

Water Resources Survey



Part I:
HISTORY OF LAND AND WATER
USE ON IRRIGATED AREAS

and

Part II:
MAPS SHOWING IRRIGATED
AREAS IN COLORS DESIGNAT-
ING THE SOURCES OF SUPPLY

Judith Basin County, Montana

Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June 1963

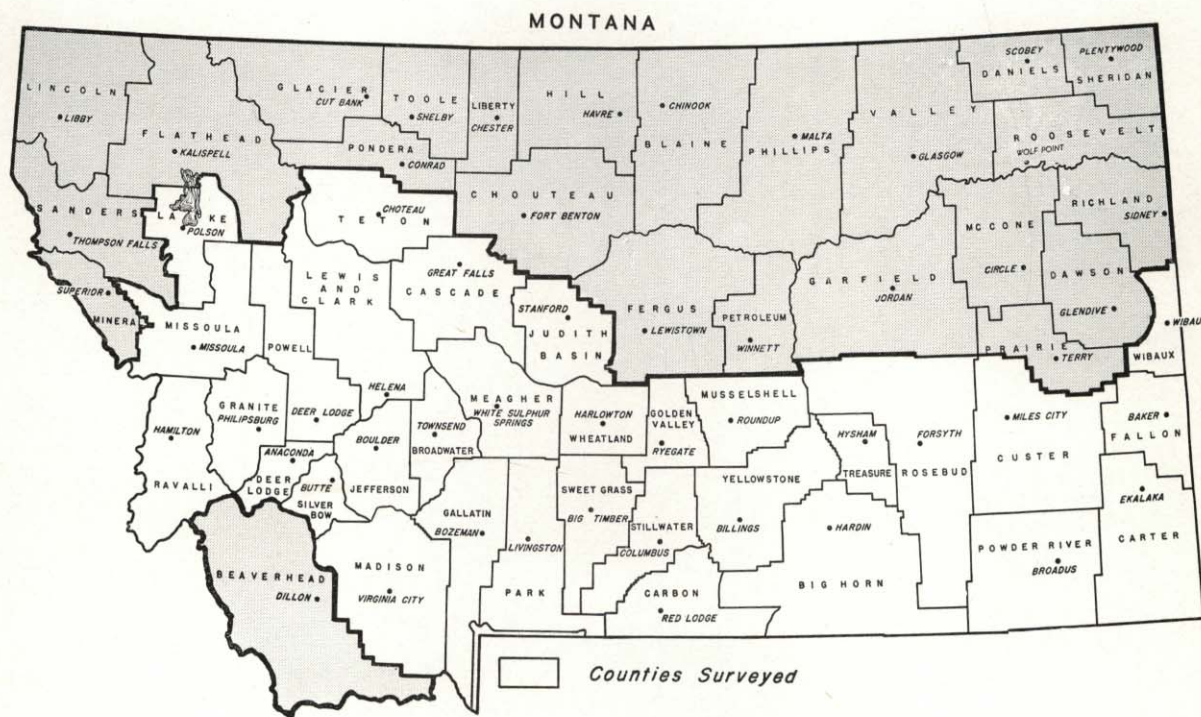
WATER RESOURCES SURVEY

JUDITH BASIN COUNTY

MONTANA

Part I

History of Land and Water Use
on Irrigated Areas



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STATE ENGINEER'S OFFICE
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June, 1963

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June, 1963

Honorable Tim M. Babcock
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Babcock:

Submitted herewith is a consolidated report on the Water Resources Survey of Judith Basin County, Montana.

This work was accomplished with funds made available to the State Engineer by the 37th Legislative Session, 1961, and in co-operation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

The report is divided into two parts: Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the County showing in colors the lands irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties: Big Horn, Broadwater, Carbon, Carter, Cascade, Custer, Deer Lodge, Fallon, Gallatin, Golden Valley, Granite, Jefferson, **Judith Basin**, Lake, Lewis and Clark, Madison, Meagher, Missoula, Musselshell, Park, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Wibaux, Wheatland and Yellowstone.

The office files contain minute descriptions and details of each individual water right and land use, which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in this report can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Respectfully submitted,

EVERETT V. DARLINTON, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid co-operation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is hereby acknowledged.

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The State Engineer's Office, Water Resources Survey, hereby expresses sincere appreciation to the many ranchers, farmers and stockmen who have given their helpful co-operation in this survey.

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FOREWORD

SURFACE WATER

Our concern over surface water rights in Montana is nearly a century old. When the first Territorial Legislature, meeting in Bannack, adopted the common law of England on January 11, 1865, the Territory's legal profession assumed that it had adopted the Doctrine of Riparian Rights. This doctrine had evolved in England and in eastern United States where the annual rainfall is generally more than twenty inches. It gave the owners of land bordering a stream the right to have that stream flow past their land undiminished in quantity and unaltered in quality and to use it for household and livestock purposes. The law restricted the use of water to riparian owners and forbade them to reduce appreciably the stream flow, but the early miners and ranchers in Montana favored the Doctrine of Prior Appropriation which permitted diversion and diminution of the streams. Consequently, the next day the legislature enacted another law which permitted diversion by both riparian and non-riparian owners. Whether or not this action provided Montana with one or two definitions of water rights was not settled until 1921 when the Montana Supreme Court in the *Mettler vs. Ames Realty Co.* case declared the Doctrine of Prior Appropriation to be the valid Montana water right law. "Our conclusion," it said, "is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865 and that it is unsuited to the conditions here. . ."

The appropriation right which originated in California was used by the forty-niners to divert water from the streams to placer mine gold. They applied to the water the same rules that they applied to their mining claims—first in time, first in right and limitation of the right by beneficial use. Those who came to the Montana gulches brought with them these rules, applying them to agriculture as well as to mining.

The main points of consideration under the Doctrine of Prior Appropriation are:

1. The use of water may be acquired by both riparian and non-riparian landowners.
2. It allows diversion of water regardless of the reduction of the water supply in the stream.
3. The value of the right is determined by the priority of the appropriation; i.e., first in time is first in right.
4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.
5. A right to the use of water is considered property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion of water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of it within 20 days in the county clerk's office of the county in which the

appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream, one must petition the District Court having jurisdiction over that stream for permission to make an appropriation. If the other appropriators do not object, the court gives its consent and issues a supplementary decree granting the right subject to the rights of the prior appropriators.

Inasmuch as the Montana laws do not require water users to file official records of the completion of their appropriations, it becomes advisable as soon as the demand for the waters of a stream becomes greater than its supply, to determine the rights and priorities of each user by means of an adjudication or water right suit. This action may be initiated by one or more of the appropriators who may make all the other claimants parties to the suit. Thereupon the Judge of the District Court examines the claims of all the claimants and issues a decree establishing priority of the right of each water user and the amount of water he is entitled to use. The court decree becomes in effect the deed of the appropriator to his water right.

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge, upon petition of the owners of at least 15 per cent of the water rights affected, must appoint a water commissioner to distribute the water. Chapter No. 231, Montana Session Laws 1963, Senate Bill 55 amended Section 89-1001 R.C.M. 1947, to provide that a water commissioner be appointed to distribute decreed water rights by application of fifteen per cent (15%) of the owners of the water rights affected, or, under certain circumstances at the discretion of the judge of the district court—**“provided that when petitioners make proper showing they are not able to obtain the application of the owners of at least fifteen per cent (15%) of the water rights affected, and they are unable to obtain the water to which they are entitled, the judge of the district court having jurisdiction may, in his discretion, appoint a water commissioner.”** After the commissioner has been appointed the Judge gives him full instructions on how the water is to be apportioned and distributed in accordance with the terms of the decree.

The recording of appropriations in local courthouses provides an incomplete record of the water rights on unadjudicated streams. In fact, the county records often bear little relation to the existing situation. Since the law places no restriction on the number or extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once, six appropriators each claimed all of the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of about 50 cfs. Today, the Big Hole River with an average flow of about 1,100 cfs has filings totaling 173,912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties; consequently,

water right filings on these inter-county streams are found distributed in two or more county courthouses. Anyone desirous of determining appropriations on a certain river or creek finds it difficult and expensive to examine records in several places. In addition, the records are sometimes scattered because the original nine counties of 1865 have now increased to 56. As the original counties have been divided and subdivided, the water right filings have frequently not been transcribed from the records of one county to the other. Thus, a record of an early appropriation in what is at present Powell County may be found in the courthouse of the original Deer Lodge County.

It can be readily seen that this system of recording offers little protection to rights in the use of water until they are determined by an adjudication. In other words, an appropriator does not gain a clear title to his water right until after adjudication and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes very costly when they are prolonged for years. It is estimated that litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly one-half million dollars. In the second place, unless the court seeks the advice of a competent irrigation engineer, the adjudication may be based upon inaccurate evidence. In the third place, if some claimant has been inadvertently left out of the action, the decree is not final and may be re-opened for consideration by the aggrieved party. Another difficulty arises in determining the ownership of a water right when land under an adjudicated stream becomes subdivided in later years and the water not apportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water right ownership on deeds and abstracts.

The Legislative Session of 1957 passed Chapter 114 providing for the policing of water released from storage to be transmitted through a natural stream bed to the place of use. The owner of the storage must petition the court for the right to have the water policed from the storage reservoir to his place of use. If there are no objections, the court may issue this right and appoint a water commissioner to distribute the water in accordance therewith. This law applies only to unadjudicated streams.

Administration of water on an adjudicated stream is done by the District Court, but it has its drawbacks. The appointment of a water commissioner is often delayed until the shortage of water is acute and the court frequently finds it difficult to obtain a competent man for a position so temporary. The present administration of adjudicated streams which cross the county boundaries of judicial districts creates problems. Many of the water decrees stipulate head gates and measuring devices for proper water distribution, but in many instances the stipulation is not enforced, causing disagreement among the water users.

Since a water right is considered property and may be bought and sold, the nature of water requires certain limitations in its use. One of the major faults affecting a stream after an adjudication is the failure of the District Court to have some definite control over the transfer of water rights from their designated places of use. The sale and leasing of water is becoming a common practice on many adjudicated streams and has created serious complications. By changing the water use to a different location, many of the remaining rights along the stream are disrupted, resulting in a complete breakdown of the purpose intended by the adjudication. To correct this situation, legal action must be initiated by the injured parties as it is their responsibility and not the Court's.

At one time or another all of the other Western Reclamation States have used similar methods of local regulation of water rights. Now all of them except Montana have more or less abandoned these practices and replaced them by a system of centralized state control such as the one adopted by the State of Wyoming. The key characteristics of the Wyoming system are the registration of both the initiation and completion of an appropriation in the State Engineer's Office, the determination of rights and administration by a State Board of Control headed by the State Engineer. These methods give the Wyoming water users titles to the use of water as definite and defensible as those which they have to their land.

When Montana began to negotiate the Yellowstone River Compact with Wyoming and North Dakota in 1939, the need for some definite information concerning our water and its use became apparent. The Legislature in 1939 passed a bill (Ch. 185) authorizing the collection of data pertaining to our uses of water and it is under this authority that the Water Resources Survey is being carried on. The purpose of this survey is six fold: (1) to catalogue by counties, in the office of the State Engineer, all recorded, appropriated and decreed water rights including use rights as they are found; (2) to map the lands upon which the water is being used; (3) to provide the public with pertinent water right information on any stream, thereby assisting in any transaction where water is involved; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; (6) and to have a complete inventory of our perfected water rights in case we need to defend these rights against the encroachments of lower states, or Wyoming or Canada.

GROUND WATER

Ground water and surface water are often intimately related. In fact, it is difficult in some cases to consider one without the other. In times of heavy precipitation and surface runoff, water seeps below the land surface to recharge underground reservoirs which, in turn, discharge ground water to streams and maintains their flow during dry periods. The amount of water stored underground is far greater than the amount of surface water in Montana, and, without seepage from underground sources, it is probable that nearly all the streams in the State would cease to flow during dry periods.

It is believed that Montana's ground water resources are vast and only partly developed. Yet this resource is now undergoing an accelerating development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development without some regulation of its use will cause a depletion of ground water in areas where the recharge is less than the withdrawal. Experience in other states has shown that once over-use of ground water in a specific area has started, it is nearly impossible to stop, and may result in painful economic readjustments for the inhabitants of the area concerned.

Practical steps aimed at conserving ground water resources as well as correcting related deficiencies in surface water laws have become necessary in Montana. Prior to the Legislative Session of 1961, there was no legal method of appropriating ground water. Proposed ground water codes were introduced and rejected by four sessions of the Montana Legislative Assembly, in 1951, 1953, 1955 and 1959.

In 1961, during the 37th Legislative Session, a bill was introduced and passed which created a Ground Water Code in Montana. (Chapter 237, Revised Codes of Montana, 1961). This bill became effective as a law on January 1, 1962, with the State Engineer of Montana designated as "Administrator" to carry out provisions of the Act.

Some of the important provisions contained in Montana's New Ground Water Law are:

Section 1. DEFINITIONS OR REGULATIONS AS USED IN THE ACT.

(a) "Ground water" means any fresh water under the surface of the land including the water under the bed of any stream, lake, reservoir, or other body of surface water. Fresh water shall be deemed to be water fit for domestic, livestock, or agricultural use. The Administrator, after a notice and hearing, is authorized to fix definite standards for determining fresh water in any controlled ground water area or subarea of the State.

(b) "Acquifer" means any underground geological structure or formation which is capable of yielding water or is capable of recharge.

(c) "Well" means any artificial opening or excavation in the ground, however made, by which ground water can be obtained or through which it flows under natural pressures or is artificially withdrawn.

(d) "Beneficial use" means any economically or socially justifiable withdrawal or utilization of water.

(e) "Person" means any natural person, association, partnership, corporation, municipality, irrigation district, the State of Montana, or any political subdivision or agency thereof, and the United States or agency thereof.

(f) "Administrator" means State Engineer of the State of Montana.

(g) "Ground water area" means an area which as nearly as known facts permit, may be designated so as to enclose a single and distinct body of ground water, which shall be described horizontally by surface description in all cases and which may be limited vertically by describing known geological formations should conditions dictate this to be desirable. For purposes of administration, large ground water areas may be divided into convenient administrative units known as "subareas".

Section 2. RIGHTS TO USE. Rights to surface water where the date of appropriation precedes January 1, 1962, shall take priority over all prior or subsequent ground water rights. The application of ground water to a beneficial use prior to January 1, 1962, is hereby recognized as a water right. Beneficial use shall be the extent and limit of the appropriative right. As to appropriations of ground water completed on and after January 1, 1962, any and all rights must be based upon the filing provisions hereinafter set forth, and as between all appropriators of surface or ground water on and after January 1, 1962, the first in time is first in right.

Montana's Ground Water Code provides for four different types of forms that may be filed.

Form No. 1. "Notice of Appropriation of Ground Water"—shall require answers to such questions as—(1) the name and address of the appropriator; (2) the beneficial use for which the appropriation is made, including a description of the lands to be benefited if for irrigation; (3) the rate of use in gallons per minute of ground water claimed; (4) the annual period (inclusive dates) of intended use; (5) the probable or intended date of first beneficial use; (6) the probable or intended date of commencement and completion of the well or wells; (7) the location, type, size and depth of the well or wells contemplated; (8) the probable or esti-

mated depth of the water table or artesian aquifer; (9) the name, address, and license number of the driller engaged; and (10) such other similar information as may be useful in carrying out the policy of this Act. This form is optional, but it has an advantage in that after filing the Notice of Appropriation, a person has 90 days in which to commence actual excavation and diligently prosecute construction of the well. Otherwise, a failure to file the Notice of Appropriation deprives the appropriator of his right to relate the date of the appropriation back upon filing the Notice of Completion (Form No. 2).

Form No. 2. **"Notice of Completion of Ground Water by Means of Well"**—this form shall require answers to the same sort of questions as required by Form No. 1 (Notice of Appropriation of Ground Water), except that for the most part it shall inquire into accomplished facts concerning the well or means of withdrawal, including (a) information as to the static level of water in the casing or the shut-in pressure if the well flows naturally; (b) the capacity of the well in gallons per minute by pumping or natural flow; (c) the approximate drawdown or pumping level of the well; (d) the approximate surface elevation at the well head; (e) the casing record of the well; (f) the drilling log showing the character and thickness of all formation penetrated; (g) the depth to which the well is drilled; and similar information.

It shall be the responsibility of the driller of each well to fill out the Form No. 2, "Notice of Completion of Ground Water by Means of a Well", for the appropriator, and the latter shall be responsible for its filing.

Form No. 3 **"Notice of Completion of Ground Water Appropriation Without a Well"**—is for the benefit of persons obtaining (or desiring to obtain) ground water without a well, such as by subirrigation or other natural processes so as to enable such persons to describe the means of using ground water; to estimate the amount of water so used; and requiring such other information pertinent to this particular type of ground water use.

Form No. 4 **"Declaration of Vested Ground Water Rights"**—shall be used by persons who have put ground water to a beneficial use (including subirrigation or other natural processes), prior to January 1, 1962, and will require the person within two (2) years after January 1, 1962, to file a declaration in the office of the county clerk of the county in which the claimed right is situated and shall contain the following information: (1) Name and address of the claimant; (2) the beneficial use on which the claim is based; (3) the date or approximate date of the earliest beneficial use, and how continuous the use has been; (4) the amount of ground water claimed; (5) if the beneficial use has been for irrigation, the acreage and description of lands to which such water has been applied and the name of the owner thereof; (6) the means of withdrawing such water from the ground and the location of each well or other means of withdrawal; (7) the date of commencement and completion of the construction of the well, wells or other works for withdrawal of ground water; (8) the depth of the water table; (9) so far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of ground water; (10) the estimated amount of ground water withdrawn each year; (11) the log of the formations encountered in the drilling of each well; and (12) such other information of similar nature as may be useful in carrying out the policy of the Act.

Failure to comply with this requirement shall in no wise work a forfeiture by not filing Form No. 4, "Declaration of Vested Ground Water Rights", or prevent any such claimant

from establishing such rights in the courts, but he must maintain the burden of proving such unrecorded rights. The law provides, however, that the court shall accept the filing of a "Declaration of Vested Ground Water Rights" as prima facie evidence of the right. This means that if a user has failed to make a filing and a case comes up in court to adjudicate the rights, the one who has not made a filing must prove his case by witnesses.

It shall be recognized that all persons who have filed a Water Well Log Form as provided for under Sections 1 and 2 of Chapter 58, Sessions Laws of Montana, 1957, shall be considered as to having complied with the requirements of this Act.

Copies of the four types of forms used in filing on ground water are available in the County Clerk and Recorder's office in each of Montana's 56 counties. It shall be the duty of the County Clerk in every instance to file the original copy for the county records; transmit the second copy to the Administrator (State Engineer); the third copy to the Montana Bureau of Mines and Geology; and the fourth copy to be retained by the appropriator (person making the filing).

Accurate records and the amount of water available for future use are essential in the administration and investigation of water resources. In areas where the water supply becomes critical, the ground water law provides that the administrator may define the boundaries of the aquifer and employ inspectors to enforce rules and regulations regarding withdrawals for the purpose of safeguarding the water supply and the appropriators (see the wording of the law for establishing a "controlled area").

The filing of water right records in a central office under control of a responsible State agency, will provide the only efficient means for the orderly development and preservation of our water supplies and will protect all of Montana's use — on both ground and surface waters.

METHOD OF SURVEY

Water Resources data contained in Part I and Part II of this report are obtained from courthouse records in conjunction with individual contacts with landowners. A survey of this type involves extensive detailed work in both the office and field to compile a comprehensive inventory of water rights as they apply to land and other uses.

The material of foremost importance used in conducting the survey is taken from the files of the county courthouse and the data required includes; Land ownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers in regard to the distribution and use of water. Deed records of landownership are reviewed and abstracts are checked for water right information when available.

Aerial photography is used by the survey to assure accuracy in mapping the land areas of water use and all the other detailed information which appears on the final colored township maps in Part II. Section and township locations are determined by the photogrammetric system, based on government land office survey plats, plane-table surveys, county maps and by "on the spot" location during the field survey. Noted on the photographs are the locations of each irrigation system, with the irrigated and irrigable land areas defined. All the information compiled on the aerial photo is transferred and drawn onto a final base map by means of aerial projection. From the base map, color separation maps are made and may include three to ten overlay separation plates, depending on the number of irrigation systems within the township.

Field forms are prepared for each landowner, showing the name of the owner and operator, photo index number, a plat defining the ownership boundary, type of irrigation system, source of water supply and the total acreage irrigated and irrigable under each. All of the appropriated and decreed water rights that apply to each ownership are listed on the field forms with the description of intended place of use. During the field survey, all water rights listed on the field form are verified with the landowner. Whenever any doubt or complication exists in the use of a water right, deed records of the land are checked to determine the absolute right of use.

So far as known, this is the first survey of its kind ever attempted in the United States. The value of the work has become well substantiated in the counties completed to date by giving Montana its first accurate and verified information concerning its water rights and their use. New development of land for irrigation purposes by State and Federal agencies is not within the scope of this report. The facts presented are as found at the time of completion of each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

Complete data obtained from this survey cannot be included in this report as it would make the text too voluminous. However, if one should desire detailed information about any particular water right, lands irrigated, or the number and amount of water rights diverting from any particular stream, such information may be obtained by writing the State Engineer's Office in Helena.

Every effort is being made to produce accuracy of the data collected rather than to speed up the work which might invite errors.

HISTORY AND ORGANIZATION

Judith Basin County is located near the geographic center of Montana. The county derived its name from the Judith River, named by William Clark when he traveled through the region with the Lewis and Clark Expedition in 1804.

The area now contained within the boundaries of Judith Basin County was formerly a part of the Territorial Counties of Gallatin, Chouteau, Fergus, Meagher and Cascade. In 1885, some of the area of eastern Meagher County became a part of Fergus County and two years later, in 1887, the western part of Fergus County was included in the formation of Cascade County. On December 10, 1920, Judith Basin County was created from parts of both Fergus and Cascade Counties.

The topography of Judith Basin County is characterized by mountains and plains. It is easily defined in terms of the natural land features that form it. A few of the southern peaks of the Highwood Mountains are in the northwest corner of the county. Along the boundary on the southwest is the Little Belt Mountain Range, that forms a broad, elevated plateau-like area that trends southeasterly and occupies approximately one-third of the county.

Headwaters of the streams which form the drainage pattern throughout the county are: From the Highwood Mountains, Arrow Creek and its tributaries on the north; from the Little Belt Mountains, Otter Creek on the west, and the Judith River and its tributaries on the south, central and eastern parts of the county. All of the streams draining the county are tributaries of the Missouri River. Stream flows are variable; some of the creeks flow throughout the year, whereas others are intermittent.

After the Lewis & Clark Expedition in 1805, the only white men to frequent the area of Judith Basin County were traders and trappers until 1820, when Father DeSmet, first of the missionaries, crossed the Basin with a band of Flathead and Nez Perce Indians on his return trip to St. Louis. At the mouth of the Judith River, DeSmet and his party were met by a group of Blackfeet Indians and a united Mass was held on the open plain. The Judith Basin was known as a common hunting ground for surrounding Indian tribes, mainly the Crows, Blackfeet, Nez Perce and Sioux.

Chief Joseph, on his historic flight to reach Canada, passed through the eastern part of what is now Judith Basin County, following a route along the Judith River.

Some of the early stage and freight roads that passed through the county were the Fort Benton-Billings and the Helena to Carroll, (an old town on the Missouri), near the mouth of the Musselshell River. These two routes intersected at a stage station known as "Ubet", in the southeastern part of the county, a few miles west of the present town of Garneill in Fergus County.

Among the first settlers in the county were the stockmen and miners. Early pioneering stockmen began their open-range operations in the latter part of the 1870's. One of the larger cattle outfits to begin ranching operations in 1878 included T. C. Power and his brother of Fort Benton, J. H. McKnight of Fort Shaw who joined with H. P. Brooks, a pioneer cattleman, to organize the Judith Cattle Company. Open-range cattle operations continued to prosper for several years, with thousands of cattle on the ranges of central Montana. The severe winter of 1886-1887 depleted most of open-range cattle herds of western America until 1890, when cattle again appeared on the ranges of the Judith Basin, although on a much smaller scale.

The Bower Brothers were early sheep raisers in the area and at one time controlled 100,000 acres of land. The first livestock Association was organized in 1881 by the stockmen of Shonkin, Highwood, and Belt districts to protect their cattle herds from the marauding Indians of Canada and the reservation north of the Missouri River.

Charles Marion Russell, Montana's famous cowboy artist, spent many of the early years of his life in the Judith Basin. He emerged as a noted painter, sculptor and pen and ink artist. One of his most famous paintings, "The Last of the Five Thousand", depicts the remnants of a large cattle herd after the winter of 1886-1887. Charlie Russell had as many individual friends as anyone that lived, and unlike most people, he could express his inner feeling with ease, either in words or pictures, which was probably a contributing factor to his greatness. The cabin he lived in while painting many of his pictures was moved from its original location near Utica, to a "Dude Ranch" near Lewistown in Fergus County for preservation.

During the 1860's, mining, as in other areas of the Montana Territory, began in Judith Basin with the prospecting for gold in the gulches on the east side of the Little Belt Mountains. Gold was discovered in Yogo Gulch about 1865, but the prospectors were driven away by hostile Indians. Placer mining was resumed in Yogo Gulch in 1879, but these operations for the most part were abandoned when the silver-lead deposits at Barker (Clendennin) and Hughesville were discovered. The town of Yogo, which at one time had a population of about 1,200, was virtually deserted by 1883. Some placer mines were operated intermittently on a small scale at Yogo, Elk, Lion, Skunk, Black Tail and other gulches until as late as 1897. To avoid excessive transportation costs, smelters were constructed at Barker (Clendennin) and at Hughesville. The smelter at Hughesville was operated only a short time, because the furnace did not have a suitable refractory lining. The 40-ton smelter at Clendennin was equipped with a water-jacketed furnace. This smelter was operated about 18 months by Col. George Clendennin; it produced \$375,000 worth of bullion. Operations ceased when Col. Clendennin was killed by falling rock at the Wright & Edwards mine in 1883.

The discovery of sapphires in a basic dike near Yogo Gulch in 1896, created much interest in that area. Considerable mining activity resulted. Several companies mined sapphires along this dike for many years. Control of the entire sapphire-bearing dike was acquired by the "New Mines Sapphire Syndicate", a British company, in 1914. Operations by this company continued until 1929, when all sapphire mining in the county ceased. Recently the property was acquired by a Montana company, "The New Mine Sapphire Syndicate", but production to date is insignificant.

Judith Basin County has an area of 1,880 square miles (1,203,200 acres) and is approximately 50 miles long (north to south) and 40 miles wide (east to west). In the last census (1960), the county had a population listed as 3,000.

Some of the larger towns and small communities in the county today are: Stanford, Geyser, Windham, Moccasin, Hobson, Raynesford and Utica.

Stanford, the county seat, began as a trading post and station on the Fort Benton-Billings stage route in 1875. When the branch line of the Great Northern Railway came through the county in 1908, the tracks were laid southeast of the town, and later it was transplanted to its present location. One version is that Stanford was named by J. E. Bower, who abbreviated the name of his home town of Stanfordville, New York. Other historical records list Stanford

as named for James T. Stanford of Great Falls. Leading industries supporting the town are farming, ranching and mining. Recently, rich iron ore mines south of the town have been developed, with Stanford as the rail head for shipment of the iron ore.

Geyser is located in the northeastern part of the county. This community is supported mostly by the surrounding farming and livestock operations in the area. One of the early livestock ranches owned by the Merrimac Cattle Company is located north of the town.

Windham is a small community about 6 miles southeast of Stanford, on State Highway No. 20 and U. S. No. 87 and the branch line of the Great Northern Railway. It is a shipping point and depends upon farming, ranching and some mining activities from the surrounding area.

Moccasin is a small rural community on the railway and highway in the eastern part of the county. The Central Montana Branch Agriculture Experiment Station is located near the town.

Hobson acquired its name from S. S. Hobson who was a pioneer cattle rancher in the Judith Basin. The town receives its income from the surrounding agricultural area as well as being a shipping point on the Great Northern Railway.

Raynesford, in the northwestern part of the county was not settled until 1916. The main occupations of this community are based on agriculture, with some lumbering and mining.

Utica is one of the older towns in Judith Basin County. It was settled in 1879 and became known as the headquarters for many early day cow-hands of the territory during the fall cattle round-ups. Utica, today is primarily a livestock and farming community.

Merino, Kolin and Benchland are shipping stations along the route of the Great Northern Railway.

The old mining towns of Barker (Clendennin) and Hughesville are now "Ghost Towns", with scarcely any buildings left to remind one of mining settlements. Yogo, which once contained a population of 1,200 miners, is now non-existent.

Transportation facilities in the county include the Billings-Shelby branch line of the Great Northern Railway and the Chicago, Milwaukee, St. Paul and Pacific Railroad. The Great Northern passes through the central part, while the Milwaukee line barely enters the county in the extreme southeast and northeast corners. The combined highways, State No. 20 and U. S. No. 87, enter the county east of the town of Moore in Fergus County and leave the county a few miles west of Raynesford. Along the southeastern boundary, State Highway No. 19 enters the county and follows near the county line where it connects with the combined State Highway No. 20 and U. S. No. 87.

