatures passed mining laws and regulations. In 1850, California passed a "Possessory Act," which regulated mining on agricultural lands in possession of someone other than the miner. Regardless of the Possessory Act or who held "possession," the lands were still part of the public domain of the United States.

Placer Mines and Lode Mines

Placer mines are those in which the mineral is found in free form, such as nuggets or flakes, in superficial sand or gravel deposits. Placer mines require large amounts of water to operate sluice boxes and other washing or panning apparatus used by miners to retrieve precious mineral from dirt, sand or gravel.

The placer miners dug ditches and canals along the mountain sides to bring the required water to their claims even though these early mining ditches were dug in trespass on the public domain.

Placer mining was predominant until the discovery, in 1859, of the silver-rich Comstock Lode at Virginia City, Nevada.

A lode claim is located on a vein of hard rock in place. Lode mines require tunnels and mills to reach, extract and process the ore.

Lode mining presented problems different from those of placer mining. For example: What if a miner discovered other veins of valuable mineral not previously known to exist while drilling a tunnel to his own vein? And if a miner should build a mill on top of a vein of ore, who would own that vein? By comparison the placer mining problems were few due to the fact that those workings were usually on the surface. Lode mines were such a different matter that their operation required many more laws and regulations.

1866 - The First Congressional Statutes

Congress disposed of the lead mines in the State of Arkansas and Illinois and the Territories of Iowa and Wisconsin in 1846 (9 Stat. 37) and then, for all practical purposes, was silent on the subject of mining for 20 years. Although there were many heated debates over the mineral lands and how they should be leased or sold, nothing significant materialized from all the discussion until July 25, 1866. On that date Congress passed an act entitled, "An Act Granting to A. Sutro the Right of Way, and Granting Other Privileges to Aid in the Construction of a Draining and Exploring Tunnel to the Comstock Lode, in the State of Nevada" (14 Stat. 242).

Under the terms of this Act, Sutro was granted the right to drill a tunnel and claim up to two sections of non-mineral land, not in the possession of others, near the entrance of the tunnel. He was also granted the right to purchase the mineral veins and lodes within 2000 feet of each side of the tunnel, at prices from $1.25 to $5 per acre. Subject to the various stipulations and provisions of the act, a patent was to be issued for the lodes and veins.

The day after passage of this act, July 26, 1866, Congress passed "An Act granting Right of Way to Ditch and Canal Owners over the Public Land, and for other purposes" (14 Stat. 251). Section 9 of the Act does grant such a right of way. Section 1, however, declared its main purpose; "...the mineral lands of the public domain, both surveyed and unsurveyed, are...free and open to exploration and occupation..." Regardless of its title, it was unquestionably a Lode Mining Act.

Section 3 set forth the procedures to be followed in making proper application for patent and pointed out that "...it shall be the duty of the surveyor-general, upon application of the party, to survey the premises and make a plat thereof..."

In no case was the plat, survey or description, or the patent, to cover more than one vein or lode.

The fourth section of the Act limits the length of a lode claim filed after passage of the Act to 200 ft; no minimum or maximum width is mentioned. All lode claims made prior to July 26, 1866, were to be in conformity, as to size, shape, etc., with the customs of the miners and local laws and rules. Each person could make only one location on a lode or vein. An association of persons was limited to 3000 feet (15 locations) along a single vein or lode.

Section 10 of this Act provided for agricultural entry on lands previously withdrawn as mineral lands on which no "valuable mines" had been discovered.

No mention of placer claims was made in the 1866 Mining Act. The prolonged silence of Congress in regard to placer claims was broken four years later.

1870 - Placer Claims Added

On July 9, 1870 (16 Stat. 217), the Lode Claim Act of 1866 was amended by the addition of sections 12 through 17.

Section 12 made placer claims, which included "...all forms of deposit, excepting veins of quartz or other rock in place...," subject to entry and patent. Where the lands were previously surveyed according to the rectangular system, the entry was to conform to legal subdivisions and was limited to 160 acres for each claimant or association of claimants. This section also provided "that the legal subdivision of forty acres may be subdivided into ten-acre tracts." No specific mention is made of how the claim was to be made on unsurveyed lands and there was no requirement that the deposit be valuable.

Section 13 provides that placer claims must meet requirements of State or Territory statutes concerning limitations for mining claims. Presumably placer claims made prior to July 9, 1870, would come under the local laws and customs mentioned throughout the first 11 sections of the Act.

It took less than two years for some of the obvious deficiencies of the Placer Act to be corrected.

1872 - The Mining Act

The Act adopted by Congress on May 10, 1872 (17 Stat. 91) is still the basic mining law of the United States. There have been amendments pertaining to coal, oil and gas (minerals which are now leased), but insofar as the Act pertains to lodes and placers, it is still in effect. Most of the mining claims requiring resurvey by the cadastral surveyors of the Bureau of Land Management were patented after the passage of this 100 year old statute.

Probably no other law of the land has created more litigation or has been interpreted more by lawyers and the courts. Few of these legal cases have had direct connection with the dependent resurvey of a mining claim. A cadastral surveyor must, however, have a basic understanding of the mining laws and the various decisions regarding them in order to resurvey a patented claim. Such knowledge is also required when surveyors must restore the corners of patented mining claims in order to segregate them from the remaining public lands.

This discussion is limited to the fundamentals of the laws concerned with mining in the United States. For a more complete treatment of the subject, refer to the 1872 Mining Act, 17 Stat. 91; U.S. Code, Title 30, and the numerous books that have been written on mining claims and mining laws.

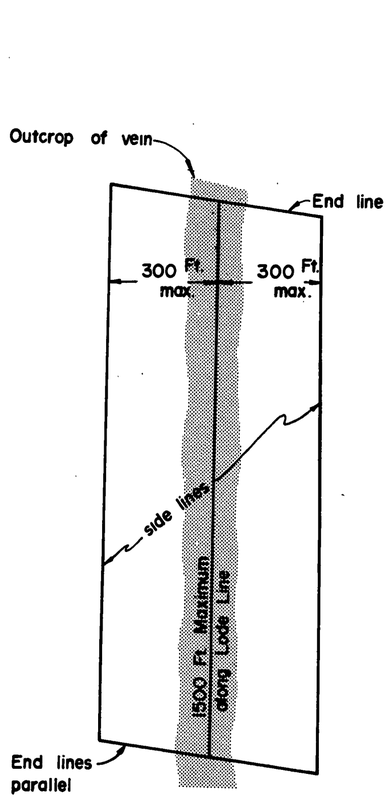
Lode Claims

An individual may make a claim upon "...veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits... ." The lode claim is limited to 1500 feet in length along the vein and 600 feet in width (300 feet each side of the vein) as measured at right angles to the vein or "lode line." The endlines of a lode claim must be parallel.

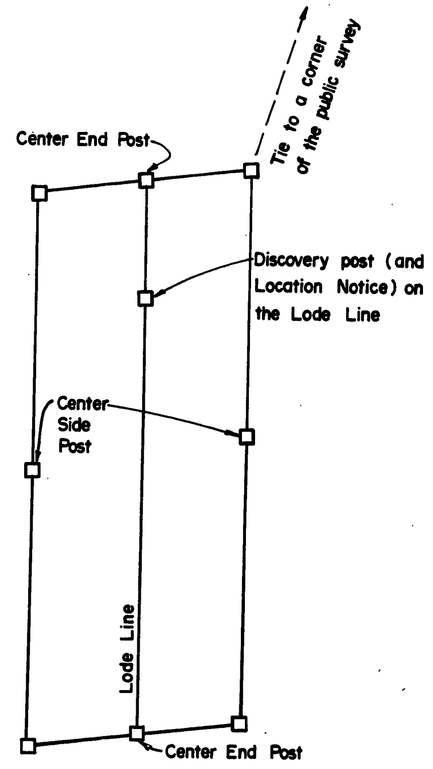
When a prospector finds a vein or lode which he believes to contain valuable mineral, he follows a more or less basic process in establishing his claim. He places a post at his discovery point and traces out the vein, as nearly as is possible, to determine the lode line. By whatever means he has available, he places posts at the four corners of his claim. He places a notice and description of his claim in a suitable container (usually a can or jar) on his discovery post.

Claims may be located in the following states: Alaska, Arizona, Arkansas, California, Colorado, Florida, Idaho, Louisiana, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming.

The prospector must comply with varying state laws as well as the Federal statutes. Some states require center end posts, that is, posts on the lode line at the end of his claim. Other states require center side posts. North Dakota is the only state that restricts the maximum of 600 feet in width.



LODE CLAIM, 1872 MINING ACT



LODE CLAIM MONUMENT NOMENCLATURE

FUNDAMENTALS OF NON-CONVENTIONAL CADASTRAL SURVEYS

After he has made his discovery and staked his claim, the claimant files a location notice with the county clerk or recorder in the county in which the claim is located. Before the counties were formed, such notices were filed with the mining district recorder. A notice of location must contain a description of the claim and a tie to a permanent land monument such as a section or ¼ section corner, or a location monument, or a tie to natural features which make it possible for the claim to be identified.

There are three things the locator must watch out for. He must not stake his claim on lands withdrawn by the BLM from mineral entry. He must not stake his claim on lands already patented in fee to someone else. He must be careful not to place his discovery point on a claim location already staked by and in possession of a prior locator. He may stake his claim in conflict with a prior claim but, if he does so, he should show the prior claim and where the claims overlap.

Survey Not Required

The claimant need not have the claim surveyed. To hold possession he must do at least $100 worth of "assessment" work on the claim each year. As long as he remains in possession and works the mine as a paying operation, he does not need to have the claim surveyed and he does not need to make application for patent. Many multi-million dollar mines operate on unpatented mining claims.

U.S. Mineral Survey

If a mining claimant does wish to patent his claim, he must first have it surveyed. The claimant must pay the cost of the survey and the attendent expenses of field note and plat preparation, application fees, etc. The Bureau of Land Management asserts rigid control over the manner in which the mineral surveys are conducted and reported. The Bureau examines and appoints qualified mineral surveyors. These surveyors, ordinarily private practitioners, occupy a peculiar position in that during the execution of the surveys they are technically Government employees even though their fees are paid by the claimants who employ them.

A claimant who wishes to arrange for a mineral survey should first request an official list of appointed mineral surveyors from the Bureau of Land Management. He may then select a surveyor from the list and make financial arrangements with him. The claimant may then make application for a mineral survey.

Instructions are written which, among other things, direct the mineral surveyor to execute the survey, inform him of other known U.S. Mineral Surveys in the area and assign a U.S. Mineral Survey number. Usually claimants also give their lode claims a name, such as "Nellie Lode," or Black Jack No. 1." The names are for identification purposes and they simplify reference to specific lode claims.

A claimant has the right at any time to fire the mineral surveyor and choose his successor. The Bureau of Land Management, however, tells the surveyor how his survey is to be conducted.

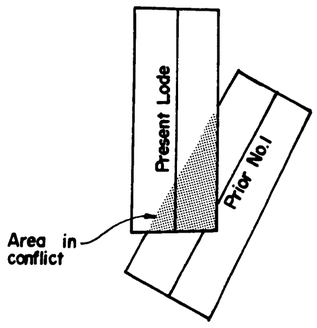
Once an application for survey has been made the claimant is precluded from amending his location. If he did not have the assistance of a surveyor when he staked the location, his location may not have parallel endlines or may be oversize, undersize or the like. If there are no other locations adjacent to or in conflict with his claim he may choose, prior to applying for a survey, to amend his location to correct the defects. However, if he does amend his location, his location rights start on the date the location is amended. Once the Order for Mineral Survey is issued, the surveyor must make the survey within the lines as marked by the location posts. He must make the endlines of lode claims parallel and the lode must not exceed the length and width restrictions.

In making the mineral survey the surveyor must show any conflicts with patented land, prior mineral surveys and any conflicts with claims within the same group of claims when there is a group-claim survey. Known conflicts with prior locations, even if they are unsurveyed, should also be shown if they are to be excluded. The surveyor must tie Corner Number One of each claim to, preferably, the nearest identified corner of the rectangular survey system within a two mile distance or to a location monument within the limiting distance.

When the required field work is completed the mineral surveyor must submit his field notes and a plat of the survey to the BLM, along with an estimated value of all improvements and expenditures found within his survey. The field notes are checked for correctness and the mineral survey plat is prepared by the BLM, with costs charged to the claimant.

Mineral surveyors are now appointed by the Washington Office (43 CFR 3861.5), but mineral surveys are not submitted to the Washington Office as is the case with other public land surveys. Instead, when all is in proper order, a mineral survey is approved at the State Office level. Once approved, the mineral survey becomes an official government survey with all the attendent restrictions and regulations pertaining thereto.

A mineral survey by itself confers no rights to the claimant that he did not have under his original location. It is more of a pre-requisite to patent than anything else at this point. After the survey is approved the claimant may apply for patent, though he is not required to do so.



Field Examination Prior to Patent

If a claimant applies for a patent, an examination is made of his claim by a qualified mineral examiner, a government employee, who determines whether or not the claim is valid under the law. To be a bona fide claim it must contain "valuable" minerals. This has long been defined as minerals sufficient in quantity and quality and of such character as to encourage a prudent person to expend time, labor and money to extract those minerals with a reasonable degree of expectancy of making a profit from the endeavor. Almost any vein or lode in the mining areas of the country will contain traces of metals. A mere trace or mineral of low quality would not, however, constitute a valid claim (U.S. v. Coleman, 88 S. Ct. 1327; 20 L Ed. 2d 170).

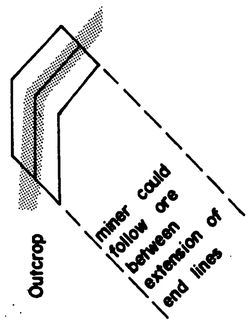
If found valid and free of adverse claims after the required posting and advertising, the claim will go to patent, with payment at the rate of $5 per acre.

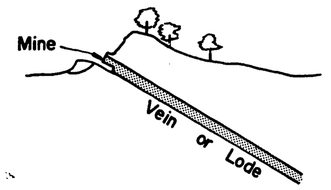
Conflicts with prior patents or other claims within a group or with valid lode locations held by other claimants, and which are excluded from the patent description, are the cause of most of the cadastral surveyor's problems when he is executing a resurvey to define the boundaries of the public lands.

The Surveyor and the Provisions of the 1872 Mining Law

Section 2 of the 1872 Mining Act limits a lode claim to 1500 feet in length along the vein and 300 feet in width on each side of the vein. These dimensions may be reduced by local statutes or mining regulations but cannot be reduced in width by such rules to less than 25 feet each side of the vein. The end lines of the claim must be parallel. No minimum length is specified.

In early mining practice many claims were much less than 1500 feet long and as little as the minimum 50 feet in width. Since the side lines do not have to be parallel the claims often had two, three or more courses along a side line, but never a dog-leg in the end line. The end lines were required to have a "substantial" length (34 L.D. 470, 35 L.D. 22). Claims made prior to the 1872 Mining Act, under the provisions of the 1866 Mining Act, could be made by up to 15 locators but could later be surveyed as one claim. This resulted, on occasion, in a patent for a mineral survey which is up to 3000 feet long and only 50 or 100 feet wide.

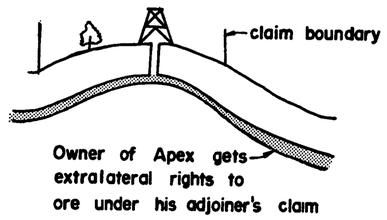




Apex at an outcrop

Section 3 of the Mining Act grants extralateral rights to persons who hold lode claims in which the apex or top of a vein is located. Under this provision a claimant with extralateral rights could follow a vein which "apexed" within his claim in its downward dip, outside the side lines of the claim but only within the vertical plane drawn through the end lines. He could mine a vein apexing on his claim and under the surface of adjoining property belonging to someone else. He had no right to the adjoining surface, however.

Extralateral rights were granted only if the end lines of the claim were parallel. A claim without parallel end lines would be allowed, but without extralateral rights. If a mineral survey returned parallel end lines and the monuments on the ground revealed that the end lines were not in fact precisely parallel, this would not deprive the claimant of his extralateral rights if the end lines were substantially parallel (Grant v. Pilgrim, C.C.A. Alaska 95 F. 2d 562; Note 157,30 U.S.C.A. 26).



Because of the parallel end line requirement claims were often staked and later surveyed in conflict with adjoining mineral surveys or patented lands. The trespass was legally allowed so long as it was done "peaceably." The areas in conflict were excluded from the claim which left it a fraction of a full claim. These claims were often called "fractions," such as "Standard Fraction" or "Alpine Fraction."

Although not specifically mentioned in the 1872 Mining Act, it has also been ruled that mining claims receive riparian rights if one line of the claim is shown by the survey of the claim as being a meander line along a meanderable body of water (45 L.D. 330, Alaska, 1916).

Section 4 of the Mining Act granted the right of possession to veins and lodes discovered in tunnels, and prevented locations on the surface along the line of the tunnel so long as the tunnel remained valid.

Section 5 of the Mining Act deals with recording requirements, annual assessment work requirements and other factors not directly connected with the surveys.

Section 6 provides for patenting claims. One of the requirements under this section is "...a plat and field notes of the claim or claims in common, made by or under the direction of the United States surveyor-general, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the ground,..." shall be filed with the application for patent.

The surveyor-general was to certify that $500 worth of labor had been expended on the claim, that the plat was correct and contained a full description of the claim by "...reference to natural objects or permanent monuments as shall identify the claim..." The term "permanent monuments" has been adjudicated to include just about anything but it usually means a corner of the rectangular survey or a location monument within two miles of the claim.

Section 7 of the Mining Act describes adverse claims and authorizes a "court of competent jursidiction" to settle the dispute or decide who gets the claim. The Land Office could not be the final judge unless the adverse claim was waived.

Section 8 of the 1872 Mining Act is probably the cause of more problems for the present day surveyor than any other part of the Act. Keep in mind that resurveys, except where specified by law, were not authorized until the Act of March 3, 1909 (35 Stat. 845) as you read this section, which follows in its single-sentence entirety:

> Sec. 8. That the description of vein or lode claims, upon surveyed lands, shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued as aforesaid for claims upon unsurveyed lands, the surveyor-general, in extending the surveys, shall adjust the same to the boundaries of such patented claim, according to the plat of description thereof, but so as in no case to interfere with or change the location of any such patented claim.

Of course, the "rectangular" sections in a township are very often far from being rectangular. They may be a misshapen figure with eight or more sides. The requirement in this section of the Mining Act that the surveyor-general was to segregate the mining claims from the rectangular survey system according to the mineral survey plat was interpreted as meaning that no change could be made in the dimensions of the claim as shown on the plat.

Segregation diagrams were made of a township, portions of a township or individual sections, depending on the mining activities and number of mineral surveys. When a mineral survey was made and tied to a section corner the claim was plotted on the diagram according to the bearings and distances returned in the mineral survey. There was no problem as long as there was only one claim or as long as the claims were far apart. These ties, which were supposed to be made from corner number one of the claim to the

FUNDAMENTALS OF NON-CONVENTIONAL CADASTRAL SURVEYS

nearest identified sections or quarter section corner were not, however, always accurately made. The exterior boundaries of a section were drawn, usually nice and square on the rectangular record. As more claims were surveyed and tied to different corners, conflict with previously plotted claims would appear even if they did not exist in fact on the ground. A mineral surveyor might show a conflict with a prior (and perhaps patented) mineral survey though, when it was plotted on the segregation diagram, no such conflict would appear.

The surveyors-general were, or thought they were, in an impossible situation. They had no statutory authority and no funds with which to perform resurveys of the section lines. They couldn't resurvey the previously surveyed claims, the claimant had to pay for the present mineral survey and the surveyors-general had to make their segregation diagram strictly on the basis of the survey records.

Some surveyors-general forced their mineral surveyors to show conflicts where in fact there were none, and in other instances to not show conflicts which did exist.

These segregation diagrams usually were not "official" records of the General Land Office. They were signed by the surveyor-general of a particular state or territory but were not approved by the Surveyor-General of the United States in Washington.

As mining claims were added a new sheet protracting the the legal subdivision, segregating the mineral survey and assigning lot numbers to the remaining fractional areas was sometimes made. Many times, when new sheets were prepared, lot numbers were kept the same but the area was reduced. Sometimes they were repeated in a different place on the diagram. An agricultural entry patent was sometimes issued for certain lots and/or legal subdivisions, but the lot's location, and the area of the lot, might depend on which diagram was being used.

The Mary Darling Placer Claim, 31 L.D. 64, is an example of the problems created before these practices ended with the passage of the Act of April 28, 1904. This Act amends Section 2327 of the Revised Statutes (33 Stat. 545; 30 USC 34) and declares that the monuments on the ground shall control over erroneous or inconsistent descriptions or calls and the surveyors-general are bound to recognize them.

Though the situation was improved, the surveyors-general still did not have a resurvey law, so they "passed the buck" to the mineral surveyors. Sections 43 through 49 of the Manual of Surveying Instructions for the Survey of the Mineral Lands of the United States, 1909 (prepared in 1908), provide that if a mineral surveyor reports an error in a previous (unpatented) mineral survey, the first surveyor must go out, correct the error and amend his survey. If however, he says the second surveyor is the one in error, they must make a joint survey and resolve the dispute. It is not hard to visualize the risk the second surveyor would run if he reported the first surveyor to be in error; it could be costly in time and money and might lead to some rather hard feelings between surveyors. Most "amended surveys" are due to these requirements.

Segregation diagrams are no longer made. They have long since been replaced by the familiar supplemental plats and connected sheets.

The problem of non-existent conflicts excluded from a mineral claim patent was dealt with in 45 L.D. 10. The decision in that case was: If a patent calls for an exclusion because of a conflict with a senior claim, and that conflict does not exist on the ground as shown by the monuments, the excluded area belongs to the patentee of the Junior claim. The basis for the decision was that, had it been known at the time of the patent that no conflict existed, no exclusion would have been made.

Whether such an exclusion might remain public land subject to survey or might instead have passed to the patentee of the mineral claim, would be subject to close examination of the circumstances causing the exclusion and the wording and intent of the patent. In general, where the patents described the Junior claim by metes and bounds to exclude the conflict, the area in conflict would remain Public Lands. Where the Junior claim patent described the entire claim"less its conflict with.." the Senior claim, the situation fits 45 L.D. 10, and title would pass to the Junior claim patentee.

Section 9 of the Mining Act repeals portions of the Lode Mining Act of 1866, and provides for the patenting of claims made under that Act.

Section 10 retains the Placer Claim Act of 1870, but provides that placer claims are limited to 20 acres for any one placer location. Under this section, a group claim was still not to exceed 160 acres. The placer claim was to be in conformity with the legal subdivisions "as near as practicable," if located on surveyed lands, and no further survey was required. If the claim was on unsurveyed lands, or could not be made to conform with the rectangular system, a survey and plat were required. The last provision in this section of the Act directs "... that where by segregation of mineral land in any legal subdivision a quantity of agricultural land less than 40 acres remains, said fractional portion of agricultural land may be entered...for homestead purposes."

The provision that all placer claims conform to the legal subdivisions of a section made it possible for the claimant to receive patent by an aliquot part(s) description without the expense of a mineral survey and plat. The provision that it must conform "as near as practicable," however, caused the legal subdivision method to be widely ignored. Gold placer claims were often made along a mountain stream in ravines that sometimes caused them to assume rather wild shapes. Below Tincup, Colorado, there were "gulch placers" that were as little as five feet in width and stretched for 18 miles along the creek (6 L.D. 227). These claims were rejected by the local land office, but the rejection was overruled and patent was granted. Resurveys of such placer claims today could be quite a task.

For a full discussion of placer claims, see also Snow Flake Fraction Placer, 37 L.D. 250.

Some state statutes or local regulations, and even some surveyors-general, required that the corners of a placer claim be staked even if taken by legal subdivision. Such surveys often take the form of a stairstep pattern of allegedly aliquot parts, because the sections were not always properly subdivided. The surveyor sometimes started from a section or quarter-section corner and, for example, ran West, 10 chains; North, 20 chains; West, 10 chains, and then indicated he was at the SE1/16 section corner. That could be true only if the section was a perfect 80 chain square and the surveyor's work was precise.

A dependent resurvey and subdivision of section may, however, reveal a distorted section. The cadastral surveyor may find the placer claim monumented on the ground, but he may also find that the monuments do not conform to the positions described by aliquot parts in the patent.

If the patent described the placer using the aliquot parts, the practice followed by the BLM would be to honor the aliquot parts of the distorted section. This would be dependent on the ownership pattern and the local usage regarding the claim corner monuments.

Had the patent been issued by reference to a plat of the mineral survey which showed the cardinal courses, the BLM would then honor the monuments as found on the ground.

The last provision of this section of the Mining Act results in what is known as a "mineral segregation survey." If a mineral survey of a lode claim has been made in a section and there is good reason to believe there is distortion in the section lines, a supplemental plat based on the survey records could lead to a misrepresentation of the true acreage remaining in the section. A resurvey is made of the section boundaries and the mineral claim for the purpose of segregating the mineral land from the agricultural land. The fractional parts are given lot numbers and areas. These "segregation surveys" are now infrequent. They may be made to segregate either an official mineral survey or a valid, but unsurveyed, mineral location in which the lode claimant has a valid possessory title. See section 3-71 of the Manual of Surveying Instructions, 1973, which, generally, requires retracement of claims to provide accurate lotting of remaining public lands.

Section 11 of the Mining Act deals with lode claims within placer claims. If a known lode exists within a placer claim the claimant must file separately on the placer and on the minimum lode claim, 1500 feet in length and 50 feet in width. The lode is deducted from the placer for determining the price to be paid. If one claimant locates a lode claim and another locates a placer claim encompassing the prior lode location, the prior location (if valid) must be segregated from the placer. In this situation, a cadastral surveyor may be called upon to execute a segregation survey.

Sections 12, 13 and 14 deals with the appointment of and rules regarding mineral surveyors, land office regulations and handling of contests, and the ownership of intersecting lode veins, respectively.

Section 15 of the Mining Act provides for patent to be issued for up to 5 acres for a millsite. The millsite must be on non-mineral land and it may not be contiguous to the vein or lode. This was long held to mean that a millsite could not be contiguous to the lode claim. From this came instances where millsites were surveyed on non-mineral bearing land with only a foot or so of space between the side line of a lode claim, and the side line of the millsite. It is now acceptable for the millsite to have a common boundary with the side line of the lode claim (Yankee Millsite, 37 L.D. 674).

The millsite can be located across the end line of such a lode claim, but the area within the millsite must be shown to be non-mineral bearing in character (Montana-Illinois Copper Mining Co., 42 L.D. 434).

There is no mention of how many millsites may be taken up, but each one must be actually used for milling or mining purposes.

Mining Laws Codified

The preceding discussion is primarily directed toward an understanding of what happened in the past in order to give the cadastral surveyor some idea of what he may find when surveying an old mining claim. For that reason, the provisions of the mining law discussed are those of the 1872 Mining Act as written in the United States Statutes at Large.

In 1874, the Statutes at Large were re-written and codified under the Revised Statutes. In some cases the Revised Statutes had slightly different wording than the corresponding section of the original.

In 1926 the mining laws were broken down into sections and codified in Title 30 of the United States Code. The present wording of the mining laws is that contained in the United States Code, Title 30.

Mineral-Land Laws Since 1872

Since 1872, Congress has passed many laws pertaining to mineral lands. Most of them have been for specific purposes. Some of them are of possible interest to cadastral surveyors.

1897 - The Act of February 11, (29 Stat. 526), placed the public lands that were chiefly valuable for petroleum under the placer mining laws. The oil lands were taken up as a placer claim under the provisions of this Act.

1899 - The Appropriations Act of February 3 (30 Stat. 1095), authorized the survey of irregular homestead entries in the Black Hills Forest (Reserve) in South Dakota.

1904 - The Act of April 28 (33 Stat. 545), declared (as noted previously) that the monuments on the ground control over the field notes and plat.

1905 - The Act of February 1 (33 Stat. 628), transferred the administration of the National Forest Reserves to the U.S. Forest Service. The Act, however, provides that the administration of the minerals and land laws remained under direction of the General Land Office. Although the Forest Service does the administrative work (validity, etc.,) of mining claims within the national forests, the mineral survey, patent, etc., are still under the jurisdiction of the Bureau of Land Management.

1906 - The coal lands were withdrawn from entry.

1909 - The Act of March 3 (35 Stat. 845), authorized the resurvey of the public lands and also authorized patents on coal lands. The coal itself, however, was reserved to the United States.

1914 - The Act of July 17 (38 Stat. 509), permitted the entry of mineral lands containing nitrate, phosphate, potash, oil, gas and asphalt. These minerals, however, were reserved to the Government.

1920 - The Mineral Leasing Act (41 Stat. 437), provided for the leasing of oil, gas, coal, phosphate, sodium and other minerals. The Mineral Leasing Act affects the cadastral surveyor because he may be called upon to survey the surface of patented lands in order to determine where the Government retained the minerals. In this connection the surveyor could come increasingly under state laws, state court decisions, and local conditions affecting the execution of a resurvey, because the boundaries of the sub-surface rights follow the surface boundaries.

1960 - The Act of March 18 (74 Stat. 7), authorized the locating and patenting of millsites adjoining placer mining claims.

1962 - Public Law 87-851, enacted October 23, 1962, is also known as the Mining Claim Occupancy Act (MCOA). This law provided that the occupant of a mining claim which was not valid could receive that part of the claim actually used by him for a residence. The occupant was required to have been a resident on the claim for seven years prior to July 23, 1962. He was required to pay for the survey of his tract, which could be up to, but not exceeding 5 acres in size. Payment for the tract was to be at the current valuation rate. This law expired on June 30, 1971.

FUNDAMENTALS OF NONCONVENTIONAL CADASTRAL SURVEYS

Other Metes and Bounds Surveys

Many other non-conventional, metes and bounds type surveys have been executed in the past. Some, other than those in Alaska, are currently being made. The cadastral surveyor may have occasion to resurvey any of them. In all of them the corner restoration principles are very much alike. The following is a description of some, but not all, of these older surveys.

Donation Land Claim (DLC)

Donation land claims were authorized in Florida, New Mexico and Oregon by the Acts of August 4, 1842 (5 Stat. 502), September 27, 1850 (9 Stat. 496), March 2, 1853 (10 Stat. 172) and July 22, 1854 (10 Stat. 308).

For the most part, DLC's were surveyed in a rectangular form with north-south lines and east-west lines. Nevertheless, many were irregular in shape and some were bordered on one or more sides by a meanderable body of water. In the latter instance the DLC attained riparian rights. New plats of rectangular surveys followed DLC surveys and fractional portions remaining in a section were given lot numbers. DLC's were numbered beginning with DLC No. 37 in each township in which they appeared.

Soldiers' Additional Homestead

The Act of April 4, 1872 (17 Stat. 49), as amended by the Act of June 8, 1872 (17 Stat. 333), granted an additional homestead to veterans of the Civil War. The Act of March 3, 1909 (32 Stat. 1028), extended the provisions of the previous Acts to Alaska. Under the terms of these Acts, a soldier could take an additional entry which, when added to his original homestead entry, would not exceed 160 acres. These additional entries could be preempted. Sometimes they were for only a few acres and were seldom in rectangular form.

Indian Allotments

Indian allotments were surveyed under various laws and provisions. On reservations they normally were about 20 acre tracts which conformed, more or less, to the rectangular subdivision of a section. In other places they would run as much as 160 acres. Sometimes they were rectangular in form but not in cardinal directions. The variations in Indian allotments are so great that it is impossible to be specific. They were identified by name and/or number in such a widely differing system (or lack of system) that the surveyor must examine each situation in itself.

National Forest Homestead Entry Surveys (H.E.S.)

The Act of June 11, 1906 (34 Stat. 233), provided for agricultural homestead entry, within the national forests, of public lands that had been classified by the Forest Service as more suitable for agricultural than for forestry purposes. These Homestead Entry surveys were usually made by a Forest Service surveyor under Special Instructions issued by the General Land Office. These surveys were, more often than not, a many sided figure with 20 or more corners or angle points. They were generally well executed and their restoration seldom poses any serious problem. In each of these surveys the plat was made by the GLO and the field notes and plats were approved by the GLO prior to the issuance of patent by the land office.

The National Forest Homestead Entry Survey Act was repealed on October 23, 1962 (76 Stat. 1157), and these surveys are no longer executed.

Exchange Surveys

The exchange surveys were authorized by the Act of March 20, 1922 (42 Stat. 465), and amendments thereto. Under this act, the Forest Service is authorized to exchange an area of public land for an area of privately owned (patented) land elsewhere in a national forest. The purpose of the exchange is to provide for a consolidation of lands in order to facilitate administration of the forests. Originally, most of the exchange surveys were made by the Forest Service with Special Instructions, plats and patents issuing from the General Land Office in much the same manner as usual for homestead entry surveys within the national forests. The Act anticipated that exchanges were be be made by aliquot parts or lot numbers from a supplemental plat, but irregular metes and bounds tracts are far more usual in exchange surveys. Many of the tract surveys being made by BLM surveyors on lands administered by the Forest Service are made for the purpose of effecting exchanges.

Small Holding Claims

The Small Holding Claim (SHC) surveys were made pursuant to the Act of March 3, 1891 (26 Stat. 854), the Act of June 15, 1922 (42 Stat. 650) and the Act of June 8, 1926 (44 Stat. 709). Most of these were in New Mexico and Arizona. They were surveyed so that patent might be granted to the claimants of small tracts. They were usually in a group due to the settlement of a village. A special court verified the claims and the survey was made in accordance with the lands awarded to the bona fide claimant. Most surveys of these small holding claims were well executed. Unless there has been extensive obliteration of the original corners and angle points, few serious problems are encountered in their restoration.

Spanish and Mexican Land Grants

Most of the Spanish and Mexican land grants are in southern California, Arizona and New Mexico. The Federal Government acquired title to the lands that make up these States by treaty with or purchase from Spain and Mexico. The bona-fide rights of the owners of lands which had been granted by Spain or Mexico were honored by the United States. A court-of-claims verified title upon proofs. The grants were then surveyed and verifying patents were issued.

Sometimes the grants adjoined each other and a "dividing" survey was not executed. This left the boundary between contiguous grants described but not surveyed on the ground. In these instances the division line between grants is open to interpretation and may require a great deal of research and investigation before a dividing line may be fixed by survey.

These land grants may contain only a few acres up to thousands of acres in area and have from as few as four corners up to hundreds. The original surveys were often poorly executed, poorly monumented and vaguely described. Restoration of a grant boundary may, therefore, be extremely complex. Resort may be made to all types of collateral evidence, including topographic calls, in order to fit the original survey to the shape of the natural terrain features. If the boundary of the grant is along a meandered river or the ocean, the boundary is riparian.

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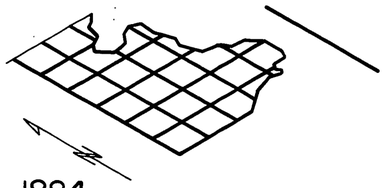
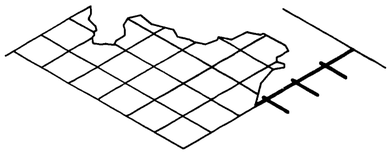
MINERAL SEGREGATION SURVEY IN NEW MEXICO

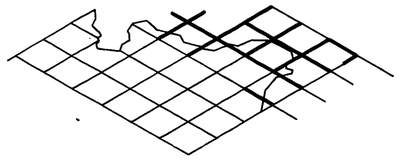
1873



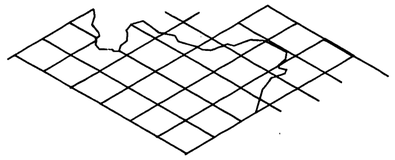
1884



1892



1930



History of Surveys

1873 George H. Pradt surveyed the west 2½ miles of the south boundary, the west boundary, the south 3 miles of the east boundary, and a portion of the subdivisional lines as shown on the plat approved November 26, 1873, Figure 1. Pradt terminated his subdivisional lines at the foot of the San Mateo mountains and then traversed thru the fractional sections in a manner similar to meandering.

1884 William White completed the south boundary of T. 12 N., R. 9 W., and subdivided most of T. 11 N., R. 9 W. White ran west on the south boundary of section 36, set a ¼ section corner at 40.00 chains, traversed around an impassable mountain area, regained line and set a witness corner for the corner of sections 1, 2, 35 and 36, 14.40 chains west of the true point. He then completed the boundary, returning a true line of west, with each corner at normal intervals.

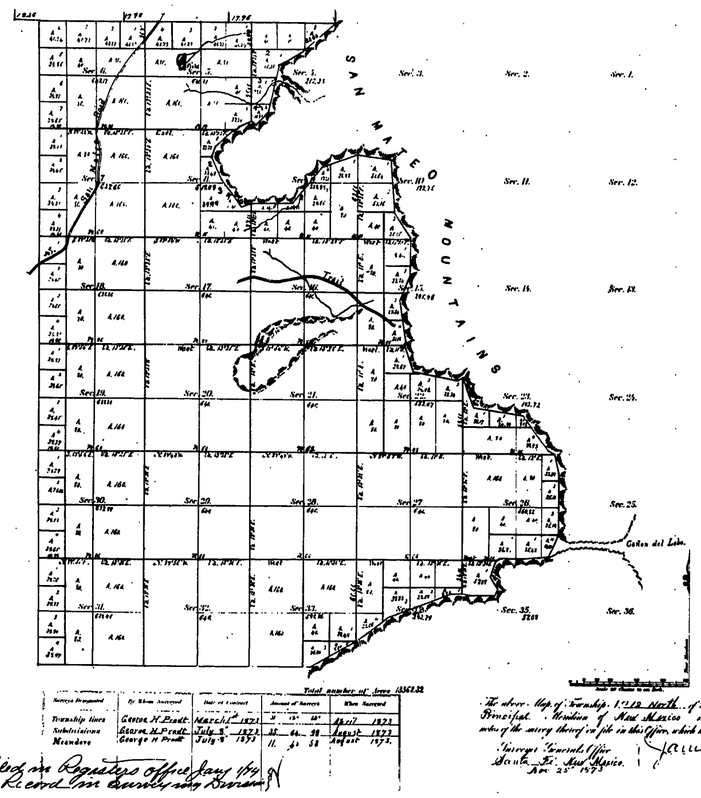
1892 Walter G. Marmon completed the survey of several sections, including sections 25, 26, 35 and 36, as shown on the plat approved September 21, 1892, Figure 2. Marmon retraced the east half mile between sections 1 and 36, returning a distance of 39.96 chains. He then ran N. 0° 01' W., from the witness corner of sections 1, 2, 35 and 36, 40.00 chains, offset east 14.40 chains and established the ¼ section corner. He then proceeded normally. Marmon ran N. 0° 01' W., between sections 34 and 35, set a ¼ section corner at 40.00 chains, found and destroyed the Pradt "fractional section" corner at 56.30 chains and intersected the Pradt corner of sections 26, 27, 34 and 35. Marmon ran the line between sections 26 and 35 random and true with the ¼ section corner at midpoint and destroyed the Pradt "fractional section" corner.

1930 Everett H. Kimmell dependently resurveyed the east boundary of section 36.

FRACTIONAL TOWNSHIP No. 12 NORTH RANGE No. 9 WEST OF THE NEW MEXICO PRINCIPAL MERIDIAN

Received with Surveyor letter of Nov 26, 1873

Pradt Report - 2516 9



Meanders of San Mateo Mountains

Points	Courses	Distances	Points	Courses	Distances
Through Sec. 1			Through Sec. 25		
1	S 60° W	33.33	1	S 56° W	18.18
2	S 64° W	11.11	2	S 84° W	16.16
3	S 17° 30' W	14.14	3	S 84° W	8.80
4	S 12° W	14.14	4	S 77° W	13.13
5	S 41° W	14.14	5	N 81° W	8.80
6	N 77° W	8.80	In cor. pine 8 bears		
In cor. pine 8 bears					
			Through Sec. 26		
Through Sec. 2			1	West	18.18
1	S 61° W	14.14	2	S 71° W	16.16
2	S 18° W	14.14	3	S 82° W	16.16
In cor. pine 8 bears			In cor. pine 8 bears		
Through Sec. 3			Through Sec. 34		
1	S 21° W	14.14	1	S 21° W	14.14
2	S 45° W	14.14	2	S 65° W	4.14
3	S 17° W	14.14	In cor. pine 30 cm		
4	S 17° E	17.68	Ash & boundary Tree		
5	S 38° E	12.60			
6	N 61° E	7.56			
In cor. pine 8 in 8					
Through Sec. 9					
1	East	36.96			
2	N 24° E	31.46			
3	N 54° E	18.48			
4	N 76° E	17.64			
5	N 33° E	5.04			
In cor. pine 8 in 8					
Through Sec. 11					
1	S 80° E	36.96			
2	S 41° E	14.14			
3	S 80° E	17.64			
4	S 8° E	8.80			
In cor. pine 8 in 8					
Through Sec. 12					
1	South	33.00			
2	S 11° W	24.24			
3	S 7° E	34.64			
4	S 0° W	3.96			
In cor. pine 8 in 8					
Through Sec. 13					
1	S 21° E	18.18			
2	S 10° E	34.64			
3	S 16° E	6.60			
In cor. pine 8 in 8					
Through Sec. 14					
1	S 21° E	18.18			
2	S 21° E	33.33			
3	S 21° E	18.18			
4	S 0° W	14.08			
5	N 21° W	17.68			
6	S 41° W	8.80			
7	S 21° E	5.72			
In cor. pine 8 in 8					

Entered in field book Vol 122 - page 157/79.

The above Map of Township 12 South of Range 10 West of the New Mexico Principal Meridian is strictly compiled to the field notes of the survey thereof on file in this office, which have been examined and approved.

George Leonard Office Santa Fe, New Mexico. Nov 25th 1873

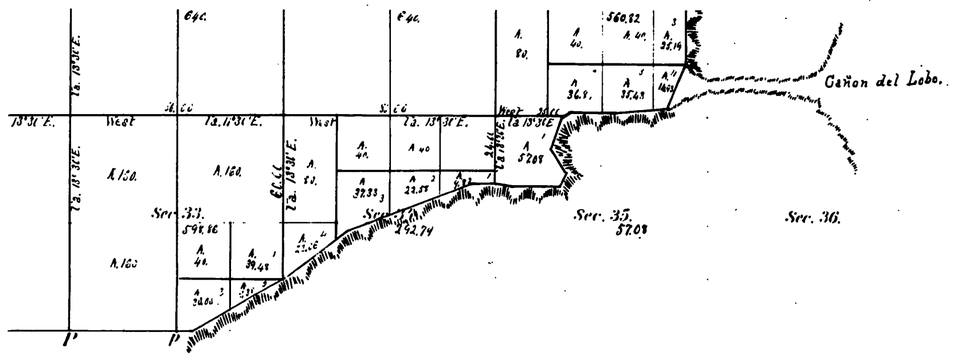
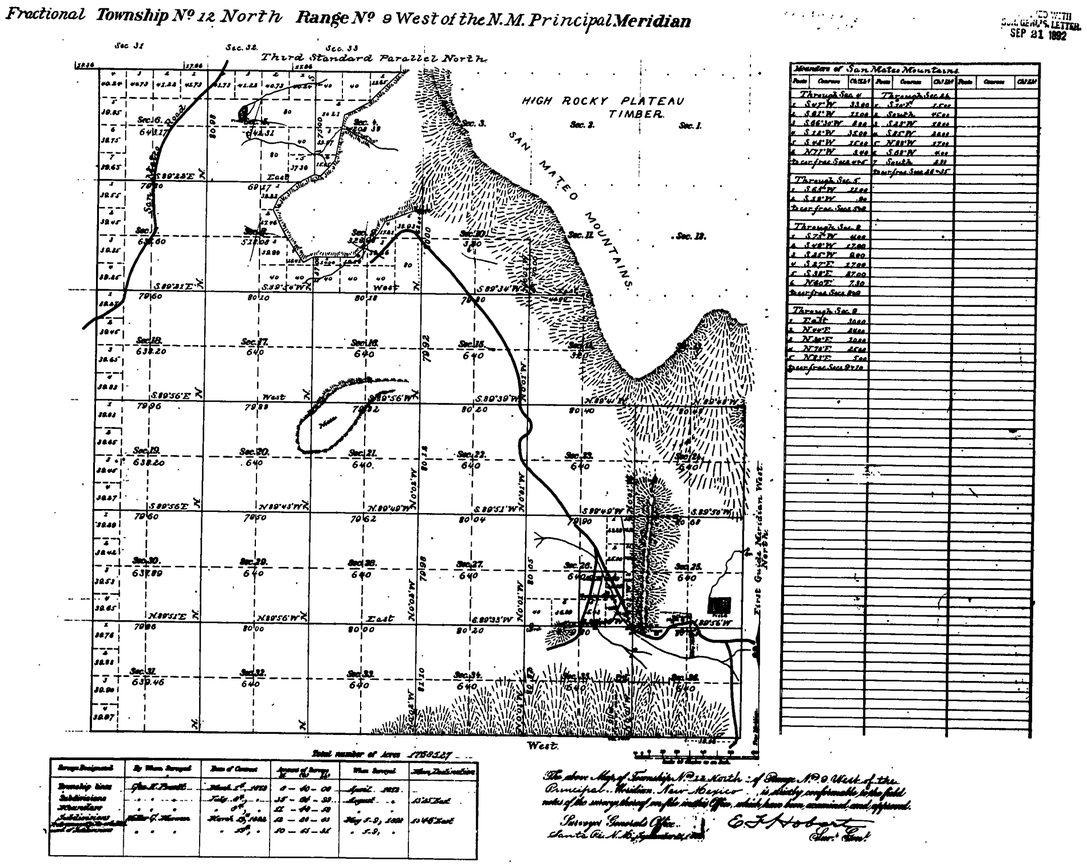


Figure 1 - 1873 Plat With Detail

MINERAL SEGREGATION SURVEY IN NEW MEXICO



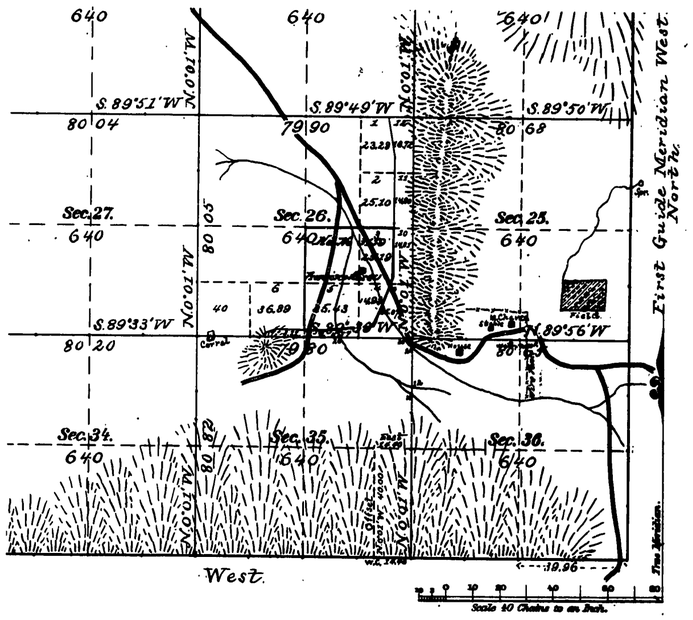


Figure 2 - 1892 Marmon Plat With Detail

MINERAL SEGREGATION SURVEY IN NEW MEXICO

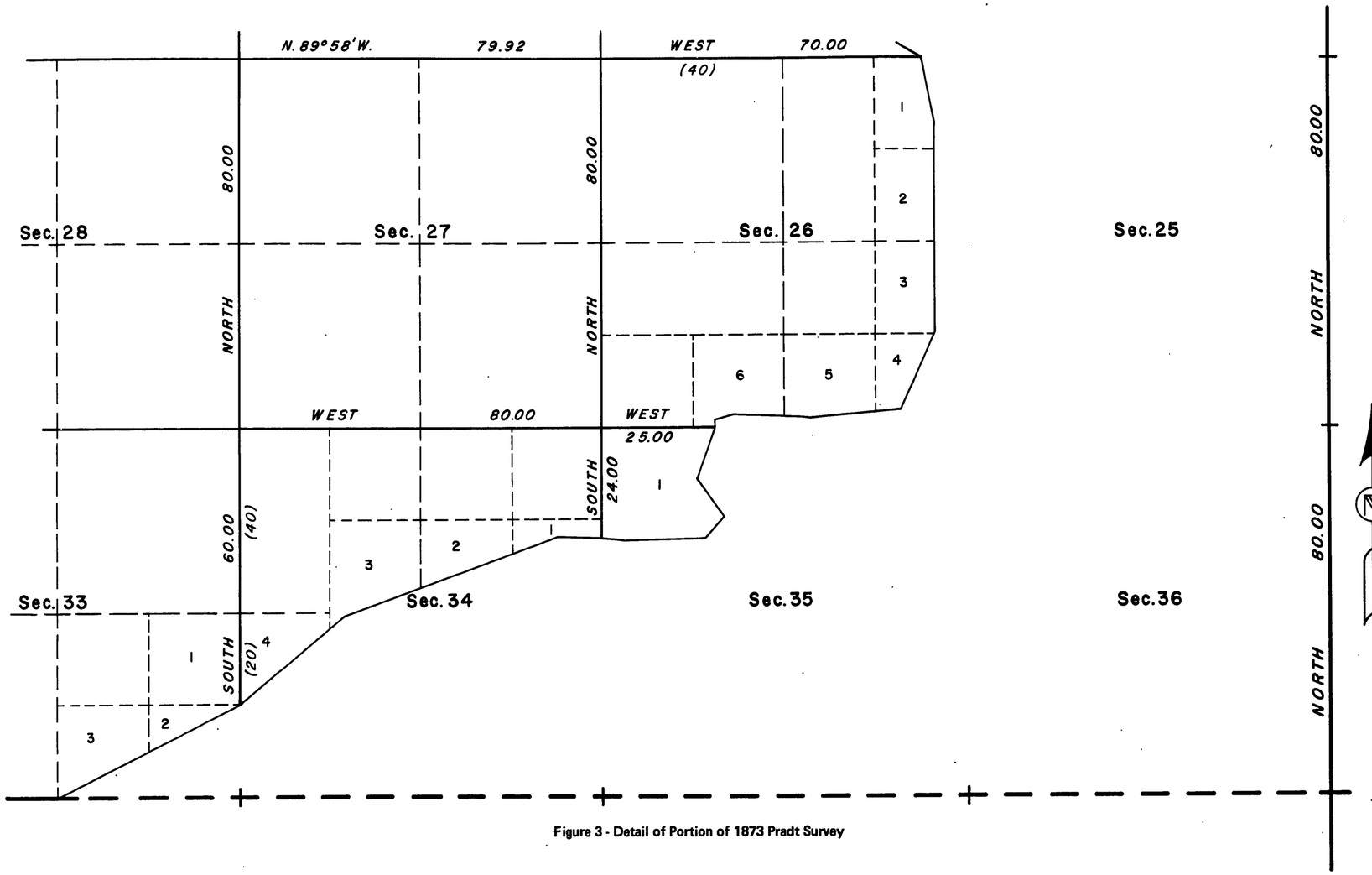


Figure 3 - Detail of Portion of 1873 Pradt Survey

MINERAL SEGREGATION SURVEY IN NEW MEXICO

Reasons for Request of this Survey

On January 23, 1946, Alva H. Gunnell and F.L. Schneider located the Silver Perl No. 1 lode mining claim. On April 10, 1946, and April 24, 1946, A.L. Head and Ralph O. Burney located the Mt. Taylor No. 1 and Mt. Taylor No. 2 lode mining claims. These claims were duly recorded with the Valencia County Recorder. The three claims are described as being in sections 35 and 36, T. 12 N., R. 9 W., N.M.P.M.

In 1952, F.L. Schneider and three other persons applied for mineral patent on the Silver Perl No. 1 Building Stone Placer claim. This claim was described by legal subdivisions and aliquot parts as:

W½ SW¼, Sec. 36; SE¼ NE¼ SE¼, SE¼ SE¼, SE¼ SW¼ SE¼, Sec. 35, T. 12 N., R. 9 W; NE¼ NW¼ NE¼, NW¼ NE¼ NE¼, sec. 2, T. 11 N., R. 9 W., N.M.P.M.

The application excluded the unsurveyed Silver Perl No. 1 and Mt. Taylor No. 1 and No. 2 lode locations. The provisions of 43 CFR 3863 - Placer Mining Claim Patent Applications - state that a placer claim does not require a regular mineral survey if taken by legal subdivisions, that all lode claims must be shown and "in all cases whether the lode is claimed or excluded, it must be surveyed and marked upon the plat, ...".

No application was made by the claimants of the lode claims for mineral survey and patent. But the lode claims would require a segregation survey to determine the area of the placer patent and proper payment.

The placer applicants agreed to furnish a surveying crew to be supplied by a mineral surveyor and paid an additional one hundred dollars toward the office work; with the Bureau to furnish a cadastral surveyor to supervise the surveying crew, write field notes, etc., incident to a segregation survey. The contributing funds arrangement was authorized by the Interior Appropriations Act of July 9, 1952, (66 Stat. 447). (For present provisions see 43 USC 1264).

Special Instructions

On September 19, 1952, Special Instructions were prepared for Group 540, New Mexico. They provided for the dependent resurvey of sections 35 and 36, T. 12 N., R. 9 W., N.M.P.M., and segregation survey of the unsurveyed Silver Perl No. 1 and Mt. Taylor No. 1 and No. 2 lode claims. The claims to be segregated could not exceed 1500 ft. by 600 ft. and the end lines must be parallel. The claims as segregated were to be tied to section or ¼ section corners. The field work was assigned to Everett H. Kimmell and the work was begun on October 27, 1952.

Conditions Found on the Ground

Figure 3 illustrates the pertinent portion of the 1873 survey by Pradt. Figure 4 illustrates the pertinent records of previous surveys on which dependent resurveys are to be based in 1952.

Figure 5 is a sketch showing the recovered original corners and position of the lode location corners as staked and posted.

