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Water Resources Survey

Phillips County Montana

Part I:

HISTORY OF LAND AND WATER USE ON IRRIGATED AREAS

and

Part II:

MAPS SHOWING IRRIGATED AREAS IN COLORS DESIGNATING THE SOURCES OF SUPPLY

Published by

MONTANA WATER RESOURCES BOARD

Helena, Montana — June, 1968

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WATER RESOURCES SURVEY

PHILLIPS COUNTY
MONTANA

PART I
History of Land and Water Use on Irrigated Areas

MONTANA

Published by
MONTANA WATER RESOURCES BOARD
Helena, Montana

June, 1968

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MONTANA STATE AGRICULTURAL EXPERIMENT STATION

C. C. Bowman, Irrigation Engineer and Consultant, Bozeman

June, 1968

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

Dear Governor Babcock:

Submitted herewith is a consolidated report on a survey of Water Resources for Phillips County, Montana.

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, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Deer Lodge, Fallon, Flathead, Gallatin, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Missoula, Musselshell, Park, **Phillips**, Pondera, Powder River, Powell, Ravalli, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Valley, 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 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.

Respectfully submitted,
E. V. DARLINTON, Director
Montana Water Resources Board

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 cooperation 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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Dann M. Garrison, Commissioner — Lester Wilke, Commissioner
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Frenchman Water Users Association (MWRB Project)

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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 the 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 Mattler vs. Ames Realty 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 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 the 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.

Montana laws do not require water users to file official records of the completion of their appropriations; therefore, 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. The Judge of the District Court then examines all of the claims 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 percent 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 percent (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 percent (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 his instructions on how the water is to be apportioned and distributed in accordance with the full 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 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 c.f.s. Today, the Big Hole River with an average flow of about 1,000 c.f.s. has filings totaling 173,912 c.f.s. One is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recording 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 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 readily be seen that this system of recording offers little protection to rights in the use of water until they are determined by adjudication. In other words, an appropriator does not gain 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 extremely 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 reopened 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 is 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 the right and appoint a water commissioner to distribute the water in accordance therewith. This law applies only to unadjudicated streams.

Administration of water on adjudicated streams 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 appointee for so temporary a position. 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 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 difficulties encountered after an adjudication of a stream is the failure of the District Court to have 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. Legal action necessary to correct this situation must be initiated by the injured parties as it is their responsibility and not that of the court.

At one time or another all of the 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 title 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: (1) to catalogue by counties in the office of the State Engineer, all recorded, appropriated, and decreed water rights including the 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 involving water; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; and (6) to have a complete inventory of our perfected water rights in case of 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 accelerated development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development without some regulation of its use would cause a depletion of ground water in areas where the recharge is less than the withdrawal. Experience in other states has shown that once excessive 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 affected area.

Practical steps aimed at conserving ground water resources as well as correcting related deficiencies in surface water laws became 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 in four biennial sessions of the Montana Legislative Assembly — 1951, 1953, 1955, and 1959.

In 1961, during the 37th Legislative Session, a bill was introduced and passed creating 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. However, the 1965 Legislature abolished the office of the State Engineer and transferred his duties to the State Water Conservation Board, effective July

1, 1965. On July 1, 1967, the name of the State Water Conservation Board was changed to the Montana Water Resources Board. Therefore, the Montana Water Resources Board became the "Administrator" of this Act.

Some of the important provisions contained in Montana's 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 the water fit for domestic, livestock, or agricultural use. The Administrator, after a notice of hearing, is authorized to fix definite standards for determining fresh water in any controlled ground water area or sub-area of the State.

(b) "Aquifer" 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 utilizations of water.

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

(f) "Administrator" means the Montana Water Resources Board 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 district 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 purpose of administration, large ground water areas may be divided into convenient administrative units known as "sub-areas."

Section 2. RIGHT 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.

Any ground water put to beneficial use after January 1, 1962, **must** be filed with the County Clerk and Recorder in the county where the ground water is withdrawn in order to establish a right to use of the water.

Montana's Ground Water Code now provides for three different types of forms available for filing water rights depending upon the nature of the ground water development. The old Form No. 4 became invalid after January 1, 1966.

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 estimated 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, 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 the 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 formations 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 sub-irrigation 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.

Montana's Ground Water Code, as amended by the 1965 Legislature, provides for a period of four (4) years after January 1, 1962 for filing on vested ground water rights (all ground water used prior to January 1, 1962, from water wells, developed springs, drain ditches, sub-irrigation, etc.). Therefore, the deadline was December 31, 1965. A person did not lose his vested ground water rights by failure to file within the four-year period although, in the event of a future ground water dispute, he may be called upon to prove his rights in court. If a person files now on ground water developed prior to January 1, 1962, his date of priority becomes the date of filing, rather than the date when the water was first used.

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

It is important to note that the ground water law states, "UNTIL A NOTICE OF COMPLETION (form #2 or #3) IS FILED WITH RESPECT TO **ANY** USE OF GROUND WATER INSTITUTED **AFTER** JANUARY 1, 1962, **NO** RIGHT TO THAT USE OF WATER SHALL BE RECOGNIZED."

Copies of the 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 of the county records; transmit the second copy to the Administrator (Montana Water Resources Board); and 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 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, provides the only efficient means for the orderly development and preservation of our water supplies and it protects all of Montana's use—on both ground and surface water.

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: landownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers concerning 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 and 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 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 Montana Water Resources Board in Helena.

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

WATER RESOURCES SURVEY

Phillips County, Montana

PART I

History of Land and Water Use
On Irrigated Areas

Published by

MONTANA WATER RESOURCES BOARD
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HISTORY AND ORGANIZATION

The Lewis and Clark Expedition of 1804-1806 explored the southern part of what is now Phillips County, following the route of the Missouri River along its southern boundary. At that time the region was inhabited by the Gros Ventres and the Assiniboine Indian tribes.

The Missouri River was the principal freight route into Montana for the Western gold fields in the 1800s, and when the river was too low during the summer months for navigation to Fort Benton, the trading posts of Carroll and Rocky Point situated in what is now the southern part of Phillips County became important freight depots for the region. From these frontier trading posts over-land routes known as the Cow Island and Broadwater trails led to Fort Benton, Helena, Virginia City and other mining camps throughout the Montana Territory.

In 1853-1855 the Stevens Expedition explored this region in their search for a northwestern transcontinental railroad route. It was through the work of the Stevens Expedition that many of the natural resources of this region became known.

By 1880 stock raising was making its appearance upon the plains of northeastern Montana and for many years this was the chief industry of Phillips County. Thousands of head of sheep and cattle ranged the slopes of the Little Rocky Mountains and along the Missouri River breaks to the Canadian border. The town of Malta became a principal shipping point for the area when the railroad was built through the Montana Territory in 1887. The railroad employed a working force of more than 8,000 men and completed 643 miles of track and more than 500 miles of graded right-of-way from Minot, North Dakota, to Great Falls, Montana, in 7½ months — a railway building feat that still stands as a record.

One of the first white men to locate permanently in Phillips County was Robert M. Trafton of Malta. In 1886 he left Devils Lake, North Dakota with a band of Cree and Chippewa Indians and started westward collecting buffalo bones along the way which he shipped East to be ground up as fertilizer. He arrived in the vicinity of what is now Malta in 1887 and filed upon government land a few miles west of the town. He was not only the first white man to file upon a homestead in Phillips County, but he was the first to prove up on his land. He was also the first man to establish an irrigation system from the Milk River.

Mr. Trafton built a store on the bank of the Milk River within the present limits of Malta in 1888, and in the same year he became the first postmaster of the settlement. A few of the Indians whom Mr. Trafton employed on his westward trek remained to settle permanently in this region.

Some of the other early day pioneers who settled in and around Malta in 1890 and filed on a homestead or operated business establishments were: R. W. Garland, E. W. Tucker, J. C. Ellison, Joseph Hyatt, L. W. Gibson and W. S. Cowan.

John Survant, Manager of the Bloom Cattle Company, was notable among the early day cattlemen. Circle Diamond cattle camps were established by him on Beaver Creek but the main headquarters were on Assiniboine Creek north of Malta. Survant came into the country in 1892, later returned to Missouri where he was married, and when he returned brought his wife to live at the ranch headquarters. Other cattle outfits were the Robert Coburn Circle C Cattle Company operating in the vicinity of the Little Rocky Mountains. The Long X came in shortly after the turn of the century, the N Bar N operated in Saco and Hinsdale territory, and the Bear Paw Pool earlier had ranged cattle across the southern end of the county.

In the 1890s Malta became a shipping point for cattle, sheep and wool, and by the turn of the century it was a well established frontier town.

B. D. Phillips was running 100,000 sheep on his ranch southwest of Malta and in the year 1900 more than a million pounds of wool was sheared at a machine plant operating there. Andrew Davidson, William Garland, Alex Elliot, and G. L. Partridge were others running large numbers of sheep with more and more smaller stockmen coming into the country. One of these was the John Hardin family who settled near Malta in 1898.

The discovery of gold in the Little Rockies in the 80s brought in a stampede of miners, gamblers and desperados to this isolated area of a vanishing frontier. Men carried six-shooters not as ornaments, but through the vital need of self-preservation.

Although other frontier towns gained the reputation of the "toughest" towns in America, certainly Landusky was second to none. Landusky, located in the Little Rockies, was fifty miles from the nearest railroad and 70 miles from Malta, one of the largest towns in the area. Law and order was not established in Landusky until well after the turn of the century and it was almost certain death to the law man who attempted to carry out his official duties in this isolated area.

The Little Rockies were the rendezvous area for the notorious Curry brothers, John, Loney, and Kid. John Curry was shot and killed in 1896 by Jim Winters in self defense, and when Jim Winters was killed in 1901, Kid Curry was strongly suspected of the killing. Loney Curry was killed by a posse at Dodson, Missouri in 1900 for his part in a Union Pacific train robbery 113 miles west of Cheyenne, Wyoming. Kid Curry, the most ruthless outlaw of the Curry brothers, led the gang which held up the Great Northern Express Flyer five miles west of Malta July 3, 1901, and escaped with $80,000 in loot. Later, Curry was tried and convicted in Tennessee for his part in the holdup and was sentenced to serve a term in a federal penitentiary. However, he escaped and it was rumored he fled to South America.

So daring was the Curry gang after the Great Northern robbery, notices were found posted in the Little Rocky area threatening vengeance upon all members of the posses who had searched for them, even while there was a reward of $7,500 for the capture, dead or alive, of any of the gang's members.

Pike Landusky was perhaps one of the most interesting characters in Montana history and his violent fits of temper were renowned throughout the territory. Landusky was killed by Kid Curry in his own saloon in 1895. It was a revenge killing for the mistreatment Curry had suffered at the hands of Landusky while Curry was under arrest and left handcuffed in charge of Landusky. Later, when Curry was free, he deliberately picked a quarrel with Landusky, striking him in the face, and when Landusky made a move to draw his gun Curry shot him dead.

The wealth in gold taken from the Little Rockies has been tremendous, both from placer and quartz mines, and the district still remains one of the leading quartz mining areas of the State.

Gold was first discovered in the Little Rockies in 1884 by a prospecting party composed of Frank Aldrich, "Dutch" Louis, and Pike Landusky. Frank Orman and Pike Landusky discovered the first quartz lode in the same year and secretly worked the Gold Bug mine, taking their ore at night on pack horses to the nearest shipping point.

Quartz mining in the Little Rockies was not developed to any extent until 1892 when Charles Whitcomb, a professional foot racer and prospector, won a large stake in a foot race. Using the money he won in the foot race he invested it with Ben D. Phillips, Pike Landusky, Pete Zortman and others in the development of the August mine at Landusky and the Ruby Gulch and Beaver Creek mines near Zortman. The August mine produced ore as high as $700.00 per ton, and like the Ruby Gulch mine paid its owners more than a million dollars in dividends.

A curious story is told of how Ben D. Phillips got his start in this region. With two English companions he was prospecting in the Bear Paw mountains south of Havre when a band of Indians attacked the party. Both of Phillips' companions were killed, but Phillips managed to escape and later buried the bodies of his partners as well. He notified the parents in England of their sons' untimely deaths, and for his thoughtfulness they sent him $2,000.00. It was this money which launched him into the livestock business near the Little Rockies.

Settlements were still confined to the southern part of the Phillips County area until 1906, although small settlements had sprung up along the route of the Great Northern.

In 1906, the dry land movement began and land from the International border to the Great Northern Railway and farther south to the Missouri River was homesteaded, although much of the territory now comprising Phillips County was not surveyed and sectionized until 1910. After 1910 homesteaders sought land in the county in ever increasing numbers and the momentum of the movement did not cease until about 1918.

The Milk River Project (see write-up on Page 50 of this report) was open for settlement in 1913 and provided a more stable farm income for many of the settlers in the area. Some of the older settlers, the cattle and sheep men of earlier days who possessed large areas of range land in the county, abandoned those lands and homesteaded on land in the irrigated area along the Milk River. Many of the new settlers homesteaded upon the abandoned range lands of the ranchers.

Most of the irrigated landowners prospered while the later dry land farmers met with little success and eventually abandoned their homesteads. However, some of the better dry land areas were farmed with small margins of profit for the farmers who decided to stay on until conditions improved. With improved methods developed in dry land farming, those farmers operating in the better areas who applied the newer methods succeeded where others had failed.

Malta, the county seat, is the largest town in Phillips County and has a population of about 2,500 people. Other towns and smaller rural communities in the county are Saco, Dodson, Landusky, Wagner, Zortman, Regina and Whitewater.

Phillips County was created on February 5, 1915, from the western part of Valley County and the eastern part of Chouteau County. The county was named after Ben D. Phillips, one of the larger ranchers and landowners in the county. Following the establishment of Phillips County there occurred a transition from a prairie populated with Indians and buffalo to development of large ranches stocked with cattle brought up from Texas with trail herds. Later, sheep were introduced into the county and gold was discovered in the Little Rockies; next followed the homestead era and dry land grain farming; the next new development was diversified irrigated farming and the more moderate size stock ranches of today. Stock raising and farming are now the main sources of the county's income.

Phillips County is the third largest county in size in the state with a land area of 5,279 square miles.

During the homestead era from 1917 to 1920, the county experienced its largest population count of an estimated 13,000 residents. The last census listed the county's population at 6,027 persons.

CLIMATE

Bounded on the south by the upper end of Fort Peck Reservoir, and on the north by the Saskatchewan Border, Phillips County lies mostly a little more than 200 miles east of the Continental Divide. One of Montana's larger counties (over 5,000 sq. mi.), topography runs from mountainous in the Little Rocky Mountains of the southwest corner to mostly hills and plains, cut occasionally by coulees, elsewhere. Elevations run from near 6,000 ft. MSL on some of the Little Rocky peaks to about 2,100 ft. MSL where the Milk River flows eastward out of the county northeast of Saco. The drainage system is complex. The southern border section drains directly into Fort Peck Reservoir, while the eastern slopes of the Bear Paws (mostly via Beaver Creek) drain east and northeast into the Milk River, which also receives runoff from the area to the north—well into Saskatchewan, primarily via Whitewater Creek and Frenchman River. On the average, drainages tend toward the west, but there are many exceptions.

Considering the large area and complex topography, it is not surprising that climate variations within the county are large. Day-to-day weather patterns are shaped by such effects as coldest extremes in valley bottoms during clear weather, earliest warming after winter cold spells on hilltops and mountain slopes, heaviest precipitation on mountains, valley drainage, winds, etc. For the greater part, the county comes quite close to having a true "continental" climate, with cold winters, warm summers, the drier season during the winter, and a quite well-defined May-June wet season. The "chinook" wind, which in much of Central Montana is a frequent cold-season phenomenon, is not as common over most of the county as in areas to the west; but an important exception is along the east slopes of the Little Rockies at the higher elevations where these warming winds are more frequent than, for example, in the Milk River Valley downstream from Dodson or Malta.

Winters can be cold in Phillips County. The average number of days per year with minimum temperature 0°F or colder for a 30-year period at Malta is 42, but about half the years will have fewer, half more. The January **average** temperature runs to the cold side, with the coldest areas adjacent to the Canadian Border (see temperature table), running about 10° colder, on the average, than on the slope north from Fort Peck Reservoir. Seasonal transitions are quite rapid, the average temperature between October and November falling by nearly 20°, and rising just as rapidly March to April. Summers are warm—Malta has an average 26 days a year with maximum 90° or more, mostly in July and August. Really hot weather is not common—summer heat will reach 100°F somewhere in the county about three years in four, but only on a day or two. Oppressive combinations of heat and high humidity are uncommon. The freeze-free season (32°F) at Malta averages 131 days, from May 13 to September 21, but may vary from 100 to 160 days in a given year, and this season will average 10 to 20 days shorter in the higher country near the Canadian Border, and several days shorter in the higher sections in the southwest quarter.

Precipitation varies across the county more than one might expect (see table), from a little more than nine inches per year to thirteen or more inches in some of the wetter sections. Annual averages are estimated at 20 inches or more in the Little Rocky Mountains. While the annual averages are such that the area technically is classed as "semi-arid," it must be noted that about 80 per cent of all moisture that falls comes during the warmer half of the year, and the critical growing month of June is usually the year's wettest period. Winter snowfall is generally light except in the Little Rockies, and in most agricultural areas averages only about 30 inches a year.

Stormy weather of several kinds may occur, but the most troublesome type is the summer thunderstorm carrying at times heavy showers of rain and/or hail, gusty winds, lightning, and in rare instances a small tornado. This storm type is very important because it is most common during the crop-maturing season, and few years pass without at least a small amount of hail-caused crop damage. On the other hand, hail—when it occurs—will affect only a relatively small part of the county in most years. Cold waves, not as much of a hardship in the 1960s as in earlier years, still can pose problems for the unprepared or uninitiated. An occasional thundershower will be heavy enough to "flash" flood some normally dry creeks or coulees, but areas affected are almost always small. When rainfall combines with an active spring snow runoff period, flooding may occur along the Milk River—but the frequency of this combination is estimated at about once in 20 or 25 years.

Some detailed data from a number of weather stations in the county are summarized in the following table:

TEMPERATURE

Station	Years of Record	Elevation	Highest and Year of Record	Lowest and Year of Record	January Average	July Average	Annual Average
Forks 4NNE	1941-1960	2600	106 (1949)	–46 (1954)	8.7	68.0	39.4
Loring 10N	1951-1960	2660	105 (1960)	–50 (1954)	5.3	67.1	39.3
Malta	1905-1960	2255	109 (1936)	–56 (1916)	11.2	70.9	42.2
Telegraph Creek	1931-1960	2537	109 (1936)	–51 (1936)	15.0	71.8	43.8

PRECIPITATION

Station	Years of Record	Elevation	Yearly Average Total	Growing Season Average Total	Percent Falling in Growing Season	Wettest Year	Driest Year
Content	1940-1960	2260	11.04	8.49	77	15.98 (1953)	6.28 (1949)
Dodson 3 W	1951-1960	2298	9.94	7.88	79	13.57 (1953)	6.89 (1960)
Dodson 11 N	1940-1960	2715	9.82	7.64	78	16.43 (1942)	6.17 (1960)
Forks 4 NNE	1941-1960	2600	10.84	9.11	84	17.49 (1942)	6.75 (1949)
Harb	1951-1960	2424	10.22	8.12	79	14.88 (1953)	6.19 (1960)
Loring	1951-1960	2660	12.31	9.90	80	19.41 (1954)	7.67 (1960)
Malta	1905-1960	2255	12.77	9.85	77	22.76 (1927)	6.32 (1910)
Phillips 1 S	1951-1960	2650	11.01	8.74	79	14.28 (1953)	8.72 (1959)
Saco 1 NNW	1951-1960	2170	9.07	7.47	82	14.27 (1953)	5.03 (1960)
Telegraph Creek	1931-1960	2537	11.26	8.55	76	18.48 (1942)	5.57 (1960)
Whitewater	1951-1960	2355	9.89	8.12	82	15.19 (1954)	6.77 (1956)

SOILS

Glenn R. Smith, Soil Scientist

The soils of Phillips County have been developed over material brought into the district, and can be divided according to the soil forming process from the material; (1) glacial soils formed as a result of ice during the glacial period, (2) alluvial soils formed by streams during pre-glacial, glacial, and recent times, (3) residual soils formed from material weathered from the geological formations.

Local rock formations furnish the material for soils found in a given area. The physiography, drainage, and geologic history influence how these materials were deposited and account for many differences found in soils. Soil depth, texture, and acidity or alkalinity are directly related within limits to the material from which the soil is formed.

The variations in soils result from the alteration of geologic material either in place or transported by climate and living organisms, and especially vegetation. The length of time these forces have been active and the topography is particularly influential in causing visible soil differences over short distances, often within a few feet.

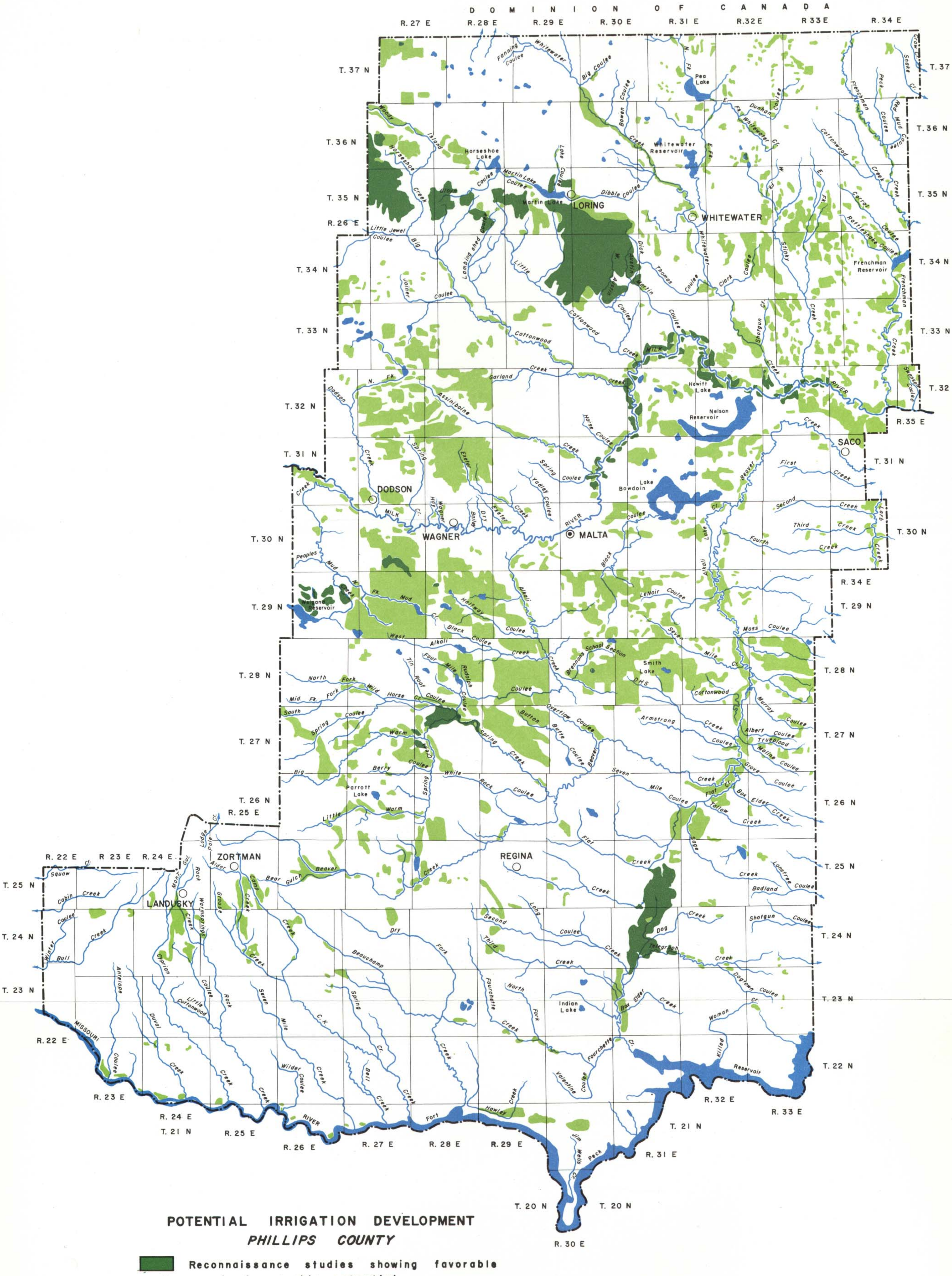
Glacial Soils

The major event in the geologic history that influenced the soils of Phillips County was continental glaciation. Sand, silt, clay, gravel, and boulders were picked up by the ice sheet which mixed them by crushing and then redeposited the mixture known as glacial till, the nature of which is determined by the mixture in the path of the ice sheet. During the retreat of the ice the running water segregated the material according to particle size. The coarse materials, sand and gravels, usually settled out near the margins of the ice; the fine materials, silt and clay, settled out further from the ice margins and were often deposited in bodies of still water such as ponds and lakes. Material sorted and deposited by the melt is called glacial outwash.

The glacial soils of Phillips County cover a more extensive area than any other type. These are an estimated 302,000 acres which are topographically suitable for consideration of irrigation planning. A reconnaissance survey shows an estimated 47,400 acres of glacial plains to have soils warranting such planning. The remaining 254,600 acres need further investigations to determine what areas might be considered for future irrigation planning.

The manner in which the glacial till was deposited by glaciation gives rise to a number of land forms. The rolling and hummocky topography represents the layers of till covering the upland areas. There are stony ridges and mounds separated by shallow depressions, which were formed at the time the glacial movement was temporarily or permanently halted. The northern portion of Phillips County has a concentration of these depressions known as the prairie potholes region. This area covers a large acreage of northeastern Montana and neighboring Canada. Characteristic stream formations also are found in glaciated areas, such as the sinous ridges which represent the former beds of streams in the glaciers and the gravelly to stony fans (outwash) where the streams emerged.

The combination of the topography and undesirable till material have formed land areas of either or both soil and topography which are not desirable for irrigation planning. The major-



POTENTIAL IRRIGATION DEVELOPMENT

PHILLIPS COUNTY

Reconnaissance studies showing favorable topography for arable potential.

Reconnaissance soil studies showing soil generally favorable for irrigation planning.

ity of the county is rangeland which grows grasses that are very satisfactory for cattle and sheep grazing. There are also a number of areas which have a medium textured surface soil with a sufficient soil depth over a till substratum to produce dryland wheat.

The large area north of the Milk River, Phillips County, has a rolling glacial terrain that is principally utilized for livestock grazing land with only scattered areas of dryland farming. The soils can be divided into two general phases, the land that has a surface soil depth which will allow a good growth of grass and dryland grain and the land which has a shallow soil solum over till and allows only a limited growth of grass and very little dryland farming.

The principal soils are upon glaciated area, and the topography is quite rolling in nature with large boulders and smaller cobble strewn over the surface terrain. Those areas now being dryland farmed had to be cleared of these obstructions first. The soils are dark grayish brown with three essential layers; the surface layer may range in thickness from 1″ to 4″ and forms a loose powdery mulch; the silty layer varies from 8″ to 15″ and is a rich brown color, and this is compact and usually has a well defined columnar structure; below this is a layer of high carbonate accumulation which is underlain by the parent material of a grayish-brown calcareous glacial till. The texture of the glacial till varies but generally it is of a heavy, tight compact nature and restricts drainage to the extent that irrigation would be doubtful. The local name of these soils are the Scobey Series. There may be small tracts within the general area that would warrant irrigation, but these tracts cannot be located without a detail or semi-detail land classification survey.

The exception to the general glaciated pattern north of the Milk River in Blaine and Phillips Counties is the large upland area known as the "Big Flat." The overall size of this area is estimated at 142,300 acres of which 9,700 acres lies in Phillips County. The soils, loam textured, are well developed over a friable loam ranging to a clay loam glacial till underlain by gravel and sand which indicates that the thin glacial deposits are situated over high terrace gravels. The general terrain is split into two large main and several smaller broad glacial melt water valleys. The soils of the broad valleys are of either sandy or loamy materials over loose sand and gravel occurring at an estimated 20″ to 30″ depth.

The "Big Flat" area warrants consideration for irrigation in those sections limited to the gently sloping smooth terrain and soils which have adequate water holding capacity. The principal limiting factor is water supply; although, underground water bearing gravels are within reach of turbine type irrigation pumps. The quantity of water known to be available is sufficient to irrigate a sizeable area; however, this source of water would have to be subjected to further study as to quality, quantity, and source before consideration should be given to any large scale irrigation developments.

There are smaller areas similar to the "Big Flat" high terrace in Phillips County. These occur in the north central portion, and approximately 35,370 acres can be considered for future irrigation planning. The percentage of arable acreage is low due to the topographic features. The present land use patterns of these terraces are believed to be equally distributed between wheat and grazing land. The water supply for any irrigation is limited because of the doubtful yield of underground water. The surface water supply is also very doubtful due to the high elevation above any existing streams or rivers.

The glaciated area of Phillips County extends south of the Milk River Valley, and the topography is quite rolling and steep adjacent to the river. The area near Bowdoin Lake is a typical example of the rough rolling type of glaciated topography. There are small areas of sandy soils within the general topographic area; however, the acreage of these areas are too small for any extensive irrigation planning.

Several large high benches are adjacent to the Milk River Valley. The soils vary from a loam with sufficient depth to warrant dryland farming to a shallow phase high alkaline loamy soil with numerous slick spots. The higher eroded benches adjacent to the Milk River may have small areas of light textured soils, but the topography is rough and rolling which prevents any sizeable acreage for irrigation planning.