Numerous improved county roads provide year around motor travel to the people living in the outlying rural areas.

CLIMATE

Located very near the geographic center of Montana, Judith Basin County in many ways seems to be a "composite" of the many features found throughout the State. As is the case in most of Montana, topography plays an important role in the climate of the area, with high and rugged mountain country in much of the southwest quarter sloping toward rather broad and fertile valleys in most northern and eastern sections. Elevations range from higher than 9,000 feet above sea level on some of the southwestern mountains to a little lower than 4,000 feet in a few of the valley bottoms along the northeastern border. This configuration of geographical features, as will be seen, has marked effects on climate.

While the climate has many features associated with the so-called "continental" type, there are some important exceptions. While cold arctic air masses usually invade the area from a few to several times each winter, they seldom cover the area for more than a few days at a time, being succeeded usually by the warm, dry Foehn (known locally as Chinook) winds which can blow for a week or more several times each season. This Foehn wind condition is not found in true Continental climates, nor is the heavy winter snowfall which occurs nearly every year over the Little Belt Mountains in the southwest part of the county. Annual snowfall in the higher Little Belts is estimated at about 300 inches a year, although records from just across the Cascade County line at King's Hill indicate that falls of snow in some of the wetter winters can reach between 400 and 500 inches. Snowfall in the valley areas runs mostly 40 to 50 inches a season, running a little higher on the mountain foothills, and perhaps a little less in the Wolf Creek Valley northeast of Stanford. Valley snowfall can occur in any month except July and August, and is quite unusual in June or early September. Heaviest mountain snows fall from late February to late April, and Stanford records indicate a decided monthly average snowfall maximum in March (9.0 inches for the month).

Precipitation as a whole seems to be adequate over agricultural areas about 8 years in 10, and years producing 20-inch or larger totals are not uncommon (see table). Annual averages range from a little more than 11 inches in the limited semi-arid areas near Hobson, around 14 inches over most of the valley farmlands, to as high as about 30-40 inches in the mountains southwest of Utica. It is important to note (see table) that, in the arable valley areas, more than 70 per cent of the annual precipitation falls between April 1 and September 30—arbitrarily defined here as the growing season. Too, the wettest months normally are May and June, exactly the period when fast-growing crops need most moisture. Nearly all of this "growing season" moisture falls as rain.

As the part-time "continental" climate type mentioned above might indicate, cold temperatures can and do occur (see table), but when they are observed they are invariably associated with arctic air masses which most of the time remain only a few days before being moved aside by the relatively warm "Chinook" winds. Temperature rises of 50° in a few hours are observed a time or two almost every winter. Conversely, although "hot" weather can occur (again, see table), heat seldom lasts for more than a day or two; and hot days are invariably followed by pleasantly cool nights. Further, hot weather, when it does occur, is never accompanied by high humidity. While average annual temperatures in the valleys run about 42° to 43°, on the higher mountains of the southwest quarter this average is about 7° or 8° cooler. While extreme temperatures, both hot and cold, do occur, it must be noted that daytime highs in July (warmest month) average only 82.5° at Stanford, and lows in January (coldest month) average (+) 9.70—quite different from the extremes shown in the table.

Freeze data in the county have been processed for only one station; Stanford, which should represent fairly well most of the agricultural area. At Stanford, the average length of season between last-in-spring and first-in-fall 32° temperatures is 104 days—June 4 to September 16. This means that for any year there is a 50 per cent probability that the last 32° freeze will have occurred by June 4, and the same probability that the first 32° freeze will have occurred by September 16. For 28° freeze, the length of season averages 130 days—from May 18 to September 24; and for 24° freeze 154 days—May 4 to October 4.

Judith Basin County has considerable sunshine throughout the year, but there are some cloudy days during the May and June wet season, and clouds and snow generally accompany winter Arctic air invasions. Following storms, however, clearing is rapid and wintertime "Chinooks" are almost always experienced with clear or nearly clear skies. Summer mornings are almost always clear, sometimes giving way to large cumulus cloud types near noon, with scattered thundershowers from mid-afternoon to early evening. In an average year, about 30 to 35 days with thunderstorms will be observed at any point, and it is these thunderstorms that produce the county's most troublesome storm from an economic point of view: hail. Few years pass without hail damage to crops in some part of the county, but at the same time the local nature of most hailstorms limits the extent of hailfall, and widespread hail damage in any one year is uncommon.

Other severe storm types sometimes observed include high winds, blizzards, and heavy rains; but these are not very frequent. Westerly winds sometimes become very strong (60-70 mph) in well developed "Chinook" conditions, but this phenomenon is most common in the northeast and east parts of the area where residents are well prepared for it. There have been a few tornado funnels reported over the years, but instances where they have caused damage, or even so much as touched the ground, can be classed as very rare. Even hail, generally considered the most troublesome weather element, usually produces moisture worth at least as much as the damage caused. Judith Basin's climate is an extremely valuable natural resource.

Listed below is a tabulation of Judith Basin County weather data as observed over the years:

TEMPERATURE

Station	Highest of Record	Lowest of Record	January Average	July Average	Annual Average
King's Hill (1938-1961) (Cascade)	90	-41	16.3	56.7	34.9
Moccasin (1931-1961)	103	-48	20.8*	66.6*	42.8*
Raynesford (6/54-12/61)	104	-41	23.4	64.3	42.1
Stanford (1927-1961)	104	-44	22.1*	66.5*	43.2*
Utica (1894-1927)	108	-57	22.8	64.6	42.8
*1931-1960					

PRECIPITATION

Station	Yearly Average	Growing Season Average	% Falling in Growing Season	Wettest Year	Driest Year
Hobson (1950-1961)	11.59	9.02	78	15.35 (1959)	8.74 (1956)
King's Hill (1938-1961) (Cascade)	28.72	15.09	53	38.71 (1959)	21.65 (1943)
Moccasin	13.73*	10.64*	77	23.78 (1909)	9.57 (1934)
Raynesford (6/54-12/61)	13.95	10.25	73	18.12 (1957)	9.88 (1960)
Stanford (1927-1961)	14.96*	11.19*	75	22.05 (1948)	9.64 (1936)
Utica (1894-1927)	16.42	12.22	74	24.16 (1909)	8.64 (1895)
Utiça (1949-1958)	13.40	10.22	76	17.38 (1950)	9.71 (1957)
*1931-1960					

SOILS

A wide variety of soil materials in Judith Basin County accompanied by wide variations in other soil forming factors has resulted in a great many different kinds of soils. Parent materials that are common include limestone, sandstone, shale, argillite, intrusive and extrusive igneous rocks, and alluvium derived from these materials. One very extensive material is gravelly or cobbly loamy alluvium deposited on high upland benches and forms.

Great soil groups occurring in the county are Chestnut, Chernozem, Gray Wooded, Brown Podzolic, Grumusol, Regosol, Lithosol and Alluvial. Most of the soils in irrigated and dry farmed areas belong in the Chestnut, Chernozem, Grumusol, Regosol and Alluvial great soil groups.

Most of the soils now being used for irrigated farming are deep and loamy in texture and are generally suitable for irrigated agriculture. Some drainage problems have developed and there are local areas where alkalinity or salinity are problems. Installation of deep drainage ditches will correct these conditions in most cases.

A detailed standard soil survey has been completed on all of Judith Basin County except the National Forest lands in the Little Belt Mountains. A report of this survey will be published under the title "Soil Survey of the Judith Basin Area." The information contained in this report will provide a good physical basis for planning use and management of lands covered by the survey.

CROPS AND LIVESTOCK

Agriculture is the primary source of income to the people of Judith Basin County. Small grains and livestock are the main produce from the land with wheat, barley, beef cattle and sheep being the major farm products.

Seventy-one percent of Judith Basin County is classified as farm and grazing land. The land not classified as farming or grazing land consists mainly of mountains, timber and timbered grazing land.

The major portion of the non-farming or non-grazing land lies in the southwest portion of the county, which is in the Lewis and Clark National Forest. The total land area of the county is 1,203,200 acres or 1,685 square miles, according to the 1962 Annual Report of the Clerk & Recorder. The 1959 Bureau of Census figures show there were 418 farms, averaging 2,050 acres in size, valued at \$99,046 per farm, with the average value of \$51.85 per acre. The three main types of farms are—livestock raising, dryland grain, and diversified livestock and small grains.

The following summary totaling 777,014.74 acres, is the 1963 Land Classification Classes and Grades for Judith Basin County.

TILLABLE IRRIGATED LAND—TOTAL 785.83 ACRES

Grade	Tons of Alfalfa per acre	No. Acres	Assessed Values
3	3.0-3.4	127.22	\$50.79
4	2.5-2.9	658.61	40.15

NON-IRRIGATED FARM LAND—TOTAL 274,110.93 ACRES

Grade	Bushels of Wheat per acre on summer fallow	No. Acres	Assessed Values
1A	24.50	2,615.62	\$32.50
1B	22.50	29,318.20	27.50
2A	20.50	57,174.074	23.25
2B	18.50	107,301.80	19.00
2C	16.50	68,654.06	15.00
3A	14.50	8,771.01	12.00
3B	12.50	276.17	9.56

MIXED HAY OR WILD HAY LAND—TOTAL 15,728.52 ACRES

Grade	Tons of Hay per acre	No. Acres	Assessed Values
3	2.0-2.4	1,129.59	\$30.55
4	1.5-1.9	8,795.32	20.96
5	1.0-1.4	5,138.61	16.00
6	.5- .9	665.00	12.00

GRAZING LAND—TOTAL 483,606.58 ACRES

Grade	Acres for 10 months grazing season per 1000 lb. steer or equivalent	No. Acres	Assessed Values
1A	10 acres and under	3,684.90	\$17.60
1B	11-18 acres	20,008.93	9.00
2A	19-21	152,979.00	7.50
2B	22-27	180,650.57	5.50
3	28-37	94,234.53	3.75
4	38-55	23,344.96	2.85
5	56-99	7,962.69	1.75
6	100 acres and over	741.00	1.00

Total Number of Timber Acres—2,782.88.

The above classification does not include Federal or State land.

Crops grown in the Basin are those varieties of small grains and forage that matures in 90-110 days and can stand late spring frosts. The average growing season is 112 days. The short growing season, low temperatures and dry atmosphere are more favorable for wheat than other crops. The climate is more favorable for the production of winter wheat.

The primary cash crops produced are winter wheat, barley and spring wheat. Alternate cropping and fallowing is the main cropping system used in producing these crops.

A survey compiled in 1960 gave the following statistics on the variety and acres of grain planted.

GRAIN VARIETIES 1960

1960—Winter Wheat

Cheyenne	65,500 acres	80% of total average planted in Winter Wheat
Karmont	14,700 acres	18% " " " " " " "
Newturk	800 acres	1% " " " " " " "
Rego	900 acres	1% " " " " " " "
Total	81,900 acres	

1960—Spring Wheat (excluding Durum)

Centana	6,900 acres	69% of total average planted in Spring Wheat
Ceres	2,700 acres	26% " " " " " " "
Thatcher	200 acres	2% " " " " " " "
Marquis	300 acres	3% " " " " " " "
Total	10,100 acres	

1960—Durum Wheat

Mindum	200 acres	100% of total average planted in Durum
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1960—Barley

Compana	29,300 acres	85% of total average planted in Barley
Betzes	2,500 acres	7% " " " " " " "
Titan	1,200 acres	4% " " " " " " "
Moravian	1,100 acres	4% " " " " " " "
Ellis	200 acres	
Total	34,300 acres	

The acreages of oats and corn produced are minor compared to wheat and barley. The oats produced are used mainly on the farm where grown, with the remainder being sold locally.

The corn grown is made into silage, which is used on the farm where it is grown for livestock feed.

Alfalfa is the major hay crop with mixed or wild hay being second. Alfalfa is the main hay crop grown on the better irrigated land and deep and well drained soils in the river bottoms and foothills. The wild grasses in the wet bottom lands and the timothy and clover in the higher elevations produce 1 to 2 tons of hay per acre. Practically all of the hay is used as livestock feed in Judith Basin County, with very little ever being shipped out. Generally hay is shipped in because of a shortage of winter pasture for livestock.

The following table made up from the County Assessors records, gives the livestock numbers from 1950 thru 1962.

LIVESTOCK ON FARMS AND RANCHES

	<u>1950</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
Cattle.....	35,452	41,320	41,579	33,726	34,163	35,321	39,480	37,687	37,948
Sheep.....	22,608	16,899	21,903	19,127	22,759	24,853	25,201	23,933	20,365
Hogs.....	568	560	623	264	593	955	875	1,252	1,583
Horses and Mules.....	.....	.....	.....	.....	720	721	723	756	804
Chickens.....	.....	.....	.....	.....	18,900	16,500	16,100	16,000	8,207

Much of the terrain and forage in Judith Basin County is very suitable for cattle and sheep production.

As a whole there are springs and streams which provide adequate water for livestock use. Most of the cattlemen operate on a cow, calf and yearling basis. The mountain areas are used during the summer and the inter-mountain basins and plains in the winter. The feeding of hay starts in November or December and ends in April or May depending on the weather. The main breeds of cattle are Hereford and Angus. There are thirteen purebred Hereford breeders and four Aberdeen-Angus breeders in the county.

Columbia and Targhee are the main breeds of sheep used on the ranges and Hampshires in the farm flocks.

Judith Basin County has a Livestock Association and a Woolgrowers Association which are commodity groups for the cattle and sheep industry.

There are sixteen cattle feed lots in the county, averaging around 150 head per lot. There is an ample supply of barley and fattening stock which gives a potential of an expansion in the feeding business. There are four producers who feed sheep on the years they feel it will be profitable.

There are a few ranches with sows and litters, however, the largest percentage of the hogs are shipped in and fed in a feed lot and sold as fat market hogs.

SNOW SURVEY

Snow surveys are made by the Soil Conservation Service and co-operators of other Federal, State and private organizations from two to five times during the winter and early spring months. The depth and amount of water in the snow are measured at the same location each year. This information, together with soil moisture and precipitation data is used to predict the probable streamflow during the coming spring and summer months.

Streamflow forecasts are valuable aids in water management. Farmers and ranchers, reservoir operators, power companies and other water users are definitely concerned with the prospective water supply. Cropping plans, power production and reservoir storage can be regulated to provide the most economical use of the water that will be available.

The two snow survey courses which provide information on water supply in Judith Basin County, and of which records are available through 1962 are:

Snow Course

Name	Number	Elevation	Year Estab.	Meas. Dates*
Crystal Lake	9-C-1	6100'	1941	3, 4
Kings Hill	10-C-1	7500'	1934	3, 4, 5

Additional information is available from the Snow Survey Supervisor, Soil Conservation Service, Bozeman, Montana.

*March 1, April 1 and May 1 measurements.

STREAM GAGING STATIONS

The U. S. Geological Survey measures the flow of streams co-operating with funds supplied by several State and Federal agencies. The results have been published yearly in book form by drainage basins as Water Supply Papers through the year 1960. Beginning with 1961 the stream-flow records are being published annually by the U. S. Geological Survey for the entire State under the title "Surface Water Records of Montana". Data for 1961-65 and subsequent five year periods will be published in Water Supply Papers. Prior to general issuance, advance copies of station records may be obtained from the U. S. Geological Survey. That agency's records and reports have been used in the preparation of this resume'.

Data given below cover the stream gaging records which are available for Judith Basin County. The records for South Fork of Judith River and for Judith River near Utica, which are now in operation, cover data available through the water year 1961. The water year begins October 1 and ends September 30 of the following year. The records for Ross Fork near Hobson and Wolf Creek near Stanford include the year ending September 30, 1962 when these stations were discontinued.

Following are equivalents useful in converting from one unit of measurement to another:

- (a) In Montana, one cubic foot per second equals 40 miner's inches.
- (b) One acre-foot is the amount of water required to cover an acre one foot deep.

- (c) One cubic foot per second will nearly equal two acre-feet (1.983) in 24 hours.
- (d) A flow of 100 miner's inches will equal five acre-feet in 24 hours.
- (e) One miner's inch flowing continuously for 30 days will cover one acre 1½ feet deep.

For reference purposes, the stream gaging stations are listed in downstream order.

South Fork Judith River near Utica*

The water-stage recorder is just downstream from Trask Gulch, 8 miles upstream from confluence with Middle Fork and 18 miles southwest of Utica. The drainage area is 58.7 square miles. Records are available from August 1958 to date. The maximum discharge was 194 cfs (June 7, 1959) and the minimum daily, 1.0 cfs (November 27, 1958). There are minor diversions for irrigation above the station.

*This gaging station is now in operation, 1963.

Judith River near Utica*

The water-stage recorder is 3½ miles downstream from confluence of South and Middle Forks and 9 miles southwest of Utica. The drainage area is 328 square miles. Records are available from October, 1919 to date. The maximum discharge observed was 1,120 cfs (June 11, 12, 1927 from rating curve extended above 580 cfs) and the minimum, no flow (March 19-21, 1933). The average discharge for 42 years was 50.1 cfs or 36,270 acre-feet per year. The highest annual run-off was 102,000 acre-feet (1927) and the lowest, 6,340 (1937). There are a few minor diversions for the irrigation of hay meadows above the station.

*This gaging station is now in operation, 1963.

Ross Fork near Hobson

The water-stage recorder was 1 mile downstream from Hauck Coulee, 3½ miles east of Hobson, and 7 miles upstream from mouth. The drainage area is 337 square miles. Records are available from June 1946 through December 1953 and March 1955 through September 1962. The maximum discharge was 2,640 cfs. (May 21, 1962) and the minimum, no flow at times. The average discharge for 14 years was 14.0 cfs or 10,140 acre-feet per year. The highest annual run-off was 19,090 acre-feet (1952) and the lowest, 2,010 acre-feet (1957). There are small diversions for irrigation of hay meadows above station. Flow may be increased by operation of Ackley Lake, which receives water from Judith River.

Sage Creek at Windham

The staff gage was near road bridge a quarter of a mile south of Windham. The drainage area is 58.6 square miles. Records are available from March 1920 through June 1922. The maximum discharge observed was 50 cfs (May 12, 1960 from rating curve extended above 8 cfs) and the minimum observed, 0.1 cfs (April 7, 10, 1921). There were small diversions for irrigation above station.

Wolf Creek at Neubert Ranch near Stanford

The chain gage was at Neubert Ranch a quarter of a mile downstream from confluence of Dry Wolf and Running Wolf Creeks and 4 miles southwest of Stanford. The drainage area is about 109 square miles. Records are available from October 1919 through September 1926. The maximum discharge observed was 322 cfs (June 16, 1920 from rating curve extended above 140 cfs) and the minimum, no flow on many days during July to September 1921. The average discharge for 7 years (1919-26) was 15.3 cfs or 11,080 acre-feet per year. The highest annual run-off was 19,100 acre-feet (1920) and the lowest 6,750 acre-feet (1925). There were many small diversions for irrigation above station.

Wolf Creek near Stanford

The water-stage recorder was half a mile downstream from confluence of Dry Wolf and Running Wolf Creeks and 4 miles southwest of Stanford. The drainage area is 112 square miles. Records are available from March 1950 through November 1953, from March 1955 through December 1958 and from July 1959 through September 1962. The maximum discharge was 578 cfs in addition to an estimated overflow of 50 cfs (June 4, 1953 from a rating curve extended above 52 cfs) and the minimum, no flow (Nov. 17, 1951, result of ice jam). The average discharge for 9 years was 5.58 cfs or 4,040 acre-feet per year. The highest annual run-off was 15,740 acre-feet (1953) and the lowest, 1,120 acre-feet (1961). There is some regulation from a small dam and there are several diversions above station for irrigation of hay meadows.

Partial Record Stations and Miscellaneous Discharge Measurements

In order to provide information on more streams than are covered by stream gaging stations, the U. S. Geological Survey has for several years been collecting some partial records. These are in addition to the miscellaneous discharge measurements which have always been reported. These partial records, when correlated with simultaneous discharges of nearby continuous-record stations give fair indications of available flow.

There are about twenty low flow and more than a hundred crest-stage partial record stations in the Missouri Basin in Montana. Operation of most of these began in 1959. Crest-stage gages are being operated in Judith Basin County on two tributaries of the Judith River near Utica.

The partial record stations as well as the miscellaneous discharge measurements are listed at the end of each U. S. Geological Survey Water Supply Paper or Surface Water Records report.

RESERVOIRS

Records of storage in Ackley Lake have reported in reports of the U. S. Geological Survey.

Ackley Lake near Hobson

The tape gage is at the dam 4 miles southwest of Hobson. Month-end storage records are available from June 1938 to date. The maximum month-end contents reported was 5,980 acre-feet at times in 1942, 1944 and 1950, and the minimum, 2,170 acre-feet August 31, 1941. This is an offstream irrigation reservoir formed by earthfill dam with concrete conduits completed by the Montana Water Conservation Board in 1938. Water is diverted from Judith River 7½ miles west of Hobson. The total storage capacity is 6,140 acre-feet of which 325 acre-feet is dead storage. Records are furnished by Montana Water Conservation Board.

MINING

Judith Basin County encompasses a region of topographic and geologic diversity. A land of many uses, it contains large acreages of undulant and cultivated plains, and embraces many square miles of rolling foothills and forested mountains. These latter and prominent topographic units are the Little Belt Mountains to the southwest, the Highwood Mountains to the northwest, and the Big Snowy and Moccasin Mountain groups to the east. The real geologic substance of Judith Basin County is thus: a topographic and structural depression nearly surrounded by a series of mountain ranges, representing the orogenic transition from the Rocky Mountain front to the Great Plains of the United States.

Rocks exposed within its limits are sedimentary and igneous in origin—the igneous rocks forming the cores of the mountains, and the sedimentary rocks, though much greater in areal extent and time, spanning the geologic column from oldest (Precambrian) to youngest (Recent alluviums and gravels).

METALS

The ceaseless search for gold was the quest that first led the early white man into the country and gold was found, principally in the gravels and alluvium of Yogo Gulch, about the year 1878. Unlike the bonanzas discovered earlier in Alder Gulch, Confederate Gulch, and other famous localities in Montana, the gold found here was sparse in quantity and erratic in distribution. Yet activity at Yogo Gulch persisted, and it later became world famous when the discovery of gem quality sapphires in 1896 made it the most productive and important gem locality in the United States.

But discoveries of the time also included the finding of rich silver and lead outcrops in 1879 in the Little Belt Mountains, around which were built the present day towns of Barker and Hughesville. The pattern so typical of the early day mining camps was repeated. Hundreds of claims were located, new mining enterprises rapidly commenced, and large quantities of the richest ores were rushed by oxen drawn wagons to Fort Benton on the Missouri River, thence to Wales for smelting via river ports on the Mississippi River at New Orleans.

An attempt was made to eliminate the high transportation costs by construction of a smelter at Hughesville. Its operation was not in any way successful because of an unsuitable refractory lining. However, a later smelter constructed at Glendennin (Barker) produced bul-

lion valued at \$375,000, but was closed in 1883 when its owner, Col. George Glendennin, was killed by a fall of ground at the Wright and Edwards mine. Smelting facilities did not become available again until the year 1888 when smelters were erected at Great Falls, Helena, and nearby Neihart.

Depletion of the rich near surface ore bodies and corresponding disclosure of low grade basic ores at depth, forced construction of a railroad link from Barker to the Great Northern Railroad system at Monarch in adjoining Cascade County.

Disaster struck in the year 1892 when national demonitization of silver drove its price downward from \$1.05 an ounce in 1890, to 53 cents an ounce in 1902. In the years that followed, mining continued in a small and sporadic way. No large scale operations began until the St. Joseph Lead Company acquired and operated the Block P mine near Barker from 1927 to 1930. The depression of the 30's forced closure of this operation, and it was not until 1941 that the property was reactivated. In 1943 operations were altogether terminated and the property subsequently acquired by the American Smelting and Refining Company. Recent activity has been work only of a leasing nature.

In summary, metal production from Judith Basin County has been from lead, zinc, and silver ores obtained principally from the Barker district. An approximate value from 1921 to 1961 is \$6,050,000 worth of these metals, and it is apparent that total production was worth considerably more.

BARKER DISTRICT

The Barker district is the most important mining area in the county, for it was here that the richest and largest ore deposits were found. The largest producer was the Block P mine, which in 1929 was the largest individual producer in Montana. Other formerly productive mines were the Tiger, Moulton, Liberty, Carter, and Blankenship.

In general, the best ore occurred within fissure veins near or at the contact of an intrusive syenite in granitic porphyry. At other important producers, the ore bodies were localized along limestone and the porphyry contact.

RUNNING WOLF DISTRICT

The Running Wolf district, about 18 miles southwest of the town of Stanford, the county seat, contains several deposits of high grade magnetite and hematite ores, suitable for the manufacture of iron and steel. In 1956 production of iron ore was initiated, and shipments to eastern markets by the Young-Montana Corporation were begun.

The ore material occurs at or near the contact of igneous intrusive rock that has intruded Madison Limestone. The deposits are tabular in shape and are considered to have been formed by contact metasomatic processes.

GOLD PLACERS

Gold production from placers is insignificant. Recorded production from 1921 to date is 21.12 ounces. However, somewhat more than this must have been produced previously. The early day sources were from alluvial gravels in Yogo Gulch. Gold from this area was found to be bright and clear and without attached quartz. Its source was probably from "iron cap" outcrops carrying small amounts of free milling gold.

Placering was also conducted on Dry Wolf Creek, and remnants of operations are visible on the south fork of the Judith River. The source of gold and amount produced is not known.

URANIUM

Occurrences of uranium in Judith Basin County are known. Petrified dinosaur bones in the Morrison Formation give high radiation counts, as do the coal seams at the top of the Morrison Formation and the Heath Shale. However, from what is known, these deposits as they are now developed are but subcommercial in grade.

NON-METALLICS AND FUELS

In the mind of the public, mining is universally associated with tales of fabulous gold and silver or uranium deposits worth many millions of dollars. But mining is also concerned with non-metallic minerals that form the bulwark of our civilization.

COAL

Coal in Judith Basin, as generally elsewhere in central Montana, is found at the top of the Morrison Formation. Reserves have never been fully developed but are estimated at 243,930,000 tons. Where mined, the seams were from 30 inches to 80 inches in width, and the coal was of a bituminous grade. Most of the coal was used by the railroads, a small amount by the ore producers, local ranchers, and towns.

SHALE

The Colorado Shale has perhaps the best potential use. On some roads in the County, it is being used as a surfacing material, where after a few years of use it gives a smooth consolidated surface. Samples from beds in several localities give satisfactory results for uses as expanded lightweight aggregate. Shale from other beds is suitable for common brick. Kootenai clay shale is used for brick and tile manufacturing in adjacent Fergus County (Lewistown). Petroliferous shale is found in the Heath Formation at Lone Tree Dome and has yielded as high as nine gallons of oil per ton of shale.

GYPSUM

Gypsum is well known in Judith Basin County because of the U. S. Gypsum Company's plant at Heath, Montana, in nearby Fergus County, where gypsum wallboard is shipped to western markets. Although present gypsum mining is confined to Fergus County, deposits of gypsum in Judith Basin County occur, particularly at Lone Tree Creek where it occurs in the Otter Formation. The deposit is about 11 feet thick and 1,000 to 2,000 feet long, being commercial in thickness and grade.

BENTONITE

Stratigraphically, bentonite occurs in the Colorado Formation and is extensive in areal extent. Its quality, however, is not quite as good as that of other bentonite deposits occurring in Montana. Locally, it is used by ranchers and farmers in the area as a "sealer" to line their irrigation ditches and reservoirs.

SAPPHIRES

Judith Basin County has the distinction of being the locale of the most important gem locality in the United States. Value of sapphires produced from Yogo Gulch is estimated to be \$25,000,000. A British company formerly owned and controlled most of the productive ground, and cut and sold stones in London and in the larger cities in Europe. Many of the stones were valued from \$30 to \$40 a carat, although prices ranged as high as \$75 a carat for the finer ones. It is reported that the largest stone was found in 1910 and weighed 19 carats. Annual production was about 90,000 carats of gem material and 440,000 carats of industrial sapphires. The color of the higher priced gem stones was the "cornflower" blue, similar to the finer stones of Ceylon, whereas others were "peacock" blue, amethystine-colored, and purplish-red.

Recently the property was acquired by a Montana company, The New Mine Sapphire Syndicate, but production to date is insignificant.

The geology of the sapphire-bearing ground is relatively simple. A near vertical igneous dike striking about S. 75° W. cuts gently dipping Madison Limestone. The dike material near the surface consists of a soft yellow to gray clay containing fragments of limestone. At a depth from 5 to 50 feet below, the dike is composed of a greenish-gray unaltered rock. Most of the best stones were found in the soft altered material near surface.

SOIL CONSERVATION DISTRICT

Judith Basin County Soil and Water Conservation District comprises an area of 1,203,000 acres of land. Its boundaries coincide with the boundaries of Judith Basin County.

The district is governed by a board of five supervisors who are elected by the land occupiers in the district and three associate supervisors who are appointed. They carry out a program in erosion control, water conservation, soil fertility management, land improvement and land adjustment to proper land use.