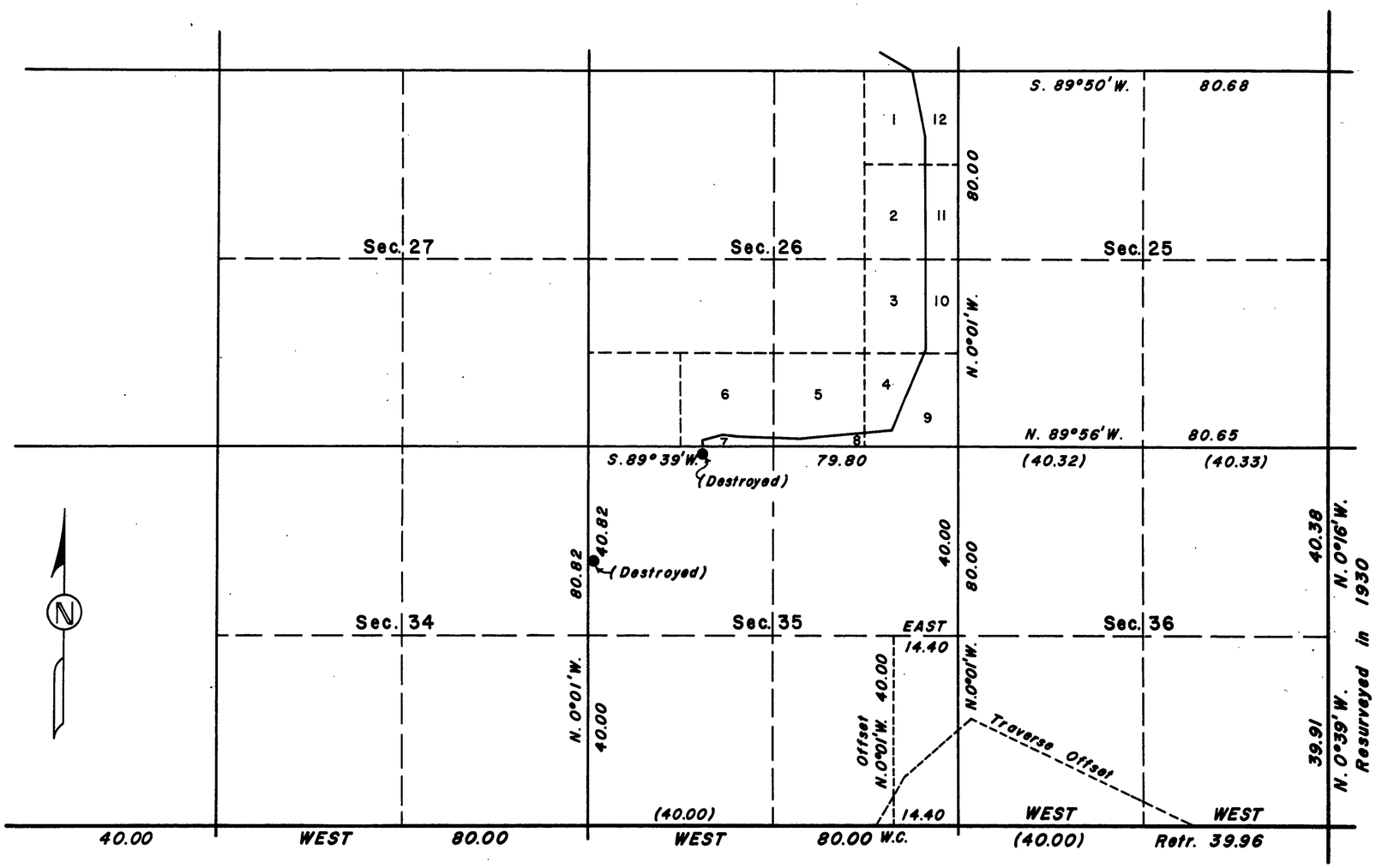


Figure 4 - Detail of Previous Survey Record

MINERAL SEGREGATION SURVEY IN NEW MEXICO

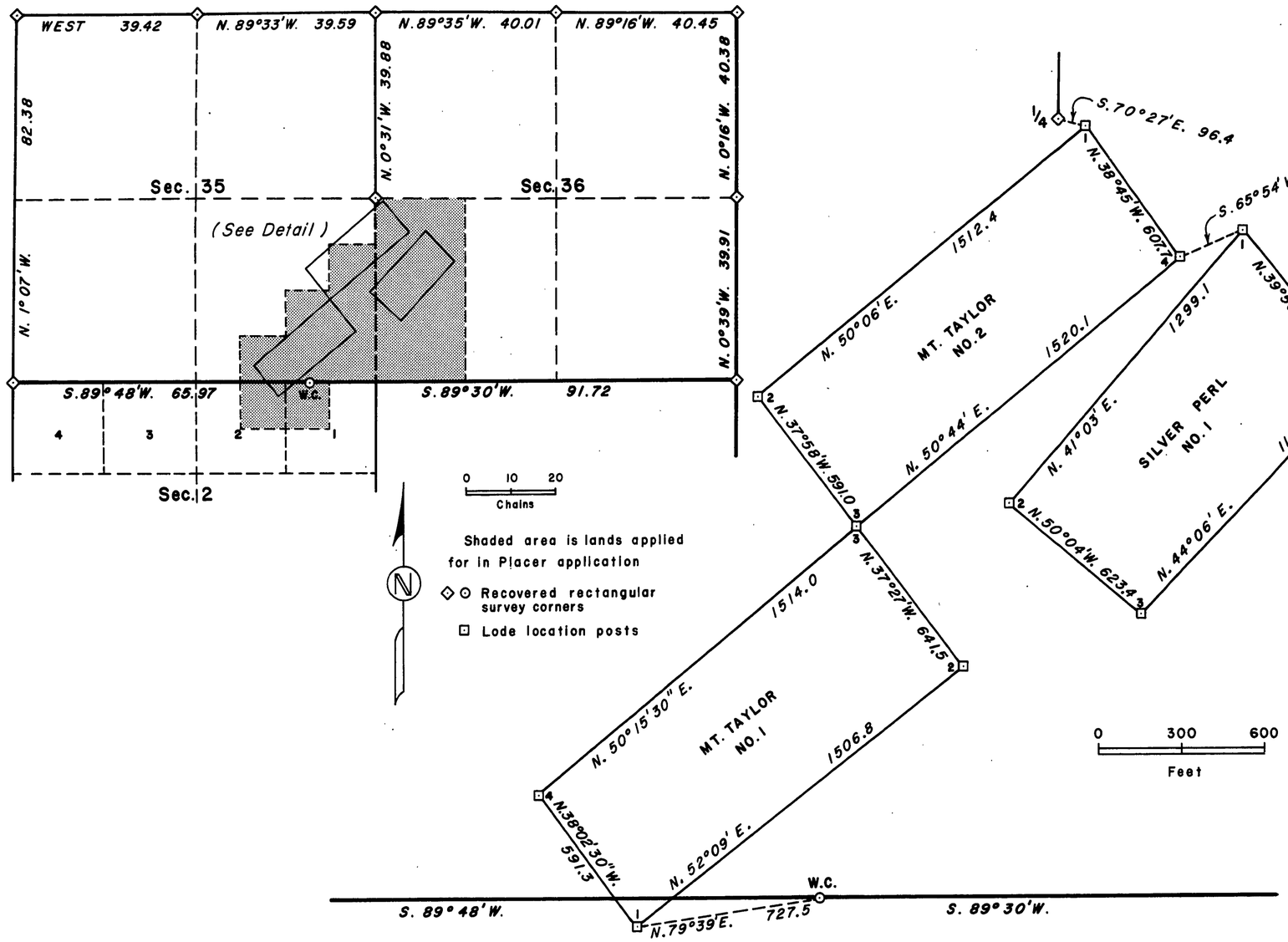


Figure 5 - Recovered Corners and Location Posts

Preliminary Statement of the Problem

The surveyor must restore the lost ¼ section corners of sections 1 and 36; 2 and 35; 34 and 35, and establish the corner of sections 1, 2, 35 and 36. He must survey the lode claims to be segregated within the provisions of the mining laws.

Regulations

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

5-17	Witness corners
5-34 and 5-38	Single proportionate measurement
7-39 to 7-43	Mineral segregation surveys
9-76 and 9-77	Plats of mineral segregation surveys
10-17 and 10-18	Lode lines and End lines

Legal Constraints

The lode claims cannot exceed 1500 feet in length nor 600 feet in width, and the end lines must be parallel. No part of the claim may extend outside the claim as located and posted on the ground. Details of the mining laws are codified in Title 30 USC.

Final Statement of the Problem

The surveyor must restore the lost corners of sections 35 and 36 and segregate the lode claims. The lode claims require revision to comply with the mining laws.

Solution

The missing corners were restored by single proportionate measurement methods. The recovered witness corner controlled for alignment and measurement in both directions and became an angle point in the township line.

The three lode locations were all "oversize" in either length or width, or both. Location posts 2 and 3 of the Mt. Taylor No. 2 were held in their original position, as was location post number 3 of the Silver Perl No. 1 claim. The surveyor consulted the lode claimants for their desires on where and along which lines the claims were to be reduced to be within the legal limit of 600x1500 feet with the following plan:

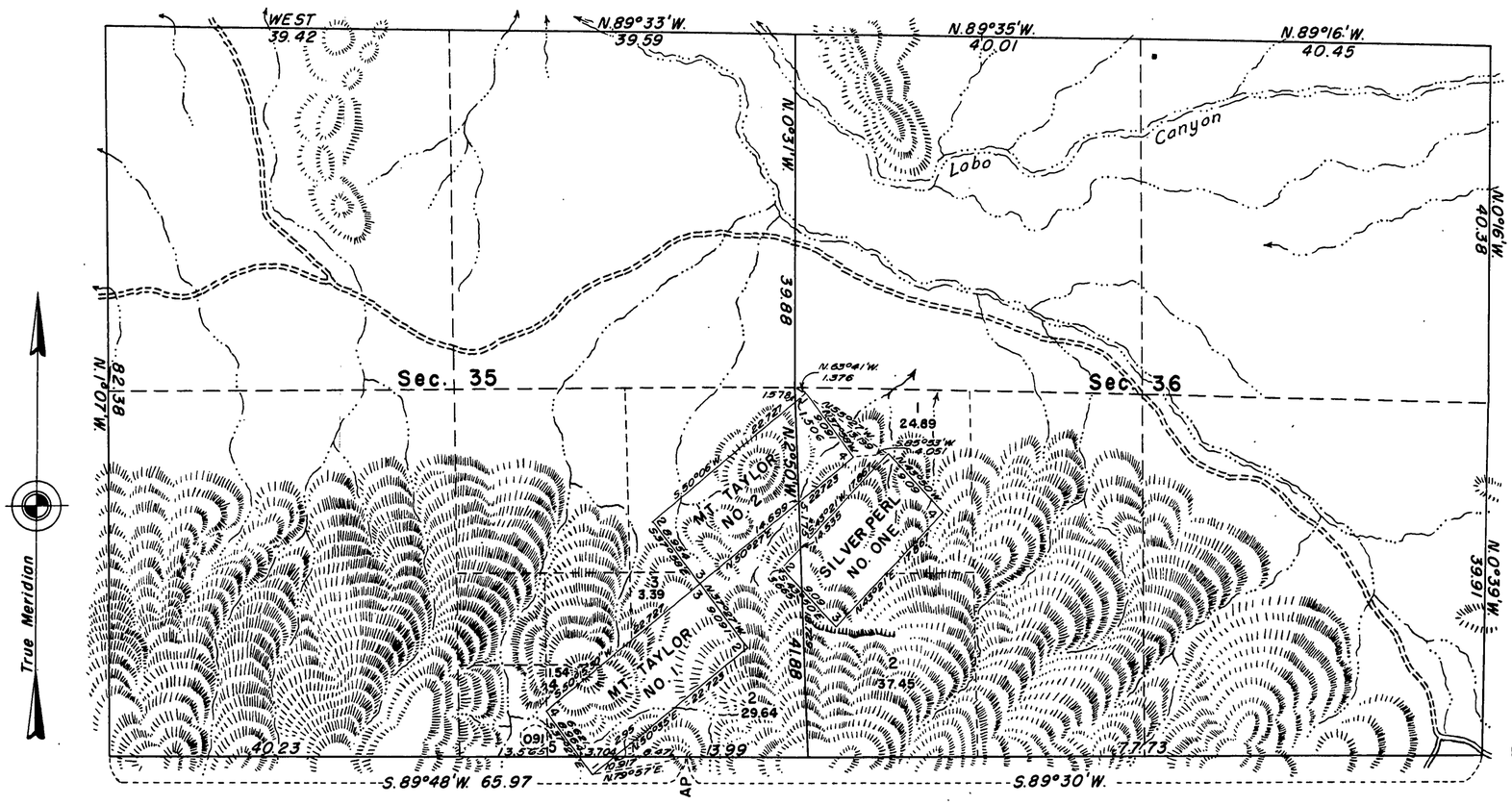
Mt. Taylor No. 1; Line 3-4 was held for alinement and reduced to 1500 ft. Line 3-2 was held for alinement and reduced to 600 ft. Line 4-1 was made parallel to line 3-2. Corner 1 was placed slightly inside the location line 1-2.

Mt. Taylor No. 2; Line 1-2 was held for alinement and reduced to 1500 ft. Line 1-4 was made parallel to line 3-2 and reduced to 600 ft.

MINERAL SEGREGATION SURVEY IN NEW MEXICO

TOWNSHIP 12 NORTH, RANGE 9 WEST OF THE NEW MEXICO PRINCIPAL MERIDIAN, NEW MEXICO

Dependent Resurvey and Segregation Survey of Sections 35 and 36



0 2 4 6 8 10 20 30 40

Scale in Chains

Area exclusive of segregations: 1,223.12 Acres
Area of segregations: 56.88 Acres
T O T A L: 1,280.00 Acres

Figure 6 - Accepted Plat

Latitude 35°13'04" N.
Longitude 107°43'48" W.

Silver Perl No. 1; Location post number 3 was held fixed. Line 3-2 was shifted inwardly and reduced to 600 ft. Posts 1 and 4 were shifted inwardly with line 1-4 reduced to 600 ft. and made parallel to line 2-3. This solution was based on directions from the claimant who indicated the areas which he was willing to "give up".

Each corner of each claim was monumented with a brass capped iron post, marked as an Angle Point, with the appropriate number, claim initials, and with the section number outside the claim. The claims were tied together and also tied by course and distance to the ¼ section corner of sections 35 and 36; and the former witness corner on the south boundary of section 35.

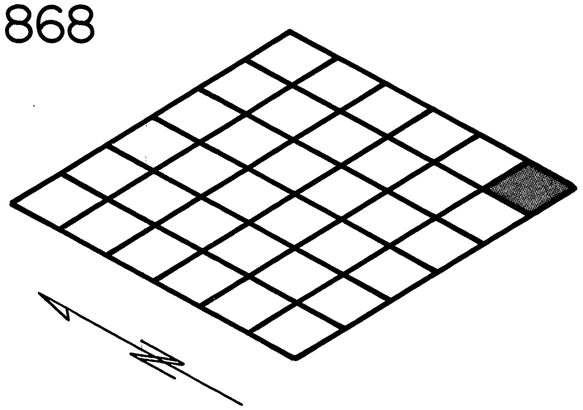
The plat was constructed showing the fractional lots and areas of the lands applied for in the placer patent application. A supplemental plat of section 2, T. 11 N., R. 9 W., was prepared returning an area on new lots, numbered 5 and 6, for the areas erroneously described in the patent application in that section. The plat accepted June 2, 1953, is shown by Figure 6. The supplemental plat of section 2 was accepted June 3, 1953.

Supplemental Topic

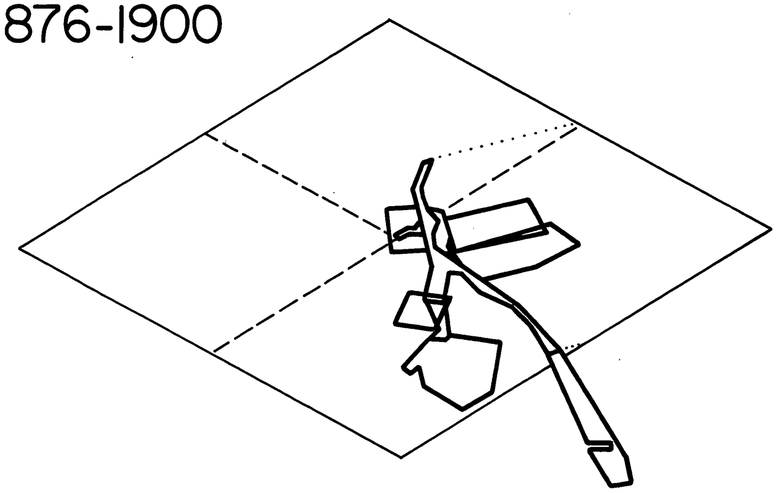
Two errors appear on the accepted plat, Figure 6. The proportions on the south boundary of the township, westerly from the township corner should have been 38.84 chains, 38.88 chains, and 14.00 chains, respectively, to the witness corner, (now an angle point). The south half mile between sections 34 and 35 should have been 40.77 chains and the north half mile 41.61 chains (instead of placing the ¼ section corner at midpoint). Finally, the bearings and distances shown on the North-South section lines read the wrong direction.

RESTORATION OF MINERAL SURVEYS, MONTANA

1868



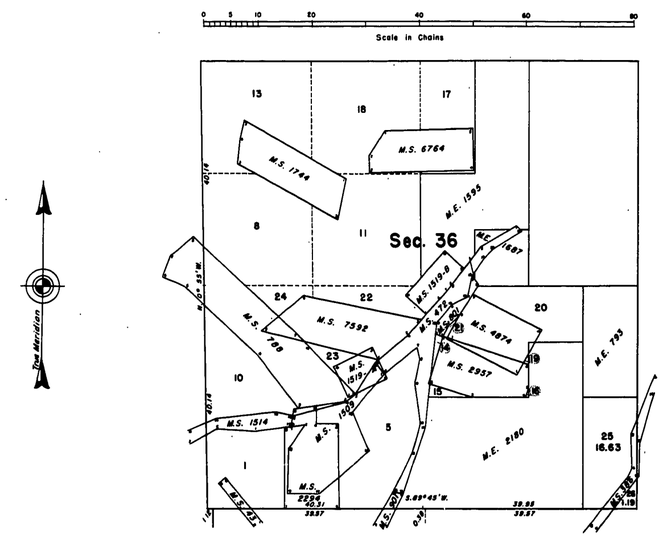
1876-1900



DUPLICATE ORIGINAL

TOWNSHIP Nº 10 NORTH, RANGE Nº 4 WEST, OF THE PRINCIPAL MERIDIAN, MONTANA.

SUPPLEMENTAL PLAT OF SEC. 36



This plat of sec. 36, T. 10 N., R. 4 W., of the Principal Meridian, Montana, is based upon the plats approved July 8, 1868 and March 15, 1950, and the mineral survey record. It shows lots 25 and 26, created by cancellation of Mineral Entry No. 678, located in the N½ of the SE¼ of the SE¼.

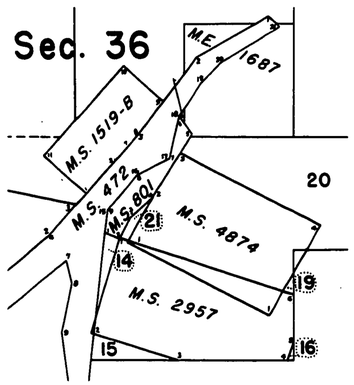
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C., September 23, 1952

This plat showing amended lottings, having been correctly prepared in accordance with the regulations, is hereby accepted.

For the Director

Chief, Branch of Surveys

Figure 1 - Supplemental Plat, With Detail At Left



History of Surveys

1868 Benjamin F. Marsh surveyed the exterior boundaries and subdivisional lines.

Subsequent dependent resurveys are not directly pertinent to this case.

1876 Marsh also surveyed Mineral Survey No. 472, Placer, Lot No. 47.

1880 George B. Foote surveyed Mineral Survey No. 801, Placer, Lot No. 54.

Marsh surveyed Mineral Survey No. 901, a Placer.

1884 Marsh surveyed Mineral Survey No. 1509, Placer, Lot No. 57.

Mineral Survey No. 1519, Mt. Helena Lode and Millsite Lots 59-A and 59-B was surveyed by Marsh.

1888 Albert S. Hovey surveyed Mineral Survey No. 2490, Placer, Lot 70. M.S. 2490 was a part of M.S. 1509, awarded an adverse claimant by judicial decree.

1890 Paul S.A. Bickel surveyed Mineral Survey No. 2957, Phenix Lode.

1899 Bickel surveyed Mineral Survey No. 4874, 96 Lode.

Segregation diagrams were approved on July 21, 1886, and December 11, 1896.

1950 A plat of dependent resurvey and segregation of mineral claims in sections 35 and 36 was accepted March 15, 1950. A supplemental plat of section 36 was accepted September 23, 1952. This plat depicts the mineral surveys and lotting status at the inception of this resurvey. The plat is shown in Figure 1.

Reasons for Request of this Survey

On October 23, 1962, the Congress enacted Public Law 87-851 (76 Stat. 1127; 30 USC 701-709) commonly referred to as the Mining Claim Occupancy Act, or MCOA. This law allowed the Secretary of the Interior to convey to an occupant of an invalid mining claim the land actually occupied by the claimant for residential purposes, up to, but not exceeding 5 acres. The claimant must pay the cost of surveying the tract, the appraised value of the land and other costs as defined by the Act.

On September 16, 1964, Margaret E. Corbett filed an application under Public Law 87-851 and in due course of events the mineral examiner declared the "Corbett Limestone Placer" invalid under the mining laws on October 14, 1964. During the examination the examiner was unable to determine the location of the Corbett home with certainty. A highway department map indicated the house was located on the patented M.S. 472 Placer.

Paul Drennon was the occupant of unpatented M.S. 2957, Phenix Lode. The status of the Phenix Lode was in doubt, as was the location of his home. The possibility existed that his home could be located on the patented lot 14.

The Chief, Division of Lands and Minerals, Montana State Office, requested a resurvey and survey of small tracts to resolve these problems.

RESTORATION OF MINERAL SURVEYS, MONTANA

Special Instructions

On June 3, 1966, Special Instructions were prepared for Group 539, Montana. They provided for the dependent resurvey of the necessary mineral surveys within section 36 and the survey of two small tracts, the boundaries of the tracts to be determined after the true positions of the Corbett and Drennon homes were determined. The tract boundaries were to be surveyed according to actual occupancy as determined by the Missoula District Manager. These lands are located in the outskirts of the City of Helena, Montana. The Group was assigned and field work began on June 15, 1966.

Conditions Found on the Ground

The status of the surveys was determined as follows:

Mineral Surveys 472, 788, 801, 1514, 1519A, 1519B, 2294, 2490, 7592 and 4874, and M.E. 2180 are patented. Mineral Surveys 1509 and 2957 are unpatented. The "Corbett Limestone Placer" location, unsurveyed, is located on the greater part of Lot 5.

Figure 2 is an enlarged sketch of the area, showing the recovered original corners of the mineral surveys, relative coordinate positions of those corners, mineral survey record courses and distances, and the status of lands involved. At the time of the field work the Phenix Lode was not yet cancelled.

The Corbett home was found to be on the invalid Corbett claim. The Drennon home was found to be on line 1-2 of the Phenix Lode. No evidence of any kind could be found to determine the position of corners 7-12 and corner 14 of M.S. 472 Placer.

Preliminary Statement of the Problem

The surveyor must restore the lost corners of M.S. 472, and survey the small tracts.

Regulations

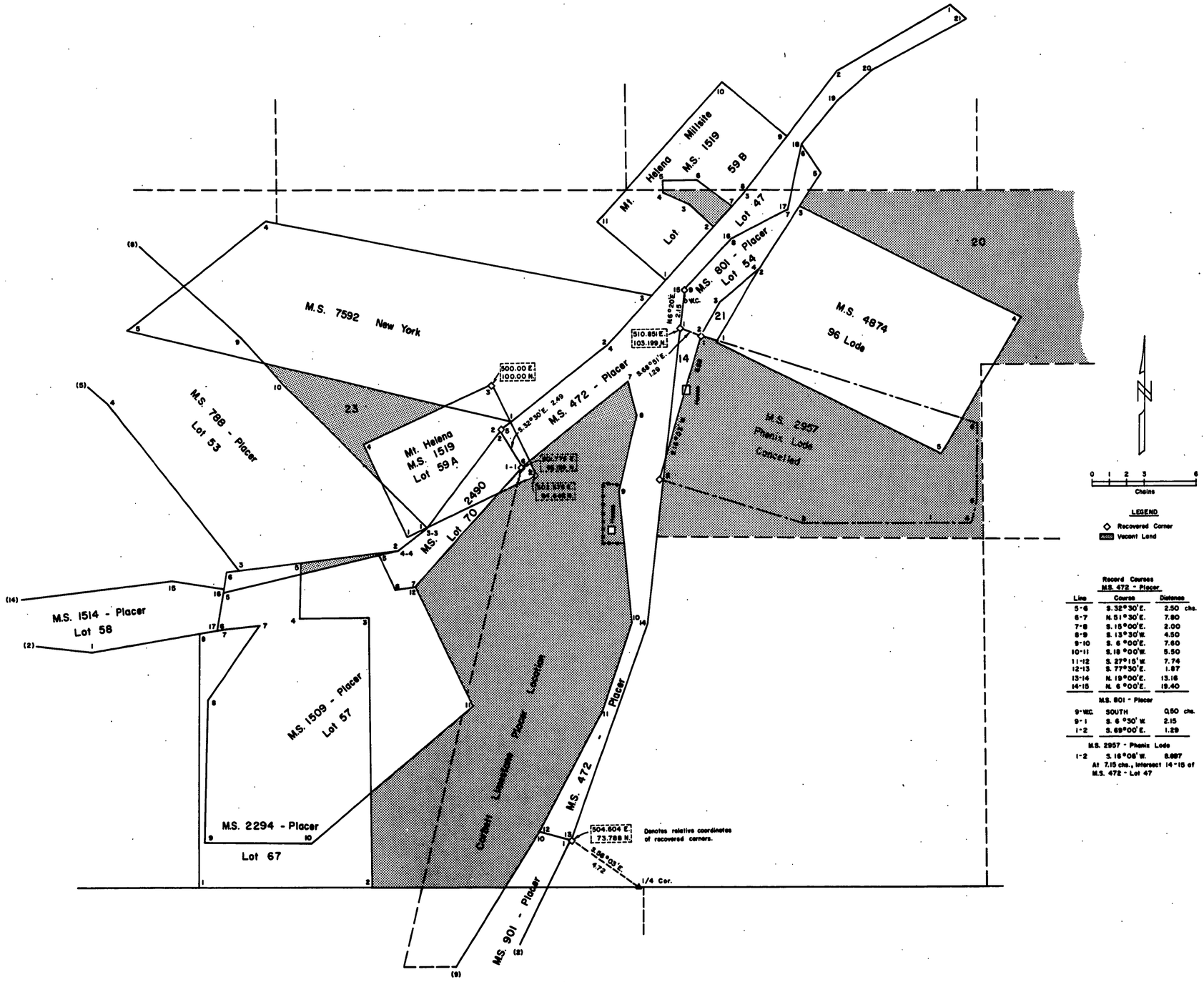
Regulations pertaining to the Mining Claim Occupancy Act are found in 43 CFR 2550.

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

5-17	Witness corners
5-20 to 5-23, 5-42	Restoration of Lost Corners
5-43 to 5-46	Broken Boundary Adjustments
7-16	Metes-and-Bounds surveys

Legal Constraints

The dependent resurvey must be executed in a manner that will restore the lost corners as nearly as possible in their true original position and protect the bona fide rights of the patented lands. The small tracts cannot exceed 5 acres.



Record Courses
M.S. 472 - Placer

Line	Course	Distance
5-6	S. 32°30'E.	2.50 chs.
6-7	N. 51°30'E.	7.80
7-8	S. 15°00'E.	2.00
8-9	S. 13°30'W.	4.50
9-10	S. 6°00'E.	7.60
10-11	S. 18°00'W.	5.50
11-12	S. 27°15'W.	7.74
12-13	S. 77°30'E.	1.87
13-14	N. 19°00'E.	13.16
14-15	N. 6°00'E.	19.40

M.S. 801 - Placer

9-MC.	SOUTH	0.50 chs.
9-1	S. 6°30'W.	2.15
1-2	S. 69°00'E.	1.29

M.S. 2957 - Phenix Lode

1-2	S. 16°08'W.	8.887

At 7.15 chs., intersect 14-15 of M.S. 472 - Lot 47

Figure 2 - Corner Recovery and Mineral Survey Record Courses

RESTORATION OF MINERAL SURVEYS, MONTANA

Auxiliary Topic

At the time the field work was executed, M.S. 2957, Phenix Lode had not been declared invalid or relinquished by the claimant. Technically, a survey of a small tract within a surveyed and uncancelled mining claim cannot be made. The mining laws are complex and administrative procedures required to invalidate a claim and cancel the mineral survey are usually lengthy; these procedures were in process for the Phenix Lode.

The courts have held that the execution of the field work alone does not constitute a survey - that something else is required. That something else is the preparation of field notes, plat and acceptance by the Director of the Bureau of Land Management.

The field work could proceed on the Drennon tract but the plat could not be accepted until after the legal procedures for invalidation were complete and M.S. 2967, Phenix Lode was duly cancelled.

Final Statement of the Problem

The surveyor was to restore the lost corners 7-12 and corner 14 of M.S. 472 by a proportionate method. These corners are required to determine the boundaries of public lands and for purposes of determining acreage of the remaining lands after the survey of the two small tracts. The two tracts must be surveyed and monumented.

Solution

The lost corners of M.S. 472 - Placer were restored by the broken boundary method (compass rule) described in section 5-43 of the manual. A grant boundary adjustment (Manual, section 5-44) was also computed. Both methods were compared with the record courses and distances. The compass rule adjustment most nearly conformed to the record. Corners No. 6 and No. 13 controlled the position of corners No. 7 thru No. 12. Corner No. 15, identical with corner No. 9 of M.S. 801, was restored at record bearing and distance (North, 0.50 chains) from the witness corner established in the survey of M.S. 801. Corner No. 14 of M.S. 472 was tentatively restored between corners No. 13 and No. 15. Corner No. 1, M.S. 801 was found on the restored line 14-15, a desirable condition. The compass rule was thus used to restore corner No. 14.

The Corbett home was found to be entirely within the vacant lot 5 and invalid Corbett placer location with a yard fenced on the north, south and west. The actual land in occupancy use was thus easily determined. The Corbett tract was designated Tract 37. Corner No. 9, M.S. 472 was designated and marked for Angle Point No. 1 and from that point Tract 37 was surveyed in a clockwise direction, limited by the fence and by lines 8-9 and 9-10 of M.S. 472. Each angle point was monumented and properly marked.

The Drennon home was only partially located on M.S. 2957, Phenix Lode. The Missoula District personnel indicated the extremities of actual occupancy to be surveyed along the northerly and easterly sides of the Drennon tract, which was designated Tract 38. Angle Point No. 1 was established on line 1-2 of M.S. 2957. Angle point No. 2 was established at the intersection of line 14-15, M.S. 472 and line 1-2 of M.S. 2957. Angle Point No. 3 was established on line 14-15 of M.S. 472 and the easterly line of occupancy. Angle Point No. 4 was the most northeasterly corner of occupancy. Each angle point was monumented and properly marked.

Corner 13, M.S. 472 was tied to the ¼ section corner of section 36, on the south boundary of the township. This tie made it possible to accurately protract the mineral surveys and determine areas of fractional lottings necessary within section 36, and construction of the plat based on the resurveyed lines and previous mineral survey and rectangular survey records.

On October 31, 1968, Paul Drennon relinquished all rights, title and interest to M.S. 2957, Phenix Lode. The mineral survey of the claim was officially cancelled on November 7, 1968. A notation of the cancellation was placed on the plat of M.S. 2957. None of the monuments were removed from the land.

The plat was constructed assigning a new lot number and area to the former lot 5; former lots 15, 16 and remaining portion of cancelled Phenix Lode; and a lot number and area to a small remnant lying between M.S. 788 and M.S. 1509. The SW¼NE¼ of section 36 was patented as was the Mt. Helena Millsite. The millsite was surveyed omitting an area between corners No. 2 and No. 7, which was never indicated as vacant public land on supplemental plats. By protraction, the east-west centerline of section 36 crosses the area. A lot number and acreage was assigned to the portion south of the protracted east-west centerline.

M.S. 2294 is patented and is largely in conflict with M.S. 1509, outside the patented M.S. 2490. M.S. 1509 is not patented but is a mineral survey of record, presumably with possessory rights. Until the validity of M.S. 1509 is determined, M.S. 1509 must be shown on the plats. Only when a claim is found invalid may the survey be cancelled.

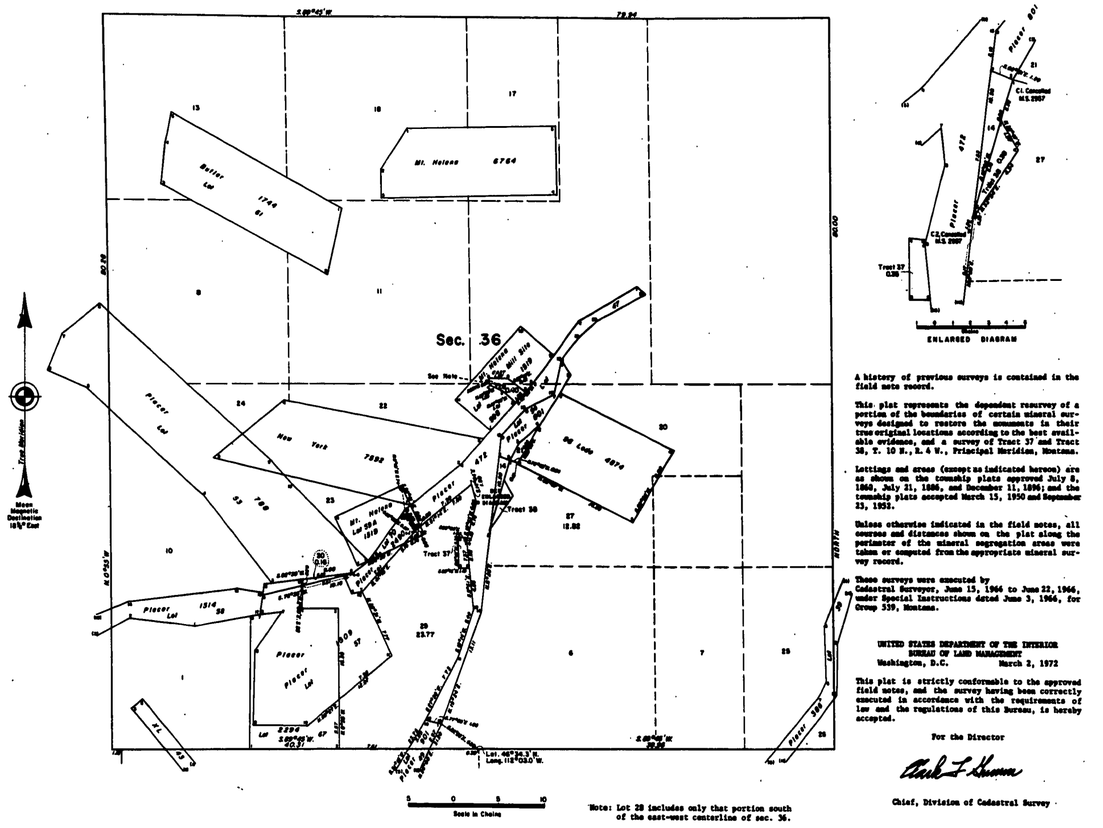
The field notes were written, the plat was prepared and submitted to the Washington Office. The plat was accepted on March 2, 1972, and is shown in Figure 3.

Tract 37 was patented under the Mining Claim Occupancy Act.

Drennon could not qualify for purchase under the MCOA because of residency requirements, etc. Tract 38 has been leased under the Small Tract Act of June 1, 1938, 52 Stat. 609; 43 USC 682a; and 43 CFR 2730.

TOWNSHIP 10 NORTH, RANGE 4 WEST OF THE PRINCIPAL MERIDIAN, MONTANA. DUPLICATE ORIGINAL

SURVEY OF TRACTS 37 AND 38



A history of previous surveys is contained in the field note record.

This plat represents the dependent resurvey of a portion of the boundaries of certain mineral surveys designed to restore the monuments in their true original locations according to the best available evidence, and a survey of Tract 37 and Tract 38, T. 10 N., R. 4 W., Principal Meridian, Montana.

Lottings and areas (except as indicated hereon) are as shown on the township plats approved July 9, 1868, July 21, 1886, and December 11, 1896; and the township plats accepted March 15, 1950 and September 23, 1953.

Unless otherwise indicated in the field notes, all courses and distances shown on the plat along the perimeter of the mineral segregation areas were taken or computed from the appropriate mineral survey record.

These surveys were executed by Cadastral Surveyor, June 15, 1966 to June 22, 1966, under Special Instructions dated June 3, 1966, for Group 539, Montana.

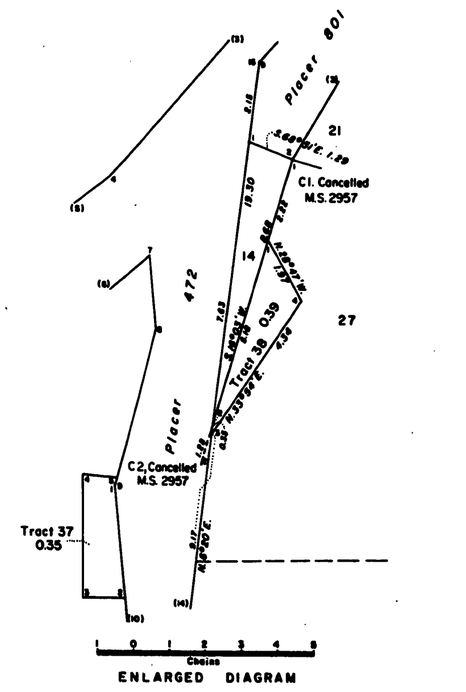
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. March 2, 1972

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

Clark L. Hamm

Chief, Division of Cadastral Survey



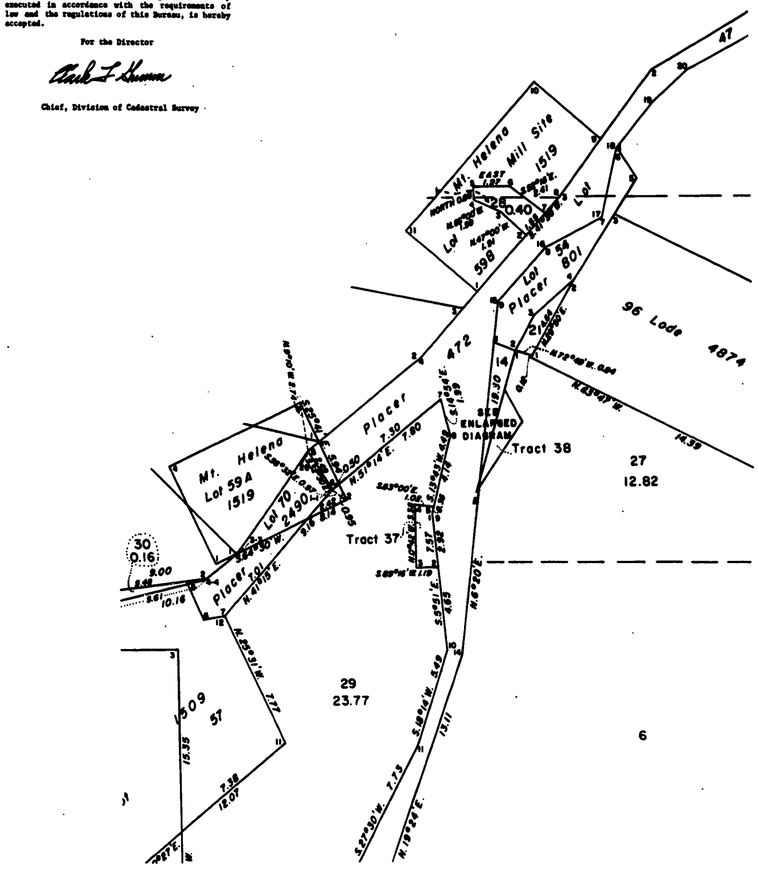
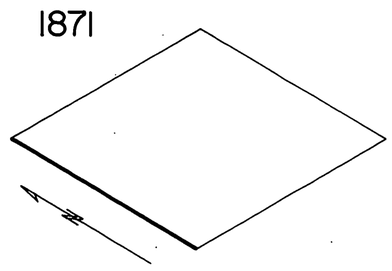
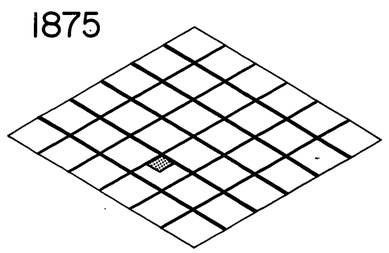
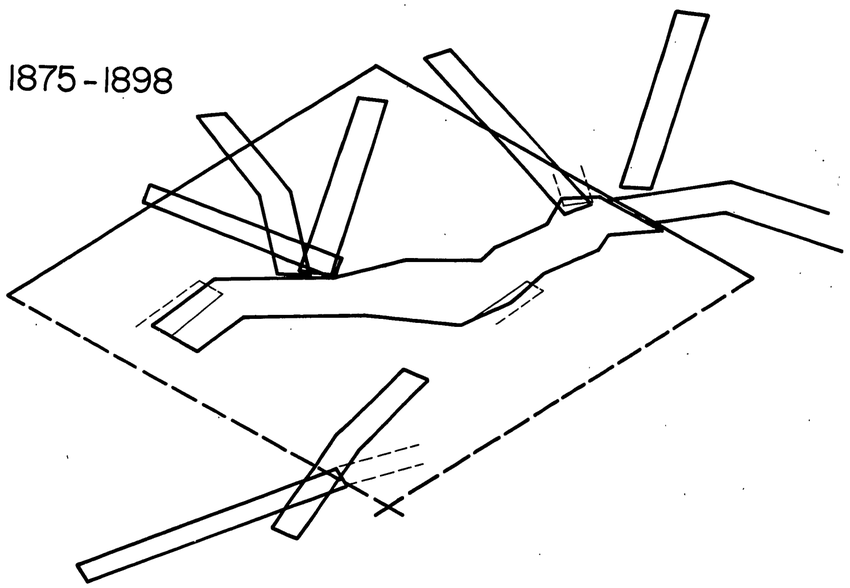


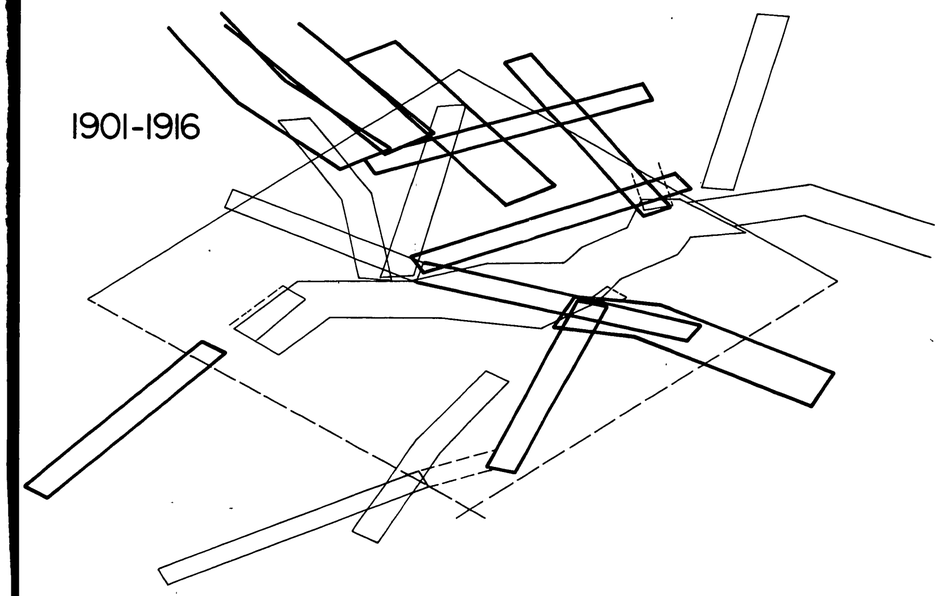
Figure 3 - Accepted Plat, With Details On Right

MINERAL SURVEY RESTORATION









E4-1

History of Surveys

The full history of surveys in this township is complex and lengthy. Because the discussion here is confined to the vicinity of the northeast quarter of section 20, the history of pertinent surveys is given:

1871 Frances F. Bryne surveyed the west boundary of the township.

1875 Edwin H. Kellog surveyed the subdivisional lines as shown on the plat approved July 24, 1875, Figure 1.

1875 Josiah Dart surveyed M.S. 203, D.M. McKnight Placer. Corner number 1 was tied to the corner of sections 19, 24, 25 and 30 on the west boundary of the township. From corner number 5, Dart's notes state: "Cabin, S. 38° W., 70 ft."

1880 J.P. Maxwell amended M.S. 203, McKnight Placer, (prior to patent) excluding conflicts with the unsurveyed Charlotte, Southern Kansas and Vine Lode locations. Maxwell reported a tie from corner number 12 of the McKnight to the ¼ section corner of sections 20 and 21, but did not describe the corner monument. Though not so stated it is evident that this tie was computed.

1882 Daniel Drummond surveyed M.S. 530, Eclipse Lode, on March 1. Corner number 1 was tied to the corner of sections 16, 17, 20 and 21. The conflict with the McKnight Placer was shown with no reference to the unsurveyed Vine location.

1882 J.P. Maxwell surveyed amended M.S. 542, Groton Placer. Corner number 1 was tied to the southeast corner of section 21. Corners numbered 5 and 6 were reported to be on line 10-11 of the McKnight Placer.

1889 C.A. Russell surveyed M.S. 5915, Vancouver Lode. Corner number 1 was tied to the corner of sections 16, 17, 20 and 21.

1893 C.A. Russell surveyed M.S. 8616, Alaska and Blue Ribbon Lodes. Corner number 1 was tied to the corner of sections 17, 18, 19 and 20. The conflict of the Blue Ribbon with the unsurveyed Princeton Lode location was shown.

1898 C.A. Russell also surveyed M.S. 12635, Crisman and Bessie Lodes on July 1-6, 1898. Corner number 1 of each claim was tied to the corner of sections 16, 17, 20 and 21. Corner number 4, Bessie, was described as being on line 4-5, McKnight Placer. The conflict of the Bessie with the unsurveyed Iron Lode location was shown. The conflict with the Crisman and McKnight Placer was shown.

Russell also surveyed M.S. 12822, Arapahoe Lode, on September 29, 1898. Corner number 1 was tied to the corner of sections 16, 17, 20 and 21. Conflicts with the Crisman and Bessie Lodes were shown.

1901 Mathew Rogers surveyed M.S. 15296, Iron Lode. Corner Number 1 was tied to the corner of sections 16, 17, 20 and 21. Conflicts with the unsurveyed Iron Lode location and the previously surveyed Eclipse and Bessie Lodes were shown. The Iron Lode and Iron Lode location had different claimants.

1902 Albert E. Chase surveyed M.S. 15921, Dona Lode. Corner number 1 was tied to the corner of sections 17, 18, 19 and 20. No conflicts were indicated.

1907 Horace C. Hall surveyed M.S. 18311, Seven Thirty, Eclipse, Klondyke and Cresent Lodes. Corner number 1 of each claim was tied to the corner of sections 16, 17, 20 and 21. Conflicts with the previously surveyed Crisman, Bessie and Iron Lodes and McKnight Placer were shown. The Eclipse Lode was the same claim as the previously surveyed M.S. 530. An erroneous tie to corner number 4, McKnight Placer, indicated an unreal conflict of the Bessie Lode and McKnight Placer. Corner numbers 1 and 2, Klondyke Lode, were described as identical with corner numbers 3 and 4, Crisman Lode. No conflicts with unsurveyed locations were indicated.

1916 Henry S. Senderson surveyed M.S. 19742, Dixie Queen Lode on April 10, 1916. Corner number 1 was tied to the corner of sections 16, 17, 20 and 21. Conflicts with the previously surveyed Klondyke and Crescent Lodes and McKnight Placer were shown. No conflicts with any unsurveyed locations were indicated.

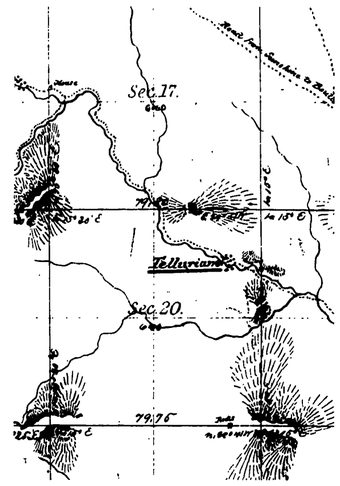
1916 Henry S. Senderson also surveyed M.S. 19744, Roberta, Golden Rule and Queen of the Valley Lodes on April 11-15, 1916. Corner number 1 of each claim was tied to the corner of sections 16, 17, 20 and 21. The conflicts with the previously surveyed Arapahoe, Bessie and Iron Lodes were shown. No conflicts with any unsurveyed locations were indicated.

The Connected Sheet of section 20, on file in the Colorado State Office showing the described mineral surveys is shown in Figure 2.

On March 6, 1903, an unofficial "segregation diagram" was approved by the Surveyor General of Colorado. This diagram assigned lot numbers to areas of public lands made fractional by mineral surveys. It is not an official plat of survey, but shows lot numbers 37 thru 45.

1953 On January 21, 1953, a supplemental plat of the NE¼ of section 20 was accepted and is shown in Figure 3.

On July 17, 1953, a supplemental plat of the NE¼ of section 20 was accepted and is shown in Figure 4.



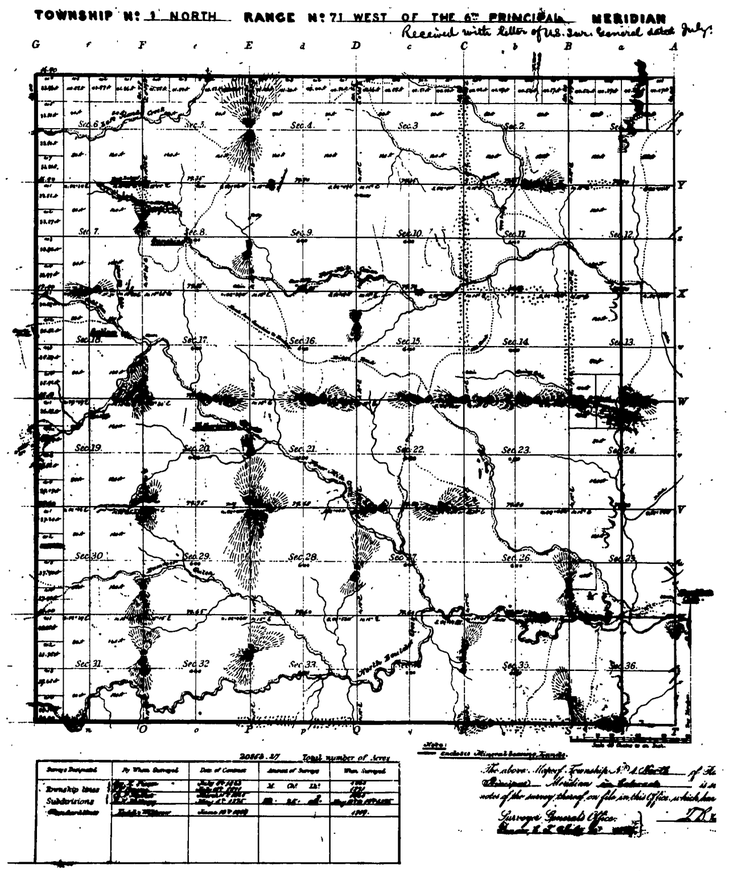


Figure 1 - Original Plat With Detail of Section 20

MINERAL SURVEY RESTORATION

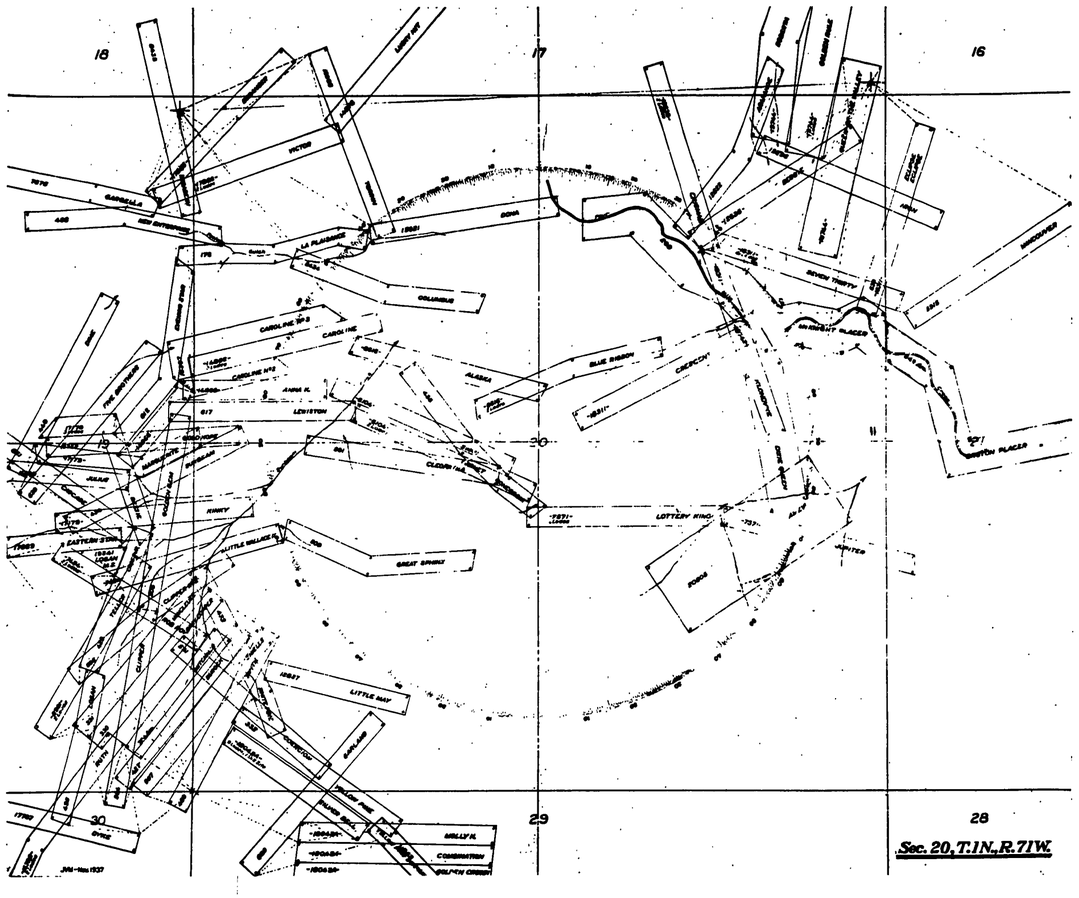


Figure 2a - Connected Sheet, Section 20

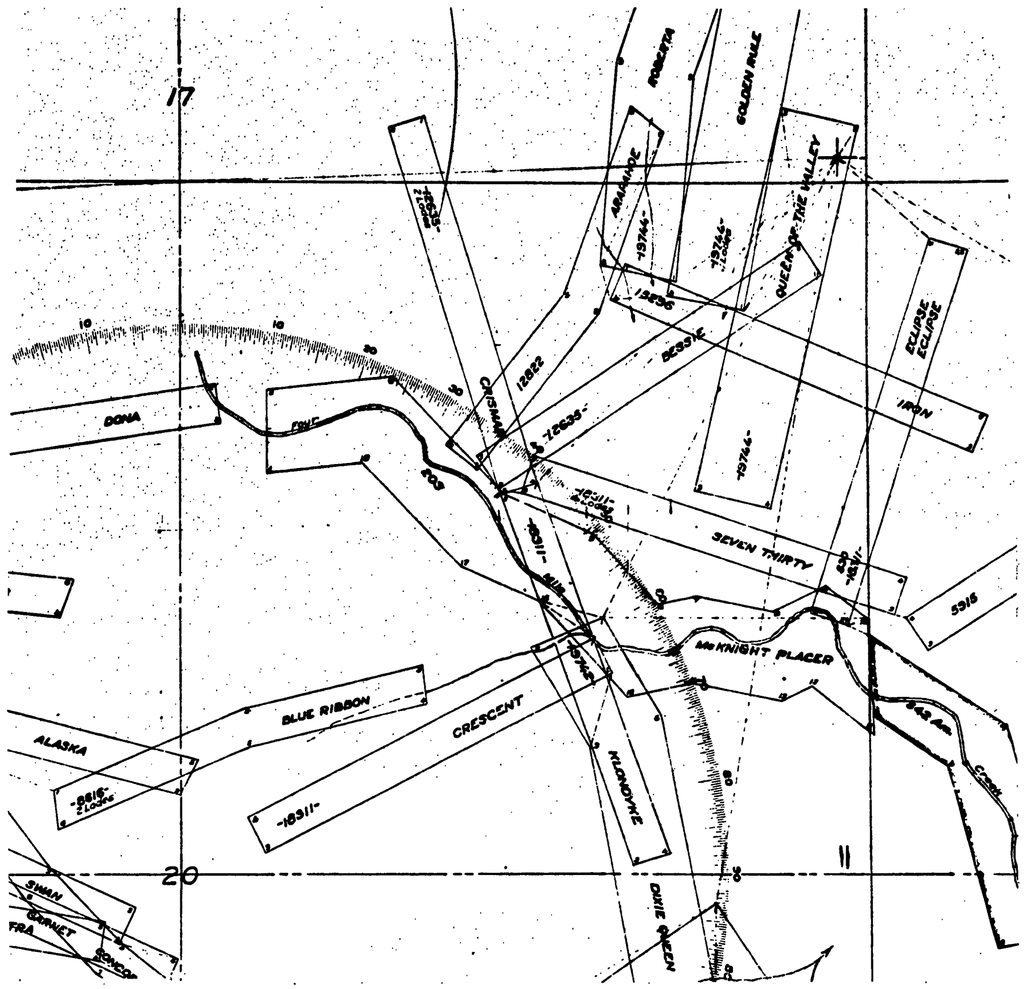


Figure 2b - Detail At NE¼ Section 20

MINERAL SURVEY RESTORATION

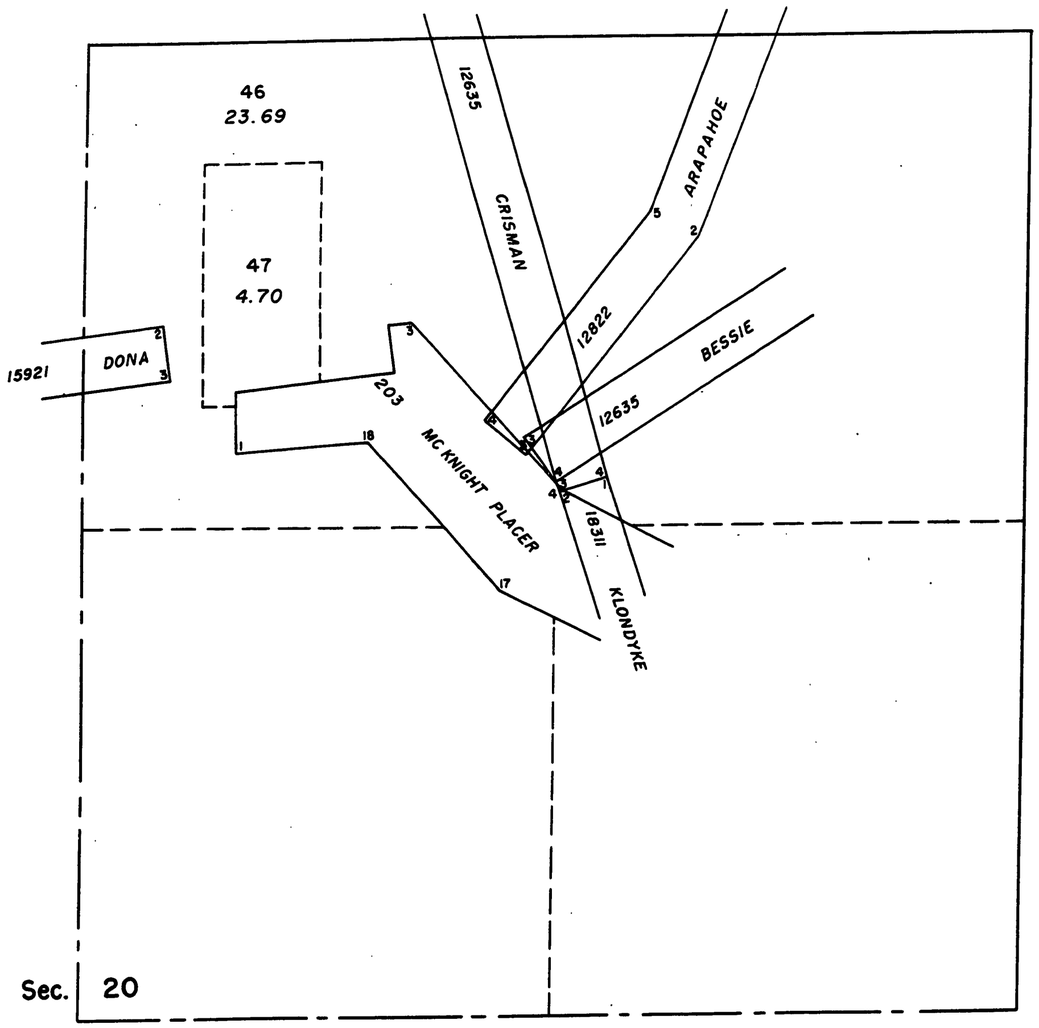


Figure 3 - Supplemental Plat

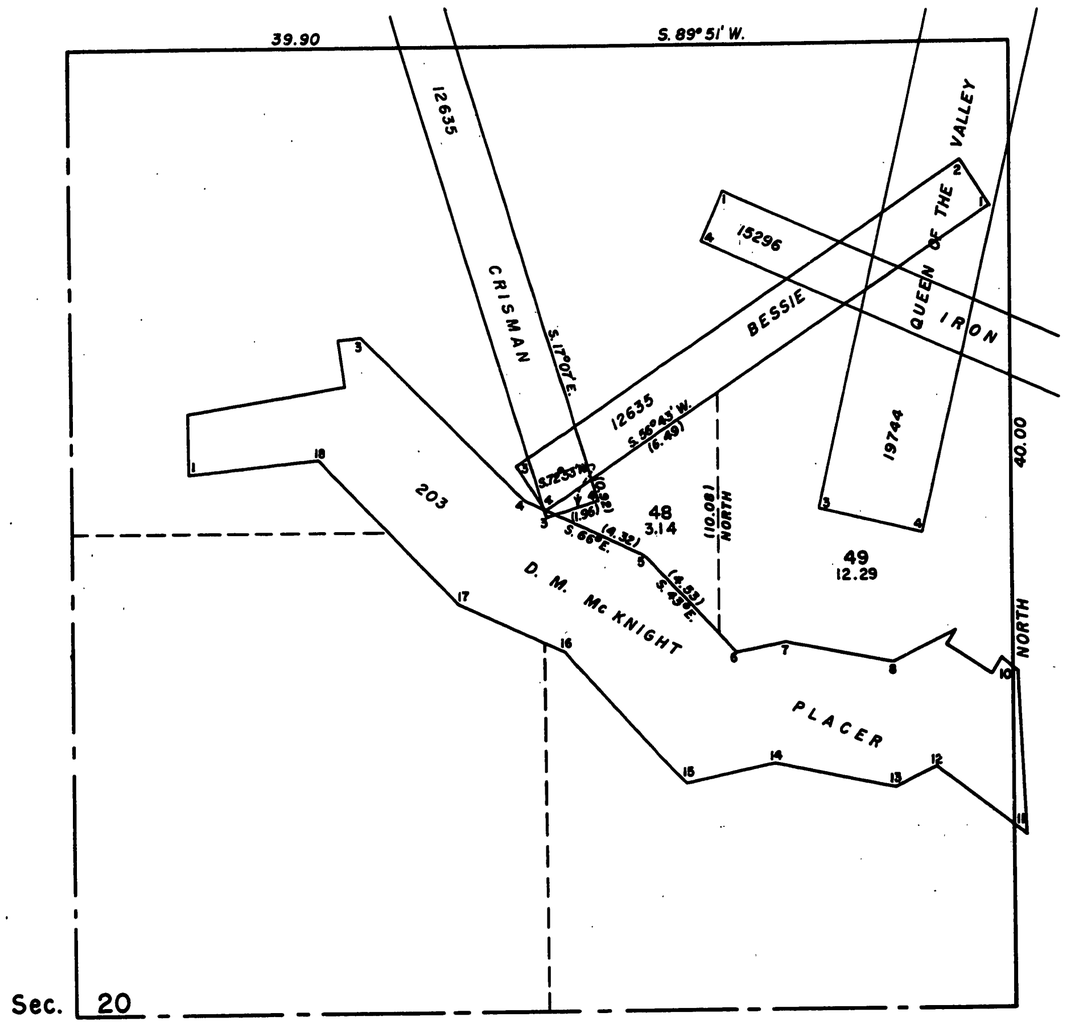


Figure 4 - Supplemental Plat

Reasons for Request of this Survey

Section 20, T. 1 N., R. 71 W., is located about 4½ miles northwest of Boulder, Colorado. The area is rough and mountainous, making surveying and identification of survey lines difficult. Extensive mining activities and mining claims in years past created a confused pattern of ownership. Homes and cabins have been constructed on mining claims, both surveyed, and unsurveyed lode locations. The decline of the mining industry and abandonment had made many of the unpatented claims invalid under the mining laws. Applications were being filed on the public domain lands under the Small Tract Act (43 USC 682a-c) and other Congressional Acts.