The glacial uplands bordering the Milk River are not as rugged or steep in the western portion of the county. The soils are generally medium textured and of a relatively shallow depth over the glacial till or shale parent material; an exception being the gently sloping area 4 miles southwest of the point where the eastern boundary of the Fort Belknap Indian Reservation crosses the Milk River. There are scattered areas of the gently sloping, undulating till plain that have a dark colored loam or clay loam glacial soil of sufficient depth over the till parent material to allow adequate internal drainage of irrigation water. These areas may be reached with one canal which could include approximately 2,000 acres in Blaine County and 2,340 acres in Phillips County. A detailed study is needed to determine the feasibility of the area.

The large, vast open area between the foothills of the Little Rocky Mountains and the breaks of the Milk River has general topography suitable for irrigation; however, the majority of the soils are not arable due to the high alkaline content and shallow solum over the till and shale like substratum. The soil has developed over the glacial drift which was deposited as a shallow cover in the more thinly glaciated portion of the county. The predominant Solidized-Solenetz soils have a rich brown, heavy tough clay loam layer from 6″ to 15″ below the surface. The high alkaline layer restricts root growth. The areas with shallow Solidized-Solenetz type of soils have a desolate appearance characterized by a surface having 20 to 60 per cent bare spots known as "scabland," "slick spots," or "blowouts." The depth to the glacial till parent material is generally 18″ to 24″ which prohibits internal drainage of these areas. In general, the Phillips Series should not be considered for irrigation planning.

Residual Soils

The depth of the pre-glacial parent material is shallow throughout most of the southern portion of Phillips County. The glacial material overlying the parent material has eroded leaving large areas of residual soils over Bearpaw shales. The soil is heavy to medium textured, high in alkali, and of a shallow depth over the shales. The beneficial use of the vast areas of residual soil is for cattle and sheep grazing.

The Little Rocky Mountains are in the southeastern portion of Blaine County. The eastern slopes of these mountains extend into the western portion of Phillips County. The general topography of these slopes is rough rolling to steeply eroded ridges and fans. The soils are generally associated with a shale substratum within an approximate 36″ depth, they may be of either an alluvial or residual nature. The soils vary from a medium to heavy texture which are very sticky when wet and high in alkali. The beneficial use of this land is for livestock grazing.

The southern boundary of Phillips County is the Missouri River. The large area of land bordering this river is known as the Missouri breaks or badlands. The Bearpaw shale is exposed in many steep drains, ridges, and hills. The soils are residual or local alluvium from the shales; they can be considered only for livestock grazing.

Colluvial Soils

Colluvial soils are formed from deposits of rock and soil which have accumulated at the foot of slopes either by gravity or stream action. The southern slopes of the Little Rocky Mountains have colluvial materials which consist largely of sedimentary rocks such as limestone, igneous and metamorphic. The more gentle slopes have a bench-like formation standing out prominently above the deeply entrenched stream courses, which seam the mountain sides.

The surface soil of the gentle slopes is gravelly of a rich to dark brown, friable loam to a depth of 5" to 6". The subsurface layer is a darker brown, calcareous, compact, heavy loam grading below 12" to 16" into a friable silty clay loam. More or less lime-coated gravel and rock are found in all layers but become more abundant with depth. These soils are considered favorable for cultivation; however, the benches are rather narrow for extensive farming. The largest land bodies may warrant consideration for irrigation planning, but the acreages and location of these areas cannot be determined without a further and more detailed survey.

Alluvial Soils

These soils occur along streams of Phillips County, the largest stream being the Missouri River; however, the second largest stream, the Milk River, is of more agricultural importance. The soils distinguishing characteristics are influenced by their parent material, but also to some extent to the degree of development under the agency of the soil-forming process. The material below the surface is essentially the same as it was at the time of deposition. Most of the alluvial soils of Phillips County are found along the Milk River and the Beaver Creek valleys, with some being along every stream or drainage throughout the county.

The alluvial soils of Phillips County can be divided into two characteristic soils forming processes: first, the most recent alluvial deposits which occur along present streams and drainages; second, the other soil forming process being the alluvial deposits from the preglacial rivers, mainly the Missouri and Musselshell, with other smaller deposits from many preglacial creeks and drainages. The division of the two soil forming processes cannot be easily distinguished because most of the present streams are flowing in the pre-glacial stream valleys.

In Phillips County the Milk River flows in the pre-glacial valley of the Missouri from the Blaine County line to Malta; then the present course of the river turns sharply to the north flowing in its post-glacial valley through the rugged so-called "big bend country." In the big bend section, the valley in a few places exceeds one mile in width, and it is bordered by rolling clay hills with numerous boulders scattered over the surface. Below the mouth of Frenchman Creek the valley again widens and the river enters the pre-glacial valley of the Missouri River which sometimes is two miles in width. The Milk River flows southeastward in the pre-glacial valley of the Missouri until it terminates into the present Missouri River approximately six miles below Fort Peck Dam. The river follows a very meandering course through the valley. During low water it is a sluggish stream entrenched from 15 to 20 feet below its flood plain, and it ranges from 60 to 75 feet in width.

Although in general appearance the valley floor is fairly level, it is very uneven in many places. Recent deposits of alluvium have built up the land bordering the present stream course so that it is actually a few feet higher than some of the land farther away from the stream; many sloughs and old oxbows representing former channels of the river are filled with water at least part of the year, and these depressions divide the arable land into very irregular areas which interfere somewhat with its use. Many isolated low glacial mounds and ridges in the valley interrupt the generally level surface relief. The alluvial deposits bordering the Milk River, the depressions, and the glacial mounds and ridges in the valley interfere considerably with irrigation and retard surface drainage during times of high water and the irrigation season.

There are several large areas of alluvial soils which are light to medium textured loams and clay loams. Irrigated agriculture is proving profitable on large acreages of these soils; however, additional drainage facilities are needed in some of the areas to enhance the accrual of agricultural benefits. There are 6,050 acres immediately adjacent to the Milk River that are suitable for developing irrigation, but land leveling and clearing of deciduous trees is a prerequisite. The main factor that should be considered in irrigation planning is the general topography of the area adjacent to the river. Many oxbows and sloughs are present; also the meandering channel of the river interfers with the land forms. The areas of arable land are therefore small and generally can be considered only for river pump irrigation by individual farmers. The development of canals for service to large areas is not generally possible.

The extreme fine textured soils which tend to predominate in the Milk River Valley can be related to the parent materials. The local names of the heavier textured soils are the Bowdoin clay, Harlem clay, and Orman clay loam series. These soils are formed from various outwash materials of the Bearpaw shale formations that outcrop in the breaks bordering the valley. The clay soils have similar characteristics, and the irrigation management should be uniform. Approximately one-fourth of the irrigated land in the Milk River Valley is on these clay soils. The percentage of heavy textured soils being irrigated in Phillips County will be considerably higher due to the vast areas of clay soils west of Malta, near Hinsdale and Saco, Montana. The clays are somewhat similar in physical characteristics, but a number of variations exist in depth and amount of stratifications of lighter textured materials. In places the depth of clay is 48″ or more and has no light textured substratum; in other areas sandy substratum may appear in narrow stratifications or as a major texture change above the 48″ depth. The use of these soils for irrigation depends upon the depth to the light textured substratum; in general the areas with less than 36″ of clay over the light textured material can be utilized by growing western wheatgrass (blue joint) and some alfalfa hay crops. The deeper clay soils are a risk for even blue joint hay production. The surface generally becomes saline and alkaline-saline in nature, retarding plant growth and eventually causing a non-productive area.

The majority of the blue joint meadows are being irrigated by flooding, the water being confined with dikes constructed around the fields. Addition of excessive amounts of water to cover the high spots has necessitated flooding for long periods of time in the spring. Farmers often make no effort to drain the water off the land once the high spots are covered. Under these conditions about one-half ton of low quality hay is produced. Internal as well as surface drainage of these clay soils is poor. Poor surface drainage is due to the low downstream gradient of the valley and the old, partially filled-in stream channels. The low infiltration rate results from the high clay content of the soil as well as type of clay. The soil cracks between irrigation, and this condition should be considered in irrigating the meadows. The initial water intake rate is high while the water fills the cracks, but when the cracks are closed on swelling, water intake is nil. The correct management as proven by testing should be, first slope the land and border dike the meadows with adequate surface runoff drains at the ends of the irrigation runs. When irrigating, apply a large head of water to fill the cracks, and then shut off the water supply which avoids ponding. Fertilization of the meadows with nitrogen has also proven very profitable. The local Federal and State Agricultural Agencies can assist farmers with fertilization and land development practices; a visit with them will prove beneficial.

There are numerous small creeks on the north side of the Milk River which have narrow alluvial valleys of saline and alkali soils. The parent material through which these streams meander is mainly Bearpaw shale that adds an undesirable alluvium wash of heavy alkaline soil material to stream valleys.

One of the main larger streams entering the Milk River in Phillips County is Frenchman Creek. The valley of Frenchman Creek is a gorge-like depression along most of its course. It heads in Canada and flows due south a few miles west of the Phillips-Valley County line. The stream is deeply entrenched in its heavy alkaline flood plains which widen out locally to two or three miles in width. The soils of the flood plain are typical heavy textured soils which will produce only limited hay crops under irrigation. The potential arable acreages are very small and any future irrigation of the valley lands are nil.

Whitewater Creek is one of the larger streams in the northern part of the county. It rises in Canada and flows to the southeast emptying into the Milk River in the east-central part of the county. The valley varies from one-half to two miles in width and is quite gravelly and swampy, especially towards the north. Gravelly benches rise 10 to 25 feet or more above the flood plain in the lower part of the valley. There may be small areas of arable land on the gravelly benches; however, any sizeable acreage for future irrigation should not be considered without more detailed studies.

Beaver Creek and its larger branches rise in the Little Rocky Mountains and follows a meandering course through the south and east-central parts of the county; it is one of the larger tributaries of the Milk River in Phillips County. It empties into the Milk River across the county line in Valley County. The streams in this part of the county were probably diverted from their preglacial courses by the ice, accounting for the occurence of lakes and poorly drained heavy depressions about the Little Rocky Mountains. The flood plains are stony and gravelly wash from the mountains. The Beaver Creek Valley is entrenched in uplands as far east as the badland basin below the mouth of Warm Springs Creek. At one time the stream probably entered the pre-glacial Musselshell River by way of this badland basin depression. Above the basin the valley widens out from one to two miles, uniting with the ancient Musselshell Valley in the vicinity of the Sun Prairie area in the north portion of Township 32N—Range 26E. At Bowdoin the stream enters the pre-glacial valley of the Missouri River. The valley widens out to three or four miles and the flood plain soils are very heavy textured and poorly drained.

The heavy textured soils within the Beaver Creek Valley and its tributaries prevent any extensive expansion of irrigation; there are many abandoned acres which have been irrigated. The predominating clay is Bowdoin. The present irrigation within the broad areas of the valley is for hay production. The Bowdoin Clay has been explained previously in this report.

There are approximately 3,400 acres of potentially arable land in the basin-like area where Little Warm, Big Warm, and Wild Horse Creeks join. The presently irrigated lands are producing blue joint hay with scattered areas of alfalfa being tried. A detailed soil survey is necessary to determine the potential of further irrigation which depends upon the drainage, alkalinity and depth of soil. There is a clay loam textured surface soil over much of the area outlined on the map.

The Musselshell River flowed through southern Phillips County before glaciation changed its course. The pre-glacial valley is a well defined depression, one to five miles wide, in the southeastern part of the county east of Legg and as far north as the mouth of Telegraph Creek; this depression is a badland basin. The ancient stream course is locally known as "Holly Flat" which was probably named after Fort Hawley. Below Sun Prairie the ancient valley floor is covered with wash from the Larb Hills, giving this portion of the valley the character of recent stream deposits. The area known as Sun Prairie is of a lighter textured soil than the Bowdoin clays along Beaver Creek. There are approximately 9,600 acres which warrant further studies for irrigation planning. The anticipated land use would be for hay production which is needed for the continued expansion of livestock production.

The streams south of the Little Rocky Mountains drain a badly broken area. Near the Missouri River all streams are deeply entrenched, some as much as 200 to 300 feet. The alluvium washed in by the drainage of these streams is closely associated with geologic formations which in general are shales; very little arable land would be formed in this alluvial wash.

The Missouri River flows through a deep narrow depression, but some 300 to 500 feet below the general level of the upland areas. The valley averages two and three miles in width and is bordered by breaks and badlands extending back long distances from the stream. The flood plains in which the stream is entrenched is from 15 to 20 feet above the stream during low water, and are narrow and largely confined to the bands in the stream course. Colluvial wash from the Bearpaw and Lance shale breaks often extend down to the banks of the stream. Landslides occur locally and sometimes have the appearance of stream terraces. The soils of the alluvial terraces are generally influenced by the colluvial and alluvial material washed in from the breaks.

There are a few alluvial terraces along the Missouri River being irrigated by river pumps. Any future irrigation development is not anticipated because of the poor quality soil and the Charles M. Russell Game Range covering the areas above the Fort Peck Reservoir.

In conclusion, the irrigation of alluvial soils in Phillips County is generally limited to production of grain and hay for livestock. The average of the estimated irrigated acres harvested show 84% of the land producing hay; 47% producing alfalfa; 28% wild hay, and other hay accounting for 7%. The percentage of wild hay production results from irrigation of the slowly permeable clay soils which generally will not produce adequate yields of any other crop.

Summary

The vast area of Phillips County is basically utilized by livestock grazing which is the main adaptable agriculture for this region. Irrigation is a very beneficial means of stabilizing this economy; however, future expansion is limited to the smaller acreage of favorable soil for an expanded irrigated agriculture. The reconnaissance studies by the Water Resources Survey personnel show approximately 399,470 acres being topographically suitable for future irrigation planning; a further study of the soils, however, limit this to about 66,450 acres. Considering the generalities of a reconnaissance study, it is probable that detailed studies would increase the potential arable 66,450 acres;

however, the general glaciated terrain and soils are not very adaptable to large acreages of irrigable land.

The main problem of irrigation in Phillips County is the clay soils. There is a great need for improved water management in the irrigation of these soils. Leaching in agriculture is the process of dissolving and transporting soluble salts by downward movement of water through the soil. Because salts move with water, salinity depends directly on water management, that is irrigation, leaching, and drainage. These three aspects of water management should be considered collectively in the over-all plan for an irrigated area if maximum efficiency is to be obtained. If we apply this concept to the irrigation of heavy soils in Phillips County, the first obstacle is drainage; the water must maintain a downward movement to keep the soluble salt content below the toxic limit for the crop grown. The slowly permeable clays that extend below 48" and have very few stratifications of lighter soil allow very little vertical movement of water, and many areas will become of a high alkaline-saline content which prohibits even adequate growth of blue joint hay.

The local Federal and State Agricultural Agencies have soil surveys, and experimental information which will help in determining areas for future irrigation and management of presently irrigated lands within Phillips County. Contacting these Agencies will help individual farmers save money and labor, and also conserve the land for future use.

References

DeYoung, William, Montana Agricultural Experiment Station; Youngs, F. O. and Glassey, T. W., United States Department of Agriculture, Soil Surveys of Milk River, Montana: United States Department of Agriculture Bulletin, Series 1928, Number 22.

Geisker, L. F. and Morris, E. R., Montana Agricultural Experiment Station; Strahorn, A. T., and Manifold, C. B., United States Department of Agriculture, Soil Survey (Reconnaissance) of The Northern Plains of Montana: United States Department of Agriculture, Bulletin Series 1929, Number 21.

Geisker, L. F., Montana Agricultural Experiment Station; Soils of Phillips County, Soil Reconnaissance of Montana: University of Montana Agricultural Experiment Station, Bulletin Number 199, December 1926.

Schumaker, Gilbert; and Davis, Sterling, Western Soil and Water Research Branch, United States Department of Agriculture, Nitrogen Application and Irrigation Frequencies for Western Wheatgrass Production on Clay Soil: Reprinted from Agronomy Journal Volume 53: 168-170, 1961.

Acknowledgments

Holter, Thomas, Area Soil Scientist, Soil Conservation Service, Glendive, Contribution for Mapping Soil Areas in Phillips County, Montana, January 1968. Ward, Harold B., Chief Land Classification Section, Upper Missouri Projects Office, Bureau of Reclamation, Great Falls, Montana, Contribution of Land Classification Information in Phillips County, Montana, January 1968.

CROPS AND LIVESTOCK

Phillips County is located in the northcentral part of Montana on the northern boundary of the United States. It is bounded on the west by Blaine County, on the south by Fergus, Petroleum, and Garfield Counties, on the east by Valley County and on the north by Canada.

The southern boundary of the county is marked by the Missouri River which forms the head water of Fort Peck Dam at the southeast corner of the county. The county is bisected by the Milk River which furnishes irrigation water to support the productive irrigated valley that runs across the county. A small section of the Fort Belknap Indian Reservation lies within the extreme western part of the county; in the southwestern section of the county are the historical Little Rocky Mountains.

Phillips County is the third largest in size of Montana's 56 counties. The area contains approximately 3,345,000 acres of which 68 per cent are being farmed. The county's principal industry is agriculture and presently there are about 1,674,000 acres under cultivation; the average farming unit is composed of 3,184 acres; and there are about 621 farms in the county.

The average annual rainfall in Phillips County is 12.5 inches. The principal source of income is from grain crops and livestock; the income ratio of crops to livestock is about one to one.

The county is dotted with sloughs and pot holes; many of these sloughs cover substantial pieces of land. These areas produce slough grass—sometimes known as goose grass—and is quite productive. Although this grass contributes largely to the local cattle diet many of the sloughs could support more desirable and productive type grasses. Turf grasses which could be planted in the sloughs are Reed Canary and Creeping Meadow Foxtail. Much of the irrigated land in the county is being harmed by being subjected to too much water. In many cases because of poor management the land becomes so saturated that it will grow only cattails. In other instances the irrigators apply more water than is necessary for normal plant growth. These poor practices result in spoiled land, loss in crop yields and, of course, a waste of water.

The grasslands in Phillips County support quite a substantial beef industry. In 1967 there were 42,761 cows on the tax rolls, and there were 19,871 yearlings in the county, the total number of cattle is 75,081. The number of sheep in the county have been steadily decreasing, and they now number only 16,468, which is considerably less than a few years ago. The hogs in the county number about 2,500.

Phillips County is primarily a feeder producing area in cattle production. Some of the major grains produced are wheat and barley.

However, much of these grains is fed to stock cows or calves being wintered in the county; otherwise there is very little livestock fattening being done in the county. Virtually no corn or sugar beets are grown in the county, and this lack combined with rather variable weather limits livestock feeding.

Below is a tabulation of the major grains raised on dryland farms:

Crop	Acres	Bushels
Wheat	88,963	1,802,372
Barley	39,187	924,141
Oats	9,321	310,253

Several hog producers in the county have built slotted floors in their hog sheds, thus improving sanitary conditions and raising their efficiency as well as saving labor and protecting their capital investment. If those hog producers who have turned to the slotted floors benefit to the extent anticipated the hog industry should expand.

IRRIGATION

There are 260 farms under irrigation in the county having a total irrigated acreage of 87,140.62. Some of this acreage is administered by irrigation districts. The Malta Irrigation District contains 32,484.67; and the Dodson District has 1,004.25 acres.

Below is a tabulated list of the major crops raised on irrigated land:

Crop	Acres	Amount
Spring Wheat	1,498	39,520 bu.
Winter Wheat	43	1,247 bu.
Oats	1,133	46,070 bu.
Barley	831	29,880 bu.
Alfalfa	28,400	56,821 tons

INCOME FROM FARMS

No. of Farms	Gross Income
15	$60,000 and over
26	40,000 to 59,999
33	30,000 to 39,999
63	20,000 to 29,999
64	15,000 to 19,999
102	10,000 to 14,999
67	7,500 to 9,999
74	5,000 to 7,499
83	2,500 to 4,999
94	250 to 2,499

Value of Farm Products Sold

All Farm Products Sold	$9,123,870
Average per Farm	14,692
Poultry	23,691
All Crops	3,441,070
Dairy	124,770
All other Livestock	5,533,688

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 in Water-Supply Papers through the year 1960. Beginning with 1961, the streamflow records have been 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 Phillips County from the beginning of measurements through the water year 1966. The water year begins October 1 and ends September 30 of the following year.

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.

Peoples Creek near Dodson*

The water stage recorder is a quarter of a mile upstream from Indian Service diversions, 6½ miles southwest of Dodson, and 7 miles upstream from mouth. The drainage area is 670 square miles. Records are available from April 1918 to November 1921 (fragmentary), June 1951 to date (1967). The maximum daily discharge was 3,500 c.f.s. (Mar. 30, 1952) and the minimum, no flow at times. The average discharge for 15 years (1951-66) was 28.7 c.f.s. or 20,780 acre-feet per year. The highest annual runoff was 58,690 acre-feet (1952) and the lowest, 856 acre-feet (1961). There are diversions for about 700 acres above the station.

Milk River at Malta

The chain gage was at the old highway bridge at Malta. The drainage area is 11,762 square miles. Records are available from August 1902 to September 1922. The maximum discharge observed was 11,500 c.f.s. (March 26, 27, 1918) and the minimum, no flow at times. The average discharge for 14 years (1902-16) was 465 c.f.s. or 336,600 acre-feet per year. The highest annual runoff was 762,000 acre-feet (1907) and the lowest, 30,500 acre-feet (1905). Since 1917, the flow has been increased during the irrigation season by flow of St. Mary Canal. There are many large diversions for irrigation above the station.

Whitewater Creek near international boundary*

The water-stage recorder is 500 feet downstream from North Fork, 3½ miles south of international boundary, 11 miles north of Loring, Montana, and 14 miles south of Orkney, Saskatchewan. The drainage area is 458 square miles. Records are available from March 1927 to date (1967), seasonal records only in most years. The maximum discharge was 3,500 c.f.s. (April 14, 1952) and the minimum, no flow at times in most years. There are no diversions. This is one of a number of stations which are maintained jointly by the United States and Canada.

Frenchman River at international boundary*

The water-stage recorder and concrete control are 50 feet north of the international boundary and 22 miles northeast of Whitewater. The drainage area is 2,299 square miles. Records are available from April 1917 to date (1967), seasonal records only for most years. The maximum discharge was 22,700 c.f.s. (April 15, 1952) and the minimum, no flow at times in most years. Natural flow of stream is affected by several storage reservoirs, diversions for irrigation, and return flow from irrigated areas. Water may be diverted into or from Battle Creek basin through Cypress Lake. This is one of a number of stations which are maintained jointly by Canada and the United States.

Frenchman Canal near Saco*

The water-stage recorder is two-thirds of a mile downstream from point of diversion and 10¼ miles northeast of Saco. Records are available from October 1920 to September 1921, October 1927 to October 1950 (complete) and seasonal records from March 1951 to date (1967). The maximum daily discharge was 132 c.f.s. (April 11, 1954) and the minimum, no flow at times in each year. Canal diverts water from the left bank of Frenchman River for irrigation in Frenchman Valley.

Beaver Creek above Dix Creek, near Malta*

The water-stage recorder is just downstream from bridge on county road, one mile upstream from Dix Creek, and 25 miles southeast of Malta. The drainage area is 929 square miles. Records are available from December 1966 to date (1967). The maximum discharge was about 1,300 c.f.s. (March 25, 1967) and the minimum, no flow at times. Flow regulated by small storage dams and some diversions for irrigation above the station.

Beaver Creek near Malta

The chain gage was at highway bridge at Hales Crossing, 21 miles southeast of Malta. The drainage area is 1,010 square miles. Records are available from March 1917 to September 1921. The maximum discharge observed was 6,040 c.f.s. (June 18, 1920) and the minimum, no flow for several months each year. The highest annual runoff was 85,400 acre-feet (1920) and the lowest, 23,300 acre-feet (1919).

Beaver Creek overflow near Bowdoin

The staff gage was 3 miles south of Bowdoin and 12 miles east of Malta. Records are available from July 1903 to December 1906 (complete), May 1908 to October 1912 (fragmentary), and March to November 1911 (gage heights and discharge measurements only). The maximum discharge observed was 3,900 c.f.s. (June 9, 1906) and the minimum, no flow for several months each year. Runoff was 48,700 acre-feet (1906) and 2,324 acre-feet (1905). Water flows in this channel only during high flows of Beaver Creek.

Beaver Creek near Bowdoin

The wire-weight gage was at county highway bridge, 2½ miles southeast of Bowdoin. The drainage area is 1,208 square miles. Records are available from April 1920 to September 1921. The maximum discharge observed was 3,720 c.f.s. (June 20, 1920) and the minimum, no flow at times in each year. There are many small diversions above the station. Beaver Creek overflow channel (see preceding station) bypasses water around station at times of high flows of Beaver Creek.

Beaver Creek near Saco

The chain gage was 2 miles south of the former town of Ashfield, 9 miles southwest of Saco, and 16 miles east of Malta. The drainage area is 1,224 square miles. Records are available from October 1903 to December 1906, July 1908 to October 1912. Gage heights and discharge measurements only available from July to September 1903. The maximum discharge was 6,650 c.f.s. (June 9, 1906) and the minimum, no flow at times in each year. The average discharge for 7 years (1903-06, 1907-12) was 46.2 c.f.s. or 33,450 acre-feet per year. The highest annual runoff was 114,400 acre-feet (1906) and the lowest, 4,562 acre-feet (1905). There are several small diversions above the station. At medium and high stages Beaver Creek overflow (see above) bypasses this station and re-enters Beaver Creek some distance downstream.

Beaver Creek near Brady's Ranch, at Ashfield

The chain gage was at Ashfield. The drainage area is 1,327 square miles. Records are available from October 1917 to September 1918. The Maximum discharge observed was 2,000 c.f.s. (August 25, 1918) and the minimum, no flow on many days. The runoff in 1918 was 30,900 acre-feet. There are numerous diversions for irrigation of hay meadows above the station.

Partial Record Stations and Miscellaneous Discharge Measurements

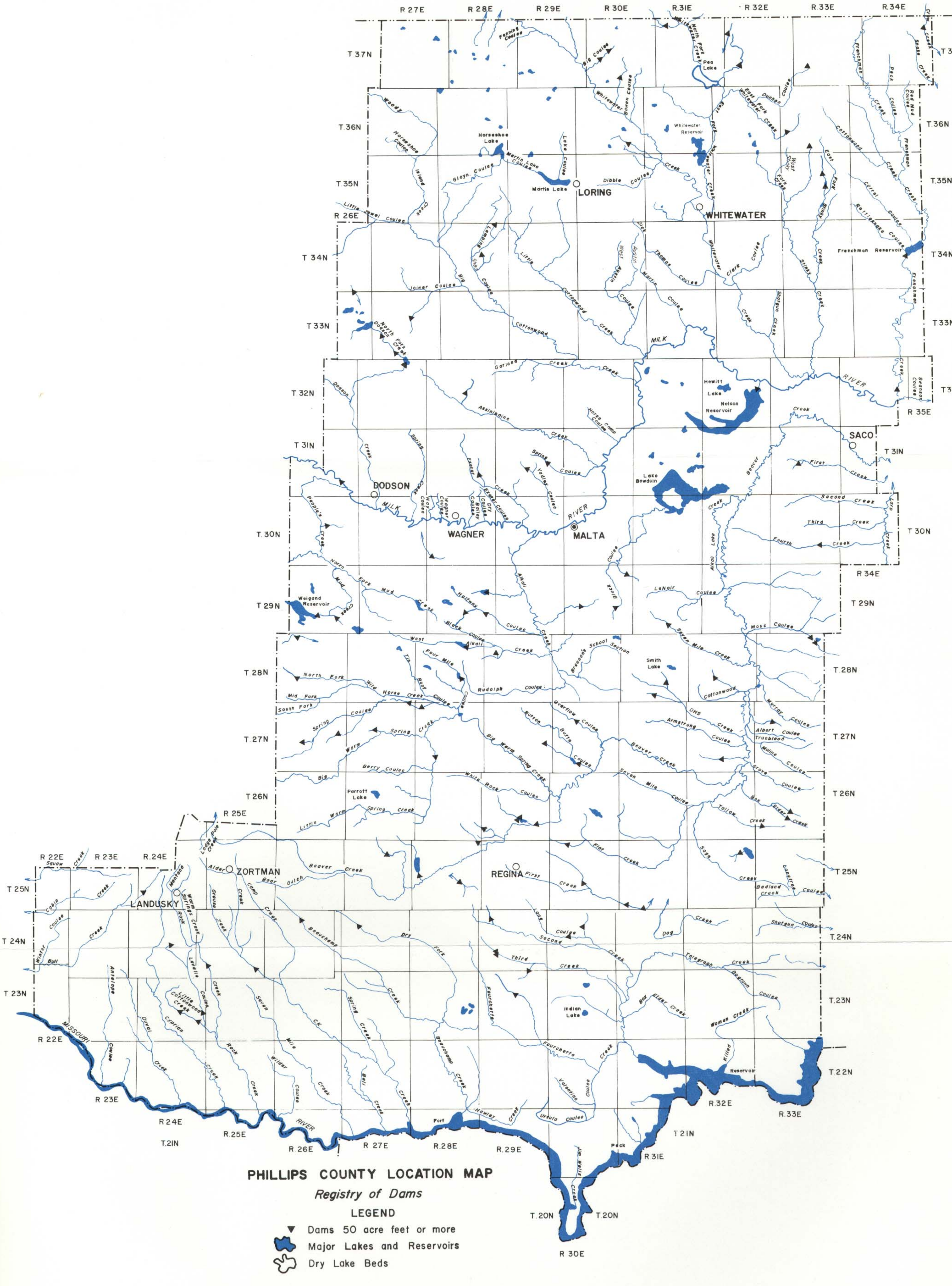
In order to provide information on more streams than are covered by stream gaging stations, the U. S. Geological Survey has for several years been collecting some partial records. These are in addition to the miscellaneous discharge measurements which have always been reported. These partial records,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

There are five crest-stage partial-record stations in the Milk and Missouri basins in Phillips County. Stations are now (1967) being operated on Duval Creek near Landusky, Black Coulee near Malta, Alkali Creek near Malta, Disjardin Coulee near Malta, and South Fork Taylor Creek near Malta.