Under State law, the supervisors have the power to call upon local, State and Federal agencies to assist in carrying out a soil and water conservation program. The Judith Basin Soil and Water Conservation District has memoranda of understanding with the Soil Conservation Service, State Forestry Department and Extension Service to provide technical assistance to District Co-operators in carrying out a sound soil and water conservation program. Close working relations are maintained with the Farmers Home Administration, the Agricultural Stabilization and Conservation Committee and the United States Forest Service.

The Soil Conservation Service assists the district by furnishing and interpreting basic data on soils and plant cover and other features of the land. Technical data are interpreted in terms of accepted alternative land uses and treatments to help guide the farm and ranch operators in developing sound conservation plans. It also aids District Co-operators in performing operations requiring technical skills beyond the experience of the individuals involved.

The office of the State Forester and Forest Service co-operate with the district by coordinating the programs in timber management, tree planting, forest and range fire control and watershed management on Federal, State and private lands.

The Extension Service assists the district with its education and information program. An important function of each district is to inform landowners and occupiers of the benefits derived from wise use of the communities soil and water resources.

One of the major problems of these districts is to acquaint the urban people who comprise a large percentage of the total population of the districts, with the need for conservation.

Technical phases of the district's program include detailed soil surveys, forest site and utilization investigations, range site and condition surveys, ground water investigations, topographic and other engineering surveys. By a careful analysis of this basic resource information, proper land use and needed conservation treatment of each field can be determined. The technician interprets the surveys and provides the District Co-operator with alternatives in land use and treatment that will enable him to treat the hazards and limitations that occur on each tract of land. With this information and by counseling with the technician, the farmer or rancher makes the final decisions. These decisions are recorded in the Conservation Plan. The co-operator determines what will be done on his place and when it will be carried out.

When the plan is completed the co-operator is given further technical assistance on layout work essential in establishing conservation practices on the land as called for in the conservation plan. This technical assistance is provided without cost to the co-operating farmer or rancher.

There are 309,318 acres of Federal lands in Judith Basin County. Approximately 98,844 acres are owned by the State of Montana. Of the total area approximately 285,000 acres are cropland. It is estimated that about 6,400 acres are irrigated and 278,600 acres are dryland. Approximately 568,600 acres are devoted to pasture and range use of which 543,600 is native range, 20,000 acres seeded dryland pasture. There are 329,000 acres of wooded land of which 300,000 are federally owned. There are approximately 1,600 acres of land considered other land such as townsites, roads and highways, railroads and like lands.

The major enterprises on agricultural lands are livestock and grain production. Beef cattle, sheep and swine are produced. Cash crops produced are winter wheat, spring wheat and barley.

Work done since the organization of the district on irrigated lands, consists largely of improvement of irrigation systems within the farm boundaries, land leveling, construction of permanent ditches, installation of water control structures, farm drainage systems, improved cropping and pasture management systems, soil management and improvement of wildlife habitat. On dryland pasture and range, the work done has been improvement of vegetative cover through seeding, deferred-rotation grazing, fencing, livestock water development and improvement of wildlife habitat.

Since the District was organized, assistance has been given on proper cropping systems on over 80,000 acres, land leveling and grading 500 acres, drainage installed on 400 acres requiring nearly 5 miles of ditch, over 125 structures installed, 35 miles of irrigation ditch construction, range improvement on 54,000 acres, pasture improvement on 2,000 acres, seeding of hay and pasture on 12,000 acres, 315 stock ponds constructed, 200 springs developed, 130 wells developed, 60 ponds stocked with fish, 100 acres improved wildlife habitat, and 90 acres of farmstead and feedlot windbreaks.

An inventory of soil and water conservation needs in Judith Basin County has recently been completed. This inventory is a part of a National Inventory and estimates remaining conservation needs by land uses. The inventory is based upon statistically expanded data obtained from randomly selected 160 acre samples on which detailed soil surveys were completed. The inventory estimates that approximately 70% of the non-irrigated cropland and approximately 69% of the irrigated cropland needs additional treatment and is feasible to treat; that approximately 70% of the native range, 68% of tame pasture and 50% of irrigated native grassland is in need of additional conservation treatment. It estimates that approximately 20,000 acres of private woodland need improvement of the existing stand and most of the privately owned woodland needs protection from fire, insects, disease and from animals. The needed treatment consists primarily of a combination of practices to adequately control erosion and conserve moisture.

A considerable amount of conservation work has been accomplished through efforts of organized groups and this is encouraged wherever possible.

The largest single unit of irrigation water used is delivered to the farms from Ackley Lake, a State Water Conservation Board Project. The balance from private water rights out of the Judith River and from small private irrigation storage dams.

The Judith Basin Soil and Water Conservation District owns no earth moving equipment of it's own but depends on private contractors both within and outside the district to carry out needed conservation measures.

Co-operative efforts of landowners and operators, other groups and agencies have contributed to the overall success of the District.

FISH AND GAME

Judith Basin County is geographically located in the heart of some of the best big game hunting in Montana. The Little Belt Mountains are famous for their mule deer hunting. The pronghorn antelope are found and hunted on the prairie areas of the county. Other game animals include white-tailed deer, and black bear. The moose, largest member of the deer family, is found in the mountainous areas of Judith Basin County.

The Montana Fish and Game Department operates the Judith Game Range. The range provides a wintering area for a large herd of elk or wapiti that come down out of the Little Belt Mountains during the severe weather. Other types of game animals as well as game birds are found on the range.

The ring-necked pheasant will be found in habitat that provides cover near cultivated fields in valley bottoms. Other birds that have been introduced in this area are the Hungarian partridge and the Merriam turkey. The turkeys were released on the Judith River Game Range and have increased rapidly. If they are as successful as plantings in other parts of the state, a limited hunting season can be hoped for. Hungarian seasons have been set to run concurrently with the pheasant season.

Native species of grouse include blue and ruffed grouse which are found in the mountainous areas and the sage grouse (some males weigh up to seven pounds) find the sage brush areas to be ideal.

Waterfowl hunting is limited because of the lack of water areas but some duck hunting can be found on the small streams, farm ponds and the Judith River.

Predator animals provide sport when game seasons are closed. Hunting coyote, bobcat and magpies has been increasing in popularity in recent years.

Furbearers include mink, muskrat, beaver, badger, skunk and weasel to test the skill of young and old trappers alike.

Trout fishing is enjoyed along the Judith River, Wolf Creek, Arrow Creek, Otter Creek and many other small stream areas. Rainbow, brown and eastern brook trout are found in most of these streams. Ackley Lake, a storage reservoir, was chemically treated to remove rough fish and planted with rainbow and eastern brook trout. A fish stocked in 1958 weighed 10 pounds when taken in 1962.

With more time and better transportation, outdoor recreation is rapidly becoming Montana's fastest growing industry. Judith Basin County, with its diversified lands and water, has much to offer those who like to hunt, fish, study nature or just relax. Wise conservation of the county's soils, waters and forests will assure an abundance of wildlife for generations to come.

LEWIS AND CLARK NATIONAL FOREST

The Lewis and Clark National Forest was created by Presidential Proclamation on February 22, 1897. On August 16, 1902, a Presidential Proclamation established the Little Belt National Forest which included the public land in Judith Basin County. In December 1903, the Highwood National Forest was established by Presidential Proclamation. Approximately eleven sections of the Highwoods are in Judith Basin County.

In July 1908, the Little Belt National Forest and the Highwood National Forest were combined to form the Jefferson National Forest. This consolidation also included the Snowy Mountains and Little Rockies. On April 8, 1932, the Jefferson National Forest was consolidated with the Lewis and Clark National Forest and the name "Lewis and Clark" was retained for the combined areas.

Faster transportation over more and better roads in the area and better communication facilities permitted the consolidation of the Dry Wolf Ranger District at Stanford, the Highwood District at Highwood, the Judith River District at Utica, and the East End District at Judith Gap to form the present Judith Ranger District on the Lewis and Clark National Forest.

Of the 312,137 acres on this Ranger District, 292,834 acres are within Judith Basin County. Three percent of the land within the District is in private ownership under homesteads and patented mining claims.

All National Forests are managed and developed under a multiple use concept. In the face of a growing interest in outdoor recreation; a growing need for greater supplies of clear, clean water; for more trees that will yield good wood; for more grass to feed livestock; and more food and homes for wild animals, fish, and birds, the multiple use approach has proved the most effective form of forest land management to provide the greatest overall benefits from these public lands. This resource management concept provides for the conservation of

the basic land resource while producing high-level sustained yields of water, recreation, timber, forage, and wildlife. Multiple use management permits more than one use of areas without conflicting with the development and use of other resources. Timber resources are managed to provide a continuous supply of lumber and other forest products, to demonstrate good forestry practice, and to improve cover and food supplies for wildlife. Ranges are managed to provide a sustained supply of forage and browse for livestock and game animals. Forests and watercourses are managed to preserve their beauty and attractiveness for recreational enjoyment and to provide a favorable habitat for game and fish. Watersheds are managed and protected to safeguard water supplies, prevent erosion, and reduce floods. One of the indispensable roles of these public lands is to continue forever the gathering, storing, and regulation of the flow of great quantities of water.

Sixty-six ranchers graze livestock on the Lewis and Clark National Forest in Judith Basin County. Forage areas on the Judith Ranger District are divided into 33 grazing allotments; all but one are in Judith Basin County. The National Forest grazing allotments in the county provide forage for 3,672 cattle and 4,100 sheep for approximately 3 months each year.

The National Forest lands in the county produce approximately three million board feet of timber each year. There are two operating sawmills on these public lands, but much of the timber logged in this portion of the Lewis and Clark National Forest is taken to the mills at White Sulphur Springs in adjoining Meagher County. No commercial timber in Judith Basin County is in private ownership.

Local ranchers are cutting approximately 20,000 poles and posts each year from the Judith Ranger District in this county. Timber studies indicate that from 150,000 to 200,000 poles and posts could be harvested in this area each year on a sustained-yield basis.

Most of the National Forest area in this county is easily accessible by automobile. A few areas require four-wheel-drive vehicles. Because of this accessibility and the large number of game animals in the area, these public lands are popular with hunters. The area provides outdoor recreation for local and out-of-state sportsmen hunting bear, elk, mule deer, white-tailed deer, and upland birds. Grouse hunting is very popular in the area. The Forest Service is responsible for the fish and game habitat on the public lands; Montana's Fish and Game Commission establishes hunting and fishing seasons, sets bag limits, and enforces the hunting and fishing regulations on the Lewis and Clark National Forest.

Insects and disease represent the greatest threats to the forests of these public lands. They destroy more timber than forest fires. Unless insects and disease are brought under control, they can eliminate entire species. This in turn can have serious impact on other resources of the National Forests; forage, wildlife, recreation, and water.

Forest fires have burned much of the National Forest in Judith Basin. The most devastating forest fires were in the late 1800's and early 1900's. Lodgepole pine has restocked much of the burned area. About 50 percent of the National Forest land in Judith Basin County is covered with lodgepole pine. Since 1911 there have been no large forest fires in the area.

During the summer fire season, the Forest Service assigns top priority to fire suppression. Improved roads, technological advances in equipment, and fire suppression techniques

contribute to annual reductions in the burn acreage. The majority of the forest fires in Judith Basin County are caused by lightning. The area's first forest fire lookout was constructed in 1937 on Mt. High.

There has been a steady increase in the recreational use of National Forest land. In 1962, a total of 30,600 recreational visits were recorded on National Forest lands in Judith Basin County. One new campground was constructed in 1962. During 1963-64, the Forest Service plans to expand two existing campgrounds and construct another new campground. Within these public lands there are four public campgrounds, providing a total of 37 family camping units.

In addition to the public campgrounds, there are 12 private residences located in the area under the provisions of Forest Service special-use permits. Another 30 special-use permits provide for haycutting, fences, missile sites, water lines, pastures, reservoirs, roads, power lines, a cemetery, and telephone lines on these public lands.

**SUMMARY OF IRRIGATED LAND BY RIVER BASINS IN THE
FOLLOWING COUNTIES COMPLETED TO DATE**

**Big Horn, Broadwater, Carbon, Carter, Cascade, Custer, Deer Lodge, Fallon, Gallatin, Golden
Valley, Granite, Jefferson, Judith Basin, Lake, Lewis & Clark, Madison, Meagher,
Missoula, Musselshell, Park, Powder River, Powell, Ravalli, Rosebud, Silver
Bow, Stillwater, Sweet Grass, Teton, Treasure, Wheatland, Wibaux and
Yellowstone**

RIVER BASIN

	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
*Missouri River.....	98,430.50	22,286.50	120,717.00
Jefferson River.....	61,291.00	9,713.00	71,004.00
Beaverhead River.....	40,771.00	6,076.00	48,847.00
Big Hole River.....	23,775.00	1,950.00	25,725.00
Madison River.....	39,445.00	7,660.00	47,105.00
Gallatin River.....	111,914.00	21,097.00	133,011.00
Smith River.....	32,934.00	19,679.00	52,613.00
Sun River.....	124,474.58	4,385.00	128,859.58
Marias River.....	1,724.00	0	1,724.00
Teton River.....	61,228.00	14,255.00	75,483.00
Musselshell River.....	64,789.00	57,870.00	122,659.00
Little Missouri River.....	42,513.00	1,499.00	44,012.00
Grand Total Missouri River Basin.....	703,289.08	166,470.50	869,759.58
Yellowstone River Drainage Basin			
Yellowstone River.....	303,501.00	96,148.00	399,649.00
Stillwater River.....	27,489.00	16,403.00	43,892.00
Clark Fork River.....	91,768.00	24,195.00	115,963.00
Big Horn River.....	65,395.00	25,579.00	90,974.00
Tongue River.....	28,170.00	7,762.00	35,932.00
Powder River.....	35,948.00	2,299.00	38,247.00
Grand Total Yellowstone River Basin.....	552,271.00	172,386.00	724,657.00
Columbia River Drainage Basin			
Clark Fork (Deer Lodge, Hellgate, Missoula) River.....	145,804.70	14,934.20	160,738.90
Bitterroot River.....	111,102.43	3,200.00	114,302.43
Flathead River.....	111,208.61	1,702.82	112,911.43
Grand Total Columbia River Basin.....	368,115.74	19,837.02	387,952.76
Grand Total in the Counties Completed to Date.....	1,623,785.82	358,706.52	1,982,492.34

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF JUDITH BASIN COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
*Missouri River.....	0.....	0.....	0
Belt Creek.....	0.....	0.....	0
Otter (Bear) Creek.....	32.00.....	0.....	32.00
Entwisle Coulee.....	0.....	14.00.....	14.00
Williams Creek.....	27.00.....	26.00.....	53.00
Spring & Coulee.....	62.00.....	0.....	62.00
Little Otter (Limestone) Creek.....	29.00.....	8.00.....	37.00
Peterson Creek.....	10.00.....	0.....	10.00
Government Coulee.....	13.00.....	14.00.....	27.00
Brush Coulee.....	15.00.....	0.....	15.00
Cora Creek.....	42.00.....	0.....	42.00
Arrow Creek.....	955.00.....	140.00.....	1,095.00
Pine Creek.....	0.....	0.....	0
Little Birch Creek.....	36.00.....	0.....	36.00
Birch Creek.....	44.00.....	0.....	44.00
Middle Fork Arrow (Pine) Creek.....	47.00.....	0.....	47.00
North Fork Pine Creek.....	32.00.....	0.....	32.00
Young's Creek.....	198.00.....	0.....	198.00
Unnamed Tributary West of Arrow Creek.....	135.00.....	0.....	135.00
Flanagan Creek.....	18.00.....	0.....	18.00
Eastern Coulee.....	53.00.....	0.....	53.00
Unnamed Stream.....	7.00.....	0.....	7.00
Big Flat Coulee.....	56.00.....	0.....	56.00
Black (Todd) (Long) (Pine) Coulee.....	20.00.....	0.....	20.00
Byrnes Creek.....	215.00.....	0.....	215.00
Unnamed Creek.....	13.00.....	0.....	13.00
Unnamed Creek.....	5.00.....	0.....	5.00
Erwin Creek.....	104.00.....	0.....	104.00
South Fork Arrow (Hay) Creek.....	53.00.....	44.00.....	97.00
Crow Coulee.....	43.00.....	0.....	43.00

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first streams named above which is not indented.

IRRIGATION SUMMARY OF JUDITH BASIN COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
McCarty Creek.....	726.00.....	0.....	726.00
Avoca Creek.....	12.00.....	0.....	12.00
Lone Tree (Dry Fork Arrow) Creek.....	174.00.....	91.00.....	265.00
Reservoir (Springs).....	18.00.....	182.00.....	200.00
Big Flat Spring.....	23.00.....	0.....	23.00
Spring.....	52.00.....	0.....	52.00
Dipping Vat (Spring Coulee) Creek.....	98.00.....	41.00.....	139.00
Braun (Brown) Creek.....	344.00.....	91.00.....	435.00
Dead Creek.....	33.00.....	0.....	33.00
Rose Creek.....	225.00.....	0.....	225.00
Davis Creek.....	2,069.00.....	0.....	2,069.00
Mountain Stream.....	35.00.....	0.....	35.00
Martin Creek.....	313.00.....	0.....	313.00
North Branch Martin Creek.....	102.00.....	0.....	102.00
Coulee.....	18.00.....	0.....	18.00
Paul Creek.....	87.00.....	49.00.....	136.00
Cottonwood (McDonald) Creek.....	0.....	0.....	0
Girard Creek.....	0.....	54.00.....	54.00
Fall Creek.....	28.00.....	0.....	28.00
Mansfield Creek.....	353.00.....	0.....	353.00
Timber Creek.....	0.....	198.00.....	198.00
Surprise Creek.....	607.00.....	0.....	607.00
North Fork Surprise Creek.....	161.00.....	0.....	161.00
Alkali Coulee.....	26.00.....	0.....	26.00
Rattlesnake Coulee.....	10.00.....	0.....	10.00
Sun (Hazlett) Creek.....	93.00.....	0.....	93.00
Total Arrow Creek & Tributaries.....	7,641.00.....	890.00.....	8,531.00
Judith River.....	5,390.00.....	1,653.00.....	7,043.00
South Fork Judith River.....	48.00.....	0.....	48.00
Springs.....	5.00.....	0.....	5.00
Courtney (Spring) Creek.....	25.00.....	0.....	25.00
Antelope Creek.....	104.00.....	0.....	104.00
South Fork Antelope Creek.....	173.00.....	0.....	173.00

IRRIGATION SUMMARY OF JUDITH BASIN COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Spring & Coulee.....	8.00.....	17.00.....	25.00
Springs.....	23.00.....	0.....	23.00
Slough & Springs.....	187.00.....	0.....	187.00
Slough & Springs.....	5.00.....	0.....	5.00
Twin Springs.....	5.00.....	0.....	5.00
Spring Branch.....	71.00.....	0.....	71.00
Spring Branch (Porter Creek).....	114.00.....	0.....	114.00
Ross Fork.....	157.00.....	104.00.....	261.00
Frazier Creek (Seven Springs Coulee).....	0.....	0.....	0
Spring.....	10.00.....	0.....	10.00
Unnamed Creek.....	8.00.....	0.....	8.00
Red Spring (Bluff) Creek.....	65.00.....	0.....	65.00
Barrows Creek.....	16.00.....	0.....	16.00
Mud (Muddy) Creek.....	0.....	0.....	0
North Fork Muddy Creek.....	92.00.....	0.....	92.00
South Fork Mud (Little Muddy) Creek.....	40.00.....	0.....	40.00
West Buffalo Creek.....	81.00.....	59.00.....	140.00
Saager (Coal Bank) Creek.....	0.....	40.00.....	40.00
Unnamed Coulee.....	12.00.....	0.....	12.00
Gravel Pit.....	20.00.....	0.....	20.00
Big Coulee.....	0.....	0.....	0
Barney Creek.....	0.....	0.....	0
Jellison Creek.....	83.00.....	0.....	83.00
Trout Creek.....	12.00.....	0.....	12.00
Hauck (Spring) (Salt) Creek.....	0.....	0.....	0
Spring Branch.....	0.....	35.00.....	35.00
Lake Creek.....	76.00.....	0.....	76.00
Unnamed Tributary.....	44.00.....	0.....	44.00
Olson (Dawkins) Creek.....	134.00.....	0.....	134.00
Total Ross Fork & Tributaries.....	850.00.....	238.00.....	1,088.00

IRRIGATION SUMMARY OF JUDITH BASIN COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN—(Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Louse Creek.....	134.00.....	0.....	134.00
Indian Creek.....	90.00.....	0.....	90.00
Sage (Beaver) Creek.....	234.00.....	101.00.....	335.00
Bubbling Springs (Spring Branch) (Pepin) (Jack Murphy's) Creek.....	191.00.....	0.....	191.00
Big Coulee.....	0.....	35.00.....	35.00
Unnamed Coulee.....	0.....	50.00.....	50.00
Willow Creek.....	468.00.....	0.....	468.00
West Fork (Spring) (Branch) (Coulee) (Dunsmore) Willow Creek.....	5.00.....	0.....	5.00
Cottonwood (Big) Spring.....	37.00.....	0.....	37.00
Wolf Creek.....	1,815.00.....	60.00.....	1,875.00
Dry Wolf Creek.....	471.00.....	43.00.....	514.00
Tuttle Springs.....	20.00.....	0.....	20.00
Old Channel (Dry Wolf Creek).....	3.00.....	0.....	3.00
(Little) Spring Creek.....	158.00.....	0.....	158.00
Coyote Creek.....	126.00.....	0.....	126.00
Springs.....	10.00.....	0.....	10.00
Skull Creek.....	127.00.....	0.....	127.00
Walker Spring.....	5.00.....	0.....	5.00
Little Wolf Creek.....	0.....	0.....	0
Unnamed Tributary.....	89.00.....	0.....	89.00
Total Judith River & Tributaries.....	10,991.00.....	2,197.00.....	13,188.00
Total Irrigation in Judith Basin County.....	18,862.00.....	3,149.00.....	22,011.00

ACKLEY LAKE STORAGE PROJECT (S.W.C.B.)
(Ackley Lake Water Users Association)

HISTORY

This project consists of an off-stream bench reservoir created by the construction of an earth fill dam. The reservoir is located five miles southwest of Hobson in Judith Basin County. Water for the reservoir is supplied by a diversion canal from the Judith River. There is also an outlet canal from the reservoir back to the Judith River which supplies water through several main distribution canals of the irrigation system. The drainage area of the Judith River above the diversion canal is 326 square miles, and is located in the high, timbered slopes of the Little Belt Mountains.

The Ackley Lake Storage Project was financed by a loan and grant agreement from the Public Works Administration together with State Water Conservation Board funds.

On October 22, 1936, the State Water Conservation Board accepted an offer from the P.W.A., whereby the government would purchase bonds in the amount of \$54,000 and allow a grant of \$44,180 to construct the project. The offer called for the construction of the dam, the supply and outlet canals, and a loan to be evidenced by water conservation revenue bonds. The Board issued its Series "J" bonds dated January 1, 1937, which were sold to the government on July 22, 1937. These bonds mature from January 1, 1940 through January 1, 1967, with the Union Bank and Trust Company of Helena acting as trustee for the bond issue. The State Water Conservation Board required the formation of the Ackley Lake Water Users Association and the sale of 5,266 acre-feet of water under contract to be approved by Finance Division of the P.W.A.

The Ackley Lake Water Users Association was incorporated on November 17, 1936, with the capital stock listed at \$10,000, which was to be divided into 10,000 shares at a par value of \$1.00 each. Originally there were 33 water purchase contracts (see page) signed, satisfactory to P.W.A. and approved by the Association.

In order to pay off the cost of the project to the State Water Conservation Board, the Ackley Lake Water Users Association entered into a Water Marketing Contract (see page) with the Board in which the Association agreed to pay the Board \$4,212.80 on November 1st of each year, commencing with the year 1938 and ending with the year 1967.

Bids for construction of the project were received on December 17, 1936 and Tomlinson and Arkwright of Great Falls, Montana was the low bidder at \$65,969.50. The Board awarded the contract to said firm the same day and it was approved by the P.W.A. on January 5, 1938. This project first operated during the year of 1938 and has operated every year to the present time.

PRESENT STATISTICS

Location: Lands irrigated in Judith Basin County under the Ackley Lake Storage Project are located in sections 6, 7, 8 and 18 T. 14N., R. 15E; sections 10, 11, 12, 13, 15, 22 and 24 T. 14N., R. 14E; and section 35 T. 15N., R. 14E.

Length and Capacities of Canals: The diversion canal from the Judith River to the reservoir has a capacity of 100 second-feet and is 5 miles long. Point of diversion for this canal is

from the right bank of the Judith River in SW $\frac{1}{4}$ NW $\frac{1}{4}$ section 13, T. 14N., R. 13E. The outlet canal follows a northeasterly course of 4 miles from the reservoir to the Judith River. It has an initial capacity of 65 second-feet.

Reservoir: The Ackley Lake Reservoir is located in sections 22 and 27 T. 14N., R. 14E and has a storage capacity of 5,635 acre-feet.

Operation and Maintenance: The present annual charge for operation and maintenance on this project is \$1.00, with an additional 80 cents for construction, making a total annual charge of \$1.80 per acre-foot.

Present Users: There were 18 water users purchasing 2,486 acre-feet of water from Ackley Lake Reservoir in 1962.

Acreage Irrigated: In the year of 1962, there were 1,621 acres irrigated under the Ackley Lake Storage Project in Judith Basin County with 823 acres potentially irrigable under the present ditch system.

WATER RIGHT DATA

The water right that applies to the Ackley Lake Storage Project was filed by the State Water Conservation Board on August 20, 1935 from the Judith River for 4000 miner's inches of water or 100 c.f.s. (Ref. Document No. 62272, Clerk and Records Office, Stanford, Montana). (See Maps Part II, pages 10 & 11.)

WATER MARKETING CONTRACT

This is an agreement between a Water Users' Association and the State Water Conservation Board on any project built or operated by the Board: whereby the Board agrees to sell to the Association all of the available water of the project, and the Association agrees to distribute same to water purchasers and provide method of payment of sums due, levying of assessment for operation and maintenance cost, time of notification of such levy to be given water purchasers, time of default and remedies in the event of default.

WATER PURCHASE CONTRACT

This is a three party contract entered into between the individual water purchaser, the Association and the State Water Conservation Board on any project built or operated by the Board: whereby the individual agrees to purchase a definite amount of water and to pay therefore a definite sum of money on or before a definite day, until a definite future date; in addition to such definite annual sum, the individual agrees to pay such additional sum or sums as may be required annually as his proportionate share of the cost of operation and maintenance of the Association. This contract is not valid until the water purchaser executes a Subscription and Pledge Agreement.

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

APPROPRIATIONS (Filings of Records)				DECREED RIGHTS			
STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
MISSOURI RIVER BASIN							
*Missouri River	0....	0....	0				
Belt Creek	0....	0....	0				
Dry Fork Belt Creek..	5....	3,840.00....	96.00				
San Miguel Creek..	1....	60.00....	1.50				
Villards Creek	1....	200.00....	5.00				
Galena Creek	7....	1,912.00....	47.80				
Unnamed Spring	1....	5.00....	0.12				
Unnamed Spring	1....	50.00....	1.25				
West Galena							
Creek	1....	All....	All				
Ben Gulch Creek	2....	90.00....	2.25				
Daisy Creek	1....	80.00....	2.00				
Park Creek	1....	30.00....	0.75				
Silver Creek	1....	5.00....	0.12				
Dream Gulch	1....	100.00....	2.50				
Bear Creek	3....	540.00....	13.50				
Green Creek	3....	140.00....	3.50				
Gold Run Creek..	5....	2,240.00....	56.00				
St. Louis Creek	2....	330.00....	8.25				
Queen of the							
Hills Gulch	1....	30.00....	0.75				
Otter Bear Creek.....	16....	4,742.00....	118.55				
Unnamed Lake	1....	288.00....	7.20				
Whiskey Spring	1....	100.00....	2.50				
McMillan Spring	2....	800.00....	20.00				
Unnamed Tributary	1....	15.00....	0.37				
Unnamed Stream ..	1....	40.00....	1.00				
Unnamed Spring ...	1....	50.00....	1.25				
Unnamed Springs ..	2....	100.00....	2.50				
Unnamed Spring ...	1....	100.00....	2.50				
East Fork							
Otter Creek	1....	1,000.00....	25.00				
Dry Coulee	1....	100.00....	2.50				
Sheep Coulee	2....	360.00....	9.00				
Spring Coulee	1....	75.00....	1.87				
Three Coulees	1....	150.00....	3.75				
Unnamed Coulee ...	1....	All....	All				
Unnamed Coulee ...	0....	0....	0				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Spring ...	1....	50.00....	1.25				
Anderson Coulee ...	1....	200.00....	5.00				
McMillan Coulee	2....	350.00....	8.75				
Unnamed							
Springs	1....	100.00....	2.50				
Taylor Coulee	1....	100.00....	2.50				
Entwisle Coulee ...	1....	200.00....	5.00				
Unnamed Spring..	2....	300.00....	7.50				
Cathrae Coulee ..	1....	200.00....	5.00				
Mollar Coulee	1....	100.00....	2.50				
Unnamed							
Spring &							
Coulee	1....	200.00....	5.00				

*Names of streams indented on the left-hand margin indicate that they are tributaries of the first stream named above which is not indented.