Two such applications were accommodated by the preparation of Supplemental plats shown in figures 3 and 4. As the number of applications increased it became evident that supplemental plats could not meet the needs and could create even greater problems of identification. The Colorado State Supervisor (Director) requested a resurvey of section 20, subdivision of the section and identification of the boundaries of the public lands within the section.

MINERAL SURVEY RESTORATION

Special Instructions

Special Instructions for Group 448, Colorado, were prepared on March 11, 1959. They provided for the dependent resurvey and subdivision of section 20, resurvey of patented mineral surveys and subdivision into small tracts of the remaining public lands as required by the State Supervisor. The Group was assigned to a cadastral surveyor. Field work began March 25, 1959.

Conditions Found on the Ground

A search of patent records and the files revealed the following status conditions:

M.S. 203, McKnight Placer, patented April 1, 1881. The patent description excluded the conflict with the unsurveyed Charlotte, Southern Kansas and Vine Lode locations.

M.S. 8616, Alaska and Blue Ribbon Lodes, patented January 11, 1895. Alaska patented in full. Blue Ribbon patented excluding the conflicts with the Alaska and the conflict with the Princeton Lode location, unsurveyed.

M.S. 12635, Crisman and Bessie Lodes, patented August 9, 1901, excluding the Crisman conflict with the McKnight Placer and excluding from the Bessie the conflict with the Iron Lode location, unsurveyed, and all veins apexing within the exclusions.

M.S. 12822, Arapahoe Lode, patented August 9, 1901, excluding all conflicts with the Crisman and Bessie, and all veins apexing within the excluded area.

M.S. 15296, Iron Lode, patented November 9, 1903, excluding all that portion of the Bessie lying south of and outside the Iron Lode claim, unsurveyed, and all veins apexing within the exclusion.

M.S. 15921, Dona Lode, patented December 13, 1904, with no exclusions of any kind mentioned.

M.S. 19744, Roberta, Golden Rule and Queen of the Valley Lodes, patented August 4, 1919, excluding all conflicts with the Bessie, Arapahoe, and Iron Lode (M.S. 15296), and all veins apexing within the exclusions. No mention is made of the unsurveyed Iron Lode location.

M.S. 19742, Dixie Queen Lode, patented August 4, 1919, excluding the conflict with M.S. 203, McKnight Placer.

Lots 47 and 48 were patented in 1955.

The E½NE¼NE¼NW¼ of section 20, was patented August 2, 1960, while this survey was still in progress.

Some mineral surveys were still of record. In the letter of transmittal of resurvey returns dated June 13, 1962, it is stated that M.S. 18311, the Seven Thirty, Eclipse, Klondyke and Crescent Lodes were declared null and void on May 13, 1959. The file records do not indicate that any of the unsurveyed lode locations, (Charlotte, Vine, Southern Kansas, Iron and Princeton) were ever adjudicated. There is no record of cancellation of M.S. 18311 in the file or on the plats.

With the status of the lands determined, the first step was to plot all of the mineral survey records in reverse order on a large scale drawing. In the NE¼ of section 20 the latest mineral survey record is M.S. 19744. An assumed co-ordinate was assigned to the corner of sections 16, 17, 20 and 21. From that point the Roberta, Golden Rule and Queen of the Valley claims were plotted, then M.S. 19742, Dixie Queen, and so on back to M.S. 203, McKnight Placer. This process revealed descrepancies in corner positions and intersections which could then be resolved temporarily based on probabilities. Figure 5 illustrates the mineral survey records as so plotted and reveals some minor defects in the connected sheet, Figure 2.

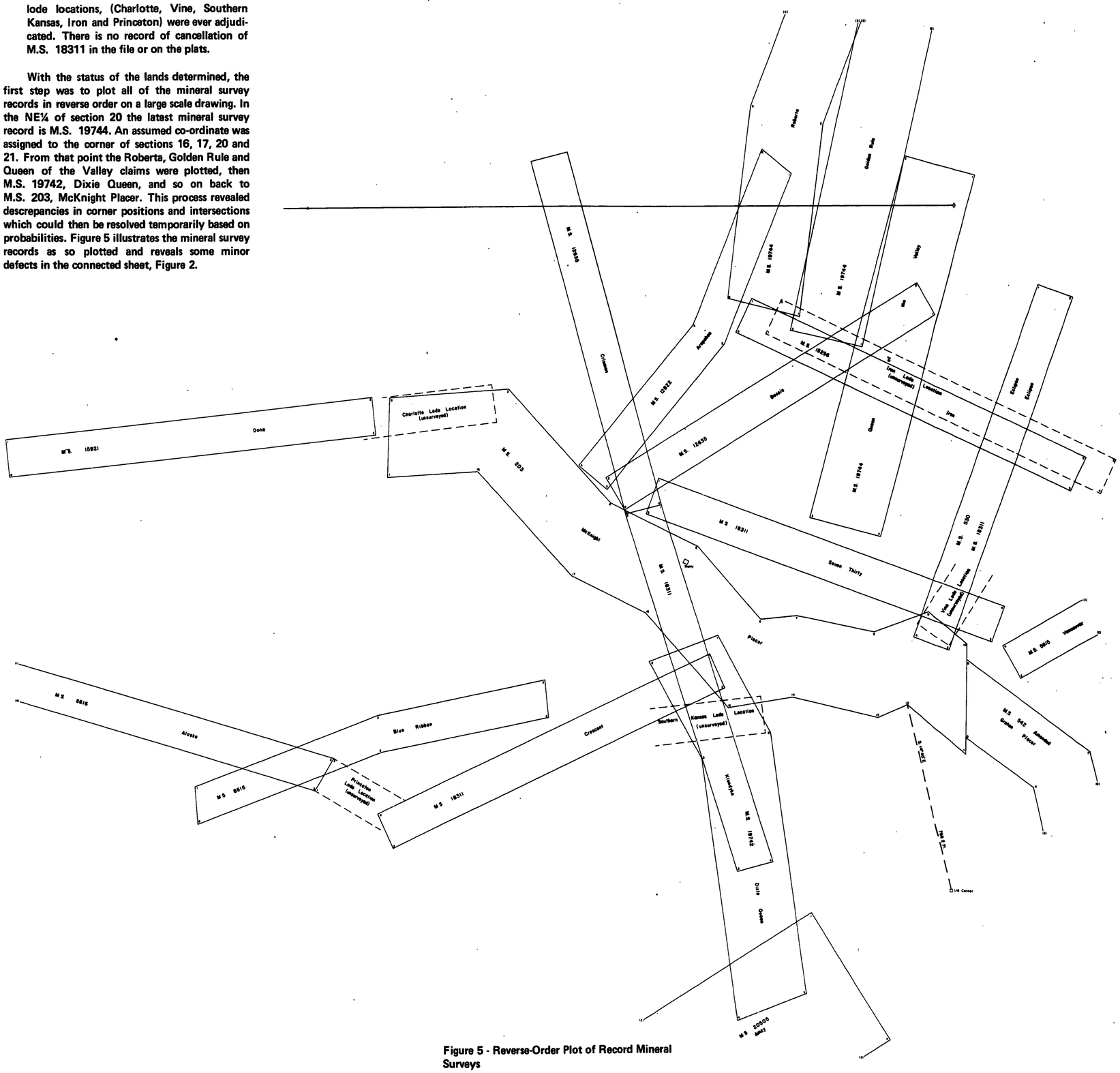


Figure 5 - Reverse-Order Plot of Record Mineral Surveys

MINERAL SURVEY RESTORATION

Section 20 was dependently resurveyed. All four section corners, the ¼ corner of sections 20 and 29, and ¼ corner of sections 19 and 20 were recovered. The lost ¼ section corners and all of the necessary 1/16 section corners were restored or established at single proportionate positions. The centerlines of the section and centerlines of the NE¼ and NW¼ were surveyed and monumented as needed. All section lines and section subdivisional lines were adjusted to a perfect closure and each monument assigned a relative co-ordinate. Based on the large scale plat of the mineral surveys (which served as a "dirty sheet") approximate relative co-ordinates were assigned to the mineral survey corners for searching purposes.

Using a solar transit, in good condition and adjustment, closed traverses were run through each 1/16 section, beginning and ending at an established corner. If a mineral survey corner was found, the traverse was run into and out from that corner (in some cases a close "side tie" was made) and so on to a closure. The terrain was very broken and man-made structures often precluded any possibility of a direct line retracement of the mineral survey boundaries. In this manner a very large percentage of the original mineral survey corners were recovered, usually marked with the original stone monuments. Closures were kept to 1:5000 or better. The closing error was adjusted and a fixed relative co-ordinate assigned to each recovered corner. As corners become fixed, an approximate proportionate position was computed for those corners not yet found and further search made in the near vicinity of a computed point, resulting in more recoveries. Search was made for all other possible collateral evidence, such as the tunnel adit (entrance) described in the mineral survey notes, calls of topography, buildings, and testimony of local residents and private surveyors. The final evidence on which corner restorations were based and the further division of the public lands is illustrated in figure 6.

Preliminary Statement of the Problem

The surveyor must restore the lost corners of the patented mineral surveys as described in the patents and establish the corners of the patented lots 47 and 48 as shown on the supplemental plats, delineating the boundaries of the remaining public lands. The remaining lands must be surveyed into lots along aliquot part subdivision-of-section-lines insofar as possible and by metes and bounds as required to meet the needs of the State Director for purposes of disposal under the appropriate land laws.

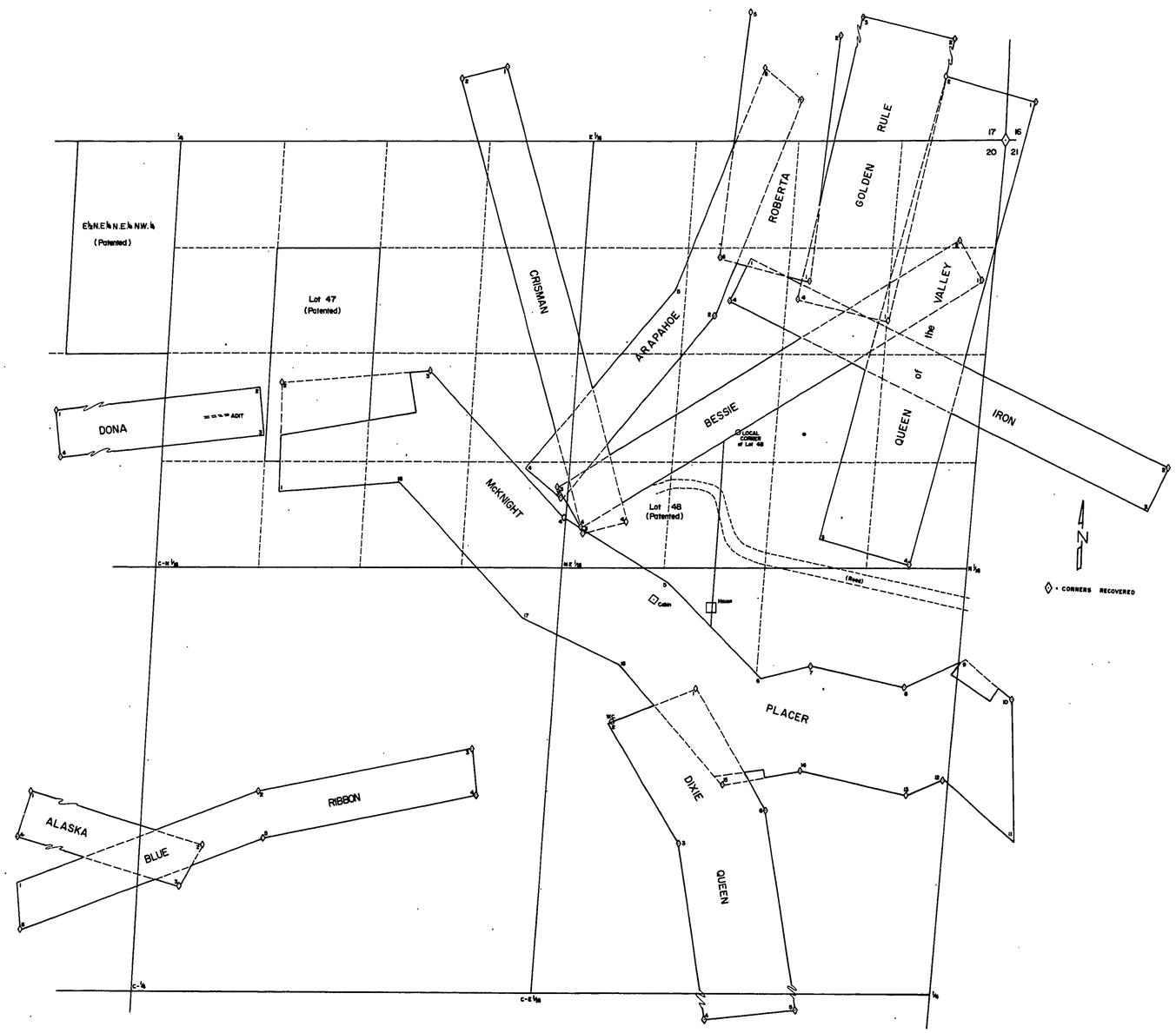


Figure 6 - Conditions Found and Corner Recovery

MINERAL SURVEY RESTORATION

Regulations

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

5-4 to 5-17	Identification of existent corners
5-20 to 5-23	Restoration of lost corners
5-38	Single proportionate measurement
5-42	Local corners and property rights
5-44	Grant boundary adjustment
5-29 and 5-45	One point control and index correction
5-46 and 5-47	Special cases
6-1 to 6-32	Dependent resurveys and Bona-fide rights
7-8 to 7-12	Subdivision of sections
7-16	Metes and Bounds Surveys
7-32 to 7-38	Small Tract Surveys

The surveys must conform to the land laws including those codified in Titles 30 and 43, U.S. Code as described in E-1.

Legal Constraints

The survey must comply with the regulations and judicial decisions and be executed in a manner that will protect the bona-fide rights of all claimants.

Changes in Instructions

After the retracements of the boundaries of section 20 were completed it became evident that enough distortion existed in the section lines to further complicate the survey situation. The high value of the land for residental purposes made a survey of the adjoining sections imperative. Supplemental Special Instructions for Group 448 were prepared on May 25, 1959, extending the resurveys and surveys to include sections 17, 18 and 19.

Auxiliary Topic - Minimum Lot Areas

As finally completed and approved, there are four small areas of public land in the NE¼ of section 20 which were not identified with an assigned lot number and area. Two of these fragments are less than 0.01 acre in area. Section 9-21 of the Manual of Surveying Instructions, 1973, was construed to mean that an area less than 0.01 acres would not be lotted. This interpretation was in error. Any area of public land, regardless of how small, should be identified, assigned an appropriate lot number and given an area designation of 0.01 acre, even if only containing a few square feet. Of course if such a fragment contains more than 0.01 acre, the proper acreage would be shown to the nearest 0.01 acre. When a resurvey and survey of this type is being made, identifying all the public lands would tend to preclude any further need of supplemental plats to identify the remaining public lands. These small parcels cannot be "given away" without a proper patent procedure.

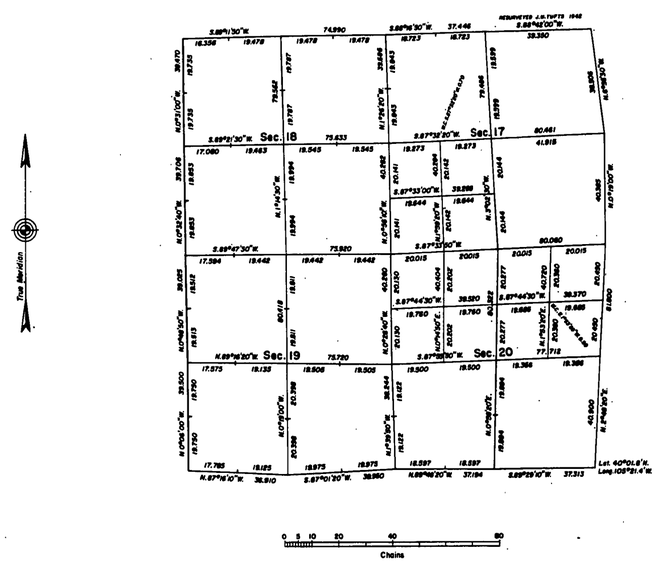
Until properly patented, even a very small parcel will remain public land as an "island" or "window" in the surrounding patented lands, creating potential title problems to valuable improvements and could conceivably be filed on under the land laws.

Final Statement of the Problem

The surveyor is to restore the lost mineral survey corners. He must survey and monument the small tracts in a manner that will meet the needs of the Lands and Minerals Officers of the Colorado State Office in the processing of the small tract applications.

TOWNSHIP 1 NORTH, RANGE 71 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COLORADO.

DEPENDENT RESURVEY AND PARTIAL SUBDIVISION



This plat (in 6 sheets) represents a retracement and re-establishment of the boundaries of secs. 17, 18, 19 and 20, and certain mineral surveys therein, designed to restore the corners in their original locations according to the best available evidence and a partial subdivision of these sections. The lottings and areas are based upon the plats approved July 24, 1875, October 22, 1919, December 28, 1925, September 20, 1923, and plats accepted November 29, 1932, May 25, 1950, July 25, 1951, January 21, 1953, April 28, 1953, July 17, 1953, September 10, 1954, February 2, 1955, May 18, 1955, April 23, 1956 and April 10, 1959, excepting as new or modified lottings are shown on the respective sheets of this plat for the detail not shown hereon as follows:

Sheet 2 - Resurvey and partial subdivision in ___ sec. 20
Sheet 3 - " " " " " " sec. 20
Sheet 4 - " " " " " " sec. 20
Sheet 5 - " " " " " " secs. 18 & 19
Sheet 6 - " " " " " " sec. 17

Area of segregations	1022.70 Acres (approx.)
Area exclusive of segregations	1534.83 Acres (approx.)
Total area resurveyed	2557.53 Acres

The boundaries of sections 8 and 9 were resurveyed by John M. Tufts, Cadastral Engineer, in 1942 and are represented upon the plat accepted November 27, 1942. For history of the mineral surveys refer to the mineral survey record. History of previous surveys is set forth in the field note record.

For topography within the sections reference is made to U.S. Geological Survey Quadrangle Sheets "Gold Hill" and "Boulder", dated 1957.

As shown hereon, the surveys and resurveys in sections 17, 18, 19 and 20, T. 1 N., R. 71 W., of the 6th Principal Meridian, Colorado, were executed by ___ from March 25, 1959 to March 16, 1961, under special instructions dated March 11, 1959 and supplemental special instructions dated May 25, 1959, for Group 448, Colorado.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. March 13, 1963

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 Engineering

Figure 7 - Sheet 1 of the Accepted Plat

MINERAL SURVEY RESTORATION

TOWNSHIP 1 NORTH, RANGE 71 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COLORADO.

RESURVEY AND PARTIAL SUBDIVISION OF N.E. 1/4 SECTION 20

Solution

The methods used to restore lost mineral survey corners, in order of mineral survey number was:

M.S. 203, McKnight Placer; Corner number 5 was restored at record bearing and distance from a cabin described in the mineral survey notes. John and Ester Romarine who were local residents since 1904 signed a sworn affidavit that of their personal knowledge this existing cabin occupied the site of the original cabin. A copy of their affidavit was included at the end of the field notes.

Corner number 6 was restored by use of grant boundary adjustment, section 5-44, between the restored corner number 5 and recovered corner number 7.

Corner number 9 was restored by the grant boundary adjustment between the recovered corners numbered 8 and 10. The intersections of the Vine Lode location were restored by single porportionate measurement on line 8-9 and line 9-10. The southeast and southwest corners of the Vine Lode location were than restored by the grant boundary adjustment.

Corners numbered 12 to 15 were well marked stone monuments, whereas the record called for wood posts. The found monuments appeared to have been in place for a long period, perhaps 40 years - as evidenced by moss and lichen growth, embedding, etc. No record could be found to reveal who had remonumented these points. Each monument was quite close to record bearing and distances from original corner number 10 and had been used as authentic survey marks by the local residents. In conformity with the intent of sections 5-42 and 6-28 of the Manual of Surveying Instructions, 1973, the stone monuments for corner numbers 12 to 15 were accepted and used as original.

Corner number 11 was restored between corner numbers 10 and 12 by the grant boundary adjustment.

Corner Number 16 was restored at record bearing and distance from the recovered Corner Number 1, M.S. 19742, Dixie Queen Lode. The field notes of the Dixie Queen Lode state that Corner Number 10 of the McKnight Placer was recovered and tied to Corner Number 1. The position of Corner Numbers 14, 15 and 16 of the McKnight Placer were computed using the tie to Corner Number 10 and the McKnight record. The conflict between the Dixie Queen and McKnight was based on those computed positions. The Dixie Queen was patented on that basis. Both the Dixie Queen and McKnight Placer were occupied on the assumption that Corner Number 16 of the McKnight was in the position called for by the Dixie Queen. Rather than disrupt an acceptable situation, Corner Number 16 was restored on the basis of the Dixie Queen tie.

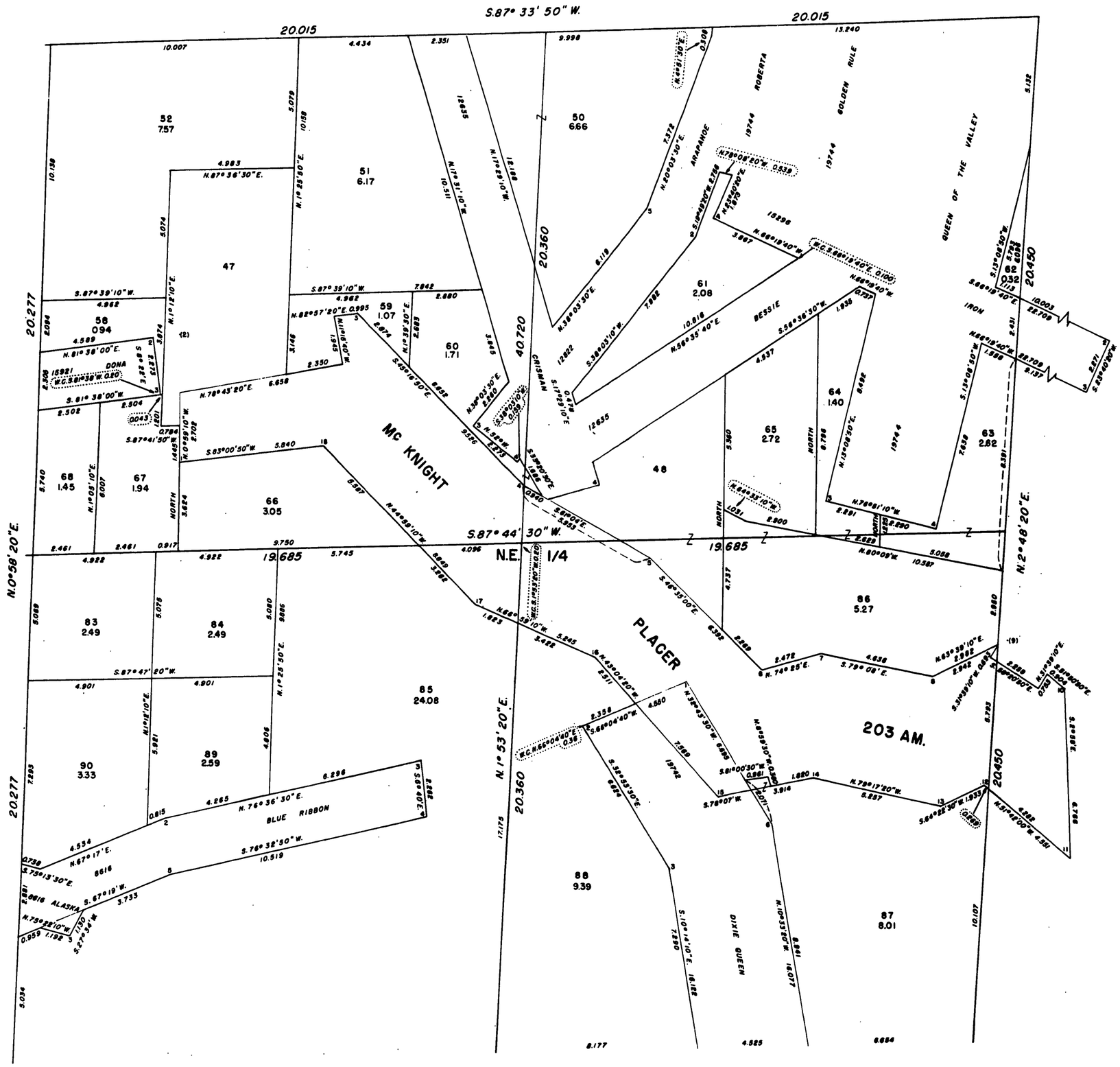


Figure 8 - Portion of the Accepted Plat

MINERAL SURVEY RESTORATION

The east endline and the north sideline intersections of the Southern Kansas location were restored by single proportionate measurement on lines 14-15 and 15-16 of the McKnight Placer. The northeast corner of the Southern Kansas location was then restored by using the grant boundary adjustment.

Corner Numbers 17, 18 and 1 were restored by the grant boundary adjustment between the restored Corner Number 16 and recovered Corner Number 2.

The south sideline and east endline intersections of the Charlotte Lode location were restored by single proportionate measurement along line 1-2 and 2-3. The southeast corner of the Charlotte location was then restored by the grant boundary adjustment.

M.S. 8616, Blue Ribbon Lode; the lost corner number 1 of the Blue Ribbon Lode was restored at record distance from the recovered corner number 6 and on a line parallel to endline 3-4.

M.S. 12822, Arapahoe Lode; the lost corner 4 was restored at record distance from the recovered corner number 3 and on a line parallel to line 1-6. The lost corner number 5 was then restored between corner number 4 and corner number 6 by the grant boundary adjustment.

M.S. 15296, Iron Lode; the lost corner numbers 1 and 3 were restored between recovered corners numbered 2 and 4, each by the grant boundary adjustment.

M.S. 15921, Dona Lode; line 2-3 was determined from the lode line at record distance (107 ft.) from the adit of the discovery tunnel and parallel to line 1-4. The lost corner numbers 2 and 3 were restored on line 2-3 at record distance (75 ft.) each side of the lode line.

M.S. 19744, Roberta, Golden Rule and Queen of the Valley Lodes; the lost corner number 3, Queen of the Valley was restored on a line parallel to and the same length as line 1-2 of the claim.

The corners of the patented lots 47 and 48, shown on the Supplemental Plats, figures 3 and 4, were established as follows:

Lot 47; as shown on the plat is the SE¼NW¼NW¼NE¼ and the NE¼SW¼NW¼NE¼ lying outside of the patented McKnight Placer. In compliance with the special instructions, the exterior lines of these aliquot parts were calculated and surveyed on the calculated courses and distances with the south and east lines terminated at the intersections with the McKnight Placer boundary.

Lot 48 was another problem. The Supplemental plat (Figure 4) was improperly made in 1953, showing specific courses and distances. The easterly line of lot 48 was intended to lie along an aliquot part division, i.e., the N-S centerline of the SE¼SW¼NE¼NE¼, and aliquot part extensions of that line to intersections with the Bessie Lode and McKnight Placer, figure 6. The patentee had a survey made of lot 48 by D.H. Core, a registered land surveyor. Core established the most northeasterly corner of lot 48 on line 1-4 of the Bessie Lode at the distance shown on the plat (6.49 chains) from line 1-4 of the Crisman Lode. From that point he ran due South (as shown on the plat) to an approximate intersection with line 5-6 of the McKnight Placer; approximate because corner numbers 5 and 6 of the McKnight were not monumented at that time. On the basis of the line surveyed by Core, the owner of lot 48 constructed a home. Upon the dependent resurvey of section 20 the aliquot part division line (intended to be the east line of lot 48) passed through the house, about as shown in Figure 6. The northeast corner of lot 48 as established by Core was found and was on line 1-4, Bessie Lode. That point was accepted and the easterly line of lot 48 was extended due South therefrom to an intersection with line 5-6, McKnight Placer. Placement of specific distances on the Supplemental plat which were wholly based on the original survey record created, in effect, a metes and bounds survey. The government would be in an untenable position if it tried to hold to the aliquot part division instead of the distances indicated on the improper plat.

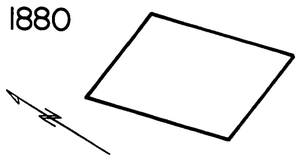
The division lines between the various lots were surveyed as directed by Lands and Minerals staff to meet their needs in processing the small tract applications. The lot lines followed aliquot part subdivisional lines wherever possible. Improvements such as roads and dwellings determined the position of most lot lines, many of which were not monumented. Where lot corners were monumented, "Copperweld" stakes were used in most instances. Brasscapped iron posts were used to monument the regular subdivision of section corners on those lines which were surveyed normally. Mineral survey corners marked with stone monuments were not remonumented.

In writing the field notes, the section lines were written, then section subdivisional lines with all intersections entering and leaving public lands called and monumented if they were also a lot corner. The resurvey of the McKnight Placer was written in its entirety with lot corners called and in most cases monumented as they occurred. The metes and bounds descriptions were written in order of lot numbers. Finally the mineral survey corners not previously described but which controlled the directions of lines and proportions were written in order of mineral survey numbers.

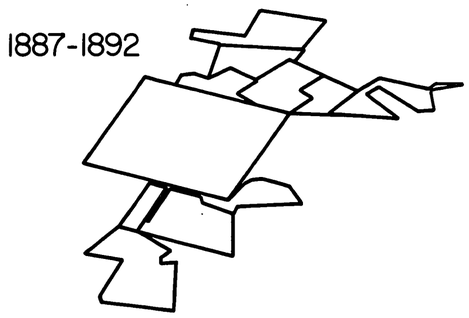
The plats of the entire Group 448 were accepted on March 13, 1963, and consisted of six sheets. Sheets 1 and 2 are shown in Figures 7 and 8.

H.E.S. AND MINERAL CLAIMS, S. DAKOTA

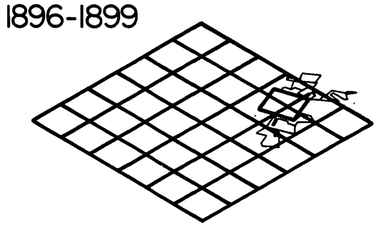
1880



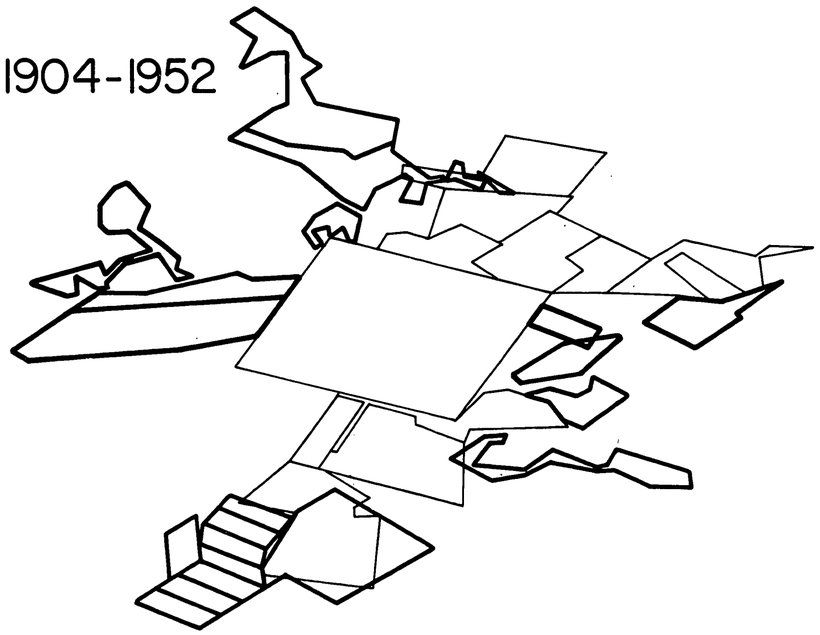
1887-1892



1896-1899



1904-1952



History of Surveys

1880	F.W. Von Bodengen surveyed the Custer City townsite on July 26, 1880. See figure 1, the connected sheet.
1887	Charles W. Bryden surveyed M.S. 506, Clark Placer, plat approved October 19, 1887.
	Charles W. Bryden also surveyed M.S. 507, Smith Placer, plat approved October 25, 1887.
1888	John W. McIntyre surveyed M.S. 548, Haserodt Placer, as shown on the plat approved June 23, 1888 and M.S. 590, Heideprim Placer, plat approved February 9, 1889.
1889	John W. McIntyre surveyed M.S. 594, Hall Placer, as shown on plat approved June 6, 1889.
1890	John W. McIntyre surveyed M.S. 644, Mallon Placer, as shown on the plat approved June 19, 1890 and M.S. 651, Tubbs Placer, plat approved September 1, 1890. McIntyre also surveyed M.S. 701, Denver Placer, plat approved September 1, 1890.
1892	John W. McIntyre surveyed M.S. 890, Durst Placer, plat approved June 13, 1892 and M.S. 936, Edward Cook Placer, plat approved January 28, 1893.
1896	Frank S. Peck surveyed the exterior boundaries of T. 3 S., R. 4 W., in September, 1896.
1897	James W. Baldwin surveyed the subdivisional lines of T. 3 S., R. 4 W.
1898	M.P. McCoy retraced the exterior boundaries of Custer City townsite. The township plat was approved on May 23, 1899. See figure 2.
1904	Roscoe K. Watson surveyed H.E.S. of Mathew S. Daly, plat approved May 22, 1907.
1907	Charles M. Caton surveyed M.S. 1954, Home and Japan Lode group, plat approved September 27, 1907.
1908-1911	Charles E. Smith surveyed H.E.S. No. 60, plat was approved November 2, 1909, H.E.S. No. 95, plat approved January 10, 1910 and H.E.S. No. 157, plat approved March 29, 1912.
1914	W.C. Campbell surveyed H.E.S. No. 277, plat approved July 19, 1915.
	Fred D. Mendenhall surveyed H.E.S. No. 326, plat approved October 25, 1915.
	W.C. Campbell surveyed H.E.S. No. 327, plat approved March 31, 1917.
	W.C. Campbell surveyed H.E.S. No. 328, plat approved February 21, 1916.
1917	W.C. Campbell surveyed H.E.S. No. 392, plat approved October 31, 1919.
	H.F. Mader surveyed H.E.S. No. 393, plat approved August 23, 1918.
	H.F. Mader surveyed H.E.S. No. 412, plat approved September 23, 1918.
	W.C. Campbell surveyed H.E.S. No. 525, plat approved October 31, 1919.
1923	Supplemental plat of section 23 prepared, approved August 15, 1923.
1949	Stein Bangs surveyed M.S. 2152, Wayside Lode, plat approved October 18, 1949, and M.S. 2158, Horseshoe Lode, plat approved October 29, 1952.

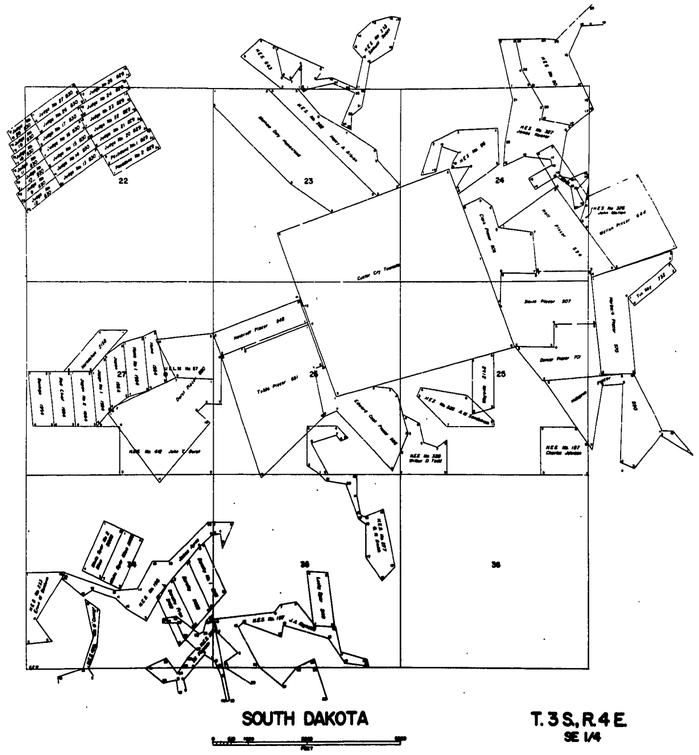


Figure 1 - Connected Sheet

H.E.S. AND MINERAL CLAIMS, S. DAKOTA

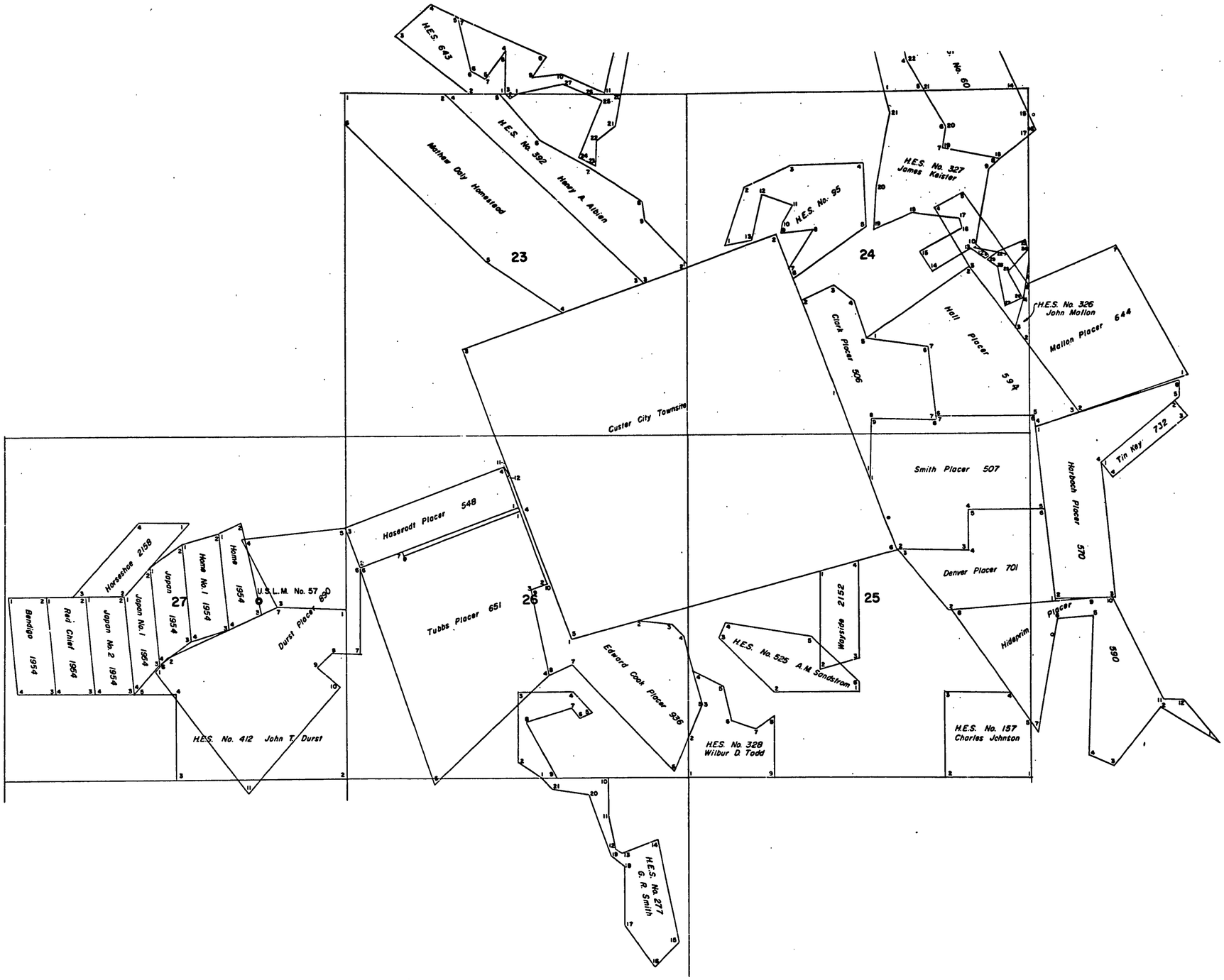
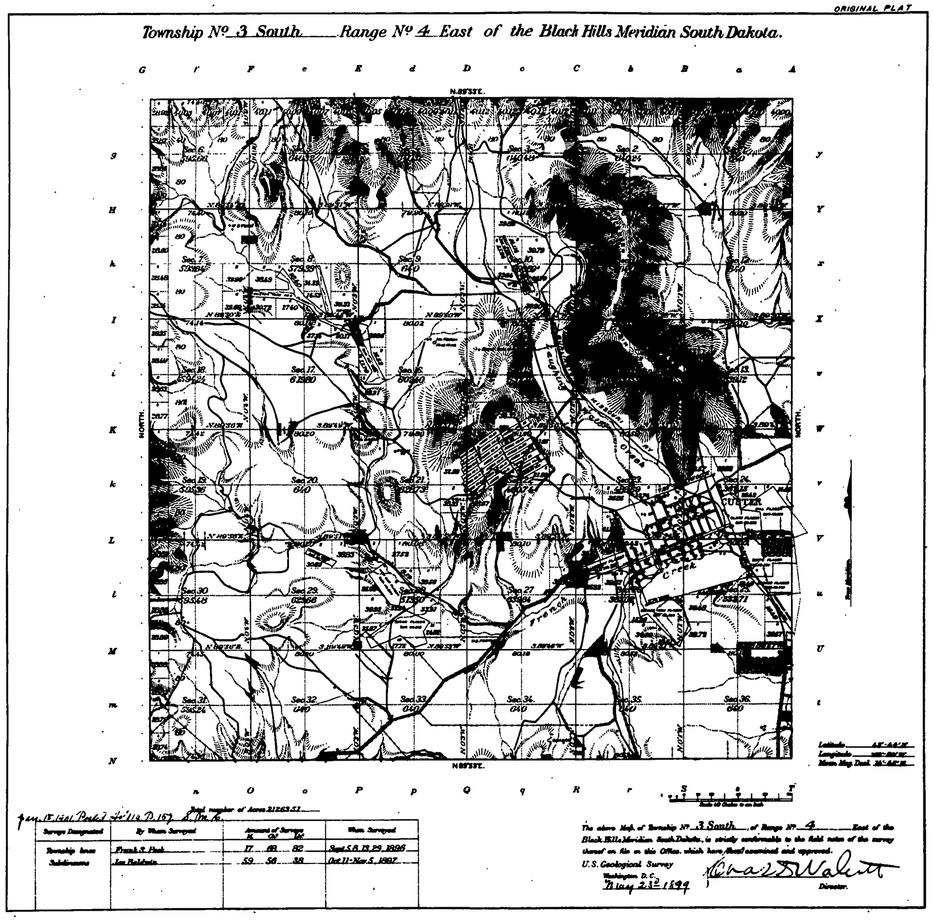


Figure 1a - Portion of Connected Sheet

H.E.S. AND MINERAL CLAIMS, S. DAKOTA



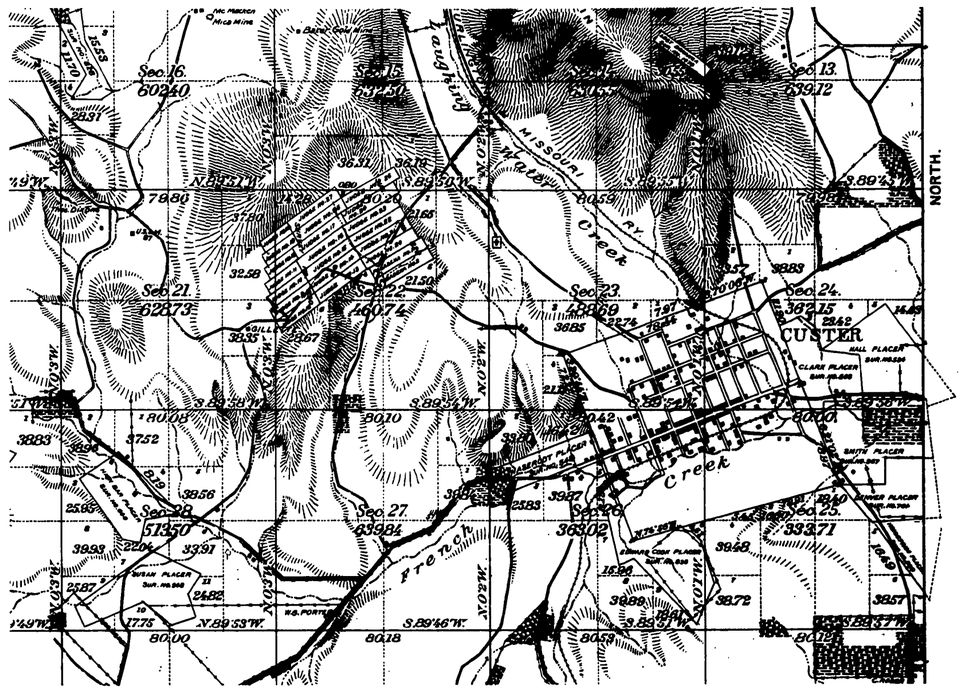


Figure 2 - Township Plat With Detail of Sections 23-27 on Right

Reasons for Request of this Survey

The public lands in this township are located in the Black Hills National Forest. The Forest Service was in the process of trying to effect several land exchanges. These exchanges are authorized under the Act of March 20, 1922 (42 Stat. 465). In the land exchange known as the "Rosse Exchange", the Forest Service was to exchange the patented N½SE¼SE¼ of section 22 for some vacant land in section 27, specifically: The triangular area in the SE¼NW¼ lying between the Japan Lode, M.S. 1954, and the Horseshoe Lode, M.S. 2158; that part of the SW¼NE¼ outside the patented M.S. 1954; and all of the SE¼ lying between the patented M.S. 1954 and patented H.E.S. number 412. These described lands required lot numbers and areas for patent purposes. A supplemental plat would not suffice because of uncertainties of the true position of the patented lands in relationship with section subdivisional lines. In general, the many metes and bounds surveys within the township created administrative problems. The Regional Forester requested a dependent resurvey of the township.

Special Instructions

Special Instructions were prepared on June 22, 1967, for Group 41, South Dakota. They provided for the dependent resurvey of T. 3 S., R. 4 E., including subdivision of sections and resurvey of the metes and bounds surveys to the extent necessary to define and properly plat the public lands within the township. The field work was begun on June 23, 1967. This discussion is limited to the work in sections 23 thru 27.

Conditions Found on the Ground

Figure 3 depicts the conditions found on the ground. All corners were recovered EXCEPT those indicated. The resurveys were not extended into T. 3 S., R. 3 E. The tracts in that township are shown only for informative purposes and to indicate relationships. For record plats see the supplemental topics at the end of this discussion.

All of the Homestead Entry Surveys are patented. H.E.S. 326 and 327 are partially in conflict with M.S. 644, Mallon Placer, but no mention is made of the conflicts and there are no mineral reservations made in the patents. H.E.S. 412 is largely in conflict with the Durst Placer, M.S. 890, but no mention is made of the conflict nor are any mineral reservations made in the patent.

The Custer townsite is patented.

Section 23 - Lots 7 and 12, the N½SE¼SW¼NW¼, and the NW¼SW¼ are patented.

Section 24 - There are no patents in this section except the Homestead Entry Surveys, Custer Townsite, and Mineral Surveys.

Section 25 - Lots 1 and 5, the W½SW¼ and SE¼ SW¼ are patented.

Section 26 - Lot 3 includes all of the SW¼NW¼ outside the Haserodt Placer. Lot 7 includes all of the NW¼SE¼ outside the Edward Cook Placer. Lots 3, 4, 5 and 7 and the N½SW¼ were patented to Tubbs. The S½SW¼ has also been patented.

Section 27 - The N½NE¼, Lot 1, NE¼NW¼, S½SW¼, M. S. 1954, M.S. 2158 and H.E.S. No. 412 have been patented.

Section 35 - The E½NW¼ and NW¼NW¼ have been patented without mention of the Tubbs Placer, M.S. 651.

All of the Mineral Surveys have been patented with the following exceptions:

M.S. 644, Mallon Placer: Mineral application (for patent) was made on this claim by John Mallon on December 11, 1890. The application was officially rejected on February 21, 1906. M.S. 644, Mallon Placer has never been declared null and void, nor has the mineral survey ever been cancelled.

M.S. 651, Tubbs Placer: On December 5, 1890, Newton S. Tubbs filed a mineral entry on M.S. 651. Before any action was taken on this entry and after the township was surveyed, Tubbs filed a homestead entry on lots 3, 4, 5 and 7 and the N½SW¼ section 26. Since this homestead entry was partially in conflict with the Durst Placer, M.S. 890, John P. Durst protested the Tubbs entry. In the ensuing Land Office hearing Tubbs stated that he had abandoned his mineral application. The Durst protest was dismissed because the Durst Placer was also being farmed instead of mined. The Tubbs Placer mineral entry was cancelled on August 3, 1904. Tubbs was later granted a patent to the lands applied for under the homestead entry. The mineral survey of the Tubbs Placer has never been cancelled.

M.S. 890, Durst Placer: No action has ever been taken on this claim. After the Tubbs Placer dispute, John P. Durst filed on the larger portion of the lands covered by the Durst Placer, under a homestead entry. This entry was surveyed as H.E.S. No. 412 and Durst was granted patent to H.E.S. No. 412. No action has been taken against M.S. 890, Durst Placer and is still an official mineral survey of record.

H.E.S. AND MINERAL CLAIMS, S. DAKOTA

M.S. 2152, Wayside Lode: This claim was patented excluding the area designated as Tract A and the portion in conflict with H.E.S. 525.

Preliminary Statement of the Problem

The surveyor must restore the lost corners indicated on figure 3 and subdivide the sections to the extent necessary to properly lot and return areas on the vacant public land under Forest Service administration. The surveys are to be executed to the closures required for "Class D" terrain.

Regulations

The following sections of the Manual of Surveying Instructions, 1973, are directly applicable to the problem:

3-79 to 3-89	Subdivision of sections
3-124	Limits of closure
5-4 to 5-18	Identification of existent corners
5-20 to 5-38, 5-41 and 5-42	Restoration of lost corners
5-43 and 5-44	Restoration of broken boundaries
6-11 to 6-32	Dependent resurveys
7-8 to 7-12	Subdivision of sections

Legal Constraints

The lands within surveyed but unpatented mineral surveys must be treated in accordance with Interior Decision A-30762, Harry Yukon, dated August 23, 1967.

Auxiliary Topic - Cancellation of Surveys

Portions of the parcels of land to be patented in the "Rosse Exchange" were in conflict with M.S. 890, Durst Placer. The Durst Placer is an officially approved survey of record. Admittedly H.E.S. No. 412, patented to John P. Durst under an agricultural entry, is largely in conflict with the Durst Placer. Since agricultural entries could not be made on KNOWN mineral lands the agricultural patent might be construed as an adjudication of any mineral rights on the Durst Placer. In fact, there had been no adjudication as to the validity of the lands embraced by the mineral survey, as currently provided for in 43 CFR 4.451. Until the Durst Placer, M.S. 890 has been officially declared null and void, the mineral survey cannot be cancelled. Until the mineral survey is officially cancelled the lands embraced by the claim are in a state of withdrawal from other entry, the land cannot be lotted, and the M.S. 890 would have to be shown on the dependent resurvey plat. See Interior Decision A-30762, Harry Yukon, dated August 23, 1967, and cases cited therein.