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

Details of operation of the following reservoir are available in U. S. Geological Survey publications.



PHILLIPS COUNTY LOCATION MAP

Registry of Dams

LEGEND

- ▼ Dams 50 acre feet or more
- Major Lakes and Reservoirs
- Dry Lake Beds

Nelson Reservoir near Saco*

This is an offstream reservoir of the Milk River. The staff gage is located on the dam 10 miles northwest of Saco. Records are available from March 1928 to date (1967). The maximum contents observed was 60,570 acre-feet (July 12-14, 1965) and the minimum observed, 4,600 acre-feet (March 31, 1937). The usable capacity is 66,800 acre-feet between elevations 2,200 feet and 2,223 feet. This reservoir has never been operated to maximum capacity. Water is used for irrigation, recreation, and wildlife.

*This station is now in operation (1967).

DAMS AND RESERVOIRS

The State of Montana has no statutes governing the design or construction of dams and, except for projects which the Montana Water Resources Board has constructed, the Board has no means of automatically obtaining information concerning design specifications, storage capacities, locations, or ownerships of dams and reservoirs built throughout the State. Consequently, steps have been taken to make this information available for use by the State, Federal Government, and private citizens.

By means of a questionnaire, the Montana Water Resources Board recently obtained from the various federal agencies who design structures, the basic engineering data, locations, and ownerships of dams and reservoirs for which they either have, or had, responsibility and which have storage capacities of 50 acre-feet or more. The contributing federal agencies were the Soil Conservation Service, the Forest Service, the Bureau of Reclamation, and the Bureau of Land Management. The Montana Power Company also participated in the study.

Information on numerous dams and reservoirs constructed by private individuals in Montana is not available and is, therefore, omitted. However, the Board's Water Resources Survey crew, while working in Phillips County, obtained information on private dams and reservoirs within this county. The available information obtained from all sources was compiled by the Board for each county in the State and a list of dams and reservoirs which store 50 acre-feet or more of water was published.

GROUND WATER

A. J. Mancini, Geologist

Summary*

Ground-water possibilities in Phillips County are related directly to the geological occurrence of suitable aquifers (material or rocks that yield usable quantities of potable water). Such aquifers, from most recent to older rocks, are as follows:

Alluvium.—Gravel, sand, and silt of the Milk River Valley and some of its tributaries where sufficient thickness of such loose material has been deposited. Quality of water from such aquifers ranges from fair to good, but most is classified as hard.

An older preglacial alluvium may be found at greater depth in the Milk River Valley; it represents deposits of the preglacial Missouri River.

Terrace gravel.—Gravel deposits around the Little Rockies are capable of yielding large quantities of good water. Recharge area is small, and in most such deposits the storage is also small.

Glacial outwash.—Most of Phillips County is covered with surficial glacial drift. The drift is a poor aquifer, capable of yielding only small quantities of water, much of it containing dissolved sodium sulfate. Occasional outwash channels (glacial stream channels) may be encountered, and because such channels are filled with alluvium, the yield of ground water may be much greater.

Flaxville Gravel.—The older preglacial gravels are capable of yielding adequate supplies of relatively good water. The recharge area is small, however, so continuous large-volume use from numerous wells is not advisable.

Hell Creek-Fox Hills Sandstone strata.—Sandstone beds in the Hell Creek Formation and Fox Hills Sandstone will yield small to moderate supplies of good water, depending on the available recharge and geological situation. These strata occur north of Fort Peck Reservoir in the southeast part of Phillips County.

Judith River Formation.—The Judith River Formation contains sandstone strata capable of yielding water of only fair quality to wells. The Judith River is overlain by the thick impervious Bearpaw Shale throughout most of the county, and artesian pressure may be encountered.

Eagle Sandstone.—The Eagle is exposed only around the perimeter of the Little Rockies. Throughout most of the county it is too deep for consideration as a water source. The water would likely be poor, except in the area near the Little Rockies.

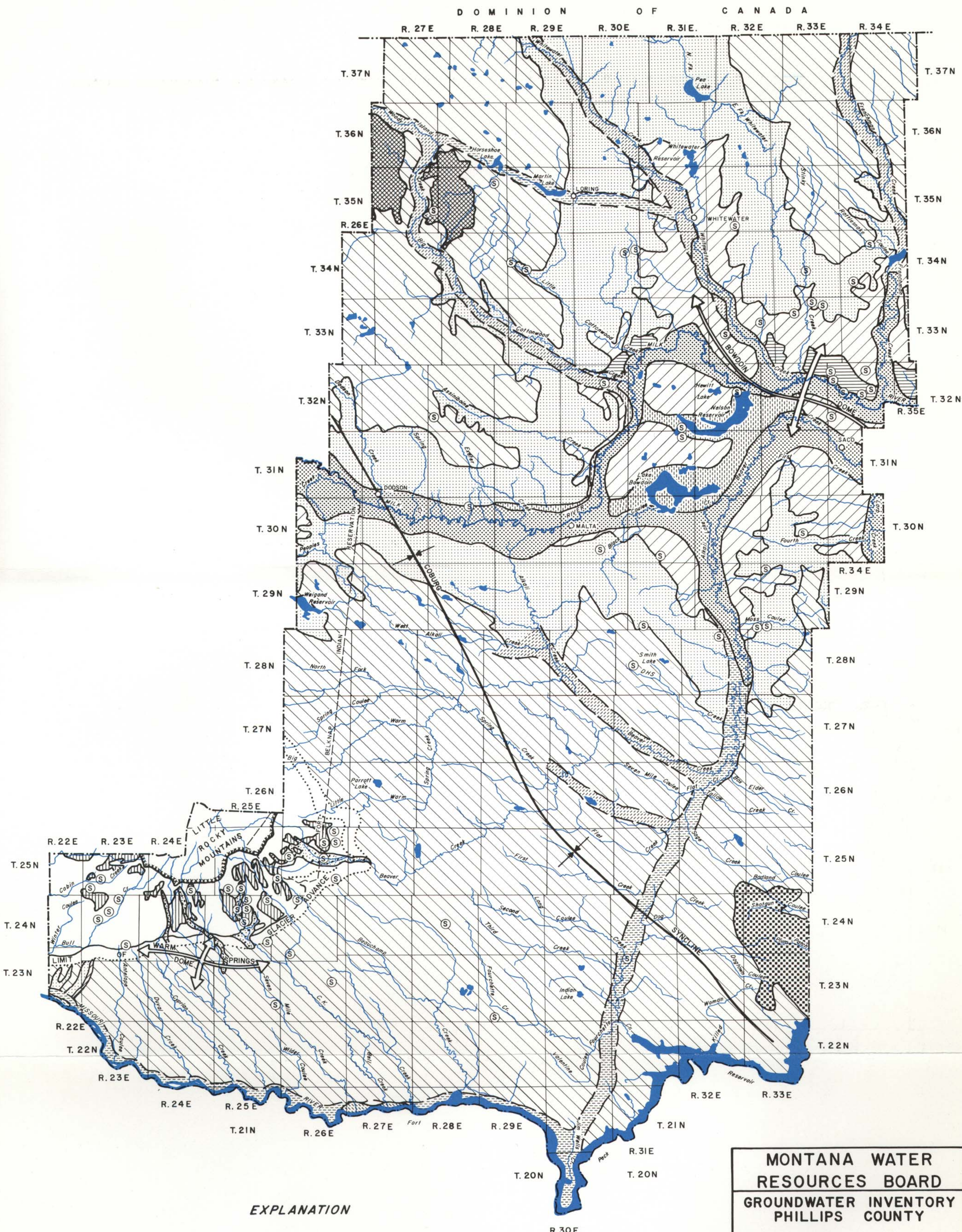
The records of the Montana Bureau of Mines and Geology show that 1,069 water-well appropriation forms were filed as of December 31, 1966. Of these filings, 436 were for stock wells, 403 domestic and stock, 185 domestic, 12 public supply, 11 irrigation, 2 industrial, 1 commercial, and the rest miscellaneous.

Although the foregoing figures indicate that Phillips County is making extensive use of the ground-water resource, it is still hardly tapped. Advances in the technology of improving water quality will insure a vastly greater use in the future.

*contributed by the Montana Bureau of Mines and Geology

GEOLOGY

The geologic influence on the occurrence of groundwater in Phillips County began many millions of years ago and continues to this day. The deposition of the Fox Hills sandstone in late Upper Cretaceous time (60,000,000 to 70,000,000 years ago) marked the permanent withdrawal of the sea from the region, and slow regional uplift brought into play effects of climate and topography which resulted in the inception and growth of a primeval drainage system. The Little Rocky Mountains in southwestern Phillips County became a prominent landmark as a result of intense geologic activity, and hosted igneous intrusions which split and deformed surrounding sedimentary formations. The Tertiary period followed with continued uplift and rejuvination; stream development was significant and many of the alluvial aquifers were deposited. At the close of this period the streams of Phillips County were part of a drainage system which flowed north through Canada and into Hudson's Bay.



EXPLANATION

- Flood Plain--alluvium may yield small amounts of water from flood plain, moderate to large amounts from buried valley fill.
- Buried Pre-glacial Missouri River Valley--Moderate to large yields from valley fill.
- Pre-glacial Dranage Channel--fair to moderate yields possible locally.
- Abandoned Temporary Drainage Channel--unknown potential at present.
- Missouri River Alluvium--unreported potential.
- Colluvium and Alluvium of Mountain Streams--unreported potential.
- Fluvial Terraces:
  - Remnants of Gravel--capped Tarraces, Unglacied (U) / Glacied (G)--unreported potential.
  - Big Flat Gravels--insufficient development to estimate potential; some water available.
- Hell Creek-Fox Hills Sandstone Bedrock mantled with glacial deposits--unreported potential.
- Bearpaw Shale Bedrock mantled with glacial deposits--small yields locally from glacial deposits.
- Judith River Formation Bedrock, Glaciated--small yields from bedrock and glacial deposits.
- Claggett Shale Bedrock mantled with glacial deposits--small yields possible locally from glacial deposits.
- Unglaciated Mountainous Area--small yields possible from bedrock; springs are common.
- (S) Reported Spring.
- Structrual Dome.
- Structrual syncline.

MONTANA WATER RESOURCES BOARD

GROUNDWATER INVENTORY PHILLIPS COUNTY

COMPILED FROM DATA AVAILABLE AS OF JAN. 1, 1968.

Compiled from reports of U.S. Geological survey, the Montana Bureau of Mines & Geology, and others.

Geologist A. J. Mancini.
Drafted by D. L. Ward.

Scale: 6 mi. 18 mi.

Concurrent with continued uplift, a gradual climatic cooling took place, as reportedly indicated by fossil assemblages of southward-migrating plants. Cooling culminated with the advent of Pleistocene glaciation about 1,000,000 years ago, at the beginning of the Quaternary period. Glaciers advanced in stages from the Hudson's Bay region and covered almost all of Phillips County.

The "Ice Age," as the Pleistocene epoch has been called, brought about drastic changes in the drainage pattern. Existing streams were displaced bodily from valleys and channels. Even the Missouri River was diverted from its west-east channel through the middle of the county to its present course at the southern county line. The diversion of drainage to the present system tributary to the Mississippi River is the major regional effect of Pleistocene glaciation.

The final ice retreat took place about 40- to 50- thousand years ago. Remaining as testimony to the glacial epoch is a mantle of glacial till—an unstratified mixture of clay, silt, and sand, with minor amounts of gravel, cobbles, and boulders—covering almost all of the county, and up to 200 feet thick on the northern plain. More than one period of ice-advance took place, with intervening periods of milder weather and ice-retreat. The glacial epoch may in fact still be in existence and the present age could be but an interglacial period of more temperate climate and of only limited duration.

One of the greatest events in the history of life took place during the Tertiary period, prior to the glacial epoch. This was the widespread development of prairie grasses which resulted in great increases in herds of mammals, some of which were the progenitors of present day livestock. Advancing ice caused these herds to roam southward. After the final ice-retreat, Man followed the returning herds northward in the wake of the vanishing ice.

The present topography of Phillips County probably is very similar to that which existed during the last ice-melt. Some local drainage changes likely resulted from down-cutting and aggradation, and from the build-up of morainal ridges. The present drainage is not entirely integrated, and there are numerous small undrained surface depressions dotting the glaciated plains and areas formerly covered by glacial lakes. The Milk River today follows the valley of the preglacial Missouri River.

The outcrop pattern of bedrock formations reflects the broad influence of the Bowdoin dome, a preglacial low structural uplift which apparently also influenced the post-glacial drainage pattern of the Milk River and its tributaries. The amount of structural relief from the top of Bowdoin dome to the Coburg syncline is about 1,000 feet. The northwest-southeast trending Coburg syncline separates Bowdoin dome on the north from the Little Rocky Mountains uplift in the southwest. There is about 4,000 feet of structural relief from the outcropping aquifers on the flanks of the Little Rocky Mountains to the axis of the Coburg syncline. The broad Bowdoin dome causes potential aquifers to be at relatively shallow depths in much of the county, and the structural advantage of the Little Rocky Mountains uplift provides the relief for artesian bedrock aquifers such as Judith River sandstones.

AQUIFERS

Most of the groundwater withdrawn is from buried valley fill, and Judith River standstones. The potential of the Kootenai and Madison formations is recognized but the depth to water thus far has deterred large-scale development. The aquifers are described individually in sequence of geologic age, the youngest or most shallow first and the deepest last. Water-well data have been taken from well appropriation and completion forms filed with the Groundwater Code Administrator. Deep-well data has been obtained from the files of the Oil and Gas Conservation Commission. Data on the chemical quality of water was obtained from the records of the State Department of Health. Available data has been accepted as reasonably reliable and accurate.

Alluvium (Quaternary)—is fresh-water accumulations of silt, sand, gravel, and clay, mixed and interbedded, of recent geologic age and normally unconsolidated or only weakly cemented. In Phillips County these are floodplain deposits of the Milk River and deposits of the larger tributaries. Some alluvium is also reported along creeks on the slopes of the Little Rocky Mountains and locally along the Missouri River. The floodplain deposits of the Milk River do not contain good aquifers, apparently due to high clay content. Quicksand lenses are not utilized extensively due to inherent problems associated with sand-flowage. Based on the depths to boulder-intervals under the Milk River floodplain the recent alluvium is about 25 to 50 feet thick. Using this criteria very few water wells are completed in the recent alluvium. Some of the tributary valleys are more prospective for shallow-alluvium groundwater than the Milk River valley. Colluvium in the Little Rocky Mountains is water-bearing but of unknown groundwater potential.

Glacial Deposits (Quaternary)—cover most of the county. Glacial till seldom is an extensive aquifer due to the low porosity and poor permeability (small pore spaces and slow water movement). The amount of water entering a well completed in glacial till is to some extent proportional to the area of aquifer surface exposed, therefore a well of larger diameter usually will have a slightly larger yield. A larger bore also betters the opportunity of reaching more effective lateral porosity and permeability. A gallery or trench has been used to this end in other areas where very shallow aquifers have poor porosity and permeability. Where till predominates, the thickness from the top of this material to the base of the deepest boulder-interval varies from less than ten to two hundred feet. Three separate intervals of boulders have been recorded in one well near the Canadian International Boundary, and two intervals have been recorded as far as the south side of the Milk River floodplain. Reported thicknesses of boulder-intervals vary from less than a foot to fifteen feet. There are wells in northern Phillips County which appear to be completed in sands and gravels associated with glacial material. By inference these aquifers are predominately outwash deposits. A dependable source of recharge must exist to make these effective.

Ancient valley fill underlies the Milk River floodplain in a pre-glacial Missouri River channel to a depth as great as 200 feet, and is a heterogeneous accumulation of glaciofluvial clastic material which collected in valleys and depressions during the glacial epoch. The fill includes aquifers of gravel and coarse sand from ten to sixty feet in thickness. Malta's municipal wells when originally completed reported high yields from the buried valley fill. These aquifers are not known to be extensive and therefore cannot be judged as capable of large sustained yields unless recharge is at least equal to withdrawal. Buried valley fill is also interpreted to be present in narrow preglacial or temporary drainage channels north and south of the Milk River.

Water quality is variable, due to the combined effects of the parent material of the sand and gravel beds, the rate of percolation through the aquifers, the precipitation and recharge pattern, evaporation, and runoff from shale bedrock. Total dissolved solids have been reported in amounts less than 500 ppm (parts per million) to more than 4,000 ppm. Almost all water-quality reports show a relatively high sodium content. Groundwater from several wells in Malta has amounts of total dissolved solids from 700 to almost 1,800 ppm (artesian water—probably from the Judith River formation—reportedly carried 3,900 ppm total dissolved solids). In and near the town of Saco, well-water was reported as having from 400 to 3,400 ppm total dissolved solids. Reports from the Dodson area show from 850 to 3,250 ppm total dissolved solids. Between Dodson and Malta, shallow well-water was reported as having total dissolved solids in amounts of 2,100 to 2,500 ppm.

Terrace Gravels (Tertiary)—have a patchy distribution on the north side of the Milk River from the junction of Cottonwood Creek eastward to the Valley County line. The groundwater potential of these glaciated terrace remnants is not known. Terraces can be areas of recharge for topographically lower aquifers and springs; this is known to be the case on the flanks of the Little Rocky Mountains where numerous springs issue from the slopes of terraces capped by unglaciated gravels. Some of these may be age-equivalents of the Flaxville gravel or younger, and some may be of more recent (post-glacial) age.

Flaxville Gravel (Tertiary)—has been recognized as a good aquifer in Blaine County on the Big Flat. The eastward continuation of the Big Flat in Phillips County is a dissected terrace of unknown groundwater potential.

Igneous Intrusives (Tertiary)—are present in the Little Rocky Mountains and are not normally aquifers, although igneous contacts can serve as conduits for percolating groundwater and springs.

Hell Creek-Fox Hills (Cretaceous)—is an isolated sequence of sandstones and shales in the southeastern part of the county, of unknown groundwater potential. The sandstones are regional aquifers but are of very limited extent here and partially veneered with glacial till.

Bearpaw Shale (Cretaceous)—is an interval of blue-black shale of varying thickness due to erosion, as much as 1,000 feet thick underlying younger bedrock, and not normally an aquifer. Water passing over or through the Bearpaw shale will eventually carry in solution sodium leached from this formation.

Judith River Formation (Cretaceous)—is an interval of interbedded sandstones, shales, clays, and coal seams having an overall thickness of from 420 to 480 feet in the plains area. Where the Judith River is exposed on the flanks of Bowdoin dome the thickness is considerably less and aquifers are brought closer to the surface. Water of the Judith River sandstones is produced from depths of less than 1,000 feet, at flowing rates of from one to thirty gpm (gallons per mintes) and pumping rates of from two gpm to five-hundred gpm. In a complete stratigraphic section as many as five individual sandstone layers, each about 20 feet thick, may be utilized as water sources. The better aquifers are in the lower half of the formation, and the basal sandstone sometimes attains a thickness in excess of 50 feet. Erosion has locally caused the better aquifers to be nearer the surface. The total dissolved solids of Judith River water normally measure in excess of 2,000 ppm. Water in the lower sandstones generally is less mineralized than that in the upper part of the formation. Sandstones of the Judith River formation can be anticipated to carry some potable water throughout the county where the formation thickness is sufficient to be effective. Traces of natural gas have been reported from Judith River sandstones.

Claggett Shale (Cretaceous)—is an interval of shale similar to the Bearpaw shale and not normally an aquifer. A complete section is reported to vary in thickness from less than 200 feet on the flanks of the Little Rocky Mountains to more than 700 feet locally in the plains area. In the vicinity of the Bowdoin dome structural uplift, Claggett shale is the surface bedrock and is thinner than normal due to erosion.

Eagle Formation (Cretaceous)—underlies the Claggett, and is about 200 feet thick and not utilized extensively as a groundwater aquifer. Two wells reportedly have been completed in the Eagle at shallow depths on the flank of the Little Rocky Mountains as sources of domestic and stock water. Elsewhere in the county the Eagle either is at excessive drilling depths or has undergone a facies change into aquiclude lithology. Flammable natural gas has been reported from the Eagle locally.

Colorado Shale (Cretaceous)—is approximately 1,500 feet of bluish-gray and gray-black shale with sandstone lenses and stringers, none of which is considered an aquifer. The commercial accumulation of natural gas in the Bowdoin field occurs in silty sandstone lenses in this interval, at depths of 700 to 900 feet below the surface.

Kootenai Formation (Cretaceous)—is part of the Dakota-Lakota sequence which is 300 to 400 feet of sandstones and shales containing some of the best artesian aquifers in Central Montana. Only one well in the county is reported using Kootenai water, and this from a depth in excess of 2,500 feet. Depth to aquifer is the deterring factor in widespread usage of what could prove to be an excellent local groundwater source.

Ellis Interval (Jurassic)—is a group of limestones, sandstones, and shales which attain a collective thickness of 300 to 400 feet. Local potential aquifers may be present.

Madison Limestone (Mississippian)—is approximately 1,000 feet of light - colored limestones sometimes having cavernous porosity in an upper massive unit. Where this unit has been penetrated and tested by deep exploratory wells large quantities of water have been recovered. The Madison apparently has the potential for large-scale irrigation, but a specific well site may encounter an impervious rock section. Deep-well control is not dense enough to project the Madison potential to a specific site everywhere in the county. The amount of recharge available to the Madison is not accurately known at this time. Presently there are records of three Madison water wells being used; two each for irrigation and livestock, and one for recreation and health.

Pre-Mississippian Aquifers—may be present below the Madison in the 2,000+ feet of Devonian-Cambrian sediments estimated to be present. These rocks are known to carry both fresh and saline waters, and have not been explored as sources of water due to the availability of potable water in shallow aquifers.

Pre-Cambrian—metamorphic and igneous rocks underlie the softer sedimentary section, and could be water-bearing in fractures or formational contacts but normally are not considered aquifers.

GROUNDWATER AREAS

Phillips County can be apportioned geographically into several groundwater areas, some of which can be further subdivided on the basis of morphology: (1) the floodplains of the Milk River and tributaries, and of the Missouri River, (2) fluvial terraces, (3) the glaciated plain, and (4) the unglaciated area. In the process of drilling water-wells caution should be exercised at all times due to the fact that small gas pockets can be encountered at shallow depths almost anywhere a well might be drilled. The highest concentration of shallow flammable gas has been found along both sides of the Milk River from Cottonwood Creek eastward to the county line, in the Bowdoin Gas Field.

The Floodplains of the Milk River and Tributaries, and of the Missouri River. Few wells are completed in floodplain deposits of the Milk River, due to the imperviousness of clay incorporated in this material. However, numerous wells penetrate the recent alluvium and bottom in the underlying valley-fill of the preglacial Missouri River channel. The gravels and coarse sands in the buried valley supply the best ground-water yields in the county. The water-bearing intervals are from less than 50 feet to more than 200 feet below ground level, and are usually from one to ten feet in thickness although exceptional thicknesses of from 40 to 60 feet are recorded. The common rate of production is from five to twenty-five gpm but fifty gpm is not unusual, and the best wells pump as much as 1,000 gpm. Small wells in rate of production have small drawdowns, and some wells have reported no drawdowns at rates up to 40 gpm. Drawdowns of 20 to 25 feet are reported for wells pumping 700 to 750 gpm. The town of Malta's municipal well number one reportedly had only three feet of drawdown at a pumping rate of 950 gpm when drilled, from an aquifer at depths of 21 to 80 feet below ground level.

One sector of the Milk River floodplain is conspicuous by a paucity of groundwater wells. There are no appropriation or well-completion records in the files of the Administrator for that part of the valley beginning at the southeast corner of T. 32 N., R. 31 E., extending to the approximate center of T. 32 N., R. 32 E.

Alluvial materials in tributary valleys north of the Milk River contain aquifers which are water-bearing at depths of 15 to 60 feet. Well-yields normally are not as high as in the Milk River valley, although one claim for 500 gpm to irrigate 50 acres has been made for a well in the valley of Frenchman Creek, in T. 32 N., R. 34 E. North of this well in T. 33 N. the creek valley is void of water wells, according to present records. The only recorded well is a dry hole with a total depth of 60 feet, in bedrock. The major tributary south of the Milk River is Beaver Creek. Beaver Creek appears to follow a preglacial channel which formerly extended from the present Missouri River in R. 30 E., northward to include an earlier watercourse in which now are found Valentine Creek and Dog Creek, Flat Creek, and Beaver Creek. Numerous wells have been drilled along Beaver Creek between Lake Bowdoin and the town of Saco, where water-bearing aquifers are found from depths of 30 to 140 feet below surface and well-yields of 5 to 25 gpm are reported.

The town of Loring in T. 35 N., Rgs. 29 and 30 E., is located near a stream which flows in a postulated preglacial valley that contains aquifers of probable limited extent at depths of 10 to 100 feet below the surface. Elsewhere some temporary channels are interpreted to have existed during the glacial epoch, and contain aquifers as deep as 200 feet below the surface along Whitewater Creek, northwest of the town of Whitewater. Along Cottonwood Creek in Tps. 33 and 34 N., Rgs. 28 and 29 E., aquifer depths are reported at less than 50 feet below ground level. Aquifers in preglacial and temporary channels can be very important locally where the surface bedrock is shale and particularly where it is the Claggett Shale, inasmuch as the first underlying dependable aquifer is then 2,500-3,000 feet below the surface.

The floodplain of the Missouri River is of very limited extent and much of it is inundated by water in the Fort Peck Reservoir.

Fluvial Terraces. Several small patches of fluvial terrace gravels are present. One such patch along the western county line in Tps. 35 and 36 N. is a continuation of the Big Flat of Blaine County. The gravels of the Big Flat supply the best-quality water in Blaine County. The extension into Phillips County has not been adequately drilled for an evaluation of groundwater potential. One well in Section 30, T. 36 N., R. 28 E. is reported to pump four gpm from three feet of gravel at a total depth of 12 feet. Another well in Section 31, T. 36 N., R. 27 E. reportedly pumps 15 gpm from the interval 12-43 feet below ground level. Other isolated remnants of gravel terraces have been mapped on the north side of the Milk River from the confluence of the Big Cottonwood Creek eastward to the county line. Some of these remnants could probably supply small temporary yields from shallow wells. Several springs which originate in terrace gravels and flow into the Milk River in R. 34 E. are utilized for stock water.

Glaciated Plain. Most of Phillips County is glaciated plain. The greatest influence on the availability of groundwater in the plains area is the structure of the Bowdoin dome. Truncation and erosion resulting from domal uplift has removed all Judith River sandstones from a relatively large area. Where this has occurred the bedrock formation is Claggett shale and if the overlying glacial till does not contain aquifers groundwater most likely will not be available above a depth of approximately 2,500 feet. The most persistent shallow aquifers away from Bowdoin dome are sandstones in the Judith River formation. The depth to aquifer varies depending on bedrock structure and surface topography. Depth generally is greater in the synclinal (structurally low) areas. Judith River water wells are less than 100 to more than 500 feet deep north of the Milk River, and less than 100 to 700 feet deep south of the Milk River. The deepest Judith River well of record is in the Coburg syncline, in T. 24 N., R. 32 E. Judith River sandstones are artesian aquifers and many wells flow small amounts of water; the highest reported flowing yield is 33 gpm, in Section 1, T. 21 N., R. 24 E. The highest pumping potential Judith River source reported in the county is this same well, rated at 500 gpm. Judith River sandstones average about 20 feet in thickness and the formation has a maximum aggregate thickness of approximately 500 feet. A well may penetrate from one to five aquifers if the complete formation is present, but the well-yield normally is small due to aquifer characteristics.

A deep well in T. 29 N., R. 31 E. encountered a flow of water from a sandstone in the Kootenai formation at a depth of 2,700 feet and was completed as a livestock water-well. Depth to aquifer prohibits greater utilization of Kootenai water. Several deeper wells in the plains area penetrated the Madison limestone and found an abundance of groundwater. A well in T. 29 N., R. 31 E. reported an estimated flow of 50,000 barrels of water per day (1,450+ gpm) from a depth of 3,500 feet. More than a dozen deep wells have been drilled unsuccessfully in search of oil and gas, and most of these had some indications of water in the Madison. Madison lithology, however, is known to vary both laterally and vertically and some barren localities can be anticipated.

Depth to the Madison aquifer is about 3,100 feet south of the Milk River in T. 33 N., R. 31 E. and 4,500 feet in T. 37 N., R. 27 E. South of Malta in T. 29 N. the Madison has been reached at depths from 3,300 to 3,600 feet. Near the town of Saco reported depths vary from 3,200 to 3,500 feet. Depth to aquifer is dependent upon the combined effects of geologic structure and surface topography. The river and stream valleys in the vicinity of Bowdoin dome should have the least amount of overburden to penetrate and therefore the shallowest depths to aquifer. Two abandoned oil tests have been completed as Madison source-water wells for agricultural uses, and one well has been drilled to obtain warm water from the Madison for purposes of health and recreation. One analysis of Madison water reports a pH. of 6.4, total dissolved solids calculated at 2,891 ppm, with 156 ppm sodium and 666 ppm calcium - magnesium. The Yapuncich - Sanderson and Brown Laboratories reported this water "suitable for stock or irrigation use." The groundwater potential of the Madison formation is almost unlimited at present.

A sequence of Fox Hills-Hell Creek sandstones and shales overlain by glacial till outcrops in T. 24 N., R. 33 E. A water well drilled in the center of the township was completed as a dry hole at a total depth of 150 feet. The driller reported 80 feet of yellow clay, 88 feet of dry gravel, and 150 feet of clay. The bedrock potential was not evaluated by this well and is yet unknown.