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1....	100.00....	2.50				
Unnamed Spring	1....	All....	All				
Unnamed Coulee	1....	100.00....	2.50				
Saper Coulee	3....	620.00....	15.50				
Bodner's Spring..	1....	2.00....	0.50				
Unnamed Springs	1....	50.00....	1.25				
Unnamed Spring..	1....	All....	All				
Unnamed Coulee	1....	100.00....	2.50				
Unnamed Coulee ..	1....	80.00....	2.00				
Williams Creek	10....	1,702.00....	42.55				
Well	1....	30.00 gallons per minute					
Unnamed Coulee	3....	300.00....	7.50				
Unnamed Spring..	2....	60.00 gallons per minute					
Unnamed Spring..	1....	10.00 gallons per minute					
Unnamed Coulees	1....	250.00....	6.25				
Unnamed Coulee	2....	200.00....	5.00				
Unnamed Coulee	1....	100.00....	2.50				
Unnamed Coulees	2....	150.00....	3.75				
Unnamed Spring..	3....	All....	All				
Unnamed Springs	1....	All....	All				
Unnamed Coulee	6....	480.00....	12.00				
Unnamed Coulee	3....	280.00....	7.00				
Unnamed Spring	1....	All....	All				
Unnamed Spring & Two Coulees	1....	25.00....	0.62				
Unnamed Spring..	1....	All....	All				
Unnamed Coulee..	1....	60.00....	1.50				
North Coulee	2....	300.00....	7.50				
Unnamed Springs & Sloughs	1....	All....	All				
Unnamed Springs	1....	100.00....	2.50				
Unnamed Coulee	1....	100.00....	2.50				
Unnamed Springs (2)	2....	100.00....	2.50				
Dry Coulee	2....	270.00....	6.75				
Unnamed Springs	1....	All....	All				
Unnamed Spring..	1....	20.00....	0.50				
Ridleys Coulee (Bitter Creek)	3....	300.00....	7.50				
Unnamed Spring..	1....	50.00....	1.25				
Little Otter (Limestone) Creek	11....	2,633.00....	65.82				
(South) East Fork Little Otter	2....	42.00....	1.05				
Unnamed Spring	1....	100.00....	2.50				
Nelson Spring..	2....	30.00....	0.75				
Clarke Spring..	2....	60.00....	1.50				
Penfold Coulee....	1....	100.00....	2.50				
Unnamed Spring	1....	50.00....	1.25				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Granite Spring	2....	32.00....	0.80				
Weaver Spring	2....	60.00....	1.50				
Giant Spring	2....	51.00....	1.27				
Peterson Creek ..	3....	650.00....	16.25				
Unnamed							
Coulees	1....	250.00....	6.25				
Unnamed							
Springs	1....	50.00....	1.25				
Pitcher Creek	0....	0....	0				
Gahan Creek ..	1....	40.00....	1.00				
Unnamed							
Coulee	1....	100.00....	2.50				
Unnamed							
Spring	1....	1,000.00....	25.00				
Briggs Creek	0....	0....	0				
Unnamed							
Coulee	1....	200.00....	5.00				
Unnamed							
Spring	1....	50.00....	1.25				
Unnamed							
Springs (3) ..	1....	300.00....	7.50				
Unnamed Spring							
& Coulee	1....	100.00....	2.50				
Tom Lees Coulee	1....	100.00....	2.50				
Unnamed							
Spring	1....	All....	All				
Unnamed Coulees	1....	200.00....	5.00				
Government							
Coulee	1....	40.00....	1.00				
Cache Coulee	1....	100.00....	2.50				
Unnamed Coulee	1....	25.00....	0.62				
Unnamed							
Coulees (2)	5....	460.00....	11.50				
Unnamed Spring..	1....	100.00....	2.50				
Michels Spring	2....	100.00....	2.50				
Unnamed Spring	1....	60.00....	1.50				
Unnamed Spring	1....	All....	All				
Unnamed Coulee	1....	100.00....	2.50				
Government							
(Dry) Coulee	3....	174.00....	4.35				
Unnamed Coulee	1....	100.00....	2.50				
Unnamed							
Springs	1....	6.00....	0.15				
Unnamed Springs	1....	100.00....	2.50				
Unnamed							
Springs (2)	1....	All....	All				
Unnamed Coulee..	1....	60.00....	1.50				
Brush Coulee	3....	260.00....	6.50				
Unnamed Coulee	2....	580.00....	14.50				
Unnamed Spring..	2....	5.00 gallons per minute					
Unnamed Spring..	1....	40.00....	1.00				
Bundy Coulee	4....	350.00....	8.75				
Unnamed Coulees	1....	250.00....	6.25				
Unnamed Spring..	1....	50.00....	1.25				
Marion Coulee	3....	500.00....	12.50				
Unnamed Spring							
& Coulee	1....	80.00....	2.00				
Unnamed Coulee	2....	304.00....	7.60				

WATER RIGHT DATA—JUDITH BASIN COUNTY
APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee & Springs	2....	260.00....	6.50				
Well	1....	All....	All				
Cora Creek	4....	5,200.00....	130.00				
Unnamed Coulee	2....	200.00....	5.00				
Unnamed Springs (3)	1....	100.00....	2.50				
Unnamed Coulees	1....	100.00....	2.50				
Two Dry Coulee.. ..	2....	200.00....	5.00				
Sheep Creek	1....	100.00....	2.50				
North Fork Cora Creek	1....	100.00....	2.50				
South Branch Cora Creek	1....	400.00....	10.00				
Unnamed Spring	1....	200.00....	5.00				
Unnamed Coulee	1....	100.00....	2.50				
Unnamed Spring	1....	12.00....	0.30				
Unnamed Springs & Coulee	1....	100.00....	2.50				
Spring Creek	2....	300.00....	7.50				
Total Belt Creek & Tributaries	254....	42,720.00....	1,067.96....	0....	0....	0....	0
Highwood Creek	1....	500.00....	12.50				
Arrow Creek	27....	54,980.00....	1,374.50				
Unnamed Tributary	1....	300.00....	7.50				
Unnamed Stream ..	1....	160.00....	4.00				
Pine Creek	2....	360.00....	9.00				
Little Birch Creek	1....	120.00....	3.00				
Birch Creek	2....	200.00....	5.00				
Middle Fork Arrow (Pine) Creek	8....	1,050.00....	26.25				
North Fork Pine Creek	1....	50.00....	1.25				
Young's Creek	1....	50.00....	1.25				
Unnamed Springs	1....	216.00....	5.40				
Flanagan Creek	3....	590.00....	14.75				
Unnamed Spring	1....	50.00....	1.25				
Eastern Coulee	1....	200.00....	5.00				
Unnamed Spring	1....	6.66 gallons per minute					
Big Flat Coulee.....	1....	80.00....	2.00				
Black (Todd) (Long) (Pine) Coulee	4....	800.00....	20.00				
Byrnes Creek	13....	3,060.00....	76.50				
Unnamed Springs ..	1....	All....	All				
Unnamed Coulee	1....	40.00....	1.00				
Unnamed Spring	1....	400.00....	10.00				
Spring Branch	1....	200.00....	5.00				
Unnamed Springs ..	1....	100.00....	2.50				
Unnamed Spring	1....	400.00....	10.00				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Erwin Creek	4....	416.00....	10.40				
White Pine Creek	1....	300.00....	7.50				
Well	1....	17.00 gallons per minute					
Unnamed Coulee	1....	All....	All				
Dry Coulee	1....	170.00....	4.25				
Swisher Coulee	2....	450.00....	11.25				
Hay (Coulee) Creek..	1....	100.00....	2.50				
Castners Coulee	2....	500.00....	12.50				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Coulees	4....	1,088.00....	27.20				
Unnamed Spring..	1....	100.00....	2.50				
Unnamed Coulee	1....	50.00....	1.25				
Unnamed Spring	2....	600.00....	15.00				
Unnamed Stream	3....	500.00....	12.50				
South Fork Arrow							
(Hay) Creek	18....	3,570.00....	89.25				
Unnamed Spring	1....	400.00....	10.00				
Ulbeg Creek	1....	50.00....	1.25				
Unnamed Coulee..	1....	100.00....	2.50				
Unnamed Spring..	1....	400.00....	10.00				
Unnamed Coulee..	1....	100.00....	2.50				
Spring Creek	1....	100.00....	2.50				
Unnamed							
(Coulee) Creek	2....	200.00....	5.00				
Dry Coulee	1....	200.00....	5.00				
Unnamed Coulee	1....	40.00....	1.00				
Unnamed Tributary	1....	100.00....	2.50				
Nevatna Coulee	1....	100.00....	2.50				
Unnamed Coulees ..	4....	420.00....	10.50				
Unnamed Springs	1....	20.00....	0.50				
Unnamed Coulee	1....	150.00....	3.75				
Frost Coulee	1....	150.00....	3.75				
Unnamed							
Springs (5)	1....	60.00....	1.50				
Hay Creek	0....	0....	0				
Red Butte Creek..	1....	300.00....	7.50				
Unnamed Spring	2....	300.00....	7.50				
Geyser Creek	8....	920.00....	23.00				
Unnamed Springs	1....	All....	All				
Dry Coulee	2....	260.00....	6.50				
Crow Coulee	8....	1,200.00....	30.00				
Unnamed Spring..	2....	300.00....	7.50				
McAllister							
Spring	1....	200.00....	5.00				
Well	1....	52.00 gallons per minute					
Unnamed Spring..	1....	100.00....	2.50				
McCarty Creek	8....	1,450.00....	36.25				
Unnamed Spring							
& Coulee	1....	100.00....	2.50				
Oakman							
(Johnson)							
Spring	1....	600.00....	15.00				
Nelson Coulee	1....	All....	All				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Avoca Creek	8....	910.00....	22.75				
Well	1....	1.00 gallon per minute					
Unnamed							
Coulee	2....	100.00....	2.50				
Unnamed Stream	0....	0....	0				
Unnamed							
Spring	2....	All....	All				
Unnamed							
Springs (3)	1....	100.00....	2.50				
Shannon (Davis							
Coulee)							
(Frost) Creek ..	5....	1,460.00....	36.50				
Unnamed							
Springs	1....	100.00....	2.50				
Davis Coulee							
Spring	1....	200.00....	5.00				
South Fork							
Davis Creek..	1....	200.00....	5.00				
Mortons Spring	1....	200.00....	5.00				
Unnamed Coulee	0....	0....	0				
Well	1....	5.00 gallons per minute					
Unnamed							
Spring	1....	200.00....	5.00				
Lone Tree (Dry							
Fork Arrow)							
Creek	12....	2,990.00....	74.75				
Unnamed Spring..	1....	50.00....	1.25				
Unnamed Spring..	1....	100.00....	2.50				
Unnamed							
Springs (2)	1....	130.00....	3.25				
Unnamed Spring..	2....	60.00....	1.50				
Well	1....	12.00 gallons per minute					
Unnamed Coulee..	1....	100.00....	2.50				
Unnamed							
Reservoir	1....	400.00....	10.00				
Unnamed Coulee..	1....	100.00....	2.50				
Berger Gulch	1....	200.00....	5.00				
Unnamed Coulee..	0....	0....	0				
Well	1....	50.00....	1.25				
Total South Fork Arrow							
Creek & Tributaries.....	124....	19,540.00....	488.50....	0....	0....	0....	0
Unnamed Coulee	0....	0....	0				
Well	1....	100.00....	2.50				
Unnamed Spring	1....	200.00....	5.00				
Arrow Creek Springs	1....	30.00....	0.75				
Big Flat Spring.....	1....	45.00....	1.12				
Dipping Vat Creek							
(Spring) Coulee	8....	1,350.00....	33.75				
Unnamed Springs ..	2....	800.00....	20.00				
Unnamed Coulee	0....	0....	0				
Unnamed Spring..	1....	All....	All				
Well	1....	15.00 gallons per minute					
Braun (Brown) Creek	20....	2,590.00....	64.75				
Unnamed Springs ..	3....	300.00....	7.50				
Unnamed Spring	1....	400.00....	10.00				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Dead Creek	1....	100.00....	2.50				
Unnamed Spring..	1....	100.00....	2.50				
Unnamed Coulee	0....	0....	0				
Unnamed							
Springs	1....	200.00....	5.00				
Rose Creek	1....	400.00....	10.00				
Unnamed							
Springs (3)	1....	300.00....	7.50				
Davis Creek	24....	5,990.00....	149.75....	489....	13....	3,640.00....	91.00
Mountain Stream ..	1....	320.00....	8.00				
Unnamed Springs	1....	100.00....	2.50				
Unnamed Spring..	1....	100.00....	2.50				
Martin Creek	24....	4,895.00....	122.37....	489....	(See Davis Creek)		
North Branch							
Martin Creek ..	1....	300.00....	7.50				
Pacific Creek	3....	600.00....	15.00				
Paul Creek	2....	230.00....	5.75				
Unnamed							
Coulees	1....	200.00....	5.00				
Barnes Springs	1....	160.00....	4.00				
Merrill Creek	1....	0....	0				
Cottonwood							
(McDonald)							
Creek	14....	2,510.00....	62.75....	10043....	5....	1,399.24....	34.98*
Girard Creek	8....	2,060.00....	51.50....	9247....	10....	760.00....	19.00*
Unnamed Branch ..	1....	300.00....	7.50				
Fall Creek	6....	880.00....	22.00				
Mansfield Creek..	10....	1,750.00....	43.75				
Timber Creek	1....	320.00....	8.00				
Surprise Creek	17....	5,110.00....	127.75				
Unnamed Reservoir	1....	400.00....	10.00				
Unnamed Spring ..	1....	100.00....	2.50				
Unnamed Spring ..	1....	20.00....	0.50				
Unnamed Spring							
& Coulee	1....	275.00....	6.87				
Wolf Butte Coulee..	1....	100.00....	2.50				
Unnamed Coulee	1....	100.00....	2.50				
Certain Spring ..	1....	100.00....	2.50				
Certain Spring	2....	200.00....	5.00				
Unnamed Tributary	1....	150.00....	3.75				
Unnamed Spring ..	1....	100.00....	2.50				
North Fork							
Surprise Creek	2....	600.00....	15.00				
Alkali Coulee	1....	100.00....	2.50				
Rattlesnake							
Coulee	1....	200.00....	5.00				
Two Certain							
Springs	1....	100.00....	2.50				
Unnamed Stream ..	3....	800.00....	20.00				
Sun (Hazlett)							
Creek	5....	1,300.00....	32.50				
Unnamed Creek..	3....	600.00....	15.00				
Unnamed							
Tributary	3....	480.00....	12.00				
Unnamed							
Tributary	1....	200.00....	5.00				

*Also in Chouteau County

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Creek ..	3....	600.00....	15.00				
Unnamed Coulees	1....	20.00....	0.50				
Unnamed Coulees	1....	160.00....	4.00				
Certain Coulees ..	1....	320.00....	8.00				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Spring	1....	0.70 gallons per minute					
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Lakes	1....	200.00....	5.00				
Unnamed Spring	1....	100.00 gallons per minute					
Coffee Creek	5....	880.00....	22.00				
Unnamed Branch ..	1....	200.00....	5.00				
South Branch							
Coffee Creek	1....	200.00....	5.00				
Total Arrow Creek & Tributaries	435....	128,965.00....	3,224.11....	3....	28....	5,799.24....	144.98
Judith River	62....	69,917.00....	1,747.92....	982....	99....	17,282.00....	432.05
South Fork							
Judith River	3....	580.00....	14.50				
Unnamed Tributary	2....	360.00....	9.00				
Middle Fork							
Judith River	6....	6,900.00....	172.50				
North Tributary to Middle Fork							
Judith River	1....	500.00....	12.50				
Cleveland Creek	1....	500.00....	12.50				
Harrison Creek	1....	1,000.00....	25.00				
Weatherwax Creek	1....	500.00....	12.50				
King Creek	1....	200.00....	5.00				
Lost Fork							
Judith River	2....	2,500.00....	62.50				
Unnamed Spring..	1....	500.00....	12.50				
Yogo Creek							
(North Fork							
Judith River)	23....	24,500.00....	612.50				
Silver Lakes	2....	5,250.00....	131.25				
Unnamed Springs	1....	500.00....	12.50				
Unnamed Stream	1....	500.00....	12.50				
Harwood Creek ..	1....	200.00....	5.00				
Heylin Creek	1....	200.00....	5.00				
Sixteen Color Gulch	1....	300.00....	7.50				
Lead							
Gulch Creek	2....	1,150.00....	28.75				
Boulder Creek	4....	3,100.00....	77.50				
Elk Creek	10....	3,600.00....	90.00				
Skunk Gulch	7....	949.00....	23.72				
Bear Gulch	0....	0....	0				
Springs in							
Bear Park	3....	250.00....	6.25				
Howard Creek..	1....	50.00....	1.25				
Unnamed Spring..	1....	100.00....	2.50				
Sawmill Gulch ..	1....	150.00....	3.75				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Russell's Coulee	2....	400.00....	10.00				
Unnamed Spring	1....	25.00....	0.62				
Big Coulee							
(Spring Branch) ..	3....	600.00....	15.00				
South Fork							
Big Coulee	1....	80.00....	2.00				
North Fork							
Big Coulee	1....	All....	All				
Ettien Creek	1....	500.00....	12.50				
Unnamed Springs	4....	1,600.00....	40.00				
Unnamed Coulee	0....	0....	0				
Unnamed Spring	1....	All....	All				
Unnamed Stream	1....	800.00....	20.00				
Dipping Tank Coulee	1....	750.00....	18.75				
Armstrong Spring ..	1....	40.00....	1.00				
Unnamed Springs							
& Coulees	2....	1,500.00....	37.50				
Spring Branch	1....	300.00....	7.50				
Unnamed Coulee	1....	100.00....	2.50				
Carr Creek							
(Spring Coulee)	3....	450.00....	11.25				
Unnamed Springs ..	1....	200.00....	5.00				
Unnamed Spring	1....	10.00 gallons per minute					
Unnamed Coulee	0....	0....	0				
Unnamed							
Springs (3)	1....	200.00....	5.00				
Waite Creek							
(Clarks Fork)	8....	2,025.00....	50.62....	982....	(See Judith River)		
Unnamed Spring	1....	160.00....	4.00				
Spring Coulee	1....	200.00....	5.00				
Dug Well	1....	30.00 gallons per minute					
Courtney							
(Spring) Creek	5....	875.00....	21.87				
Messner Coulee	2....	540.00....	13.50				
Railroad Coulee ..	2....	180.00....	4.50				
Spring Brook	1....	40.00....	1.00				
Unnamed							
Springs (2)	1....	40.00....	1.00				
South Fork							
Courtney's							
(Spring Branch)							
Creek	3....	410.00....	10.25				
Unnamed Spring	1....	40.00....	1.00				
Courtney Spring	2....	50.00....	1.25				
Colbank Coulee	1....	100.00....	2.50				
Unnamed Spring ..	1....	100.00....	2.50				
Unnamed Spring	1....	200.00....	5.00				
Spring (Branch)							
Creek	3....	500.00....	12.50				
Unnamed Spring	4....	400.00....	10.00				
Unnamed Coulee	3....	500.00....	12.50				
Unnamed Springs	1....	200.00....	5.00				
Unnamed Springs ..	1....	200.00....	5.00				
Spring Branch	1....	200.00....	5.00				
Antelope Creek	18....	3,650.00....	91.25....	982....	(See Judith River)		
Unnamed Springs ..	1....	250.00....	6.25				
Two Unnamed							
Branches	1....	60.00....	1.50				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Tributaries	2....	600.00....	15.00				
North (West) Fork Antelope Creek ..	8....	1,270.00....	31.75				
South Fork Antelope (Skunk) Creek ..	2....	300.00....	7.50				
Middle Fork Antelope Creek	1....	100.00....	2.50				
Spring Branch..	1....	100.00....	2.50				
East Fork Antelope Creek	1....	100.00....	2.50				
Unnamed Tributary	2....	600.00....	15.00				
Big Coulee	1....	150.00....	3.75....	982....	(See Judith River)		
Unnamed Spring..	1....	150.00....	3.75				
Unnamed Branch ..	1....	150.00....	3.75				
Branch of Antelope Creek ..	1....	150.00....	3.75				
Spring Creek	1....	100.00....	2.50				
Bard (Spring) Creek..	1....	1,500.00....	37.50				
Unnamed Spring	1....	500.00....	12.50				
Unnamed Springs	0....	0....	0....	338....	3....	All....	All
Unnamed Springs	1....	300.00....	7.50				
Twin Springs	0....	0....	0....	994....	2....	All....	All
Unnamed Creek	1....	75.00....	1.87				
Unnamed Springs	3....	160.00....	4.00				
Spring Branch	4....	760.00....	19.00				
Unnamed Branch	1....	200.00....	5.00				
Unnamed Coulee & Spring	1....	All....	All				
Unnamed Springs	3....	200.00....	5.00				
Unnamed Coulee	1....	200.00....	5.00				
Unnamed Stream	1....	100.00....	2.50				
Unnamed Stream	1....	100.00....	2.50				
Unnamed Spring	6....	276.00....	6.91				
Unnamed Springs	1....	200.00....	5.00				
Unnamed Springs (3)	1....	150.00....	3.75				
Unnamed Spring	1....	40.00....	1.00				
Hobson Townsite Spring	1....	600.00....	15.00				
Barr Spring	1....	40.00....	1.00				
Unnamed Springs	1....	25.00....	0.62				
Unnamed Springs	1....	100.00....	2.50				
Unnamed Springs (4)	1....	All....	All				
Spring Creek	1....	200.00....	5.00				
Unnamed Springs	1....	40.00....	1.00				
Unnamed Tributary ..	1....	160.00....	4.00				
Woodman's Creek	1....	500.00....	12.50				
Porter Creek (Spring Branch)	5....	1,070.00....	26.75				
Alkali Lake	3....	480.00....	12.00				
Unnamed Tributary Lapham (Big) Coulee	5....	950.00....	23.75				
Unnamed Spring..	1....	250.00....	6.25				
Colbraith Coulee	2....	800.00....	20.00				
Wells (3)	1....	8.00 gallons per minute					

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Ross Fork	21....	7,765.00....	194.12....	756....	24....	3,570.00....	89.25
Frazier Creek (Seven Springs Coulee)	2....	500.00....	12.50	(Part of 756 is in Fergus Co.)			
Unnamed Spring & Coulee	1....	180.00....	4.50				
Unnamed Spring..	4....	460.00....	11.50				
Twin Springs	1....	200.00....	5.00				
Unnamed Spring..	2....	200.00....	5.00				
Unnamed Spring & Coulee	1....	320.00....	8.00				
Unnamed Springs ..	2....	400.00....	10.00				
Red Spring (Bluff) Creek	3....	540.00....	13.50....	756.... (See Ross Fork)			
Red Spring	1....	200.00....	5.00				
Barrows Creek	5....	1,000.00....	25.00				
Monks Creek	1....	All....	All				
Unnamed Springs	1....	20.00....	0.50				
Spring Creek	1....	200.00....	5.00				
Alkali Spring	1....	100.00....	2.50				
Unnamed Tributary	1....	150.00....	3.75				
Mud (Muddy) Creek	8....	1,950.00....	48.75....	756.... (See Ross Fork)			
North Fork Muddy Creek....	1....	200.00....	5.00				
Platt Coulee	2....	360.00....	9.00				
Unnamed Spring	1....	160.00....	4.00				
West Fork Mud Creek	2....	2,200.00....	55.00				
Cabin Coulee Creek	2....	220.00....	5.50				
South Fork Mud (Little Muddy) Creek	4....	560.00....	14.00				
Luther Coulee..	1....	100.00....	2.50				
Unnamed Coulee	1....	160.00....	4.00				
Unnamed Springs ..	1....	300.00....	7.50				
West Buffalo Creek	26....	7,436.00....	185.90....	1626....	4....	350.00....	8.75
Unnamed Tributary	3....	300.00....	7.50				
Unnamed Springs	1....	100.00....	2.50				
Unnamed Springs	1....	All....	All				
Artesian Well (2)	1....	All....	All				
Unnamed Tributary	1....	100.00....	2.50				
Saager (Coal Bank) Creek	2....	300.00....	7.50				
South Fork West Buffalo Creek..	3....	400.00....	10.00				
Unnamed Branch	1....	100.00....	2.50				