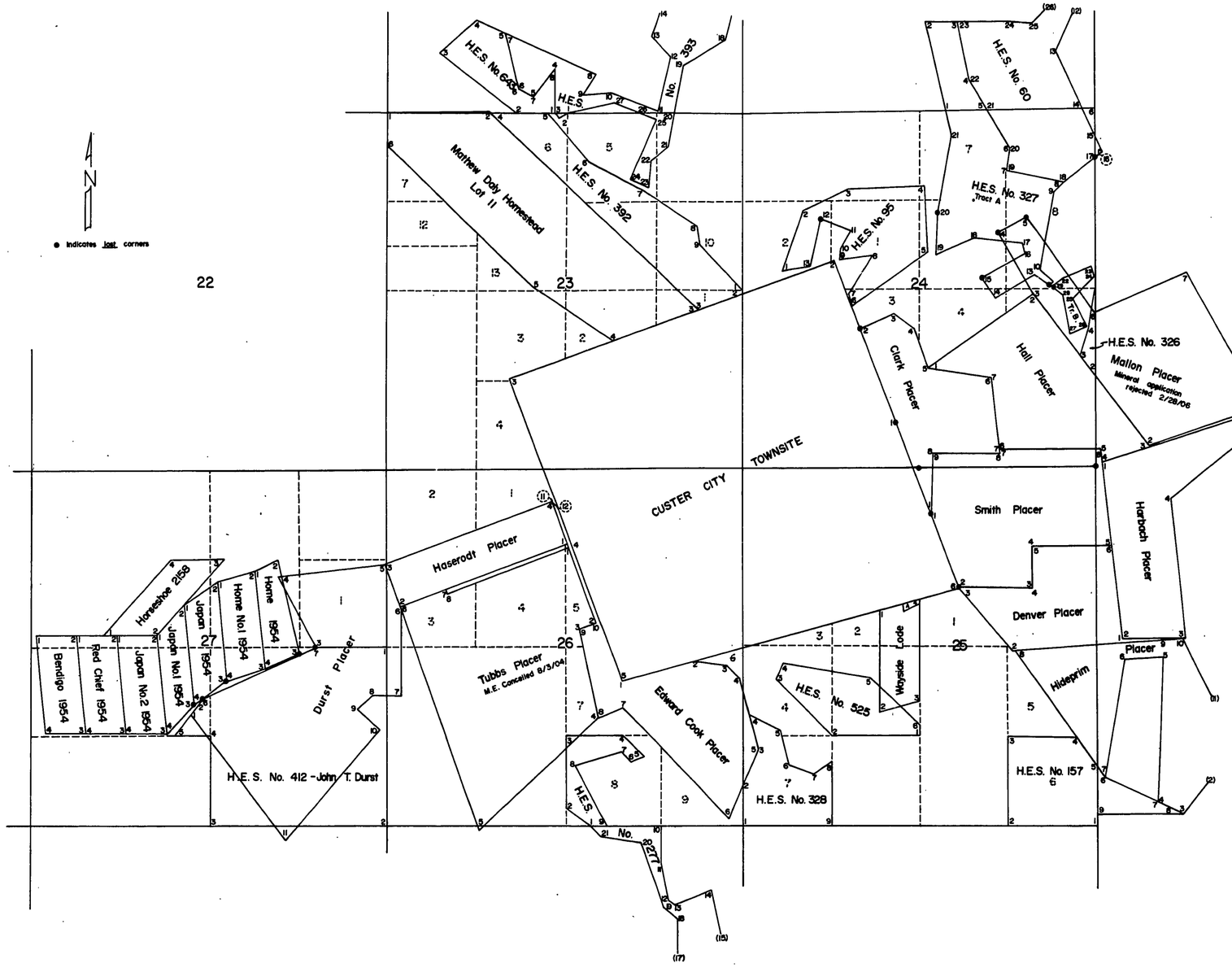


Figure 3 - Conditions Found on the Ground

Because the Forest Service has the administrative responsibility over mining claims in National Forests, they were requested to proceed against the Durst Placer, M.S. 890, the Tubbs Placer, M.S. 651, and the Mallon Placer, M.S. 644.

The Durst Placer was officially declared null and void on July 7, 1971. Mineral Survey No. 890 was officially cancelled on September 22, 1971.

The fragmentary parcels applied for in the Rosse Exchange were free to be lotted and given an area for patent purposes. No action was taken against the Tubbs Placer or Mallon Placer. Since the Mallon and Tubbs Placers were not cancelled they had to be shown on the plat. In a memorandum dated April 21, 1971, the Washington Office advised:

'In those cases where there is a cancellation or rejection of the mineral entry in the record, cancellation of the mineral survey can proceed. The rejection of an application for patent is not in itself a cancellation of the entry. In those cases where the rights of the original claimant may still be in effect, an adjudication action declaring the claims null and void must precede any cancellation of the mineral survey."

Since all of the lands embraced by the Tubbs Placer have already been patented, the status of that claim is debatable.

The rejection of the mineral application on the Mallon Placer does not constitute a cancellation of a mineral entry. The rights of the Mallon Placer must be adjudicated before the lands within the claim, but not in conflict with patented homestead entries, can be lotted and given areas.

H.E.S. AND MINERAL CLAIMS, S. DAKOTA

Final Statement of the Problem

The surveyor must restore the lost corners of the townsite, mineral surveys and homestead entry surveys, since they control the position of federal public lands. He must also subdivide the sections to the extent necessary to provide adequate data for computing areas of fractional lots.

Solution

The corner of sections 19, 24, 25 and 30 was restored at single proportionate position on the range line. The ¼ section corner of sections 24 and 25 was then restored by single proportionate measurement.

Corner Number 1, Custer Townsite, was restored by single proportionate measurement at midpoint between the recovered Corner Number 2 and Number 6. Corner Number 2, Clark Placer, was restored by single proportionate measurement between Corner Number 1, Custer Townsite, and recovered Corner Number 6, H.E.S. 95, which was on line 1-2 of the townsite. The proportionment was based on ties made by H.E.S. 95. Corner Number 1 and Number 2, Smith Placer, were restored by single proportionate measurement on line 1-6 of the Custer Townsite, based on the Clark Placer, Smith Placer and Denver Placer records. Corner Number 1, Custer Townsite and Corner Numbers 1 and 2, Smith Placer, were not permanently monumented.

Corner Numbers 12, 15 and 20, H.E.S. 327, were restored by the grant boundary method as stated in section 5-44 of the Manual of Surveying Instructions, 1973. Corner Number 29, H.E.S. 327, was restored at record bearing and distance from recovered Corner Numbers 22 and 28.

Corner Number 17, H.E.S. 60, was restored at the intersection of the range line and a direct line between recovered Corner Numbers 16 and 18.

Corner Numbers 4 and 5 of M.S. 644, Mallon Placer, were restored by the broken boundary method (compass rule) as given in section 5-43 of the Manual of Surveying Instructions, 1973, between recovered Corner Numbers 3 and 6, Mallon Placer.

Corner Number 6, H.E.S. 412, was restored by single proportionate measurement on line 3-4, Japan Lode, based on the mineral survey record. Corner Number 7, H.E.S. 412, was restored by single proportionate measurement on the east-west centerline of section 27, based on the H.E.S. record.

Corner Number 12, H.E.S. 95, was restored by the grant boundary method.

The three lost corners of M.S. 1954 were restored by the grant boundary method.

The necessary section subdivision lines were surveyed as shown on the accepted plats. "Crossing closing corners" (section 5-41 of the Manual of Surveying Instructions, 1973) were not monumented, but the intersection points where the line entered or left public lands were "called" in the field notes. Existing corners with adequate stone monuments were not remonumented but new bearing tree accessories were added where necessary.

All areas of public lands not encumbered by a mineral survey of record were lotted and given an area on the plat.

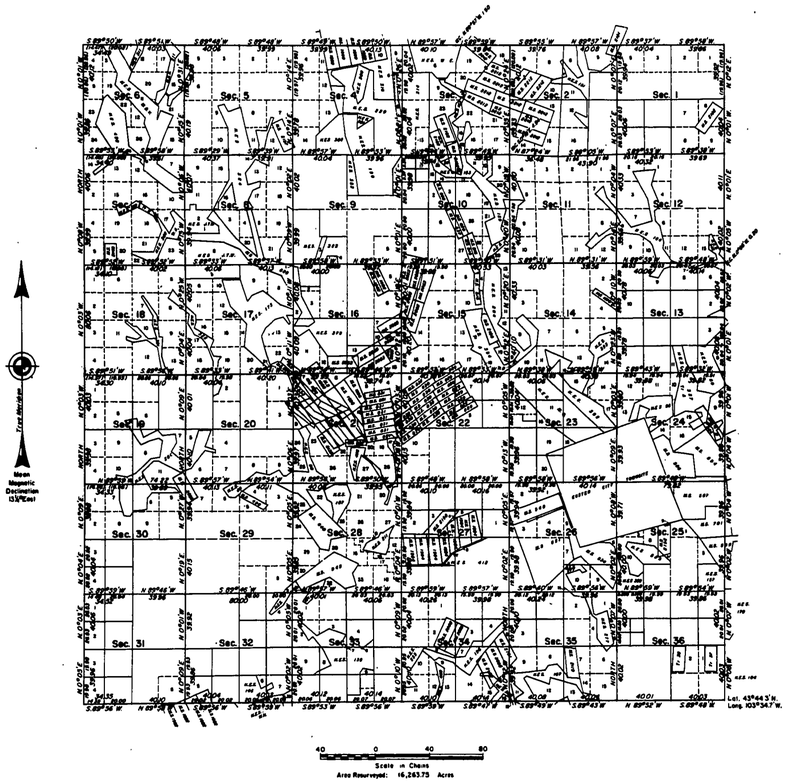
The field notes of this entire township total 702 pages. The plats are in 24 sheets. Sheets 1, 14, 15, 16 and 17, accepted January 12, 1972, are illustrated in Figures 4a through 4e.

The approved mineral survey and homestead entry survey plats are shown in historical order in the appendix figures.

TOWNSHIP 3 SOUTH, RANGE 4 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA.

DEPENDENT RESURVEY AND SUBDIVISION
AND SURVEY OF TRACT 39

Sheet 1 of 24



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

This plat in 24 sheets represents a dependent resurvey of the east, south, west and north boundaries, subdivisional lines, certain boundaries of mineral surveys, homestead entry surveys and the Custer City Townsite; designed to restore the corners in their true original locations according to the best available evidence, and the survey of the subdivision of certain sections and tract 39, in T. 3 S., R. 4 E., Black Hills Meridian, South Dakota.

Modified lottings are based upon the resurvey of the Mineral Surveys, Homestead Entry Surveys, the survey of tract 39 and the record of the Mineral Surveys. Except as new or modified vacant subdivisions are shown hereon, the lottings and areas are as shown on the plats approved May 23, 1899, May 22, 1907, Mar. 13, 1908, Aug. 25,1908, Oct. 26, 1908, May 11, 1909, Nov. 2, 1909, Sept. 25,1914, June 26, 1920, Aug. 15, 1923, Jan. 20, 1926, April 27, 1929, Jan. 30, 1931 and the plat accepted April 28, 1955.

These surveys were executed by Cadastral Surveyors beginning June 28, 1967 and completed August 25, 1971, pursuant to Special Instructions for Group No. 41, South Dakota, dated June 22, 1967.

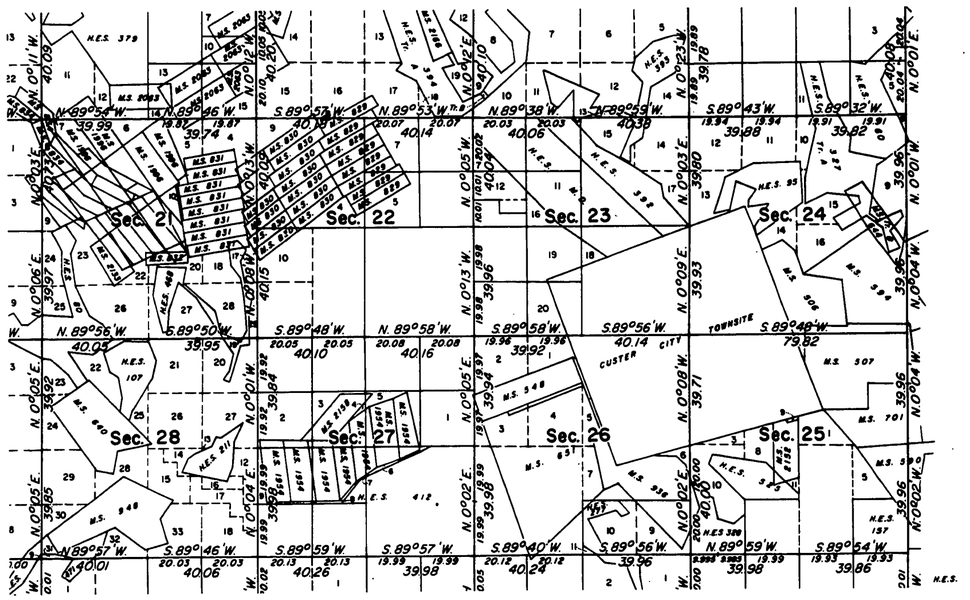
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. January 12, 1972

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 4a - Sheet 1 of the Accepted Plat

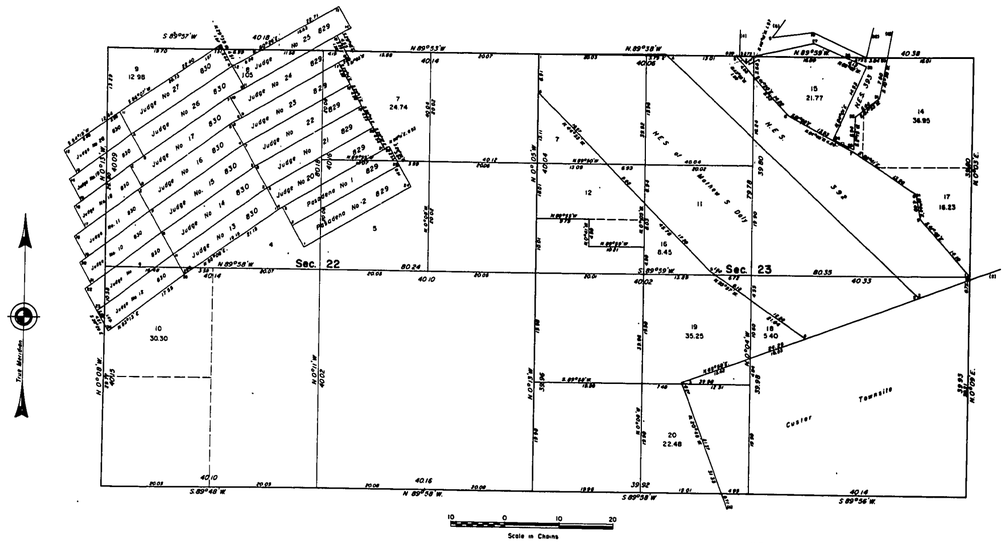


H.E.S. AND MINERAL CLAIMS, S. DAKOTA

TOWNSHIP 3 SOUTH, RANGE 4 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA.
DEPENDENT RESURVEY AND SUBDIVISION

Sheet 14 of 24

Reference should be made to Sheet No. 1 for survey information.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. January 12, 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

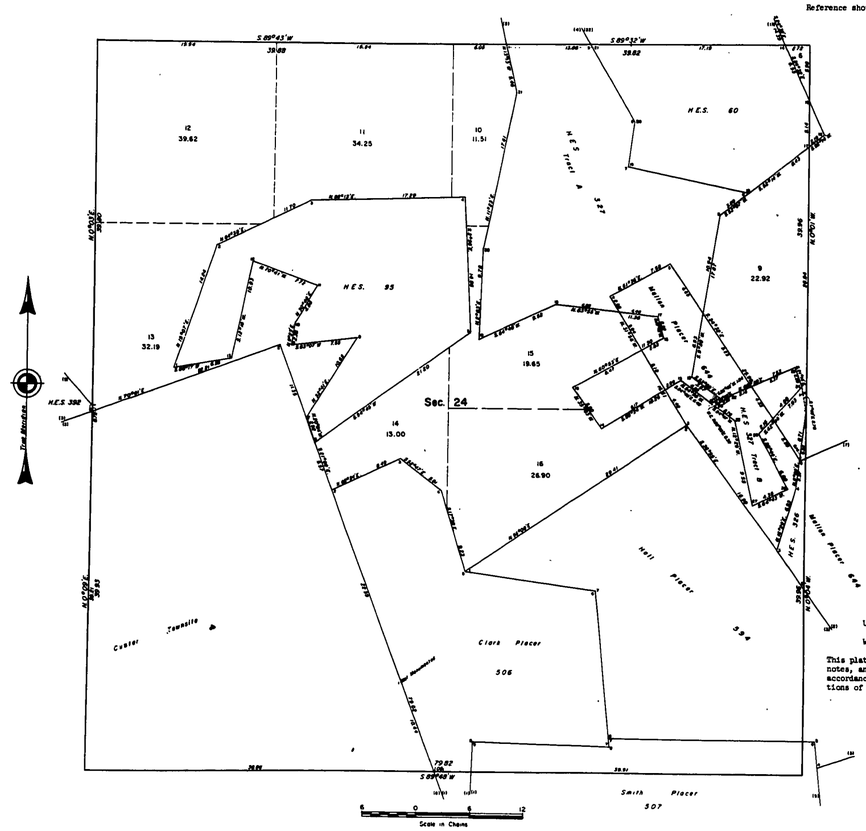
Chief, Division of Cadastral Survey

Figure 4b - Portion of Accepted Plat

TOWNSHIP 3 SOUTH, RANGE 4 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA.
DEPENDENT RESURVEY AND SUBDIVISION

Sheet 15 of 24

Reference should be made to Sheet No. 1 for survey information.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. January 12, 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

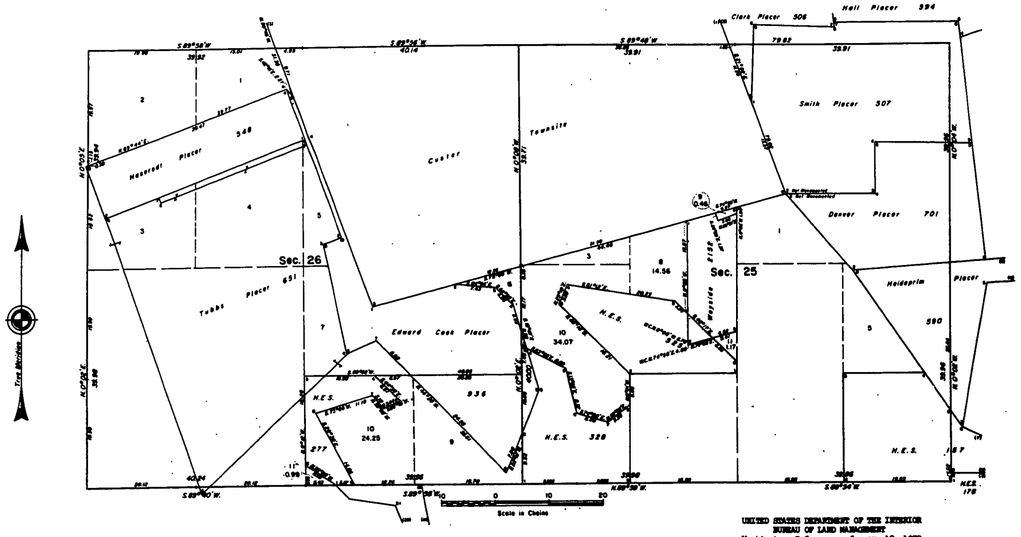
Figure 4c - Portion of Accepted Plat

H.E.S. AND MINERAL CLAIMS, S. DAKOTA

TOWNSHIP 3 SOUTH, RANGE 4 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA.
DEPENDENT RESURVEY AND SUBDIVISION

Sheet 16 of 24

Reference should be made to Sheet No. 1 for survey information.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. January 12, 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

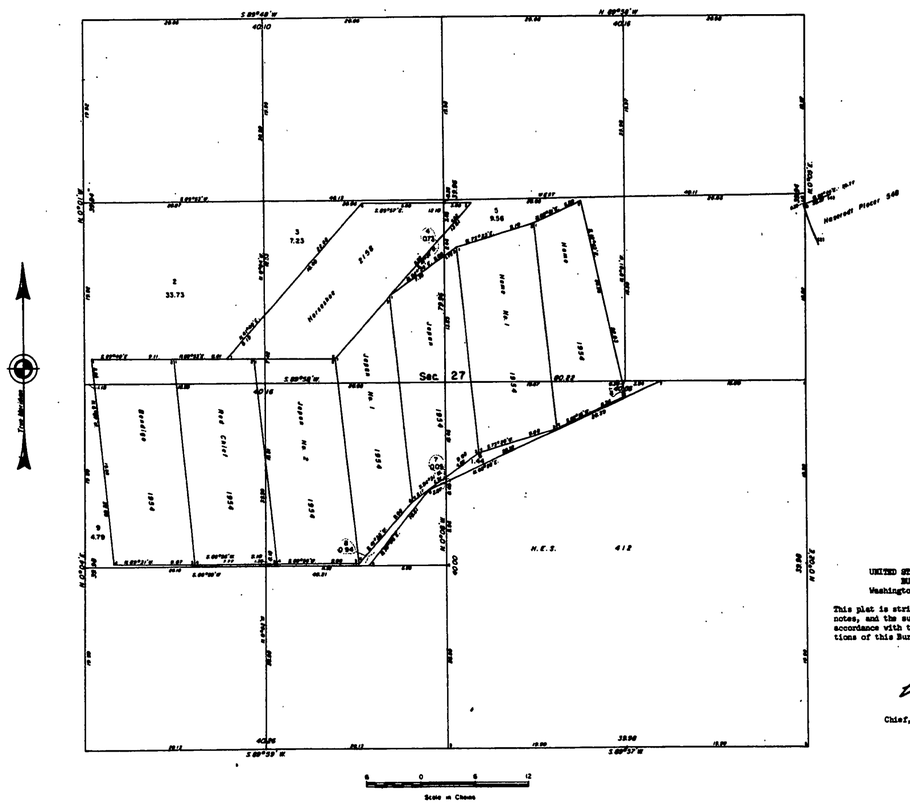
Chief, Division of Cadastral Survey

Figure 4d - Portion of Accepted Plat

TOWNSHIP 3 SOUTH, RANGE 4 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA.
DEPENDENT RESURVEY AND SUBDIVISION

Sheet 17 of 24

Reference should be made to Sheet No. 1 for survey information.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. January 12, 1972

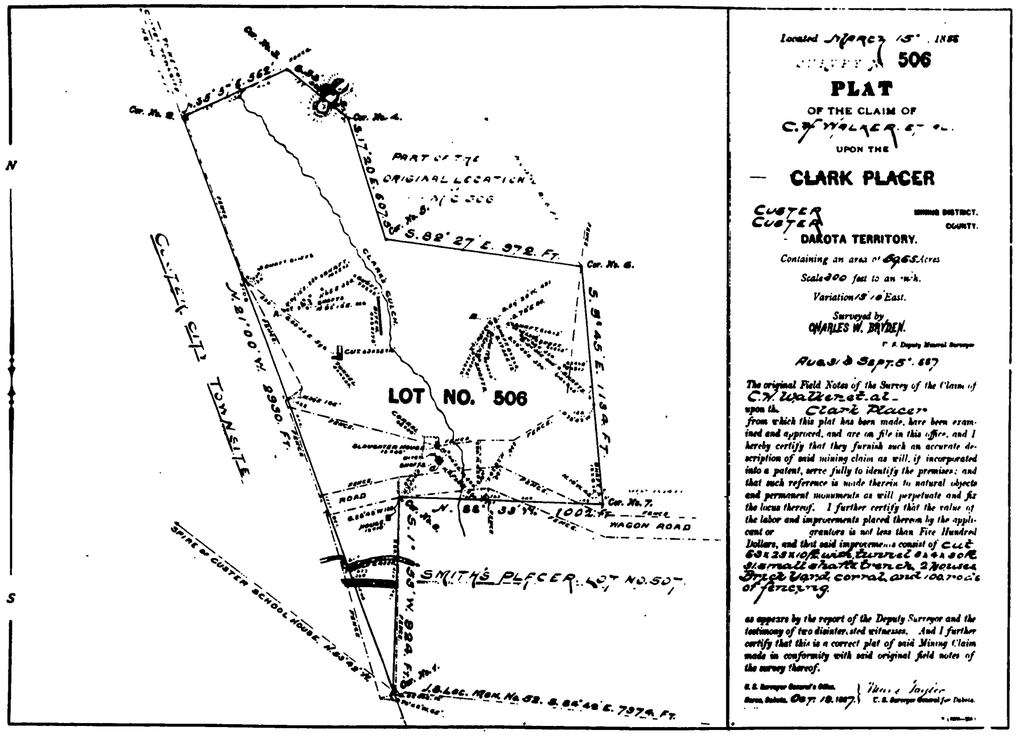
This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Chief, Division of Cadastral Survey

Figure 4e - Portion of Accepted Plat

H.E.S. AND MINERAL CLAIMS, S. DAKOTA



Located March 15th, 1885

SURVEY No. 506

PLAT

OF THE CLAIM OF

C.H. Walker & Co.

UPON THE

CLARK PLACER

Custer MINING DISTRICT.
Custer COUNTY.
DAKOTA TERRITORY.

Containing an area of 6.65 Acres

Scale 400 feet to an inch.

Variation 19° East.

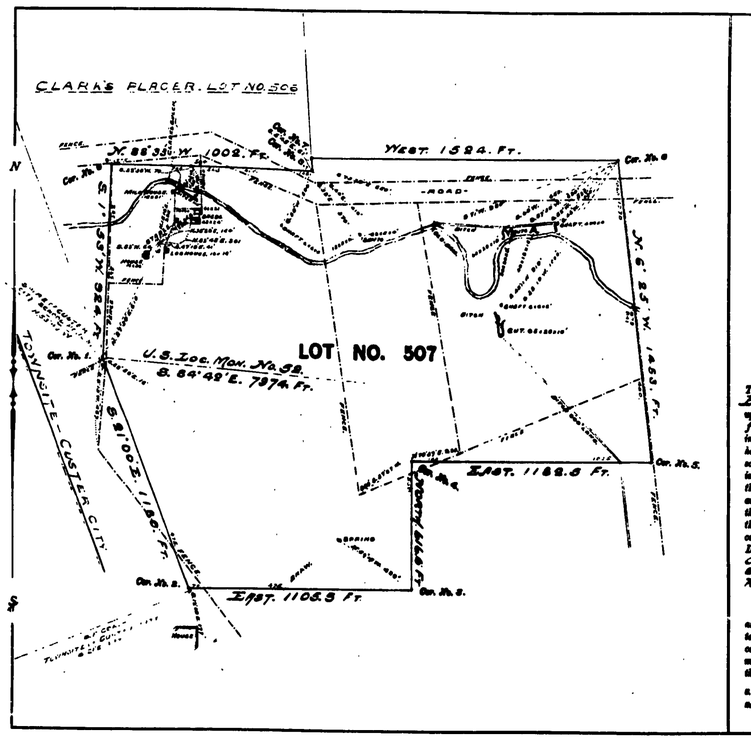
Surveyed by
CHARLES W. BRYDEN.
U. S. Deputy Mineral Surveyor

Aug. 3 & Sept. 6th, 1887

The original Field Notes of the Survey of the Claim of C.H. Walker et al. upon the Clark Placer from which this plat has been made, have been examined and approved, and are on file in this office, and I hereby certify that they furnish such an accurate description of said mining claim as will, if incorporated into a patent, serve fully to identify the premises; and that such reference is made therein to natural objects and permanent monuments as will perpetuate and fix the locus thereof. I further certify that the value of the labor and improvements placed thereon by the applicant or grantors is not less than Five Hundred Dollars, and that said improvements consist of cut 6 & 12 in. off each, Burnt 6 & 4 ft. 6 in. small shaft branch, 2 Houses Brush yard, corral, and 100 rods of fencing.

as appears by the report of the Deputy Surveyor and the testimony of two disinterested witnesses. And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof.

U. S. Surveyor General's Office, Huron, Dakota, Oct 7th 1887.
Thos. J. Snyder
U. S. Surveyor General for Dakota.



Located Nov. 1st, 1888.

SURVEY No. 507

PLAT

OF THE CLAIM OF

Ernest F. Smith

UPON THE

SMITH PLACER

Custer MINING DISTRICT.
Custer COUNTY.
DAKOTA TERRITORY.

Containing an area of 9.82 Acres.

Scale 300 feet to an inch.

Variation 16° 10' East.

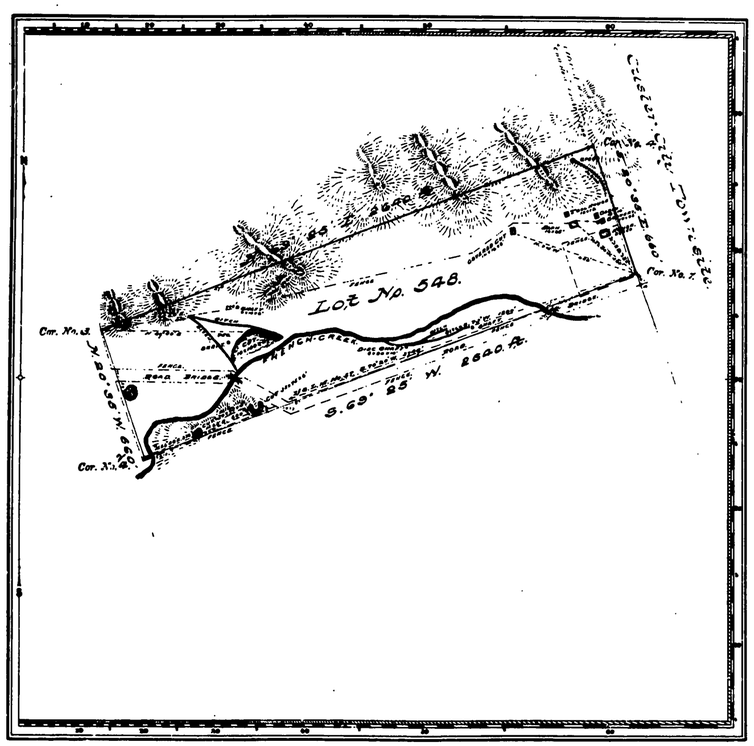
Surveyed by
CHARLES W. BRYDEN.
U. S. Deputy Mineral Surveyor.

Aug 31st-Sept 6th, 1887.

The original Field Notes of the Survey of the Claim of Ernest F. Smith upon the Smith Placer from which this plat has been made, have been examined and approved, and are on file in this office, and I hereby certify that they furnish such an accurate description of said mining claim as will, if incorporated into a patent, serve fully to identify the premises; and that such reference is made therein to natural objects and permanent monuments as will perpetuate and fix the locus thereof. I further certify that the value of the labor and improvements placed thereon by the applicant or grantors is not less than Five Hundred Dollars, and that said improvements consist of 1 Log Cabin 8 Rods fencing, 100 rods Plank, Frame House, Frame House

as appears by the report of the Deputy Surveyor and the testimony of two disinterested witnesses. And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof.

U. S. Surveyor General's Office, Huron, Dakota, Oct 26 1887.
Thos. J. Snyder
U. S. Surveyor General for Dakota.



Claim Located (Preempted) Feb. 8th, 1888
Mineral Survey No.

LOT No. 548.
Land District

PLAT

OF THE CLAIM OF

Joseph E. Pitcher.

KNOWN AS THE

HASEROOT PLACER

In Custer MINING DISTRICT.
Custer COUNTY.
Containing an area of 30.09 Acres.
Scale of 300 Feet to the inch.
Variation 16° 30' E.
April 6th 1888.
John W. McIntyre
U.S. Deputy Mineral Surveyor.

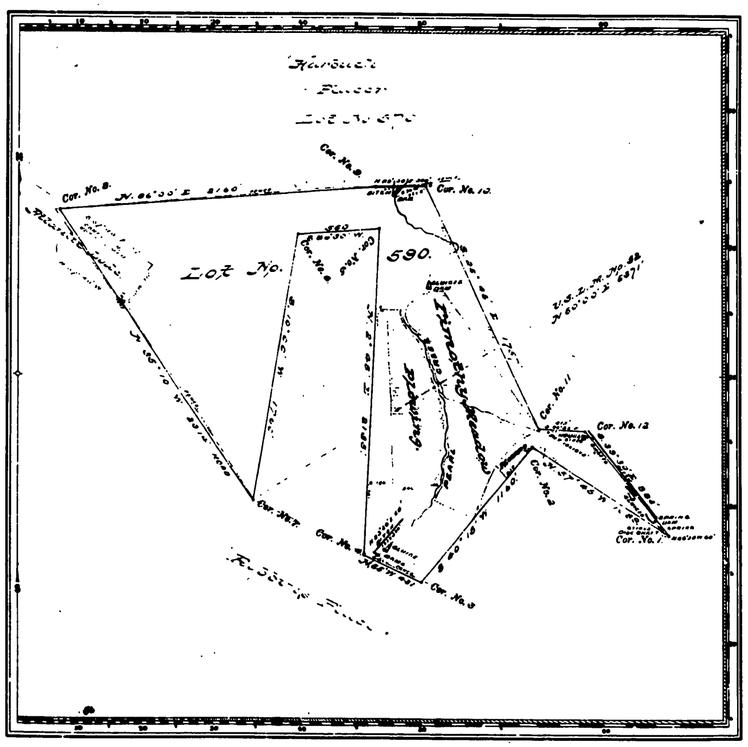
The Original Field Notes of the Survey of the Mining Claim of Joseph E. Pitcher known as the Haseroot Placer from which this plat has been made under my direction have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or his grantors, and that said improvements consist of 2 cuts, 35 ft. in, House, Barn, Grainery, Root House, Fences and others

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditure upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor-General's Office, Yank. Dakota, April 8th 1888.
U.S. Surveyor General for Dakota.



Claim Located, Amended Oct 2nd 1888
Mineral Survey No.

LOT No. 590.
Rapid City D.T. Land District.

PLAT

OF THE CLAIM OF

Fred Heilsperne

KNOWN AS THE

Heidspun Placer

In Custer MINING DISTRICT.
Custer COUNTY.
Containing an area of 85.88 Acres.
Scale of 400 Feet to the inch.
Variation 15° 30' E.
Nov. 8th 1888.
John W. McIntyre
U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of Fred Heilsperne known as the Heidspun Placer from which this plat has been made under my direction have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

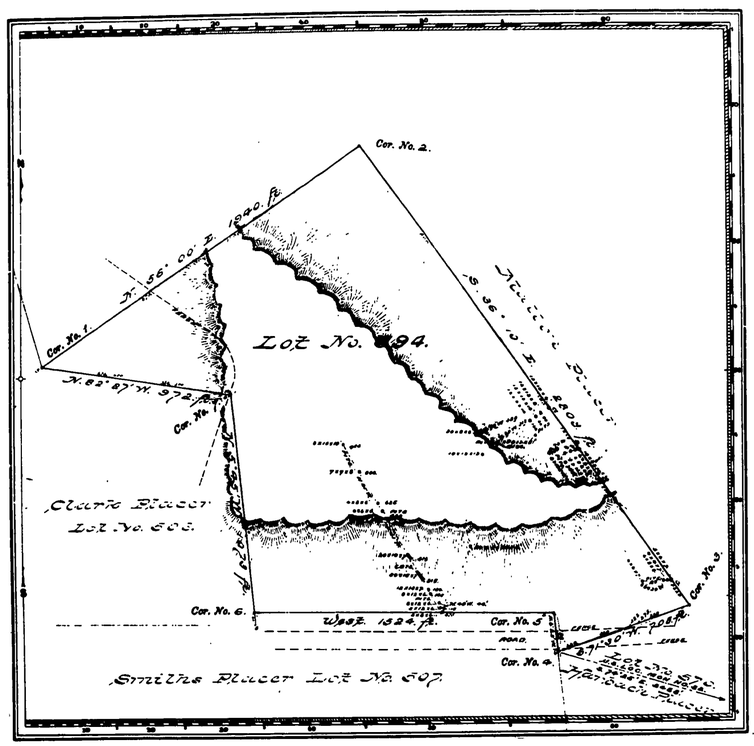
I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or his grantors and that said improvements consist of 4 dwellings, 2 Barns, 2 Stables, Fences, Ditches, Fencing, Houses, etc. Meadow to cut 100 tons

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditure upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

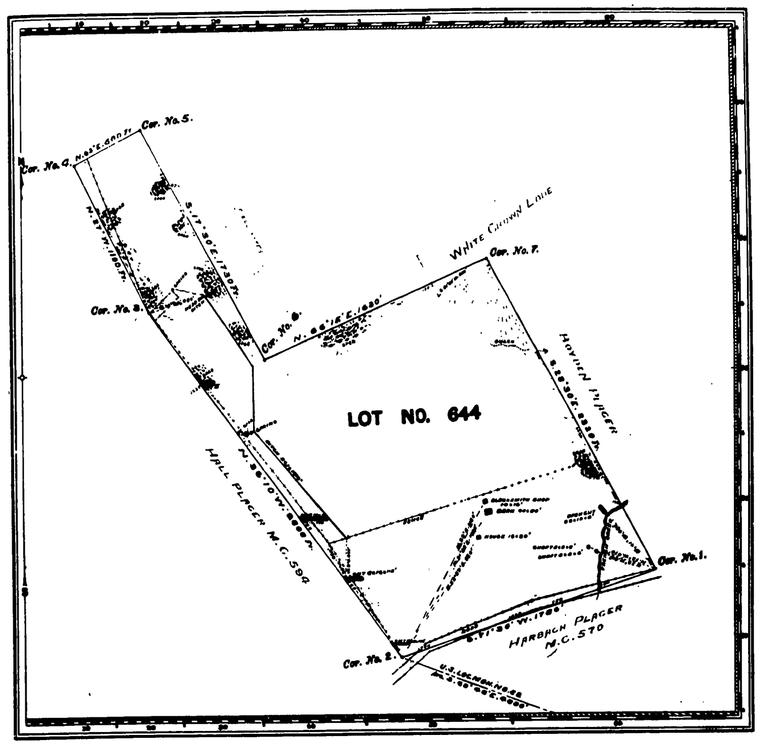
U.S. Surveyor-General's Office, Yank. Dakota, Nov 7th 1888.
U.S. Surveyor General for Dakota.

H.E.S. AND MINERAL CLAIMS, S. DAKOTA



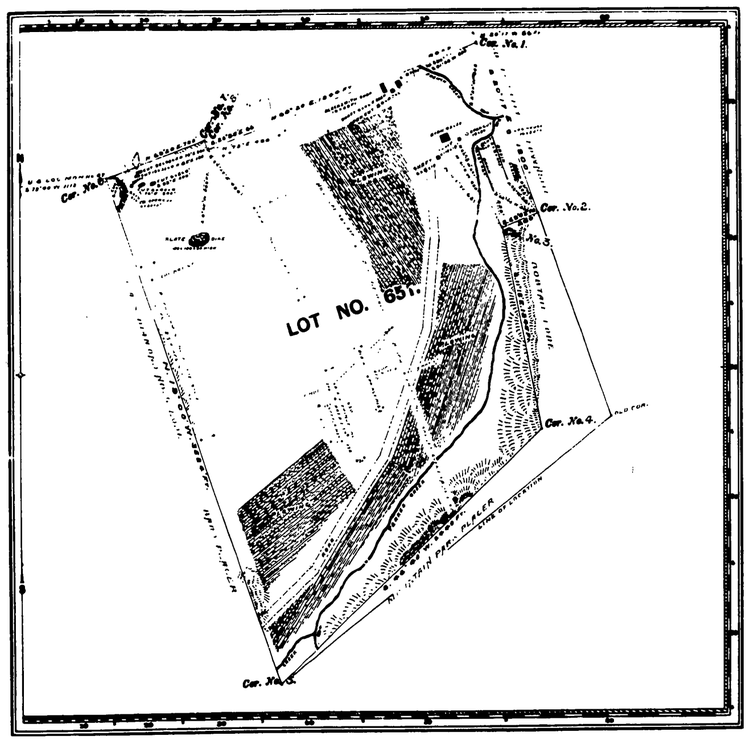
Claim Located [illegible]
Mineral Survey №
Lot №694
Rapid City Dist. Land District
PLAT
OF THE CLAIM OF
E Forest Fait
KNOWN AS THE
Fait Placer
IN Custer MINING DISTRICT.
Custer COUNTY Dakota
Containing an Area of [illegible] Acres.
Scale of [illegible] Feet to the inch.
Variation [illegible]E.
ATTESTED [illegible] 1890
[illegible]
U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of
E Forest Fait
known as the Fait Placer
from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
I further certify that Five Hundred Dollars worth of Labor has been expended or improvements made upon said Mining Claim by claimant [illegible] or his grantors, and that said improvements consist of [illegible]
that the location of said improvements is correctly shown upon this plat, and that no portion of said Labor or improvements has been included in the estimate of expenditures upon any other claim.
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.
U.S. Surveyor-General's Office, Helena, [illegible] 1890
Mans Sayler
U.S. Surveyor General for Dakota.



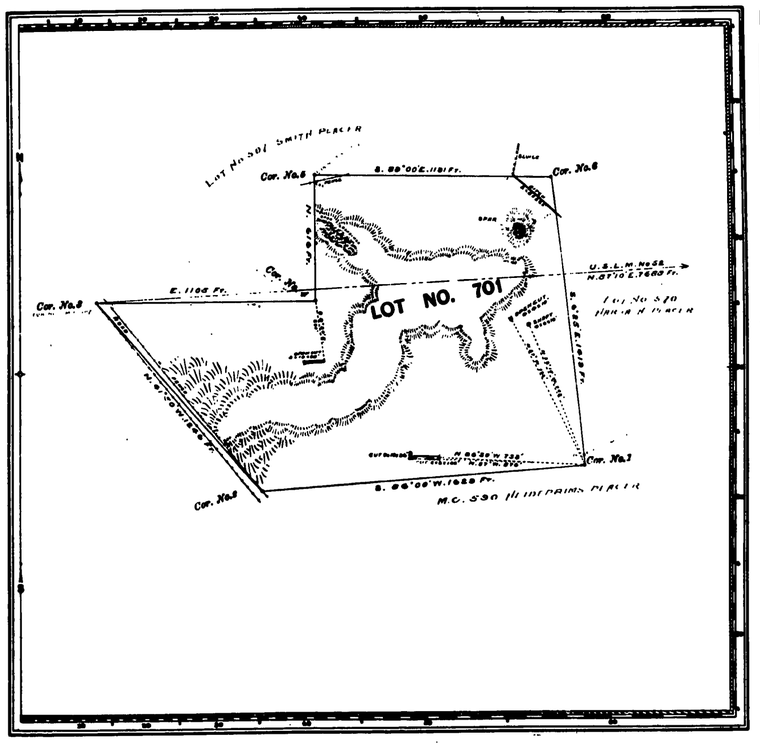
Claim Located [AMENDED] JANUARY 29 1890
Mineral Survey №644
Lot №644
RAPID CITY, Land District.
PLAT
OF THE CLAIM OF
JOHN MALLON
KNOWN AS THE
MALLON PLACER
IN CUSTER, MINING DISTRICT.
CUSTER, COUNTY, SOUTH DAKOTA.
Containing an Area of 117.91 Acres.
Scale of 200 Feet to the inch.
Variation 14°55' 16°35' E.
ATTESTED February 17-18-19-20 1890 BY
J. W. McINTYRE,
U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of
JOHN MALLON
known as the
MALLON PLACER
from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
I further certify that Five Hundred Dollars worth of Labor has been expended or improvements made upon said Mining Claim by claimant or his grantors, and that said improvements consist of Two shafts, four open cuts, one dwelling house, one barn, one blacksmith shop and 100 feet of ditching
that the location of said improvements is correctly shown upon this plat, and that no portion of said Labor or improvements has been included in the estimate of expenditures upon any other claim.
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.
U.S. Surveyor-General's Office, HURON, SOUTH DAKOTA, JUNE 18, 1890
Pitcher H. Sullivan
U.S. Surveyor General for SOUTH DAKOTA.



Claim Located JULY 20 1890
Mineral Survey № 651.
Lot №651
RAPID CITY Land District
PLAT
OF THE CLAIM OF
NEWTON G TUBBS
KNOWN AS THE
TUBBS PLACER
IN CUSTER, MINING DISTRICT.
CUSTER, COUNTY, SOUTH DAKOTA.
Containing an Area of 159.99 Acres.
Scale of 200 Feet to the inch.
Variation 15°-17'-16"E.
ATTESTED APRIL 28 1890 BY
J. W. McINTYRE,
U.S. Deputy Mineral Surveyor.

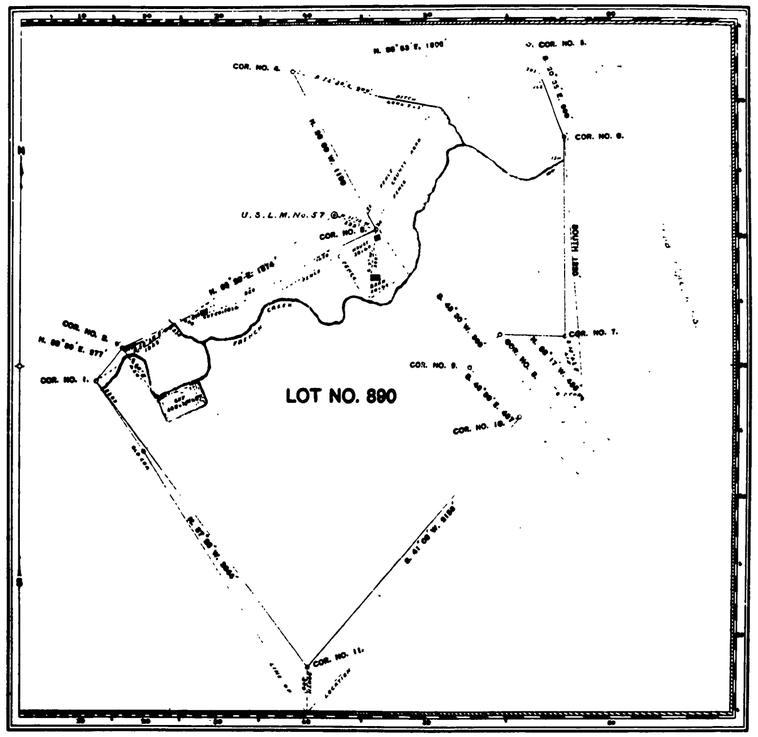
The Original Field Notes of the Survey of the Mining Claim of
NEWTON G. TUBBS
known as the
TUBBS PLACER
from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
I further certify that Five Hundred Dollars worth of Labor has been expended or improvements made upon said Mining Claim by claimant or his grantors, and that said improvements consist of 10 open cuts, four drawsheafs, 3 stream diversions, post shoot, and blacksmith shop.
that the location of said improvements is correctly shown upon this plat, and that no portion of said Labor or improvements has been included in the estimate of expenditures upon any other claim.
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.
U.S. Surveyor-General's Office, HURON, SOUTH DAKOTA, SEP. 1, 1890
Pitcher H. Sullivan
U.S. Surveyor General for South Dakota



Claim Located JANUARY 2 1890
Mineral Survey № 701
Lot №701
RAPID CITY, Land District.
PLAT
OF THE CLAIM OF
Charles Harbach & Oi
KNOWN AS THE
DENVER PLACER
IN CUSTER, MINING DISTRICT.
CUSTER, COUNTY, SOUTH DAKOTA.
Containing an Area of 60.36 Acres.
Scale of 300 Feet to the inch.
Variation 15°30' 16°30' E.
ATTESTED JULY 10 1890 BY
Jopn W. McINTYRE,
U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of
Charles Harbach & Oi.
known as the
DENVER PLACER
from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
I further certify that Five Hundred Dollars worth of Labor has been expended or improvements made upon said Mining Claim by claimant [illegible] or his grantors, and that said improvements consist of 1 open cut, one shaft, and one ditch.
that the location of said improvements is correctly shown upon this plat, and that no portion of said Labor or improvements has been included in the estimate of expenditures upon any other claim.
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.
U.S. Surveyor-General's Office, HURON, SOUTH DAKOTA, SEPTEMBER 1, 1890
Pitcher H. Sullivan
U.S. Surveyor General for SOUTH DAKOTA

H.E.S. AND MINERAL CLAIMS, S. DAKOTA



Mineral Survey № 890

Lot № 890

Land district

PLAT

OF THE CLAIM OF

NAOMI DURST

KNOWN AS THE

DURST PLACER

In CUSTER UNORGANIZED MINING DISTRICT,
CUSTER COUNTY, SOUTH DAKOTA

Containing an area of 15.6 Acres.

Scale of 400 Feet to the inch. Variation 16°30 TO 18°55 E.

SURVEYED MARCH 11-18 1895

JOHN W. MC. INTYRE U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of NAOMI DURST known as the DURST PLACER

from which this plat has been made under my direction, have been examined and approved, and are on file in this office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the location thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or HER grantors, and that said improvements consist of

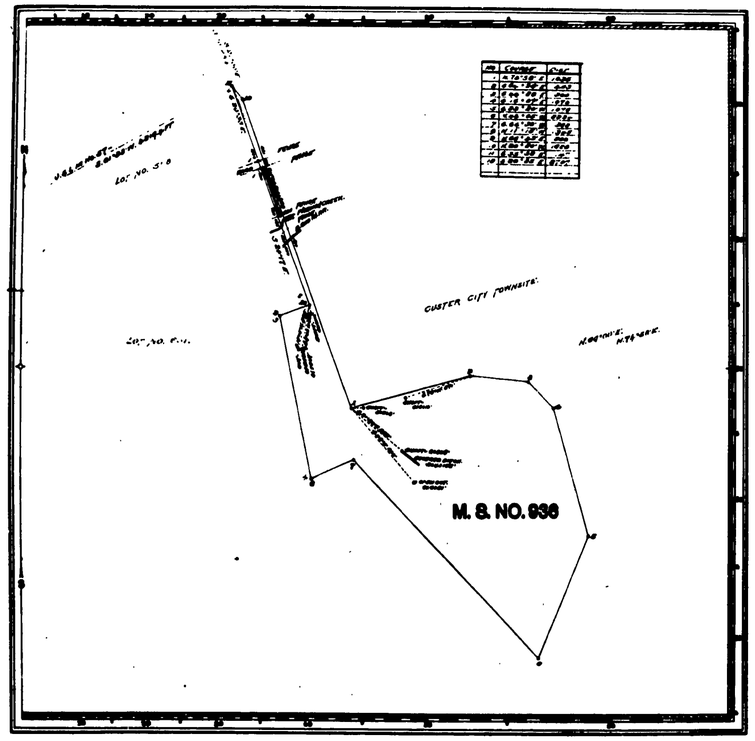
TWO OPEN CUTS AND TWO DITCHES

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office, Huron, South Dakota, June 13, 1895.

U.S. Surveyor General for South Dakota



Mineral Survey № 936

Lot №

Rapid City Land district

PLAT

OF THE CLAIM OF

Edward Roome

KNOWN AS THE

EDWARD COOK PLACER

In Unorganized MINING DISTRICT,
Custer COUNTY, South Dakota

Containing an area of 7.6 6.0 Acres.

Scale of 200 Feet to the inch.

Variation 18°00' TO 19°00' E

SURVEYED December 6-7th 1896 M

Jesse W. McINTYRE U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of Edward Roome known as the Edward Cook Placer

from which this plat has been made under my direction, have been examined and approved, and are on file in this office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the location thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or the grantors, and that said improvements consist of

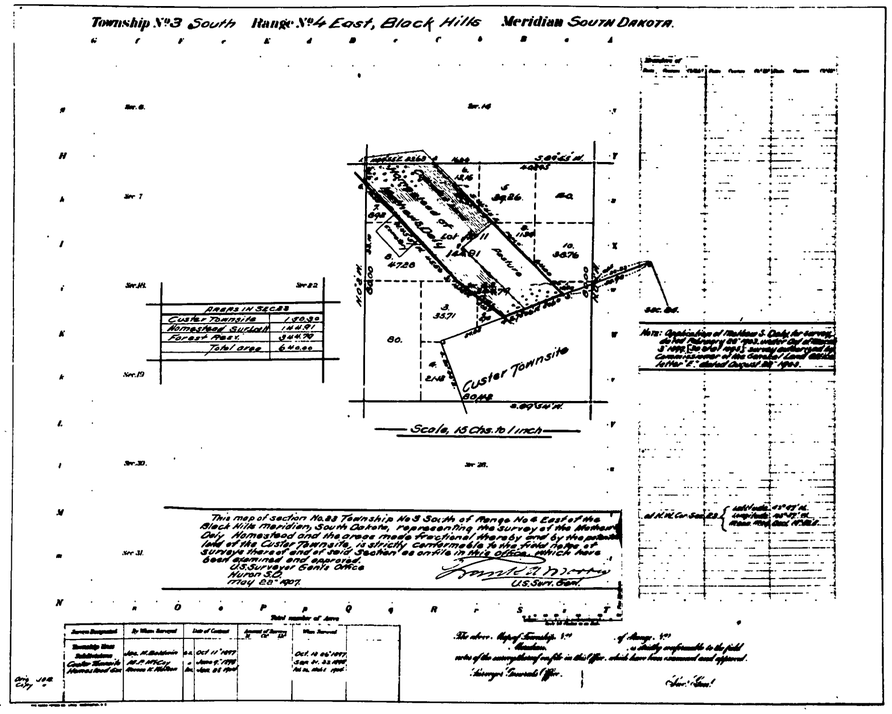
6 cuts, 6 cuts, 400 ft. or total and 100 ft. of Covered cut.

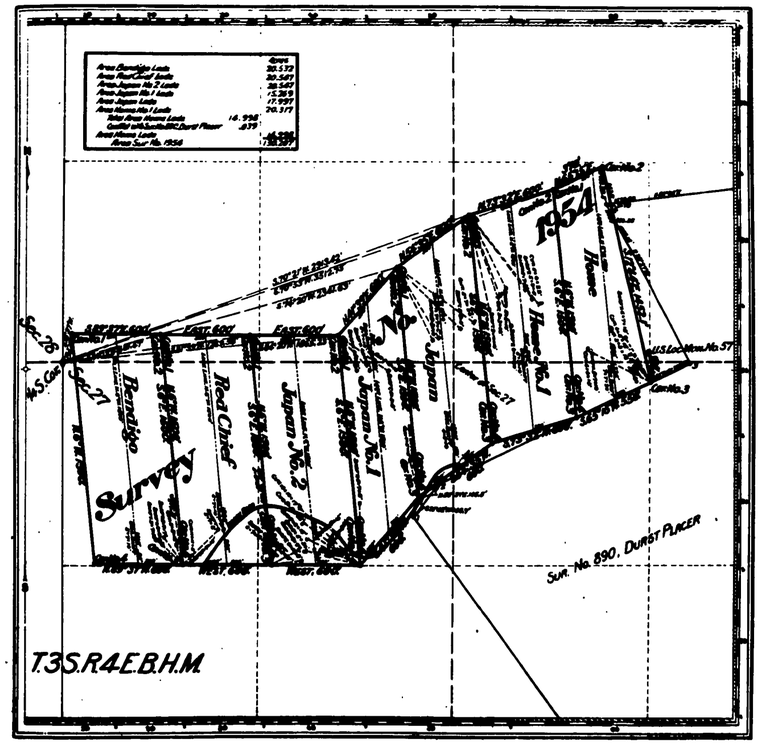
that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office, Huron, South Dakota. U.S. Surveyor General for South Dakota.

January 28, 1898





Mineral Survey № 1954

Lot №

Rapid City Land district

PLAT

OF THE CLAIM OF

James H. Colgan and Denis Corrigan

KNOWN AS THE

Bendigo et al Lodes

In Unorganized MINING DISTRICT,
Custer COUNTY, South Dakota

Containing an area of 130.207 Acres.

Scale of 400 Feet to the inch.

Variation 18°00' E

SURVEYED March 21-25, 1907 M

Charles M. Collins U.S. Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claims of Bendigo, Red Chief, Japan No. 2 and No. 1, Japan, Survey No. 1954 and Fraction Lodes

from which this plat has been made under my direction, have been examined and approved, and are on file in this office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the location thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or the grantors, and that said improvements consist of 30 shafts each 21 ft. deep

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

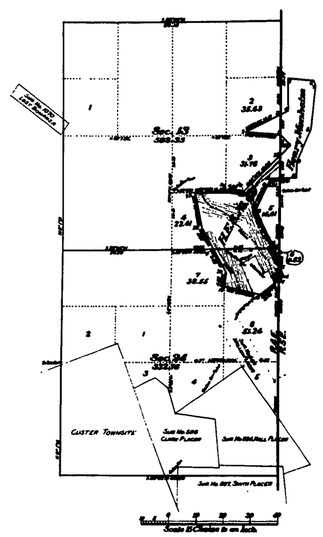
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office, Huron, South Dakota. U.S. Surveyor General for South Dakota.

September 27, 1907

H.E.S. AND MINERAL CLAIMS, S. DAKOTA

Township No. 3 South, Range No. 4 East of the Black Hills Meridian, South Dakota.



Survey Designated	By Whom Surveyed	Date of Special Instructions	When Surveyed	Date Approved
E. to Bdy.	Frank S. Pierce	No. H.E.S. June 25, 1896	Sept. 13, 1896	Dec. 30, 1897
Section Lines	J. M. Goldtrap	Amend. Oct. 11, 1897	Oct. 12-13, 1897	May 23, 1899
Mineral Survey No. 526	C. W. Bryden	Aug. 8, 1897	Aug. 30-Sept. 4, 1897	Oct. 18, 1897
" " 527			Sept. 17, 1897	" "
" " 584	J. W. McIntyre		Dec. 26, 1896	Apr. 3, 1899
" " 644			Feb. 11, 1898	June 19, 1899
Center Remainder Homestead	W. P. McCoy	Amend. June 9, 1898	Sept. 24-25, 1898	May 23, 1899
H.E.S. No. 160	Charles E. Smith	" " 1900	" " 1900	Nov. 3, 1899
H.E.S. No. 95	"	Feb. 3, 1900	Feb. 19-24, 1900	

Area of Homestead Entry Survey No. 60 in Section 19, T. 3 S., R. 4 E., B.H.M. 40.77 Acres
Sec. 30 " " " " " 19.20 "
" 19 " " " " " 21.57 "
Total Area of Homestead Entry Survey No. 60 " 81.54 "

This map of that portion of Homestead Entry Survey No. 60, Henry Hoskinville, Claimant, situated in Sections 19 and 24, in Township No. 3 South, of Range No. 5 East of the Black Hills Meridian, South Dakota, is strictly conformable to the field notes of the survey thereof, on file in this office, which have been examined and approved.
U.S. Surveyor General's Office,
Huron, S. Dak. November 2, 1900.
C. B. Alford
U.S. Surveyor General for South Dakota.