A few wells in the plains area have been completed in sand and gravel at depths to 150 feet below the surface, apparently in glacial till, or in fluvial gravels predating the ice-advance.

Unglaciated Area. The unglaciated part of Phillips County is that portion of the Little Rocky Moutains and environs in Tps. 24 and 25 N. straddling the Phillips-Blaine County line. Physiography is the result of preglacial structural uplift and eons of erosion. Bedrock formations were raised around the mountainous area, exposing once-buried permeable sandstones and limestones to precipitation and affording areas of recharge for artesian aquifers. Numerous springs on the flanks of the mountainous area are utilized as sources of stock water. Alluvium and colluvium in the mountains and dissected gravel-capped terraces have an unreported potential.

GROUNDWATER AVAILABILITY AND USE

The best-quality water reportedly is spring water, and this is favored for drinking-water whenever it is available near headquarters and can be piped indoors, and is a dependable supply. Springs in grazing areas are almost always utilized as sources of stock water; however, not all springs are perennial.

When spring-water is not available alluvium (including buried valley fill) is the next preferred source. The major difference between alluvium-water and bedrock-water is the amount of total dissolved solids. Judith River standstone-water is more mineralized than alluvium-water. Livestock supposedly can tolerate water with 10,000 to 15,000 ppm total dissolved solids, at least temporarily. Most of the groundwater wells have been completed either as livestock-water wells or combination domestic-livestock wells. In some rural areas domestic water is transported to headquarters. The transported water frequently is from a nearby spring.

Groundwater in the alluvial aquifers is runoff that reaches the valleys, and seeps underground. Some artesian water very likely also reaches these aquifers at times, where the breached Judith River formation abuts sand or gravel beds in the river channel. The amount of usable water in alluvium aquifers is a changing phenomenon and directly related to precipitation, surface runoff, and water levels of river and lakes as well as the pattern of withdrawals through wells.

The amount of water available to properly constructed wells in the Judith River bedrock is dependent upon the sandstone porosity and specific yield. A complete Judith River formation will have from 100 to 160 feet of fine-grained sandstone aquifer but only 10 to 20 per cent will be water-saturated, and only a small percentage of this water—perhaps 15 per cent—is normally available through wells. The effectiveness of the aquifer is due to its great extent, and artesian pressure.

Information on deeper bedrock aquifers is lacking. Sandstones in the Kootenai section and limestones in the Madison formation have abundant supplies of artesian water and probably could provide water for industrial development and large-scale irrigation. Both these aquifers are very extensive and are estimated to have greater specific yields than the shallow Judith River aquifers.

The greatest single factor affecting availability of water from the Kootenai and Madison is economics, the cost of drilling and completing a deep well. Present conditions do not warrant expensive deep drilling.

Historically the use of groundwater is directly related to the local economy. Economic conditions significantly affect population trends and the size of livestock herds. The latter two factors will determine the future need for and use of groundwater in Phillips County.

REFERENCES

Alden, W. C., 1932, Physiography and glacial geology of eastern Montana and adjacent area: U. S. Geological Survey Professional Paper 174.

Colton, R. B., Lemke, R. W., and Lindvall, R. M., 1961, Glacial map of Montana east of Rocky Mountains: U. S. Geological Survey Map I-327.

Dobbin, C. E., and Erdmann, C. E., 1955, Structure Contour Map of the Montana Plains: U. S. Geological Survey Map OM 178 B.

Dunbar, Carl O., 1949, Historical Geology: John Wiley and Sons, Inc., New York.

Perry, Eugene S., 1933, Possibilities of groundwater supply for certain towns and cities of Montana: Montana Bureau of Mines and Geology Miscellaneous Contributions No. 2.

Perry, Eugene S., 1934, Geology and Artesian Water Resources Along Misouri and Milk Rivers in northeastern Montana: Montana School of Mines Memoir No. 11.

Ross, C. P., Andrews, D. A., and Witkind, I. J., 1955, Geologic map of Montana: U. S. Geological Survey in cooperation with the Montana Bureau of Mines and Geology.

ECONOMIC MINERAL DEPOSITS

Geologic Situation

Economic mineral deposits, including ground water, are related to the overall geology of an area. Phillips County is situated in the Northern Great Plains physiographic province of North America, generally termed the "high plains" area. The greater part of the "islandlike" Little Rocky Mountain uplift lies within the county, and the only metallic minerals in the county are associated with the igneous rocks of the Little Rockies.

Except for the Little Rockies and the valleys of the Missouri and Milk Rivers and their larger tributaries, the land is covered with surficial glacial debris. In a small area south of Island Coulee in the northwest part of the county, part of an extensive gravel deposit, known as the Flaxville Gravel, directly underlies the glacial material. Stratified rocks of Cretaceous age form the bedrock of the county, except for the older Paleozoic strata around the Little Rocky Mountain uplift. The Bowdoin dome is a relatively gentle upwarp in the Malta-Saco area.

Coal

Minor seams of subbituminous coal in the Judith River Formation are related to the North Central Montana coal region, which extends into the southwestern part of Phillips County. There is no record of coal production, reserves are unknown, and the coal is believed to be noncommercial in both quality and quantity.

Natural Gas

The only mineral fuel produced in Phillips County is gas from the Bowdoin gas field. Natural gas has accumulated in the Bowdoin and Phillips Sandstone units in the upper part of the Colorado Shale. These units are gently bowed or flexed upward in the Bowdoin dome, which extends from a point east of Malta to the vicinity of Hinsdale in Valley County.

The Bowdoin gas field was discovered by the drilling of the Martin water well (Sec. 18, T. 31 N., R. 35 E.). This well was drilled in 1913 to a depth of 740 feet as a water well but produced a small amount of gas instead. The formations at the surface are the Clagget Shale and Judith River Formation of the Montana Group (Upper Cretaceous). The produced gas is purchased by Montana-Dakota Utilities Corporation for distribution in eastern Montana markets. About 400 wells have been drilled, and in 1966 Bowdoin field produced 2,148,063 Mcf of natural gas.

There has been little exploratory drilling in Phillips County in recent years. Only two holes were listed in the 1966 Annual Review of the Montana Oil and Gas Conservation Commission.

Bentonite

Bentonite is a variety of sedimentary rock that is composed of a specific clay (montmorillonite) which has been formed by the alteration of volcanic ash. Bentonite can be easily recognized in the field because it weathers to form a granular material resembling popcorn. Most exposures of bentonite are sparsely vegetated and become very slippery when wet.

Since 1965 there has been considerable interest in bentonite in Phillips County. Although bentonite has a wide variety of uses, most of the interest in these deposits is in connection with taconite pelletizing. In this process bentonite is used to bind very fine particles of iron ore together to form small pellets.

Well over half of the county is underlain by the Bearpaw Shale. Within this formation there are numerous beds of bentonite, some of which are thick enough to be economic. The area between the Milk River and Missouri River is mainly underlain by the Bearpaw Shale, and most of the exploration to date has been within this area.

Sand and Gravel

Deposits of sand and gravel are fairly widespread within the alluvium and the Flaxville Gravel, but most of the material must be washed to remove clay and soil before it can be used.

Metals

All metallic mineral production in Phillips County has come from the Little Rocky Mountains district in the Landusky-Zortman area. Gold placers were discovered in 1884 and lode deposits in 1893.

The gold and silver deposits occur mainly as fissure-filling veins in a granite-syenite porphyritic laccolith intruded into Precambrian and Paleozoic rocks. Minor replacement bodies in limestone have also been mined. Intrusion of the laccolith caused a doming of the Paleozoic formations. Subsequent erosion has removed the overlying rocks and exposed the porphyry in the center of the uplift. The gold is associated with pyrite and limonite and also occurs in free grains and as a telluride mineral, probably sylvanite.

Early activity within the district was sporadic, but mining flourished from 1905, when the first mills were constructed, until about 1918. Activity was revived somewhat in 1922, and in 1923 Phillips County ranked third in gold production in the state. Total gold production has been estimated at about 387,000 ounces, mostly from the lode mines. Since 1928, when placer production was first recorded separately, placer operations have yielded only small amounts of gold.

One noteworthy feature of the gold deposits in the Little Rockies was the ease of mining and processing the ore. Most of the ore, especially in the oxidized zone, was soft enough that it could be excavated by scrapers. Costs of drilling and blasting were minimal, and crushing cost was unusually low.

Whereas most gold ore must be crushed to pass through a 180-mesh screen, or finer, to permit thorough extraction of the gold by cyanide solution, seemingly the ore from mines in the Little Rockies was not passed through any screen finer than 5 mesh, and that size was used only for sulfide ore. One plant used a ⅝-inch mesh for screening oxidized ore, and another used a 1-inch screen set at a 45° angle. A test showed that 70 percent of the material that passed through this latter screen would also pass through a 12-mesh screen, however. The oxidized material treated was therefore relatively coarse, but the cyanide solution extracted about 90 percent of the gold, which is comparable to results elsewhere. Treatment of sulfide ore was somewhat less effective.

The Little Rockies district is currently being studied in some detail by the U. S. Bureau of Mines under their Heavy Metals program, and several companies are conducting surface and subsurface exploration programs generally aimed at evaluating the district for possible large, low-grade gold and silver deposits that could be mined by open-pit methods.

SOIL & WATER CONSERVATION DISTRICTS

Phillips County is served by the Phillips Soil & Water Conservation District No. 74. The original district, as organized in 1950, was known as Milk River Soil Conservation District and covered only about eleven percent (11%) of the county along the Milk River. Prior to formation of the 1950 district, the Soil Conservation Service assisted the north half of the county under a memorandum of understanding with the North Phillips Grazing District. In 1958, all the land in Phillips County was included in the district by a favorable vote of county residents and the name was changed to Phillips SCD. Area covered now is 3,346,560 acres or about 5,279 square miles. Following enabling legislation enacted by Montana in 1962, the name was officially changed by adding the word "water" to become Phillips Soil & Water Conservation District.

The District is governed by a board of nine supervisors; five of these are elected for three year staggered terms by land occupiers & owners of the area. Four advisory members are appointed annually (by elected supervisors) to assist in all the supervisory duties. Supervisors receive no salaries whatsoever and only bare minimum of mileage expenses are reimbursed for duties performed. Supervisors provide local direction to a program of complete resource conservation including erosion control or prevention, water conservation, soil management, land improvement, wildlife management, recreation, and land adjustment to proper use. This program is accomplished by providing technical assistance to individual farmers and ranchers and groups, on a voluntary basis, following an analysis of all resources and then planning and applying economically sound conservation treatment. Contracts, to do the conservation job, are encouraged as set up by the Great Plains Conservation Program of USDA, to get the job done faster. Consultative assistance to nonfarm users of land is provided by the District through the Technical Action Panel (TAP) to help solve resource problems.

State Soil & Water Districts law empowers supervisors of districts to call upon local, state, and federal agencies to assist in carrying out a soil and water conservation program. Phillips SWCD has memoranda of understanding agreements with the Soil Conservation Service, Extension Service, State Forestry Department, and Bureau of Land Management to help provide technical "onsite" assistance to District farm or ranch cooperators in carrying out a sound soil and water conservation program. Close coordination with programs of U. S. Department of Agriculture agencies such as Farmers Home Administration (FHA), Agricultural Stabilization & Conservation Service (ASCS), and Extension Service (ES) is maintained. A mutual exchange of efforts to promote more comprehensive resource management is carried out with Montana State Fish & Game Department. The Bureau of Sports Fisheries and Wildlife, Bureau of Reclamation, Malta Irrigation District, the State Water Resources Board, Chambers of Commerce, and others.

The Soil Conservation Service assists the District by furnishing and interpreting basic data on soils and plant cover and other land features. Technical data are interpreted in terms of acceptable alternative land uses and treatments to help guide the farm and ranch operators in developing sound individual or group conservation plans and Great Plains contracts. The Soil Conservation Service also aids cooperators in performing operations requiring technical skills beyond the experience of the individuals involved.

The Bureau of Land Management (BLM) cooperates with the District in grassland management, particularly on grazing lands having intermingled private and public ownerships.

The Extension Service (ES) assists the District with its education and information program; also weed control and farmstead or field tree plantings.

The ASCS has the Agricultural Conservation Program (ACP) which provides cost-sharing for designated conservation practice accomplishments on farms or ranches.

The Bureau of Indian Affairs (BIA) helps farmers and ranchers on the Fort Belknap Indian Reservation to install conservation practices.

The State Fish & Game Department cooperates in matters involving wildlife development or improvements such as farm fishpond stocking.

One of the major problems of the District is to acquaint the urban people, who comprise a large percentage of local population, with the need for soil and water conservation.

Technical phases of the District's program include detailed soil surveys, site and condition surveys on rangeland, ground water investigations, drainage studies, irrigation system evaluation and correction, topographic and other engineering surveys. By careful analysis of this basic resource information, proper land use and needed conservation treatment of each field can be determined. The technicians help farm operators interpret the surveys and provide him with alternative choices 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 technicians, the cooperator makes the final decisions. These decisions are recorded in the Great Plains Contract or Conservation Plan. The farmer or rancher determines what will be done on his farm or ranch and when the jobs will be carried out.

After the contract or plan is completed the cooperator is given further technical assistance on design and layout work essential in establishing conservation practices on the land as previously planned. This assistance is provided without cost to the cooperating farmer or rancher.

There are approximately 46,000 acres of irrigated cropland, 257,000 acres of non-irrigated cropland, 1,630,000 acres of non-federal rangeland, 52,000 acres of pasture, 6,000 acres of woodland and 5,800 acres of other lands such as roads, townsites, and water areas on which the District shares the conservation responsibility. Many of the private rangeland acres are intermingled with public rangeland (PD & LU); this necessitates cooperative consideration and treatment with BLM.

By 1975 it is anticipated about 67,000 acres of land will be irrigated not including acres with waterspreading systems using runoff. This will require additional supply water such as proposed by a diversion from the Tiber Dam on the Marias River, particularly after Canada takes her full Milk River appropriated share (part of which we now use) on the Milk River Project (BR). Water supply ditch leakage and surface and subsurface drainage problems are a major problem in the irrigated area.

There are 1,326,694 acres of federal rangeland. Some of this is solid blocks but much of it is intermingled with private rangeland so BLM has "permit" controlled grazing administration on a much larger total acreage than the federal total. The Little Rocky Mountains, previously administered by the Lewis & Clark National Forest, is now administered by the BLM following a land exchange between them and the Forest Service. Approximately 193,000 acres are State lands, primarily rangeland but including some dryland cropland. Part is under direct lease to ranchers and part controlled through leases to grazing districts.

The major enterprises in agricultural lands are small grains and livestock production. Livestock is primarily beef cattle and small grains principally wheat and barley.

Work done since the organization of the District on dry cropland consists largely of improved cropping systems including wind stripping and crop residue management and some erosion control measures. Work on irrigated land has involved primarily improving or extending irrigation systems, land leveling for efficient labor and water use, improved or new field open drainage ditches, water control structures, and soil management. Work on pasture, hayland, and rangeland has emphasized seeding of undesirable cropland to grass or re-seeding grass or legumes adapted to the specific sites, management of grasslands through degree and period of use and also through developments such as wells, pits, dams, springs, and fencing. Waterspreading development has improved hay bases for many ranches. Farmstead, feedlot and some field windbreaks are a significant item of accomplishment.

A Conservation Needs Inventory was completed for Phillips County in 1960 and supplemented in 1963. It was estimated that 56% of dryland cropland, 74% of irrigated cropland, and 96% of grasslands were in need of additional conservation treatment.

Cooperative efforts of land owners and operators, local, state, and federal agencies, contractors, civic organizations, local businessmen, news media, as well as "public-spirited" supervisors, have contributed to the overall success of the District.

FISH AND GAME

Game

In probably no other county in the state can there be found a greater variety of game animals. One of the prime resources is the Canada goose, which nests on many of the artificial reservoirs in the central and northern part of the county. This breeding population of geese is perhaps the largest in the Central Flyway.

At the other extreme is the elk in the Missouri River Breaks. A transplanted species, the elk annually provides much high-quality hunting.

The wild turkey is also found along the Missouri River and, like the elk, was successfully transplanted from another area.

Phillips County is also one of the leading producers of sage grouse, a game bird that is totally dependent on the sagebrush which is so abundant in the county. The antelope is also benefited by the vast areas of sagebrush-grassland in the county.

Other popular game animals in Phillips County include the whitetailed deer, which is most numerous in the brush and woody river and stream bottoms; the mule deer, an inhabitant of the rougher "breaks" type; the sharptailed grouse and Hungarian partridge, both of which have widespread distribution in the county. Finally, the ring-necked pheasant is to be found here, mainly in close association with irrigated farm lands.

Fish

The fishery resource of Phillips County is dominated by artificial impoundments distributed throughout the county. These waters are of various sizes and contain a wide variety of species. River fishing is provided by the Milk and Missouri Rivers which furnish fair to good catches of sauger, walleye, northern pike, and catfish.

The upper regions of Fort Peck Reservoir contain good populations of northern pike, sauger, catfish, drum and ling; however, access is generally poor and most areas receive only limited fishermen use.

Numerous reservoirs of a smaller nature provide excellent fishing for largemouth bass and northern pike. Nelson Reservoir contains the finest walleye population found anywhere in Montana.

Good fishing for trout is provided by the Cole Ponds gravel pit complex north of Saco. In addition, various small reservoirs contain good trout fishing.

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

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

RIVER BASIN **Missouri Drainage Basin**	**Present Irrigated Acres**	**Irrigable Acres Under Present Facilities**	**Maximum Irrigated and Irrigable Acres**
*Missouri River	134,575.50	26,711.33	161,286.83
Jefferson River	61,291.00	9,713.00	71,004.00
Beaverhead River	40,771.00	6,076.00	46,847.00
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	112,054.00	21,242.00	133,296.00
Smith River	32,934.00	19,679.00	52,613.00
Sun River	124,474.58	4,385.00	128,859.58
Marias River	114,823.42	13,445.88	128,269.30
Teton River	74,653.00	15,882.33	90,535.33
Musselshell River	64,789.00	57,870.00	122,659.00
Milk River	212,009.62	48,867.76	260,877.38
Yellowstone River**	303,657.00	96,016.00	399,673.00
Stillwater River**	30,423.50	8,028.53	38,452.03
Clarks Fork River**	88,160.97	1,530.83	89,691.80
Big Horn River**	65,005.00	23,858.00	88,863.00
Tongue River	28,170.00	7,762.00	35,932.00
Powder River	35,948.00	2,299.00	38,247.00
Little Missouri River	42,513.00	1,499.00	44,012.00
Grand Total Missouri River Basin	**1,629,472.59**	**374,475.66**	**2,003,948.25**
Columbia River Drainage Basin			
Columbia River	0	0	0
Kootenai (Kootenay) River	9,914.13	968.00	10,882.13
Clark Fork (Deer Lodge) (Hellgate) (Missoula) River	146,287.70	14,934.20	161,221.90
Bitter Root River	111,102.43	3,200.00	114,302.43
Flathead River	135,907.19	4,532.22	140,439.41
Grand Total Columbia River Basin	**403,211.45**	**23,634.42**	**426,845.87**
GRAND TOTAL COUNTIES COMPLETED TO DATE	**2,032,684.04**	**398,110.08**	**2,430,794.12**

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

**Figures in these River Basins revised by resurvey of Carbon County, 1965.

IRRIGATION SUMMARY OF PHILLIPS COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigated and Irrigable Acres
*Missouri River	773.00	185.00	958.00
Cow Creek	0.00	0.00	0.00
Squaw Creek	65.00	0.00	65.00
South Fork Squaw Creek	190.00	0.00	190.00
Cabin Creek	95.00	0.00	95.00
Bull Creek	0.00	115.00	115.00
Wysocki (Bull Creek) Spring	12.00	0.00	12.00
Lind (Winter Coulee)	155.00	0.00	155.00
Cyprian (Sipary Ann) (Slippery Ann) Creek	215.00	45.00	260.00
Rock Creek	1,170.00	15.00	1,185.00
Montana (Mill) (Sawmill) Creek	1.00	10.00	11.00
Warm Springs Creek	30.00	0.00	30.00
Lavalle (Cottonwood) Coulee	115.00	0.00	115.00
Total Rock Creek and Tributaries	**1,316.00**	**25.00**	**1,341.00**
Wilder Coulee	0.00	105.00	105.00
C K Creek	0.00	0.00	0.00
Camp Creek	327.00	57.00	384.00
Grouse Creek	83.00	0.00	83.00
Well	130.00	0.00	130.00
Alder Creek	0.00	140.00	140.00
Coal Butte Coulee	60.00	0.00	60.00
Beauchamp Creek	0.00	74.00	74.00
Dry Fork (North Fork) Beauchamp Creek	217.00	47.00	264.00
Garey Coulee	112.00	0.00	112.00
Unnamed Coulee	2.00	0.00	2.00
Unnamed Coulee	40.00	0.00	40.00
Unnamed Coulee	7.00	35.00	42.00
Unnamed Coulee	15.00	0.00	15.00
Hawley (Coburn Coulee) (Holly) Creek	346.00	32.00	378.00
Total Beauchamp Creek and Tributaries	**739.00**	**188.00**	**927.00**
Fourchette Creek	311.00	54.00	365.00
Lone Tree Coulee	123.00	0.00	123.00
East Coulee	65.00	0.00	65.00
Bratager Creek	20.00	0.00	20.00
Unnamed Coulee	24.00	0.00	24.00
Unnamed Coulee	5.00	0.00	5.00
North Fork Fourchette Creek	209.00	107.00	316.00
Valentine Coulee	335.00	0.00	335.00
Mickie Coulee	34.00	20.00	54.00
Telegraph Creek	775.00	107.00	882.00
North Fork Telegraph Creek	158.00	0.00	158.00
Alfalfa Coulee	22.00	0.00	22.00
Lone Tree Coulee	113.00	0.00	113.00

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

IRRIGATION SUMMARY OF PHILLIPS COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN (Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigated and Irrigable Acres
Second Creek	1,138.00	0.00	1,138.00
Unnamed Coulee	5.00	0.00	5.00
Unnamed Coulee	0.00	100.00	100.00
Unnamed Coulee	5.00	0.00	5.00
Stockade Coulee	242.00	0.00	242.00
Stratton (Ave) Coulee	455.00	0.00	455.00
Third Creek	712.00	0.00	712.00
Unnamed Coulee	30.00	0.00	30.00
Unnamed Coulee	38.00	0.00	38.00
Box Elder Creek	124.00	0.00	124.00
Unnamed Coulee	11.00	0.00	11.00
Fourchette Creek and Tributaries	**4,954.00**	**388.00**	**5,342.00**
Milk River	41,487.72	10,359.43	51,847.15
Peoples Creek	2,863.00	0.00	2,863.00
Mud Creek	305.00	0.00	305.00
Deer Creek	0.00	101.00	101.00
Dodson (Mud) Creek	75.00	0.00	75.00
North Fork Dodson (East Fork Mud) (Mud) Creek	185.00	0.00	185.00
Tom Davidson Coulee	0.00	0.00	0.00
Unnamed Coulee	24.00	20.00	44.00
Unnamed Coulee	9.00	0.00	9.00
Exeter Creek	162.00	36.00	198.00
Alkali Creek	90.00	322.00	412.00
Rudolph Coulee	168.00	0.00	168.00
Unnamed Coulee	45.00	0.00	45.00
Unnamed Coulee	22.00	0.00	22.00
Schafer Coulee	0.00	55.00	55.00
Unnamed Coulee	200.00	0.00	200.00
West Alkali Creek	385.00	250.00	635.00
Black Coulee	9.00	0.00	9.00
Unnamed Coulee	30.00	0.00	30.00
Halfway (Partridge) Coulee	263.00	0.00	263.00
Unnamed Coulee	0.00	0.00	0.00
Unnamed Lake	0.00	103.00	103.00
Unnamed Coulee	34.00	10.00	44.00
Yadley (Elliott) Creek	10.00	0.00	10.00
Flat Coulee	8.00	0.00	8.00
Sheep Creek	30.00	0.00	30.00
Assiniboine Creek	240.00	168.00	408.00
Unnamed Coulee	76.00	72.00	148.00
Sheep Coulee	0.00	0.00	0.00
Unnamed Coulee	16.00	0.00	16.00
Horse Camp Coulee	141.00	65.00	206.00
Shady (Butte) Coulee	29.00	0.00	29.00
Big Cottonwood Creek	596.00	0.00	596.00

IRRIGATION SUMMARY OF PHILLIPS COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN (Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigated and Irrigable Acres
Woody Island Creek	851.00	10.00	861.00
Joiner Coulee	56.00	0.00	56.00
Wilson Coulee	0.00	0.00	0.00
Unnamed Coulee	30.00	0.00	30.00
Lambing Shed Coulee	0.00	0.00	0.00
Unnamed Coulee	27.00	0.00	27.00
Shed Coulee	70.00	0.00	70.00
Davenport Coulee	0.00	0.00	0.00
Unnamed Coulee	0.00	0.00	0.00
Round Lake	44.00	0.00	44.00
Unnamed Coulee	18.00	0.00	18.00
Unnamed Spring	10.00	0.00	10.00
Cedar Coulee	12.00	20.00	32.00
Total Big Cottonwood and Tributaries	**1,714.00**	**30.00**	**1,744.00**
Little Cottonwood Creek	64.00	0.00	64.00
Mount (East Fork Little Cottonwood) (Routledge) Coulee	74.00	0.00	74.00
Wood Coulee	71.00	0.00	71.00
Belle Coulee	37.00	0.00	37.00
Langdon Coulee	30.00	0.00	30.00
Unnamed Coulee	21.00	0.00	21.00
Martins (Austin) (Hans) Coulee	115.00	86.00	201.00
Unnamed Coulee	16.00	0.00	16.00
McNeil Slough	231.00	21.00	252.00
Whitewater Creek	1,093.00	761.00	1,854.00
Unnamed Coulee	15.00	0.00	15.00
Unnamed Coulee	35.00	0.00	35.00
Dibble Coulee	0.00	0.00	0.00
Martin Lake	328.00	80.00	408.00
Martin Lake Coulee	0.00	0.00	0.00
Gloyn Coulee	91.00	0.00	91.00
Cowie Coulee	277.00	0.00	277.00
North Cowie Coulee	72.00	0.00	72.00
Unnamed Coulee	80.00	137.00	217.00
Unnamed Coulee	10.00	0.00	10.00
Horseshoe Lake	20.00	0.00	20.00
Unnamed Coulee	4.00	0.00	4.00
Barton Coulee	0.00	0.00	0.00
Unnamed Coulee	27.00	176.00	203.00
Lake Coulee	79.00	121.00	200.00
East Fork Whitewater Creek	124.00	0.00	124.00
Kashaw Coulee	3.00	0.00	3.00
Dunhan (Mavencamp) Coulee	46.00	0.00	46.00
North Fork Whitewater Creek	308.00	0.00	308.00
Unnamed Coulee	0.00	0.00	0.00
Greve Lake	0.00	0.00	0.00
Unnamed Coulee	28.00	0.00	28.00

IRRIGATION SUMMARY OF PHILLIPS COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN (Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigated and Irrigable Acres
Unnamed Coulee	50.00	0.00	50.00
Unnamed Coulee	60.00	0.00	60.00
Lone Tree Coulee	57.00	0.00	57.00
Unnamed Coulee	0.00	23.00	23.00
Unnamed Coulee	93.00	0.00	93.00
Unnamed Coulee	36.00	0.00	36.00
Unnamed Coulee	220.00	113.00	333.00
Dick Thomas Coulee	83.00	0.00	83.00
Clark Coulee	24.00	14.00	38.00
Bell Coulee	77.00	0.00	77.00
Unnamed Coulee	42.00	0.00	42.00
Unnamed Coulee	79.00	0.00	79.00
Total Whitewater Creek and Tributaries	**3,461.00**	**1,425.00**	**4,886.00**
Stinky Creek	216.00	29.00	245.00
Unnamed Coulee	24.00	0.00	24.00
West Fork Stinky Creek	35.00	0.00	35.00
Unnamed Coulee	23.00	0.00	23.00
East Fork Stinky Creek	33.00	0.00	33.00
Unnamed Coulee	0.00	10.00	10.00
Unnamed Coulee	3.00	0.00	3.00
Dry Stinky Creek	13.00	0.00	13.00
Little Coulee	13.00	0.00	13.00
Powell (Turkey Track) Coulee	0.00	55.00	55.00
Terralls Coulee	51.00	0.00	51.00
Davis Coulee	80.00	0.00	80.00
Frenchman Creek	3,501.00	485.00	3,986.00
Unnamed Coulee	17.00	16.00	33.00
Unnamed Coulee	14.00	0.00	14.00
Andrew Jardine Coulee	29.00	0.00	29.00
Three Chimney Coulee	42.00	0.00	42.00
Corral Coulee	29.00	0.00	29.00
Rattlesnake (Snake) Coulee	72.00	72.00	144.00
Poplar Coulee	107.00	130.00	237.00
Porcupine Coulee	139.00	0.00	139.00
Brush Coulee	4.00	0.00	4.00
Big (Prestige) (Powell) Coulee	76.00	0.00	76.00
Bone Spring (Sheep Shed) (Shed) Coulee	309.00	0.00	309.00
Bell Coulee (Canyon)	27.00	0.00	27.00
Anderson Coulee	4.00	0.00	4.00
Double S Coulee	50.00	0.00	50.00
Total Frenchman Creek and Tributaries	**4,420.00**	**703.00**	**5,123.00**
Beaver Creek	5,741.00	2,385.00	8,126.00
Parrott (Sanders) (Reservoir) Coulee	226.00	0.00	226.00
Unnamed Coulee	22.00	0.00	22.00
Seven Mile Coulee	303.00	445.00	748.00
Unnamed Coulee	30.00	0.00	30.00