WATER RIGHT DATA—JUDITH BASIN COUNTY
APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Martin Coulee..	1....	100.00....	2.50				
Spaulding Creek	1....	130.00....	3.25				
Unnamed Coulee	0....	0....	0				
Unnamed Spring	1....	100.00....	2.50				
North Fork West Buffalo (Coyote) Creek	3....	670.00....	16.75				
South Fork of North Fork West Buffalo Creek..	1....	150.00....	3.75				
Unnamed Springs	1....	3,200.00....	80.00				
South Fork West Buffalo Creek..	3....	4,060.00....	101.50				
Unnamed Coulee	1....	60.00....	1.50				
Big Coulee	10....	1,670.00....	41.75				
Unnamed Spring..	2....	100.00....	2.50				
Unnamed Springs	1....	20.00 gallons per minute					
Wells (3)	1....	46.00 gallons per minute					
Unnamed Springs	1....	100.00....	2.50				
Unnamed Spring..	1....	All....	All				
Unnamed Tributary	1....	160.00....	4.00				
Unnamed Branch	2....	230.00....	5.75				
Unnamed Spring	1....	80.00....	2.00				
Unnamed Springs	1....	215.00....	5.37				
Four Gulches & Spring	1....	All....	All				
Barney Creek	1....	300.00....	7.50				
South Coulee ..	1....	160.00....	4.00				
Jellison Creek..	1....	0....	0				
Unnamed Coulee	1....	0....	0				
Unnamed Spring	1....	100.00....	2.50				
Spring Coulee..	1....	100.00....	2.50				
Unnamed Spring	1....	200.00....	5.00				
Unnamed Tributary	1....	160.00....	4.00				
Trout Creek	4....	1,550.00....	38.75				
Unnamed Stream ...	1....	240.00....	6.00				
Hauck (Spring) (Salt) Creek ...	4....	1,200.00....	30.00				
Unnamed Springs (2)	1....	320.00....	8.00				
Well	1....	20.00 gallons per minute					
Hauck Spring	2....	200.00....	5.00				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Tributary	1....	200.00....	5.00				
Spring Branch ...	3....	520.00....	13.00				
Unnamed Spring	1....	80.00....	2.00				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	0....	0....	0				
Unnamed Spring	3....	130.00....	3.25				
Artesian Well (Hunt No. 3)	1....	600.00....	15.00				
Artesian Well	1....	100.00....	2.50				
Unnamed Spring	1....	80.00....	2.00				
Unnamed Springs	1....	80.00....	2.00				
Lake Creek	5....	1,050.00....	26.25				
Old Rooney Spring	1....	120.00....	3.00				
Ackley Lake	3....	5,200.00....	130.00				
Unnamed Spring	1....	40.00....	1.00				
Unnamed Spring	1....	All....	All				
Spring Coulee	2....	188.00....	4.70				
Unnamed Tributary	1....	50.00....	1.25				
Unnamed Spring	1....	100.00....	2.50				
Slough	1....	All....	All				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Coulee	2....	200.00....	5.00				
Olson (Dawkins) Creek	1....	150.00....	3.75				
Dawkins Spring	1....	160.00....	4.00				
Unnamed Spring	2....	360.00....	9.00				
Spring Creek	1....	All....	All				
Smiths Springs	2....	100.00....	2.50				
Total Ross Fork & Tributaries	204....	52,544.00....	1,313.59....	2....	28....	3,920.00....	93.00
Louse Creek (Big Spring Coulee)	17....	2,525.00....	63.12				
North Fork Louse Creek	1....	100.00....	2.50				
Wells (5)	2....	22.00 gallons per minute					
Unnamed Spring	1....	All....	All				
Unnamed Tributary	1....	2,000.00....	50.00				
Unnamed Tributary	1....	400.00....	10.00				
Huson Coulee	2....	360.00....	9.00				
Indian Creek	13....	2,625.00....	65.62				
Spring Coulee	1....	50.00....	1.25				
Unnamed Spring	1....	10.00....	0.25				
Unnamed Coulee	1....	200.00....	5.00				
Pound Coulee	0....	0....	0				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Tributary	1....	200.00....	5.00				
Mosely Spring	1....	30.00....	0.75				
Spring Branch	1....	200.00....	5.00				
Unnamed Spring	1....	160.00....	4.00				
Sage (Beaver) Creek	23....	5,010.00....	125.25				
West Fork Sage Creek	1....	200.00....	5.00				
South Fork Sage Creek	1....	200.00....	5.00				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Mineral Gulch	1....	All....	All				
Davis Gulch	1....	80.00....	2.00				
Stewart Creek	1....	160.00....	4.00				
Spring Creek	1....	100.00....	2.50				
Unnamed Springs ..	1....	50.00....	1.25				
Mitchell Gulch	1....	100.00....	2.50				
Unnamed Spring..	1....	100.00....	2.50				
Unnamed Spring	1....	100.00....	2.50				
Jackson's Lake	1....	40.00....	1.00				
Unnamed Spring							
& Coulee	4....	1,100.00....	27.50				
Unnamed Spring	1....	50.00....	1.25				
Unnamed Lake	1....	40.00....	1.00				
Porcupine Creek	1....	100.00....	2.50				
Unnamed Spring..	1....	50.00....	1.25				
Bubbling Springs							
(Spring Branch)							
(Pepin)							
(Jack Murphy's)							
Creek	10....	2,070.00....	51.75				
Unnamed Coulee	0....	0....	0				
Unnamed Springs	2....	200.00....	5.00				
Flat Creek	2....	800.00....	20.00				
Unnamed Coulee	1....	200.00....	5.00				
Unnamed							
Spring	1....	200.00....	5.00				
Spring Branch	1....	200.00....	5.00				
Red Spring	1....	100.00....	2.50				
Unnamed Coulees ..	1....	160.00....	4.00				
Coulee &							
Artesian Well	1....	100.00....	2.50				
Unnamed Tributary							
of Sage Creek.....	4....	440.00....	11.00				
Unnamed Coulee	1....	200.00....	5.00				
Shippee Coulee	0....	0....	0				
Big Coulee	1....	240.00....	6.00				
Unnamed Reservoir	1....	160.00....	4.00				
Unnamed Coulee	0....	0....	0				
Unnamed Lake ..	1....	200.00....	5.00				
Unnamed Spring..	3....	380.00....	9.50				
Reservoirs (2)	2....	400.00....	10.00				
Artesian Well	1....	100.00....	2.50				
Well	1....	250.00....	6.25				
Well	1....	50.00....	1.25				
Big Coulee	1....	120.00....	3.00				
Unnamed							
Reservoir	1....	200.00....	5.00				
Unnamed Springs	1....	50.00....	1.25				
Wells (2)	1....	8.00 gallons per minute					
Unnamed Coulee	1....	200.00....	5.00				
Unnamed Coulee	2....	500.00....	12.50				
Kane Coulee	2....	300.00....	7.50				
Unnamed Spring							
& Coulees	1....	200.00....	5.00				
Unnamed Coulee	1....	200.00....	5.00				
Spring Branch	1....	100.00....	2.50				
Artesian Well	1....	40.00....	1.00				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Willow Creek	22....	3,436.00....	85.91				
West Branch of Willow Creek	2....	110.00....	2.75				
Unnamed Springs & Coulee	1....	150.00....	3.75				
Glen Garrel Spring	1....	40.00....	1.00				
South Branch Willow Creek ..	1....	140.00....	3.50				
Unnamed Spring	1....	40.00....	1.00				
Unnamed Springs	1....	100.00....	2.50				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Springs	1....	140.00....	3.50				
West Fork (Spring)							
(Branch)							
(Coulee)							
(Dunsmore)							
Willow Creek ..	7....	1,060.00....	26.50				
Unnamed Springs (2) ..	1....	160.00....	4.00				
North Fork (West Fork)							
Willow Creek Spring	5....	705.00....	17.62				
Branch	1....	100.00....	2.50				
Unnamed Coulees	1....	400.00....	10.00				
Garwood Coulee..	1....	320.00....	8.00				
Unnamed Branches	1....	400.00....	10.00				
Upper Metcalf Spring	2....	320.00....	8.00				
Unnamed Springs	2....	640.00....	16.00				
Metcalf Spring..	1....	320.00....	8.00				
Basin Creek	2....	350.00....	8.75				
Unnamed Springs	2....	250.00....	6.25				
Unnamed Coulee	1....	200.00....	5.00				
Unnamed Spring	2....	200.00....	5.00				
School Creek	1....	50.00....	1.25				
Unnamed Coulee	0....	0....	0				
Cottonwood (Big) Spring	2....	340.00....	8.50				
Unnamed Coulee	1....	100.00....	2.50				
Unnamed Springs	2....	90.00....	2.25				
Artesian Well	1....	12.00 gallons per minute					
Unnamed Coulee	1....	160.00....	4.00				
Smith Coulee	1....	50.00....	1.25				
Squaw Coulee	3....	300.00....	7.50				
Unnamed Spring..	1....	100.00....	2.50				
Unnamed Spring..	2....	60.00....	1.50				
Unnamed Springs (4)	1....	800.00....	20.00				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee ..	2....	400.00....	10.00				
Certain Spring	1....	160.00....	4.00				
Artesian Wells (2) ..	2....	All....	All				
Total Sage (Beaver) Creek & Tributaries	172....	28,231.00....	705.78....	0....	0....	0....	0
Wolf Creek	46....	13,480.00....	337.00....	3....	8....	1,770.00....	44.25
Dry Wolf Creek	32....	38,044.00....	951.10				
Silver Creek	1....	80,000,000.00....	2,000,000.00				
Lyon (Lion) Creek	2....	1,500.00....	37.50				
Unnamed Spring	1....	40.00....	1.00				
Little Baldy Creek	1....	300.00....	7.50				
Baldy Creek	2....	1,300.00....	32.50				
South Fork Baldy Creek..	1....	300.00....	7.50				
Gravel Gulch	1....	200.00....	5.00				
Unnamed Spring..	1....	10.00....	0.25				
Unnamed Spring..	1....	1.00....	0.02				
Unnamed Spring..	1....	75.00....	1.87				
Unnamed Spring..	1....	All....	All				
Certain Spring ..	1....	0.00....	0.00				
Unnamed Spring..	1....	1,000.00....	25.00				
Unnamed Coulee..	0....	0....	0				
Unnamed Spring	1....	160.00....	4.00				
Mud Spring Creek	1....	500.00....	12.50				
Unnamed Spring	1....	30.00....	0.75				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Spring..	1....	200.00....	5.00				
Unnamed Spring..	1....	80.00....	2.00				
Unnamed Tributary	3....	900.00....	22.50				
Holmes Coulee	2....	400.00....	10.00				
Unnamed Spring	1....	100.00....	2.50				
Unnamed Coulees	1....	100.00....	2.50				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Springs	2....	350.00....	8.75				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Stream	5....	1,500.00....	37.50				

WATER RIGHT DATA—JUDITH BASIN COUNTY

APPROPRIATIONS AND DECREES BY STREAM

STREAM	No. of Filings	APPROPRIATIONS (Filings of Records)		DECREED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Running Wolf Creek	9....	2,000.00....	50.00....	771....	2....	300.00....	7.50*
Silver Tip Spring	1....	100.00....	2.50				
Nickerson Coulee	1....	25.00....	0.62				
Unnamed Spring	3....	150.00....	3.75				
Unnamed Tributary	1....	100.00....	2.50				
Unnamed Springs	1....	40.00....	1.00				
Vann Coulee (Spring Branch)	1....	150.00....	3.75				
Unnamed Tributary	1....	400.00....	10.00				
Unnamed Spring	1....	500.00....	12.50				
Spring Branch	3....	460.00....	11.50				
Unnamed Spring	1....	50.00....	1.25				
Unnamed Coulee	1....	200.00....	5.00				
Unnamed Creek	1....	100.00....	2.50				
Unnamed Tributary	1....	200.00....	5.00				
Unnamed Spring	1....	250.00....	6.25				
Tuttle Spring	1....	All....	All				
Two Unnamed Tributaries	1....	200.00....	5.00				
Unnamed Springs	1....	150.00....	3.75				
Well	1....	16.00 gallons per minute					
Well	1....	80.00 gallons per minute					
Unnamed Tributaries	1....	400.00....	10.00				
Meadow Creek	3....	790.00....	19.75				
Unnamed Spring	1....	200.00....	5.00				
Unnamed Spring	1....	200.00....	5.00				
Unnamed Spring	1....	80.00....	2.00				
Unnamed Spring	1....	40.00....	1.00				
(Little) Spring Creek	4....	850.00....	21.25				
Coyote Creek	18....	2,548.00....	63.70				
Unnamed Springs	1....	All....	All				
Skull Creek	15....	2,010.00....	50.25				
Unnamed Branch	1....	200.00....	5.00				
Spring Creek	2....	100.00....	2.50				
Certain Springs	1....	100.00....	2.50				
Unnamed Spring	1....	100.00 gallons per minute					
Artesian Well	1....	8.00 gallons per minute					
Wells	1....	All....	All				
Spring Creek	3....	350.00....	8.75				
Walker Spring	1....	45.00....	1.12				
Little Wolf Creek	6....	1,470.00....	36.75				
Unnamed Spring	2....	50.00 gallons per minute					
Unnamed Springs (3)	1....	80.00....	2.00				
Wells (2)	2....	55.00 gallons per minute					

*Ditch Decree. See also Wolf Creek.

WATER RIGHT DATA—JUDITH BASIN COUNTY
APPROPRIATIONS AND DECREES BY STREAM

STREAM	APPROPRIATIONS (Filings of Records)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Hammett Creek ..	1....	200.00....	5.00				
Wells (2)							
& Spring	1....	All....	All				
Antelope Coulee	2....	800.00....	20.00				
Total Wolf Creek & Tributaries	221....	80,077,008.00....	2,001,925.18....	2....	10....	2,070.00....	51.75
Total Judith River & Tributaries	951....	80,323,260.00....	2,008,081.44....	7....	142....	23,272.00....	581.80
Grand Total Judith Basin County	1,641....	80,495,445.00....	2,012,386.01....	10....	170....	29,071.24....	726.78

DRAINAGES IN JUDITH BASIN COUNTY NOT LOCATED

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Black Trail Creek.....	1....	100.00....	2.50
Drain Creek.....	1....	60.00....	1.50
Grass Coulee.....	1....	160.00....	4.00
Johnson Creek.....	1....	200.00....	5.00
Lilly Creek.....	1....	200.00....	5.00
Lone Willow Creek.....	1....	400.00....	10.00
Magpie Creek.....	1....	150.00....	3.75
Puzzler Creek.....	1....	12.00....	0.30
Snow Creek.....	1....	500.00....	12.50
Spring Brook.....	1....	50.00....	1.25
Water Wheel Creek.....	1....	4,000.00....	100.00
West Fork of North Fork Stream.....	1....	336.00....	8.40
Unnamed Branch.....	1....	500.00....	12.50
Unnamed Coulee & Reservoir.....	1....	200.00....	5.00
Unnamed Spring.....	1....	12.00....	0.30
Unnamed Springs.....	1....	500.00....	12.50
Unnamed Springs.....	1....	160.00....	4.00
A Spring.....	1....	400.00....	10.00
Unnamed Spring.....	1....	20.00....	0.50
Unnamed Springs.....	1....	50.00....	1.25
Total.....	20....	8,010.00....	200.25

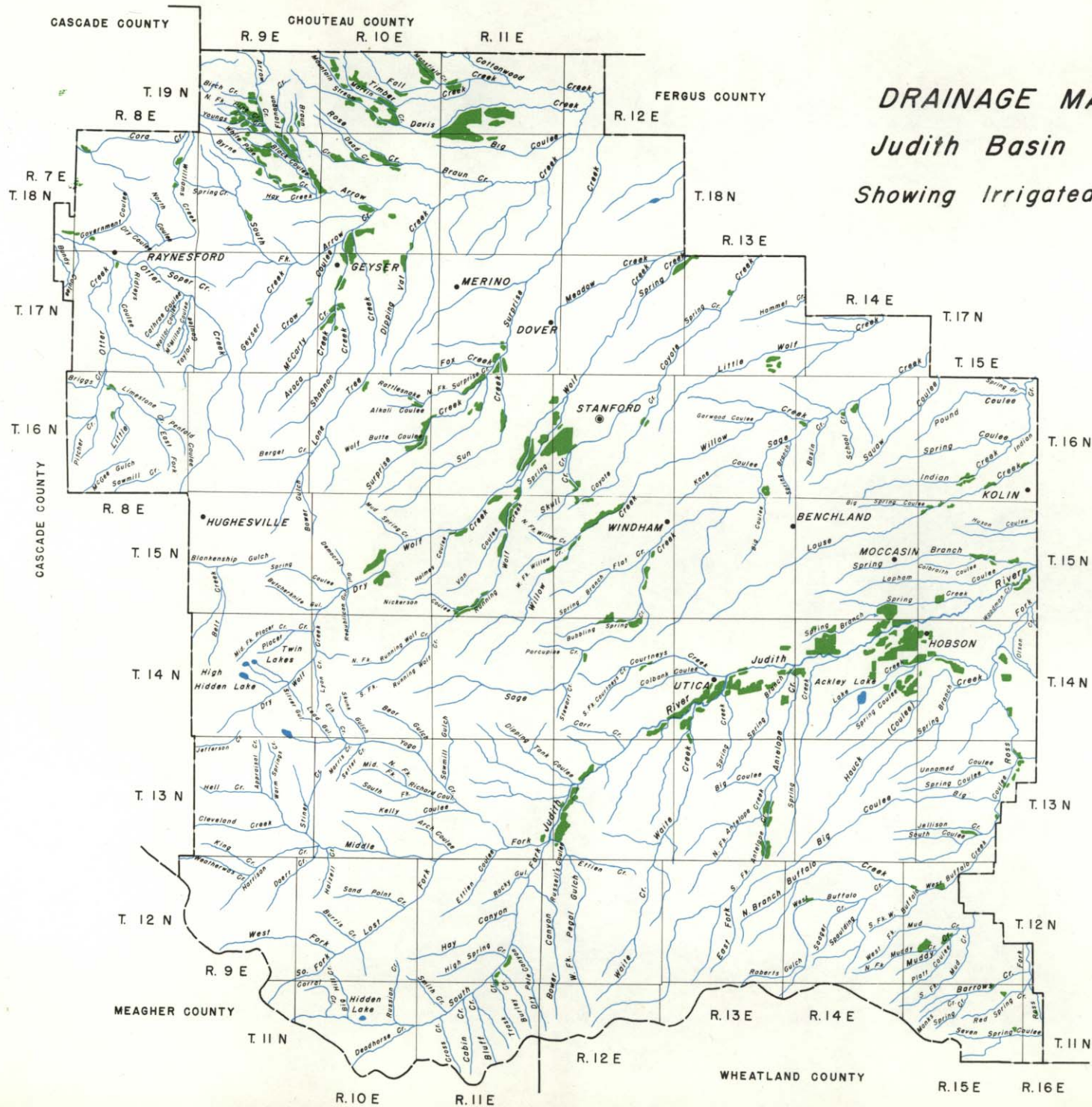
WATER RESOURCES SURVEY

Judith Basin County, Montana

Part II

Maps Showing Irrigated Areas

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1963



*DRAINAGE MAP OF
Judith Basin County
Showing Irrigated Areas*

FERGUS COUNTY

MAP INDEX

Township	Range	Page	Township	Range	Page
11 North	15 East.....	1	16 North	11 East.....	18
11 North	16 East.....	1	16 North	12 East.....	19
12 North	11 East.....	2	16 North	13 East.....	20
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14 North	12 East.....	8	17 North	12 East.....	26
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14 North	14 East.....	10	18 North	7 East.....	23
14 North	15 East.....	11	18 North	8 East.....	23
15 North	10 East.....	12	18 North	9 East.....	27
15 North	11 East.....	13	18 North	10 East.....	28
15 North	12 East.....	14	18 North	11 East.....	29
15 North	14 East.....	10	19 North	9 East.....	30
15 North	15 East.....	15	19 North	10 East.....	31
16 North	8 East.....	16	19 North	11 East.....	29
16 North	10 East.....	17			


ALL MAPS HAVE BEEN MADE FROM AERIAL PHOTOGRAPHS

MAP SYMBOL INDEX













BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

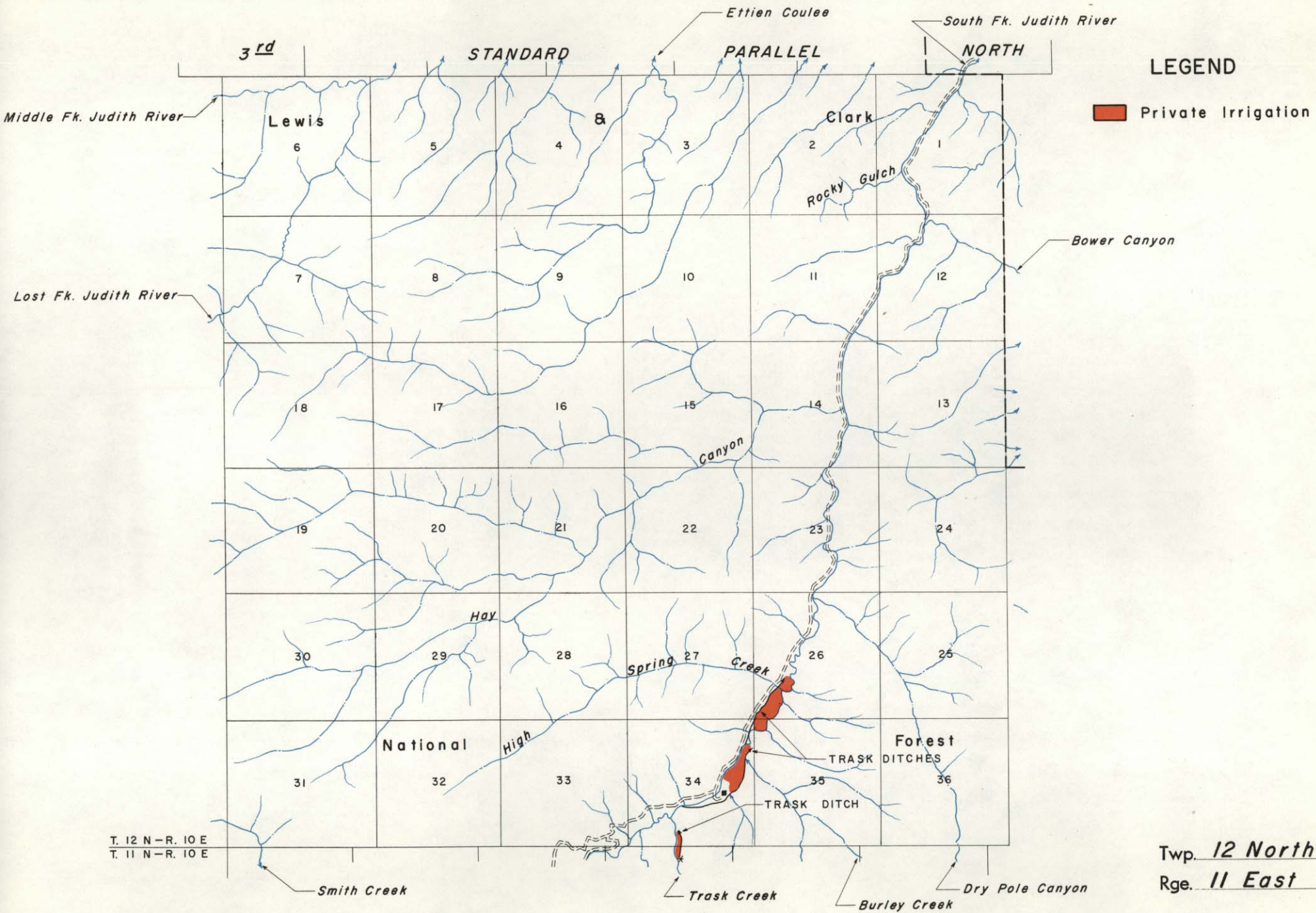
-  CANALS OR DITCHES
- > DRAIN DITCHES
- > PROPOSED DITCHES

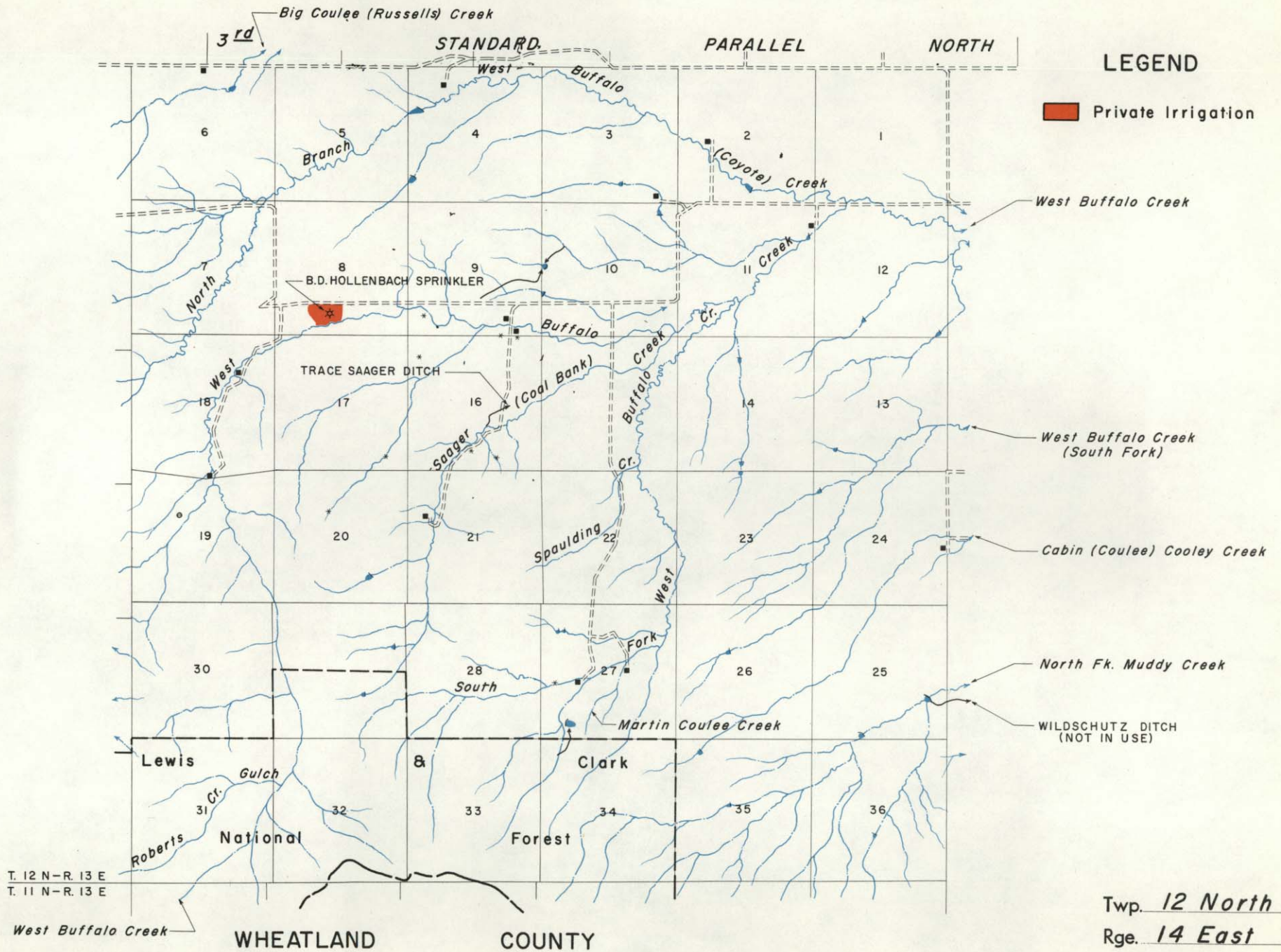
STRUCTURES & UNITS

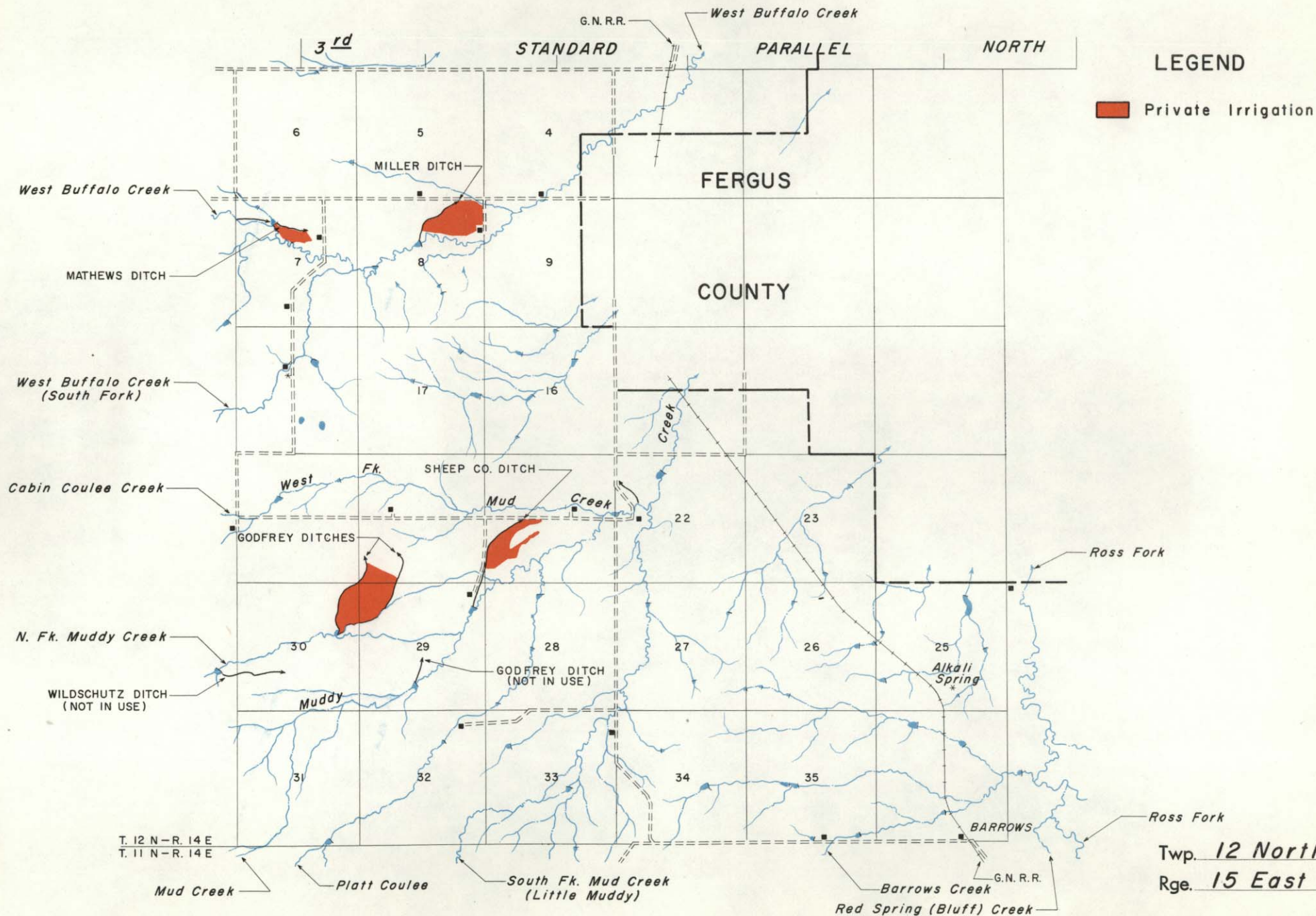
-  DAM
-  DIKE
-  FLUME
-  SIPHON
-  SPILL
-  SPRINKLER SYSTEM
-  WEIR
-  PIPE LINE
-  PUMP
-  PUMP SITE
-  RESERVOIR
-  WELL
- +++ NATURAL CARRIER USED AS DITCH

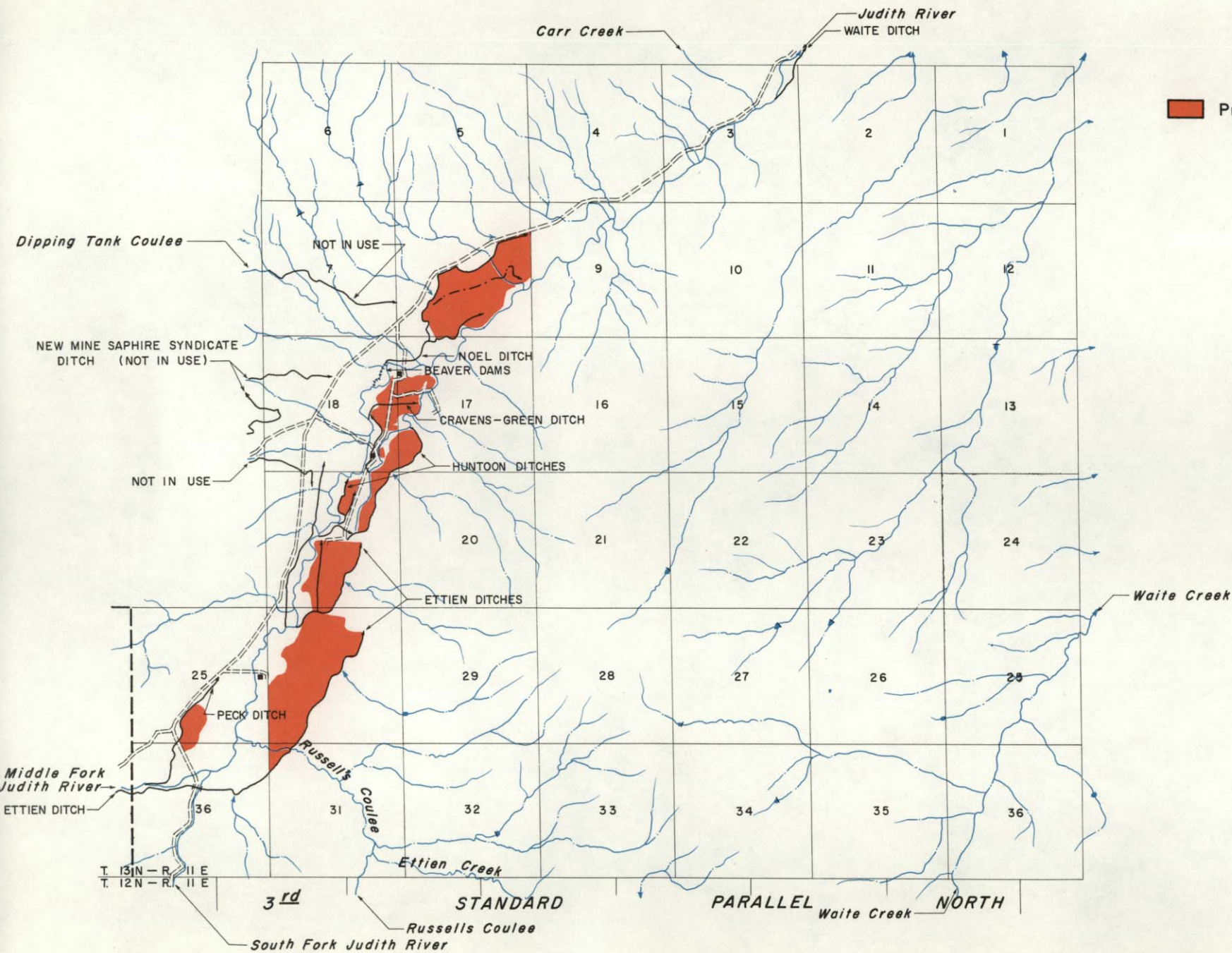
TRANSPORTATION

- == PAVED ROADS
- === UNPAVED ROADS
- +++ RAILROADS
-  STATE HIGHWAY
-  U.S. HIGHWAY
-  AIRPORT
-  SPRING
-  SWAMP
-  GAUGING STATION
-  POWER PLANT
-  STORAGE TANK
-  CEMETERY
-  FAIRGROUND
-  FARM OR RANCH UNIT
-  LOOKOUT STATION
-  RANGER STATION
-  RAILROAD TUNNEL
-  SCHOOL
-  SHAFT, MINE, OR DRIFT