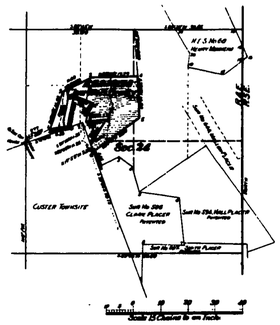
Township No. 3 South, Range No. 4 East of the Black Hills Meridian, South Dakota.

H.E.S. No. 95, Rapid City Serial 0477. July 8, 1908

Survey Designated	By Whom Surveyed	Date of Special Instructions	When Surveyed	Date Approved
E. to Bdy.	Frank S. Pierce	No. H.E. June 25, 1896	Sept. 13, 1896	Dec. 30, 1897
Section Lines	J. M. Goldtrap	Amend. Oct. 11, 1897	Oct. 12-13, 1897	May 23, 1899
Min. Survey No. 526	C. W. Bryden	Aug. 8, 1897	Aug. 30-Sept. 4, 1897	Oct. 18, 1897
" " 527			Sept. 17, 1897	" "
" " 584	J. W. McIntyre		Dec. 26, 1896	Apr. 3, 1899
" " 644			Feb. 11, 1898	June 19, 1899
Center Remainder Homestead	W. P. McCoy	Amend. June 9, 1898	Sept. 24-25, 1898	May 23, 1899
H.E.S. No. 160	Charles E. Smith	" " 1900	" " 1900	Nov. 3, 1899
H.E.S. No. 95	"	Feb. 3, 1900	Feb. 19-24, 1900	

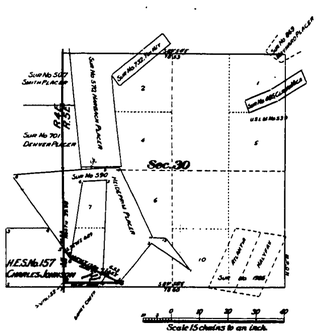
Area of Homestead Entry Survey No. 95, 46.75 Acres

This map of Homestead Entry Survey No. 95, Charles A. Beatty, Claimant, situated in Section 24 in Township No. 3 South, of Range No. 4 East of the Black Hills Meridian, South Dakota, is strictly conformable to the field notes of the survey thereof, on file in this office, which have been examined and approved.
U.S. Surveyor General's Office,
Huron, S. Dak. January 20, 1910.
C. B. Alford
U.S. Surveyor General for South Dakota.



Township No. 3 South, Range No. 5 East of the Black Hills Meridian, South Dakota.

HOMESTEAD ENTRY SURVEY No. 157
APPLICATION No. 123 LIST No. 1925, OCTOBER 16, 1908
RAPID CITY H.E. No. 08398, APRIL 19, 1909
HARNEY NATIONAL FOREST



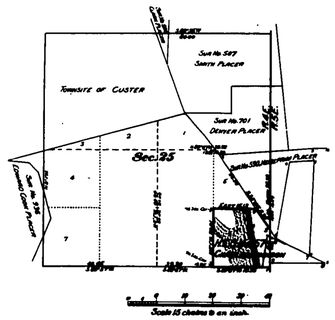
Survey Designated	By Whom Surveyed	Date of Special Instructions	When Surveyed	Date Approved
E. to Bdy.	Frank S. Pierce	No. H.E. June 25, 1896	Sept. 13, 1896	Dec. 30, 1897
Section Lines	M. P. McCoy	Amend. " 9, 1898	Oct. 4-6, 1898	May 23, 1899
Mineral Survey No. 485	Thomas F. Wentz	Oct. 19, 1898	Nov. 14-19, 1898	Dec. 16, 1899
" " 507	C. W. Bryden	Aug. 8, 1897	Sept. 17, 1897	Oct. 25, 1897
" " 570	"	June 7, 1898	June 24-27, 1898	Nov. 23, 1898
" " 590	J. W. McIntyre	Nov. 6, "	Nov. 8, 1898	Feb. 9, 1899
" " 701	"	July 7, 1899	July 17, 1899	Sept. 1, 1899
" " 723	"	Aug. 4, "	Aug. 8-9, "	Oct. 31, "
" " 869	Myron Wolcott	Oct. 30, 1901	" " 1902	Dec. 8, 1902
" " 1944	Charles E. Smith	Aug. 7, 1907	Sept. 10-11, 1907	Oct. 18, 1907
H.E.S. No. 157	"	" 19, 1911	Jan. 1-4, 1911	

Area of H.E.S. No. 157 in Section 25, T. 3 S., R. 4 E., B.H.M. 38.21 Acres
" " " " " 30, T. 3 S., R. 5 E. " 8.54 "
Total Area of H.E.S. No. 157 " 47.81 "

This map of that portion of HOMESTEAD ENTRY SURVEY No. 157, Charles L. Swingle, Claimant, situated in Section 30 in Township No. 3 South of Range No. 5 East of the Black Hills Meridian, South Dakota, is strictly conformable to the field notes of the survey thereof, on file in this office, which have been examined and approved.
U.S. Surveyor General's Office,
Huron, S. Dak. March 29, 1912.
C. B. Alford
U.S. Surveyor General.

Township No. 3 South, Range No. 4 East of the Black Hills Meridian, South Dakota.

HOMESTEAD ENTRY SURVEY No. 157
APPLICATION No. 123 LIST No. 1925, OCTOBER 16, 1908
RAPID CITY H.E. No. 08398, APRIL 19, 1909
HARNEY NATIONAL FOREST

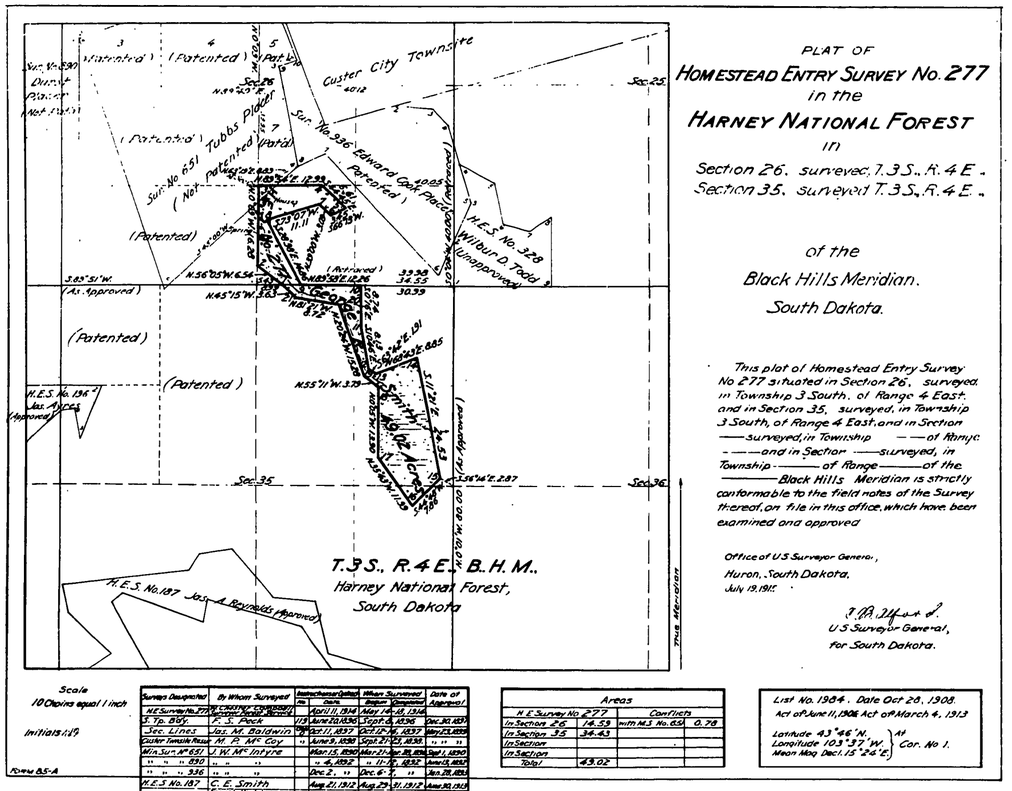


Survey Designated	By Whom Surveyed	Date of Special Instructions	When Surveyed	Date Approved
E. to Bdy.	Frank S. Pierce	No. H.E. June 25, 1896	Sept. 13, 1896	Dec. 30, 1897
Section Lines	Amended Abraham	Amend. Oct. 11, 1897	Oct. 12, "	May 23, 1899
Center Remainder Homestead	W. P. McCoy	" June 9, 1898	Sept. 24-25, 1898	" "
Min. Survey No. 485	C. W. Bryden	Aug. 8, 1897	Aug. 30-Sept. 4, 1897	Oct. 18, 1897
" " 507	"	"	Sept. 17, 1897	" "
" " 570	J. W. McIntyre	"	Nov. 8, 1898	Feb. 9, 1899
" " 590	"	July 7, 1899	July 17, 1899	Sept. 1, 1899
" " 701	"	Aug. 4, "	Aug. 8-9, "	Oct. 31, "
" " 723	"	"	Nov. 8, 1898	Feb. 9, 1899
" " 869	"	Oct. 30, 1901	July 15, 1902	Dec. 8, 1902
" " 1944	"	Aug. 7, 1907	Dec. 4-7, 1907	Jan. 16, 1913
H.E.S. No. 157	Charles E. Smith	" 19, 1911	" 1-4, 1911	

Area of H.E.S. No. 157 in Section 25, T. 3 S., R. 4 E., B.H.M. 38.77 Acres
" " " " " 30 " R. 5 E. " 8.54 "
Total Area of H.E.S. No. 157 " 47.81 "

This map of that portion of HOMESTEAD ENTRY SURVEY No. 157, Charles L. Swingle, Claimant, situated in Section 25 in Township No. 3 South of Range No. 4 East of the Black Hills Meridian, South Dakota, is strictly conformable to the field notes of the survey thereof, on file in this office, which have been examined and approved.
U.S. Surveyor General's Office,
Huron, S. Dak. March 29, 1912.
C. B. Alford
U.S. Surveyor General.

H.E.S. AND MINERAL CLAIMS, S. DAKOTA



PLAT OF
HOMESTEAD ENTRY SURVEY No. 277
in the
HARNEY NATIONAL FOREST
in
Section 26. surveyed, T.3S., R.4E.,
Section 35. surveyed T.3S., R.4E.,

of the
Black Hills Meridian.
South Dakota.

This plat of Homestead Entry Survey No 277 situated in Section 26, surveyed, in Township 3 South, of Range 4 East, and in Section 35, surveyed, in Township 3 South, of Range 4 East, and in Section ——surveyed, in Township ——of Range——, and in Section ——surveyed, in Township ——of Range——of the ——Black Hills Meridian is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S. Surveyor General,
Huron, South Dakota,
July 19, 1911.

J.A. Hyatt
U.S. Surveyor-General,
for South Dakota.

Scale
10 Chains equal 1 inch

Initials: J.A.H.

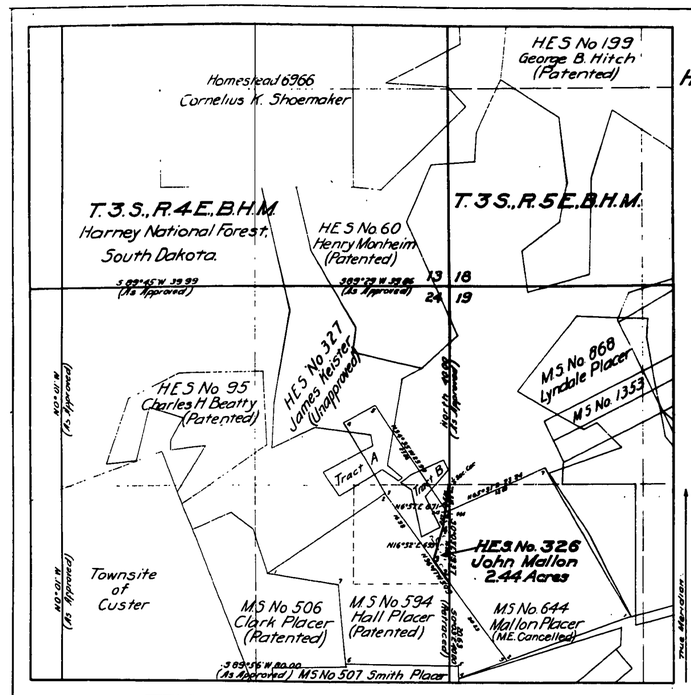
Form 85-A

Surveys Designated	By Whom Surveyed	Instructions Dated	When Surveyed	Date of Approval
H.E. Survey No. 277	C. Cheney, Deputy, and Geo. Scott, Assistant	No.	Begun: April 11, 1911 / Ended: May 14-15, 1911	Dec. 30, 1911
S. Tp. Bdy.	F. S. Peck	113	June 12, 1896	Sept. 8, 1896
Sec. Lines	Jas. M. Baldwin	"	Oct. 11, 1897	Oct. 29, 1897
Custer Townsite Plat	A. E. Ard, Cty.	44	June 9, 1898	Sept. 21, 1898
Mineral Sur. # 651	J. W. McIntyre	"	Mar. 15, 1900	Mar. 31, 1900
" " " 890	" " "	"	" 6, 1902	" 11-12, 1902
" " " 936	" " "	"	Dec. 2, "	Dec. 6-7, "
H.E.S. No. 187	C. E. Smith	"	Aug. 21, 1912	Aug. 27-31, 1912
" " " 196	Conrad Johnson, Survey Assistant	"	Sept. 25, "	Oct. 12-17, "
" " " 328	W. Christer Gamshy	"	June 23, 1914	May 27-30, 1914

Areas

H.E. Survey No. 277		Conflicts	
In Section 26	14.59	with M.S. No. 654	0.76
In Section 35	34.43		
In Section			
In Section			
Total	49.02		

List No. 1984. Date Oct 28, 1908.
Act of June 11, 1906 Act of March 4, 1913
Latitude 43°46' N. Longitude 103°37' W. Mean Mag. Decl. 15°24'E. } At Cor. No 1.



PLAT OF
HOMESTEAD ENTRY SURVEY No. 326
in the
HARNEY NATIONAL FOREST
in
Section 24 surveyed, T.3S., R.4E.,

of the
Black Hills Meridian.
South Dakota

This plat of Homestead Entry Survey No. 326 situated in Section 24 surveyed, in Township 3 South of Range 4 East and in Section —— surveyed, in Township —— of Range —— and in Section —— surveyed, in Township —— of Range —— and in Section —— surveyed, in Township —— of Range —— of the —— Black Hills Meridian is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S. Surveyor General
Huron, South Dakota
October 25, 1915

J.A. Hyatt
U.S. Surveyor-General
for South Dakota

Scale
10 Chains equal 1 inch

Initials: F.D.M.

Form 85-A

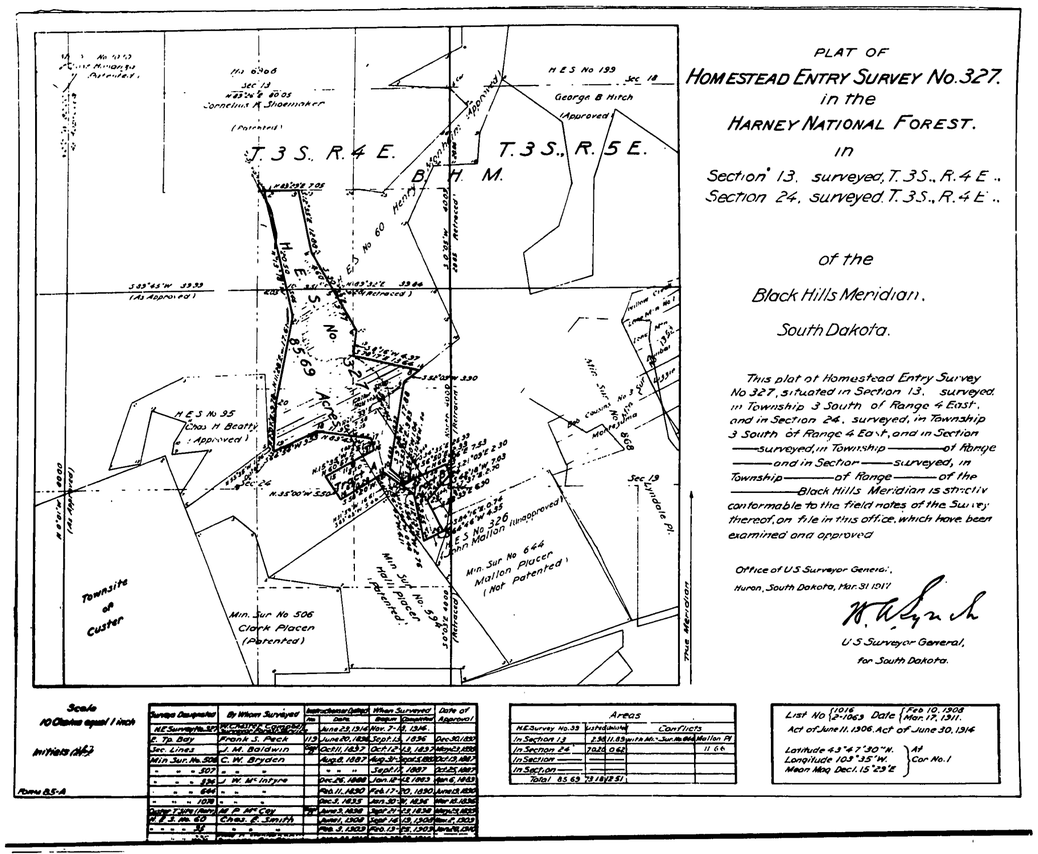
Surveys Designated	By Whom Surveyed	Instructions Dated	When Surveyed	Date of Approval
H.E. Survey No. 326	Frank D. Mayfield	No.	Begun: June 21, 1914 / Ended: Sept. 1-3, 1914	
E. Tp. Bdy.	Frank J. Peck	118	June 14, 1896	Sept. 1, 1896	Dec. 30, 1911
Sec. Lines	J. M. Baldwin	Restd.	Oct. 11, 1897	Oct. 21-Nov. 6, 1897	Dec. 13, 1897
M.S. No. 506	C. H. Bradley	"	Aug. 8, 1897	Aug. 31-Sept. 6, 1897	Oct. 13, 1897
M.S. No. 507	C. H. Bradley	"	Aug. 8, 1897	Sept. 1-2, 1897	Oct. 13, 1897
M.S. No. 594	J. W. McIntyre	"	Dec. 26, 1898	Jan. 12-24, 1899	Apr. 18, 1899
M.S. No. 644	J. W. McIntyre	"	Feb. 11, 1899	Feb. 11-24, 1899	June 6, 1899
Foreign Selection	M. F. Mc Cay	Restd.	June 9, 1898	Sept. 22, 1898	Nov. 23, 1898
M.S. No. 868	Myron Williard	"	July 1, 1899	July 11-17, 1899	Dec. 12, 1899
M.S. No. 1353	J. M. Baldwin	"	Sept. 1, 1899	Oct. 1 "	June 5, 1900
H.E. Survey No. 60	Chas. E. Smith	"	June 1, 1898	Sept. 10-Oct. 1, 1898	Nov. 2, 1898
H.E. Survey No. 95	Chas. F. Smith	"	Oct. 3, 1902	Oct. 7-20, 1902	Nov. 28, 1902

Areas

H.E. Survey No. 326		Conflicts	
In Section 24	2.44	With M.S. 644	2.28
In Section			
In Section			
In Section			
Total	2.44		2.28

List No 2-1151 Date April 28, 1911
Act of June 11, 1906; Act of June 30, 1914
Latitude 43°47'00"N. Longitude 103°35'00"W. Mean Mag. Decl. 15°57'E. } At Cor No 1

H.E.S. AND MINERAL CLAIMS, S. DAKOTA



PLAT OF
HOMESTEAD ENTRY SURVEY No. 327.
in the
HARNEY NATIONAL FOREST.
in
Section 13, surveyed, T. 3 S., R. 4 E.,
Section 24, surveyed, T. 3 S., R. 4 E.,
of the
Black Hills Meridian,
South Dakota.

This plat of Homestead Entry Survey No 327, situated in Section 13, surveyed, in Township 3 South of Range 4 East, and in Section 24, surveyed, in Township 3 South of Range 4 East, and in Section ——surveyed, in Township ——of Range ——and in Section ——surveyed, in Township ——of Range ——of the ——Black Hills Meridian is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S Surveyor General,
Huron, South Dakota, Mar. 31 1917

U.S Surveyor General,
for South Dakota.

Scale
10 Chains equal 1 inch

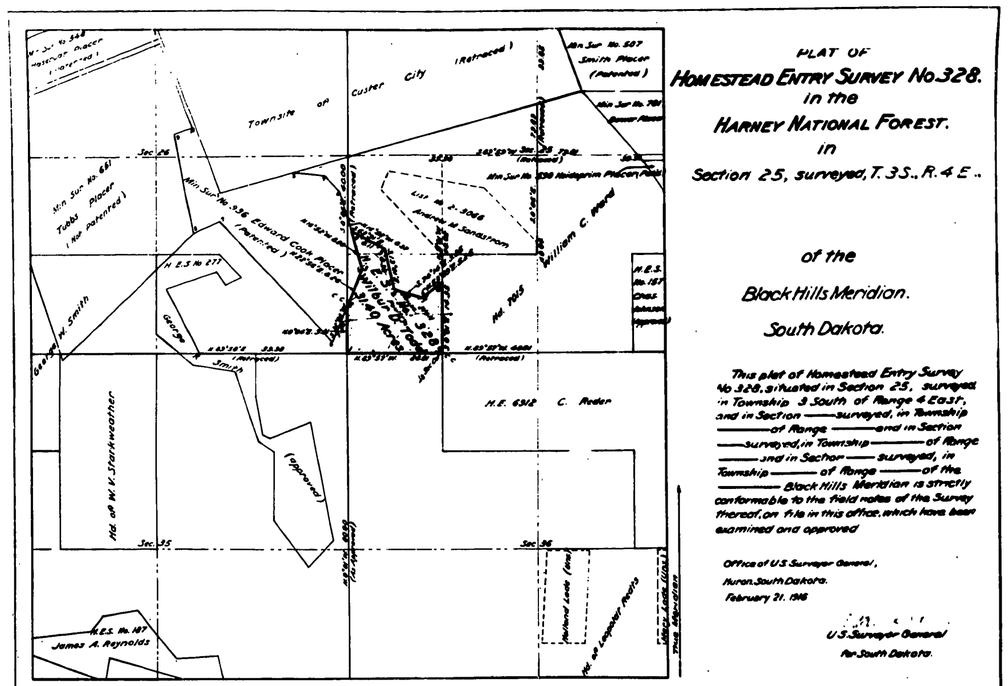
Initials (N/J)

Form 85-A

Surveys Designated	By Whom Surveyed	Instructions Office No.	Instructions Office Date	When Surveyed Begun	When Surveyed Completed	Date of Approval
H.E.S. No. 327	Chas. E. Smith		June 25, 1914	Mar. 7, 1915	Mar. 7, 1915	Dec. 30, 1915
E. Tp. Bdy	Frank S. Peck	V/3	June 20, 1874	Sept. 15, 1896	Sept. 15, 1896	Dec. 30, 1896
Sec. Lines	J. M. Baldwin		Oct. 11, 1837	Oct. 12-13, 1837	March 3, 1855	
Min. Sur. No. 506	C. W. Bryden		Aug. 8, 1887	Aug. 31 - Sept. 2, 1887	Oct. 13, 1887	
" " 507	" "			Sept. 7, 1887	Sept. 15, 1887	
" " 328	J. W. McIntyre		Dec. 26, 1888	Jan. 18 - Feb. 12, 1893	Jan. 6, 1893	
" " 644	" "		Feb. 11, 1890	Feb. 17 - 20, 1890	June 13, 1890	
" " 108	" "		Dec. 3, 1833	Jan. 30 - 31, 1834	Mar. 15, 1834	
Custer Townsite (Pat.)	Alf. P. McCoy	W	June 3, 1898	Sept. 7-13, 1898	May 13, 1899	
H.E.S. No. 60	Chas. E. Smith		Aug. 1, 1908	Sept. 16, 1908	Mar. 17, 1909	
" " 95	" "		Feb. 9, 1909	Dec. 13 - 16, 1909	Jan. 28, 1910	
" " 206	Frank M. Johnson		June 11, 1910	Aug. 15 - 17, 1910	Aug. 17, 1910	

Areas		
N.E. Survey No. 33	Estimated	Conflicts
In Section 13	2.30	11.89 in Mn. Sur. No. 644 Mallon Pl
In Section 24	2.03	0.62 / 11.66
In Section ——		
In Section ——		
Total	65.69	13.18 (2.51)

List No. 1016, 2nd List Date (Feb. 10, 1908 / Mar. 17, 1911.
Act of June 11, 1906. Act of June 30, 1914
Latitude 43°47'30" N.
Longitude 103°32'W.
Mean Mag. Decl. 15°25'E
At Cor. No. 1



PLAT OF
HOMESTEAD ENTRY SURVEY No. 328.
in the
HARNEY NATIONAL FOREST.
in
Section 25, surveyed, T. 3 S., R. 4 E.,
of the
Black Hills Meridian.
South Dakota.

This plat of Homestead Entry Survey No 328, situated in Section 25, surveyed, in Township 3 South of Range 4 East, and in Section ——surveyed, in Township ——of Range ——and in Section ——surveyed, in Township ——of Range ——and in Section —— surveyed, in Township —— of Range —— of the —— Black Hills Meridian is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S Surveyor General,
Huron, South Dakota.
February 21. 1918

U.S Surveyor General
for South Dakota.

Scale
10 Chains equal 1 inch

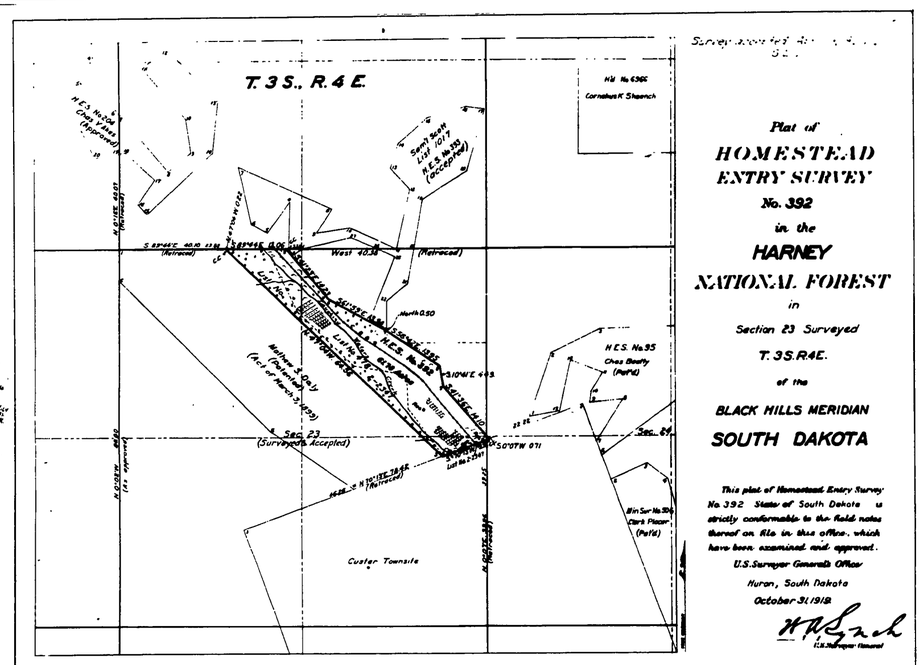
Initials (N/J)

Form 85-A

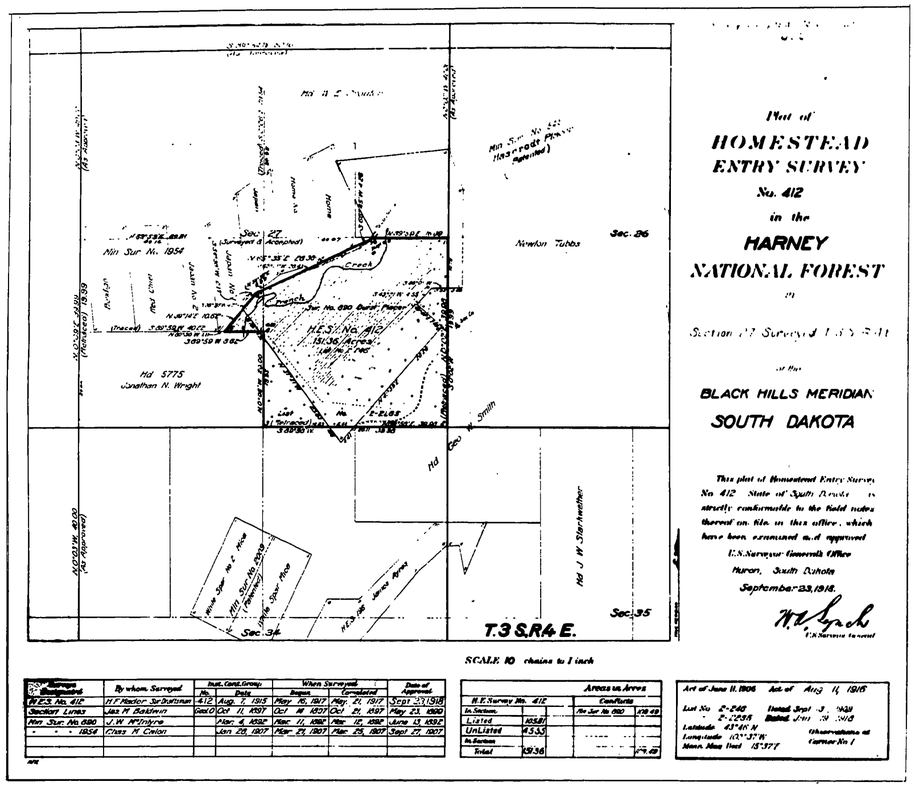
Surveys Designated	By Whom Surveyed	Instructions Office No.	Instructions Office Date	When Surveyed Begun	When Surveyed Completed	Date of Approval
N.E. Survey No. 328	Chas. E. Smith		June 25, 1914	Nov. 9, 10, 1914	Nov. 10, 1914	
Sec. Lines	James M. Baldwin		Oct. 11, 1837	Oct. 11 - 16, 1837		May 23, 1855
Custer Townsite, Pat.	Alf. P. McCoy	"	June 3, 1898	Sept. 19 - 23, 1898		
Min. Sur. No. 507	C. W. Bryden	"	Aug. 8, 1887	Sept. 7, 1887		
" " 328	J. W. McIntyre		Dec. 26, 1888	Jan. 18, 1893		
" " 538	" "		Nov. 6, -	Nov. 9, -		
" " 681	" "		Mar. 18, 1890	March 26 - 28, 1890		
" " 788	" "		[illegible]	July 18, -		
" " 1038	" "		Oct. 2, 1893	Oct. 6 - 7, 1893		
H.E.S. No. 187	Charles E. Smith		Aug. 30, 1911	[illegible]		
" " 187	" "		Aug. 30, 1911	Aug. 29 - 31, 1911		
" " 277	" "		Aug. 14, 1912	Aug. 29 - 31, 1912		

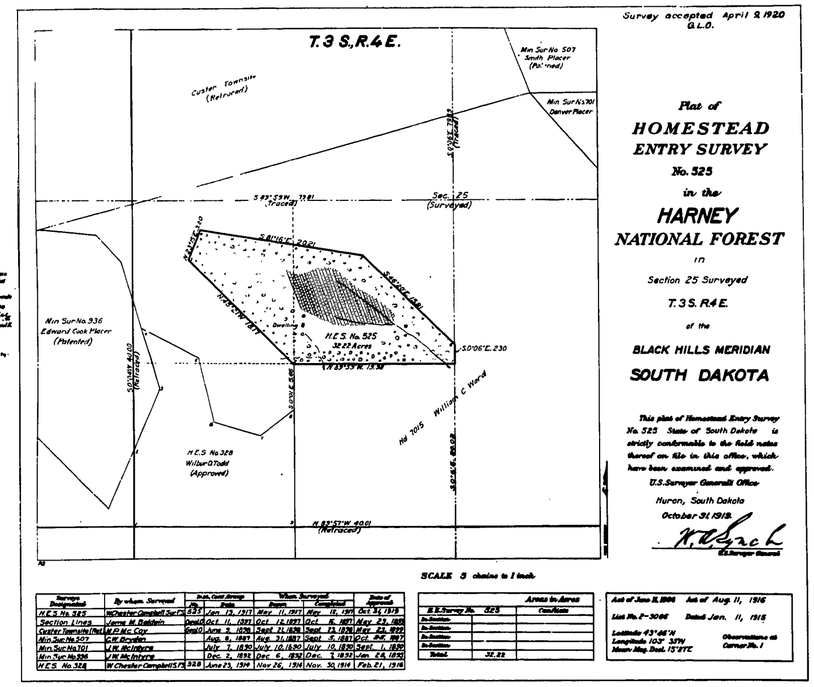
Areas		
N.E. Survey No. 328		Conflicts
In Section 25	21.60	
In Section ——		
In Section ——		
In Section ——	21.60	

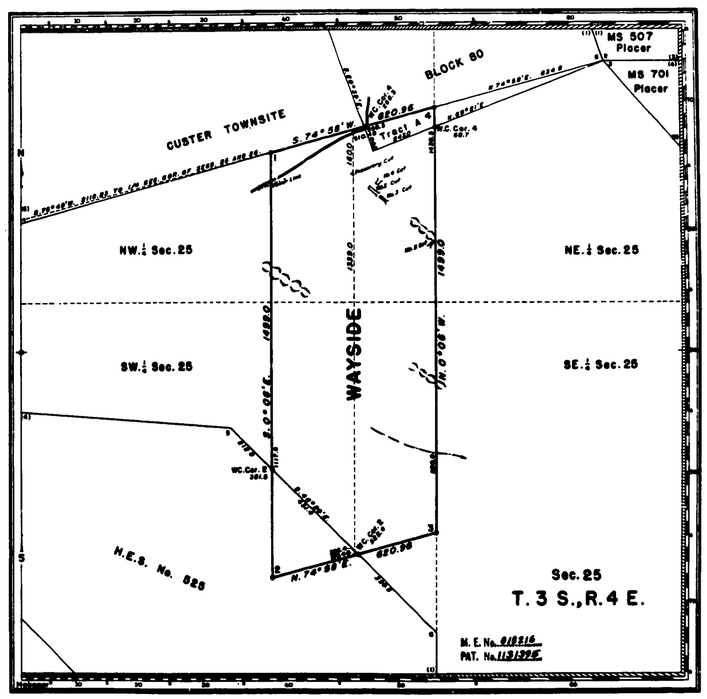
List No. 1016, Date April 6, 1908
Act of June 11, 1906; Act of June 30, 1914.
Latitude 43°46'30"N.
Longitude 103°31'W.
Mean Mag. Decl. 15°21'E.
At Cor. No. 1



H.E.S. AND MINERAL CLAIMS, S. DAKOTA







MINERAL SURVEY
No. 2152
SOUTH DAKOTA

CLAIM OF
BERNETT L. SOLOM ET AL

KNOWN AS THE
WAYSIDE LODE

SITUATE IN
Sec. 25, T. 3 S., R. 4 E., B.H.M.
CUSTER COUNTY
(Unorg.) Mining District
Rapid City Land District
Lat. 43°46' N. Long. 103°35' W.

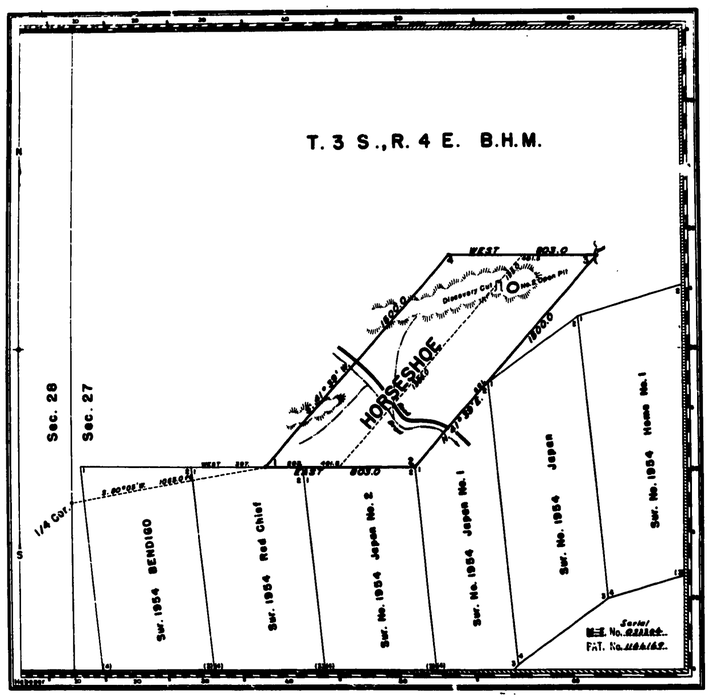
0 100 200 300 400 500 600
Feet
Magnetic Declination, 13°30' E

Surveyed April 12 to April 15, 1949,
by Stein Bangs, Mineral Surveyor.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Public Survey Office
Billings, Montana, October 18, 1949.

I hereby certify that this plat of Mineral Survey No. 2152, South Dakota, is strictly conformable to the field notes of said survey which have been examined and approved

Chief Cadastral Engineer



MINERAL SURVEY
No. 2158
SOUTH DAKOTA

CLAIM OF
NORA BORGEN-CHALGREN

KNOWN AS THE
HORSESHOE LODE

Situate in
Sec. 27, T. 3 S., R. 4 E., B.H.M.
CUSTER COUNTY
Custer Mining District
Lat. 43°46' N. and Long. 103°39' W. at
Discovery Point, Horseshoe Lode

0 100 200 300 400 500 600
Feet
Magnetic Declination 13° 35' E.

Surveyed, July 2 to August 15, 1952,
By Stein Bangs, Mineral Surveyor.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Division of Engineering
Billings, Montana, October 29, 1952.

I hereby certify that this plat of Mineral Survey No. 2158, South Dakota, is strictly conformable to the field notes of said survey which have been examined and approved.

Regional Chief of Engineering

FUNDAMENTAL LAW ON ALASKA SURVEYS

SURVEY OF PUBLIC LANDS IN ALASKA

Less than one percent of the area of Alaska is covered by the Rectangular System of Surveys (1973). Approximately two percent has been surveyed as non rectangular surveys, or as some variation of the rectangular system, using indirect methods to establish corners with electronic equipment. Protraction diagrams have been prepared for the entire state, except the Copper River Meridian in SE Alaska, lying southeasterly of Glacier Bay National Monument and the outer islands of the Aleutian chain.

The non rectangular surveys are made to meet requirements for surveys in isolated areas. The requirements for surveys in these isolated locations arise from the needs of the citizens and state and local governments as well as from the need to administer the land under the authority of Congress.

Because of the isolated location, these non rectangular surveys are usually referenced to Location Monuments which are in turn referenced to Geodetic Control Surveys established by the various Federal survey agencies.

Non rectangular surveys are authorized by various legislation (cited below) to identify the boundaries of homesteads, homesites, native allotments, trade and manufacturing sites, townsites, etc.

Because terrain conditions prompted application of electronic technology to Alaska original surveys, special methods of airborne surveying evolved. In the airborne original surveys, monuments were not required at each section and quarter section corner. Monuments were allowed to be set only at two mile intervals on the boundaries of each township.

Where terrain conditions make it impracticable to set monuments at the theoretical point along these township boundaries, the monument may be omitted. It is required only to maintain an average monument density of one monument per two miles, placed on line.

Most of the airborne surveys have been conducted in connection with surveys of land to be granted the State of Alaska.

DISPOSALS OF PUBLIC LANDS IN ALASKA

Past Congressional policy on public land has always supported the concept of turning unused land over to private citizens or public agencies who will make an optimum use of the land's resources. Toward this end, many laws have been passed concerning Alaskan land, which provide for disposal to residential use, business and industrial use, as well as for public purposes.

DISPOSALS BASED ON OCCUPANCY AND USE

A citizen who is 21 years of age and who does not own 160 acres in the United States may make a "Homestead" entry on unsurveyed or surveyed lands. Other regulatory requirements are listed in 43 CFR 2510. The area he may claim is limited to 160 acres, except that the limitation may be slightly exceeded (Rule of Approximation) where the tract is composed of irregular subdivisions. When the entryman complies with the statutory requirements and regulations, he can obtain a patent to the land. Very little land in the United States is subject to Homestead Entry. Alaska lands were open to entry under Homestead laws only where they were so classified. At this writing (1974) all Alaska Public Lands are withdrawn from entry.

Indian Allotments are disposals based on the occupancy and use of the land under 43 CFR 2530. Indians of full or mixed blood who are recognized members of their tribe may apply for a tract of Public Lands. The law provides that allotments may not exceed 40 acres of irrigable land, 80 acres of non-irrigable agricultural land, or 160 acres of non-irrigable grazing land. The allotment was intended to give title to Indians already settled on Public Lands.

A later provision for Indian Allotments was passed by Congress (see 48 USC 357, 357a and 357b) for Alaska Indians, Aleuts or Eskimos, who reside in Alaska and are the head of a family. If such an eligible Indian has occupied public land for a period of five years or more, up to 160 acres may be allotted in 40 acre subdivision units in surveyed areas. In unsurveyed areas, the aggregate will consist of individual parcels each in a reasonably compact form. Other requirements are set out in 43 CFR 2561.

Native allotments in Alaska were recodified in 43 USC 270-1 to 270-3 and then repealed by the Alaska Native Claims Settlement Act, 43 USC 1601, on December 18, 1971.

Trade and manufacturing sites which were occupied in good faith on vacant and unreserved public lands in Alaska may be patented to the claimant under 43 USC 687a. See also 43 CFR 2562. Land used for trade or other productive industry and which is nonmineral may be claimed. A notice of location is required for land occupied after 1950, and application for patent must be made within five years. The claim may not extend more than 80 rods (20 chains) along the shore of any navigable water, and may not exceed 80 acres.

DISPOSALS BASED ON OCCUPANCY AND USE

CODE OF FEDERAL REGULATIONS

Title 43—Public Lands: Interior

Chapter II—Bureau of Land Management

Subpart 2561—Native Allotments

SOURCE: The provisions of this Subpart 2561 appear at 35 F.R. 9597, June 13, 1970, unless otherwise noted.

§ 2561.0–2 Objectives.

It is the program of the Secretary of the Interior to enable individual natives of Alaska to acquire title to the lands they use and occupy and to protect the lands from the encroachment of others.

§ 2561.0–3 Authority.

The act of May 17, 1906 (34 Stat. 197), as amended August 2, 1956 (70 Stat. 954; 48 U.S.C. 357, 357a, 357b), authorizes the Secretary of the Interior to allot not to exceed 160 acres of vacant, unappropriated, and unreserved nonmineral land in Alaska or, subject to the provisions of the act of March 8, 1922 (42 Stat. 415; 48 U.S.C. 376–377), of vacant, unappropriated, and unreserved public land in Alaska that may be valuable for coal, oil, or gas deposits, or, under certain conditions, of national forest lands in Alaska, to any Indian, Aleut or Eskimo of full or mixed blood who resides in and is a native of Alaska, and who is the head of a family, or is twenty-one years of age.

§ 2561.0–5 Definitions.

As used in the regulations in this section,

(a) The term "substantially continuous use and occupancy" contemplates the customary seasonality of use and occupancy by the applicant of any land used by him for his livelihood and well-being and that of his family. Such use and occupancy must be substantial actual possession and use of the land, at least potentially exclusive of others, and not merely intermittent use.

(b) "Allotment" is an allocation to a Native of land of which he has made substantially continuous use and occupancy for a period of five years and which shall be deemed the "homestead" of the allottee and his heirs in perpetuity, and shall be inalienable and nontaxable except as otherwise provided by the Congress.

(c) "Allotment Act" means the Act of May 17, 1906 (34 Stat. 197), as amended (48 U.S.C. 357, 357a, 357b).

§ 2561.0–8 Lands subject to allotment.

(a) A Native may be granted a single allotment of not to exceed 160 acres of land. All the lands in an allotment need not be contiguous but each separate tract of the allotment should be in reasonably compact form.

(b) In areas where the rectangular survey pattern is appropriate, an allotment may be in terms of 40-acre legal subdivisions and survey lots on the basis that substantially continuous use and occupancy of a significant portion of such smallest legal subdivision shall normally entitle the applicant to the full subdivision, absent conflicting claims.

(c) Allotments may be made in national forests if founded on occupancy of the land prior to the establishment of the particular forest or if an authorized officer of the Department of Agriculture certifies that the land in the application for allotment is chiefly valuable for agricultural or grazing purposes.

(d) Lands in applications for allotment and allotments that may be valuable for coal, oil, or gas deposits are subject to the regulations of § 2093.4 of this chapter.

§ 2561.1 Applications.

(a) Applications for allotment properly and completely executed on a form approved by the Director, Bureau of Land Management, must be filed in the land office which has jurisdiction over the lands.

(b) Any application for allotment of lands which extend more than 160 rods along the shore of any navigable waters shall be considered a request for waiver of the 160-rod limitation (see Part 2094 of this chapter).

(c) If surveyed, the land must be described in the application according to legal subdivisions and must conform to the plat of survey when possible. If unsurveyed, it must be described as accurately as possible by metes and bounds and tied to natural objects. On unsurveyed lands, the application should be accompanied by a map or approved protracted survey diagram showing approximately the lands included in the application.

(d) An application for allotment shall be rejected unless the authorized officer of the Bureau of Indian Affairs certifies that the applicant is a native qualified to make application under the Allotment Act, that the applicant has occupied and posted the lands as stated in the application, and that the claim of the applicant does not infringe on other native claims or area of native community use.

(e) The filing of an acceptable application for allotment will segregate the lands. Thereafter subsequent conflicting applications for such lands shall be rejected, except when accompanied by a showing that the applicant for allotment has permanently abandoned use and occupancy of the land.

(f) By the filing of an application for allotment the applicant acquires no rights except as provided in paragraph (e) of this section. If the applicant does not submit the required proof within six years of the filing of his application in the land office, has application for allotment will terminate without affecting the rights he gained by virtue of his occupancy of the land or his right to make another application.

§ 2561.2 Proof of use and occupancy.

(a) An allotment will not be made until the lands are surveyed by the Bureau of Land Management, and until the applicant or the authorized officer of the Bureau of Indian Affairs has made satisfactory proof of substantially continuous use and occupancy of the land for a period of five years by the applicant. Such proof shall be made on a form approved by the Director, Bureau of Land Management, and filed in the appropriate land office. If made by the applicant, it must be signed by him, but if he is unable to write his name, his mark or thumb print shall be impressed on the statement and witnessed by two persons. This proof may be submitted with the application for allotment if the applicant has then used and occupied the land for five years, or may be made at any time within six years after the filing of the application when the requirements have been met.

§ 2561.3 Effect of allotment.

(a) Land allotted under the Act is the property of the allottee and his heirs in perpetuity, and is inalienable and nontaxable. However, a native of Alaska who received an allotment under the Act, or his heirs, may with the approval of the Secretary of the Interior or his authorized representative, convey the complete title to the allotted land by deed. The allotment shall thereafter be free of any restrictions against alienation and taxation unless the purchaser is a native of Alaska who the Secretary determines is unable to manage the land without the protection of the United States and the conveyance provides for a continuance of such restrictions.

(b) Application by an allottee or his heirs for approval to convey title to land allotted under the Allotment Act shall be filed with the appropriate officer of the Bureau of Indian Affairs.

Headquarters for fishermen, trappers, guides and others in productive industry may be patented under the Act of March 3, 1927 (44 Stat. 1364.) A maximum of five acres may be obtained. A notice of location is required, and application to purchase must be made within five years. See 43 CFR 2563. Under these same provisions, Homesites can also be obtained by employees of firms engaged in trade, manufacturing, or other industry. Self employed persons also qualify under this statute (43 USC 687a).

Native villages existing on Public Lands are reserved for the benefit of the Indian or Eskimo occupants. Townsites have been surveyed and deeds issued for the lots. Non-native village townsites are covered below.

CODE OF FEDERAL REGULATIONS

Title 43—Public Lands: Interior

Chapter II—Bureau of Land Management

Subpart 2325—Bureau of Indian Affairs

SOURCE: The provisions of this Subpart 2325 appear at 35 F.R. 9586, June 13, 1970, unless otherwise noted.

§ 2325.1 Designation of Indian reservations in Alaska.

(a) The inherent power conferred upon the Secretary of the Interior by section 441, Revised Statutes (5 U.S.C. 485), to supervise the public business relating to the Indians includes the supervision over reservations in the State of Alaska created in the interest of the natives and the authority to lease lands therein for their benefit. Opinion of the solicitor, May 18, 1923 (49 L.D. 592).

(b) The act of May 1, 1936 (49 Stat. 1250; 48 U.S.C., Sup., 358a, 362) extends certain provisions of the act of June 18, 1934 (48 Stat. 984; 25 U.S.C. 461–479), known as the Wheeler-Howard Act, to Alaska, and provides for the designation of Indian reservations in the State.

(c) The act of May 31, 1938 (52 Stat. 593; 48 U.S.C. 353a), authorizes the Secretary of the Interior in his discretion to withdraw, subject to any valid existing rights, and permanently reserve, small tracts of not to exceed 640 acres each of the public domain in Alaska, for schools, hospitals, and such other purposes as may be necessary in administering the affairs of the Indians, Eskimos, and Aleuts of Alaska.

(R.S. 2478, 34 Stat. 197; 48 U.S.C. 1201, 48 U.S.C. 357)

FUNDAMENTAL LAW ON ALASKA SURVEYS

DISPOSALS BASED ON GRANTS

DISPOSALS BASED ON GRANTS

Scrip is a certificate which allows the holder to make a selection of a specified number of acres of available public lands. The holder must make application for patent only on land classified as open to such entry. Scrip was issued for various reasons, but the only currently valid scrip was granted for military or naval service in WW I and before.

After satisfaction of application, each claimant is entitled to receive land in tracts having a per acre value for Soldier's Additional Homestead Claims of $250-$275. The latest date for satisfaction of Soldier's Additional Homesteads is January 1, 1975.

STATE GRANTS

When any new state is admitted to the Union, it must enter on the same footing as the existing states. Thus Alaska was granted lands on achieving statehood as other new states had been. The act of July 7, 1958, granted 400,000 acres of forest lands and 102,950,000 acres of other vacant public lands which were to be selected before January 3, 1984. Patent could not be issued on the selections until surveys and approvals were completed. The selections were required to be made in compact form and contain more than 5760 acres (nine nominal sections).

Airport grants provide a means of locating airports on Public Lands. Any public agency may apply, describing required lands by a survey.

NATIVE CLAIMS SETTLEMENT

The Alaska Native Claims Settlement Act of December 18, 1971, (43 USC 1601) authorized selection of lands by Regional Corporations and village corporations as well as individual natives. Direct copy of portions of 43 CFR 2650, Alaska Native Selections follow:

Title 43—Public Lands: Interior

Subpart 2650—Alaska Native Selections—Generally

§ 2650.0–1 Purpose.

The purpose of the regulations in this part is to provide procedures for orderly and timely implementation of those provisions of the Alaska Native Claims Settlement Act of December 18, 1971 (43 U.S.C. 1601) which pertain to selections of lands and interests in lands in satisfaction of the land selections conferred by said act upon Alaska Natives and Alaska Native corporations.

§ 2650.0–2 Objectives.

The program of the Secretary is to implement such provisions in keeping with the congressional declaration of policy that the settlement of the Natives' aboriginal land claims be fair and just and that it be accomplished rapidly, with certainty, in conformity with the real economic and social needs of Natives, without litigation and with maximum participation by Natives in decisions affecting their rights and property.

§ 2650.0–3 Authority.

Section 25 of the Alaska Native Claims Settlement Act of December 18, 1971, authorizes the Secretary of the Interior to issue and publish in the FEDERAL REGISTER, pursuant to the Administrative Procedure Act (5 U.S.C. 551, et seq.), such regulations as may be necessary to carry out the purposes of the act.

§ 2650.0–5 Definitions.

(a) "Act" means the Alaska Native Claims Settlement Act of December 18, 1971 (43 U.S.C. 1601) and any amendments thereto.

(b) "Secretary" means the Secretary of the Interior or his authorized delegate.

(c) "Native" means a Native as defined in section 3(b) of the act.

(d) "Native village" means any tribe, band, clan, group, village, community, or association in Alaska, as defined in section 3(c) of the act.

(e) "Village corporation" means a profit or nonprofit Alaska Native village corporation which is eligible under § 2651.2 of this chapter to select land and receive benefits under the act, and is organized under the laws of the State of Alaska in accordance with the provisions of section 8 of the act.

(f) "Regional corporation" means an Alaska Native regional corporation organized under the laws of the State of Alaska in accordance with the provisions of section 7 of the act.

(g) "Public lands" means all Federal lands and interests in lands located in Alaska (including the beds of all nonnavigable bodies of water), except:

(1) The smallest practicable tract, as determined by the Secretary, enclosing land actually used, but not necessarily having improvements thereon, in connection with the administration of a Federal installation; and,

(2) Land selections of the State of Alaska which have been patented or tentatively approved under section 6(g) of the Alaska Statehood Act, as amended (72 Stat. 341; 77 Stat. 223; 48 U.S.C. ch. 2), or identified for selection by the State prior to January 17, 1969, except as provided in § 2651.4(a)(1) of this chapter.

(h) "Interim conveyance" as used in these regulations means the conveyance granting to the recipient legal title to unsurveyed lands, and containing all the reservations for easements, rights-of-way, or other interests in land, provided by the act or imposed on the land by applicable law, subject only to confirmation of the boundary descriptions after approval of the survey of the conveyed land.

(i) "Patent" as used in these regulations means the original conveyance granting legal title to the recipient to surveyed lands, and containing all the reservations for easements, rights-of-way, or other interests in land, provided by the act or imposed on the land by applicable law; or the document issued after approval of the survey by the Bureau of Land Management, to confirm the boundary description of the unsurveyed conveyed lands.

(j) "Conveyance" as used in these regulations means the transfer of title pursuant to the provisions of the act whether by interim conveyance or patent, whichever occurs first.

(k) "National Wildlife Refuge System" means all lands, waters, and interests therein administered on December 18, 1971, by the Secretary as wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas, as provided in the act of October 15, 1966, 80 Stat. 927, as amended by the act of July 18, 1968, 82 Stat. 359 (16 U.S.C. 668dd).

(l) "Protraction diagram" means the approved diagram of the Bureau of Land Management mathematical plan for extending the public land surveys and does not constitute an official Bureau of Land Management survey, and, in the absence of an approved diagram of the Bureau of Land Management, includes the State of Alaska protraction diagrams which have been authenticated by the Bureau of Land Management.

(m) "Date of filing" shall be the date of postmark, except when there is no postmark, in which case it shall be the date of receipt in the proper office.

§ 2650.0–7 References.

(a) Native enrollment procedures are contained in 25 CFR 43h.

(b) Withdrawal procedures are contained in part 2300 of this chapter.

(c) Application procedures are contained in subpart 1821 of this chapter.

(d) Appeals procedures are contained in 43 CFR part 4.

(e) Mineral patent application procedures are contained in part 3860 of this chapter.

§ 2650.0–8 Waiver.

The Secretary may, in his discretion, waive any nonstatutory requirement of these regulations. When the rights of third parties will not be impaired, and when rapid, certain settlement of the claims of Natives will be assisted, minor procedural and technical errors should be waived.

§ 2650.2 Application procedures for land selections.

(a) Applications for land selections must be filed on forms approved by the Director, Bureau of Land Management. Applications must be filed in accordance with subpart 1821 of this chapter.

(b) Each regional corporation shall submit with its initial application under this section a copy of the resolution authorizing the individual filing the application to do so.

(c) Each village corporation under subpart 2651 of this chapter must submit with its initial application under this section a certificate of incorporation, evidence of approval of its articles of incorporation by the regional corporation for that region, and a copy of the authorization of the individual filing the application to do so.

(d)(1) Regional and village corporations authorized by the act subsequently filing additional or amendatory applications need only refer to the serial number of the initial filing.

(2) Any change of the officer authorized to act for any corporation in the matter of land selections should be promptly submitted to the appropriate office of the Bureau of Land Management.

(e)(1) If the lands applied for are surveyed, the legal description of the lands in accordance with the official plats of survey shall be used.

(2) If the lands applied for are unsurveyed, they shall be described by protraction diagrams.

(3) If the lands applied for are not surveyed and are not covered by protraction diagrams, they must be described by metes and bounds commencing at a readily identifiable topographic feature, such as a mountain peak, mouth of a stream, ect., or a monumented point of known position, such as a triangulation station, and the description must be accompanied by a topographic map delineating the boundary of the area applied for.

(4) Where 1:63,360 U.S.G.S. quadrangle maps with the protraction diagram plotted thereon have been published, these maps shall be used to portray and describe the lands applied for. Where 1:63,360 U.S.G.S. quadrangle maps with the protraction diagram plotted thereon have not been published, then the 1:250,000 U.S.G.S. quadrangle maps with the protraction diagrams plotted thereon shall be used.