IRRIGATION SUMMARY OF PHILLIPS COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN (Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigated and Irrigable Acres
Unnamed Coulee	59.00	0.00	59.00
Unnamed Coulee	37.00	0.00	37.00
Lone Tree Coulee	77.00	0.00	77.00
Beskeys Coulee	5.00	0.00	5.00
Lonesome Coulee	22.00	0.00	22.00
Big Warm Springs Creek	1,814.90	1,403.00	3,217.90
Cabbage Creek	42.00	0.00	42.00
Little Warm Spring Creek	2,167.00	195.00	2,362.00
Wild Horse Creek	384.00	1,410.00	1,794.00
North Fork Wild Horse Creek	15.00	0.00	15.00
South Fork Wild Horse Creek	0.00	0.00	0.00
Mid Fork Wild Horse Creek	12.00	0.00	12.00
Spring Coulee	18.00	0.00	18.00
Four Mile Coulee	202.00	278.00	480.00
John Brawn Coulee	188.00	0.00	188.00
Smith Coulee	152.00	0.00	152.00
Unnamed Coulee	181.00	0.00	181.00
Unnamed Coulee	14.00	6.00	20.00
Unnamed Coulee	29.00	100.00	129.00
Horse Pasture Coulee	57.00	0.00	57.00
Unnamed Coulee	59.00	0.00	59.00
Unnamed Coulee	24.00	0.00	24.00
Flat (Sun Prairie) (Flatwillow) (Whitcomb Sag) Creek	192.00	280.00	472.00
First Creek	1,460.00	0.00	1,460.00
Unnamed Coulee	92.00	0.00	92.00
Dog Creek	852.00	0.00	852.00
Box Elder Creek	309.00	0.00	309.00
Coal Mine Creek	22.00	0.00	22.00
Unnamed Coulee	119.00	50.00	169.00
Lone Horse Coulee	129.00	0.00	129.00
Sage Creek	1,294.00	0.00	1,294.00
Buckley Lake Coulee	36.00	24.00	60.00
Larkin Wilson Creek	391.00	0.00	391.00
(Little) Seven Mile Coulee	484.00	0.00	484.00
Tallow Creek	469.00	0.00	469.00
North Fork Tallow Creek	28.00	0.00	28.00
South Fork Tallow Creek	0.00	0.00	0.00
Skogseth Coulee	23.00	0.00	23.00
Florence Coulee	17.00	0.00	17.00
Russell Coulee	18.00	0.00	18.00
Frog Coulee	83.00	0.00	83.00
Rheumatism Coulee	0.00	0.00	0.00
Foley Coulee	227.00	0.00	227.00
Box Elder (Spring) Creek	31.00	278.00	309.00
Grove Coulee	240.00	0.00	240.00
Twin Lake Coulee	268.00	0.00	268.00
No Name Coulee	0.00	230.00	230.00

IRRIGATION SUMMARY OF PHILLIPS COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN (Continued)	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigated and Irrigable Acres
Albert Coulee	60.00	0.00	60.00
DHS (Box Elder) Creek	8.00	0.00	8.00
North Fork DHS Creek	75.00	0.00	75.00
Unnamed Coulee	6.00	0.00	6.00
Unnamed (Swede) Lake	122.00	0.00	122.00
Unnamed Coulee	30.00	0.00	30.00
Unnamed Coulee	15.00	0.00	15.00
Unnamed Coulee	135.00	0.00	135.00
Murray Coulee	0.00	52.00	52.00
Slough (Old Channel)	0.00	0.00	0.00
Wagon Box Coulee	107.00	0.00	107.00
Cottonwood Coulee	0.00	0.00	0.00
Unnamed Coulee	0.00	0.00	0.00
Unnamed Coulee	24.00	0.00	24.00
Moss Coulee	55.00	0.00	55.00
Snowbank Coulee	48.00	0.00	48.00
LeNoir Coulee	273.00	0.00	273.00
Unnamed Coulee	75.00	0.00	75.00
Blue Coulee	15.00	0.00	15.00
Total Beaver Creek and Tributaries	**19,712.90**	**7,136.00**	**26,848.90**
Larb Creek	251.00	5.00	256.00
Dinker Coulee	16.00	0.00	16.00
Abel Coulee	19.00	0.00	19.00
McNab Coulee	71.00	0.00	71.00
Third Creek	61.00	40.00	101.00
Shaw Coulee	27.00	0.00	27.00
Tank Creek	7.00	0.00	7.00
First Creek	210.00	30.00	240.00
Total Milk River and Tributaries	**78,026.62**	**21,131.43**	**99,158.05**
GRAND TOTAL MISSOURI RIVER— PHILLIPS COUNTY	**87,140.62**	**22,379.43**	**109,520.05**

FORT BELKNAP IRRIGATION PROJECT

(Fort Belknap Indian Reservation)

HISTORY

The Fort Belknap Indian Reservation is located in Blaine and Phillips Counties in north central Montana. The reservation is rectangular in shape and covers an area of about 40 miles in length from the Milk River (north boundary) to the Little Rocky Mountains in the south. In width the reservation extends for a distance of about 25 miles with three-fourths of the total area lying within Blaine County. Fort Belknap Agency headquarters are located in the northwestern part of the reservation on U. S. Highway#2, five miles southeast of the town of Harlem.

The first irrigation practiced on the Fort Belknap Indian Reservation was in the year 1893 when a small ditch was constructed from the right bank of the Milk River near the site of the present agency headquarters.

On March 27, 1894, a survey was started to determine the irrigable lands on the reservation and included the Milk River, Peoples Creek, Lodge Pole Creek, and the Snake Creek systems.

The next step in the development of irrigation on the reservation was in 1898 when additional expenditures were received for the Milk River and Big Warm Creek irrigation systems. Work continued on these projects for the next four years until 1902 at which time the Big Warm Unit was completed. In 1903, work continued on the Milk River System and the Three-Mile Reservoir was constructed.

Irrigation systems that are operating on the Fort Belknap Indian Reservation in Phillips County are part of the White Bear Unit, Ereaux Unit, Big Warm Unit and numerous private ditch systems. For additional information on the Fort Belknap Irrigation Project see Blaine County, Water Resources Survey publication, dated June 1967.

PRESENT STATISTICS

Location: The location of lands irrigated on the Fort Belknap Indian Reservation in Phillips County are as follows:

White Bear Unit "C" Canal has its point of diversion in SW¼SE¼, Section 28, T. 31N-R. 25E at the end of the Milk River main canal in Blaine County. About 4 miles of the main canal is located in Blaine County with laterals at the lower end in Phillips County. Irrigation from the "C" Canal laterals in Phillips County are in Sections 18-20 inclusive, and 29-32 inclusive, T. 31 N-R. 26E.

The Ereaux Unit Canal—has its point of diversion from Peoples Creek in the NE¼NW¼ of Section 21, T. 30N-R. 26E and irrigates land in Sections 26, 27, 29, and 31-36 inclusive, T. 31N-R. 26E and Section 1-5 inclusive, 8-10 inclusive, and 16, T. 30N-R. 26E.

Point of diversion for the **Big Warm Unit Canal** is in SW¼SW¼ of Section 3, T. 26N-R. 26E. and irrigates land in Section 3, T. 26N-R. 26E; and Section 21 and 22, T. 27N-R. 26E.

Length and Capacity of Canals: The White Bear Unit Canal has a capacity of 70 c.f.s. and is about 5 miles in length. About 1 mile of the canal is located in Phillips County.

The Ereaux Unit Canal—is approximately 5 miles in length and has a capacity of about 50 c.f.s.

The Big Warm Unit Canal System is in poor condition and in need of major repairs to operate at full capacity.

At the upper end of the canal there is a small acreage irrigated and near the lower end of the canal there are several acres irrigated from the Turcotte Reservoir. The Turcotte Reservoir has a capacity of 249 acre-feet. The initial capacity of the Big Warm Canal is about 50 c.f.s. and it has a total length of 7 miles.

Present Users: The **White Bear Unit** had a total of 55 Indian Allotments in Phillips County in 1967.

Under the **Ereaux Unit** there were 59 Indian Allotments in 1967.

The **Big Warm Unit** had a total of 63 potential Indian Allotments under the system in 1967.

Acreage Irrigated: The White Bear Unit in 1967 had 1,740 acres irrigated, 138 acres potentially irrigable under existing facilities and a total maximum irrigated and irrigable acreage of 1,878 acres.

The acres irrigated under the **Ereaux Unit** totaled 2,782.80 acres with no potential irrigable acres under the ditch system in 1967.

The **Big Warm Unit** had a total 392 acres irrigated in 1967 and no potential irrigable acres listed under the system.

WATER RIGHT DATA

The water rights that apply to the Fort Belknap Irrigation Project are:

Decreed to the Fort Belknap Indian Reservation the first right of 5,000 miner's inches or 125 c.f.s. of waters of the Milk River and its tributaries. (Reference: Case #747, Circuit Court of the U.S.A., Ninth Circuit, William A. Hunt, Judge, Helena, Montana, dated 4-21-1906, filed in Federal Records Center, G.S.A., 6125 Sandpoint Way, Seattle, Washington.) The Fort Belknap Indian Reservation is entitled by an agreement with the Bureau of Reclamation to one-seventh interest in the available storage in the Fresno Reservoir. The available annual storage capacity in the Fresno Reservoir is 127,200 acre-feet; one-seventh interest of this annual storage would be 15,310 acre-feet.

(See maps in Part II; White Bear Unit, page 58; Ereaux Unit, page 58; and Big Warm Unit, pages 29 and 34.)

FRENCHMAN IRRIGATION COMPANY

(Mutual)

HISTORY

The Frenchman Irrigation Company was first incorporated as a company on April 5, 1905. The term of years for the corporation was for a 20-year period and the shares of stock issued by the company totaled 4,800 shares at a par value of $1.00 per share. All of the shares of stock issued were subscribed to by the stockholders in the company.

Among the first water users in the Frenchman Irrigation Company were: Fredrick Groves of Hinsdale and James H. Jordan and Benjamin R. Richardson, both of Saco.

Since April 4, 1925 (after the 20-year period expired for the term of existence for the corporation), the Frenchman Irrigation Company has operated as mutual ditch company. Shares of stock in the company were reduced from 4,800 shares to 48 shares and the cost per share increased from $1.00 to $100.00 for each share of stock. All of the 48 shares are presently owned by members of the Frenchman Irrigation Company. Under this project water is supplied to all of the water users of the company from the Frenchman Creek Storage Project. Each of the company stockholders are members of the Frenchman Water Users Association, a corporation which enables them to purchase supplemental water from the Frenchman Creek storage reservoir.

PRESENT STATISTICS

Location: The point of diversion of the main canal is in the SE¼SE¼ of Section 22, T. 33 N-R. 34E; and irrigates land in Section 26, 27, 34 and 35, T. 33N-R. 34E; Section 1, 2, 11-14 inclusive, and 24 T. 32N-R. 34E; and Sections 18, 19, and 20, T. 32N-R. 35E.

Length and Capacity of Canal: The Frenchman Irrigation Company main canal is about 4 miles in length to where it spills into the McChesney Reservoir. From the reservoir the canal continues for another 2¾ miles to the county line separating Phillips and Valley Counties. The main canal continues for about another mile in Valley County before separating into various lateral ditches. The initial capacity of the canal is about 75 c.f.s.

Capacity of Reservoir: The McChesney Reservoir has a surface area of 90 acres and a capacity of 700 acre-feet.

Operation and Maintenance: Charges for operation and maintenance vary from year to year and are based on the number of shares of stock owned by the stockholders in the company.

Present Users: There were 10 active stockholders using water in the Frenchman Irrigation Company during the year of 1967.

Acreage Irrigated: In 1967 there were 1,837 irrigated acres and 236 acres potentially irrigable under the present ditch system. There is a small acreage irrigated by this irrigation company in Valley County.

WATER RIGHT DATA

The Frenchman Irrigation Company was decreed the first 4,440 miner's inches of the waters of Frenchman Creek. (Reference Case #4024, Clerk of the Courts office, Malta, Montana.)

(See maps in Part II, pages 69 and 75.)

FRENCHMAN CREEK STORAGE PROJECT

(Montana Water Resources Board)

HISTORY

At the request of the local people in the vicinity north of Saco, Montana, the Water Conservation Board authorized a survey of the project on June 2, 1949.

Bids for construction were received on August 3, 1950, and the dam was completed in November 1951. This area, including all of the Milk River drainage suffered a very severe flood in the early spring of 1952. Because of the flood conditions, the reservoir was filled to capacity before there was an opportunity to test the structure. Due to the flood, the spillway and a large section of the west abutment was washed out by the heavy spring run-off.

The Board immediately made plans to repair the structure with financial aid secured from Federal Flood Disaster funds. The dam was repaired in time to store water for the irrigation season of 1953.

One of the requirements of the Water Board in the construction of the project was the formation of the Frenchman Water Users Association. The Association was incorporated for a term of 40 years and its articles filed with the Secretary of State on August 15, 1950. Shares of stock issued for the corporation totaled 10,000 shares at a par value of $1.00 per share. The by-laws of the Association provided for the election of five directors.

Water Purchase contracts for the project were issued for a period of forty years with an annual payment of 75¢ per acre-foot plus operation and maintenance. It was originally proposed that the Frenchman Irrigation Company would subscribe for 6,000 acre-feet with 1,000 acre-feet available for other lands in the vicinity of the reservoir. There are some lands irrigated above the reservoir by substituting storage water for high priority water rights below the reservoir.

PRESENT STATISTICS

Location: Water stored in the Frenchman Reservoir is spilled into Frenchman Creek and diverted into the Frenchman Irrigation Company Canal in the SE¼SE¼ of Section 22, T. 33N-R. 34E; and provides a supplemental water supply for the irrigation of lands in Sections 26, 27, 34 and 35, T. 33N-R. 34E; Sections 1, 2, 11-14 inclusive, and 24, T. 32N-R. 34E; and Sections 18, 19, and 20, T. 32N-R. 35E. A full water supply is provided to private pump systems above and below the storage reservoir for the irrigation of land in Sections 1, 12-14 inclusive, and 24, T. 37N-R. 33E; Section 6, T. 37N-R. 34E; Sections 2, 11, 14, 23-26 inclusive, T. 35N-R. 34E; and Sections 1, 14, 23, and 26, T. 34N-R. 34E; and Sections 2, 15, 21, and 22, T. 33N-R. 34E. There is some irrigation under the Frenchman Water Users Association and the Frenchman Irrigation Company in Valley County.

Size and Capacity of Reservoir: The Frenchman Reservoir covers a surface area of 675 acres and has a storage capacity of 7,010 acre-feet.

Operation and Maintenance: Under this storage project operation and maintenance charges are 25¢ for each acre-foot of water purchased. Total water charges including operation and maintenance are $1.00 per acre-foot.

Present Users: During the year of 1967 there were 22 individual water users having contracts for 5,950 acre-feet of water under the Frenchman Creek Storage Project. At the present time there is 1,050 acre-feet of water available for purchase in the reservoir.

Acreage Irrigated: In 1967 there were 1,056 acres irrigated and 193 acres potentially irrigable under existing ditch facilities. The maximum acres irrigated and irrigable for this irrigation project is 1,249 acres.

WATER RIGHT DATA

The water right that applies to this irrigation project is an appropriation filed by the State Water Conservation Board from Frenchman Creek dated 7-25-1950 for all the unappropriated water of Frenchman Creek. (Reference: Book 1, Water Right Records, page 280, Clerk and Recorders office, Phillips County, Montana.)

(See maps in Part II; pages 69, 75, 79, 84, and 90.)

MILK RIVER PROJECT (U. S. BUREAU OF RECLAMATION)

Malta Division

(Including Dodson and Malta Irrigation Districts)

HISTORY

Irrigation in the Milk River Valley was first initiated by white settlers who built small, private, irrigation systems. The first water right filed on the Milk River was in 1889 by T. B. Burns, who in 1890 joined with his neighbors in constructing a community diversion dam in the vicinity of the present Fort Belknap Diversion Dam.

In 1891 investigations were started to determine the means of supplementing the low summer flow of the Milk River. It was found that the most feasible plan was the diversion of the St. Mary River water into the headwaters (north fork) of the Milk River. Both of these rivers, however, run through Canada, which necessitated a water rights agreement with Canada before the plan could be consummated.

Increasing irrigation activities in the Milk River Valley brought urgent requests for the developments of a Milk River Project. When the Reclamation Service was established in 1902, the Milk River Project was investigated and this resulted in authorization of the project by the Secretary of the Interior on March 4, 1903.

The St. Mary Storage Unit was authorized by the Secretary of Interior on March 25, 1905, and construction begun on July 27, 1906. The treaty with Great Britain relating to the distribution between Canada and the United States of the waters of the St. Mary and Milk Rivers was signed on January 11, 1909. The Dodson Diversion Dam was completed in January of 1910 and the first water delivered for irrigation in the season of 1911.

Dams were completed on Sherburne Lake, Nelson Reservoir, St. Mary River, and Swift Current Creek in 1915, Vandalia Dam in 1921, and Fresno Dam in 1939. Fresno Dam and Reservoir, formerly called Chain Lakes Dam and Reservoir, was constructed under the National Industrial Recovery Act and approved by the President in August 1955 pursuant to the acts of June 25, 1910 and December 5, 1924.

The Dodson Pumping Unit was approved by the President on March 17, 1944, and under the Water Conservation Act of August 11, 1939, the project was constructed to furnish water for about 1,655 acres of land above the gravity system.

The Milk River project is located in Glacier, Blaine, Phillips and Valley Counties, Montana. Water is diverted from the St. Mary River and stored in Sherburne Lake and then diverted through a 29-mile canal discharging into the North Fork of the Milk River. It then flows through Canada for 216 miles before returning to the United States. Milk River water is stored in Fresno Reservoir located 17 miles west of Havre, Montana, and in Nelson Reservoir, located 19 miles northeast of Malta. The water is diverted from the Milk River near Chinook and Harlem into private canals on each side of the river for land in that area, comprising the Chinook Division. Near Dodson, the Dodson North and the Dodson South canals of the Malta Division divert water for irrigation of land in the vicinity of Dodson, Wagner, Malta and Bowdoin. The Dodson South Canal conveys water for irrigation of land on the Malta Division south of the Milk River and also conveys water for storage in the Nelson Reservoir. From this storage, land is irrigated on the south side of the Milk River and Beaver Creek near Saco and Hinsdale. At the Vandalia Diversion Dam, the Vandalia South Canal follows along the south side of the Milk River, and carries water for irrigation of land near Tampico, Glasgow and Nashua which comprises the Glasgow Division. Land is also irrigated above the level of the gravity system along the Milk River Valley. This is accomplished by the Dodson Pumping Unit which elevates water from the Dodson North canal to irrigate additional lands above the gravity system.

The operation of all storage facilities is by the Bureau of Reclamation with funds advanced by the water users.

Malta Division

Except for storage facilities, all water supply and distribution works were constructed, operated and maintained by the Dodson Irrigation District and the Malta Irrigation District comprising the Malta Division. Water is diverted at the Dodson Diversion Dam into the Dodson North and the Dodson South canals for the Malta Irrigation District. The Dodson Pumping Plants lifts water from the Dodson North canal for the Dodson Irrigation District.

PRESENT STATISTICS

Location: Lands irrigated in the two districts of the Malta Division are as follows:

Dodson Irrigation District—lands are located in Sections 28-30 inclusive, 32-34 inclusive, and 35, T. 31N-R. 27E; and Sections 2, 3, and 11, T. 30N-R. 27E. The point of diversion is on the left bank in the NW¼NW¼ of Section 31, T. 31N-R. 27E. for the diversion from the Dodson North Canal to the Dodson Pumping Plant. The Dodson Pumping Plant is located in the SW¼SW¼ of Section 30, T. 31N-R. 27E.

Malta Irrigation District—the point of diversion the **Dodson North Canal** is in the NW¼ SE¼ of Section 26, T. 31N-R. 26E and irrigates land in Section 36, T. 31N-R. 26E; Sections 31-34 inclusive, T. 31N-R. 27 E; Sections 2-6 inclusive, 8-14 inclusive, T. 30N-R. 27E; Sections 7-18 inclusive, T. 30N-R. 28E; Sections 7, 8, 12-18 inclusive, and 21-23 inclusive, T. 30N-R. 29E; Sections 3-10 inclusive, 17 and 18, T. 30N-R. 30E and Sections 27, 28, 33, and 34, T. 31N-R. 30E.

The point of diversion of the Dodson South Canal is in the SW¼SE¼ of Section 26, T. 31N-R. 26E and irrigates land in Section 1, T. 30N-R. 26E; Sections 4, 6-10 inclusive, 13 and 14, T. 30N-R. 27E; Sections 7-10 inclusive, 13-18 inclusive, and 20-24 inclusive, T. 30N-R. 28E; Sections 13-19 inclusive, 21-24 inclusive, 26-32 inclusive, T. 30N-R. 29E; Sections 1-3 inclusive, 8-15 inclusive, 8-15 inclusive, 17-20 inclusive, and 22, T 30N-R. 30E; Sections 34 and 35, T. 31N-R. 30E; Sections 6 and 7, T. 30N-R. 31E; Sections 13, 24 and 31, T. 31N-R. 31E; and Sections 18 and 19, T. 31N-R. 32E.

A lateral of the Dodson South Canal named the Bowdoin Canal has its point of diversion in the NE¼NW¼ of Section 13, T. 30N-R. 30E and irrigates land in Sections 12, 13, and 14, T. 30N-R. 30E; Sections 1, 7, 8, 11, 12, and 14-18 inclusive, T. 30N-R. 31E; and Sections 3-10 inclusive, 17-21 inclusive, and 29-32 inclusive, T. 30N-R. 32E.

Under the Malta Irrigation District the **Nelson North Canal** from the Nelson Reservoir has its point of diversion in the SE¼NE¼ of Section 14, T. 32N-R. 32E. Lands irrigated from this canal system are located in Sections 12 and 13, T. 32N-R. 32E. The Nelson North Canal also supplies water to private users and the Glasgow Division in Valley County.

The Nelson South Canal has its point of diversion from the south side of the Nelson Reservoir in the SE¼SE¼ of Section 14, T. 32N-R. 32E. Irrigation from this canal system is in Section 24, T. 32N-R. 32E; Sections 19, 20, and 25-36 inclusive, T. 32N-R. 33E; Section 31, T. 32N-R. 34E; Sections 1-6 inclusive, and 12, T. 31N-R. 33E; and Sections 5-9 inclusive, 16-18 inclusive, 20 and 21, T. 31N-R. 34E.

The Nelson South Canal extends into Valley County and irrigates land there under the Malta Irrigation District.

Length and Capacity of Canals: The Dodson Diversion Canal, from Dodson North Canal to the pumping plant is about ½ mile in length and has a capacity of 50 c.f.s. Two impeller pumps are installed in the pumping plant, each with a capacity of 15 c.f.s. The total lift from the Dodson North Canal to the Dodson Pump Canal is 20.5 feet.

Dodson North Canal—from Dodson Diversion Dam about 4 miles west of Dodson, Montana, follows a generally easterly direction along the Milk River for a distance of 27¼ miles and has an initial capacity of 200 c.f.s.

Dodson South Canal—from Dodson Diversion Dam about 4 miles west of Dodson, Montana, follows east along the Milk River for a distance of 44½ miles and has a capacity of 500 c.f.s.

Bowdoin Canal—a lateral of the Dodson South Canal follows an easterly direction for about 8 miles, then turns generally south for another 8 miles, having a total length of 16 miles. This canal has a capacity of approximately 200 c.f.s.

Nelson North Canal—diverts from north side of Nelson Reservoir for a distance of ½ mile where it spills into the Milk River. This canal has a capacity of 250 c.f.s.

Nelson South Canal—from the eastern end of the Nelson Reservoir follows a generally southeasterly direction for 13 miles to the county boundary between Phillips and Valley Counties. From the Phillips County line it continues east for another 12 miles in Valley County. This canal has a total length of 25 miles and a capacity of 500 c.f.s.

Size and Capacity of Reservoirs: Sherburne Lake has an active storage between elevations 4,726 ft. and 4,788 ft. of 66,100 acre-feet and covers a surface area of 1,730 acres.

Fresno Reservoir has an active storage between elevations 2,530 ft. and 2,575 ft. of 127,200 acre-feet and covers a surface of 5,800 acres.

Nelson Reservoir active storage between elevations 2,200 ft. and 2,223 ft. is 66,800 acre-feet and cover a surface of 4,560 acres.

Carriage Facilities—Length and Capacity: The St. Mary Canal from the St. Mary Diversion Dam to the North Fork of the Milk River has a total length of 29 miles and a capacity of 850 c.f.s.

Operation and Maintenance: The following are the 1967 assessments levied for the two irrigation districts of the Malta Division in Phillips County:

Dodson Irrigation District

Land Class.	O. & M.	Const.	Total
1	$1.50	$1.60	$3.10
2	1.38	1.60	2.98
4	1.00	1.60	2.60
5D	.20	-0-	.20

Malta Irrigation District

Land Class.	O. & M.	Const.	Total
1	$2.80	$1.00	$3.80
2	2.73	.95	3.68
3	2.60	.60	3.20
4a	2.20	.40	2.60
4b	1.45	.25	1.70

Present Users: As of the date of our survey in 1967 there were 14 water contracts under the Dodson Irrigation District and 377 under the Malta Irrigation District in Phillips County.

Acreage Irrigated: Under the Dodson Irrigation District in 1967 there were 1,004.25 acres irrigated with 419.50 acres potentially irrigable under the ditch system, totaling a maximum of 1,423.75 acres for the district.

The Malta Irrigation District in 1967 had a total of 32,484.67 acres irrigated and 7,222.93 potentially irrigable under present facilities, totaling a maximum 39,707.60 acres under the district in Phillips County.

The Bureau of Reclamation sells some surplus water to private users as well as individual pumping contracts for other individuals not in the irrigation districts. In Phillips County surplus water purchases were for 877 acres irrigated and 1,252 acres potentially irrigable. Pumping contracts totaled 5,229 acres irrigated and 1,327 acres potentially irrigable.

WATER RIGHT DATA

The water rights that apply to the Malta Division of the Milk River Project in Phillips County are as follows:

1. Appropriation by the U.S.A. from the St. Mary River dated 5-25-1918 for 25,000 c.f.s. (Reference: Book A, Water Right Record, page 282.)

2. Appropriation by the U.S.A. from the St. Mary Reservoir dated 9-29-1921 for 25,000 c.f.s. (Reference: Book 1, Water Right Records, page 72.)

3. Appropriation by the U.S.A. from the Swift Current Creek dated 5-29-1912 for 7,500 c.f.s. (Reference: Book A, Water Right Records, page 61.)

All of the above water right filings are located in the Clerk and Recorder's Office, Glacier County, Montana.

(See maps in Part II, Dodson Irrigation District, pages 51 and 59; Malta Irrigation District, pages 50, 51, 52, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 67, 68, and 69.)