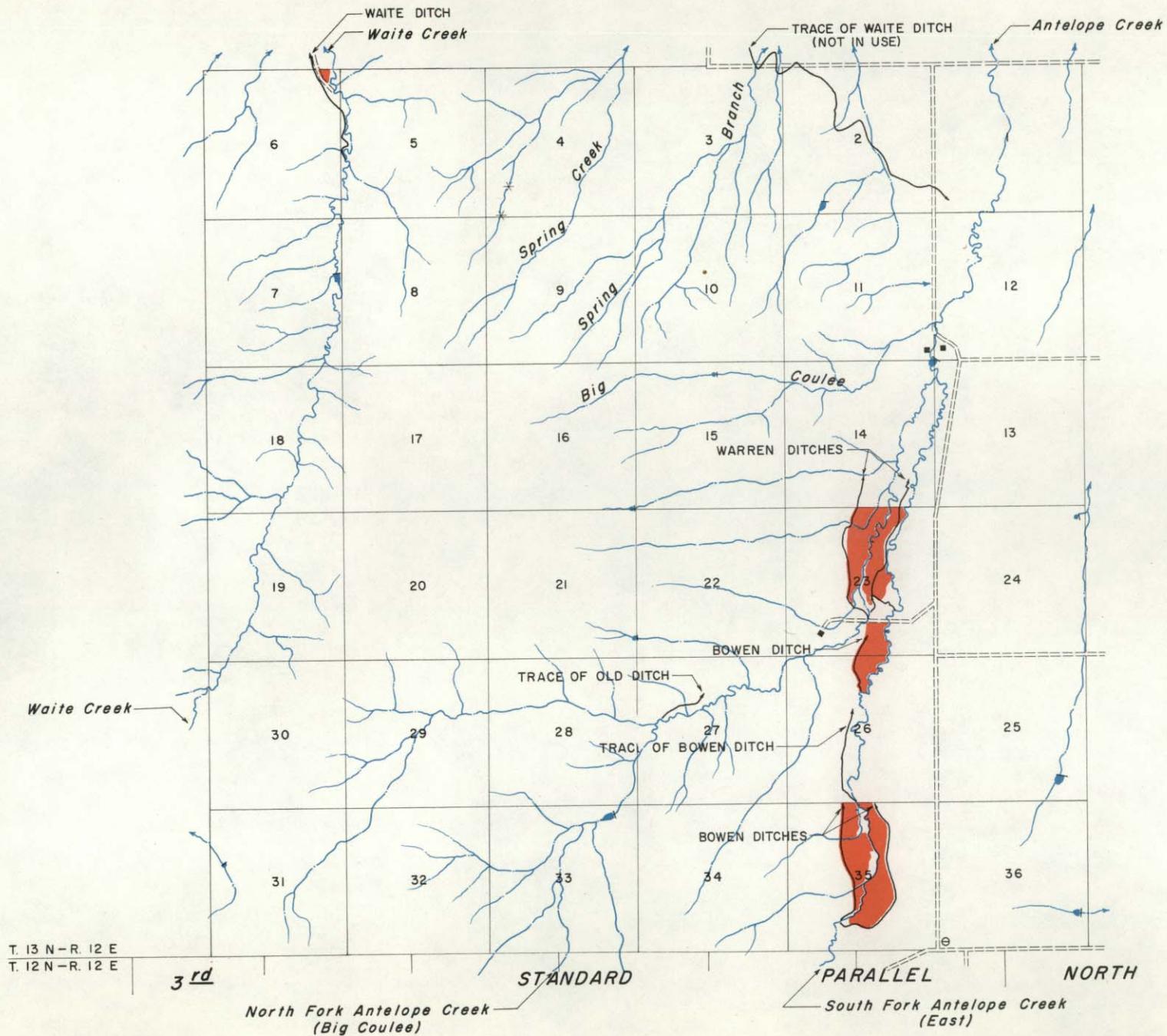








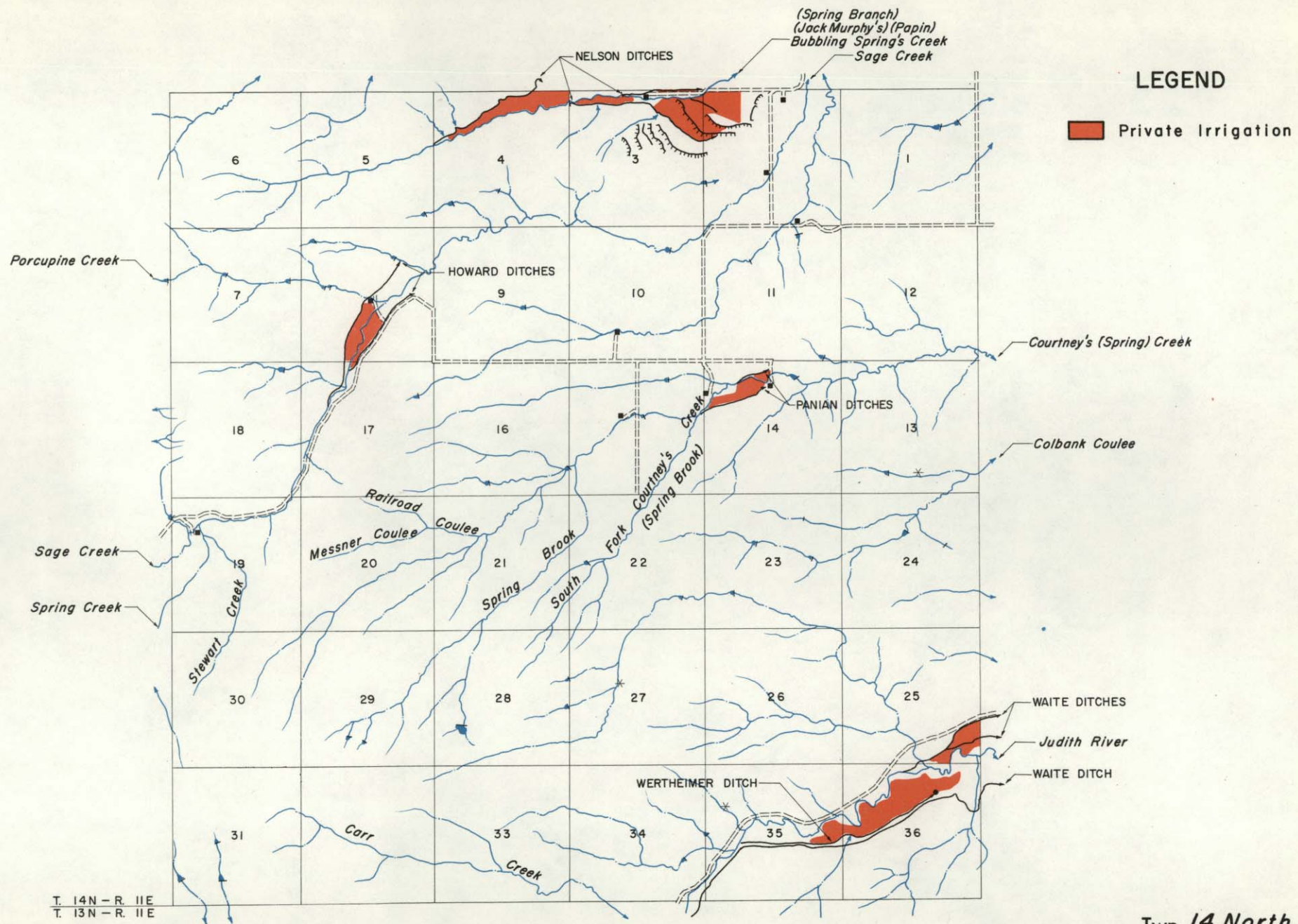
Twp. *13 North*
 Rge. *12 East & 11 East*



LEGEND

Private Irrigation

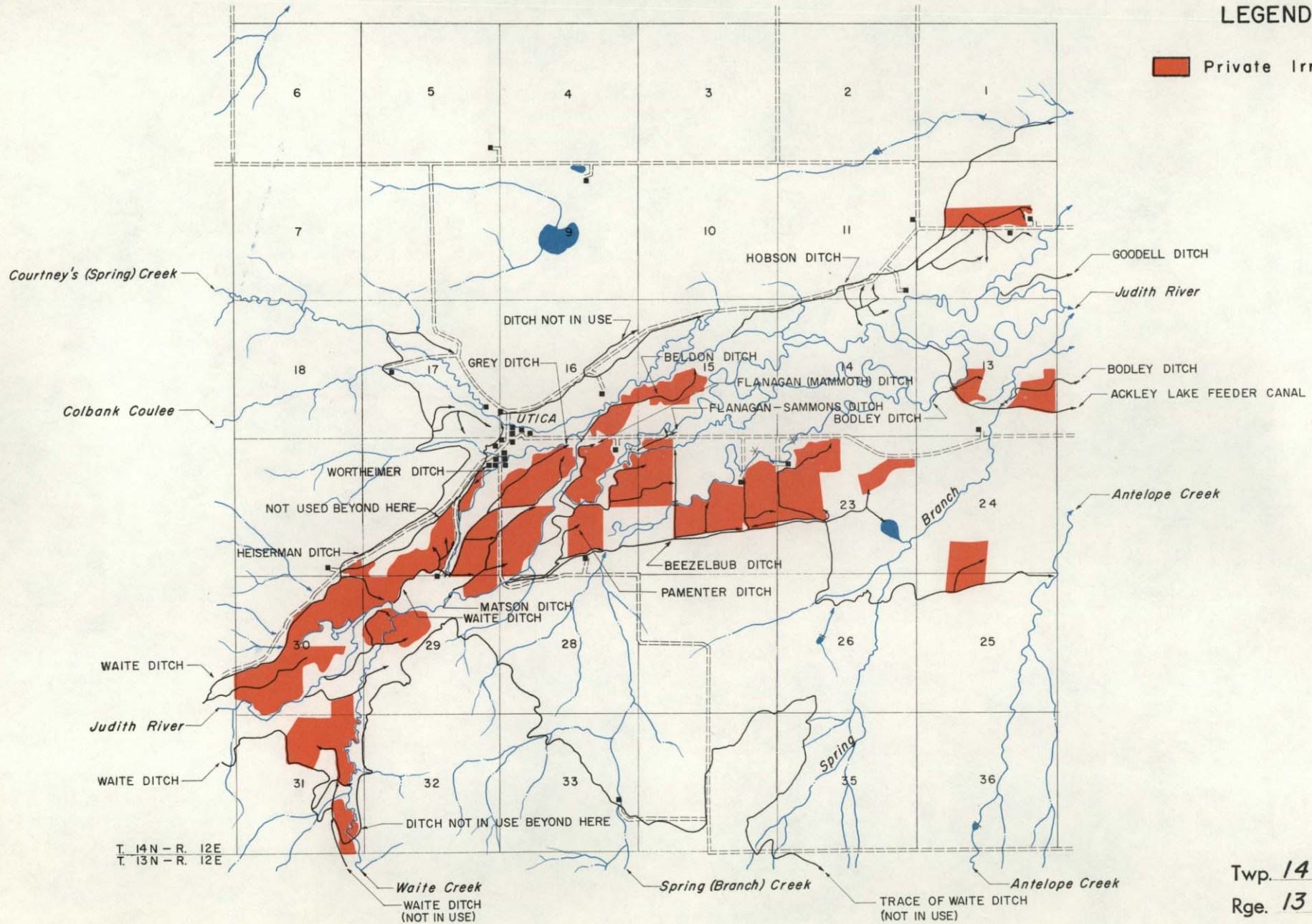
Twp. 13 North
Rge. 13 East



Twp. 14 North
 Rge. 12 East

LEGEND

Private Irrigation



Twp. 14 North
Rge. 13 East

LEGEND

- Ackley Lake Water Users Ass'n.
- Private Irrigation

FERGUS

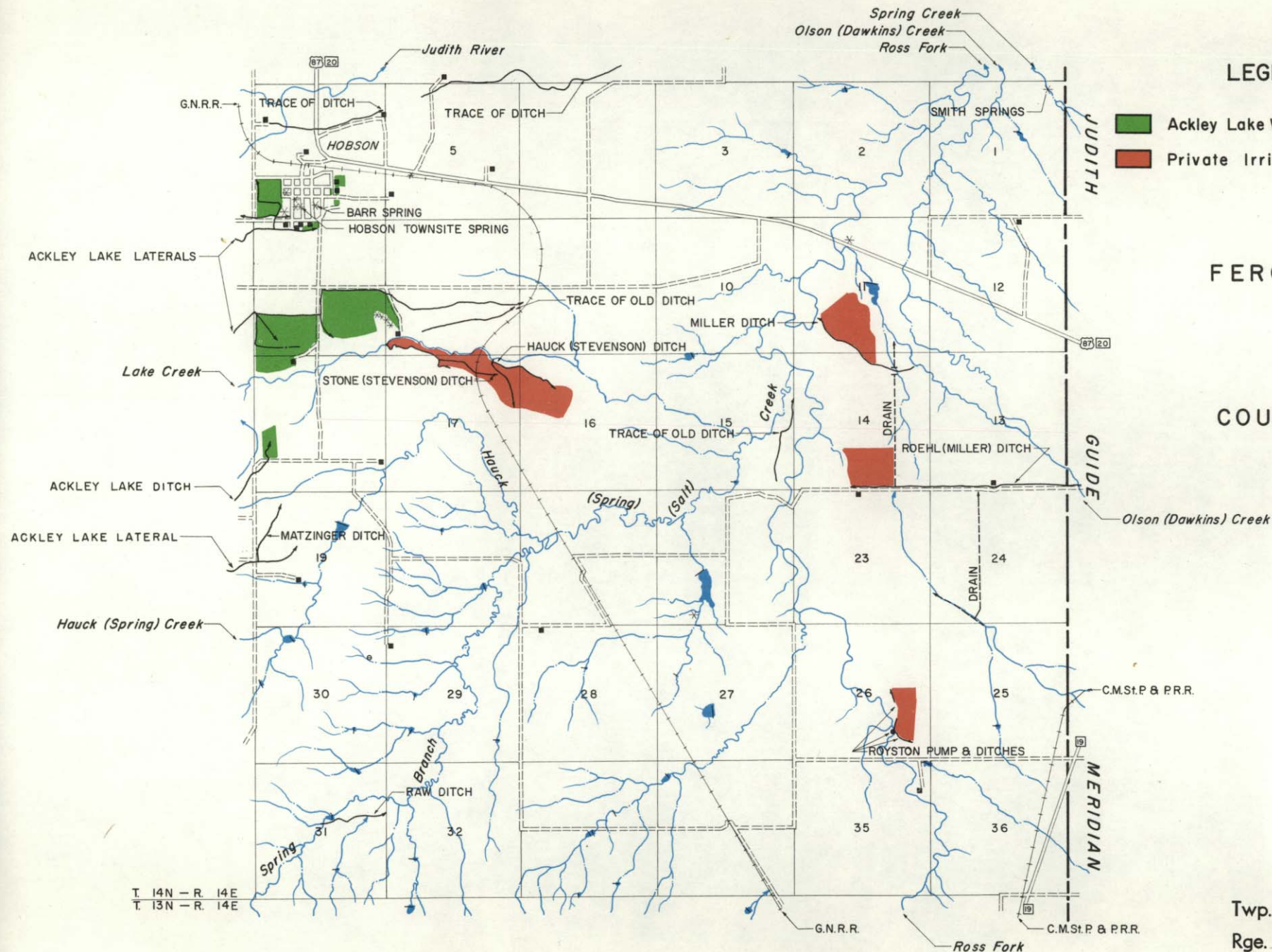
COUNTY

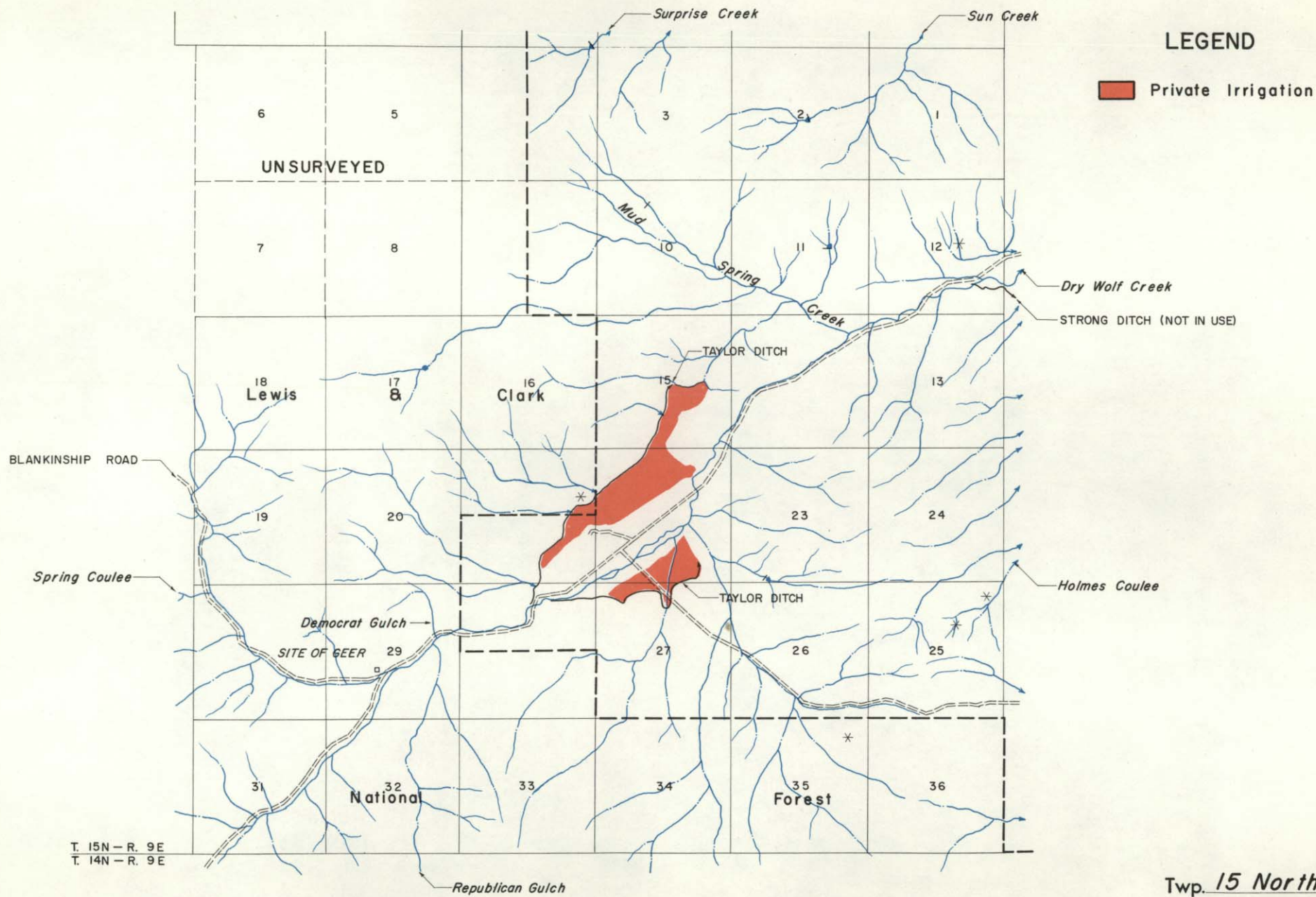
JUDITH

GUIDE

MERIDIAN

Twp. 14 North
Rge. 15 East





Twp. 15 North

Rge. 10 East

LEGEND

Private Irrigation

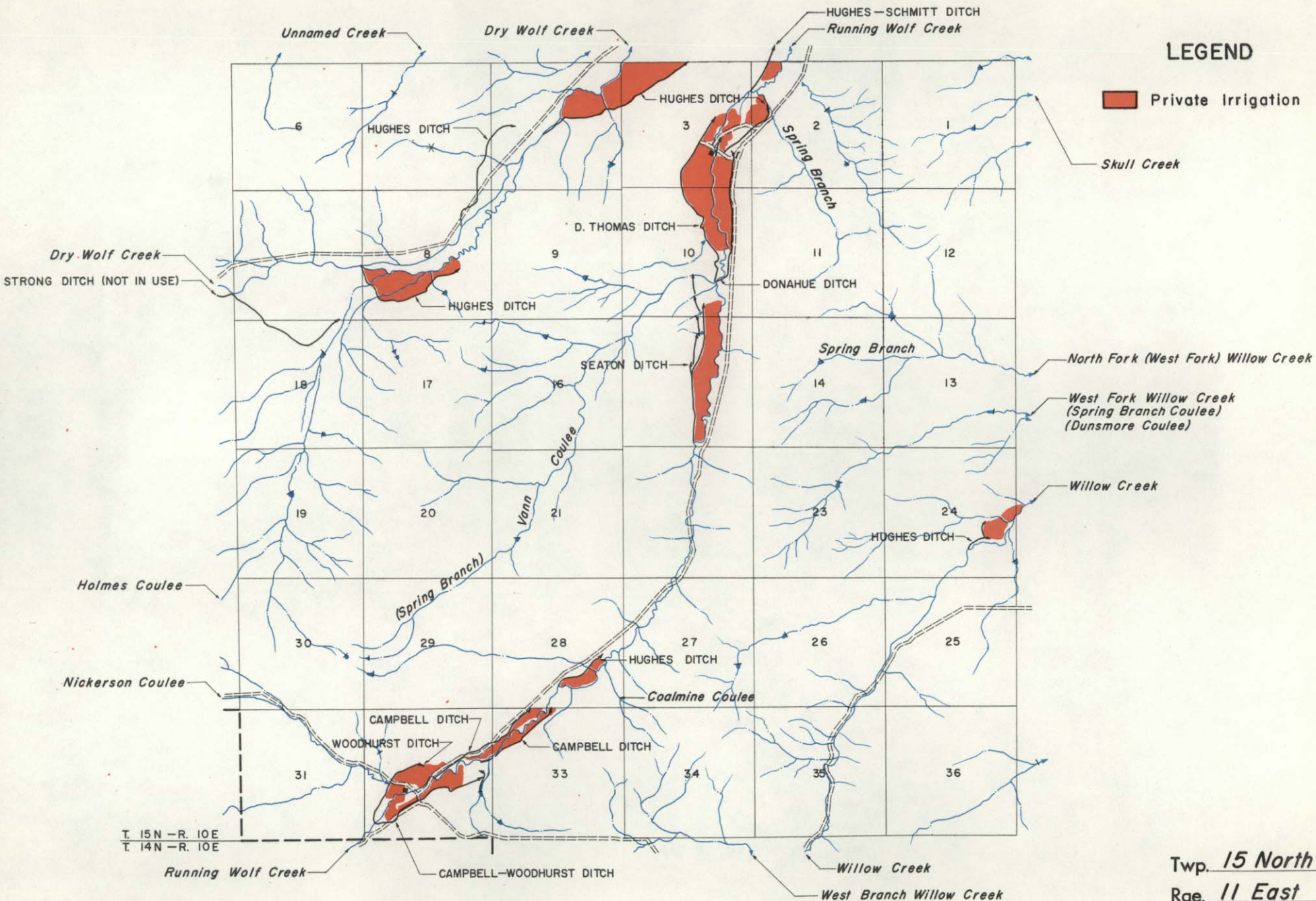
Skull Creek

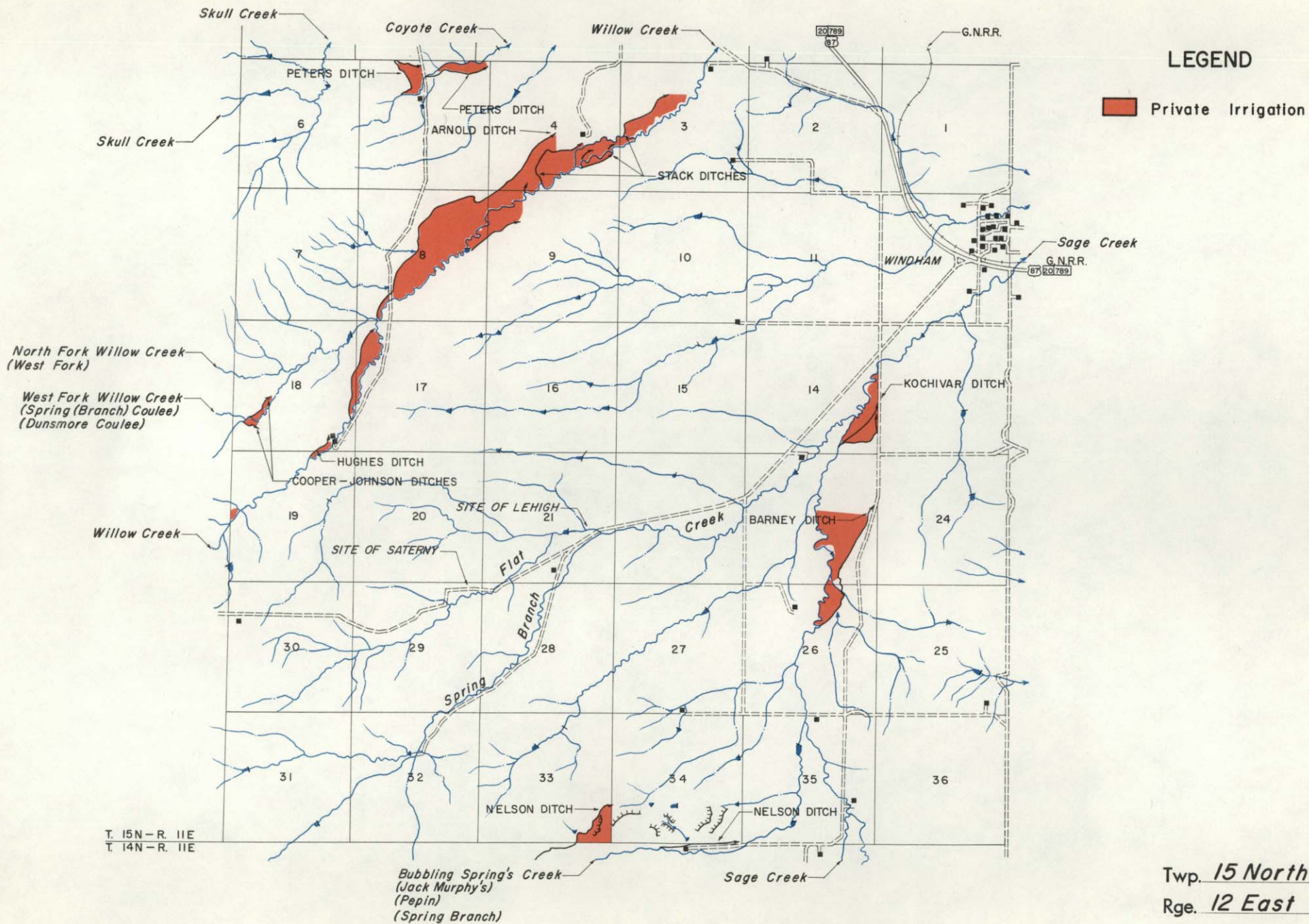
North Fork (West Fork) Willow Creek

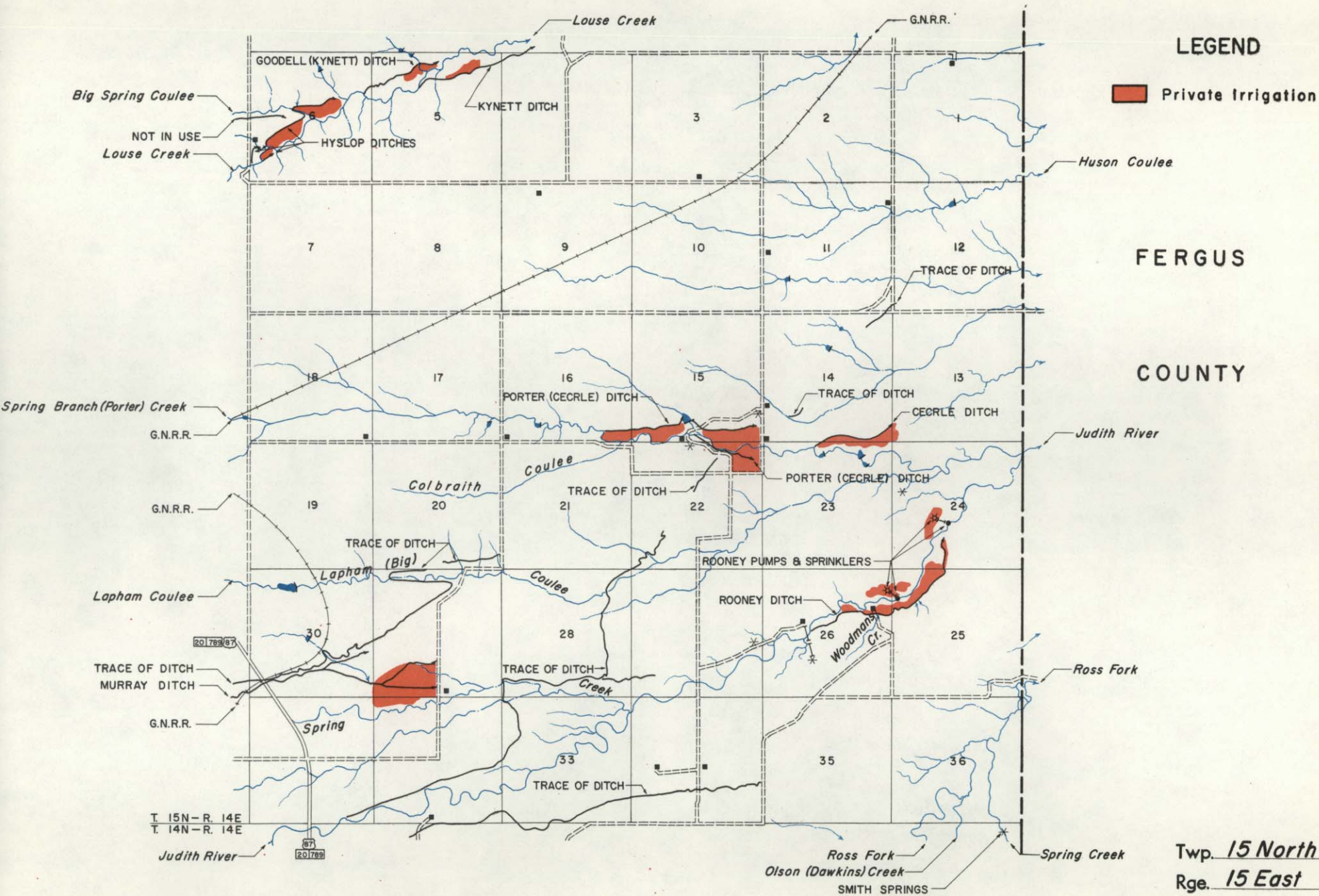
West Fork Willow Creek
(Spring Branch Coulee)
(Dunsmore Coulee)