(5) If the written description shown on the application and the map portrayal accompanying the application do not agree the delineation shown on the map shall be controlling.

(f) The selected areas may be adjusted by the Secretary with the consent of the applicant and amendment of the application by the applicant, provided that the adjustment will not create an excess over the selection entitlement.

§ 2650.3 Lawful entries, lawful settlements, and mining claims.

§ 2650.3–1 Lawful entries and lawful settlements.

(a) Pursuant to sections 14(g) and 22(b) of the act, all conveyances issued under the act shall exclude any lawful entries or entries which have been perfected under, or are being maintained in compliance with, laws leading to the acquisition of title, but shall include land subject to valid existing rights of a temporary or limited nature such as those created by leases (including leases issued under section 6(g) of the Alaska Statehood Act), contracts, permits, rights-of-way, or easements.

(b) The right of use and occupancy of persons who initiated lawful settlement or entry of land, prior to August 31, 1971, is protected: *Provided*, That:

(1) Occupancy has been or is being maintained in accordance with the appropriate public land law, and

(2) Settlement or entry was not in violation of Public Land Order No. 4582, as amended. Any person who entered or settled upon land in violation of that public land order has gained no rights.

(c) In the event land excluded from conveyance under paragraph (a) of this section reverts to the United States, the grantee or his successor in interest shall be afforded an opportunity to acquire such land by exchange pursuant to section 22(f) of the act.

§ 2650.3–2 Mining claims.

(a) *Possessory rights.*—Pursuant to section 22(c) of the act, on any lands to be conveyed to village or regional corporations, any person who prior to August 31, 1971, initiated a valid mining claim or location, including millsites, under the general mining laws and recorded notice thereof with the appropriate State or local office, shall not be challenged by the United States as to his possessory rights, if all requirements of the general mining laws are met. However, the validity of any mining claim may be challenged by the United States or by the grantee or his successor in interest at any time.

(b) *Patent requirements met.*—An acceptable mineral patent application must be filed with the appropriate Bureau of Land Management office not later than December 18, 1976, on lands conveyed to village or regional corporations.

(1) Upon a showing that a mineral survey cannot be completed by December 18, 1976, the filing of an application for a mineral survey, which states on its face that it was filed for the purpose of proceeding to patent, will constitute an acceptable mineral patent application, provided all applicable requirements under the general mining laws have been met.

(2) The failure of an applicant to prosecute diligently his application for mineral patent to completion will result in the loss of benefits afforded by section 22(c) of the act.

(3) The appropriate office of the Bureau of Land Management shall give notice of the filing of an application under this section to the village or regional corporation which has selection rights in the land covered by the application.

(c) *Patent requirements not met.*—Any mineral patent application filed after December 18, 1976, on land conveyed to any village or regional corporation pursuant to this act, will be rejected for lack of departmental jurisdiction. After that date, patent applications may continue to be filed on land not conveyed to village or regional corporations until such land is conveyed.

§ 2650.4–7 Public easements.

(a) Prior to reserving any public easements under section 17(b) of the act, the concerned village and regional corporations shall be afforded notice and opportunity for submission of views. If the Secretary determines that a public easement should be reserved in any conveyance, the reasons for that determination will be provided in writing, upon request of the grantee.

(b)(1) A public easement shall be reserved only if it is specific as to use and corridor location and size and both use and corridor location and size shall be reasonably related to an anticipated public use or a planned or existing governmental function.

(2) No public easement shall be reserved in such manner as to:

(i) Deprive the grantee or its successor in interest of reasonable access to bodies of water or highways in or bordering upon the land embraced in the conveyance without his consent.

(ii) Constitute a so-called scenic easement.

(c) A reserved public easement shall be subject to the following conditions:

(1) The Secretary shall terminate a public easement if it is not used for its purpose by the date specified in the conveyance, but in any event not later than December 18, 2001, or if he finds that conditions are such that its retention is no longer needed for public use or governmental function.

(2) The grantee or its successor in interest shall be entitled to just compensation for the loss of value of any improvements existing on the date of the reservation of the easement which are impaired or required to be removed by the exercise of the easement.

(3) The easement shall be no more extensive in size than is reasonably required for the purpose for which reserved. Upon the definite location of an easement or easements for which a corridor was reserved, the reservation to the extent not used for the easement or easements shall be of no further force or effect.

(4) A corridor location shall be no more extensive in width or length than is reasonably necessary to locate any easement to be reserved, taking into consideration climate, topography, terrain, and available data.

(d) The State and the Federal-State Land Use Planning Commission shall be afforded 90 days after notice by the Secretary to make recommendations with respect to the inclusion of public easements in any conveyance.

§ 2650.5 Survey requirements.

§ 2650.5–1 General.

(a) Selected areas are to be surveyed as provided in section 13 of the act. Any survey or description used as a basis for conveyance must be adequate to identify the lands to be conveyed.

(b) Surveys shall take into account the navigability or nonnavigability of bodies of water. The beds of all bodies of water determined by the Secretary to be navigable shall be excluded from the gross area of the surveys and shall not be charged to total acreage entitlements under the act. Prior to making his determination as to the navigability of a body of water, the Secretary shall afford the affected regional corporation the opportunity to review the data submitted by the State of Alaska on the question of navigability and to submit its views

§ 2653.5 Cemetery sites and historical places.

(a) The appropriate regional corporation may apply to the Secretary for the conveyance of existing cemetery sites or historical places pursuant to section 14(h) of the act. The Secretary may give favorable consideration to these applications: *Provided*, That the Secretary determines that the criteria in these regulations are met: *And provided further*, That the regional corporation agrees to accept a covenant in the conveyance that these cemetery sites or historical places will be maintained and preserved solely as cemetery sites or historical places by the regional corporation, in accordance with the provisions for conveyance reservations in § 2653.9.

(b) The survey of selected sites shall include only the area actually used and a reasonable buffer zone, not over 66 feet wide around abandoned cemeteries; not over 330 feet wide around an area identified as an historical place; and an area to provide reasonable future expansion around active cemeteries.

FUNDAMENTAL LAW ON ALASKA SURVEYS

DISPOSALS BASED ON SALES

DISPOSALS BASED ON SALES

A small tract of public land may be leased or sold for residential or recreational use where the isolated location would not create hardship on state or local government for schools and other facilities such as roads and fire protection. Five acres may be obtained under this provision (43 USC 682a), but see 43 CFR 2731.6 for variation to 7½ acres. Interestingly, any Department of the Interior employee stationed in Alaska may purchase or lease one tract for residence or recreation purposes; see 43 CFR 2731.1. State and local governments and even nonprofit corporations may obtain lands for recreation and public purposes, 43 USC 869. Usually, up to 640 acres may be purchased -- more for State Parks.

CEMETERIES

43 USC 682 authorizes the Secretary to sell unreserved public lands for cemetery purposes. The land required must be as nearly rectangular as possible and cannot exceed 80 acres.

TOWNSITES

The U.S. Code and the Code of Federal Regulations provide for disposal of townsites under eight general types:

Presidential	43 USC 711-712; 43 CFR 2760
Defacto	43 USC 713-715, 717; 43 CFR 2762
Trustee	43 USC 718-720; 43 CFR 2763
Townsite Addition	43 USC 727; 43 CFR 2763.8
Non Native (Alaska)	43 USC 732; 43 CFR 2565
Native (Alaska)	43 USC 733-737; 43 CFR 2564
Reclamation	43 USC 561-573; 43 CFR 2764, 2765
Railroad (Alaska)	43 USC 975b; 43 CFR 2566

PRESIDENTIAL TOWNSITES

This type is established by the government in areas of anticipated development, or the public can petition the Secretary of the Interior to establish a townsite. A selected area is designated as a townsite and withdrawn from other entry by issuance of a Public Land Order. A townsite plan is drawn up, Special Instructions are issued, and the townsite is surveyed by the Cadastral Surveyor assigned. The lots are appraised, the time, place and terms of sale are drawn up and published in the news media and Federal Register. The lots are sold at public auction, and after all regulations are met, a patent is issued to the purchaser. Tok Junction, Alaska, is an example of this type townsite.

DEFACTO TOWNSITE

If people have already established a townsite on public lands, they may obtain title to such lands under these provisions. They may file a plat of the townsite with the County Recorder, on not to exceed 640 acres. The cost of surveying and platting the townsite is to be paid for by the people. If they fail to file the plat with the Bureau of Land Management within 12 months, the BLM can survey the townsite and charge the expense to the new townsite by increasing the minimum value of the lots to be purchased in the amount of fifty percent. Each occupant has preference rights to the lot he occupies. Remaining lots are sold at auction after notice is published in the Federal Register and news media.

Very few townsites are now patented under these provisions of the townsite laws. A recent example, however, is an addition to the town of Metaline, Washington.

TRUSTEE TOWNSITE

The Trustee Townsite is the most common and is the usual method of handling a Defacto townsite. Entry must be made by the mayor or other corporate authority. If the town is not incorporated, entry is made by the County Judge. The entry is made in trust for the occupants, and for the Municipality on the streets and unoccupied lots. The exterior boundaries of the townsite are surveyed by the BLM without cost to the occupants. If the trustee petitions BLM to subdivide the townsite into streets, blocks and lots, the cost of this survey is assessed against the lots within the townsite. The patent to the townsite is issued to the trustee.

The trustee issues deeds to the occupied lots, and after advertisement, sells the unoccupied lots to the highest bidder. Lots may be held for municipal use. The size of the townsite is limited according to population, but cannot exceed 2,560 acres unless the additional lands requested are in actual use as a townsite. Fairbanks, Alaska, and Socorro, New Mexico, are examples of this type townsite.

TOWNSITE ADDITION

If a townsite has been patented under the Trustee Townsite provisions, but does not exceed the acreage limitations, additional entries may be made on contiguous public lands. The area of the original townsite plus any additions may not exceed the limitations based on population, or 2560 acres, whichever is lesser. The boundaries of the addition are surveyed by the BLM, and if the trustee petitions the BLM for the subdivisions, the cost of the subdivision survey is charged against the lots, etc.

There are many additions to Trustee Townsites, such as Juneau and Fairbanks, Alaska.

NON-NATIVE TOWNSITE (Alaska)

This is another Trustee Townsite, but the trustee is appointed by the Secretary of the Interior. The maximum size is based on population, but may not exceed 640 acres. The exterior boundaries are surveyed by the BLM at government expense. The occupants petition for the subdivisions, and after approval, these are surveyed by BLM with the cost of subdivision assessed against the lots. In the subdivisions, reservations are usually made for tracts designated for government use. The patent is issued to the trustee. The trustee disposes of the lots and tracts according to regulations, and keeps all the records. After all of his duties have been performed, the trustee turns over all of his records to the BLM and the municipal authorities of the town.

Dillingham and Cordova are examples of the Non-Native Townsite in Alaska.

NATIVE TOWNSITE (Alaska)

The Native Townsite is handled under the same general provisions as the Non-Native Townsite. The main differences are that the entire cost of surveying and platting is borne by the BLM without assessment against the lots. Also, the Natives have a choice of either restricted or unrestricted deed. If a Native applies for an unrestricted deed, the BIA must certify the applicant is competent to manage his own business affairs. The lands held by restricted deed are not subject to taxation by Federal or local governments. If certain conditions are met, an unrestricted deed can be issued at a later time.

The Native Townsite is common is Alaska. Stoney River Townsite is an example of this type of townsite.

RECLAMATION TOWNSITE

If a Bureau of Reclamation project displaces a town which requires a new townsite, and the BLM approves, public lands may be withdrawn, surveyed into a townsite, and disposed of under the general provisions of the Presidential Townsite. The cost of surveying, disposal, and administration is paid from Reclamation funds. The lots are appraised by the Bureau of Reclamation, sale is advertised in the Federal Register and local news media, and the lots are sold at public auction. Occupants of lots have certain preference rights. Patents are issued and records kept by the Land Office. Proceeds are returned to the Reclamation fund. Lots or tracts for public buildings or schools are patented to the town, for those uses, under a restricted patent.

Huntley and Worden, Montana, and Algoma, Oregon, are examples of Reclamation Townsites, but they may also be made in Alaska.

RAILROAD TOWNSITE (Alaska)

The act of March 12, 1914, provides for the withdrawal of lands along the Alaska Railroad to be set aside, surveyed, and disposed of under the general provisions of the Presidential Townsite. The townsite lands are selected by the Railroad. The BLM surveys the townsite and subdivisions. The lots are appraised and sold as in the Presidential Townsite.

Nenana and Anchorage, Alaska, are examples of Alaska Railroad Townsites.

FUNDAMENTAL LAW ON ALASKA SURVEYS

RIGHTS OF WAY

Interest in lands granted for Rights of Way are of the nature of an easement, license, or permit, unless applicable legislation specifies otherwise. Licenses and permits are considered to be revokable at will by the owner. The permittee may remove earth and rocks for construction from the property for use elsewhere.

Rights of Way may be granted on application by other Federal agencies, State agencies, local government, or individuals and corporations. The applicant agrees to keep the Right of Way clear, provide weed and erosion control, control fire hazards, and to keep roads and trails crossing the new work in operating condition.

Each application must be accompanied by a map at specified scales (43 CFR 2802.1-5), showing courses and distances referred to true meridian with stationing at all deflection points. The initial and terminal points should be connected to the nearest corner of the Public Lands Survey. All subdivisions of the Public Lands Survey within the limits of the work are shown in their entirety, based on the official plats..

The applicant is required to establish reference monuments if it happens that monuments for corners of the Public Lands are to be destroyed or covered by the work in progress.

If the applicant wishes to transfer his interest in the Right of Way, he must obtain prior approval and the assignee must comply with the same requirements as the original applicant.

Anyone who enters or takes title to public lands affected by any Right of Way, takes the land subject to the Right of Way. Their entry is based on the gross area entered without deduction for the area of the Right of Way involved.

Public Land Orders affecting Right of Way are shown below for information purposes. Later amendments may affect the provisions shown so that the latest status should be determined in each case.

RIGHTS-OF-WAY FOR HIGHWAYS

October 16, 1951

ORDER NO. 2665

SUBJECT: RIGHTS-OF-WAY FOR HIGHWAYS IN ALASKA

Sec. 1. Purpose. (a) The purpose of this order is to (1) fix the width of all public highways in Alaska established or maintained under the jurisdiction of the Secretary of the Interior and (2) prescribe a uniform procedure for the establishement of rights-of-way or easements over or across the public lands for such highways. Authority for these actions is contained in Section 2 of the Act of June 30, 1932 (47 Stat. 446, 48 U.S.C. 321a).

Sec. 2 Width of Public Highways. (a) The width of the public highways in Alaska shall be as follows:

(1) For through roads:

The Alaska Highway shall extend 300 feet on each side of the center line thereof.

The Richardson Highway, Glenn Highway, Haines Highway, Seward-Anchorage Highway, Anchorage-Lake Spenard Highway and Fairbanks-College Highway shall extend 150 feet on each side of the center line thereof.

(2) For feeder roads:

Abbert Road (Kodiak Island), Edgerton Cutoff, Elliott Highway, Seward Peninsula Tram road, Steese Highway, Sterling Highway, Taylor Highway, Northway Junction to Airport Road, Palmer to Matanuska to Wasilla Junction Road, Palmer to Finger Lake to Wasilla Road, Glenn Highway Junction to Fishhook Junction to Wasilla to Knik Road, Slana to Nebesna Road, Kenai Junction to Kenai Road, University to Ester Road, Central to Circle Hot Springs to Portage Creek Road, Manley Hot Springs to Eureka Road, North Park Boundary To Kantishna Road, Paxson to McKinley Park Road, Sterling Landing to Ophir Road, Iditarod to Flat Road, Dillingham to Wood River Road, Ruby to Long to Poorman Road, Nome to Council Road and Nome to Bessie Road shall each extend 100 feet on each side of the center line thereof.

(3) For local roads:

All public roads not classified as through roads or feeder roads shall extend 50 feet on each side of the center line thereof.

Sec. 3. Establishment of rights-of-way or easements.

(a) A reservation for highway purposes covering the lands embraced in the through roads mentioned in section 2 of this order was made by Public Land Order No. 601 of August 10, 1940, as amended by Public Land Order No. 757 of October 16, 1951. That order operated as a complete segregation of the land from all forms of appropriation under the public-land laws, including the mining and the mineral leasing laws.

(b) A right-of-way or easement for highway purposes covering the lands embraced in the feeder roads and the local roads equal in extent to the width of such roads as established in section 2 of this order, is hereby established for such roads over and across the public lands.

(c) The reservation mentioned in paragraph (a) and the rights-of-way or easements mentioned in paragraph (b) will attach as to all new construction involving public roads in Alaska when the survey stakes have been set on the ground and notices have been posted at appropriate points along the route of the new construction specifying the type and width of the roads.

Sec. 4. Road maps to be filed in proper Land Office. Maps of all public roads in Alaska heretofore or hereafter constructed showing the location of the roads together with appropriate plans and specifications will be filed in the Alaska Road Commission in the proper Land Office at the earliest possible date for the information of the public.

/s/ Oscar L. Chapman

Secretary of the Interior

UNITED STATES
DEPARTMENT OF THE INTERIOR
WASHINGTON 25, D. C.

ORDER NO. 2665 (October 16, 1951) Amendment No. 1.

SUBJECT: RIGHTS-OF-WAY FOR HIGHWAYS IN ALASKA

The right-of-way or easement for highway purposes covering the lands embraced in local roads established over the public lands in Alaska by section 2 (a) (3) and section 3 (b) of Order No. 2665 of October 16, 1951 (16 F.R. 10752), is hereby reduced, so far as it affects the Otis Lake Road, to 30 feet on each side of the center line thereof over the following described lands only:

Seward Meridian

T. 13 N., R. 3 W.,
Sec. 21, N½SW¼ and SW¼SW¼

/s/ Oscar L. Chapman

Secretary of the Interior

July 17, 1952

FUNDAMENTAL LAW ON ALASKA SURVEYS

PROCEDURE FOR EXECUTION OF LAND DISPOSALS

In general, the process of execution of surveys in connection with disposal of Public Lands involves the following steps:

1)	Application to the Land Office	(Claimant)
2)	Adjudication of Claim	(Lands)
3)	Examination in the Field	(Lands)
4)	Request for Survey	(To Cadastral)
5)	Prep. Special Instructions	(Cadastral)
6)	Field Survey	(Cadastral)
7)	Field Notes & Plat	(Cadastral)
8)	Patent	(Lands)

EXECUTION OF TOWNSITE SURVEYS

In the past few years, the townsite program in Alaska was a large share of the surveying work load. Although the procedures may vary slightly from time to time and vary for an individual townsite, the following steps may be used as a guide on Native Townsites:

1. With the assistance of the Bureau of Indian Affairs, the residents of the town petition for a townsite survey and appoint a Trustee. This petition may be received by the Trustee or the BLM State Office, but in either case it is forwarded to the Land Office for serialization.

2. The Land Office serializes the petition, runs a status report, and refers it to the District Manager. A copy of the petition is routed to the Trustee and Engineering. Engineering checks for the availability of up-to-date aerial photos, and whether there are unapproved Cadastral Surveys in the area. If recent photography is not available, the District Manager requests it.

3. The District Manager refers the petition to the Area Manager who programs a preliminary examination. The BIA Realty Officer and State Division of Aviation are alerted so that they may participate. Existing withdrawals and other land claims are reviewed for possible required modification (Natives of Alaska have prior rights). A written report is prepared which explains the resolution of any conflicts.

4. The District Manager approves the report, which either:

   a. Recommends rejection of the townsite petition. The Trustee is issued a decision rejecting the petition, granting the right of appeal. After the appeal rights have been exhausted, the case is closed on the records.

   b. Recommends proceeding with a townsite and places the townsite on the survey list. If he desires higher priority, he makes a memo recommendation to that effect in the file.

5. The District Manager alerts other Federal and State agencies of BLM's plans to proceed with a townsite survey. These agencies include (by initials) FHA, BIA, VA, Post Office, Public Health Service, Extension Service, FAA, USFS, GSA, Fish & Wildlife, and the Corps of Engineers. The state agencies include the Housing Authority, Divisions of Highways, Lands, and Aviation, Departments of Education, Public Welfare, Fish and Game, and Defense. The city or village Council and the Borrough Office are also notified, as is, in many instances, the Congressional Delegation.

6. The District Manager refers the case file to Cadastral Engineering for assignment of a Survey Number and suggestion of priorities.

7. Using up-to-date aerial photos, ground control is obtained. This is a joint effort of the Area Manager, Photogrammetry and Cadastral Survey. An on-the-ground investigation is made, ownerships are determined, as well as locations for municipal reserves, expansion areas, and feasibility of street locations. These details are sketched on enlarged aerial photos or any available base map.

8. From the ground control obtained, an "As-built" plat of the townsite is prepared. All man-made improvements and important natural features are shown. A proposed townsite plan is developed, with all streets, blocks and lots of the subdivisions shown. This proposed layout is reviewed by Engineering.

9. Copies of the proposed townsite plan are taken to the village council by the Townsite Trustee, Area Manager, Engineering, and the BIA Realty Officer. The plan is discussed and examined by the occupants and the council. Any objections are heard. Necessary adjustments are made. The lot boundaries, street locations, municipal reserves, etc., are finalized, with concurrence of the village council. All occupants, as well as the council, affix their signature on the agreed-upon plat, attesting that it is acceptable to them.

10. The approved plan is then drafted. Special Instructions are written and the townsite placed on the schedule for survey.

11. A cadastral surveyor is assigned to do the field work. After completion of the field survey, the required field notes are written, and plats of the boundaries of the townsite and of the townsite survey itself are prepared. After checking they are submitted to the Washington Office for approval and acceptance.

12. After the plat is accepted, the Trustee posts the Notice of Intent to File Final Proof, and a copy of the plat of the townsite in the village.

13. Four Proof Witnesses are obtained to attest that the plat has been posted, and has continued to remain posted, for a period of 30 days.

14. Publication of the Notice is not required for an all native townsite. In a non-native or part native townsite, where the Trustee contemplates an auction sale of the vacant lots, the Trustees Notice of Intent to File Final Proof must be published once a week for a period of five weeks in a newspaper of general circulation.

15. Following the posting (and publication if required) the Trustee submits Final Proof and applies for the patent.

16. The Land Office issues the final certificate and patent.

17. The Trustee posts the NOTICE of LOT AWARDS in the townsite for a period of at least 30 days.

18. The Trustee visits the Townsite accompanied by the Area Manager and the BIA Area Field Representative. The occupants are assisted in making application for deeds to their lots.

19. Restricted deeds are issued to the Natives, by the Trustee, not less than 30 days after the posting.

    In a non-native, or part native townsite, the vacant lots can be sold. In an all native townsite, none can be sold.

20. If lots can be sold, the Sale Notice (listing all the lots to be sold and the minimum acceptable bid) is posted in the village, and published in the nearest newspaper for 30 days prior to the sale.

21. The vacant and unclaimed lots are sold at public outcry auction, at the time and place specified in the Sale Notice. A second sale and subsequent sales may be held, provided each is advertised in the same manner as the first.

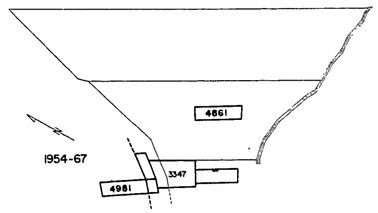
22. Successful bidders are issued non-native (unrestricted) deeds.

23. After all patented lands in the townsite have been deeded and the excess monies either conveyed to the city (if incorporated) or spent on an approved project within the townsite, the townsite is closed, the records are properly distributed, and the Trustee is dismissed.

FUNDAMENTAL LAW ON ALASKA SURVEYS

Disposal Type	Applicant	Type Lands Subject to Disposal	Notice to B.L.M.	Information Reqd. by Applicant	Nominal Dimensions (Area)	Maximum Allowance Dimensions	Survey Requisition	Processing Requirements
Homestead	Head of Family or see 43 CFR 2511.1. Indian applicants See 2511.3-2.	Nonmineral, non-saline land not occupied by industry. Must be classified as open to Homestead.	Not required in Alaska. May be initiated by application.	Description by section, township, and range.	160 Acres	May exceed 160 acres if composed of subdivisions	U. S. Survey	Surveyor can adjust boundaries to make 160 acres.
Native Claim	Resident Indian, Aleut or Eskimo who is head of the family.	Unreserved Alaska lands occupied by claimant.	Application certified by BIA.	Described by Plat, if surveyed – or by metes and bounds with tie to natural object plus location map.	160 Acres, (can be separate tracts each in compact form).	160.00 Acres.		43 CFR 2561 48 USC 357, 357a, 357b. Surveyor can reduce boundaries to make 160 acres.
T & M Sites	Person or corporation operating productive industry	Vacant and nonmineral land occupied by industry.	Notice within 90 days of occupancy.	Statement on business use and improvements, general description.	80 Acres.	80.00 Acres. Cannot abut more than 80 rods of shore space on navigable water.	Applicant pays for government survey.	43 CFR 2562, survey to be made in season following special instructions. 48 USC 461.
Headquarters and Homesites	Fishermen, Trappers, Traders or manufacturer engaged in productive industry.	Unreserved nonmineral public lands.	Notice reqd. within 90 days.	Description by plats of survey or metes and bounds if unsurveyed.	5 Acres.	5.00 Acres, but small, (2 1/2 acres or less). Portions of subdivisions left isolated may be reduced.		48 USC 461, See 43 CFR 2563.
Native Villages	Indian or Eskimo occupants, trustee townsites.	Public Lands occupied by native villages.	Not reqd.	Trustee takes title.				48 USC 355 a-d, Native receives restricted, nontransferrable deed unless special application is made thru BIA. See 43 CFR 2564.
Small Tracts	Individual or corporation plus Dept. of Interior Employee.	Only vacant land classified as suitable for lease or sale.	Application in triplicate unless already classified.	Describe by aliquot parts if surveyed; or by metes and bounds to accurately identify.	5 Acres.	Unusable fractions of lots may increase area to 7 1/2 acres maximum.		48 USC 682a 43 CFR 2730 50 ft. Right of Way reserved on boundaries for roads.
Recreation and Public purposes.	Nonprofit corporation and local governments.	Unreserved public land as suitable for public purpose.	Triplicate, Application and Petition – unless already classified.	Statement of proposed use, in triplicate.	640 Acres except roadside parks have 10 acres.	640 Acres per application except state parks.		43 CFR 2740 43 USC 869
Cemetery	Religious Association Corporations authorized to own cemeteries.	Unreserved, unappropriated nonmineral public lands.	Application to BLM Reqd.	Description of lands, authority for holding cemeteries.	80 Acres			As nearly rectangular as possible.
Townsite	Lot purchasers must be U.S. citizens.	Public Lands not reserved or withdrawn which is classified as suitable for townsite.	Petition reqd. to establish classification as townsite unless govt agency sponsored.		100-200 people, 320 acres. 200-1000 people, 640 acres. 1000 people, 1280 acres., plus 320 acres / 1000. For 100 or less people, actual occupancy.	Townsite not to exceed 2560 acres.	Map to be filed within 12 months from establishment, or government may perform survey and add cost to lot prices.	See 43 CFR 2760 43 USC 711
Scrip	Veterans of WWI	Lands classified for Soldier's Additional Homestead.	Applicant must publish notice of intention to file.					Soldier Scrip becomes null & void Jan. 1, 1975. Appraised value of $250/acre or more reqd. for classification.
State Grants	State of Alaska, to compensate for loss of school lands.	Vacant, unreserved lands.	Petition and application.	Statement referring to the Enabling Act, mineral character and description of selecting lands. Cause of loss of base lands.				43 CFR 2620, esp. 2624. 43 USC 869-2
Airport Grants	Any public agency defined in 14 CFR 153.3	Any lands owned or controlled by the United States.	Application in duplicate to BLM with copy to FAA.	Description	More than 5760 acres per tract.	One application limited to 12,000 acres, except may be waived on unsurveyed lands.		43 CFR 2640, 49 USC 1115 Publication and posting
ANCSA	Village corporation, Regional (Native) corporation and individual natives.		Applications required.	Description by survey or protraction diagram and map if available.	Units of more than 1280 acres to village corporations and regional corporations.		Surveys will consider navigability of waters, and beds of navigable waters excluded. No ground monument by BLM of bodies of water. Survey regional tracts monumented at 2 mile intervals.	43 USC 1600 43 CFR 2650

NATIVE CLAIM SURVEY



History of Surveys

1954 Harold Radcliffe surveyed U.S. Survey No. 3347.

1964 J. West Perley executed U.S. Survey No. 4661 in September 1964.

1967 Edward P. Prendergast surveyed U.S. Survey No. 4981 on October 7-9, 1967.

Reasons for Request of this Survey

This survey was requested in connection with applications by Adam and Ralph A. Sanford.

Special Instructions

The Special Instructions cover all the known and anticipated conditions on the ground, and direct the surveyor to survey two native allotments and any native graves found within them. No mention is made of a school site. Figure 1 is a copy of a portion of the Special Instructions for U.S. Survey No. 5524.

Conditions Found on the Ground

U.S. Survey 3347, 4661 and 4981 were recovered with no resurvey problems involved.

The surveyor assigned to U.S. Survey No. 5524 followed the application descriptions with no particular difficulty. Lot 1 could be surveyed substantially as described, except that a native school was on the land. As marked on the ground and by the description lot 2 (Ralph A. Sanford) exceeded 160 acres outside the highway easement.

The northeasterly boundary of lot 1 was limited by the description and claim stakes. When surveyed it turned out to contain much less than 160 acres, so acreage limitations were not approached, and no adjustments required.

Preliminary Statement of the Problem

The application for survey cites a description of the claim. It is the surveyor's duty to locate the described land on the ground and to reconcile any differences between the description and the "as staked" corners.

Manual Regulations

This survey illustrates the application of sections 7-4 and 7-16 of the Manual of Surveying Instructions, 1973.

Legal Constraints

This work must comply with the U.S. Code of Federal Regulations, chapter II, 2561.0-8, Native Allotments; chapter II, 2325.1 (C), School Tracts; P.L.O. 2288, Native Cemeteries; P.L.O. 386, 601 and 1613, Highway Easements; Secretarial Order 2665, amendments 1 and 2, Highway Easements.

Native allotments in Alaska are defined and the rules for surveying are set out in 43 CFR 2561. A Native may receive as much as 160 acres which is to be surveyed in a reasonably compact form.

Native cemeteries were originally required to have a 330 foot buffer zone but this requirement was modified to require only "whatever buffer zone is necessary."

Public Land Order No. 386 and 601 reduced the width of specific public highways. The Glenn Highway was affected by these orders, specifying 150 feet each side of the centerline as withdrawn. The withdrawal was, in its effect, a right of way. The requirements were revised under P.L.O. No. 1613.

In P.L.O. No. 1613 the previous withdrawals for highway or road rights-of-way are revoked and easements established. Also under P.L.O. 1613, provision is made for a patentee to purchase the land adjoining his patent up to the centerline of the highway or road as it existed on April 7, 1958. A bonafide, valid claim may be amended to include the easement, with such inclusion not being charged to the acreage limitations of the claim itself. If the claimant declines his right to take to the centerline of the road or highway, the easement may then be claimed by someone else. In other words: A man may claim the easement if he wishes but cannot build upon it or otherwise obstruct the easement from public use.

Final Statement of the Problem

The surveyor had to revise the lines of lot 2 to comply with acreage limitations and provide for the native school located on lot 1, but not mentioned in the Special Instructions.

Solution

The surveyor assigned to U.S. Survey 5524 was familiar with the many laws, rules and regulations pertaining to the survey and disposal of public lands in Alaska. He surveyed a lot to segregate an area and improvements used by the existing school from the claim.

The school had an existing right over the claimant. By discussion with local officials and examination of the area of actual use, lot 3 was surveyed, containing 2 acres, to segregate the school site.

Discussion and consultation with the owners of the graves determined the area of lots 4 and 5 to accommodate the provisions of P.L.O. No. 2288. The burden is placed upon the surveyor (at least in part) to determine "whatever buffer zone is necessary" for a cemetery.

Lot 2 was surveyed very nearly as described, except that the length along the Glenn Highway had to be reduced to hold to the 160 acre limitation. Lot 2 contains exactly 160 acres outside the highway easement and the side lines are parallel. Lot 2 was actually surveyed and monumented to the centerline of the Glenn Highway and contained 166.73 acres. (After submission to the Washington Office for acceptance, the area within the highway easement was redesignated lot 6, containing 6.73 acres, and lot 2 was reduced to 160 acres. There are no monuments on the ground marked for lot 6. The claimant received patent to both lots 2 and 6).

As required by Section 7-16 of the Manual of Surveying Instructions, 1973, and the Special Instructions, a witness point was set on line 2-3 of lot 2 at 45.42 chains to mark that line.

Lot 2 of U.S. Survey 4661 and lots 4 and 5 of this survey were carefully tied to the corners of lot 1 to show their true relationship.

SPECIAL INSTRUCTIONS

U.S. Survey No. 5524
Alaska

(Native Allotments)

June 10, 1968

Provides for the survey of two tracts of land situated on the easterly side of the Glenn Highway near Chistochina, Alaska, at approximate Latitude 62° 34' N., Longitude 144° 40' W., being those tracts applied for by Adam Sanford, and Ralph A. Sanford, under Anchorage Serial Nos. 031645 and 031654, respectively.

In the execution of U.S. Survey No. 5524, Alaska, the surveyor assigned is authorized and directed to make the survey hereinafter set out and any necessary retracements and restoration of points of control; and will be guided by the Manual of Surveying Instructions, 1947, the provisions of these Special Instructions and the provisions of any supplemental instructions which may be issued pursuant to a report of complications, or by reason of additional authorization.

AUTHORITY

The Chief, Division of Lands and Minerals Program Management, by memorandum dated August 16, 1967, requested the necessary survey to accommodate an application filed by Adam Sanford, Anchorage Serial No. A-031645; and the Manager, Anchorage Land Office, by memorandum dated May 18, 1962, requested the necessary survey to accommodate an application filed by Ralph A. Sanford under Anchorage Serial No. A-031654.

APPROPRIATION

Costs of this survey are payable out of current Management of Lands and Resources appropriation in accordance with administrative requirements. An accurate account of all expenses incurred in the execution of this survey will be submitted to the Branch of Office Engineering along with the field data.

RELATED SURVEYS

U.S. Surveys Nos. 3332, 3347, and 4661 are located in the immediate vicinity.

METHODS AND PROCEDURES

These instructions provide for survey of the boundaries of the tracts as filed. A description of each tract, as given in the request for survey, is as follows:

A-031645, Native Allotment, Adam Sanford

"Beginning at Corner No. 1 of U.S. Survey 3347; thence Northeasterly following the west side of the right-of-way of the Glenn Highway a distance of 3/8 of a mile; thence S. 44° 06' E. one mile, more or less, to the right bank of the Copper River; thence Southwesterly following the meanders of the right bank of the Copper River to a point S. 44° 06' E. from Corner No. 1 of U.S. Survey 3347; thence N. 44° 06' W. ½ mile, more or less, to the point of beginning, containing 160 acres.

Improvements: House 19' x 19', House 12' x 24', Cache, Tent Frame, Smoke house 18' x 20', Dog houses - 5 each, Outhouses - 2 each."

NOTE: Lot 4, U.S. Survey No. 4661 lies within this tract.

A-031654, Native Allotment, Ralph A. Sanford

"Beginning at a point located approximately 3/8 of a mile northeasterly along the centerline of the Glenn Highway from Corner No. 1 of USS 3347;
thence northeasterly along the centerline of the Glenn Highway 3/8 of a mile to Corner No. 2;
thence S. 44° 06' E. approximately 7/8 of a mile to the Copper River and Corner No. 3;
thence meandering southwesterly along the Copper River approximately 3/8 of a mile to Corner No. 4;
thence N. 44° 06' W. approximately 1/2 of a mile to Corner No. 1, the true point of beginning."

The total area of this survey is undetermined. Each lot should be held as near as practicable to the individual description; however, A-031645 may not exceed 160.00 acres, and A-031654 will be surveyed as one lot containing approximately 170 acres, with the portion outside the highway easement not to exceed 160.00 acres.

The surveyor assigned will execute the surveys based upon the above descriptions, using good survey practice in making such modifications as may be necessary. Minor adjustments to provide parallel boundaries or promote good survey practice should be made. Major adjustments must have prior approval of the officer approving these Special Instructions.

A portion of this survey will consist of meanders of the Copper River. Such meanders will be extended approximately 10 chains on each side of the survey. Native allotments are not limited to 40.00 chains of shorespace.

The easement of the Glenn Highway is 150 ft. each side of the highway centerline.

The westerly boundary of A-031645 will be common with the easterly easement line of the Glenn Highway and may be surveyed by a traverse 150 ft. from and parallel to the approximate highway centerline.

The westerly boundary of A-031654 will be common with the approximate centerline of the Glenn Highway.

Each angle point on the highway centerline or highway easement line will be given a corner number, monumented and properly referenced.

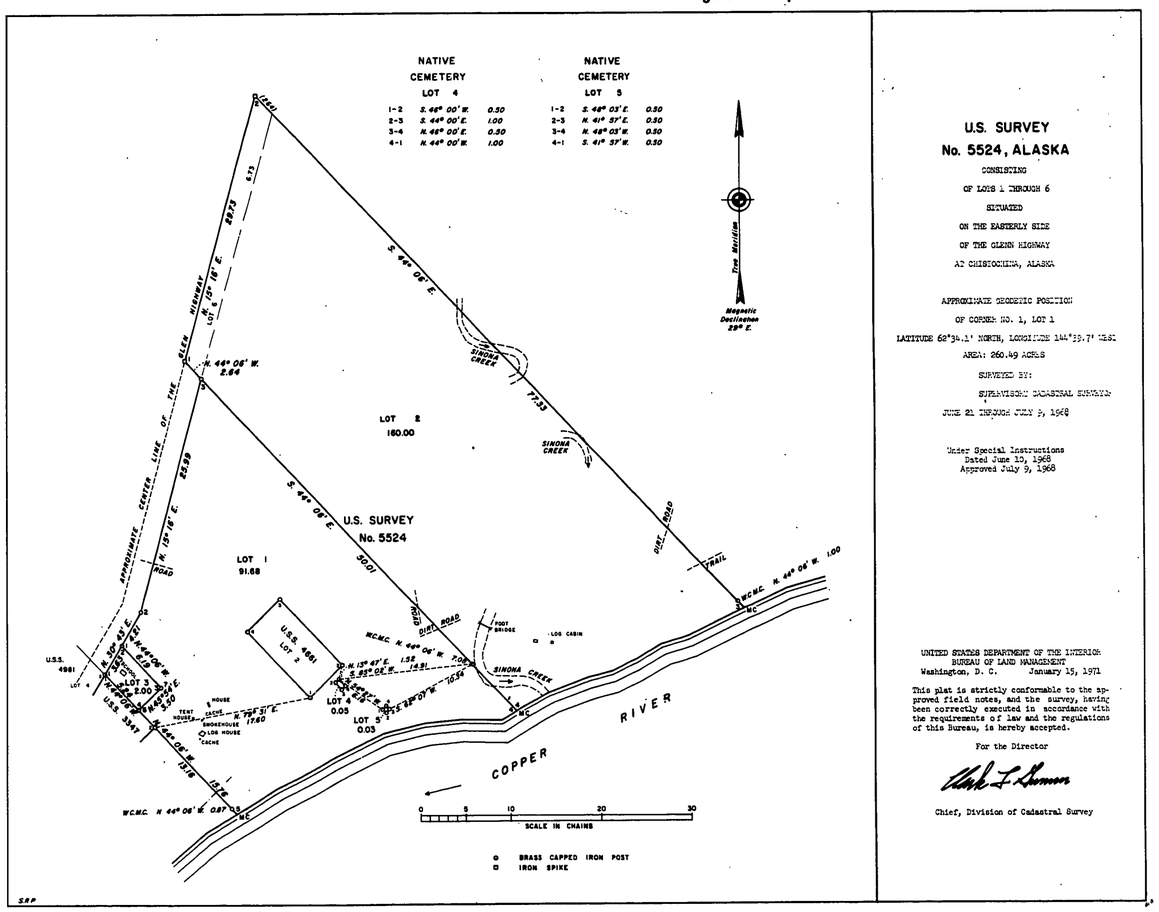
Witness points will be set on any line that exceeds 45.00 chains in length, and will be numbered consecutively.

There are several native graves located in A-031645.

These graves will be located and lots of adequate size will be surveyed exluding them from this tract.

This survey being contiguous with U.S. Surveys Nos. 3347 and 4661 (Lot 2) no other location ties will be necessary. Corners of U.S. Surveys 3347 and 4661 (Lot 2) will have the proper marks added for this survey, including the new data.

Figure 1 - Special Instructions



U.S. SURVEY
No. 5524, ALASKA
CONSISTING
OF LOTS 1 THROUGH 6
SITUATED
ON THE EASTERLY SIDE
OF THE GLENN HIGHWAY
AT CHISTOCHINA, ALASKA

APPROXIMATE GEODETIC POSITION
OF CORNER NO. 1, LOT 1
LATITUDE 62°38.1' NORTH, LONGITUDE 144°39.7' WEST
AREA: 260.49 ACRES
SURVEYED BY:
SUPERVISORY CADASTRAL SURVEYS
JUNE 21 THROUGH JULY 9, 1968

Under Special Instructions
Dated June 10, 1968
Approved July 9, 1968

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C. January 15, 1971

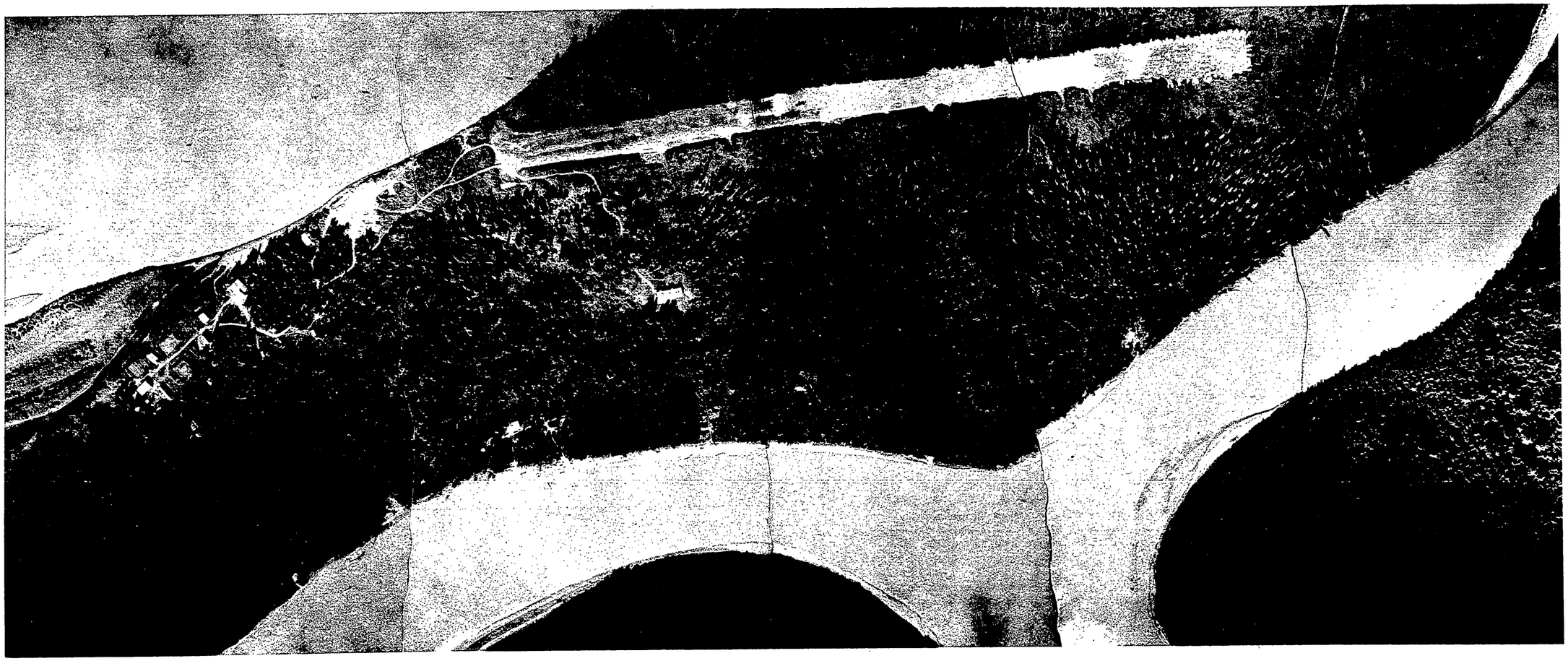
This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

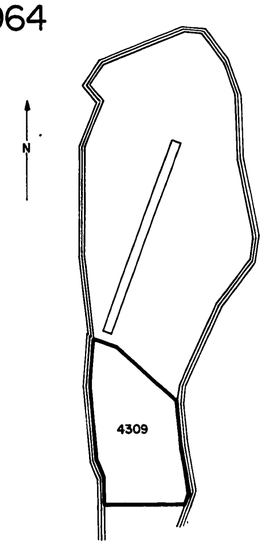
Chief, Division of Cadastral Survey

Figure 2 - Accepted Plat

STONEY RIVER TOWNSITE



1964



History of Surveys

1964 Edward A. Taylor performed U.S. Survey No. 4309 to accommodate a Trade and Manufacturing Site claim.

No rectangular surveys exist in the vicinity.

Reasons for Request of this Survey

The village of Stoney River is located on an island in the Kuskokwim River, near its confluence with the Stoney River.

In 1962 the native residents of Stoney River petitioned for a townsite. The petition was approved and assigned Fairbanks Serial No. 031391. Aerial photography was flown on July 24, 1966. (Figure 1) Ground control was established and ownership of the existing properties was determined in the fall of 1967. The "as built" compilation and a preliminary townsite design were completed in January 1968. (A portion of the preliminary townsite design is illustrated by figure 2) The preliminary design, with modifications, was approved by the village council. The final townsite design was completed and a preliminary plat completed in the spring of 1968. The preliminary plat was drawn to scales of 200 feet and 50 feet to the inch. Block and lot numbers were assigned, and dimensions were given on this completed preliminary plat.

Special Instructions

Special Instructions were written on April 19 and approved on April 23, 1968, under U.S. Survey No. 4490. (See figure 3) The approved plan was made part of the Special Instructions. The work was assigned to a cadastral surveyor on April 29, 1968.

Preliminary Statement of the Problem

The surveyor is required to establish the lot and block corners on the ground according to the preliminary design. The surveyor must scale some preliminary values and set out the scaled distances on the ground. If these initial bearings and distances fit the topography and improvements he finds on the ground the scaled values become temporarily fixed. Using the fixed values, the surveyor then computes or measures the balance of the lines in the townsite.

Manual Regulations

This survey illustrates the application of sections 7-17 to 7-31 of the Manual of Surveying Instructions, 1973.

Legal Constraints

The general provisions pertaining to Native Townsites are codified in 43 USC 733-737, formerly 48 USC 355 to 355e. Title 43 CFR, Subpart 2564, is also applicable.

Final Statement of the Problem

No change.

Solution

Work was begun on May 28, 1968.

The northerly boundary (Line 1-2 and 2-3) of U.S. Survey No. 4309 was retraced. The monuments were recovered and additionally marked for corners 1, 2 and 3 of U.S. Survey No. 4490, Tract A. The remaining exterior boundaries of Tract A were then surveyed, clockwise, in accordance with the final design. All measurements were made in the foot unit, to the nearest one hundredth of a foot. The meanders of the slough, a branch of the Kuskokwim River, were surveyed in the same manner. The methods and procedures were third order (1/5000). The error of closure was then adjusted to a closure using the broken boundary (compass rule) method. Since the bearings and lengths of the lines from corner 1 to corner 5 of Tract A were fixed by the previous U.S. Survey 4309, the adjustment was made only in the line 5-6 and the meanders of the slough.

STONEY RIVER TOWNSITE

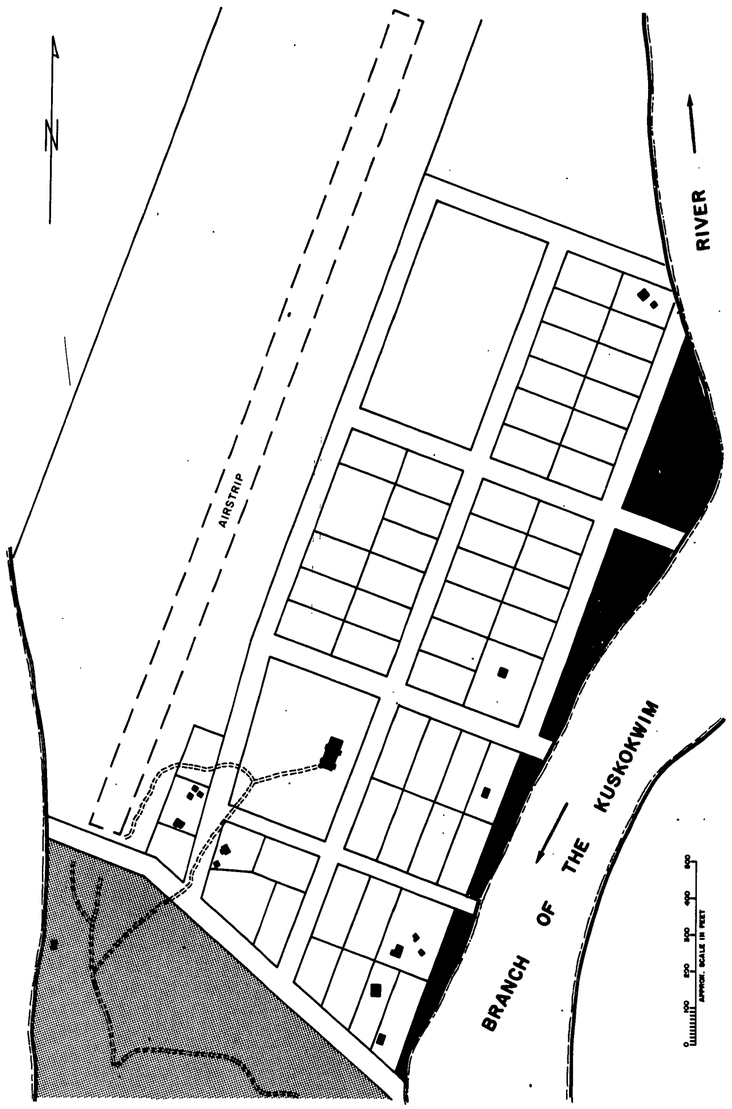


Figure 2 - Preliminary Design

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Alaska State Office
Division of Engineering
555 Cordova Street
Anchorage, Alaska

SPECIAL INSTRUCTIONS

U.S. Survey No. 4490
Alaska

April 19, 1968

Provide for the survey of two tracts of land situated between the Kuskokwim River and a slough of the Kuskokwim River, at approximate Latitude 61° 47' N., Longitude 156° 35' W.; Tract A being those lands petitioned for townsite by the Native residents of the Village of Stony River, under Fairbanks Serial No. 031391, and Tract B, being those lands containing the airport.

In the execution of U.S. Survey No. 4490, Alaska, the surveyor assigned is authorized and directed to make the survey hereinafter set out and any necessary retracements and restoration of points of control; and will be guided by the Manual of Surveying Instructions, 1947, the provisions of these Special Instructions and the provisions of any supplemental instructions which may be issued pursuant to a report of complications, or by reason of additional authorization.

AUTHORITY

The District Manager, by memorandum dated March 22, 1968, requested the necessary survey to accommodate Townsite application, Fairbanks Serial No. 031391, filed by the inhabitants of the Village of Stony River.

APPROPRIATION

Costs of this survey are payable out of current Management of Lands and Resources appropriation in accordance with administrative requirements. A separate accurate account of all expenses incurred in the execution of the boundary and subdivision of this survey will be kept, and will be submitted to the Branch of Office Engineering along with the field data.

RELATED SURVEYS

U.S. Survey No. 4309 is located in the immediate vicinity.

METHODS AND PROCEDURES

These instructions provide for survey of the Stony River Townsite, based on an approved plan, attached to, and made a part of these instructions.

A portion of this survey will consist of meanders of the Kuskokwim River and an unnamed slough. Such meanders will be extended approximately 10 chs. on the unsurveyed side of the survey.

All exterior corner points, meander or witness meander corners, street centerline intersections, angle points and witness points will be monumented with iron posts, or brass tablets, set in concrete, with brass caps properly marked. All monuments falling within streets will be buried at least one foot below the present or anticipated grade of the streets. Block corners will be monumented with copperweld monuments. Lot corners will be monumented with 5/8-inch diameter reinforcing rods, with caps suitable for marking or with other corner material of a substantially permanent nature.

The townsite initials will not be placed on any corner monument of this survey.

This survey being contiguous with U.S. Survey No. 4309, no other ties will be necessary. Corners of U.S. Survey No. 4309 will have the proper marks added for this survey, including the new date.

Pertinent topographic features will be noted, recorded in the field note record and delineated on the plat of survey.

GENERAL

Copies of available maps, plats, and field notes will be furnished as data.

The field tablets and computations will be carefully verified while in the field and will be so kept as to facilitate ready preparation of the final returns, whether by the surveyor assigned or some other surveyor of the service.

The surveyor shall include with this material a field sketch of the survey whereon the final adjusted courses of all lines of the survey are shown. He shall also provide closure sheets, based upon these final adjusted courses for the townsite, individual tracts, blocks and lots. Areas need not be computed for individual lots as this can be computed later by ADP. These tablets and computations, together with the data furnished, will be packaged and filed with the Anchorage Branch of Office Engineering at the first available opportunity after completion of the field work.

In the event that complications are encountered, not covered by these instructions, while executing the survey, a report will be made to this office together with any recommendations.

/s/ Jack C. Means

Jack C. Means
Chief, Branch of Office Engineering

Approved: April 23 1968

/s/ Lyle F. Jones

Lyle F. Jones
Chief, Division of Engineering

Copy to: Chief, Branch of Field Surveys
Chief, Division of Engineering, Washington, D.C.

JHTyer:ft 4/19/68
Rewritten:LFJones:ft 4/23/68

Figure 3 - Special Instructions

The direction of the line 5-6 was determined by a line parallel to and 190 feet from the centerline of the existing airport runway. After the exterior boundaries were surveyed and adjusted, the total area of Tract A was computed to be 57.53 acres. The street centerlines were then surveyed and monumented with brass capped iron posts at the centerline intersections and angle points. These centerline monuments must be intervisible. To comply with this requirement the intersection of Birch and Willow Roads was not monumented. Instead the monuments were placed on the centerline of Birch Road, intervisible with the intersections of North and Church Roads. The terminal intersections with the meander lines were monumented in a manner similar to witness corners and marked as witness points. All street centerline monuments were buried with the tops at least one foot below anticipated final street grades and marked for the street intersection only.

The exterior boundaries of the blocks were then surveyed and monumented with "Copperwelds." These monuments were driven flush (or nearly so) with the surface of the ground, and marked with the survey number, block and lot identification. If they were set as witness corners (along the meander lines) they were also marked with WC MC, and an arrow pointing to the true corner.

Finally, the lot corners were established and monumented using steel reinforcing rods with aluminum caps. They were driven flush with the ground and marked for the appropriate block and lot numbers only. Note that the townsite initials and letters TS were not marked on the monuments.

The area of each block must be computed and the area of the streets determined. The sum of all the block areas plus the streets must equal the total area of the townsite. The total of each lot within a block is also computed, and the sum of the lot areas must equal the area of the block.

The area of each lot or unsubdivided block is entered on the plat in square feet, to the nearest square foot.

Lot 9, Block 7; Lot 8, Block 8 and Blocks 9 and 10, are areas designated as Municipal Reserves and are so labeled on the plat. Block 2 accommodates the existing school. Blocks 4 and 11 are expansion areas and are not subdivided at the present time. They are not Municipal Reserves, however.

To complete Survey No. 4490, the airport was surveyed as Tract B. The westerly boundary is parallel to and 500 feet from the centerline of the runway. The meanders of the river and slough and the line 3-4 were surveyed in chain units and in minutes of bearing. The meanders were extended for 10 chains, from corner 3 and corner 4, to show the direction of the shore line. It is required that a witness point be set on any line that exceeds 45 chains in length, so the southwesterly corner of Block 11, Tract A was utilized and marked as the witness point on line 5-1 of Tract B, fulfilling the requirement. Tract B was not adjusted to a perfect closure because it is not part of the townsite. However, the actual closure was well within limits.

After the survey was completed all the calculations were checked. Based upon the final design sheets which were drawn at scales of 200 feet and 50 feet to the inch, sketch plats were prepared. These were needed for drafting of the final plat. The field notes were written of the survey of the exterior boundaries of Tracts A and B, only. The field notes describe the exterior corners of the survey but not the corners of the townsite subdivision. Distances are given to street intersections and block lines but no description of those monuments is entered. The details of the townsite subdivisions are given on the plat only.

The plat of U.S. Survey 4490 and the Stoney River Townsite is in two sheets. Sheet 1 shows the exteriors of the survey as given in the field notes. Sheet 2 shows the townsite subdivision details. These sheets are illustrated by figures 4 and 5.