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

	APPROPRIATIONS (Filings of Records)						
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	24	10,388.00	259.70				
Cow Creek	0	0	0				
Squaw Creek	2	400.00	10.00				
South Fork Squaw Creek	1	200.00	5.00				
Cabin Creek	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Unnamed Springs	1	50.00	1.25				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	12,000.00	300.00				
Bull Creek	4	1,100.00	27.50				
Wysocki (Bull Creek) Spring	2	92.00	2.30				
West Fork Bull Creek	1	3.00	.08				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	80.00	2.00				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	160.00	4.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lind (Winter) Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	3,000.00	75.00				
Antelope Coulee	2	288,000.00	7,200.00				
Unnamed Coulee	1	10,000.00	250.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Duval Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Cyprian (Sipary Ann) (Slippery Ann) Creek	11	10,960.00	274.00				
Landusky Springs	1	1,600.00	40.00				
Mud Creek	1	80.00	2.00				
Unnamed Coulee	0	0	0				
Willow Spring	1	100.00	2.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	25,000.00	625.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				

* 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 — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	3,200.00	80.00				
Unnamed Coulee	1	6,000.00	150.00				
Unnamed Coulee	1	2,480.00	62.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Rock Creek	23	38,474.00	961.85	305	12	1,046.00	26.15
Sullivan Creek	1	---	---				
Montana (Mill) (Sawmill) Creek	11	1,710.00	42.75	305	1	20.00	.50
Chrystal Spring	1	250.00	6.25				
Unnamed Spring	1	120.00	3.00				
Morrison Springs	1	400.00	10.00				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	All	---	305	1	5.00	.13
Warm Springs Creek	11	3,720.00	93.00	305	3	380.00	9.50
Warm Springs	2	200.00	5.00				
Dry Gulch	0	0	0				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lavalle (Cottonwood) Coulee)	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Little Cottonwood Creek	2	All	---				
Unnamed Coulee	1	6,800.00	170.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	4,800.00	120.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Total Rock Creek and Tributaries	**79**	**59,074.00**	**1,476.85**				
Wilder Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Beach Coulee	1	200.00	5.00				
Rea's Coulee	1	8,000.00	200.00				
Unnamed Coulee	1	2,000.00	50.00				
Seven Mile Creek	4	131.00	3.28				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Bell Coulee (Nichols Creek)	2	6,000.00	150.00				
Unnamed Coulee	1	All	---				
C.K. Creek	6	2,723.00	68.08				
Camp Creek	12	4,200.00	105.00	2321	3	255.00	6.38
Grouse Creek	13	2,980.00	74.50				
Alder Creek	25	8,120.00	203.00				
West Fork Alder Creek	1	200.00	5.00				
2nd Fork Alder Creek	1	100.00	2.50				
Unnamed Spring	1	40.00	1.00				
Guthrie Springs	2	60.00	1.50				
Pole Gulch	1	40.00	1.00				
Unnamed Spring	2	120.00	3.00				
Unnamed Spring	1	---	---				
Unnamed Spring	1	All	---				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	40.00	1.00				
Ruby Gulch	10	1,880.00	47.00				
North Branch Ruby Gulch	2	350.00	8.75				
Independent Gulch	2	1,550.00	38.75				
East and West Coulee	2	400.00	10.00				
Armstrong Spring	1	20.00	.50				
Peters (Mosher) Spring	2	140.00	3.50				
Whitmore Spring Creek	1	100.00	2.50				
Coal Butte Coulee	1	400.00	10.00				
Unnamed Coulee	1	6,400.00	160.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	8,400.00	210.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	7,820.00	195.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Spring Creek	1	400.00	10.00				
Unnamed Coulee	1	2,000.00	50.00				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	5,600.00	140.00				
Unnamed Coulee	1	5,400.00	135.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Total C.K. Creek and Tributaries	**104**	**61,483.00**	**1,537.08**				
Dam Coulee	1	200.00	5.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Beauchamp Creek	2	4.00	.10				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	5,000.00	125.00				
Unnamed Coulee	1	5,000.00	125.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Trine Creek	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	8,000.00	200.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	9,000.00	225.00				
Unnamed Coulee	1	2,800.00	70.00				
Unnamed Coulee	1	6,000.00	150.00				
Unnamed Coulee	1	6,000.00	150.00				
Dry Fork (North Fork) Beauchamp Creek	4	4,900.00	122.50				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	6,000.00	150.00				
Garey Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	6,000.00	150.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	3,000.00	75.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Hawley (Coburn Coulee) (Holly) Creek	5	22,120.00	553.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
First (Dam) Coulee	7	8,400.00	210.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Jim Wells Creek	2	1,200.00	30.00				
Total Beauchamp Creek and Tributaries	**71**	**113,424.00**	**2,835.60**				
Fourchette Creek	17	5,577.00	139.43				
Henderson Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lone Tree Coulee	3	600.00	15.00				
East Coulee	2	600.00	15.00				
Bratager Creek	1	All	---				
Unnamed Spring	1	All	---				
Smith Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
North Fork Fourchette Creek	6	2,900.00	72.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Valentine Coulee	2	800.00	20.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Matobich Artesian Well #1	1	.36	.01				
Unnamed Coulee	1	All	---				
Ursula Coulee	1	2,000.00	50.00				
Cart Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Cottonwood Coulee	1	120.00	3.00				
Camp (Shellito) Creek	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	2	All	---				
Daisy Coulee	1	1,000.00	25.00				
Gold Coulee	1	All	---				
Dry (Cottonwood) Coulee	1	All	---				
Mickie Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Wire Corral Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Rush Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Telegraph Creek	12	2,780.00	69.50				
North Fork Telegraph Creek	2	400.00	10.00				
North Pine Fork Telegraph Creek (Willson Coulee)	2	600.00	15.00				
Dogtown Coulee	1	200.00	5.00				
Alfalfa Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Koss Spring	1	40.00	1.00				
South Fork Telegraph Creek	3	200.00	5.00				
Lone Tree Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Second Creek	12	2,220.00	55.50				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Long (Tank) (East Fork Second Creek) Coulee	8	3,000.00	75.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Stockade Coulee	6	2,000.00	50.00				
Stratton (Ave) Coulee	1	All	---				
Third Creek	8	880.00	22.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Box Elder Creek	3	1,400.00	35.00				
South Fork Box Elder Creek	1	40.00	1.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Total Fourchette Creek and Tributaries	172	28,157.36	703.94				
First Creek (Johns Coulee)	3	1,040.00	26.00				
Killed Woman Creek	2	1,160.00	29.00				
Unnamed Coulee	1	All	---				
Artesian Well	1	2.00	.05				
Chippy Creek	2	1,000.00	25.00				
Timber Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Black Coulee	1	All	---				
Unnamed Coulee	1	4,000.00	100.00				
Unnamed Coulee	1	2,000.00	50.00				
Lone Tree Coulee	3	4,000.00	100.00				
Badland Coulee (Shell Rock Creek)	2	200.00	5.00				
Unnamed Coulee	1	2,000.00	50.00				
Southwest Fork Lone Tree Coulee	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Shotgun Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Shotgun Spring	1	40.00	1.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Plum Patch Creek	2	600.00	15.00				
McKay Coulee	2	200.00	5.00				
Milk River	15	356,720.00	8,918.00				
Milk (Eureka) Creek	2	800.00	20.00				
East Eureka Creek	2	800.00	20.00				
Peoples Creek	2	84,000.00	2,100.00				
Lodge Pole Creek	3	281.00	7.03				
East Fork Lodge Pole Creek	1	2,000.00	50.00				
Mud Creek	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
North Fork Mud Creek	0	0	0				
Golden Willow Creek	1	2,156.00	53.90				
Deer Creek	1	2,020.00	50.50				
Unnamed Coulee	2	600.00	15.00				
Dodson (Mud) Creek	14	92,680.00	2,317.00				
Unnamed Coulee	1	All	---				
North Fork Dodson Creek (East Fork Mud) (Mud)	6	1,800.00	45.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
West Fork Dodson Creek	1	400.00	10.00				
Unnamed Coulee	2	400.00	10.00				
Unnamed Coulee	1	---	---				
Unnamed Coulee	1	200.00	5.00				
Vaughn Coulee	2	1,200.00	30.00				
Unnamed Coulee	1	400.00	10.00				
Spring (Caselberg) (Flat) Creek	9	84,712.00	2,117.80				
Unnamed Coulee	1	80.00	2.00				
Unnamed Coulee	2	600.00	15.00				
Tom Davidson Coulee	5	82,200.00	2,055.00				
Wind Coulee	0	0	0				
Mid Fork Wind Coulee	1	100.00	2.50				
Unnamed Coulee	1	All	---				
Willow Creek	1	200.00	5.00				
Hay Coulee	1	1,000.00	25.00				
Wagner Coulee	1	1,000.00	25.00				
Unnamed Coulee	1	1,000.00	25.00				
Unnamed Coulee	1	400.00	10.00				
Gravel Coulee	1	400.00	10.00				
Lone Tree Coulee	2	3,200.00	80.00				
Bailey Creek	1	1,000.00	25.00				
Dry Coulee	2	1,500.00	37.50				
Davidson Coulee	1	1,000.00	25.00				
Unnamed Coulee	4	1,500.00	37.50				
Unnamed Coulee	1	400.00	10.00				
Exeter Coulee	1	400.00	10.00				
Exeter Creek	4	84,600.00	2,115.00				
LaFond Coulee	3	800.00	20.00				
Wilson Coulee	1	200.00	5.00				
Alkali Creek	11	91,800.00	2,295.00				
Rudolph Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Schafer Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Well	1	.36	.01				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Well	1	.36	.01				
Unnamed Coulee	1	All	---				
Brennons School Section Coulee	1	120.00	3.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Bennett Coulee	3	900.00	22.50				
West Alkali Creek	8	15,360.00	384.00				
Black Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Halfway (Partridge) Coulee	6	1,480.00	37.00				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
1st South Fork Halfway Coulee	1	200.00	5.00				
2nd South Fork Halfway Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Lake	2	800.00	20.00				
Unnamed Lake	2	600.00	15.00				
Unnamed Coulee	0	0	0				
Unnamed Lake	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Slough	1	500.00	12.50				
Unnamed Coulee	1	1,000.00	25.00				
Slough	1	1,000.00	25.00				
Box Elder Coulee	2	6,000.00	150.00				
Cottonwood (Taylor) Coulee	2	81,000.00	2,025.00				
Turmell Coulee	1	400.00	10.00				
Lone Tree Coulee	1	200.00	5.00				
Unnamed Coulee	1	4,000.00	100.00				
Sand Coulee	1	200.00	5.00				
Yadley (Elliott) Creek	4	2,800.00	70.00				
Unnamed Coulee	1	120.00	3.00				
Flat Coulee	1	400.00	10.00				
Sheep Creek	1	400.00	10.00				
Stone Creek	2	1,400.00	35.00				
Unnamed Coulee	1	400.00	10.00				
Unnamed Spring	1	200.00	5.00				
Unnamed Coulee	1	400.00	10.00				
Delaney Coulee	1	All	---				
Cook Coulee	1	600.00	15.00				
Assiniboine Creek	7	8,120.00	203.00				
Sheep Coulee	1	600.00	15.00				
Williams Coulee	2	800.00	20.00				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Spring (Circle Diamond) Coulee	4	1,000.00	25.00				
Horse Camp Coulee	3	800.00	20.00				
Unnamed Coulee	0	0	0				
Rock Lake	1	400.00	10.00				
Basin Coulee	2	200.00	5.00				
Shady (Butte) Coulee	2	600.00	15.00				
Cabin Coulee	2	600.00	15.00				
Spring Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	400.00	10.00				
Canty Coulee	1	120.00	3.00				
Big Cottonwood Creek	10	10,320.00	258.00				
Woody Island Creek	7	4,700.00	117.50				
Crisley Basin	1	160.00	4.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	4	All	---				
All Pronto Creek	1		---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Cowan (Mud Spring) Coulee	3	1,280.00	32.00				
Malta Coulee	1	400.00	10.00				
Horseshoe Coulee	1	All	---				
Horseshoe Coulee Springs	1	All	---				
Coulee Spring	1	200.00	5.00				
Scattering Springs Coulee	1	300.00	7.50				
Atkinson Coulee	2	80.00	2.00				
Unnamed Spring	1	20.00	.50				
Galvin Spring Coulee	2	80.00	2.00				
Little Jewel (Dry Cottonwood) (Jules (Spring) (Black) Coulee	2	900.00	22.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Joiner Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Wilson Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lambing Shed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	400.00	10.00				
Unnamed Coulee	1	200.00	5.00				
Pierson Coulee	1	200.00	5.00				
Willow Coulee	1	200.00	5.00				
Shed Coulee	1	200.00	5.00				
Unnamed Spring	1	400.00	10.00				
Davenport Coulee	2	400.00	10.00				
Unnamed Coulee	0	0	0				
Round Lake	1	400.00	10.00				
Prickley Pear Coulee	1	500.00	12.50				
Garland Creek	3	2,600.00	65.00				
South Fork Garland Creek	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Hurlold Coulee	1	400.00	10.00				
Long Lake	1	400.00	10.00				
Milo Coulee	1	500.00	12.50				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Spring	1	200.00	5.00				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	200.00	5.00				
Bughouse Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Spring	1	200.00	5.00				
Cut Coulee	1	All	---				
Cedar Coulee	1	200.00	5.00				
Dogtown Coulee	1	200.00	5.00				
Dry Lake	1	200.00	5.00				
Spring Coulee	1	200.00	5.00				
Total Big Cottonwood Creek and Tributaries	**95**	**29,240.00**	**731.00**				
Unnamed Coulee	1	200.00	5.00				
Little Cottonwood	11	6,020.00	150.50				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Mount Coulee (East Fork Little Cottonwood) (Routleldge)	2	800.00	20.00				
Camp Coulee	1	400.00	10.00				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	500.00	12.50				
Austin Coulee	1	500.00	12.50				
West Branch Austin Coulee	1	All	---				
Sage Coulee	1	200.00	5.00				
Unnamed Coulee	1	200.00	5.00				
Martin's (Austin) (Hans) Coulee	6	2,500.00	62.50				
Butte (Stony) Coulee	2	400.00	10.00				
Unnamed Coulee	2	240.00	6.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	200.00	5.00				
Spring Coulee (Bear Gulch Creek)	3	2,600.00	65.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	800.00	20.00				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	400.00	10.00				
Unnamed Coulee	1	200.00	5.00				
Alkali Coulee	1	200.00	5.00				
Lone Tree Coulee	2	1,100.00	27.50				
Whitewater Creek	41	105,530.00	2,638.25				
Unnamed Coulee	2	All	---				
Unnamed Coulee	6	All	---				
Unnamed Coulee	5	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Spider Lake	1	240.00	6.00				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Big Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lone Tree Coulee	2	320.00	8.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Clanton Coulee	1	200.00	5.00				
Grange Coulee	1	200.00	5.00				
Unnamed Spring	1	200.00	5.00				
Unnamed Coulee	2	All	---				
Bowen Coulee	2	200.00	5.00				
Unnamed Coulee	1	All	---				
Lone Tree Coulee	3	600.00	15.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	4	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Dibble Coulee	3	600.00	15.00				
Martin Lake	0	0	0				
Martin Lake Coulee	3	1,200.00	30.00				
Gloyn Coulee	3	10,200.00	255.00				
Unnamed Coulee	1	500.00	12.50				
Cowie Coulee	2	400.00	10.00				
North Cowie Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Horseshoe Lake	1	20,000.00	500.00				
Barton Coulee	1	800.00	20.00				
Unnamed Coulee	2	All	---				
Lake Coulee	3	200.00	5.00				
Dry Sag Coulee	1	200.00	5.00				
Flat Coulee	1	200.00	5.00				
Wren Coulee	1	2,500.00	62.50				
Unnamed Coulee	1	500.00	12.50				
Unnamed Spring	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
East Fork Whitewater Creek	4	3,200.00	80.00				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Wallis (Dunhan) Coulee	2	200.00	5.00				
Unnamed Coulee	1	All	---				
Johns Coulee	1	All	---				
Kashaw Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Dunhan (Mavencamp) Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Rueb Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Voje Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
North Fork Whitewater Creek	5	2,800.00	70.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	4	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	600.00	15.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	5	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	5	650.00	16.25				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Greve Lake	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Greve Coulee	2	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	10	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Dunbar Coulee	4	240.00	6.00				
Unnamed Coulee	2	All	---				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lone Tree Coulee	4	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Provost Coulee	1	150.00	3.75				
Unnamed Coulee	1	---	---				
Unnamed Coulee	2	200.00	5.00				
Unnamed Coulee	1	600.00	15.00				
Unnamed Coulee	1	---	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	400.00	10.00				
Unnamed Coulee	2	All	---				
Dick Thomas Coulee	5	2,200.00	55.00				
Clark Coulee	2	500.00	12.50				
Tracy Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Bell Coulee	1	480.00	12.00				
Unnamed Coulee	1	600.00	15.00				
Shotgun Creek	1	---	---				
Unnamed Coulee	0	0	0				
Unnamed Spring	1	All	---				
Unnamed Coulee	2	200.00	5.00				
Unnamed Coulee	2	400.00	10.00				
Total Whitewater Creek and Tributaries	**289**	**160,210.00**	**4,005.25**				
Stinky Creek	9	10,300.00	257.50				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	200.00	5.00				
West Fork Stinky Creek	1	All	---				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	400.00	10.00				
Unnamed Coulee	1	All	---				
East Fork Stinky Creek	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	All	---				
Unnamed Coulee	1	All	---				
Dry Stinky Creek	1	2,000.00	50.00				
Little Coulee	2	1,600.00	40.00				
Powell (Turkey Track) Coulee	2	800.00	20.00				
Lemke Coulee	2	400.00	10.00				
Terralls Coulee	1	2,000.00	50.00				
Davis Coulee	1	200.00	5.00				
Slough (Waste)	1	All	---				
Frenchman Creek	13	89,480.00	2,237.00	4024	8	5,928.00	148.20
Turkey Track Coulee	0	0	0	4024	1	40.00	1.00
Red Mud Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Cottonwood Creek	1	All	---				
Unnamed Coulee	1	All	---				
Eklund Coulee	1	---	---				
Andrew Jardine Coulee	1	200.00	5.00				
Shed Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Two Mile Coulee	1	All	---				
Three Chimney Coulee	2	1,200.00	30.00	4024	1	120.00	3.00
Corral Coulee	3	3,600.00	90.00	4024	1	450.00	11.25
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Bakke Coulee	1	All	---				
Box Elder Coulee	6	3,600.00	90.00	4024	1	355.00	8.88
Ash Coulee	1	200.00	5.00				
Rattlesnake (Snake) Coulee	5	4,800.00	120.00				
Garrison Spring	2	All	---				
Spring Coulee	1	600.00	15.00				
Rock Creek	1	600.00	15.00	4024	1	180.00	4.50
Poplar Coulee	3	3,200.00	80.00				
Porcupine Coulee	4	7,000.00	175.00				
Unnamed Coulee	1	All	---				
Bridge Coulee	1	600.00	15.00				
Marshall Coulee	1	500.00	12.50				
Alkali Coulee	1	1,000.00	25.00				
Brush Coulee	1	1,500.00	37.50	4024	1	180.00	4.50
Big (Prestige) (Powell) Coulee	2	2,600.00	65.00				
Bone Spring (Sheep Shed) (Shed) Coulee	4	1,960.00	49.00				
Bell Coulee (Canyon)	3	1,000.00	25.00				
Double S Coulee	1	---	---				
Unnamed Coulee	1	200.00	5.00				
Burnt Shed Coulee	3	1,600.00	40.00				
Swenson Coulee	1	All	---				
Swanson Coulee	2	600.00	15.00				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Total Frenchman Creek and Tributaries	**74**	**126,240.00**	**3,156.00**				
Beaver Creek (Dry Beaver)	79	106,943.00	2,673.58	**168**	**9**	**8,187.00**	**204.68**
North Fork Beaver Creek	1	600.00	15.00				
Bear Gulch Creek	1	80.00	2.00				
Coburn Creek	3	2,500.00	62.50				
Best Coulee	1	200.00	5.00				
Dry Bear Creek	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	4,000.00	100.00				
French Coulee	1	All	---				
Parrott (Sanders) (Reservoir) Coulee	5	1,100.00	27.50				
Olson Coulee	1	200.00	5.00				
Unnamed Coulee	1	1,440.00	36.00				
Hemming Coulee	1	200.00	5.00				
Badland Creek	2	200.00	5.00				
Seven Mile Coulee	4	2,200.00	55.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Artesian Well	1	200.00	5.00				
Lone Tree Creek	1	200.00	5.00				
Beskeys Coulee	2	400.00	10.00				
Lonesome Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Beaver (Hartwick) Coulee	2	200.00	5.00				
Big Warm Springs (Big Beaver) Creek	44	57,231.00	1,430.78				
Schmidt Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Cabbage Creek	1	All	---				
Gallaway Coulee	1	All	---				
Peters Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Little Warm Spring Creek	22	11,744.00	293.60				
Unnamed Coulee	1	200.00	5.00				
Berry (Schoolhouse) Coulee	3	450.00	11.25				
Unnamed Coulee	1	All	---				
Wild Horse Creek	16	15,620.00	390.50				
North Fork Wild Horse Creek	2	800.00	20.00				
Unnamed Coulee	1	All	---				
South Fork Wild Horse Creek	1	320.00	8.00				
Mid Fork Wild Horse Creek	2	800.00	20.00				
Tressler Coulee	2	400.00	10.00				
Tin Roof Coulee	2	280.00	7.00				
McVey Coulee	1	200.00	5.00				
Spring Coulee	4	1,400.00	35.00				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Reservoir Coulee	1	400.00	10.00				
Four Mile Coulee	3	320.00	8.00				
Unnamed Coulee	1	All	---				
White Rock Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Carroll Coulee	1	400.00	10.00				
First Coulee	2	7,040.00	176.00				
John Brawn Coulee	3	12,400.00	310.00				
Button Butte Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Overflow (Jeglum) Coulee	4	All	---				
Smith Coulee	1	6,000.00	150.00				
Smith Coulee	3	600.00	15.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Shed Coulee	1	200.00	5.00				
Smith Coulee	3	All	---				
Flat (Sun Prairie) (Flatwillow) (Whitcomb Sag) Creek	18	6,400.00	160.00				
West Fork Flat Creek	2	400.00	10.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
First Creek	8	2,860.00	71.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Alkali Coulee	4	2,300.00	57.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Divide Coulee	1	100.00	2.50				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	200.00	5.00				
Dog Creek	5	2,780.00	69.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	100.00	2.50				
Box Elder Creek	2	480.00	12.00				
Coal Mine Creek	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Lone Horse Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Gumbo Coulee	1	60.00	1.50				
Unnamed Coulee	1	All	---				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Sage Creek	9	4,700.00	117.50				
Buckley Lake Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	2	All	---				
Larkin Wilson Creek	3	All	---				
Willson Coulee	3	200.00	5.00				
Unnamed Coulee	1	400.00	10.00				
Fay's Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
(Little) Seven Mile Coulee	8	3,100.00	77.50				
Unnamed Coulee	1	All	---				
Tallow Creek	4	1,400.00	35.00				
North Fork Tallow Creek	1	All	---				
Unnamed Coulee	1	All	---				
South Fork Tallow Creek	0	0	0				
Unnamed Coulee	1	2,000.00	50.00				
Skogseth Coulee	2	200.00	5.00				
Unnamed Coulee	0	0	0				
Buck Lake	1	400.00	10.00				
Florence Coulee	1	200.00	5.00				
Russell Coulee	1	200.00	5.00				
Frog Coulee	1	205.00	5.13				
Rheumatism Coulee	3	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	500.00	12.50				
Foley Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Box Elder (Spring) Creek	3	400.00	10.00				
Grove Coulee	4	800.00	20.00				
Unnamed Coulee	1	All	---				
South Branch Grove Coulee	1	All	---				
Twin Lake Coulee	3	1,100.00	27.50				
Trueblood Coulee	2	400.00	10.00				
Moline Coulee	3	400.00	10.00				
No Name Coulee	2	200.00	5.00				
Armstrong (Miller) (Little Seven Mile) Coulee	4	1,080.00	27.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Albert Coulee	2	200.00	5.00				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Coulee	1	All	---				
DHS (Box Elder) Creek	10	13,560.00	339.00				
North Fork DHS Creek	2	776.00	19.40				
Unnamed Coulee	1	All	---				
Unnamed (Swede) Lake	1	500.00	12.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Murray Coulee	2	500.00	12.50				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Slough (Old Channel)	1	1,080.00	27.00				
Wagon Box Coulee	2	200.00	5.00				
Cottonwood Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Rock Creek	1	200.00	5.00				
Seven Mile Creek	0	0	0				
South Fork Seven Mile Creek	3	1,000.00	25.00				
Unnamed Coulee	1	200.00	5.00				
Smith (Lora) Lake	2	500.00	12.50				
Moss Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Snowbank Coulee	1	All	---				
Unnamed Coulee	2	800.00	20.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	4,000.00	100.00				
Unnamed Coulee	1	---	---				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
LeNoir Coulee	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Waste Water	1	600.00	15.00				
Gilbert (Pennington) Coulee	2	800.00	20.00				
Crooks Coulee	2	1,400.00	35.00				
Unnamed Coulee	0	0	0				
Unnamed Coulee	1	All	---				
Thomas Coulee	1	600.00	15.00				
Unnamed Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	3	200.00	5.00				
Alkali Lake Coulee	4	2,400.00	60.00				
Tetrault Coulee	1	400.00	10.00				
Clanton Coulee	1	200.00	5.00				

WATER RIGHT DATA — PHILLIPS COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Records)

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Branch of Clanton Coulee	1	200.00	5.00				
Spring Creek	2	1,000.00	25.00				
Beaver Creek Slough	1	600.00	15.00				
Black Coulee	6	89,400.00	2,235.00				
Unnamed Coulee	1	All	---				
Gonzales Coulee	2	200.00	5.00				
Unnamed Coulee	1	400.00	10.00				
Unnamed Coulee	1	All	---				
Morton Coulee	1	1,000.00	25.00				
Unnamed Lake	1	400.00	10.00				
Unnamed Coulee	1	200.00	5.00				
Unnamed Coulee	2	200.00	5.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Hay Coulee	2	1,400.00	35.00				
Cattle Pass Creek	2	1,500.00	37.50				
Blue Coulee	2	600.00	15.00				
Well (Saco Hot Springs)	1	All	---				
Antelope Coulee	1	500.00	12.50				
Double Mouth Coulee	1	600.00	15.00				
Total Beaver Creek and Tributaries	**520**	**404,949.00**	**10,123.74**				
Larb Creek	5	3,800.00	95.00				
Unnamed Coulee	1	2,000.00	50.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Dyer Coulee	2	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Dinker Coulee	1	1,000.00	25.00				
Abel Coulee	2	1,600.00	40.00				
Fourth Creek	3	1,600.00	40.00				
Canon (South Fork Fourth) Coulee	1	1,000.00	25.00				
West Fork Fourth Creek	1	400.00	10.00				
Deadhorse Coulee	1	500.00	12.50				
Brush Coulee	1	500.00	12.50				
McNab Coulee	3	3,600.00	90.00				
Third Creek	1	400.00	10.00				
Abel Creek	2	480.00	12.00				
Second Creek	4	1,600.00	40.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
West to East Coulee	3	All	---				
First Creek	4	2,200.00	55.00				
Unnamed Coulee	1	All	---				
Unnamed Coulee	1	All	---				
Rock Creek	0	0	0				

Snake Creek	0	0	0			
Unnamed Coulee	1	All	---			
Total Milk River and Tributaries	**1,337**	**184,348.72**	**45,533.74**	**23**	**15,440.00**	**386.01**
GRAND TOTAL PHILLIPS COUNTY	**1,917**	**2,507,553.08**	**62,688.87**	**43**	**17,146.00**	**428.67**

DRAINAGES IN PHILLIPS COUNTY NOT LOCATED

Stream	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Little Alkali Creek	1	20,000.00	500.00
1st Coulee South Box Elder Creek	1	600.00	15.00
Canyon Creek	1	250.00	6.25
Carr Brook	1	140.00	3.50
Collins Coulee	1	240.00	6.00
Cottonwood Creek	1	600.00	15.00
Coulee #1	1	200.00	5.00
Big Dry Gulch	1	200.00	5.00
First Creek	1	400.00	10.00
First Creek South Stove Lake	1	2,000.00	50.00
Fourth Coulee	1	400.00	10.00
Horse Creek	1	200.00	5.00
King Gulch	1	100.00	2.50
Mid Fork Lone Tree Creek	1	400.00	10.00
Mathie Creek	1	200.00	5.00
McGrady Coulee	1	120.00	3.00
Middle Creek	5	4,200.00	105.00
Perry Coulee	1	80.00	2.00
Prairie Dog Creek	1	20,000.00	500.00
Robinson Creek and Lake	1	500.00	12.50
Rosebrush Coulee	1	80.00	2.00
Sheep Creek	1	-------	-------
Sheep Camp Coulee	1	1,000.00	25.00
Six Mile Creek	1	400.00	10.00
Spring Creek	2	3,200.00	80.00
Sullivan Coulee	1	600.00	15.00
Trail Creek	1	200.00	5.00
West Fork Coulee	1	600.00	15.00
Unnamed Coulee	6	6,650.00	166.25
Mineral Springs	1	20,000.00	500.00
Old Lovell Spring	1	400.00	10.00
Tripple Springs	1	All	---
Willow Springs	1	500.00	12.50
Whitewater Springs	1	300.00	7.50
Two Springs	1	50.00	1.25
Blue Lake	1	500.00	12.50
Unnamed Lake	1	200.00	5.00
Giant Springs	1	300.00	7.50
TOTAL	**48**	**85,810.00**	**2,145.25**

WATER RESOURCES SURVEY

Phillips County, Montana

PART II

Maps Showing Irrigated Areas in Colors Designating the Sources of Supply

Published by

MONTANA WATER RESOURCES BOARD

Helena, Montana

June, 1968

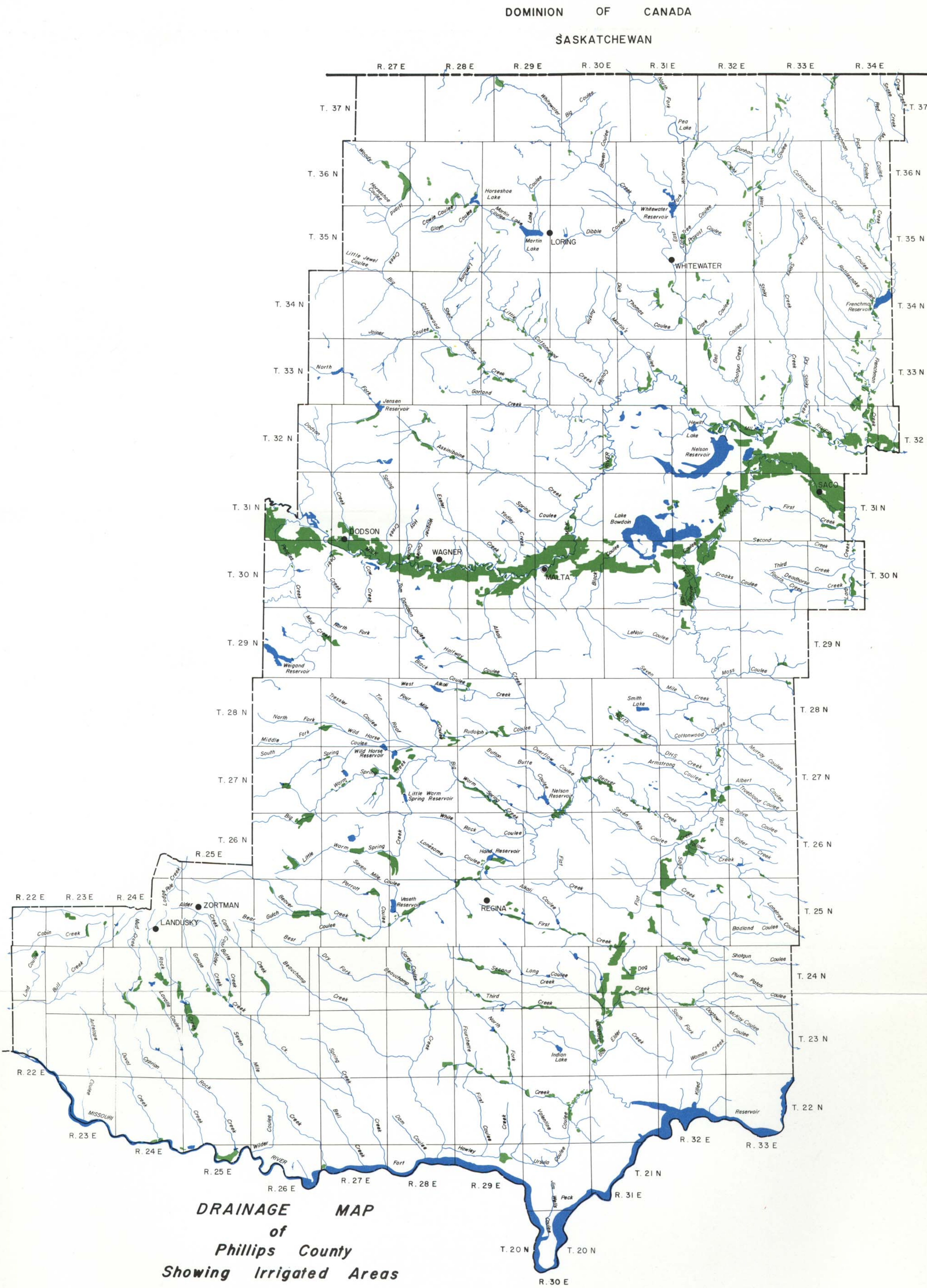
MAP INDEX

Township	Range	Page
21 North	24 East	1
21 North	25 East	2
21 North	27 East	3
21 North	29 East	4
22 North	24 East	1
22 North	25 East	2
22 North	29 East	5
22 North	30 East	6
22 North	31 East	6
23 North	22 East	7
23 North	25 East	8
23 North	28 East	9
23 North	29 East	9
23 North	30 East	10
23 North	31 East	11
24 North	22 East	12
24 North	24 East	13
24 North	25 East	14
24 North	26 East	15
24 North	28 East	16
24 North	29 East	17
24 North	30 East	10
24 North	31 East	18
24 North	32 East	19
25 North	23 East	20
25 North	24 East	21
25 North	26 East	22
25 North	27 East	23
25 North	28 East	24
25 North	29 East	25
25 North	30 East	26
25 North	31 East	27
25 North	32 East	28
26 North	26 East	29
26 North	27 East	30
26 North	28 East	30
26 North	29 East	31

Township	Range	Page
26 North	30 East	32
26 North	31 East	33
26 North	32 East	33
27 North	26 East	34
27 North	27 East	35
27 North	28 East	36
27 North	29 East	37
27 North	30 East	38
27 North	31 East	39
27 North	32 East	40
27 North	33 East	40
28 North	26 East	41
28 North	27 East	41
28 North	28 East	42
28 North	29 East	43
28 North	31 East	44
28 North	32 East	45
28 North	33 East	46
29 North	26 East	47
29 North	27 East	47
29 North	28 East	48
29 North	29 East	43
29 North	32 East	49
29 North	33 East	46
30 North	26 East	50
30 North	27 East	51
30 North	28 East	52
30 North	29 East	53
30 North	30 East	54
30 North	31 East	55
30 North	32 East	56
30 North	34 East	57
31 North	26 East	58
31 North	27 East	59
31 North	30 East	60
31 North	31 East	55-61
31 North	32 East	61

Township	Range	Page
31 North	33 East	62
31 North	34 East	63
32 North	27 East	64
32 North	28 East	65
32 North	30 East	66
32 North	31 East	66
32 North	32 East	67
32 North	33 East	68
32 North	34 East	69
32 North	35 East	69
33 North	28 East	70
33 North	29 East	71
33 North	30 East	71
33 North	31 East	72
33 North	32 East	73
33 North	33 East	74
33 North	34 East	75
34 North	28 East	70
34 North	29 East	76
34 North	31 East	77
34 North	32 East	78
34 North	34 East	79
35 North	28 East	80
35 North	29 East	81
35 North	31 East	82
35 North	32 East	82-83
35 North	33 East	83
35 North	34 East	84
36 North	27 East	85
36 North	28 East	86
36 North	29 East	81
36 North	32 East	87
36 North	33 East	87-90
37 North	29 East	88
37 North	31 East	89
37 North	33 East	90
37 North	34 East	90

ALL MAPS HAVE BEEN MADE FROM AERIAL PHOTOGRAPHS.