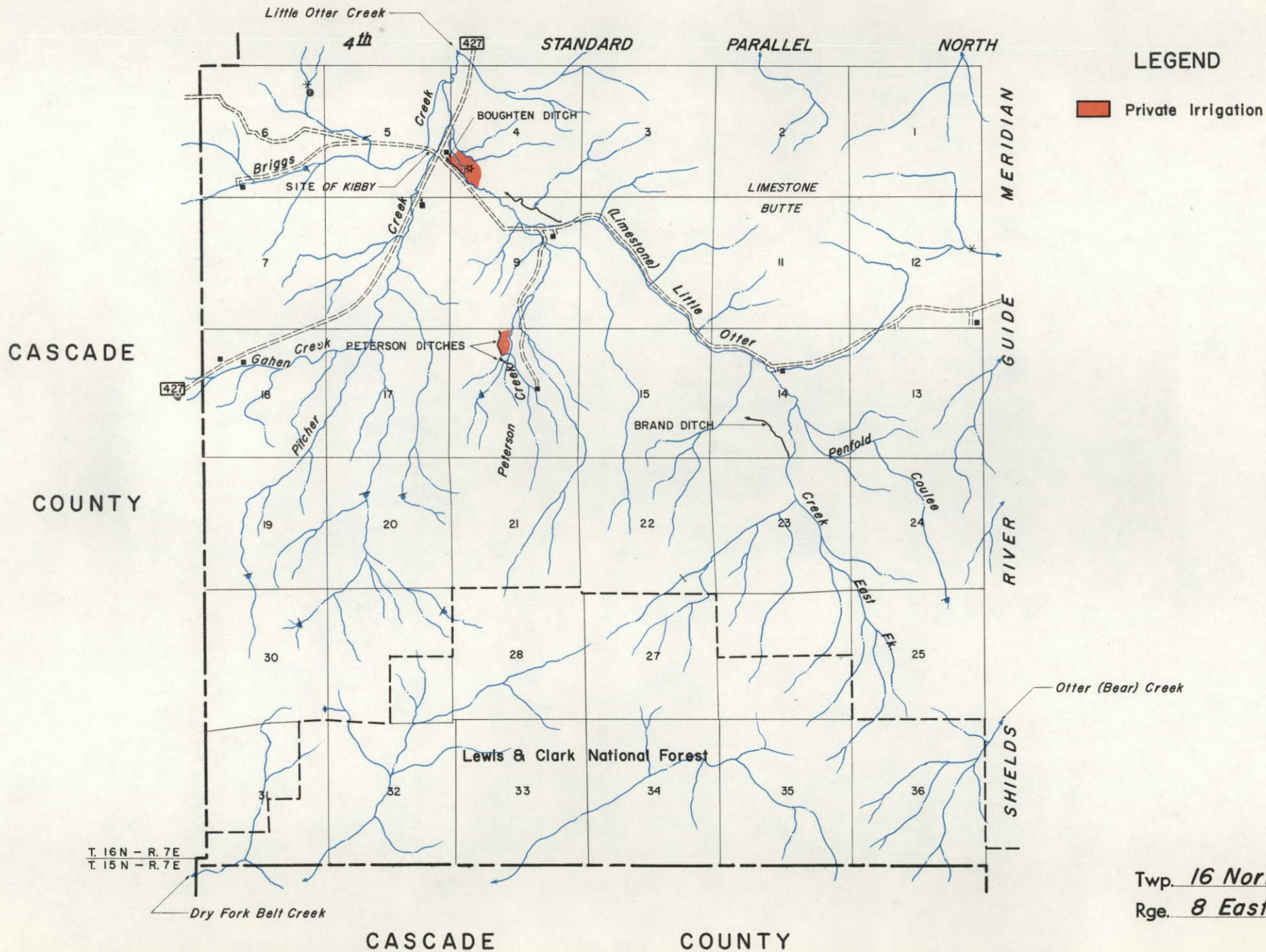
Willow Creek

Twp. 15 North
Rge. 11 East









Shannon Creek (Frost) (Davis Coulee)

Avoca Creek

4th

Lone Tree Creek (Dry Fork Arrow Creek)