STONEY RIVER TOWNSITE

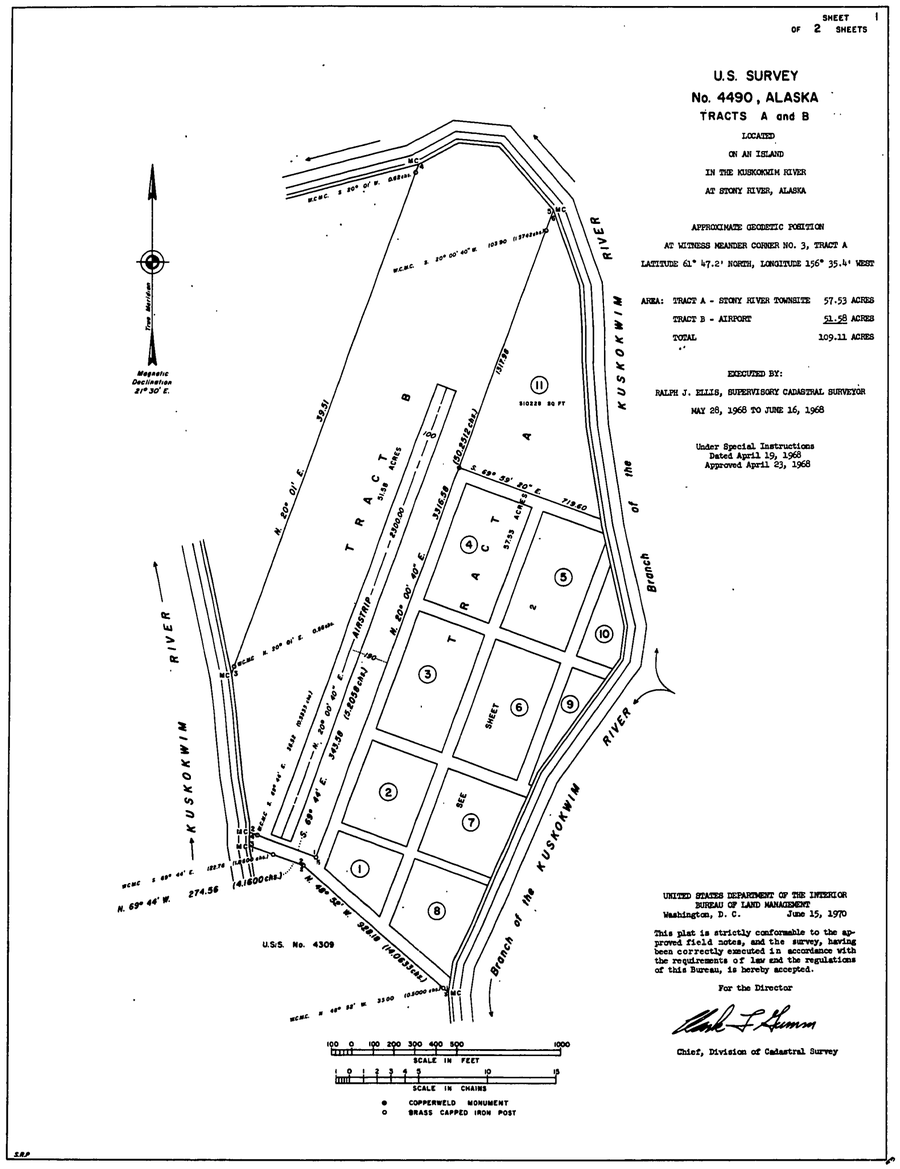


Figure 4 - Accepted Plat of Exterior Boundaries

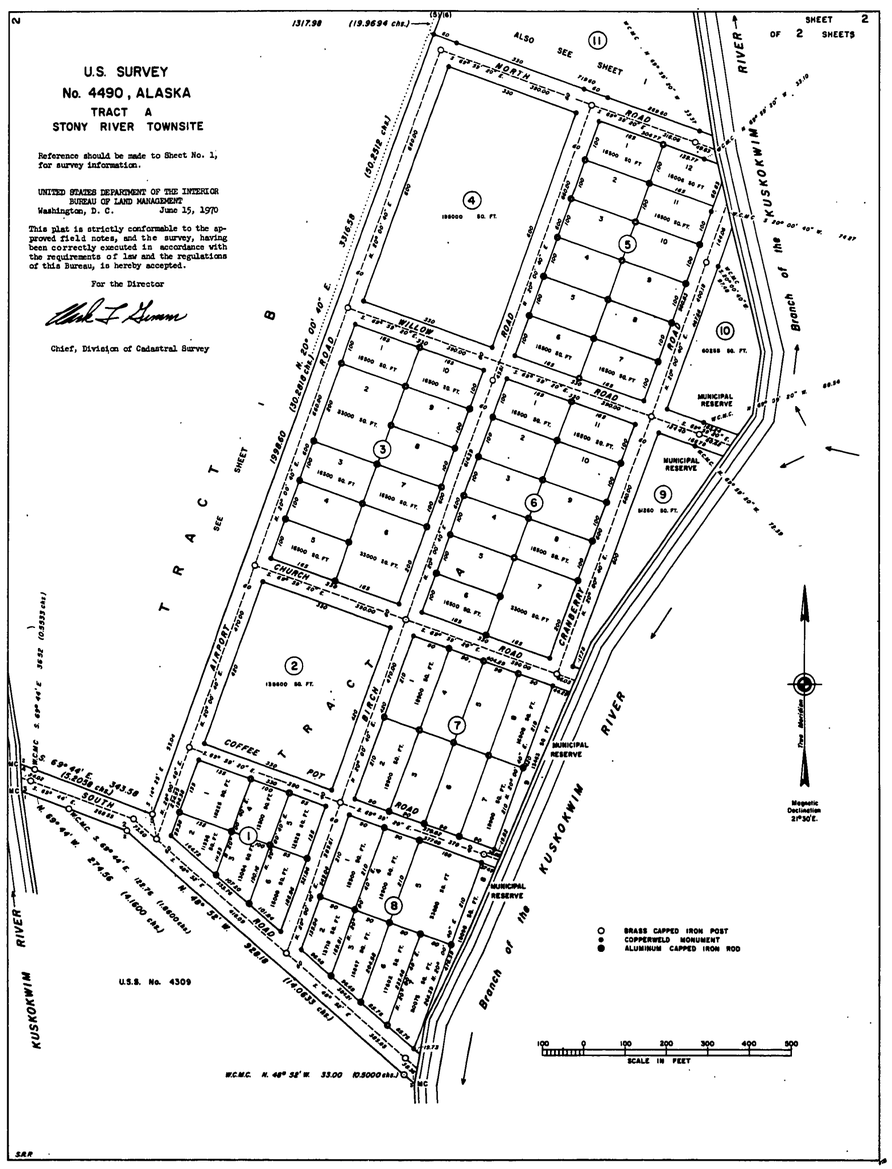
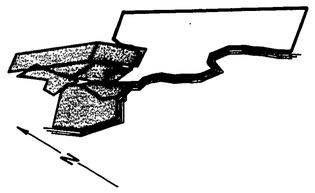


Figure 5 - Accepted Plat of Townsite Subdivisions

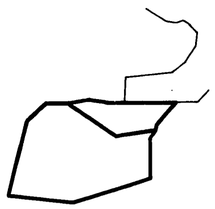
F3-3

JUNEAU TOWNSITE ADDITIONS

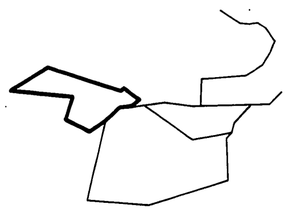
1892



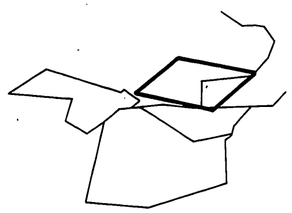
1903



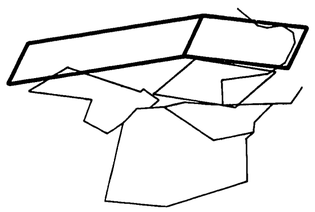
1904



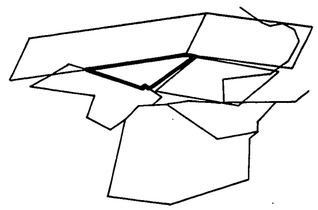
1907



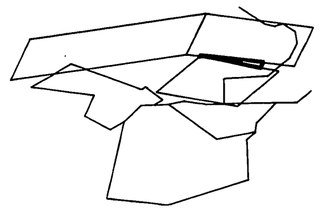
1910



1914



1937-38



U.S. SURVEY No. 7, JUNEAU TOWNSITE

From Corner No. 18 .....

N. 44° 00' W., 596.5 ft. to Cor. No. 19
N. 46° 00' E., 348.7 ft. to Cor. No. 20
S. 52° 38' E., 381.5 ft. to Cor. No. 21
N. 84° 23' E., 47.5 ft. to Cor. No. 22
S. 86° 56' E., 61.3 ft. to Cor. No. 23
S. 83° 04' E., 67.8 ft. to Cor. No. 24
N. 75° 20' E., 98.0 ft. to Cor. No. 25
N. 65° 35' E., 107.0 ft. to Cor. No. 26
N. 57° 16' E., 172.4 ft. to Cor. No. 27
N. 25° 49' E., 144.2 ft. to Cor. No. 28
N. 1° 38' W., 140.1 ft. to Cor. No. 29
N. 50° 48' W., 79.2 ft. to Cor. No. 30
N. 20° 18' W., 130.5 ft. to Cor. No. 31
N. 12° 19' E., 178.0 ft. to Cor. No. 32
N. 57° 52' E., 818.2 ft. to Cor. No. 33 .....

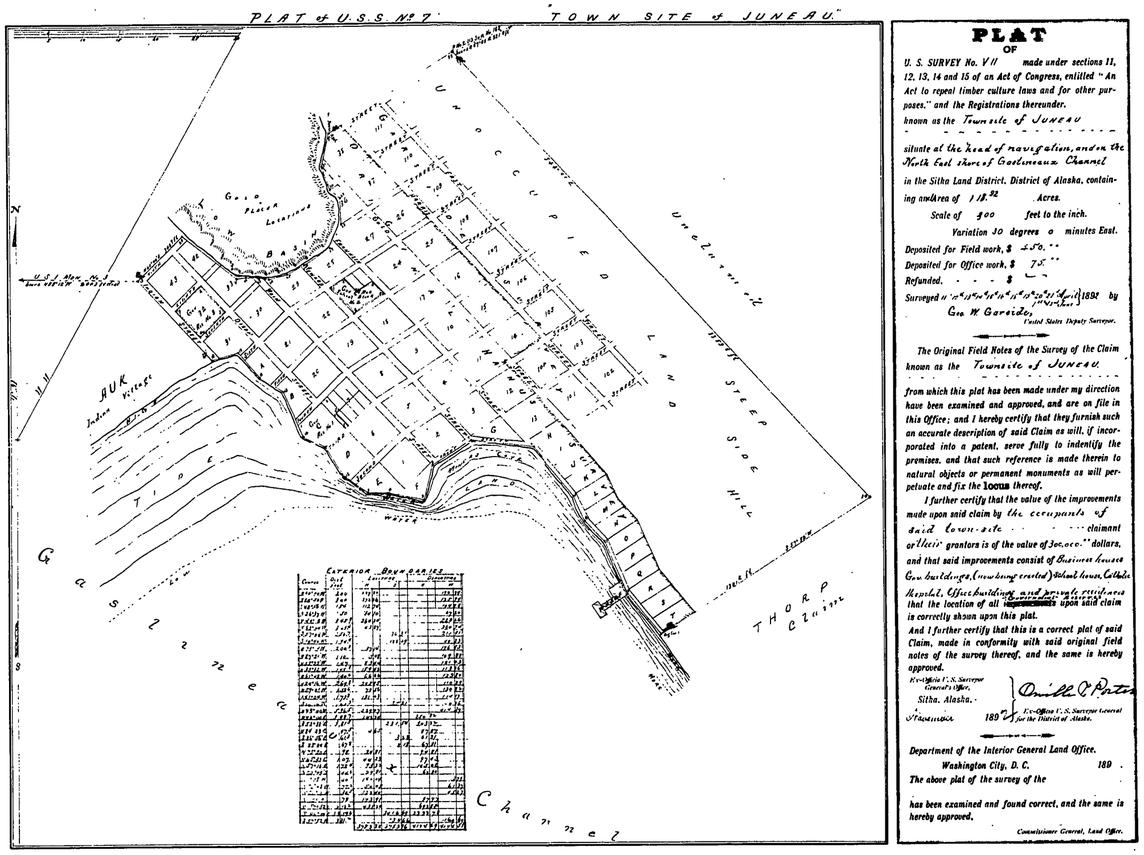


Figure 1 - Survey No. 7, Juneau Townsite

History of Surveys

1892 George W. Garside surveyed the Townsite of Juneau, U.S. Survey No. 7. The plat was approved in November, 1892. See figure 1.

1900 George W. Garside executed U.S. Mineral Survey No. 543, Nip and Tuck Lode, which was cancelled in 1914. See figure 6.

1903 George W. Garside executed Mineral Survey No. 580, Farnum and Shattuck Placers. A portion of the Farnum Placer is contiguous with the Juneau Townsite. See figure 4.

1904 C.E. Davidson surveyed a Soldiers Additional Homestead, U.S. Survey No. 383, which is contiguous with the Shattuck Placer. Refer to figure 7.

1907 Henry States executed U.S. Mineral Survey No. 761, Fraction Lode. See figure 5.

1910 F.J. Wettrick surveyed U.S. Mineral Survey 926, Boston Nos. 1 and 2 Lodes. The survey was defective in part but was corrected by Wettrick in 1914. See figure 6.

1914 H.P. Crowther executed U.S. Mineral Survey No. 1013, Tuck and Nip Lode, which is contiguous with U.S. Survey No. 383 and Mineral Survey No. 926. Corner No. 1 of Survey No. 1013 is identical with Corner No. 1 of cancelled Survey No. 543 and with Corner No. 3 of U.S. Survey No. 383. See figure 7.

1938 F.W. Williamson executed U.S. Survey No. 2348 which is bounded, east and west, by U.S. Mineral Survey Nos. 926 and 761. See figures 8 and 9.

Reasons for Request of this Survey

The entire area surrounding this survey is within the corporate limits of the city of Juneau. Two small tracts of public land remained, one between the Boston No. 2 and Fraction Lodes, southerly from U.S. Survey 2348 and north of the Townsite; the other bounded by the Fraction Lode, Farnum and Shattuck Placers, U.S. Survey No. 383, and the Tuck and Nip Lode. The adjoining mining claims had been developed as part of the city of Juneau.

The two areas of public lands contained numerous dwellings, city streets, and utility lines. The owners of the improvements, including the city, were trespassers.

The Townsite Trustee requested that these isolated parcels of land be surveyed and subdivided to permit disposal of the lands to the actual occupants and the City of Juneau.

Special Instructions

On July 11, 1962 Special Instructions were written for U.S. Survey No. 4521, directing that the lands be surveyed in two phases. Phase I was the resurvey of the boundaries of the prior surveys required to delineate the public lands and to determine the position and extent of all improvements, streets, and actual ownership and use by the occupants. A complete cadastral survey of the parcels was required. Figure 2 is a copy of the Special Instructions.

Phase II was to be the survey and monumentation of the subdivisional lines of the blocks and lots. The design of the subdivisions was to be based upon the data obtained during Phase I.

JUNEAU TOWNSITE ADDITIONS

SPECIAL INSTRUCTIONS

U.S. Survey No. 4521
Alaska

TOWNSITE ADDITION

July 11, 1962

These instructions provide for the survey and subdivision of two parcels of public land within the corporate limits of the City of Juneau, Alaska, being two of those tracts applied for by the Townsite Trustee, Alaska, under Anchorage Serial No. 057403.

In the execution of the survey and subdivision of U.S. Survey No. 4521, Alaska, the surveyor assigned is authorized and directed to make the survey hereinafter set out, any necessary preliminary investigative survey, retracement and dependent resurvey, and will be guided by the Manual of Surveying Instructions, 1947, with especial reference to Sections 473 through 488, the provisions of these Special Instructions and any supplemental Instructions which may be issued pursuant to a report of complication, or by reason of additional authorization.

AUTHORITY

The Townsite Trustee, by memorandum dated April 26, 1962, requested the survey and subdivision of two parcels of land bordering the Goldbelt Townsite Addition to permit disposal of the lands to the occupants and to the City of Juneau.

APPROPRIATION

Costs of this survey are payable out of current Management of Lands and Resources appropriation in accordance with administrative requirements and will be reimbursed from the townsite account at the time the lots are sold. An accurate account of all expenses incurred in the execution of this survey will be submitted to the Branch of Office Engineering along with the field data. This account shall show a breakdown of expenses between the boundary survey and the subdivision.

HISTORY OF EARLIER SURVEYS

The two parcels to be accommodated by U.S. Survey No. 4521 are bounded by Mineral Surveys Nos. 580, 581, 761, 926, and 1013 and by Soldiers Additional Homestead Survey No. 383, U.S. Survey No. 2348, and Townsite Survey No. 7.

LIMIT AND CHARACTER OF WORK

The survey will consist of the precise delineation of the boundaries and the subdivision of the two parcels of public lands resulting from hiatuses in the pattern of existing surveys. A copy of a portion of District Sheet No. 310, with these parcels indicated in red, is furnished as data.

METHODS AND PROCEDURES

This survey will be executed in two phases. In general terms Phase 1 will consist of dependent resurvey of the pertinent lines of contiguous surveys to a degree of accuracy consistent with townsite surveys, precise monumentation of the corners of this survey, and a reconnaissance survey upon the basis of which a subdivision design will be executed in the Branch of Office Engineering. Phase 2 will consist of the field execution of the subdivision survey as designed.

Specifically, Phase 1 shall include:

1. The dependent resurvey, and renomunentation where necessary, of the boundaries of this survey as established by the surrounding surveys. All corners will be monumented with standard iron posts and the boundaries will be surveyed with an accuracy of one part in 5,000 adjusted to a flat closure.

All measurements shall be made and returned in feet. Conversion to chains will be accomplished in the office when necessary. Temperatures shall be taken and recorded at least hourly, and appropriate correction shall be made to measured distances. Tape tension shall be determined with a spring balance. All slope angles shall be measured with the transit. The certified tape itself shall not be used in the field, but the field tape shall be standardized by comparing it with the certified tape.

2. The surveyor assigned will consult with the City Engineer of Juneau and select a permanent city monument from which a connection to this survey will be made. The bearing of a line from this selected monument to another visible city monument as said bearing appears in the City Engineer's records, shall be adopted as the true bearing for purposes of this survey. All other bearings of this survey shall be derived from this line and this method of establishing bearings shall be described in the official record. If such bearings are found to be incompatible with bearings determined by independent observations made during this survey, the extent of these deviations shall be set out in the official record of this survey.

Throughout this survey, in adjusting traverses to flat closure, a reasonable attempt shall be made to apply adjustments so that bearings and distances on lines common with lines of existing townsite surveys will be identical with the existing record. But this principle shall not be applied so rigorously as to result in distorting the lines of this survey by assigning erroneous values to the coordinates of city monuments, simply to achieve identity in coordinate values.

3. The acquisition of sufficient data to make possible the preparation of a preliminary map of the area to be subdivided. Upon the basis of this map, and the precise boundary control, the office design of the subdivision will be undertaken. The map shall show:

(a) Location and ownership of existing houses, buildings, and structures.

(b) Location of all streets, alleys, driveways, walkways, stairways, and the like.

(c) Location of public utility poles by field measurement, and location of pipe lines by examination of city maps and consultation with the City Engineer.

(d) Any other features which, in the judgment of the field engineer, would be necessary to accomplish the subdivision design in the office.

In executing steps "a" to "d", transit and tape should be used to locate all permanent improvements.

Connection will be made from a corner of the survey to each of the improvements, and such description of each improvement will be recorded as is necessary properly to identify and plat it for design purposes. Corner points will be monumented with regulation iron posts, or brass tablets, appropriately marked. The exact point to which measurement is made will be deeply center-punched in the brass cap.

GENERAL

Promptly upon completion of the field work of Phase 1, the engineer will prepare a preliminary map showing all acquired information, and submit it to the Branch of Office Engineering along with a reconnaissance report.

It is not contemplated that the official field note record of Phase 1 will be prepared until after the execution of Phase 2. The field engineer, therefore, should take particular pains to keep his field tablets with such care and completeness of detail as will make it possible for himself or another engineer of the service to readily interpret them after a considerable lapse of time.

Additional Special Instructions will be prepared for Phase 2 of this survey, after office design has been completed.

In the event that complications, not covered by these instructions, are encountered in executing the survey, report will be made to this office, together with any recommendations.

/s/ Jack C. Means

Jack C. Means
Chief, Branch of Office Engineering

SUPPLEMENTAL SPECIAL INSTRUCTIONS

U.S. SURVEY NO. 4521
Alaska

Subdivision

Townsite Addition
Juneau, Alaska

September 18, 1962

These Special Instructions are supplemental to the original Special Instructions dated July 11, 1962, and provide for the subdivisional survey of U.S. Survey No. 4521 as was contemplated in the original Special Instructions and designated as Phase 2.

METHODS AND PROCEDURES

With the exception of the area shown as Tract C, the subdivisional survey will be executed in accordance with a detailed layout sketch prepared after completing Phase 1.

The approved plat and field notes of U.S. Survey No. 2348 show cor. No. 1, U.S. Survey No. 2348 as being on line 4-1, Mineral Survey No. 926 and identical to cor. No. 2, Mineral Survey No. 761. Therefore, cor. No. 1, U.S. Survey No. 2348 should be re-established on line 4-1, Mineral Survey No. 926 and identical to cor. No. 2, Mineral Survey No. 761.

The approved plat and field notes of Mineral Survey No. 1013 show cor. No. 2, Mineral Survey No. 761 as being 0.45 ft. West of cor. No. 4, Mineral Survey No. 1013. Since the difference in bearing between the south boundary of Mineral Survey No. 1013, S. 86° 46' W., and the bearing of the tie, West, results in such a small difference, cor. No. 2, Mineral Survey No. 761 should be shown as being on line 3-4, Mineral Survey No. 1013.

Cor. No. 4, Mineral Survey No. 1013 need not be remonumented. The field notes of U.S. Survey No. 4521 can show the record position of it as being N. 86° 46' E., 0.44 ft. dist. from cor. No. 2, Mineral Survey No. 761. This will eliminate all hiatuses.

The layout sketch has been corrected and is furnished with these instructions as data.

Those areas designated on the layout sketch as tracts A and B, will be designated and marked as blocks 1 and 2. All block corners will be monumented with regulation iron posts, or brass tablets. Lot corners should be monumented with Copperweld monuments where practicable. When fence corners stand on lot corner points the corner posts may be designated as lot corners.

All other provisions of the Special Instructions dated July 11, 1962, remain unchanged.

/s/ Jack C. Means

Jack C. Means
Chief, Branch of Office Engineering

Figure 2 - Special Instructions with Supplement

Conditions Found on the Ground

Extensive retracements were made of the surrounding surveys. All information available concerning the location of the previous surveys was incorporated into the search, including data supplied by the City of Juneau's engineer. The monuments of the previous surveys were extensively obliterated and lost due to construction of homes, buildings, streets and utilities.

The only positively identified corners were:

1. Corner No. 19 of the Juneau Townsite, identical with Corner No. 5, Farnum Placer. This point was restored by reference to the southwest corner of the existing house used as a bearing object in the field notes of the Fraction Lode. This point was verified by being at the intersection of the northerly line of 9th Street and the westerly line of Indian Street as these streets exist on the ground.

2. Corner No. 4 of the Boston No. 1 Lode, identical with Corner No. 1 of the Boston No. 2 Lode, identical with Corner No. 5 of the Tuck and Nip Lode. This point was a brass capped iron post remonumented during execution of U.S. Survey No. 2348.

3. Witness Corner No. 1, and Corners 2 and 3 of U.S. Survey 2348. Witness Corner No. 1 and Corner No. 2 were restored by reference to the original bearing trees. Corner No. 3 was monumented with the original brass capped iron post.

4. Corners 6 and 7 of the Tuck and Nip Lode. These points were monumented with the original stones, described in the field notes of Mineral Survey No. 1013, and were recovered in their original positions.

The recovered corner points were connected by carefully executed traverse lines and the measurements corrected for temperature and tension. All the buildings and other improvements were tied to the traverse and carefully plotted. Figure 3 illustrates the conditions existing on the ground. Proportionate positions were computed for the unrecovered corners and further search made for any original evidence or subsequent restorations or perpetuations. None were found.

No trace of any corners of the Fraction Lode could be found. The location of line 2-3, Fraction Lode, was determined after consultation with the City Engineer, taking advantage of his retracements to fix the existing property rights.

During retracement of the Townsite boundary an original monument was found in the position for Corner No. 30. A rock was found at Corner No. 25 but is not the original set by Survey No. 7. No other corners of Survey No. 7 were found.

Preliminary Statement of the Problem

After a thorough search for original corners, the problem was to determine the methods for restoring the lost corners in order to complete Phase I of the Special Instructions.

Regulations

This survey illustrates the application of sections 7-17 to 7-31 of the Manual of Surveying Instructions, 1973, "Townsite Surveys."

It also illustrates application of 43 CFR 2763.8, "Additional Entries of Contiguous Tracts," and 43 USC 727, "Townsite less than maximum; additional entry."

Changes in Instructions

Following substantial completion of Phase I, the data and preliminary plat were submitted to the office for further instructions. Supplemental Instructions (figure 2) were issued. The procedure decided upon follows:

1. Corner No. 2 of the U.S. Mineral Survey 761, Fraction Lode, to be restored at the Tuck and Nip Lode record distance, 115.02 feet S. 30° 2l' E., from the recovered Corner No. 1 on line 1-4 of Survey No. 926, Boston No. 2 Lode, as monumented by the corners of U.S. Survey 2348.

2. Because of the very small difference in positioning, Corner No. 4 of Survey 1013, Tuck and Nip Lode, was to be restored on an extension of line 3-4 of the Tuck and Nip Lode, through the restored Corner No. 2 of Survey 761 , Fraction Lode, and 0.44 feet, N. 86° 46' E., from Corner No. 2 of the Fraction Lode. Thus Corner No. 2 of the Fraction Lode controlled the position of Corner No. 4 of the Tuck and Nip Lode.

3. Corner Nos. 1, 2, and 3 of Survey 1013, Tuck and Nip Lode, to be restored by the broken boundary method (compass rule) using the Tuck and Nip Lode record between the recovered Corner No. 7 and restored Corner No. 4.

4. Corner No. 1 of the Tuck and Nip Lode is identical with Corner No. 1 of cancelled Mineral Survey No. 543. This point had been tied to Corner No. 4 of the Shattuck Placer during execution of Mineral Survey No. 580. Corner No. 5 of the Farnum Placer is identical with Corner No. 19 of the Townsite and was recovered. Corners 4 and 5 of the Shattuck Placer, and corners 2, 3, and 4 of the Farnum Placer, both of Survey No. 580, to be restored by the broken boundary method, based on the record of Mineral Survey No. 580, between the restored Corner No. 1 of Survey No. 1013, Tuck and Nip Lode, and the recovered Corner No. 19 of U.S. Survey No. 7, Juneau Townsite.

5. Corner No. 5 of U.S. Survey 383 was to be restored by single proportionate measurement between the restored Corner Nos. 4 and 5 of Survey 580, Shattuck Placer, based on the U.S. Survey No. 383 record.

6. Corner No. 6 of U.S. Survey 383 was to be restored by the broken boundary

JUNEAU TOWNSITE ADDITIONS

method, between the restored Corner Nos. 5 and 7 (Corner No. 7 being identical with the restored Corner 2 of Survey No. 1013, Tuck and Nip Lode), based on the record of U.S. Survey No. 383.

7. Corner No. 1 of Survey 761, Fraction Lode, was to be restored by the broken boundary method between the restored Corner No. 2 of the Fraction Lode and recovered Corner No. 19 of the Townsite of Juneau based on Survey 761, Fraction Lode, record.

8. Line 1-4 of Survey 926, Boston No. 2 Lode, was to be resurveyed by extending a line from Corner No. 1 of the Boston No. 2 Lode through Witness Corner No. 1 and Corner No. 2 of U.S. Survey 2348, the Boston No. 2 Lode record distance to the intersection of line 24-25 of the Townsite of Juneau.

9. Corner No. 24 of the Townsite of Juneau was to be restored at the Boston No. 2 Lode record bearing and distance from the restored point of intersection (in 8 above), as given in the Boston No. 2 Lode field notes.

10. Corner No. 3 of Survey 761, Fraction Lode, to be restored at record distance from the restored Corner No. 2 of that survey and on a line extended from that point through the recovered Corner No. 2 of U.S. Survey 2348, based on the Fraction Lode record.

11. Corner No. 23 of the Townsite of Juneau to be restored at the Fraction Lode record bearing and distance from the restored Corner No. 3 of the Fraction Lode.

12. Line 23-24 of the Townsite of Juneau to be resurveyed between restored Corners Nos. 23 and 24.

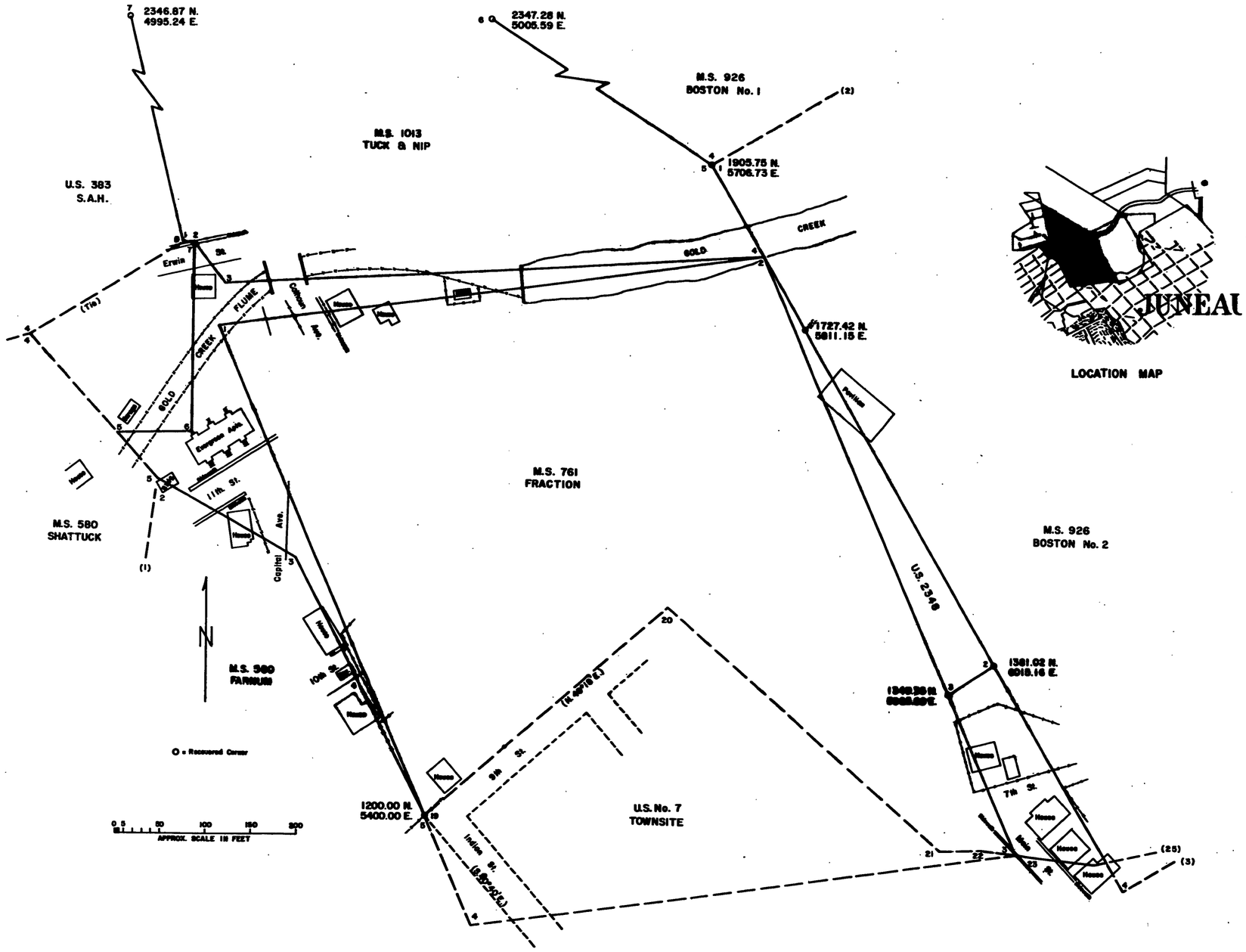
Final Statement of the Problem

The supplemental instructions provided the solution to the problem of restoration. Further work was needed to complete Phase II.

Solution

The area lying southeasterly of U.S. Survey 2348 was designated Block 1. The area lying northerly and westerly of the Fraction Lode was designated Block 2. These Blocks were then subdivided into odd shaped lots to accomodate the areas of actual use and occupancy. The street lines were determined by their actual positions upon the ground.

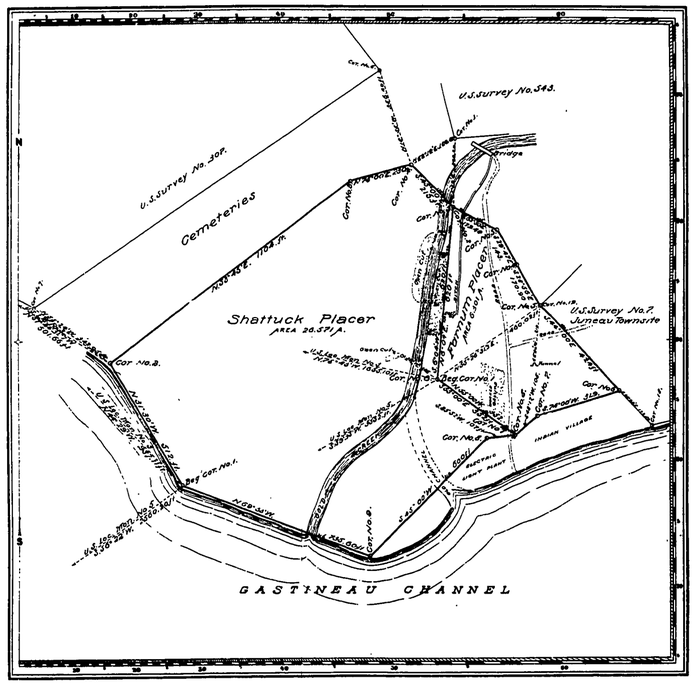
After the field work was completed the field notes were written and the plat prepared. The details of the improvements, fences, etc., were not carried to the official plat nor were any field notes of the subdivisions written. The final plat is illustrated by figure 10.



LOCATION MAP

Figure 3 - Existing Conditions and Corner Recovery

JUNEAU TOWNSITE ADDITIONS



Claim Located December 31, 1902
Recorded December 31, 1902.
Mineral Survey № 580.
Application for Survey January 16, 1903.
Lot № —
JUNEAU Land District.

PLAT
OF THE CLAIM OF
HENRY SHATTUCK
KNOWN AS THE
Farnum and Shattuck Placer Claims

In Harris MINING DISTRICT,
District of Alaska
Containing an Area of 32.873 Acres.
Scale of 200 Feet to the inch.
Variation 30° 00' E.
SURVEYED January 24—31, 1903 BY
George W. Garside, U.S.Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of Henry Shattuck known as the Farnum and Shattuck Placer Claims

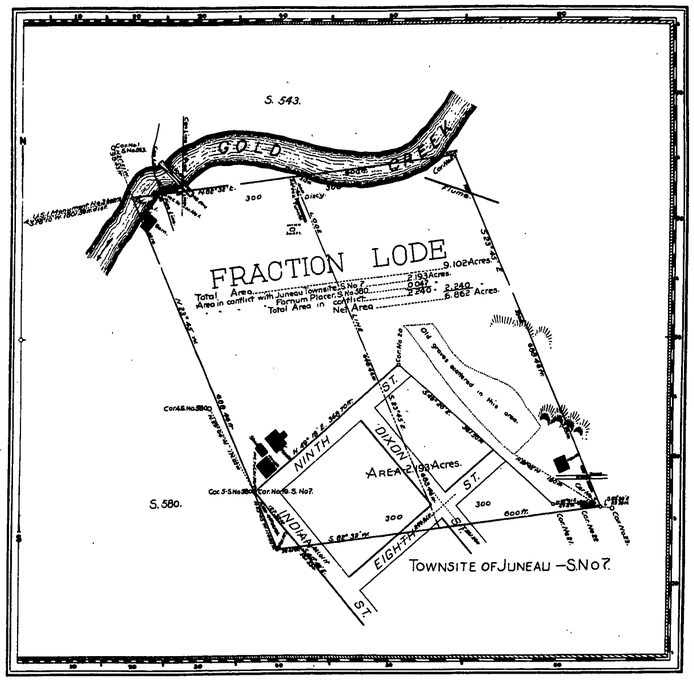
Form which this plat has been made under my direction, I have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim, by claimant or his grantors, and that said improvements consist of a Tunnel, Value $250.00
4 Surface excavations 1514.00
Ditch 150.00
Total Value of $1514.00

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S.Surveyor General's Office, Sitka, Alaska. U.S.Surveyor General for Alaska.
May 9, 1903.



Claim Located March 25, 1899
Recorded June 10, 1899.
Mineral Survey № 761.
Application for Survey October 8, 1906
Lot № —
Juneau Land District.

PLAT
OF THE CLAIM OF
J.F.Malony, John Olds and L.L. Williams.
KNOWN AS THE
FRACTION LODE.

In Harris MINING DISTRICT,
District of Alaska
Containing an Area of 6.862 Acres.
Scale of 100 Feet to the inch.
Variation 31° 45' E.
SURVEYED April 22-27, 1907. BY
Henry States, U.S.Deputy Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim of J.F.Malony John Olds and L.L. Williams known as the Fraction Lode.

Form which this plat has been made under my direction, I have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant or his grantors, and that said improvements consist of a Tunnel, Value $697.50

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.

And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S.Surveyor General's Office, Juneau, Alaska. U.S.Surveyor General for Alaska.
Mar. 12, 1908.

MINERAL SURVEY No. 580
SHATTUCK PLACER CLAIM

From Corner No. 1 .....

N. 31° 30' W., 512.00 ft. to Cor. No. 2

N. 53° 45' E., 1104.00 ft. to Cor. No. 3

N. 75° 00' E., 230.00 ft. to Cor. No. 4
Cor. No. 1, S. 543 bears N. 59° 14' E., 189.50 ft.

S. 45° 00' E., 215.00 ft. to Cor. No. 5
Cor. No. 1, S. 543 bears N. 2° 29' E., 249.20 ft.

S. 6° 04' W., 620.00 ft. to Cor. No. 6
Cor. No. 19, S. No. 7, Juneau Townsite, Bears N. 55° 26' 31.3" E., 460.02 ft.

S. 55° 00' E., 352.00 ft. to Cor. No. 7

S. 83° 52' W., 107.00 ft. to Cor. No. 8

S. 45° 00' W., 600.00 ft. to Cor. No. 9 .....

FARNUM PLACER CLAIM

Beginning at Cor. No. 1, identical with Cor. No. 6, Shattuck Placer Claim .....

N. 6° 04' E., 620.00 ft. to Cor. No. 2, identical with Cor. No. 5, Shattuck Placer

S. 62° 50' E., 179.40 ft. to Cor. No. 3 at foot of bluff.

S. 29° 47' E., 143.00 ft. to Cor. No. 4 at foot of bluff.

S. 28° 56' E., 170.90 ft. to Cor. No. 5, identical with Cor. No. 19, Juneau Townsite

S. 44° 00' E., 424.00 ft. to Cor. No. 6, on line 18-19 of Juneau Townsite. Cor. No. 18, Survey No. 7, Townsite of Juneau, bears S. 44° 00' E., 172.50 ft. dist.

S. 74° 00' W., 319.00 ft. to Cor. No. 7

S. 48° 17' W., 105.00 ft. to Cor. No. 8, identical with Cor. No. 7, Shattuck Placer .....

(All corners were wood posts in mounds of stone, no bearing trees)

Figure 4 - M. S. 580, Shattuck & Farnum

MINERAL SURVEY No. 761
FRACTION LODE

Begin at Cor. No. 1 which cannot be set as it falls in the bed of Gold Creek.
U.S.I.M. No. 3, bears S. 78° 10' W., 1801.59 ft.
Cor. No. 1, Survey No. 543 bears N. 21° 51' W., 98.43 ft. .....

(feet) Thence N. 82° 32' E.

55.94 to Witness Cor. No. 1
A granite boulder 4 x 3 x 1.4 ft. above ground .....

600.00 to Cor. No. 2
A granite stone 24 x 8 x 7 ins., set 16 ins. in the ground .....

Thence S. 23° 45' E.

688.46 Cor. No. 3
An iron pipe, 3 ins. diam., 36 ins. long, set 18 ins. in the ground .....
Cor. No. 22 of Juneau Townsite, S. No. 7, a hub with tack in center, at exact location of destroyed Cor. No. 22, bears N. 83° 38' W., 38.51 ft. .....

Thence S. 82° 32' W.

261.26 Center of Dixon St., 34 ft. wide, course N. 40° 42' W.

346.61 Center of 8th St., 30 ft. wide, running N. 49° 18' E.

541.01 Center of Indian St., 34 ft. wide, course N. 40° 42' W.

561.33 Intersect course 18 - 19, S. No. 7, identical with course 5 - 6, Farnum Placer, S. N. 580, whence Cor. 19, Juneau Townsite, identical with Cor. No. 5, S. N. 580, ... bears N. 40° 42' W., 127.32 ft.

600.00 to Cor. No. 4

Thence N. 23° 45' W.

110.95 to Witness Cor. No. 4 .....
This corner is identical with Cor. 5, S. 580 and Cor. No. 19, S. No. 7, Juneau Townsite.
Cor. No. 4, S. N. 580 bears N. 29° 04' W., 171.03 ft.
NW. side of 9th St. bears N. 49° 18' E.
SW. cor. of house, 24 x 30 ft., bears N. 43° 30' E., 33 ft.
NW. cor. of same house, bears N. 3° 45' E., 46 ft. .....

688.46 to Cor. No. 1, place of beginning.

Conflicts to be Excluded

Conflict with Juneau Townsite, S. N. 7

Beginning at Cor. No. 19, S. N. 7

Thence N. 49° 18' E., 348.70 ft. to Cor. 20

Thence S. 49° 20' E., 381.50 ft. to Cor. 21

Thence N. 87° 41' E., 47.5 ft. to Cor. 22

Thence S. 83° 38' E., 38.51 ft. to Cor. No. 3, S. N. 761

Thence S. 82° 32' W., 561.33 ft. to point on course 18 - 19, S. No. 7.

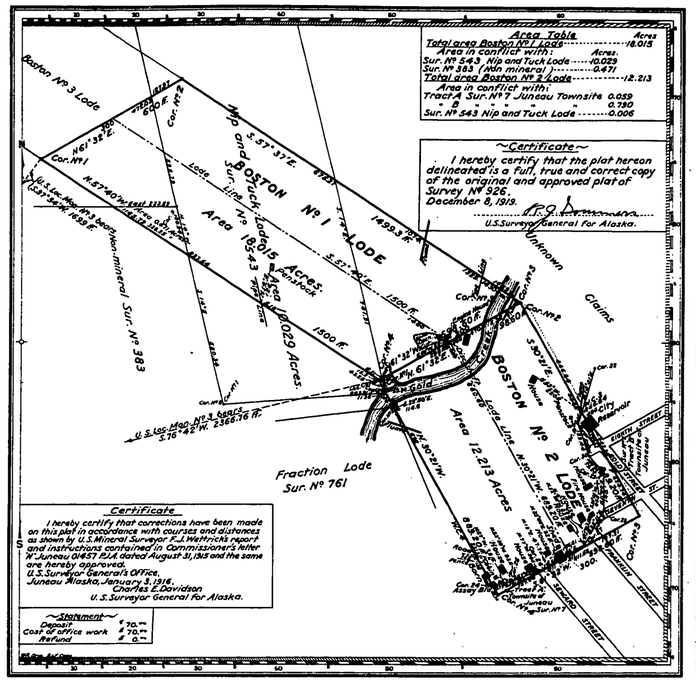
Thence N. 40° 42' W., 127.32 ft. to Cor. No. 19, place of beginning.

Conflict with Farnum Placer, S. N. 580:

Beginning at Cor. No. 5, S. N. 580, thence S. 40° 42' E., 127.32 ft. to point of intersection of line 3 - 4, S. N. 761 with line 5 - 6 S. N. 580. Thence S. 82° 32' W., 38.67 ft. to Cor. No. 4, S. N. 761, thence N. 23° 45' W., 110.95 ft. to Cor. No. 5, the place of beginning.

Figure 5 - M. S. 761, Fraction

JUNEAU TOWNSITE ADDITIONS


Area Table
Total area Boston No 1 Lode ..... Acres 18.015
Area in conflict with:
Sur. No 543 Nip and Tuck Lode 10.029
Sur. No 383 (Min mineral) 0.417
Total area Boston No 2 Lode 12.213
Area in conflict with:
Tract A Sur. No 7 Juneau Townsite 0.059
" B " " " " 0.780
Sur. No 543 Nip and Tuck Lode 0.006
Certificate
I hereby certify that the plat hereon delineated is a full, true and correct copy of the original and approved plat of Survey No 926. December 8, 1919.
U.S. Surveyor General for Alaska.
Certificate
I hereby certify that corrections have been made on this plat in accordance with courses and distances as shown by U.S. Mineral Surveyor F.J. Wettrick's report and instructions contained in Commissioner's letter W-Juneau 04571 F.J.A. dated August 31, 1915 and the same are hereby approved.
U.S. Surveyor General's Office, Juneau Alaska, January 3, 1916.
Charles E. Davidson
U.S. Surveyor General for Alaska.
Statement
Deposit $ 70.--
Cost of office work $ 70.--
Refund $ 0.--
Boston No 3 Lode
Nip and Tuck Lode
Sur. No 543
Boston No 1 Lode
Area 18.015 Acres
Area 10.029 Acres
Area 0.417 Acres
Area 12.213 Acres
BOSTON No 2 LODE
Fraction Lode Sur. No 761
Boston No 1 Lode
Tuck Lode
Johnson Claims
Cor. No 1
Cor. No 2
Cor. No 3
Cor. No 4
Cor. No 5
Cor. No 6
Cor. No 7
Cor. No 8
Cor. No 9
Cor. No 10
Cor. No 11
Cor. No 12
Cor. No 13
Cor. No

JUNEAU TOWNSITE ADDITIONS

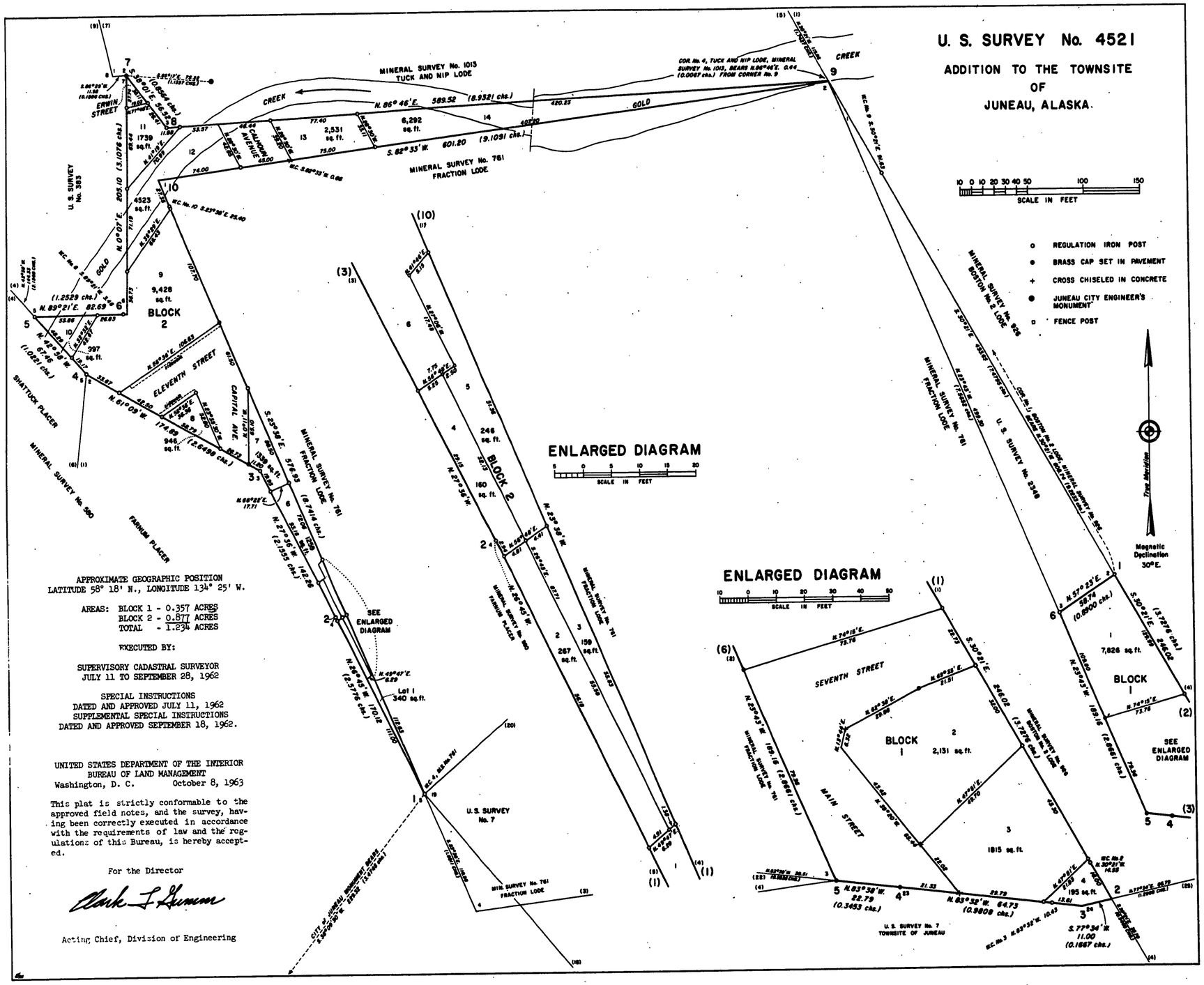
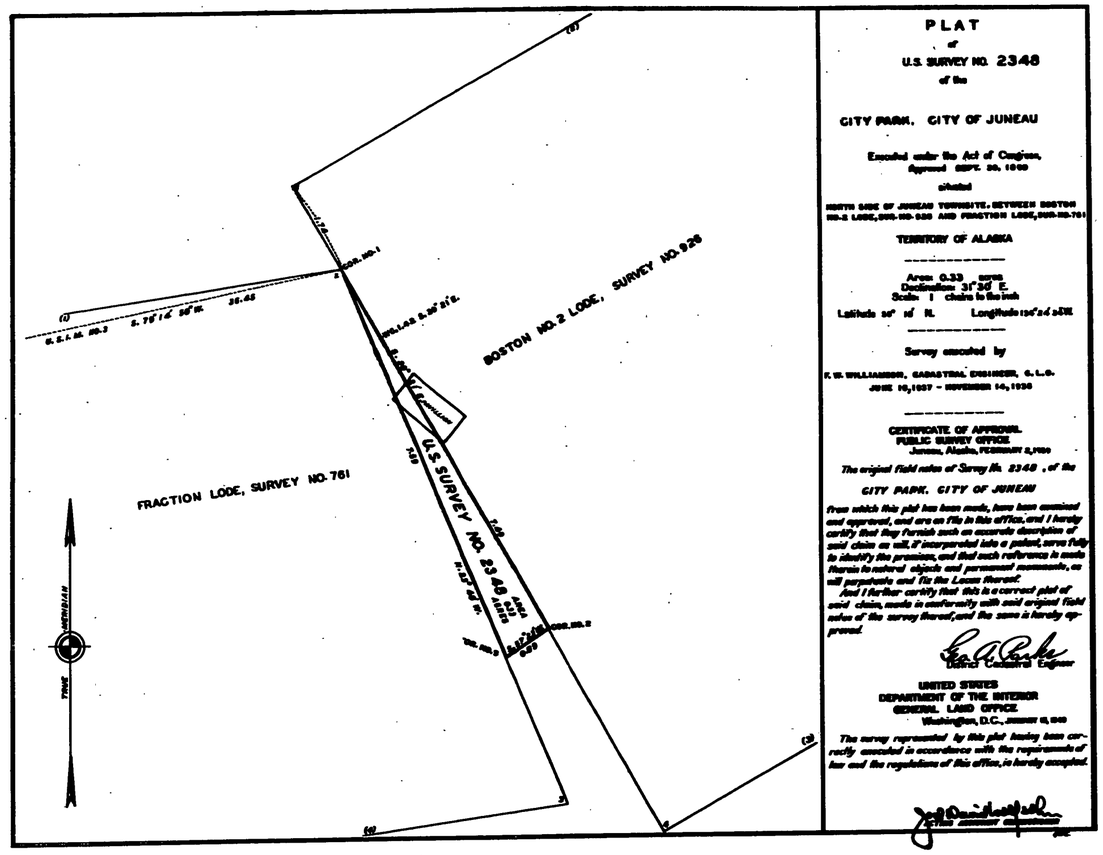


Figure 10 - Accepted Plat

JUNEAU TOWNSITE ADDITIONS



U.S. Survey No. 2348

The field notes of this survey show that Corner No. 4, Boston No. 1 Lode, identical with Corner No. 1, Boston No. 2 Lode, was reestablished and remonumented by reference to the stump of an original bearing tree. Line 1-4 of the Boston No. 2 Lode was retraced on the record bearing of S. 30° 21' E. No other corners were recovered. Corner No. 2 of the Fraction Lode was reestablished at record bearing and distance from Corner No. 1 of the Boston No. 2 Lode (S. 30° 21' E., 1.74 chains) and this point became Corner No. 1 of the U.S. Survey 2348, but could not be monumented because the point was in Gold Creek. The field notes read, in part:

S. 30° 21' E., along line 1 - 4, Boston No. 2 .....

1.42 chs. Set an iron post for Witness Cor. 2 of the Fraction Lode and W.C. 1 of this survey .....

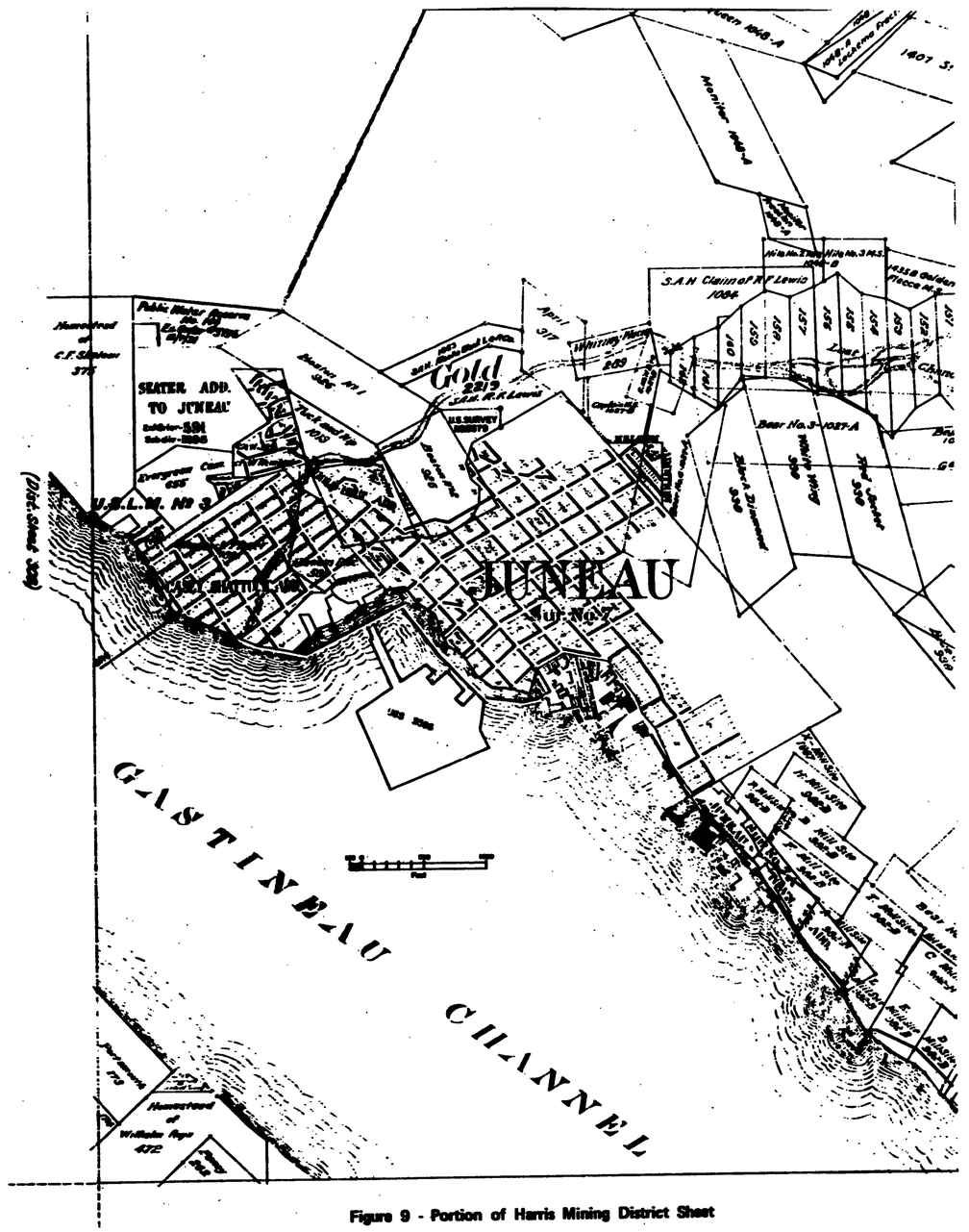
7.49 chs. Set an iron post for Cor. No. 2 ..... thence

S. 57° 23' W., 0.89 chs., Intersect line 2 - 3, Fraction Lode, Survey 761. Set an iron post for Cor. 3 ..... thence

N. 23° 40' W., along line 2 - 3, Fraction Lode .....

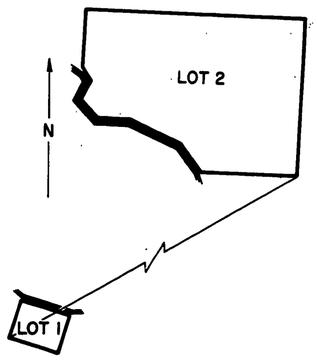
7.59 chs. to true point for Cor. 1 and place of beginning.....