DRAINAGE MAP
of
Phillips County
Showing Irrigated Areas

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

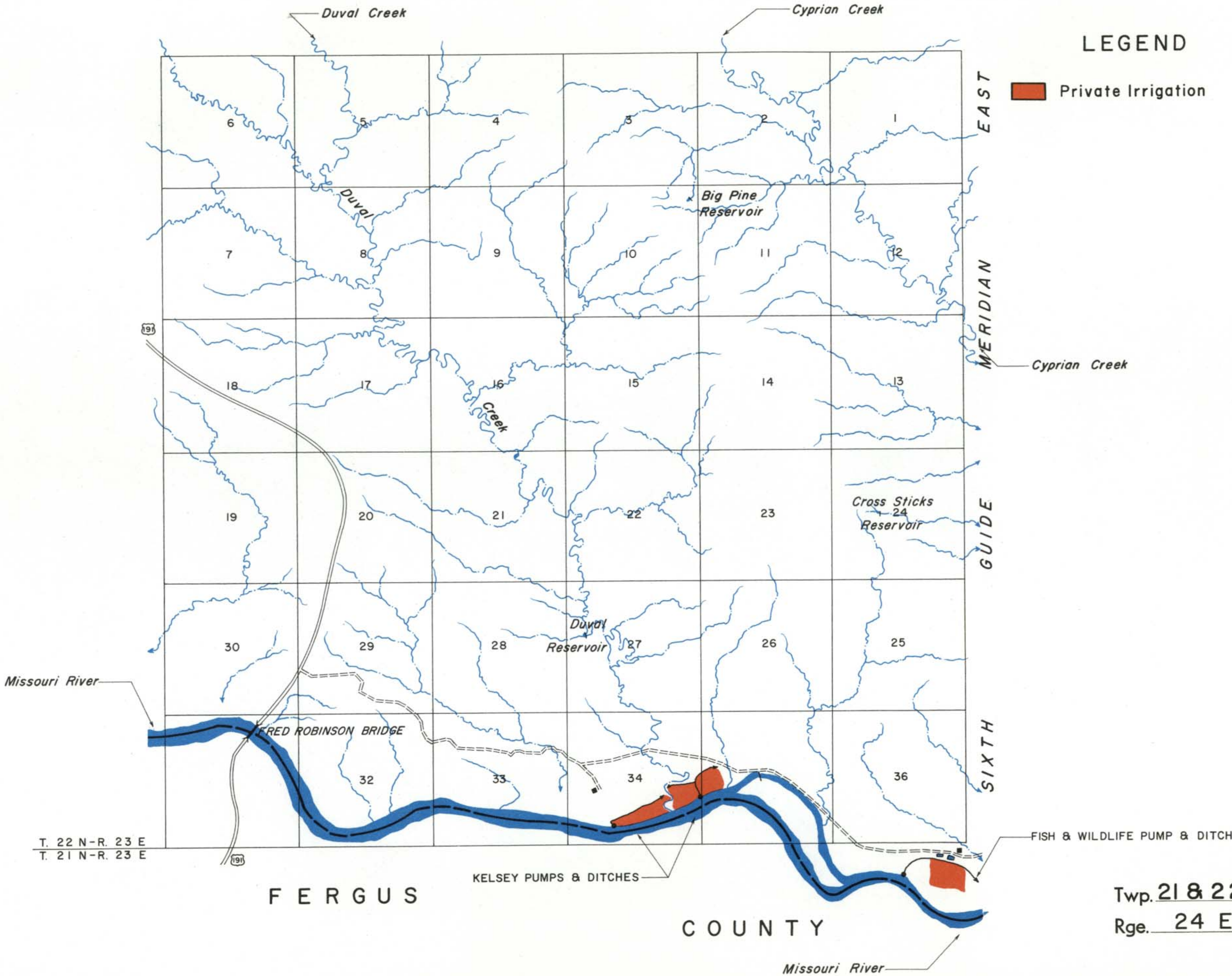
- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

TRANSPORTATION

- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U. S. HIGHWAY
- AIRPORT

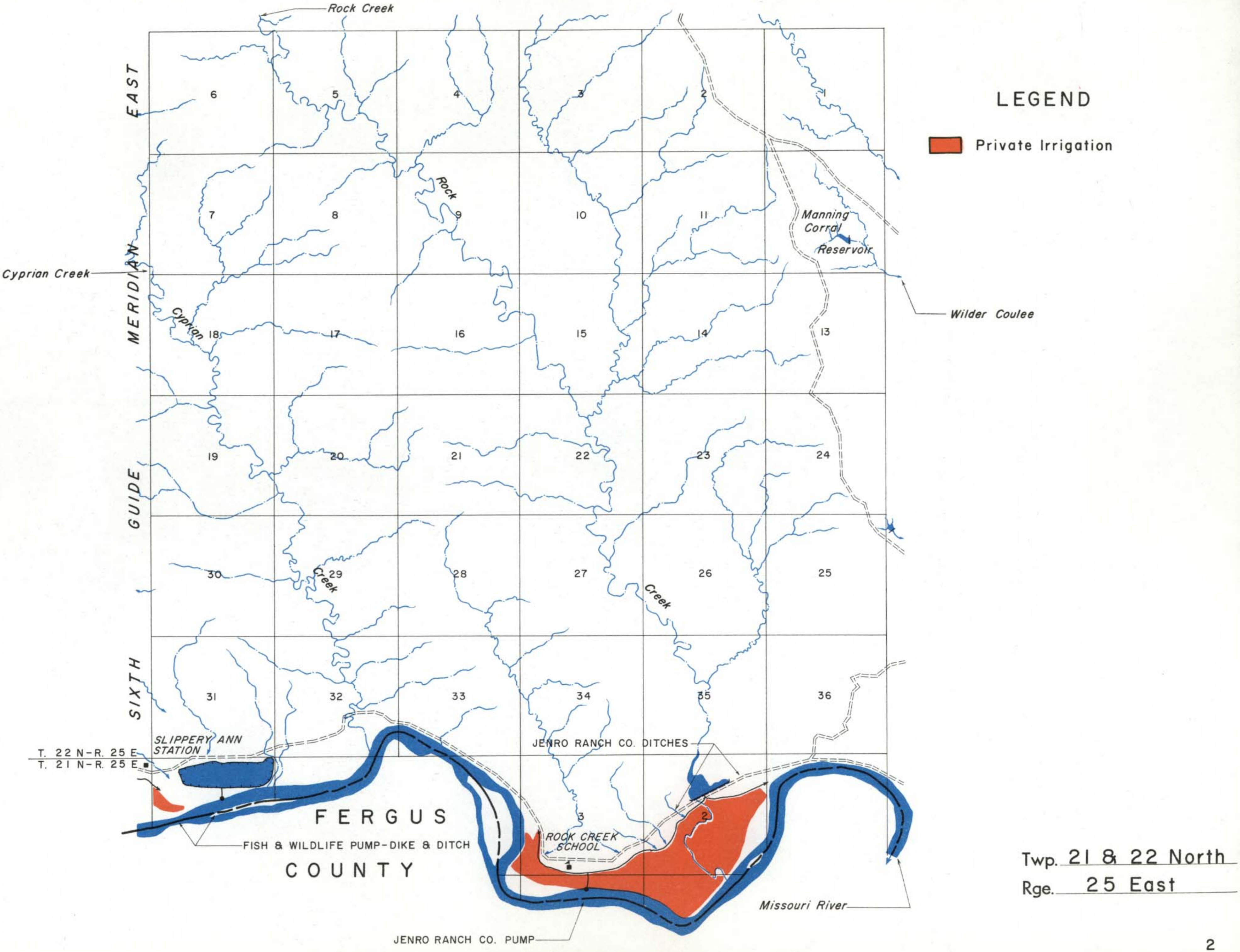
STRUCTURES & UNITS

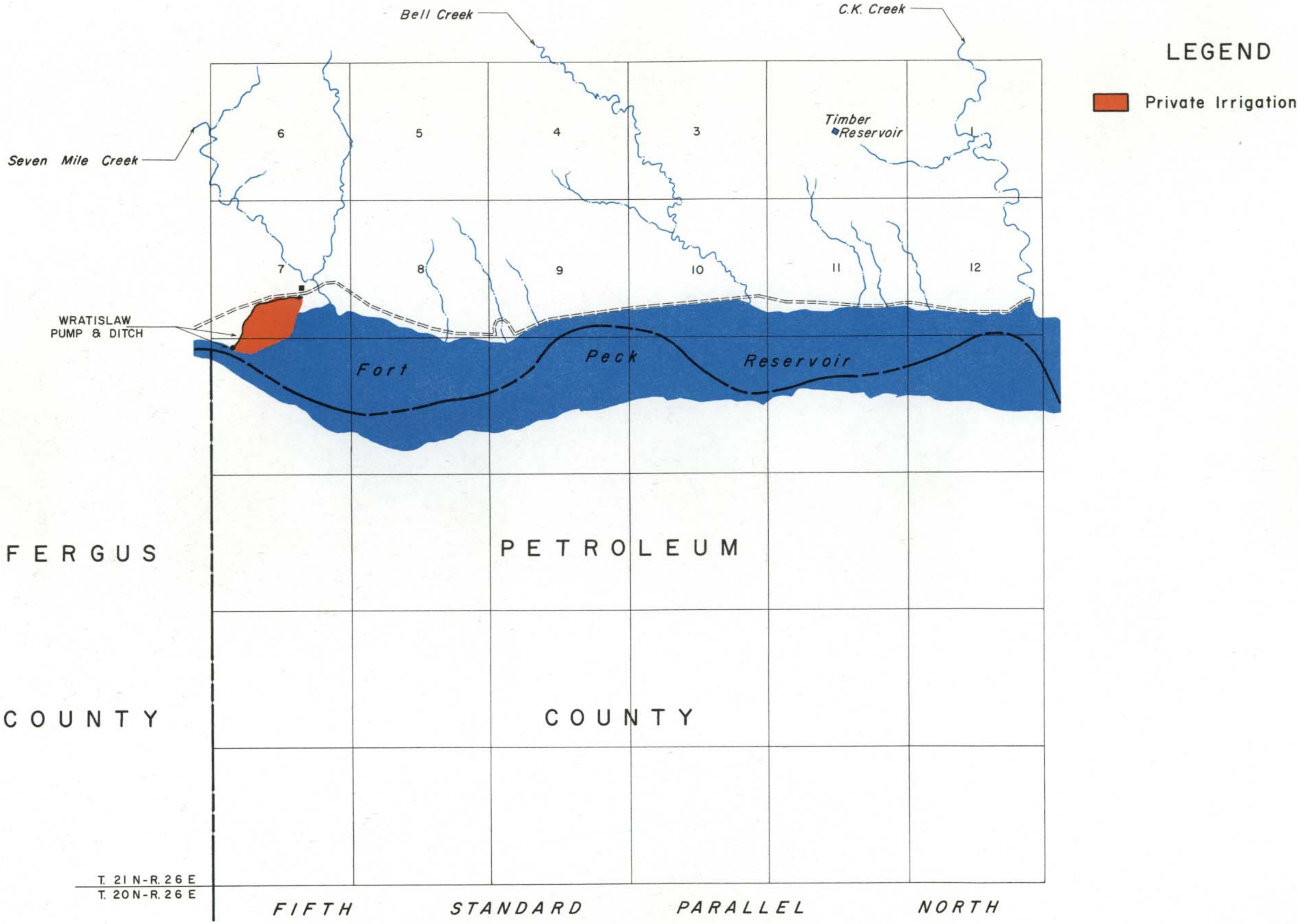
- DAM
- DIKE
- FLUME
- SIPHON
- SPILL
- SPRINKLER SYSTEM
- WEIR
- PIPE LINE
- PUMP
- PUMP SITE
- RESERVOIR
- WELL
- NATURAL CARRIER USED AS DITCH
- SPRING
- SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- LOOKOUT STATION
- RANGER STATION
- RAILROAD TUNNEL
- SCHOOL
- SHAFT, MINE, OR DRIFT



Twp. 21 & 22 North

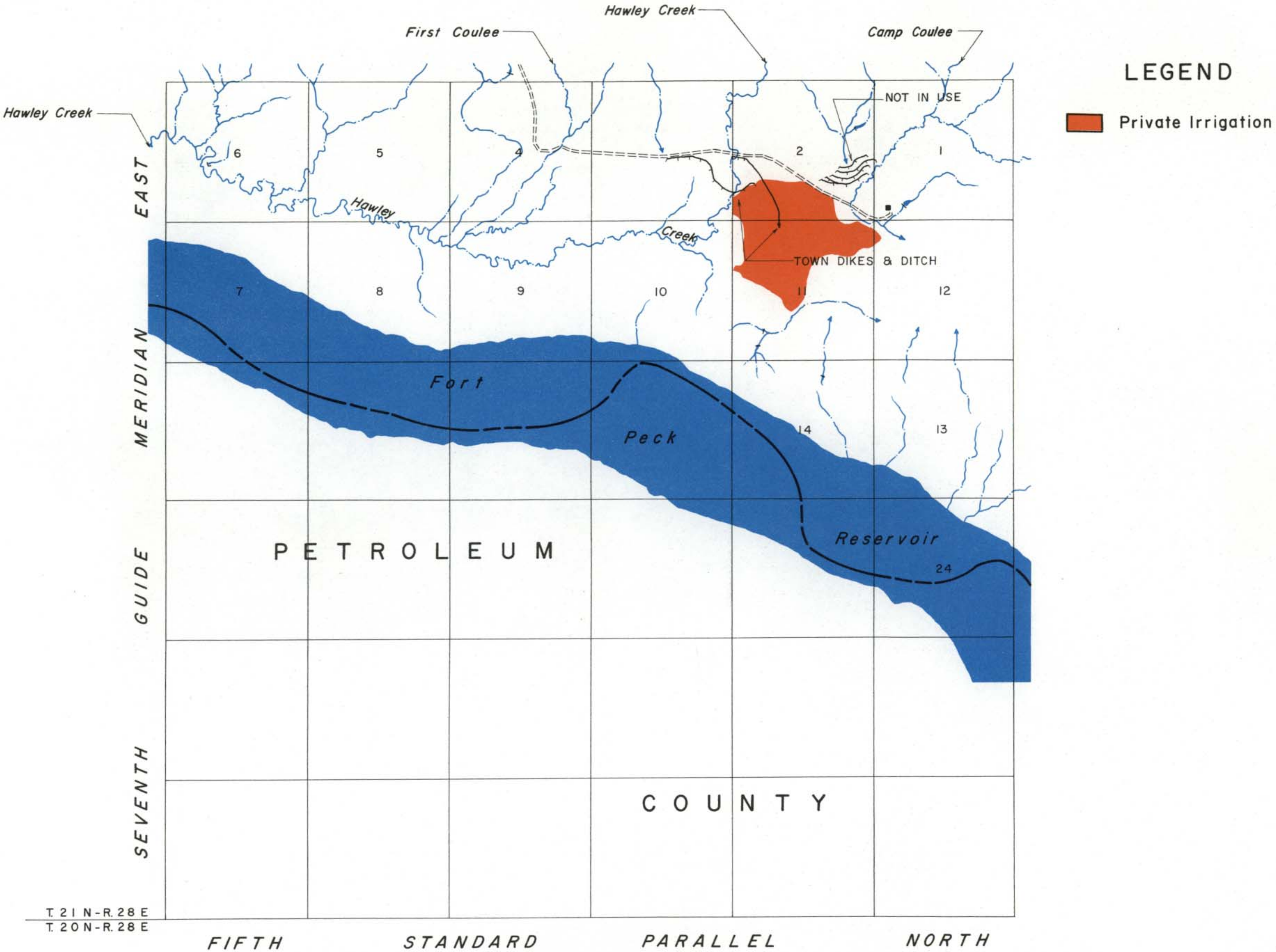
Rge. 24 East


Rock Creek
EAST
MERIDIAN
GUIDE
SIXTH
Cyprian Creek
Cyprian
Rock
Creek
Creek
Manning Corral Reservoir
Wilder Coulee
6
5
4
3
2
1
7
8
9
10
11
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
27
26
25
31
32
33
34
35
36
SLIPPERY ANN STATION
T. 22 N-R. 25 E
T. 21 N-R. 25 E
JENRO RANCH CO. DITCHES
3
2
ROCK CREEK SCHOOL
FERGUS
COUNTY
FISH & WILDLIFE PUMP-DIKE & DITCH
JENRO RANCH CO. PUMP
Missouri River
LEGEND
Private Irrigation
Twp. 21 & 22 North
Rge. 25 East