STANDARD

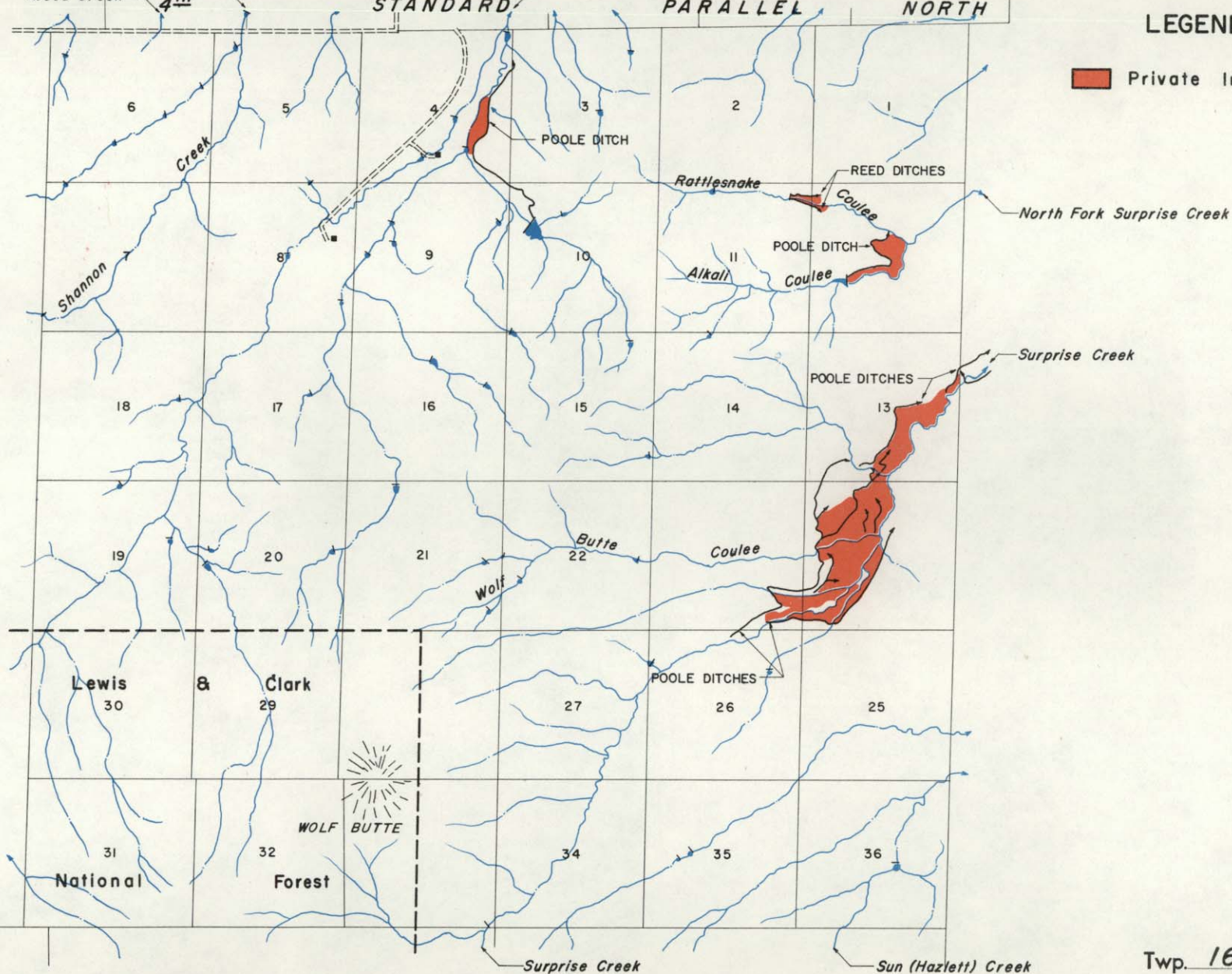
PARALLEL

NORTH

LEGEND

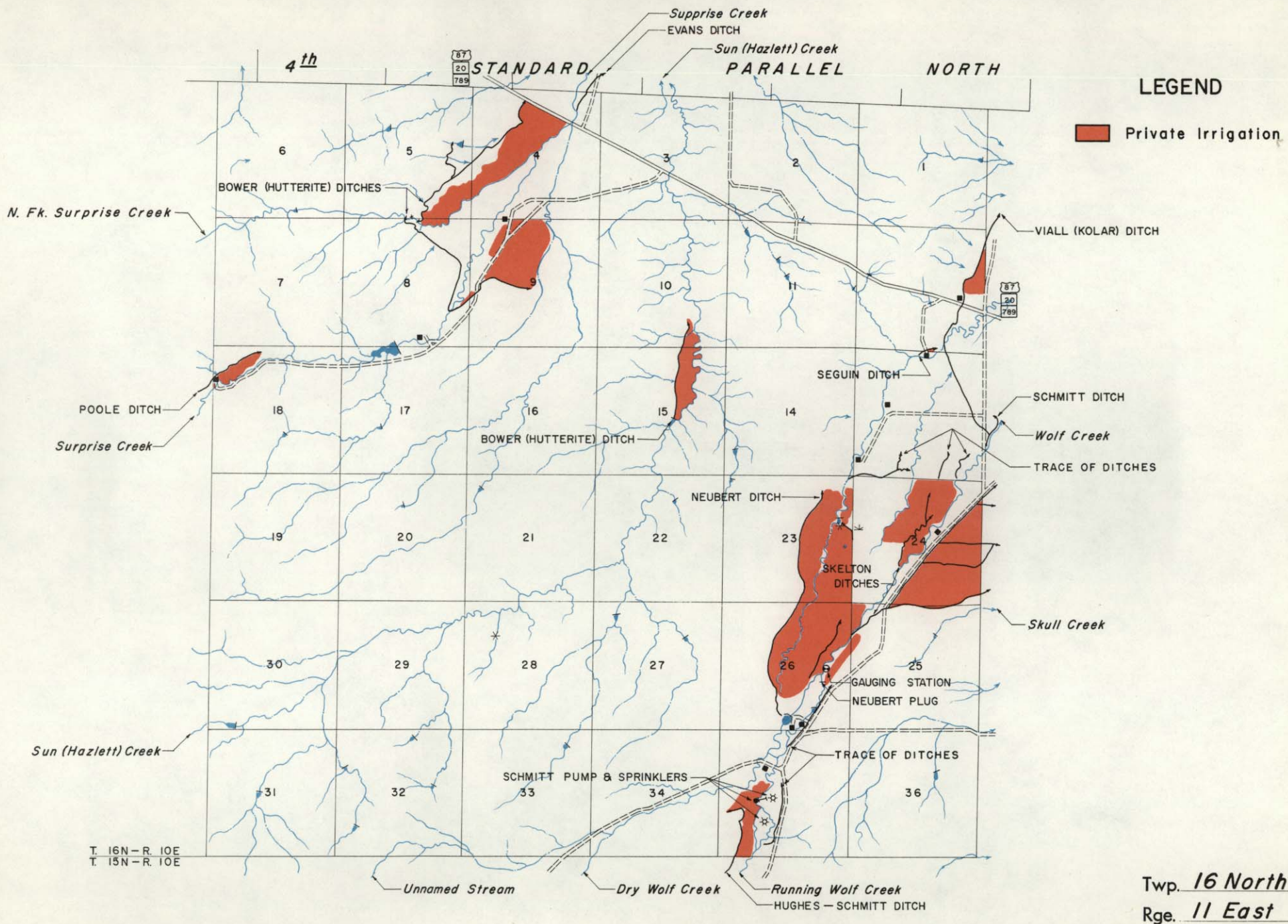


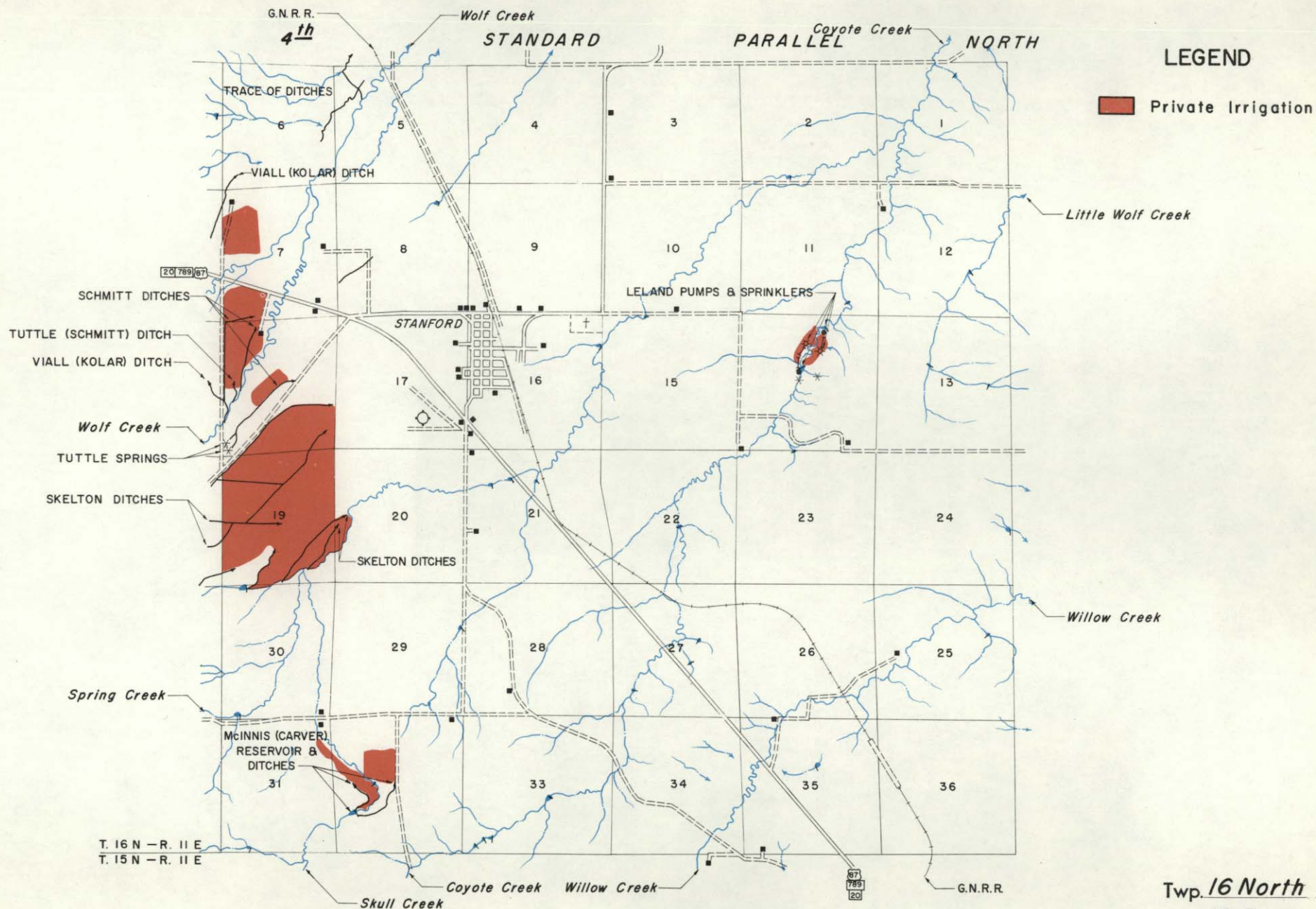
Private Irrigation

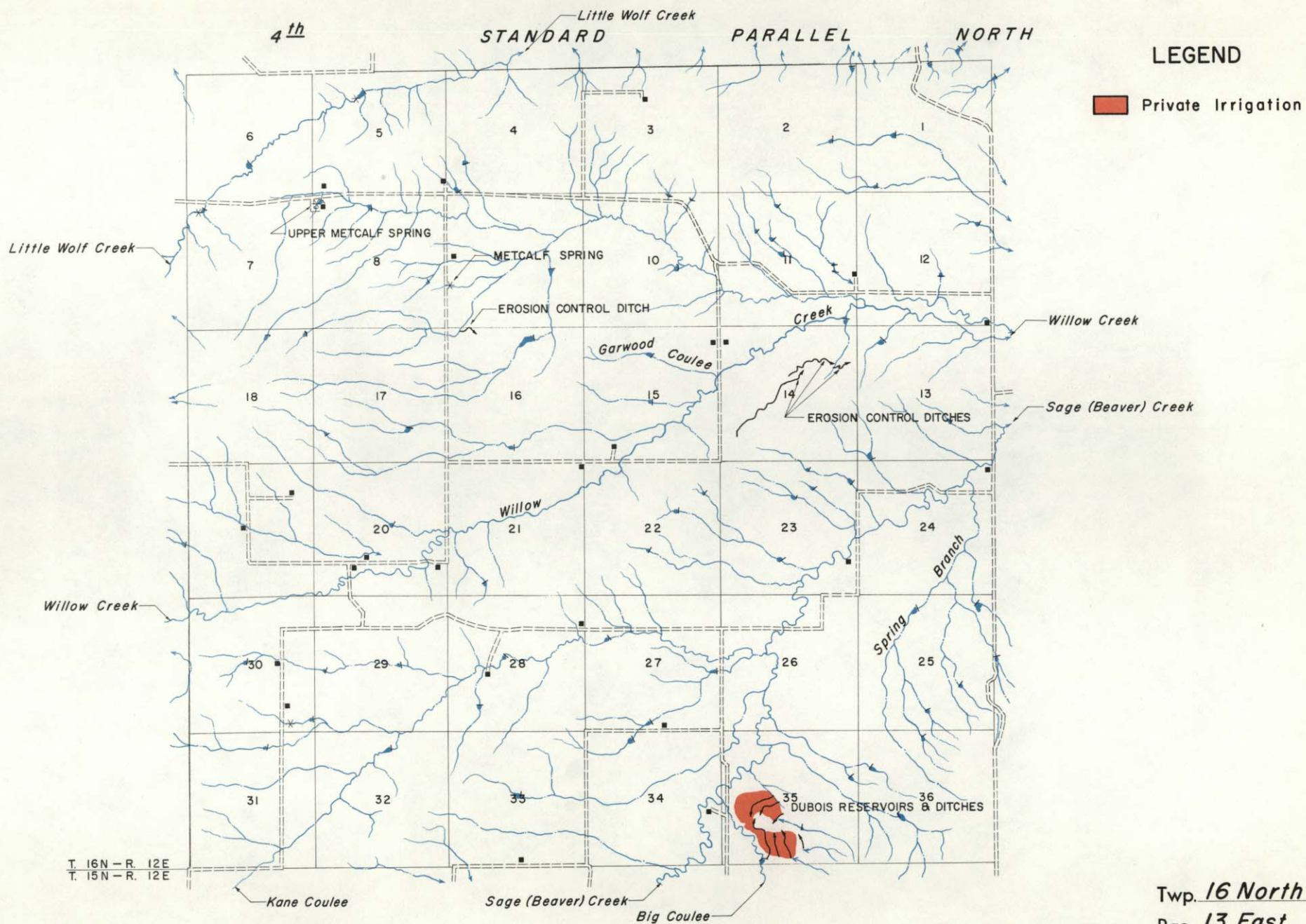


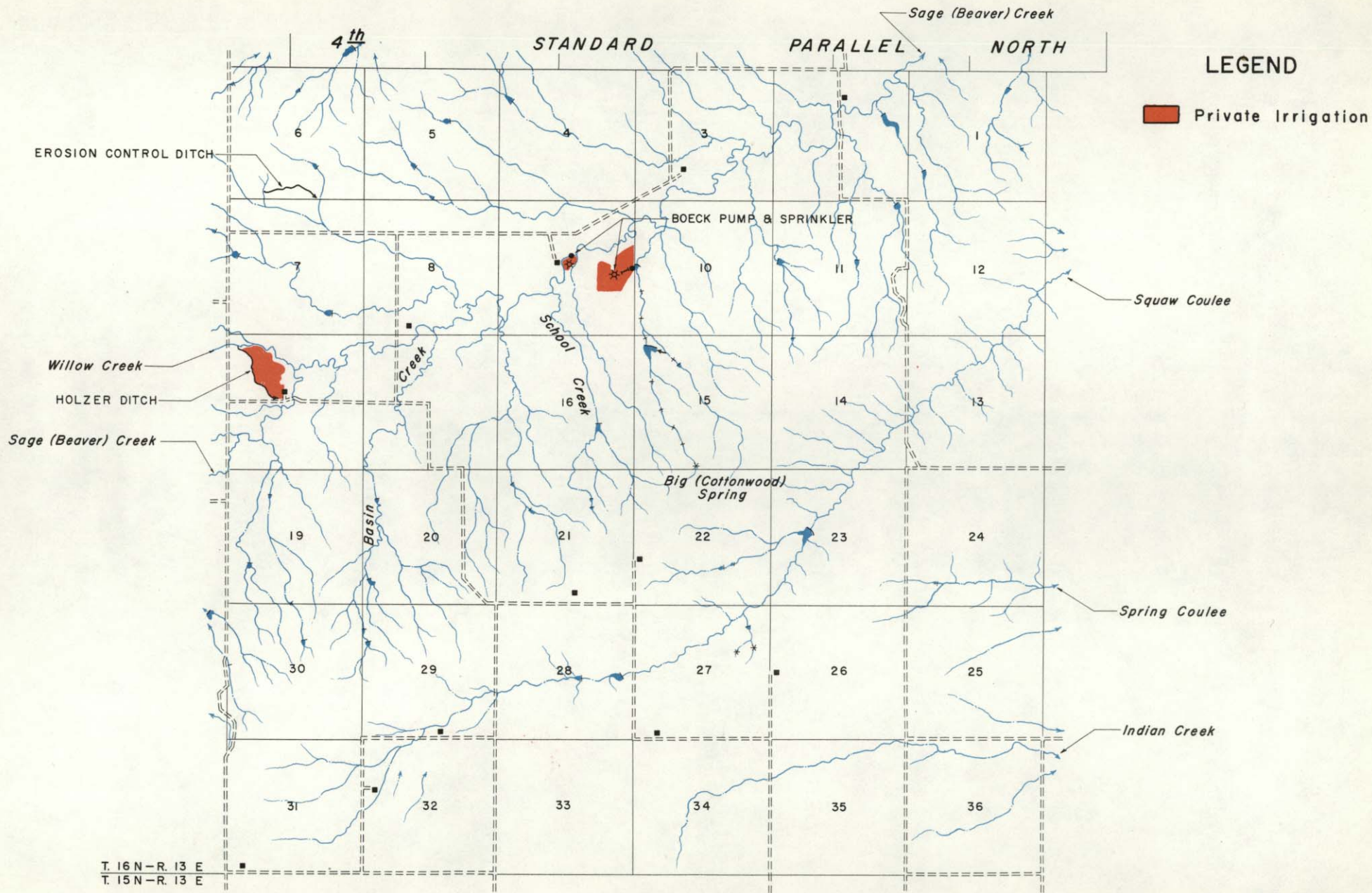
T. 16N - R. 9E
T. 15N - R. 9E

Twp. 16 North
Rge. 10 East





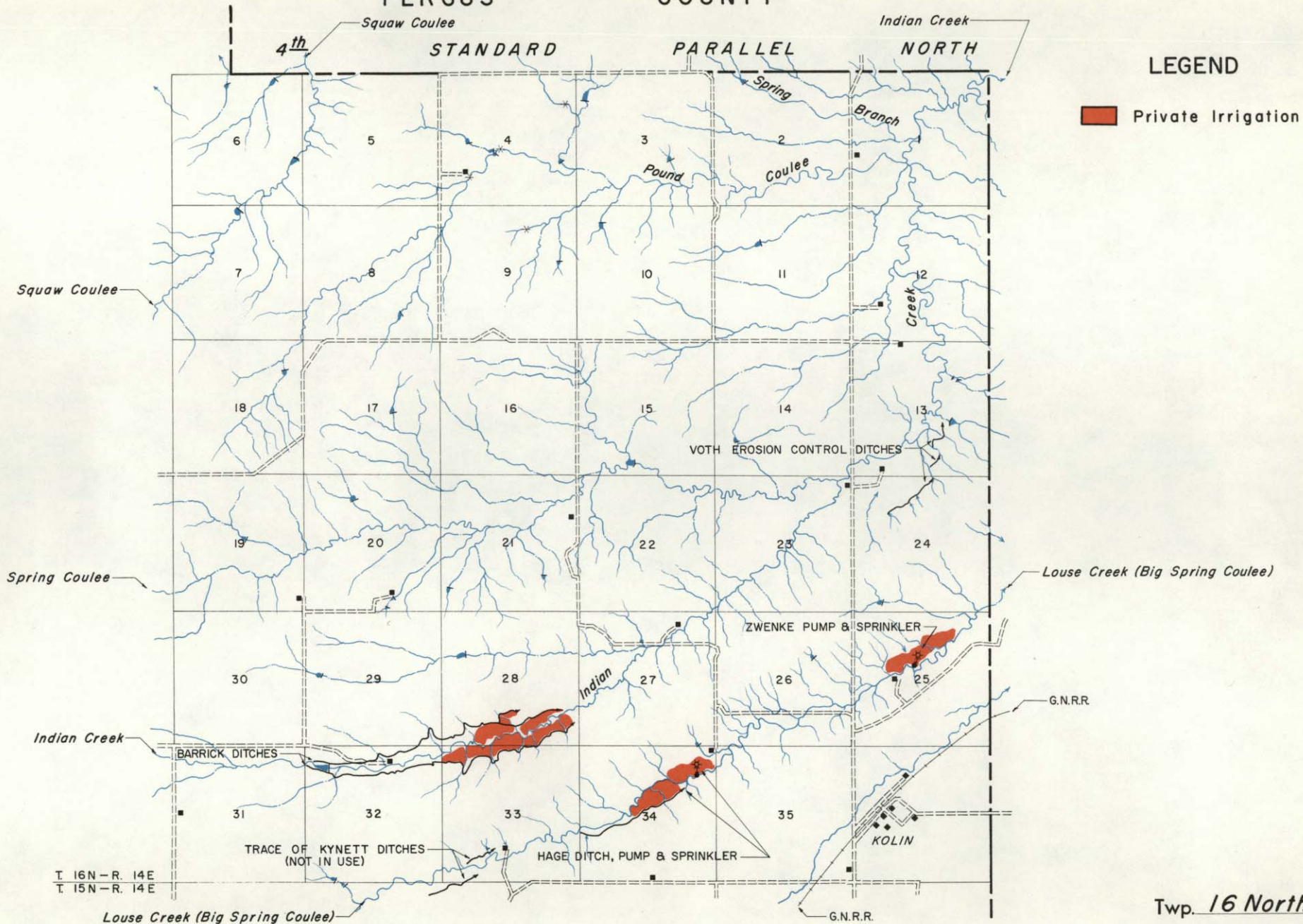




Twp. 16 North
Rge. 14 East

FERGUS

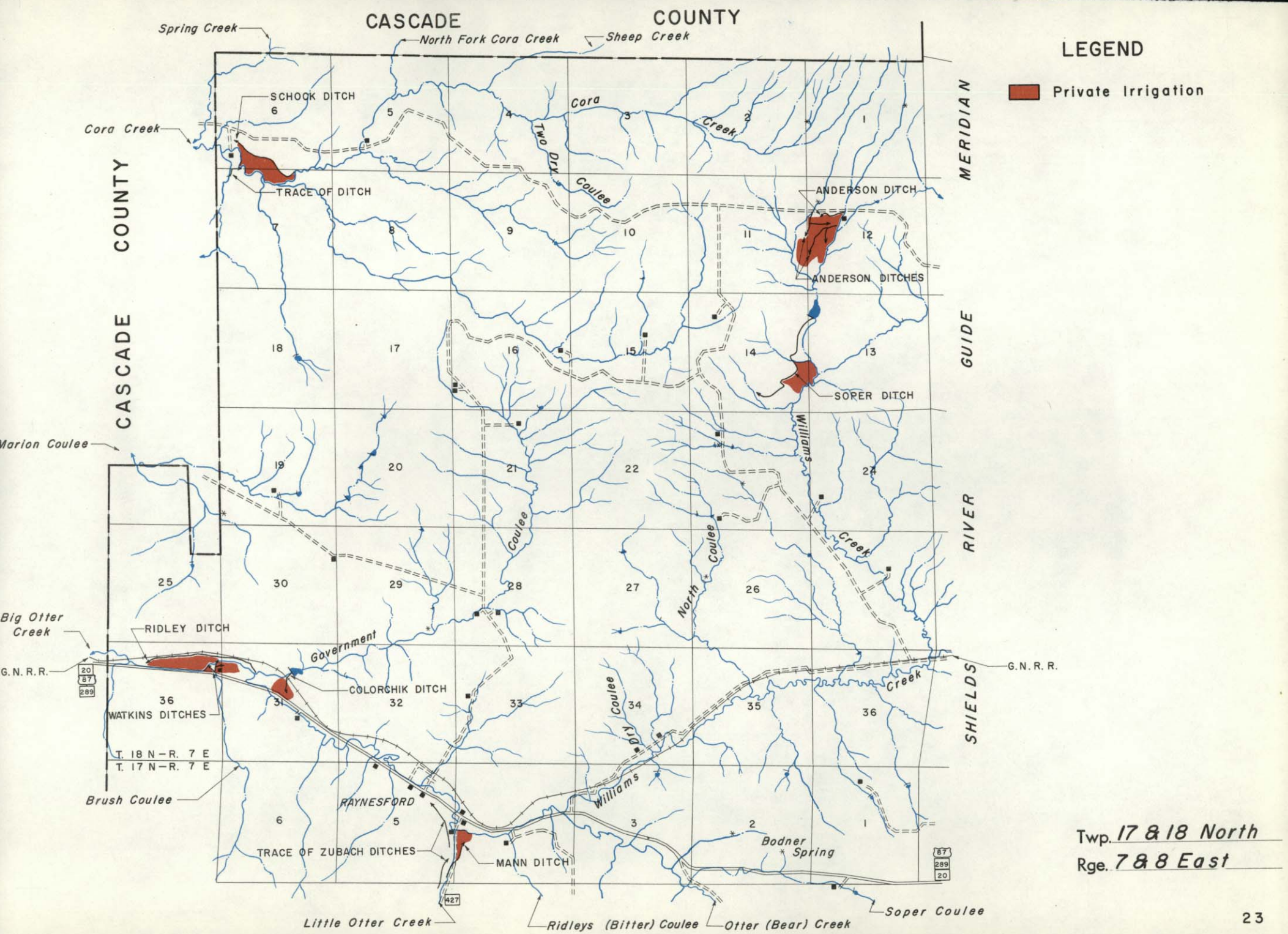
COUNTY

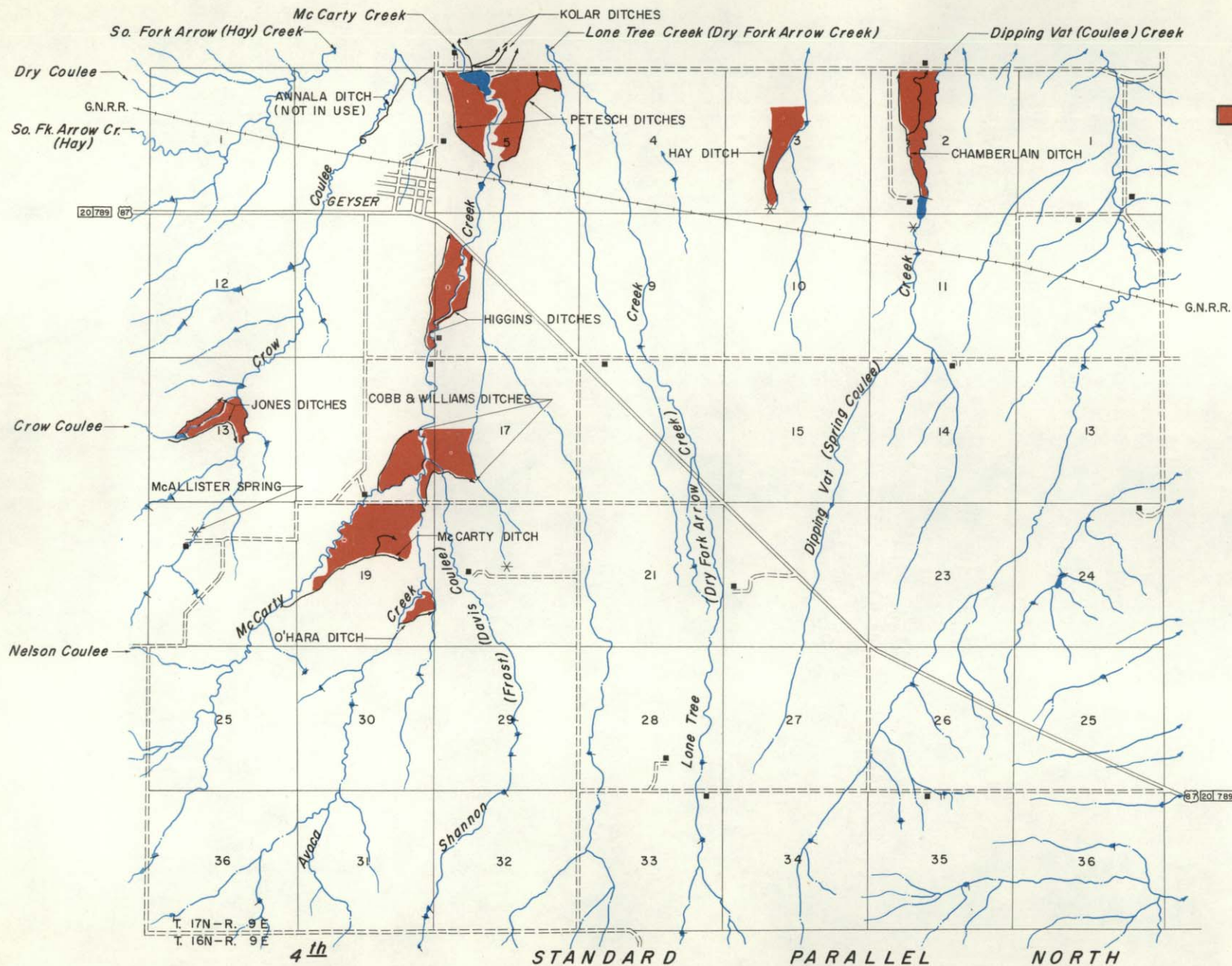


LEGEND

Private Irrigation

Twp. 16 North
Rge. 15 East

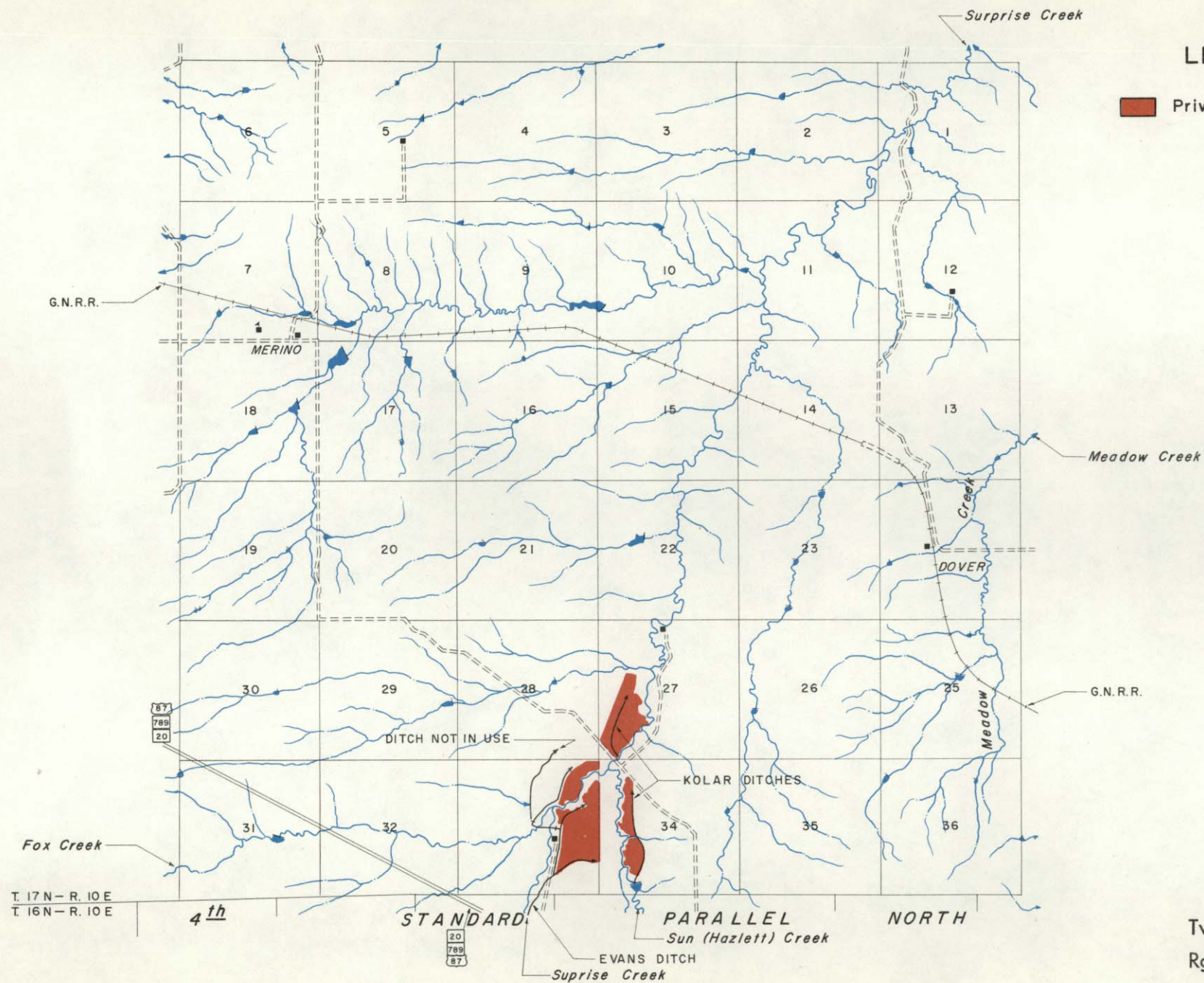




LEGEND

Private Irrigation

Tw. 17 North
Rge. 9 & 10 East



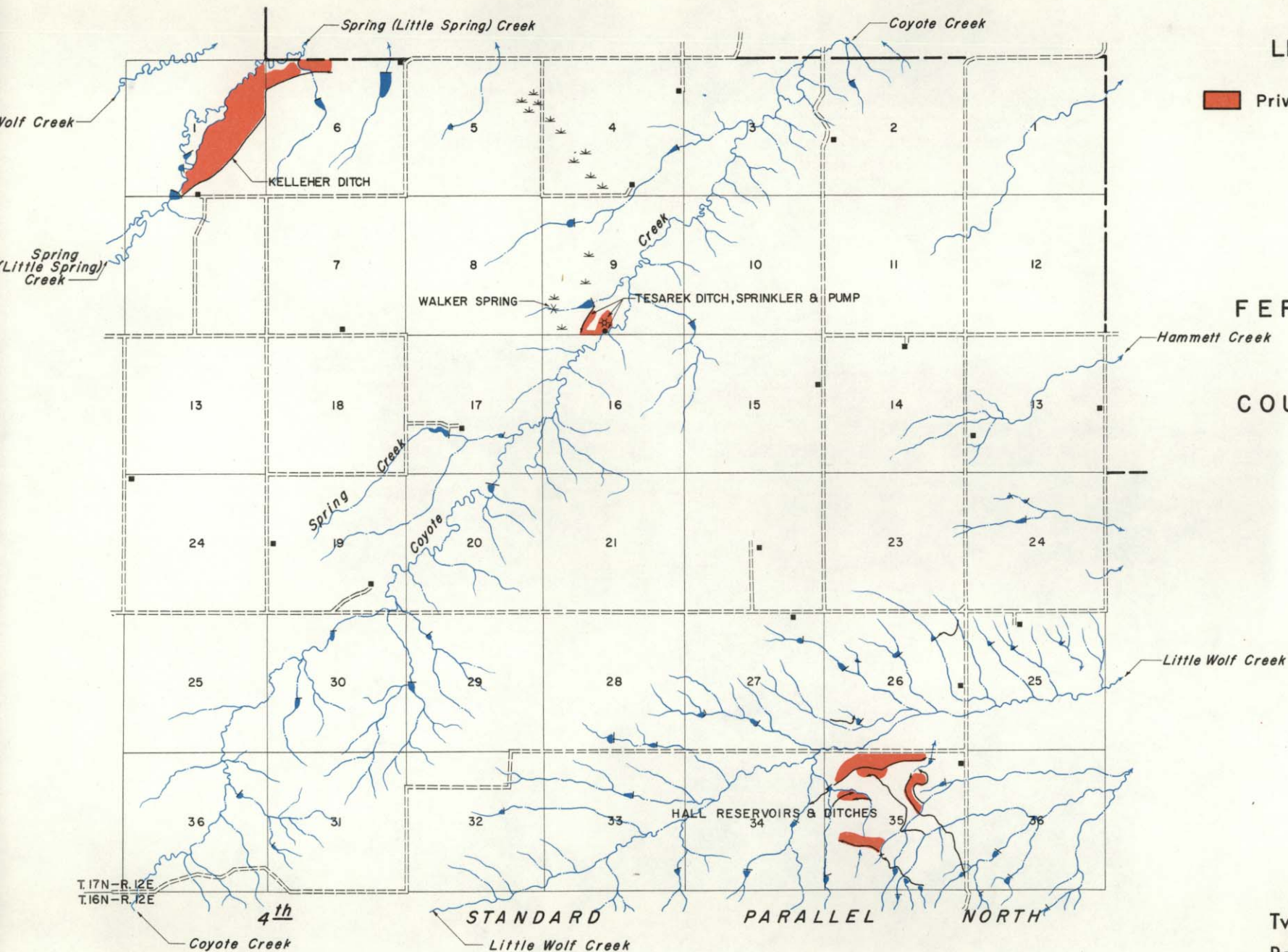
Twp. 17 North
Rge. 11 East

FERGUS

COUNTY

LEGEND

Private Irrigation



FERGUS

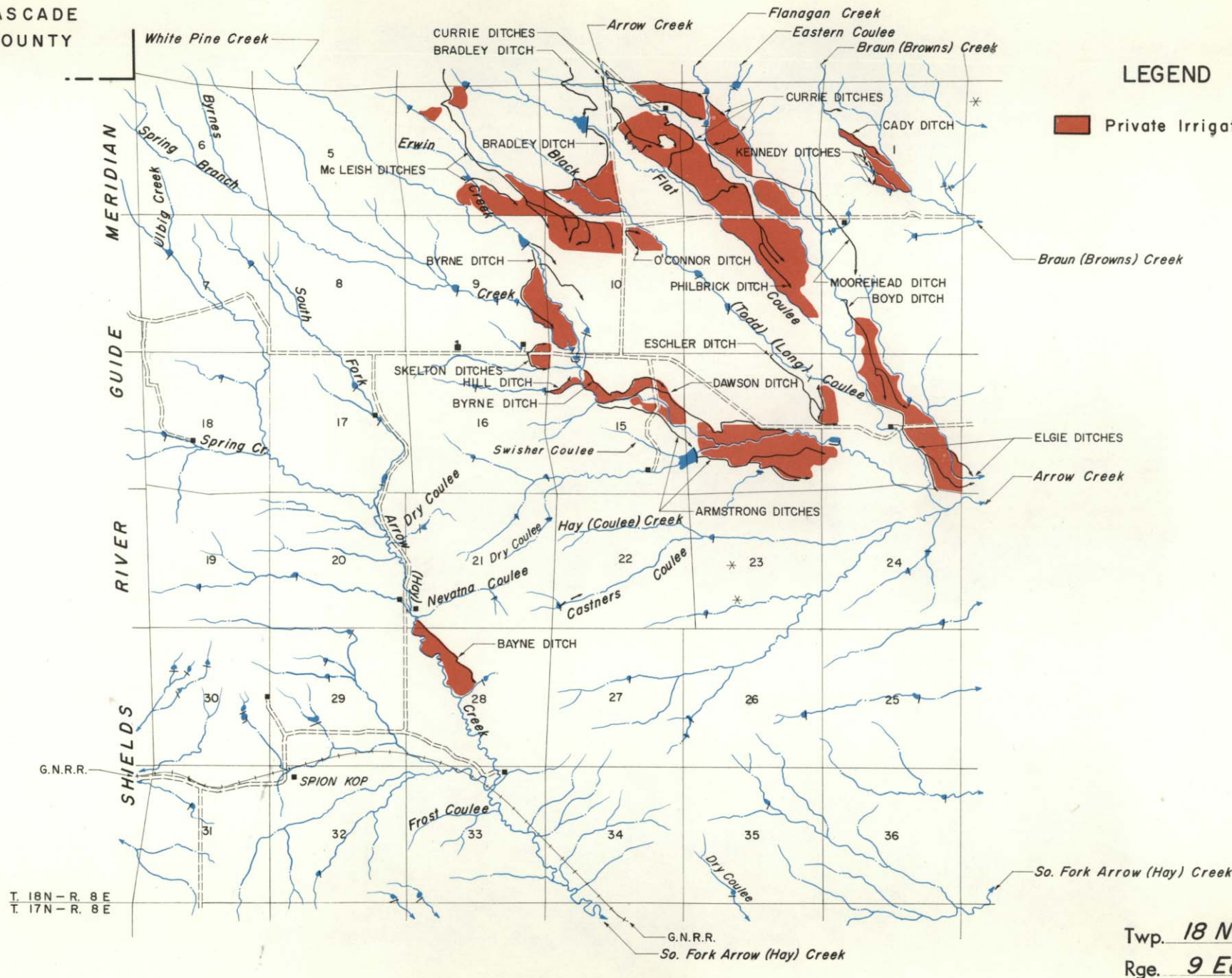
COUNTY

Twp. 17 North
Rge. 12 & 13 East

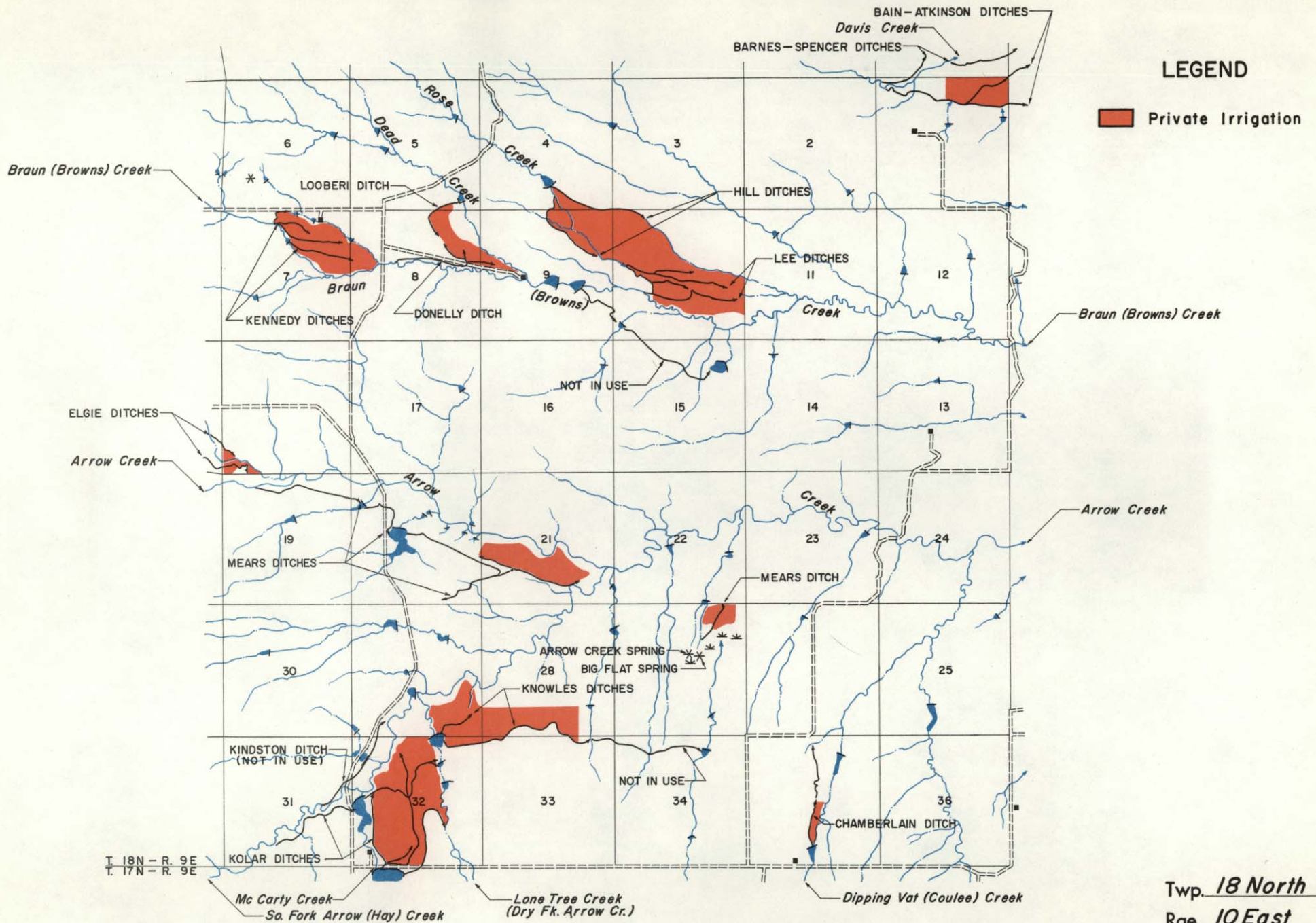
CASCADE
COUNTY

LEGEND

Private Irrigation



Twp. 18 North
Rge. 9 East



LEGEND

Private Irrigation

CHOUTEAU

COUNTY

Girard Creek

Cottonwood Creek
(McDonald Creek)

SILVA DITCH (NOT IN USE)

CALVERT DITCH

Mansfield Creek
Fall Creek

Cottonwood Creek

SILVA DITCH
MORTON DITCH (NOT IN USE)

Timber Creek

SILVA DITCH (NOT IN USE)

Merrill Creek

Davis Creek

Davis Creek

BARNES-SPENCER DITCHES

Davis Creek

T. 19 N - R. 10 E
T. 18 N - R. 10 E

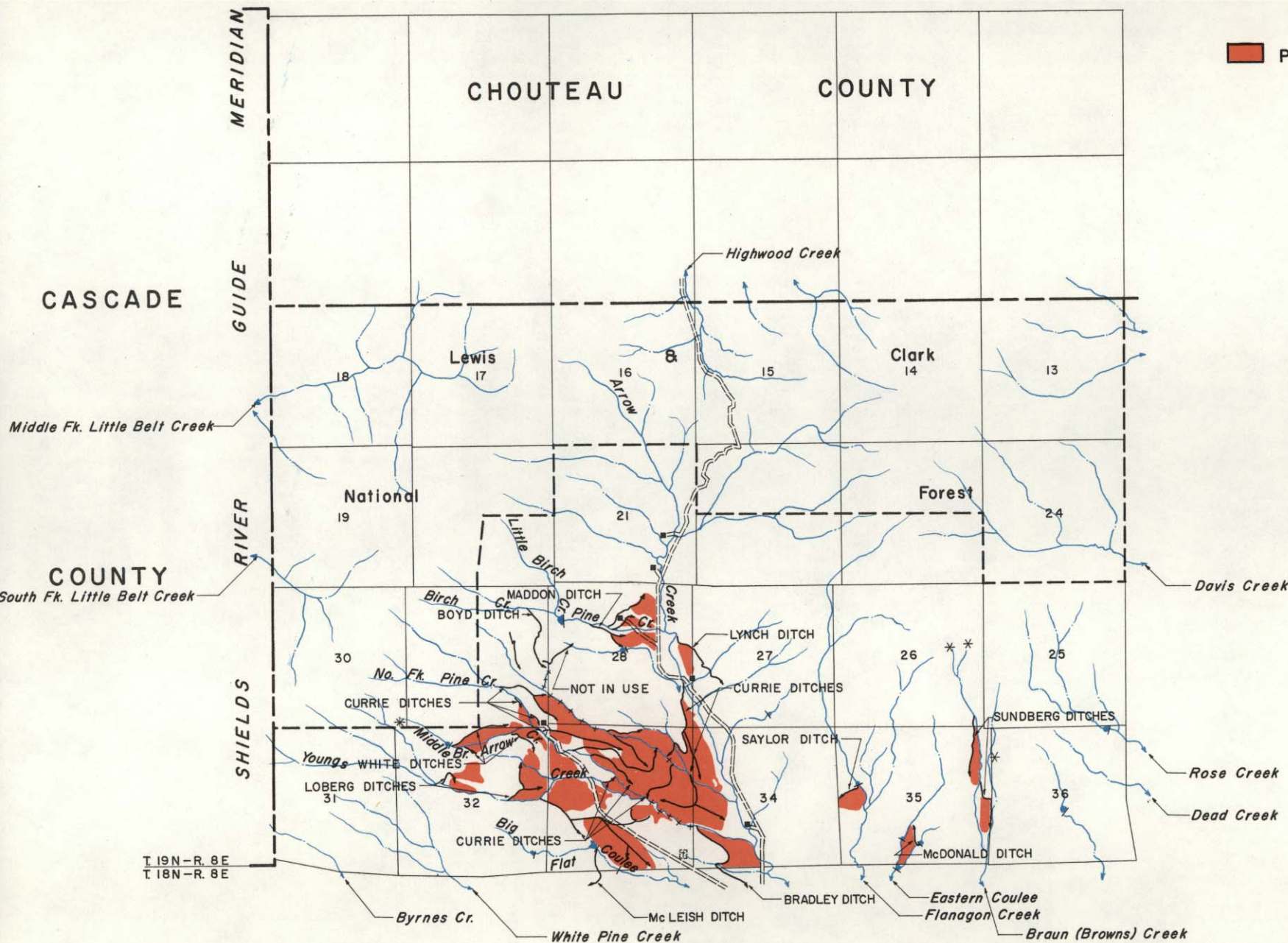
Big Coulee

Twp. 18 & 19 North
Rge. 11 East

BARNES-SPENCER DITCHES
BAIN-ATKINSON DITCH

LEGEND

Private Irrigation



* MIDDLE BRANCH ARROW CREEK ALSO KNOWN AS PINE CREEK

Twp. 19 North
Rge. 9 East

LEGEND

Private Irrigation