Figure 8 - U. S. Survey No. 2348



T & M SITE ON UNALASKA ISLAND

1968



History of Surveys

No prior surveys have been conducted in the vicinity.

Reasons for Request of this Survey

In 1961 William Bishop filed on the Trade & Manufacturing Site located on Mutton Cove, Chernofski Harbor, Unalaska Island, and on a Headquarters Site located on Mailboat Cove. In 1963 Bishop had a private survey made of the T & M Site and filed an application to purchase the site. He then sold his interest in the two claims to Milton Holmes, in April 1964, and relinquished his claims.

In January 1965 Holmes filed on the T & M Site in his own name. He also indicated he would file on the "Headquarters" Site, but as a Homesite. The field examiner found both claims to be valid and recommended that they both be surveyed at the same time since the Homesite would be a free survey. On January 25, 1966, Holmes filed a petition for survey of the T & M Site.

Holmes also filed on the Homesite. After the applications were duly approved the claims were scheduled for survey.

Special Instructions

On July 23, 1968, Special Instructions were written and approved for U.S. Survey No. 5520. See figure 1.

Conditions Found on the Ground

Figure 2 is a sketch of the T & M Site as given in the application description. By this description the claim would have exactly 80 rods of shore space and contain approximatley 77 acres.

Figure 3 is a sketch of the Homesite as given in the application description. The claim contains exactly 5 acres, is rectangular in form, and has 40 rods (10 chains) of shore space abutting navigable waters.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Alaska State Office
Division of Engineering
555 Cordova Street
Anchorage, Alaska

SPECIAL INSTRUCTIONS

U.S. Survey No. 5520
Alaska

ONE TRADE AND MANUFACTURING
SITE AND ONE HOMESITE

July 23, 1968

Provides for survey of two tracts of land situated in Chernofski Harbor, Unalaska Island, at approximate Latitude 53° 24' N., Longitude 167° 30' W., being those tracts applied for by Milton L. Holmes, under Anchorage Serial Nos. 062105 and 063716.

In the execution of U.S. Survey No. 5520, Alaska, the surveyor assigned is authorized and directed to make the survey hereinafter set out and any necessary retracements and restoration of points of control; and will be guided by the Manual of Surveying Instructions, 1947, the provisions of these Special Instructions and the provisions of any supplemental instructions which may be issued pursuant to a report of complications, or by reason of additional authorization.

AUTHORITY

The Chief, Division of Lands and Minerals Program Management and Land Office, by memorandum dated May 21, 1968, requested the necessary survey to accommodate an application filed by Milton L. Holmes, Anchorage Serial No. 062105.

It has been administratively determined to be desirable to survey A-063716.

APPROPRIATION

The applicant has made a deposit of $800.00, which has been passed to the credit of the fund created by "Deposits by Individuals for Surveying the Public Land", 14x8566 A/R. Costs of field and office work in connection with this survey will be charged in accordance with administrative requirements.

The applicant must pay the cost of surveying his claim, and an accurate account of all expenses incurred in the execution of this survey will be submitted to the Branch of Office Engineering along with the field data.

RELATED SURVEYS

The records of this office do not disclose a corner of the public land surveys within a radius of two miles.

U.S. Coast and Geodetic Survey Station "Lamb" is located approximately three-quarters of a mile southerly.

METHODS AND PROCEDURES

These instructions provide for survey of the boundaries of the tracts as filed. A description of the tracts as given in the request for survey is as follows:

A-062105, Trade and Manufacturing Site, Milton L. Holmes

"Beginning at cor. No. 1, located on high tideline 130 ft. N. 36° W. from a 1¾" capped pin 6' above high tideline, which is 4162.56 feet N. 13°15'27" E. from USC & GS Mon. "Lamb", thence 1060 ft. N. 88°06'57" E. to cor. No. 2; thence 1700 ft. N. 01°53'03" W. to cor. No. 3; thence 2380 ft. S. 88°06'57" W. to Cor. No. 4; thence 620 ft. S. 01°53'03" E. to cor. No. 5 on the high tideline; thence southerly and easterly along high tideline to point of beginning. Containing 80 acres.

The latitude and longitude of the 1st corner of the claim is: approximately Lat. 53°24'10" N., Long. 167°30' W."

"Improvements:

Slaughter house erected inside surplus army warehouse
Sectional cooler
Two compressors
Kohler generator
One-ton electric hoist
Corral
Barbed wire and staples for fencing"

A-063716, Homesite, Milton L. Holmes

"Beginning at the mouth of a small stream in Mailboat Cove, Chernofski Harbor, Unalaska Island, at Latitude 53 degrees 23' 36" N. and Longitude 167 degrees 32' 48" W; and running along the shoreline south 34 degrees E 580 feet to Point of Beginning (corner No. 1) marked by an iron pipe embedded in the ground at high water line; thence South 24 degrees W for 330 feet to Corner No. 2 marked by an iron Pipe; thence South 66 degrees E 660 feet to Corner No. 3 marked by an Iron Pipe; Thence North 24 degrees E to the shoreline, Corner No. 4 marked by an Iron Pipe; and thence along the shoreline 660 feet to Point of Beginning, containing approximately five acres."

The total area of this survey will be approximately 80 acres; however, A-062105 should be held as near as practicable to the area given in the applicant's description. A-063716 may not exceed 5.00 acres.

The surveyor assigned will execute the survey based upon the above description, using good survey practice in making such modifications as may be necessary. Minor adjustments to provide parallel boundaries or promote good survey practice should be made. Major adjustments must have prior approval of the officer approving these Special Instructions.

A portion of this survey will consist of meanders of Chernofski Harbor. Such meanders will be extended approximately 10 chains on each side of the survey.

Shorespace may not exceed 20.00 chains for A-062105.

U.S. Coast and Geodetic Survey Triangulation Station "Lamb" should be connected by course and distance to a corner of this survey. If this station is found suitable for use as a location monument, it will be designated as U.S.L.M. No. 5520, taking the usual accessories. Do not add marks to the monument. If the station is not found suitable, a U.S.L.M. will be established in accordance with Section 472, Appendix VII, Manual of Surveying Instructions, 1947.

Connection will be made between non-contiguous lots of the survey. Field verification of all ties will be made.

Connection will also be made from a corner of the survey to each of the improvements within the survey, and such description of each improvement will be recorded as is necessary to properly identify and plat it. Corner points will be monumented with iron posts, or brass tablets, with brass caps appropriately marked.

Pertinent topographic features will be noted, recorded in the field note record and delineated on the plat of survey.

GENERAL

Copies of available maps, plats, and field notes will be furnished as data.

The field tablets and computations will be carefully verified while in the field and will be so kept as to facilitate ready preparation of the final returns, whether by the surveyor assigned or some other surveyor of the service. These tablets and computations, together with the data furnished, will be packaged and filed with the Anchorage Branch of Office Engineering at the first available opportunity after completion of the field work.

In the event that complications are encountered, not covered by these instructions, while executing the survey, a report will be made to this office, together with any recommendations.

Jack C. Means
Chief, Branch of Office Engineering

Approved: 7/23/68

Jack C. Means, Acting Chief
Division of Engineering

Copy to: Chief, Branch of Field Surveys
Chief, Division of Engineering, Washington, D.C.

7/23/68

Figure 1 - Special Instructions

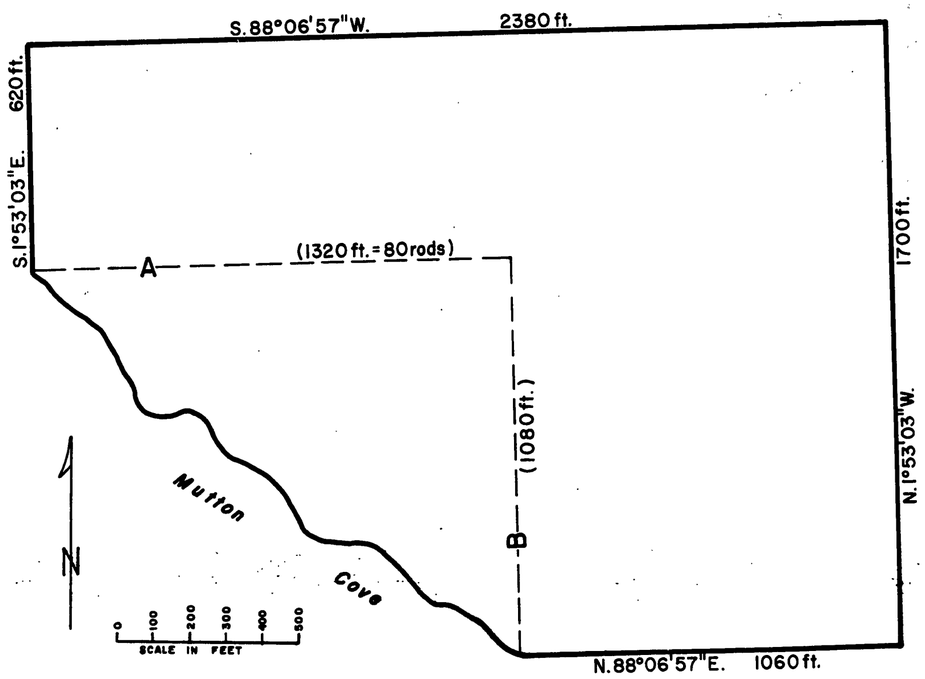


Figure 2 - T & M Site Application

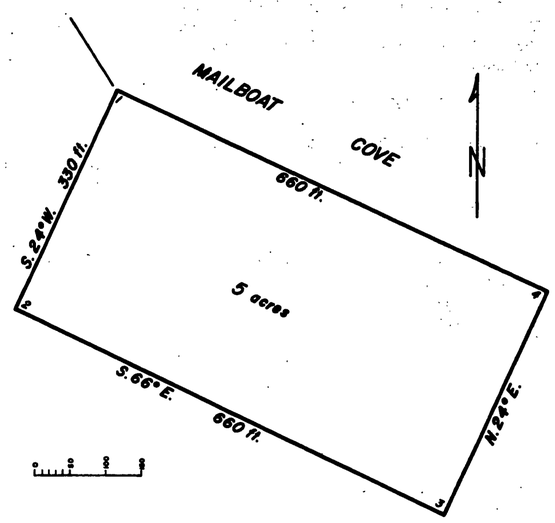


Figure 3 - Homesite Application

T & M SITE ON UNALASKA ISLAND

Neither of the claims is located on surveyed land and there are no rectangular surveys in the area. There are no coal, oil or mineral deposits known. The claims are located in reference to latitude and longitude, and the T & M Site gives a tie to U.S.C.&G.S. station "Lamb."

Lot 1, the Homesite, required some adjustments. The lot as given in the description would deprive the claimant of a substantial portion of his actual improvements.

Lot 2, the T & M Site, had been surveyed by a private surveyor in 1963. There were only minor differences in the lengths of the boundaries from meander corner 1 to corner 4. The distance from corner 4 to meander corner 5 is 17 links shorter than the description. The meander line along Mutton Cove was surveyed and extended an additional 10 chains from corners 1 and 5 to show the shore line. See figure 5.

Lot 2 contains 79.19 acres, well within the 80 acre limitation, but more than was indicated by the description. The shore space charged to the lot is 19.96 chains (dimension "A"), which is 4 links less than the 20 chain limit. The lot is rectangular in form with the side and end lines parallel.

Preliminary Statement of the Problem

In order to complete the survey, the surveyor should make some adjustments to Lot 1 so that the claimant's improvements remain on the site. Lot 2 requires small adjustments. The shorespace dimension should be checked against requirements. Both tracts must meet acreage requirements.

Regulations

This case applies section 7-16 of the Manual of Surveying Instructions, 1973, and the following from the Code of Federal Regulations:

43 CFR 2094, Shore space

43 CFR 2562, Trade and Manufacturing Sites

43 CFR 2563, Homesites

A Trade and Manufacturing Site, as defined by Section 10 of the Act of May 14, 1898 (30 Stat. 413), may not exceed 80 acres and is limited to no more than 80 rods (20.00 chains) abutting on navigable waters. The costs of surveying the claim must be paid by the claimant.

The Act of March 3, 1927 (44 Stat. 1364), amends section 10 of the Act of May 14, 1898, and provides for up to five acre claims by persons engaged in a business, as a Homestead or Headquarters.

The homestead laws provide that the homestead must conform to the rectangular system if the land is surveyed, or if unsurveyed, that the claim must be substantially rectangular in form in so far as the topography will permit. The same rule applies to a Trade and Manufacturing claim. Homesteads are surveyed without cost to the claimant, unless he elects to speed up the process by paying for the survey himself. The claimant must pay the cost of surveying a T & M Site. A 5-acre Homesite is similar to a Homestead. A 5-acre Headquarters site is analogous to a T & M Site. The claimant pays the cost of surveying a Headquarters or T & M Site but does not pay the cost of surveying a Homestead or Homesite, unless he wants to.

The Code of Federal Regulations, Title 43, Subpart 2094 (figure 4), defines the method of determining "Shore Space" on navigable waters. This shore space is limited to 80 rods in all T & M, Headquarters and Homesites. Since the latter two types are limited to 5 acres, in rectangular form, these would not normally approach 80 rods of shore space. The 80-rod limitation is effective primarily on the T & M Sites because the limitation may be waived on Homesteads.

The surveyor assigned to any of these types of claims has a general authority to make any minor adjustments in the boundaries of the claim descriptions that are necessary to provide for rectangularity, to bring the claim within the limits of shore space, acreage and to include improvements.

Solution

Figure 6 is a copy of the accepted plat of U.S. Survey No. 5520. The Homesite is still rectangular in form, contains 4.99 acres, and does not exceed the shorespace limitations. The surveyor adjusted the width and depth of the lot to include as many of the improvements as possible within the acreage limitation. As with Lot 2, all of the improvements on the lot are shown on the plat.

Lot 1 was tied directly to Lot 2 by means of triangulation across the harbor. Corner 1 of Lot 2 was tied by the same method to U.S.C.&G.S. Triangulation Station, "Lamb-1935," which was designated as U.S.L.M. No. 5520. No marks were added to the brass cap monument at the station.

All costs incurred while executing the survey of the T & M Site are charged to the claimant. The cost of surveying the Homesite is borne by the Government.

Subpart 2094—Special Resource Values—Shore Space

AUTHORITY: The provisions of this Subpart 2094 issued under R.S. 2478, secs. 4, 5, 69 Stat. 444; 43 U.S.C. 1201, 48 U.S.C. 462 note.

SOURCE: The provisions of this Subpart 2094 appear at 35 F.R. 9540, June 13, 1970, unless otherwise noted.

§ 2094.0–3 Authority.

Section 1 of the act of May 14, 1898 (30 Stat. 409) as amended by the acts of March 3, 1903 (32 Stat. 1028) and August 3, 1955 (69 Stat. 444; 48 U.S.C. 371) provides that no entry shall be allowed extending more than 160 rods along the shore of any navigable water. Section 10 of the act of May 14, 1898, as amended by the acts of March 3, 1927 (44 Stat. 1364), May 26, 1934 (48 Stat. 809), and August 3, 1955 (69 Stat. 444), provides that trade and manufacturing sites, rights-of-way for terminals and junction points, and homesites and headquarters sites may not extend more than 80 rods along the shores of any navigable water.

§ 2094.0–5 Definitions.

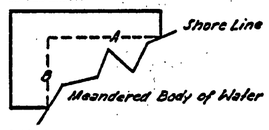
The term "navigable waters" is defined in section 2 of the act of May 14, 1898 (30 Stat. 409; 48 U.S.C. 411), "to include all tidal waters up to the line of ordinary high tide and all nontidal waters navigable in fact up to the line of ordinary highwater mark".

§ 2094.1 Methods of measuring; restrictions.

(a) In the consideration of applications to enter lands shown upon plats of public surveys in Alaska, as abutting upon navigable waters, the restriction as to length of claims shall be determined as follows: The length of the water front of a subdivision will be considered as represented by the longest straight-line distance between the shore corners of the tract, measured along lines parallel to the boundaries of the subdivision; and the sum of the distances of each subdivision of the application abutting on the water, so determined, shall be considered as the total shore length of the application. Where, so measured, the excess of shore length is greater than the deficiency would be if an end tract or tracts were eliminated, such tract or tracts shall be excluded, otherwise the application may be allowed if in other respects proper.

(b) The same method of measuring shore space will be used in the case of special surveys, where legal subdivisions of the public lands are not involved.

(c) The following sketch shows the method of measuring the length of shore space, the length of line "A" or line "B", whichever is the longer, representing the length of shore space which is chargeable to the tract:



§ 2094.2 Waiver of 160-rod limitation.

(a) The act of June 5, 1920 (41 Stat. 1059; 48 U.S.C. 372) provides that the Secretary of the Interior in his discretion, may upon application to enter or otherwise, waive the restriction that no entry shall be allowed extending more than 160 rods along the shore of any navigable waters as to such lands as he shall determine are not necessary for harborage, landing, and wharf purposes. The act does not authorize the waiver of the 80-rod restriction, mentioned in § 2094.0–3.

(b) Except as to trade and manufacturing sites, and home and headquarters sites, any applications to enter and notices of settlement which cover lands extending more than 160 rods along the shore of any navigable water will be considered as a petition for waiver of the 160-rod limitation mentioned in paragraph (a) of this section, provided that it is accompanied by a showing that the lands are not necessary for harborage, landing and wharf purposes and that the public interests will not be injured by waiver of the limitation.

Figure 4 - Shore Space Regulations

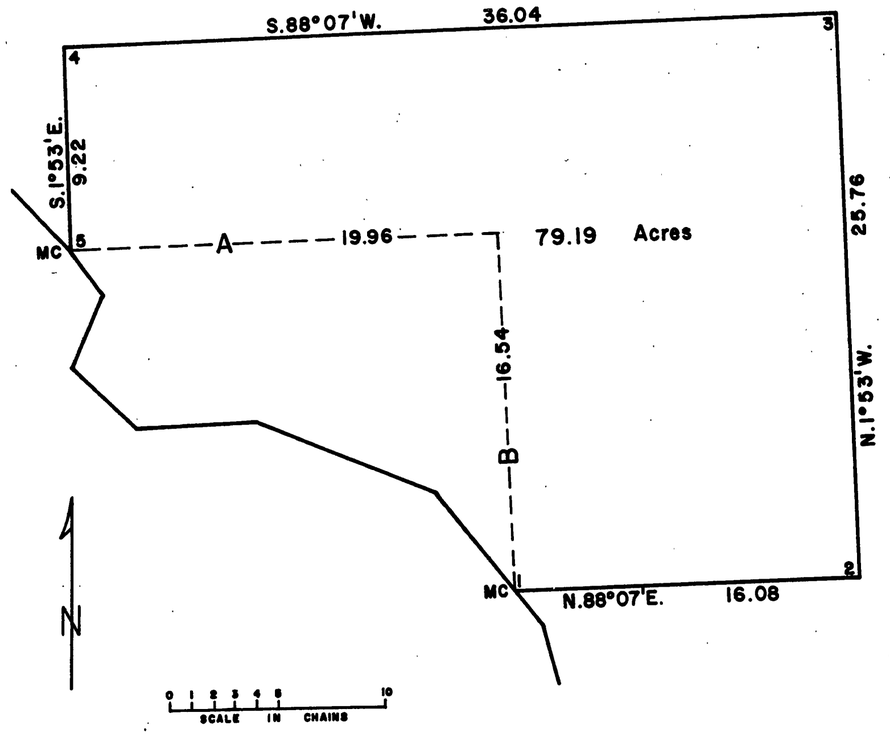


Figure 5 - Shore Space of T & M Site

T & M SITE ON UNALASKA ISLAND

Meanders - from M.C. 5

S. 37° 31' E., 2.40

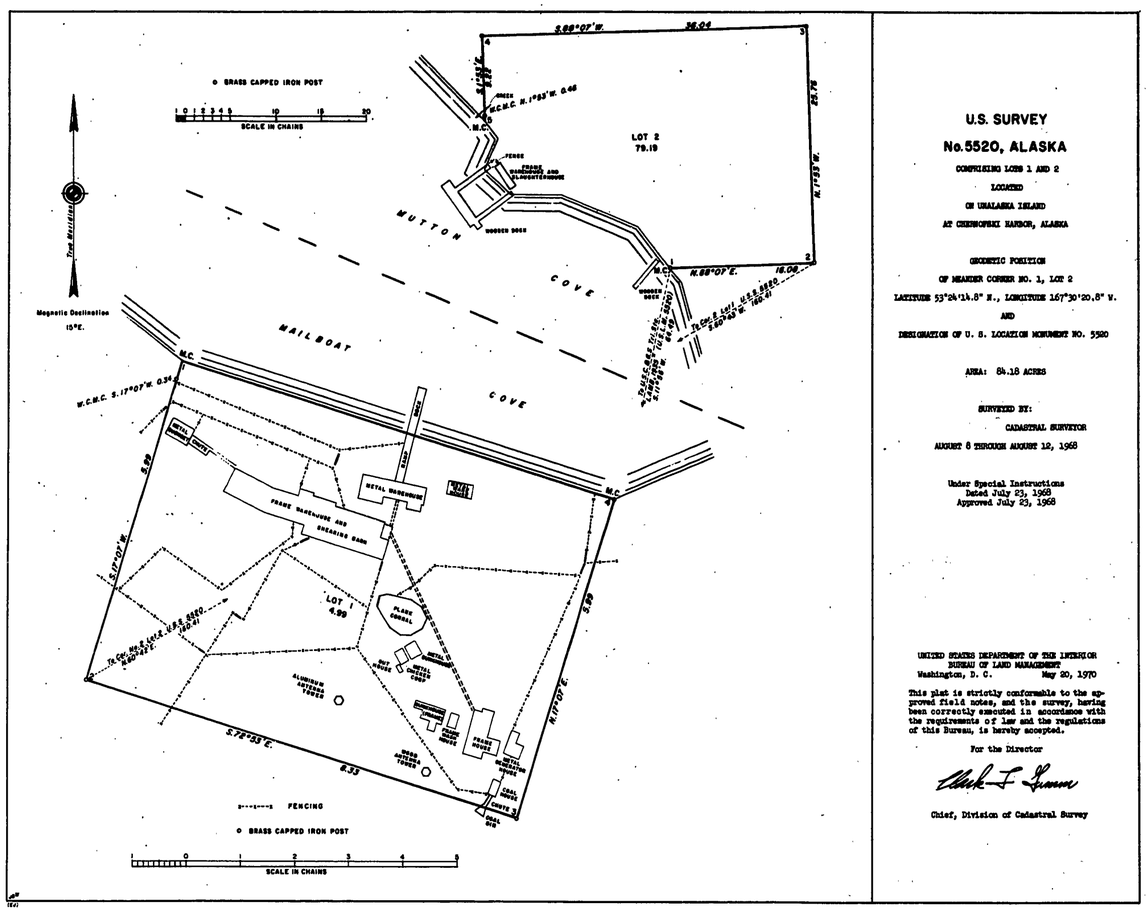
S. 24° 00' W., 3.69

S. 48° 51' E., 4.17

S. 89° 49' E., 5.41

S. 67° 54' E., 9.09

S. 38° 52' E., 5.69 chs. to M.C. 1



U.S. SURVEY

No.5520, ALASKA

COMPRISING LOTS 1 AND 2

LOCATED

ON UNALASKA ISLAND

AT CHERNOFSKI HARBOR, ALASKA

GEODETIC POSITION

OF MEANDER CORNER NO. 1, LOT 2

LATITUDE 53°24'14.8" N., LONGITUDE 167°30'20.8" W.

AND

DESIGNATION OF U. S. LOCATION MONUMENT NO. 5520

AREA: 84.18 ACRES

SURVEYED BY:

CADASTRAL SURVEYOR

AUGUST 8 THROUGH AUGUST 12, 1968

Under Special Instructions
Dated July 23, 1968
Approved July 23, 1968

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D. C.
May 20, 1970

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

Clark F. Gamm

Chief, Division of Cadastral Survey

Figure 6 - Accepted Plat

ROCK LAKE HEADQUARTERS SITE

History of Surveys

There are no previous surveys in the vicinity of this Headquarters Site and the rectangular system has not been extended into the area.

Reasons for Request of this Survey

Section 10 of the Act of May 14, 1898, 44 Stat. 1364, provides for the purchase of up to 80 acres of land in Alaska used for trade and manufacturing. Section 10 was amended by the Act of March 3, 1927, 44 Stat. 1364, providing for the purchase of not more than 5 acres by persons who are employed by someone engaged in trade or manufacturing or who is himself engaged in such industry. The 5 acre tract provided for in the latter Act is known as a Headquarters Site.

On November 1, 1965 Urban E. Rahoi filed a location notice for a Headquarters Site located near the westerly end of Rock Lake. The application to purchase was dated March 14, 1970. The necessary examinations and investigations to determine the validity of the claim were completed and the claim was found to comply with the law and regulations.

On February 22, 1971 the Land Office Manager requested the survey of the Headquarters Site. A deposit of $900 had been made by the claimant to cover the estimated cost of the survey.

Special Instructions

On March 31, 1971 Special Instructions for U.S. Survey No. 5666, Alaska, were prepared. They provided for the survey of the tract described as follows:

"This claim lies on the west end of Rock Lake lat. 61°47'30" N., long. 141°19'30" W., (USGS Map McCarthy D-1), the point of beginning corner #1 is on the westerly end and on the mean high water line of Rock Lake 400 feet west of cabin site, then northerly 330 feet perpendicular to the mean high water line of Rock Lake, then easterly 660 feet parallel to mean high water line of Rock Lake corner #3, then southerly parallel to line 1-2 approximately 330 feet to a point on mean high water line of Rock Lake, and corner #4, thence along mean high water line approximately 660 feet to corner #1 and point of beginning, containing 5 acres."

Because there were no previous surveys or rectangular net in the area the surveyor was instructed to establish a location monument. Strict account of costs were to be kept because the claimant had to pay the cost of the survey.

The work was assigned on July 23, 1971 and field work commenced on August 9, 1971.

Conditions Found on the Ground

The claim was located on the northerly shore at the westerly end of Rock Lake, as described.

The land sloped gradually in a southerly direction from the southerly end of a low ridge which was somewhat swampy in nature and contained a scattering of black spruce and willow. Improvements included a plywood frame cabin and a small boat dock on the lake. The claim was staked out, approximately as described.

Preliminary Statement of the Problem

The surveyor is required to establish monumented corners of the claim so that it conforms to the original claimant's intent and also complies with the law. He must also establish a location monument for a tie if no corners of the Public Land are available for a tie.

Regulations

The following sections of the Manual of Surveying Instructions, 1973, are applicable to this case:

3-115 to 3-121	Meandering
7-16	Metes and bounds surveys
4-18; 10-32 to 10-34	Location monuments

Legal Constraints

The regulations pertaining to Headquarters Sites are found in 43 CFR, Subpart 2562 and Subpart 2563. A Headquarters Site may not exceed 5 acres. The claimant must pay the cost of the survey.

Final Statement of the Problem

All improvements to the site are to be described; the corners must be monumented and no more than five acres can be included. A location monument is required.

Solution

Corner No. 1 was located on the edge of Rock Lake in swampy land where it would be subject to destruction by ice and wave action. This corner was therefore monumented as a witness meander corner on line 1-2. Corners 2 and 3 were monumented as marked by the claimant. Corner 4 was monumented as a meander corner on the mean high water line. The lake was meandered between corner 1 and corner 4. The meanders were extended for about 10 chains beyond both corner 1 and corner 4 for informational purposes. The cabin and boat dock were described and tied to corner 1. The boat dock was also tied in along the meanders.

Since there was no rectangular survey or location monument within 2 miles, Location Monument No. 5666 was established on the top of the low ridge and tied to the nearest corner of the survey, corner No. 3.

Prior to permanent monumentation of any of the corners, the area of the tract was computed to insure that it did not exceed 5 acres. Had the tract, as staked by the claimant, exceeded the acreage limitation the end lines would have required adjustment to reduce the acreage to 5 acres or less. In this situation such reduction was not required.

Usually the practice on this type survey is to make the end lines of the claim parallel. This survey does not have parallel end lines but is still in a normal shape.

Figure 1 illustrates the plat of survey accepted May 29, 1973.

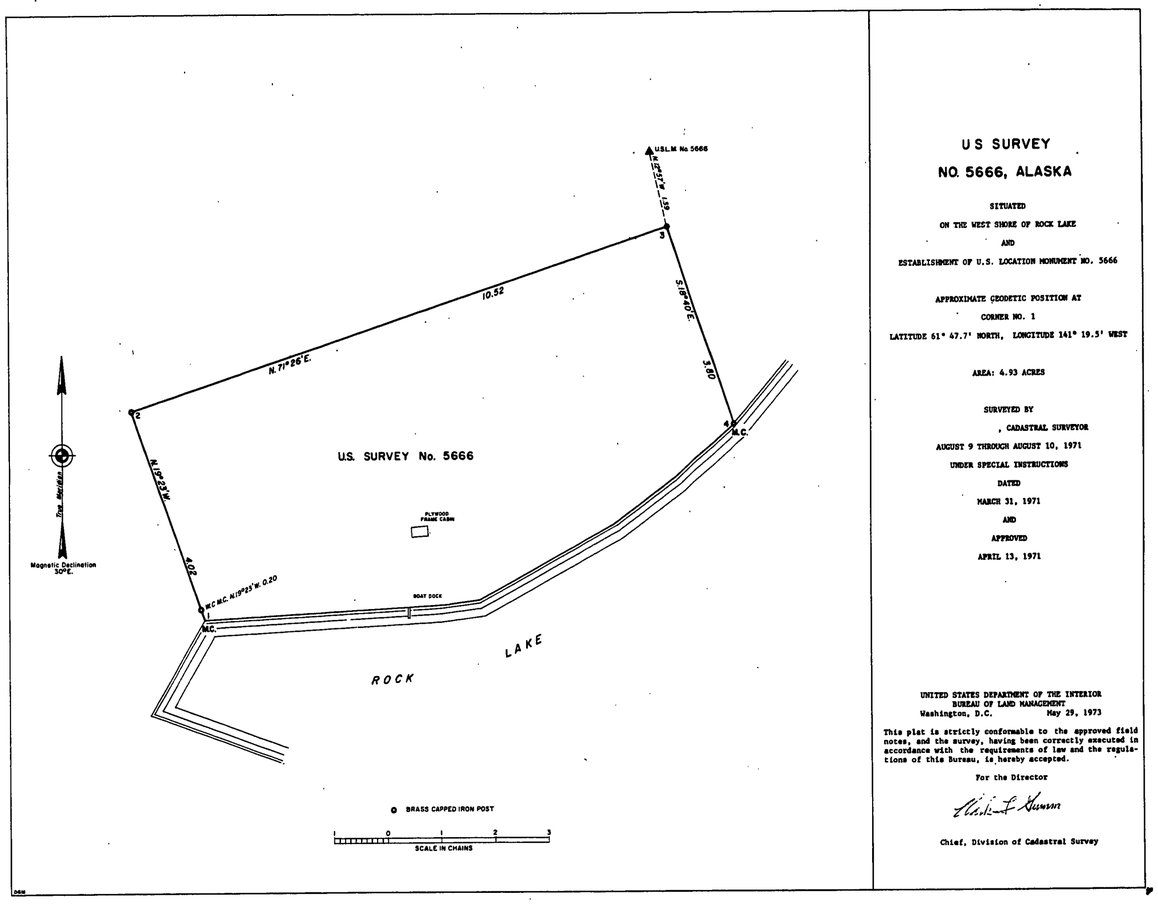
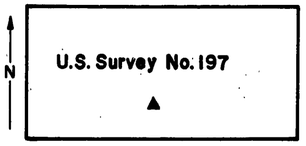


Figure 1 - Accepted Plat

RICHARDSON HIGHWAY HOMESTEADS AND HOMESITES

1907



History of Surveys

1907 Charles S. Hubbell executed U.S. Survey 197, official plat approved July 8, 1908.

Reasons for Request of this Survey

Lot 1 of this survey was in connection with a Homesite application by Steward Nutter, Anchorage Serial No. 057983.

Lot 2 was in connection with a Homesite application by Richard Dunning, Anchorage Serial No. 059331.

Lot 3 was in connection with a Homestead application by Milford Taylor, Anchorage Serial No. 051334.

Special Instructions

On June 11, 1964 Special Instructions were issued for the survey of three tracts of land, under U.S. Survey No. 3939. These instructions are shown in part by figure 3. The Special Instructions state that U.S. Survey No. 197 is located about one mile east of the three tracts. This statement was based upon the plotted position of U.S. Survey 197, as shown on a plat of unsurveyed T. 9 S., R. 4 W., Copper River Meridian. The application descriptions state that the tracts to be surveyed are located between mile posts 9 and 10 east from Valdez along the Richardson Highway. The tracts are also shown on the use map. This map is shown in part by figure 2.

Conditions Found on the Ground

The surveyor assigned to survey U.S. Survey No. 3939 surveyed the three tracts as shown on the unapproved plat of survey as shown by figure 4. The field notes and plat of this survey were submitted to the Washington Office for approval.

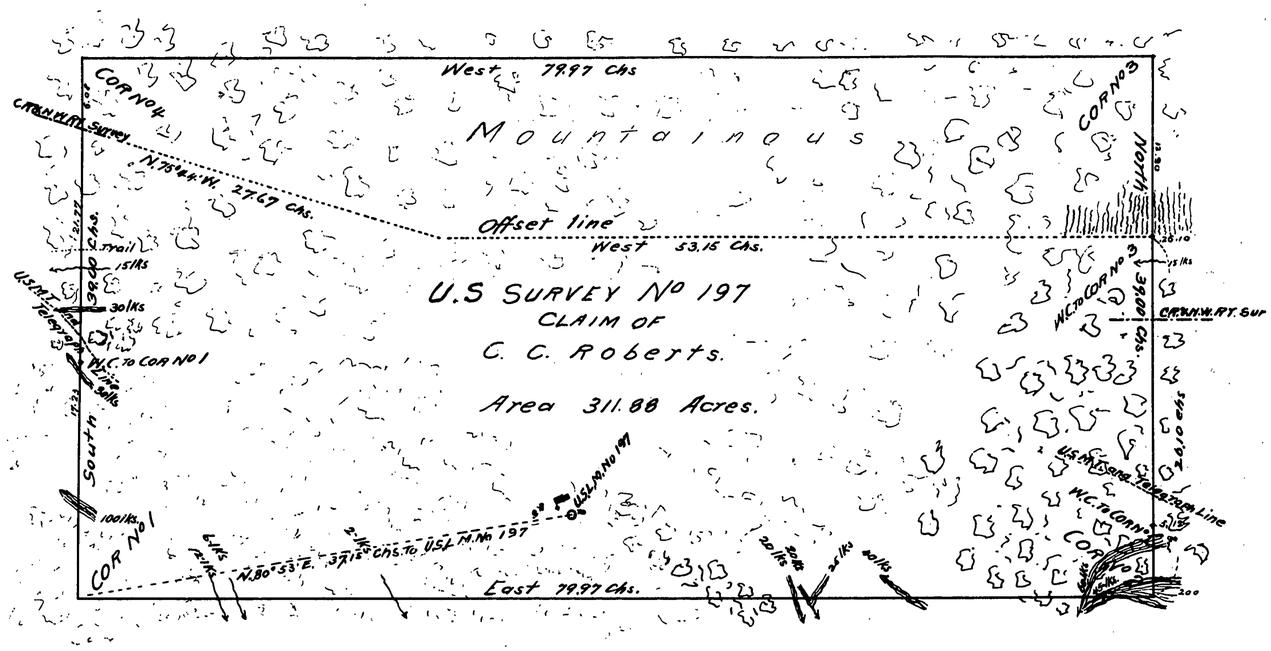


Figure 1 - Original 1907 Homestead Survey

U. S. SURVEY NO. 197

OF THE

CLAIM OF

C. C. ROBERTS

UNDER ACT OF May 14, 1898

and Act OF March 3, 1903

SITUATE

North side Lowe River, 10 miles east of Valdez, District of Alaska

DISTRICT OF ALASKA

SCALE OF	Eight	CHS. TO INCH
VARIATION	29°40'	EAST
AREA	311.88	ACRES

AS

SURVEYED BY

Charles S. Hubbell

U. S. DEPUTY SURVEYOR

August 11 - 14 1907

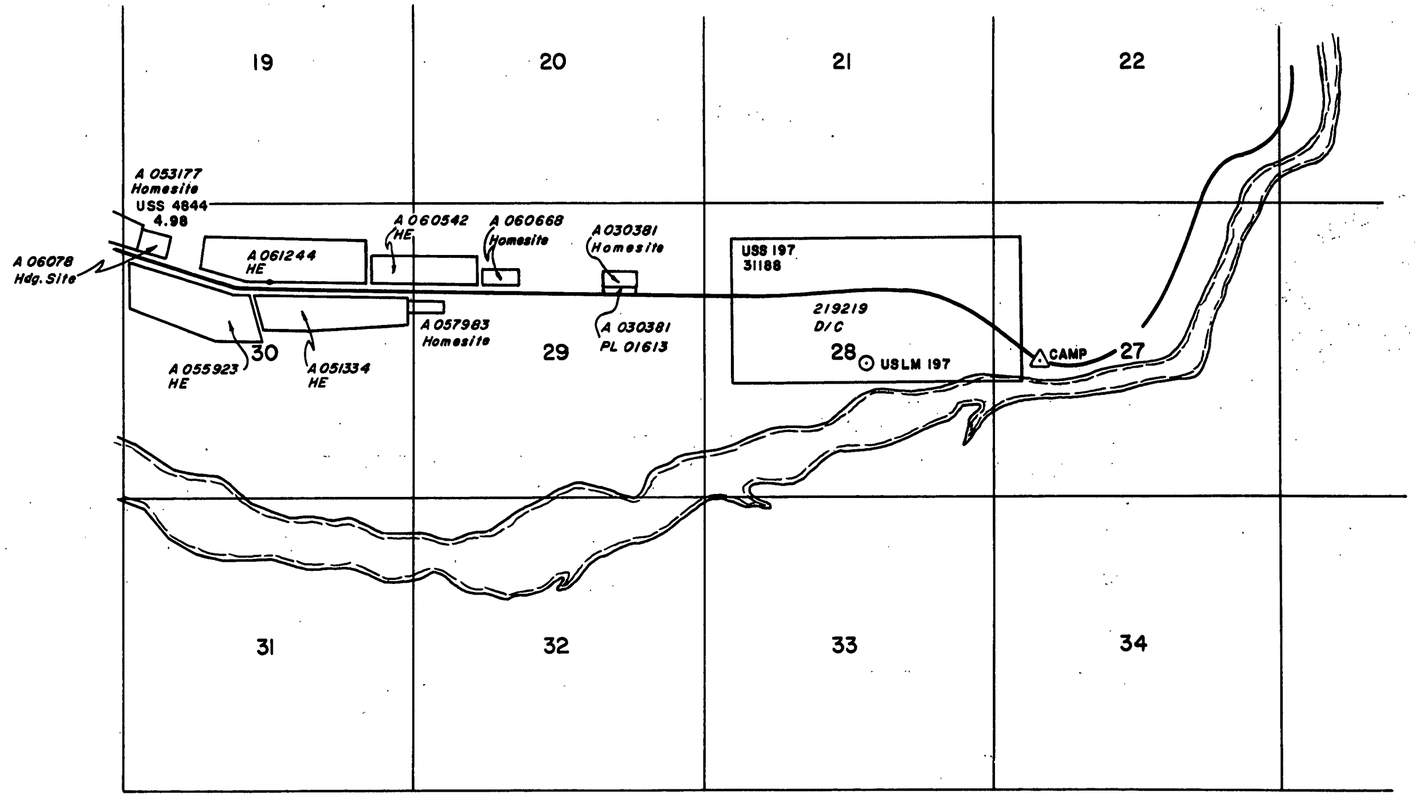


Figure 2 - 1964 Use Map

F7-1

RICHARDSON HIGHWAY HOMESTEADS AND HOMESITES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Alaska State Office
Division of Engineering
555 Cordova Street
Anchorage, Alaska

SPECIAL INSTRUCTIONS

U.S. Survey No. 3939
Alaska

Homesites and Homestead

June 11, 1964

Survey of three tracts of land situated along the Richardson Highway approximately ten miles easterly of Valdez, Alaska, being those tracts applied for by Stewart Nutter, Richard Dunning and Milford Taylor under Anchorage Serial Nos. 057983, 059331 and 051334 respectively.

In the execution of U.S. Survey No. 3939, Alaska, the surveyor assigned is authorized and directed to make the survey hereinafter set out and any necessary retracements and restoration of points of control; and will be guided by the Manual of Surveying Instructions, 1947, the provisions of these Special Instructions and the provisions of any supplemental instructions which may be issued pursuant to a report of complications, or by reason of additional authorization.

AUTHORITY

The State Director, Alaska, by memorandums dated December 9, 1963, February 27, 1964 and March 24, 1964, from the Land Office Manager, requested the necessary surveys to accommodate applications filed by Stewart Nutter, Richard Dunning and Milford Taylor, Anchorage Serial Nos. 057983, 059331 and 051334.

APPROPRIATION

Costs of this survey are payable out of current Management of Lands and Resources appropriation in accordance with administrative requirements. An accurate account of all expenses incurred in the execution of this survey will be submitted to the Branch of Office Engineering along with the field data.

RELATED SURVEYS

U.S. Survey No. 197 is located on both sides of the Richardson Highway, approximately one mile easterly.

METHODS AND PROCEDURES

These instructions provide for survey of the boundaries of the tracts requested. A description of each tract, as given in the requests for survey, is as follows:

A-057983, Homesite

"Located on the south side of the Richardson Highway at mile post 10, 10 miles east of Valdez, and directly adjoining the east side of homestead claim Anchorage 051334. Marker post #1 is indicated by a white sign on a 24" spruce tree which is also the northeast corner marker of homestead claim Anchorage 051334; thence the boundary proceeds easterly 660 feet parallel to the highway to a blaze mark on a 24" spruce which is marker #2; thence southerly to a 4 ft. high stake marked #3; thence westerly 660 feet to a 4 ft. high stake marked #4; thence northerly 330 feet to marker #1, the point of beginning. Approximate Latitude 61° 03' 55" North, Longitude 145° 58' 55" West."

A-059331, Homesite

"Homesite is located approximately 9 miles from Valdez, on the Richardson Highway. Corner Post #1 is located 150 feet north of the center of the Highway and is the same as corner post #4 of claim A-053177, then continues in a westerly direction parallel to Richardson Highway 660 feet to corner post #2, then northerly 330 feet to corner post #3, then easterly 660 feet to corner post #4, then southerly 330 feet parallelling homesite claim A-053177 westerly boundary to corner post #1."

A-051334, Homestead

"Starting 10 miles east of Valdez at milepost 10 on the south side of the Richardson Highway; then south 660 feet to the SE corner; then west 2,970 feet to the SW corner; then north 660 feet to the NW corner on the Richardson Highway; then east 2,970 feet to the point of beginning."

The total area of the survey will be approximately 55 acres; however, neither lot accommodating a homesite claim may exceed 5.00 acres.

The surveyor assigned will execute the survey based upon the above descriptions using good survey practice in making such modifications as may be necessary. Minor adjustments to provide parallel boundaries or promote good survey practice should be made. Any major adjustment must have prior clearance by the Branch of Office Engineering.

It should be noted that the homesite descriptions appear to describe lands adjacent to the highway right-of-way while the homestead is described to the highway center line. The survey should be made as indicated.

The northerly boundary of the homestead will consist of a traverse of the apparent centerline of the highway monumenting all angle points.

Corner points falling on the highway will be monumented with iron spikes, or other suitable material, driven flush with the surface of the road. Reference monuments will be established for such corners in accordance with the provisions of the Manual of Surveying Instructions, 1947.

Connection will be made from a corner of the survey to each of the improvements within the survey, and such description of each improvement will be recorded as is necessary to properly identify and plat it. All corner points not falling on the highway will be monumented with iron posts, or brass tablets, with brass caps appropriately marked.

Connection will be made between noncontiguous lots of the survey and from a corner of the survey to a corner of U.S. Survey No. 197. Field verification of such connection will be made.

Figure 3 - Special Instructions

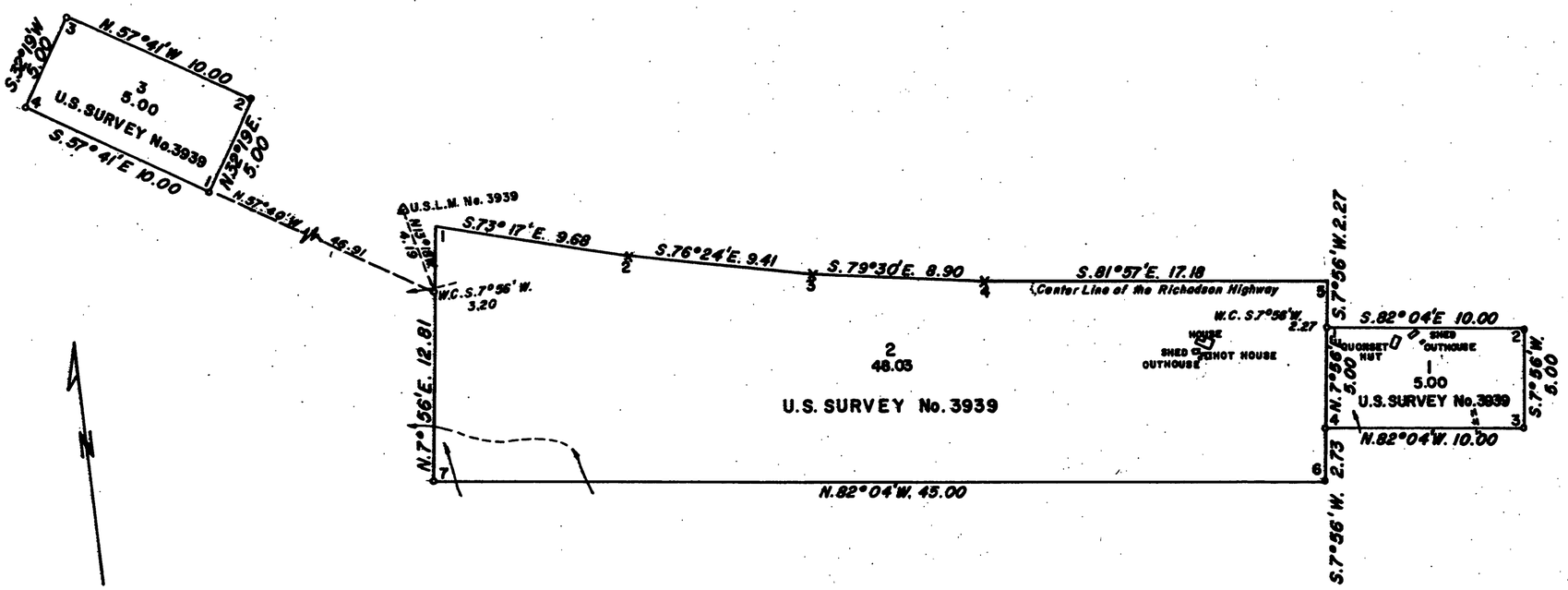


Figure 4 - Initial Plat of U. S. Survey No. 3939

Preliminary Statement of the Problem

The prior U.S. Survey No. 197 was later discovered to overlap onto portions of this survey. The plat of this prior survey is shown in part by figure 1. The field notes of this survey state (on pages 6 and 7) that U.S.L.M. No. 197 was established and monumented with an iron pipe near the buildings shown on the plat, a cottonwood bearing tree was marked and the buildings tied to the monument. The field notes on page 7, read in part:

"U.S.L.M. No. 197 is situate on the south side of the main U.S. Military trail from Valdez to Copper River, in Lat. N. 61°04' and Long. W. 145°58'. Positions are closely approximate." The actual position is 0°00' 29" in Latitude and 0°02' 40" in Longitude different from the original record.

Page 12 of the field notes read in part:

"The within tract of land is situate in Lowe River Valley, on the north side of the Lowe River and about ten miles east of Valdez, Alaska."

Page 14 of the field notes read in part:

".... survey of the tract of public land in Alaska claimed by C. C. Roberts, situate in Lowe River Valley, about ten miles east of Valdez, Alaska; that ...."

The east boundary of U.S. Survey No. 197 passes through mile post 10 of the Richardson Highway.

U.S. Survey No. 197 was not located and no tie was made to this survey as directed by the Special Instructions.

Regulations

This case applys the following sections of the Manual of Surveying Instructions, 1973.

5-4 to 5-17	Identification
7-16	Metes and Bounds Surveys

Changes in Instruction and Amended Information

On August 23, 1965, prior to any further action, Mr. Dunning, the claimant of Lot 3, reported finding evidence of the buildings shown on the original plat of U.S. Survey No. 197. Action was suspended on U.S. Survey No. 3939, and an investigation of the situation was made. During this investigation U.S.L.M. No. 197 and witness corners No. 2 and 3, of U.S. Survey No. 197 were recovered. U.S. Survey No. 3939 partially overlapped the patented U.S. Survey No. 197 as illustrated in figure 5.

On September 30, 1965, Amended Special Instructions were issued for correction of the conflict. Page one of these instructions is shown in figure 6.

RICHARDSON HIGHWAY HOMESTEADS AND HOMESITES

Final Statement of the Problem

The corners of the prior survey needed to be recovered or restored and a survey connection between the two surveys made to determine the extent of overlap.

Any portions of the Homestead or Homesites which conflicted with the prior patent would require revision. Mr. Nutter's Homesite, substantially free of the conflict, could be revised in position provided the 5 acre limitation were met. Mr. Taylor's Homestead application appeared almost entirely in conflict and would necessarily be void. Mr. Dunning's application appeared free of conflict.

A direct tie to a geodetic control survey was desirable to more properly fix these surveys.

Solution

U.S. Survey No. 197 was resurveyed and controlled by the position of witness corners Nos. 2 and 3. These original witness corners were recovered as well as the original BTs. The true corner points for corner Nos. 2 and 3 were replaced at record bearing and distance from their respective witness corners.

Corner No. 3 was replaced at record bearing and distance from it's witness corner (North, 12.90 chains.) The true corner points were not remonumented. Corner No. 4 was replaced at record bearing and distance from corner No. 3 (West, 79.97 chains.) Corner No. 4 could not be remonumented so a witness point was established 2.00 chains East, and a witness corner was set 3.50 chains South. The true point for corner No. 1 was restored at record bearing and distance 39.02 chains South of corner No. 4. The true point and record point for witness corner No. 1 were not remonumented. U.S.L.M. No. 197 was remonumented and a tie made to witness corner No. 2. A direct tie was made from witness corner No. 3, to U.S.C.&.G.S. triangulation station, "Camp 13", located about 3 miles to the east along the highway. U.S. Survey No. 197 was thus adequately retraced and identified upon the ground.

The former monuments pertaining to the voided Taylor Homestead (old lot 2) were removed as well as the monument marked for U.S.L.M. No. 3939. The monuments for lot 1, (the Nutter Homesite) were moved easterly with corners 1 and 4 placed on the east line of U.S. Survey No. 197. The Dunning Homesite (old lot 3) was changed to lot 2, and the markings corrected to reflect this change. The corrected survey was platted and field notes written for the resurvey of U.S. Survey No. 197 and survey of U.S. Survey No. 3939. The plat accepted January 23, 1969, is shown in compact form in figure 7.

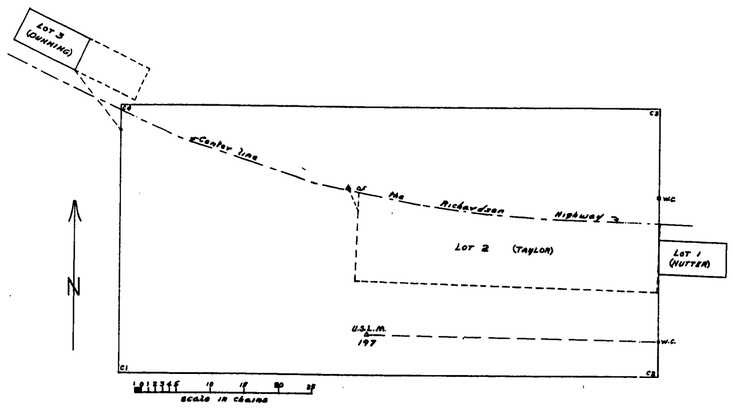


Figure 5 - Areas of Overlap

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Alaska State Office
Division of Engineering
555 Cordova Street
Anchorage, Alaska

AMENDED
SPECIAL INSTRUCTIONS

U.S. SURVEY NO. 3939
Alaska

September 30, 1965

These amended special instructions provide for modification of the survey established under the original Special Instructions for U.S. Survey No. 3939, approved June 17, 1964.

Subsequent to the execution of the survey it was found that the survey was in partial conflict with patented U.S. Survey No. 197. Preliminary investigation has indicated that the claim of Mr. Nutter's lot No. 1 of unapproved U.S. Survey No. 3939, is slightly in conflict along the easterly boundary of U.S. Survey No. 197. Mr. Taylor's claim, lot No. 2, is in complete conflict with U.S. Survey No. 197, and Mr. Dunning's claim, lot No. 3, is probably free of any conflict.

2-3
To determine the exact extent of conflict, lines ~~1-2~~ and 3-4 of U.S. Survey No. 197 will be dependently resurveyed and new corner monuments established when necessary or desireable. A witness point will be established on line 3-4 near its intersection with the Richardson Highway.

Upon completion of the dependent resurvey of U.S. Survey No. 197, the westerly boundary of lot 1, unapproved U.S. Survey No. 3939 will be adjusted to become contiguous with the east boundary of U.S. Survey No. 197. The adjustment should be made to encompass as near 5.00 acres in lot 1 as is practicable. If lot No. 2 is entirely within U.S. Survey No. 197, all monuments established for the lot will be removed and the bearing trees destroyed. If lot 3 is free of conflict with U.S. Survey No. 197, no changes will be necessary except to change the corner markings to read lot 2 instead of lot 3; however, if all of lot 2 has not been obliterated, no change in marking will be necessary. Connection will be made from a corner of this lot to a corner of U.S. Survey No. 197.

Connection will also be made from a corner of the survey to each of the improvements within the survey, and such description of each improvement will be recorded as is necessary to properly identify and plat it. Corner points will be monumented with iron posts, or brass tablets, with brass caps appropriately marked.

Pertinent topographic features will be noted, recorded in the field note record and delineated on the plat of survey.

Figure 6 - Amended Instructions

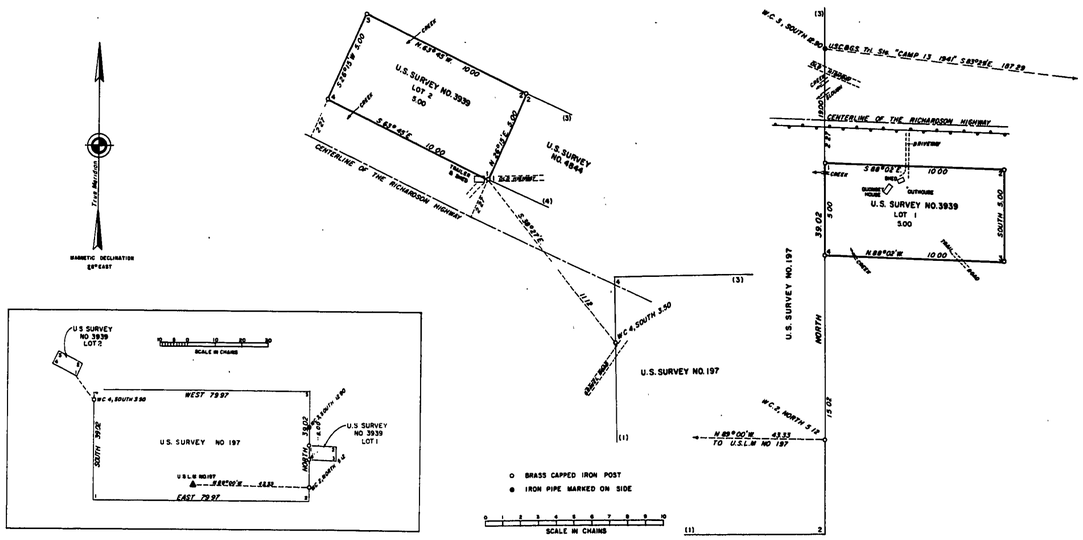


Figure 7 - Portion of Accepted Plat

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