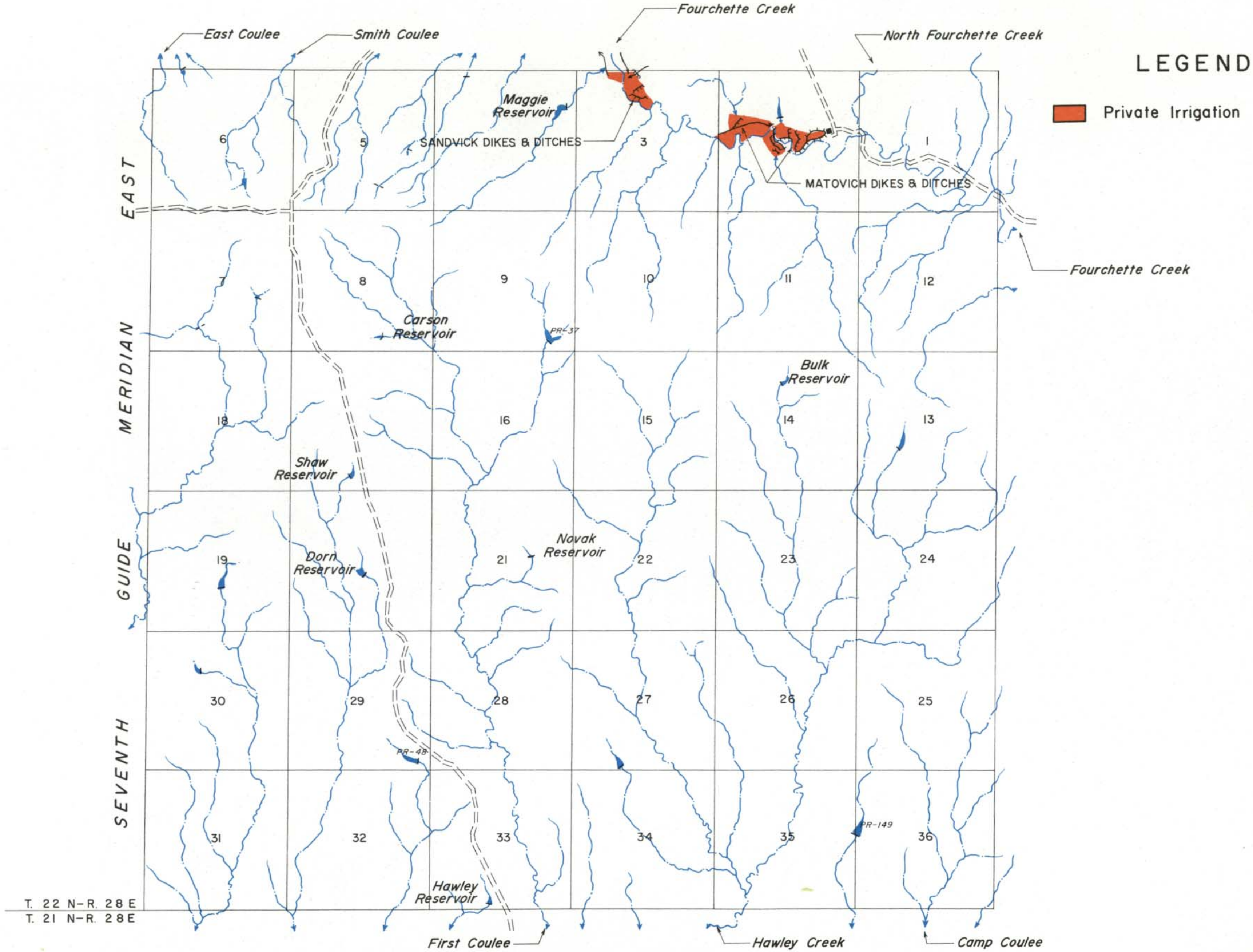


Twp. 21 North

Rge. 27 East

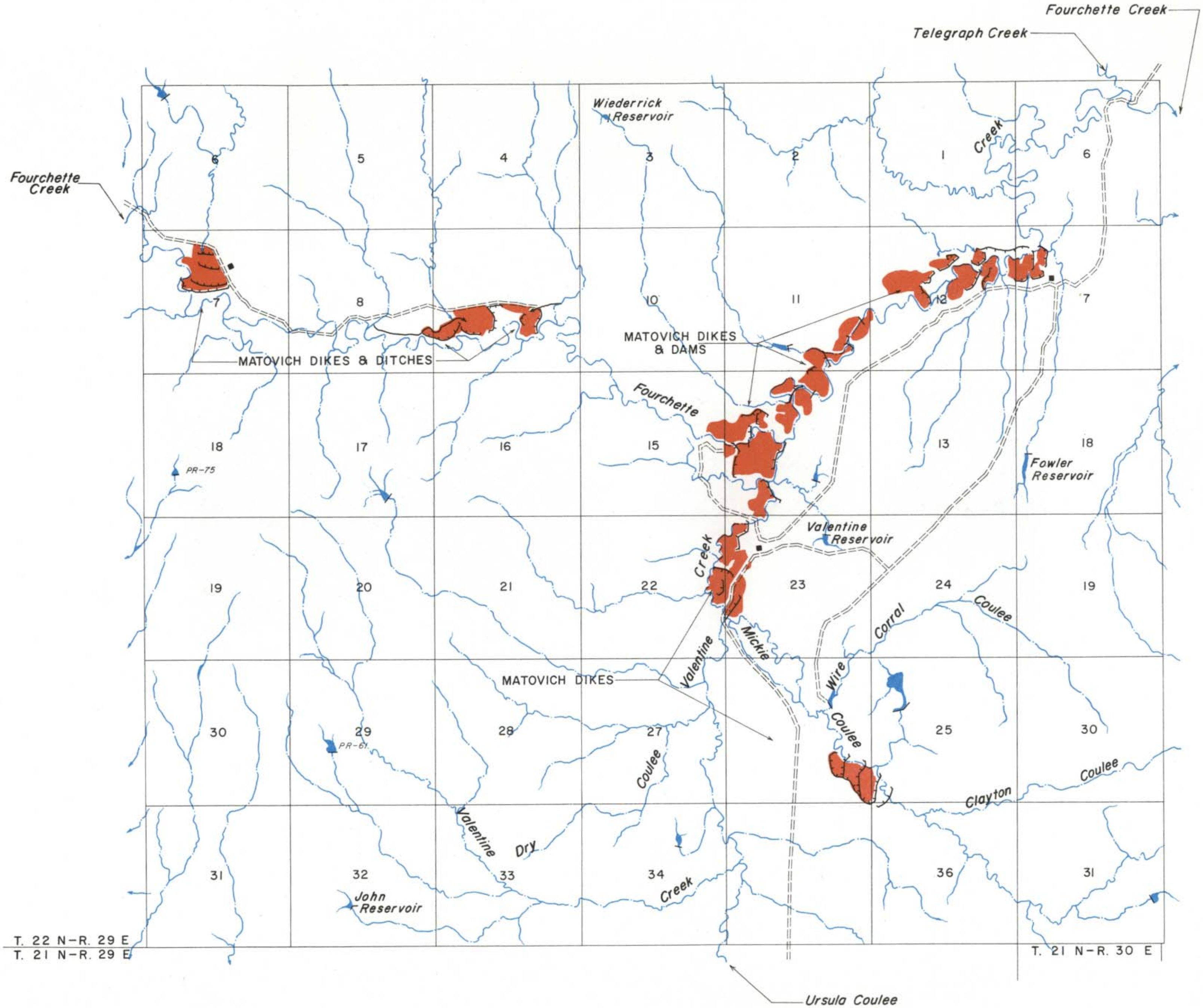


Twp. 21 North
Rge. 29 East



Twp. 22 North

Rge. 29 East

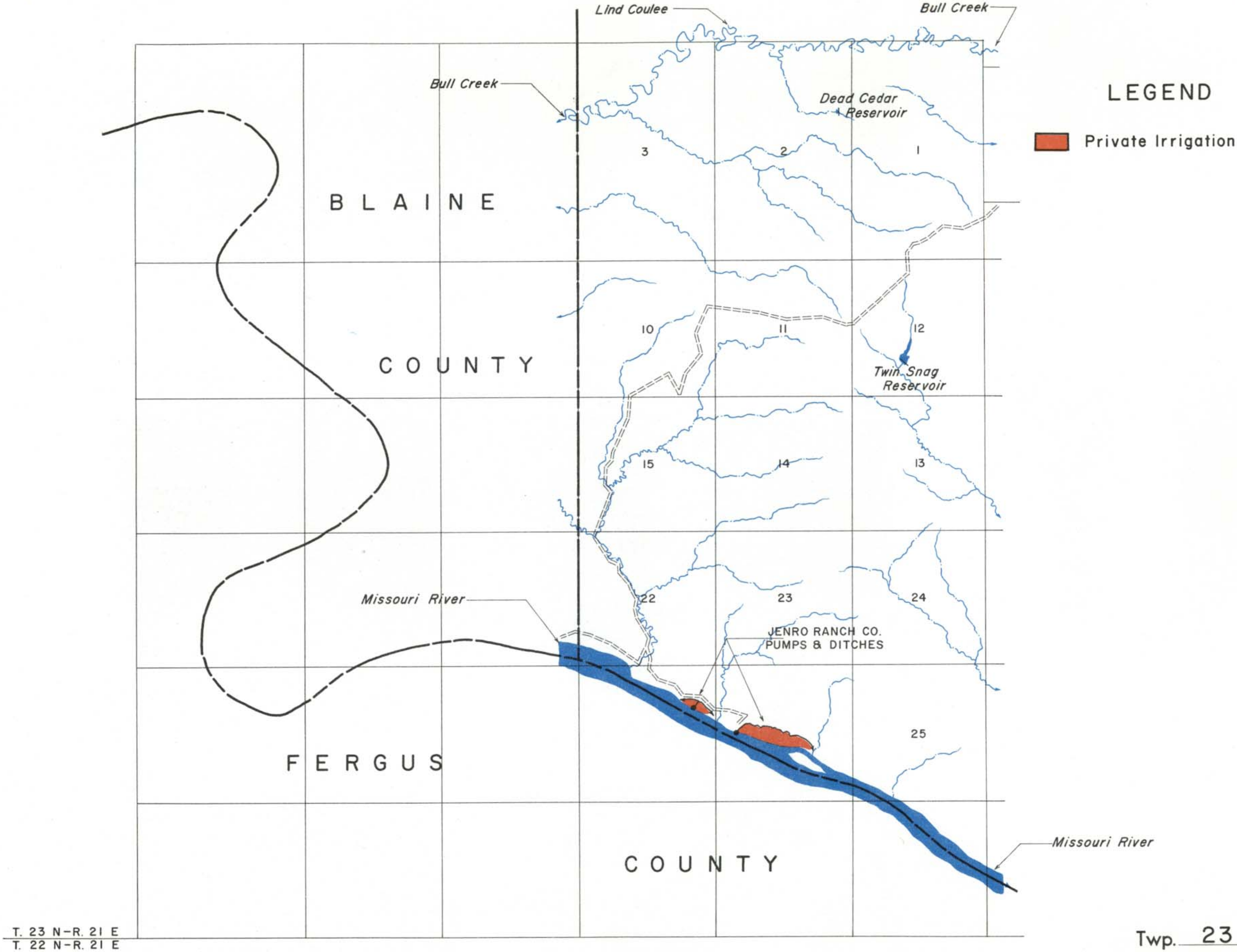


LEGEND

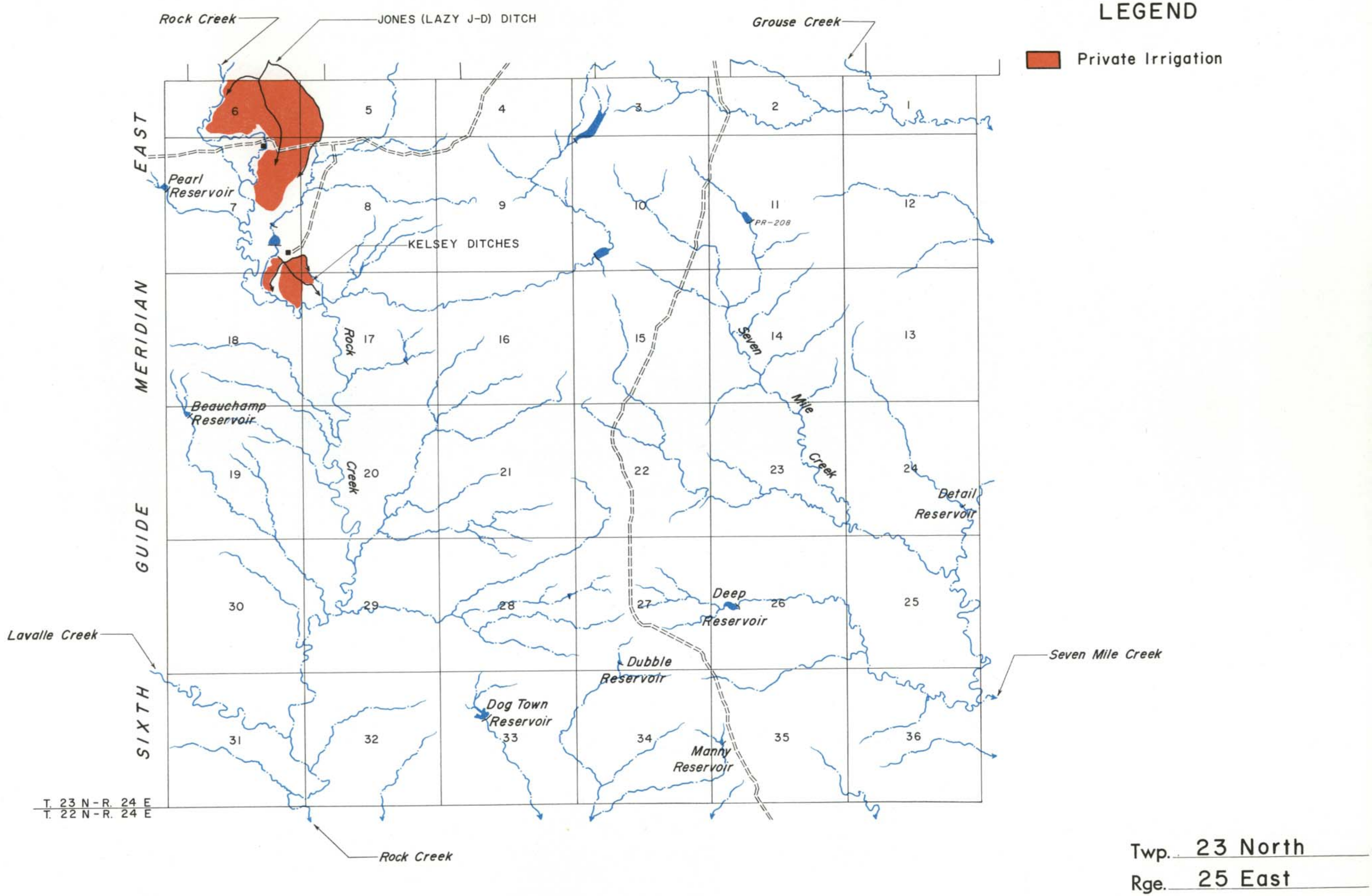
Private Irrigation

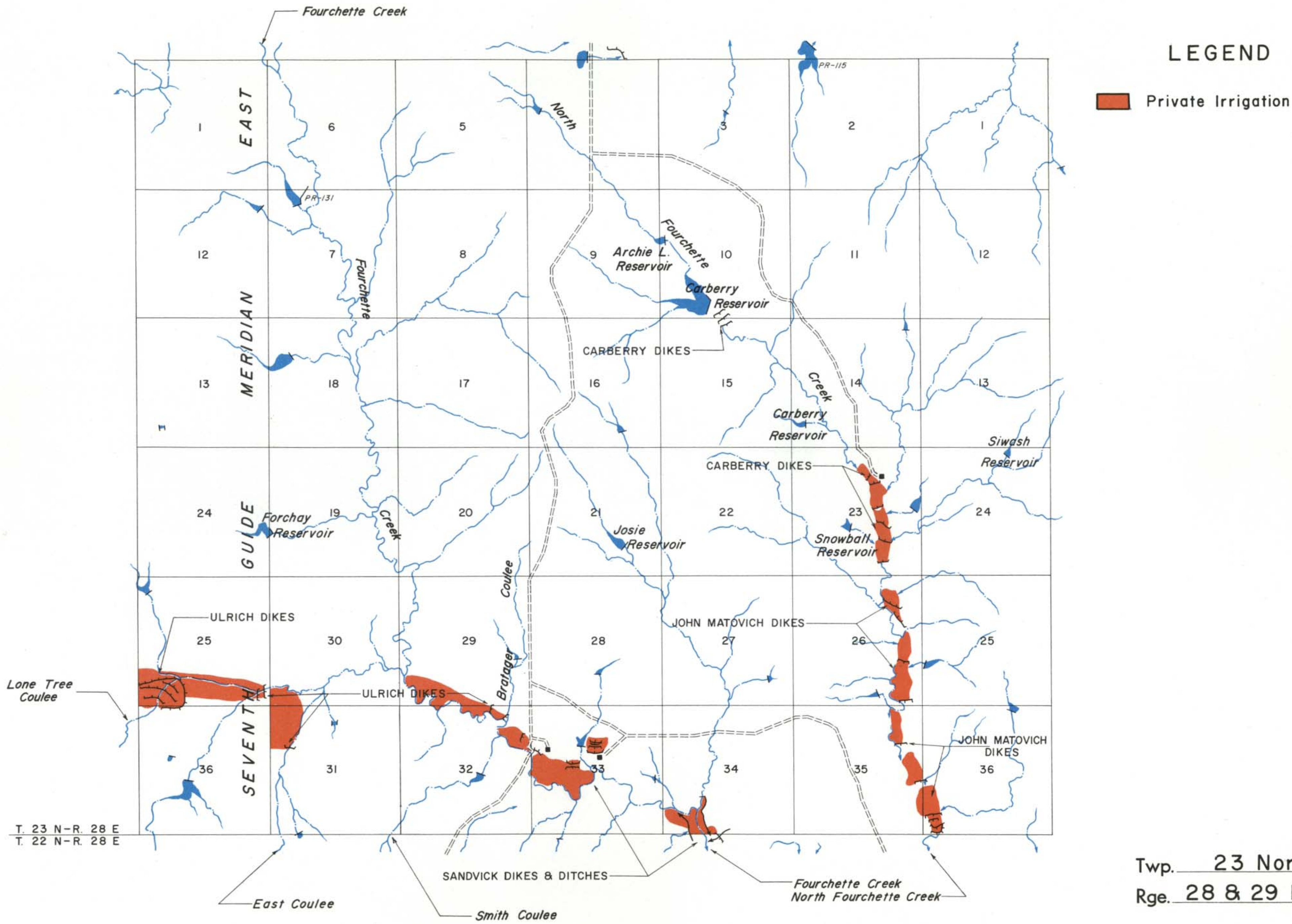
Twp. 22 North

Rge. 30 & 31 East



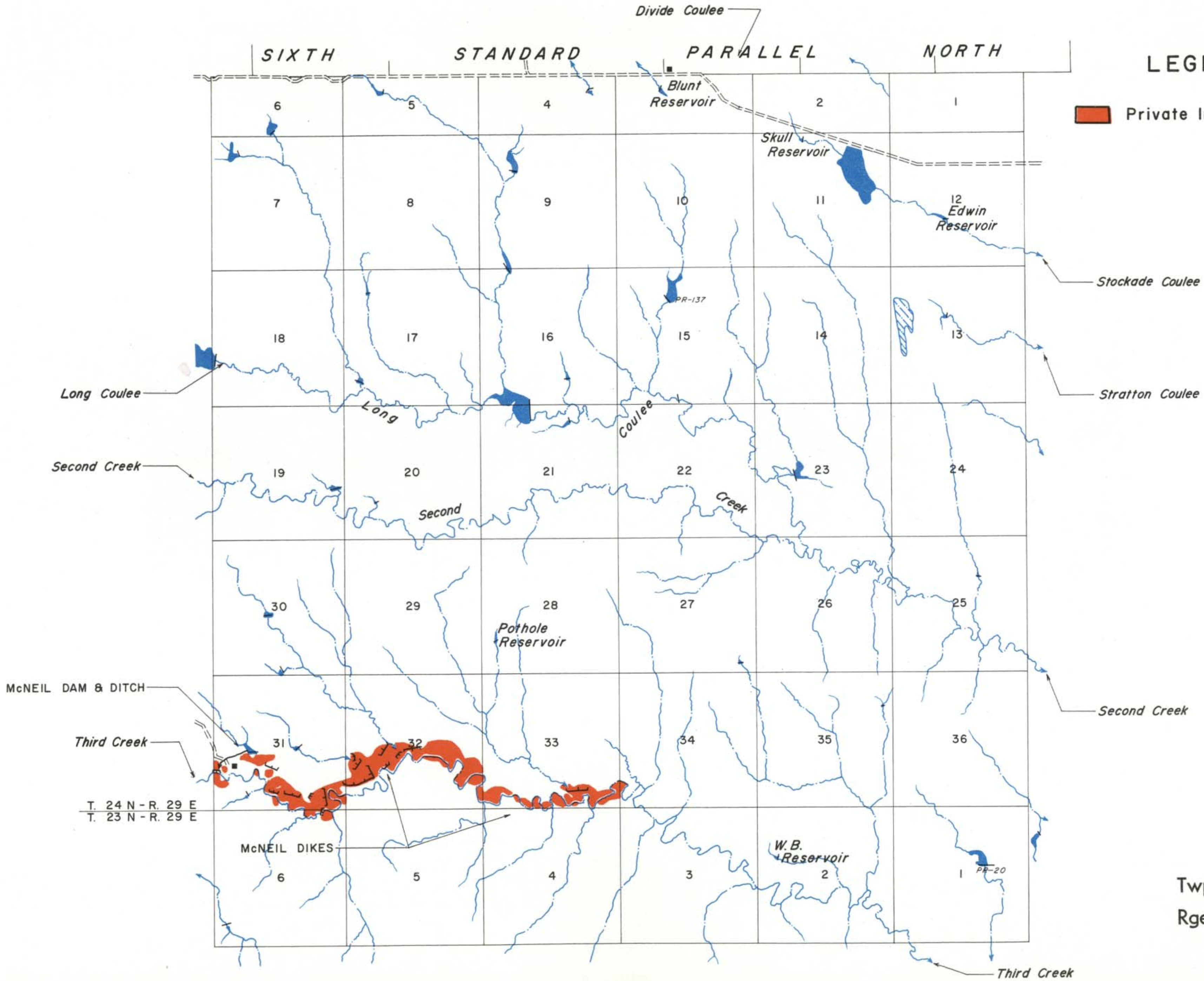
Twp. 23 North
Rge. 22 East


LEGEND
Private Irrigation
Rock Creek
JONES (LAZY J-D) DITCH
Grouse Creek
KELSEY DITCHES
Pearl Reservoir
Beauchamp Reservoir
Rock Creek
Seven Mile Creek
Detail Reservoir
Deep Reservoir
Dubble Reservoir
Dog Town Reservoir
Manny Reservoir
PR-208
Lavalle Creek
Seven Mile Creek
Rock Creek
SIXTH GUIDE MERIDIAN EAST
T. 23 N-R. 24 E
T. 22 N-R. 24 E
Twp. 23 North
Rge. 25 East



Twp. 23 North

Rge. 28 & 29 East

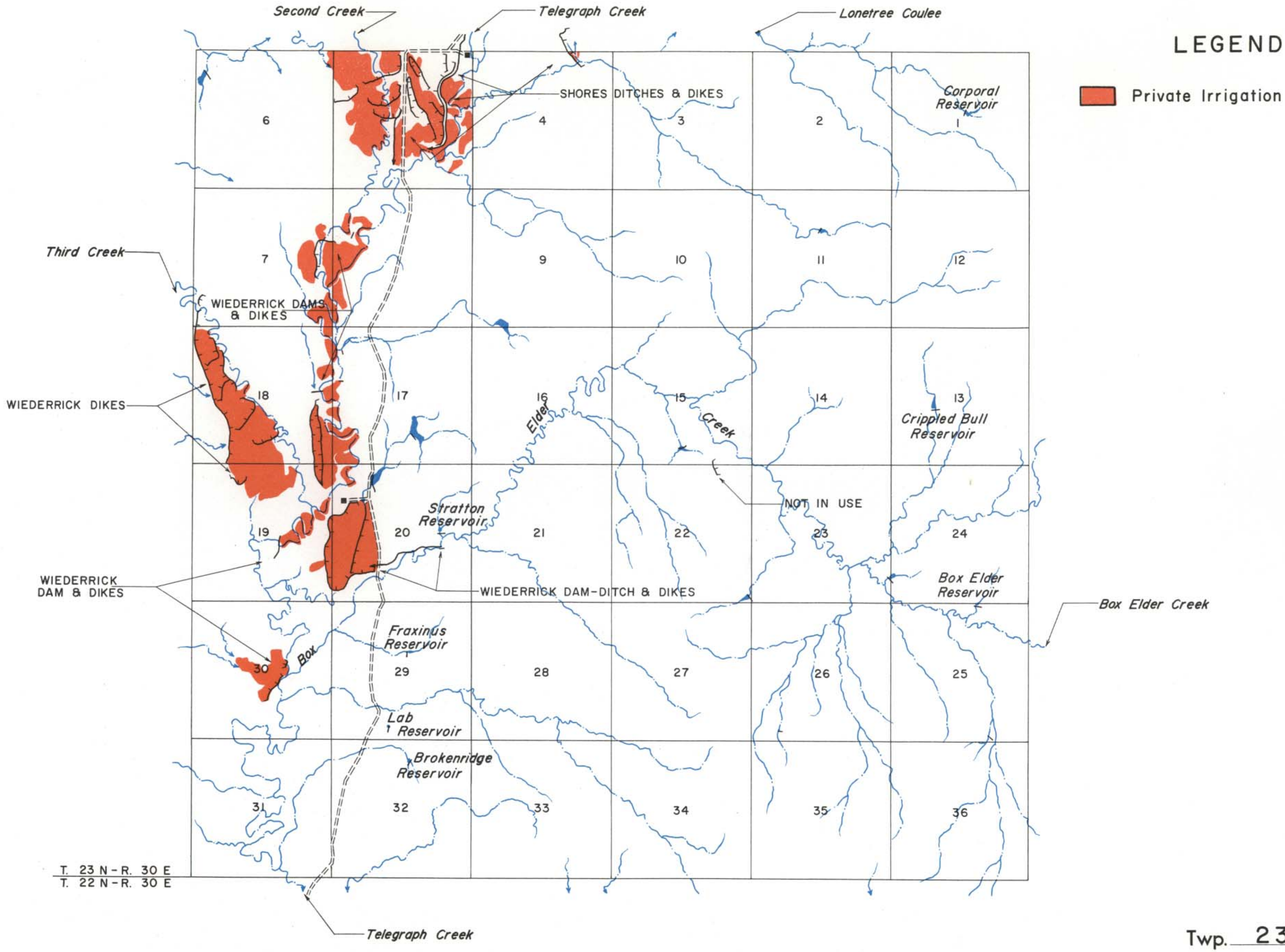


LEGEND

Private Irrigation

Twp. 23 & 24 North

Rge. 30 East

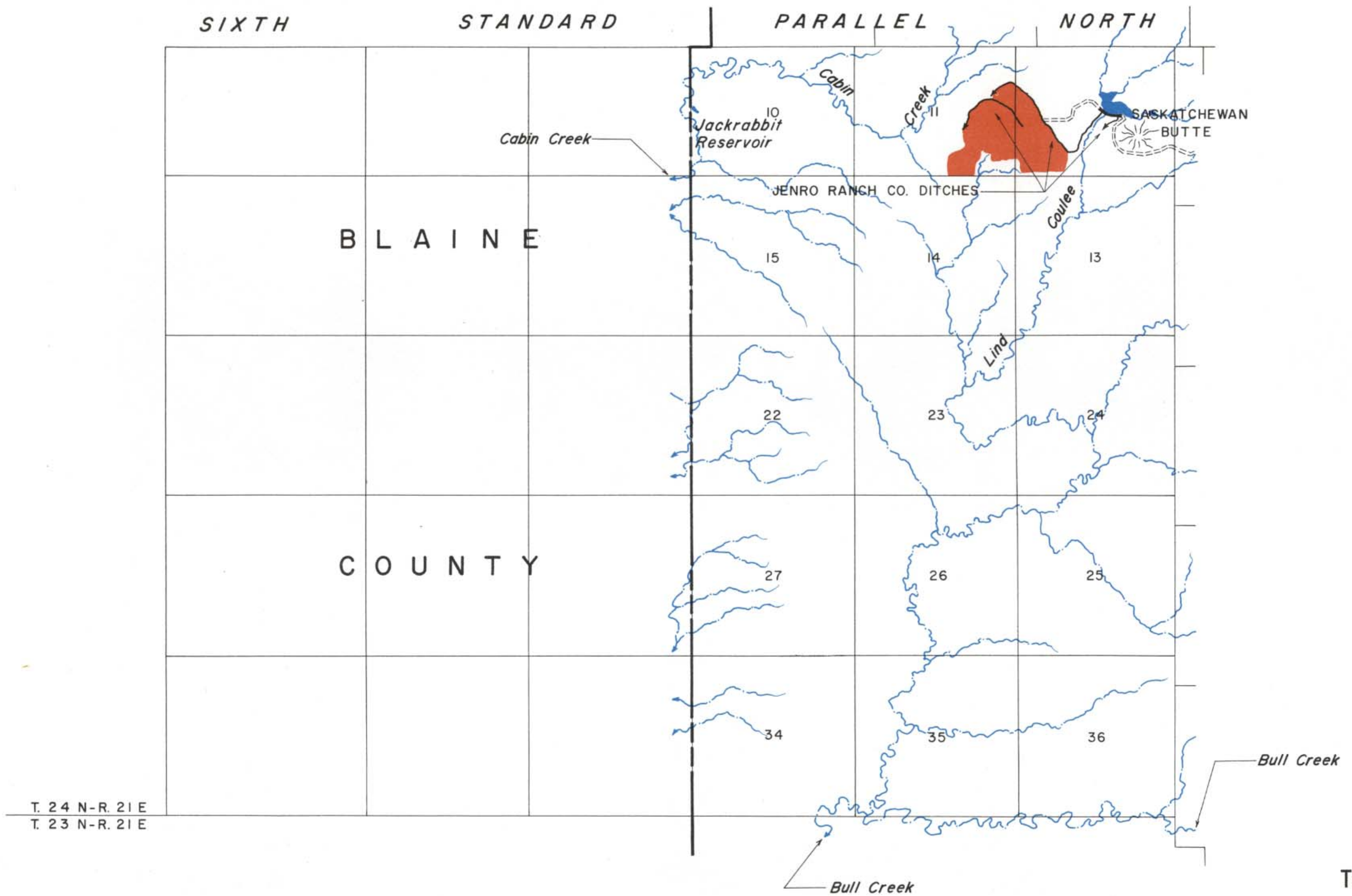


Twp. 23 North

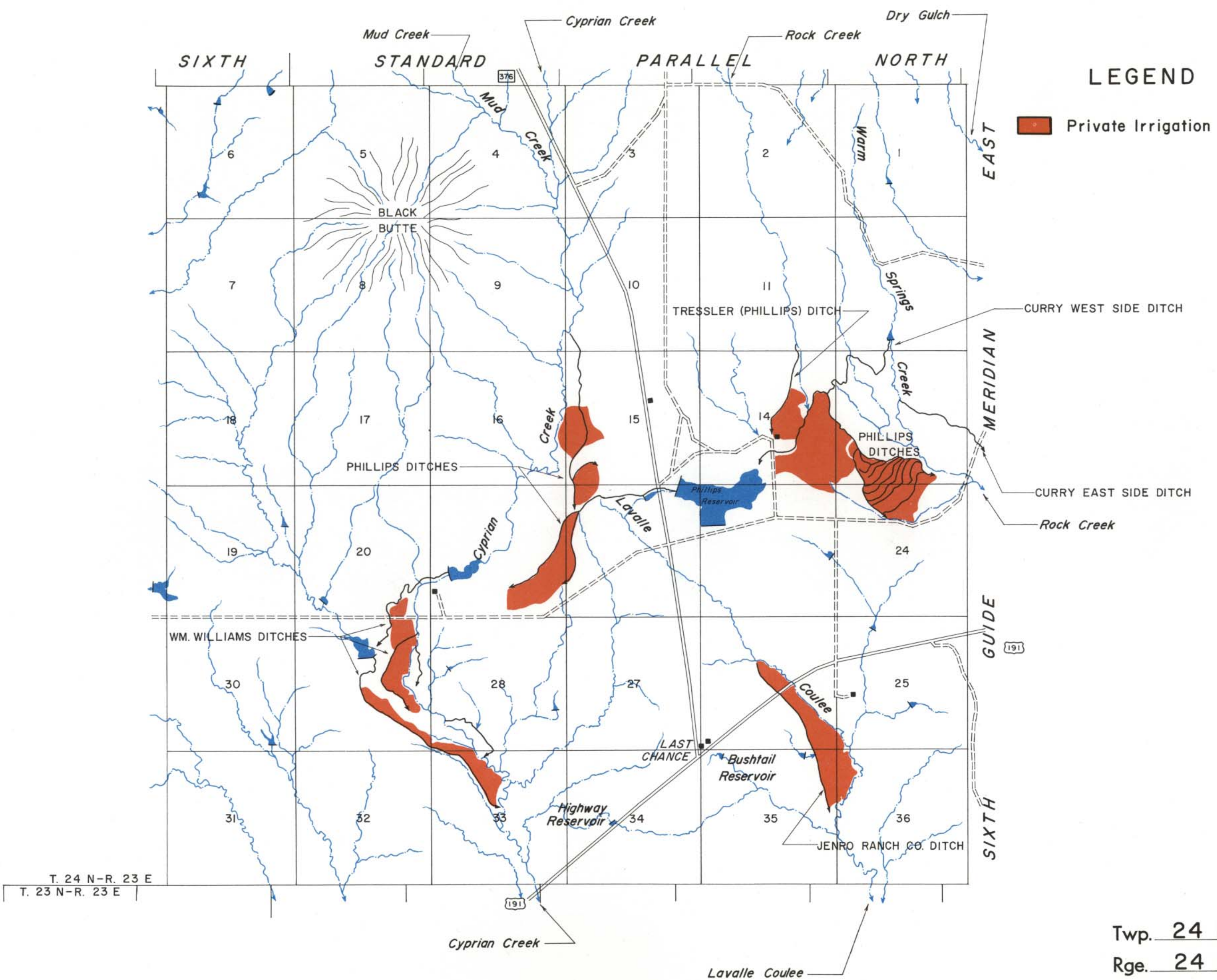
Rge. 31 East

LEGEND

Private Irrigation

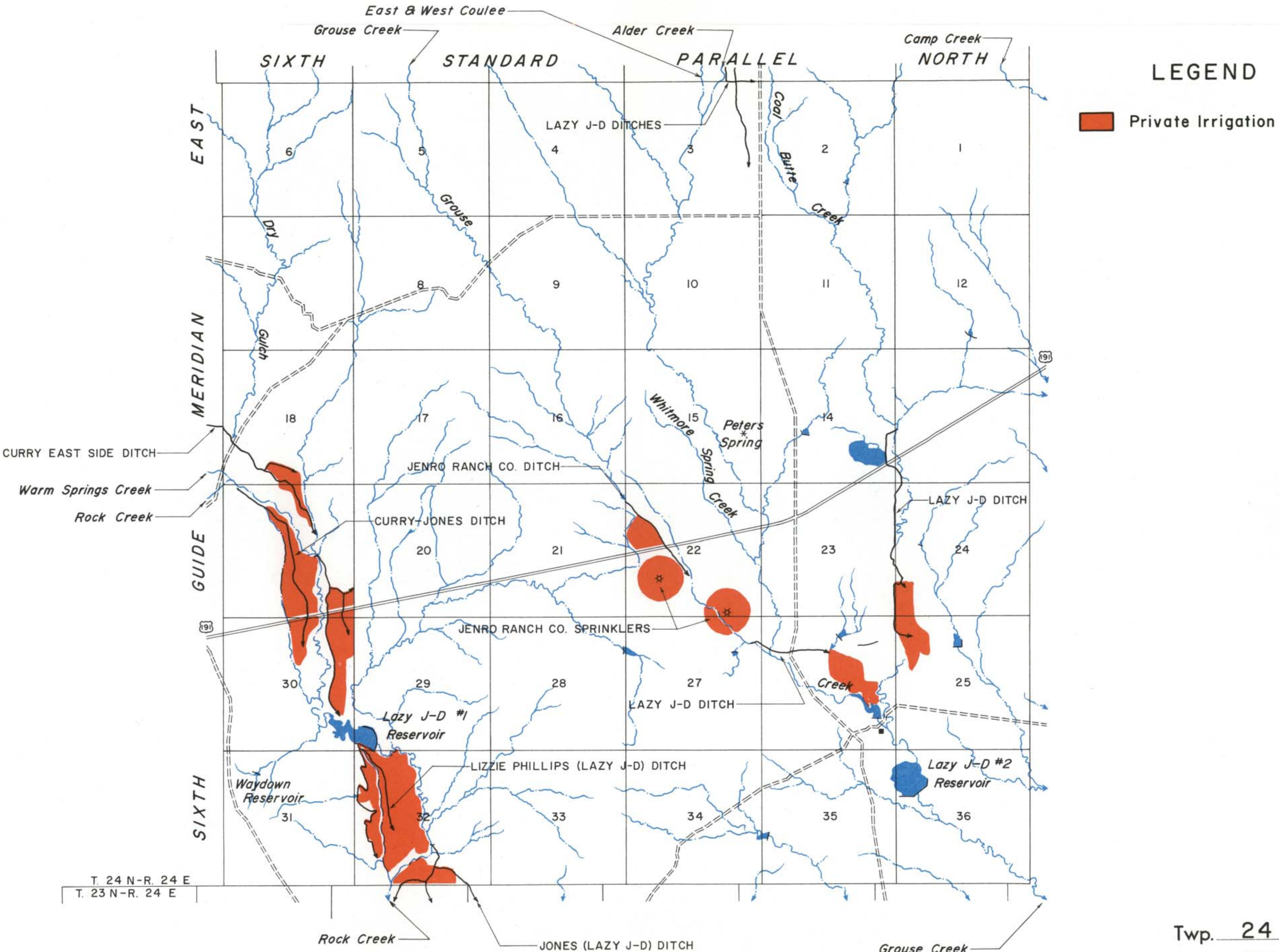


Twp. 24 North
Rge. 22 East



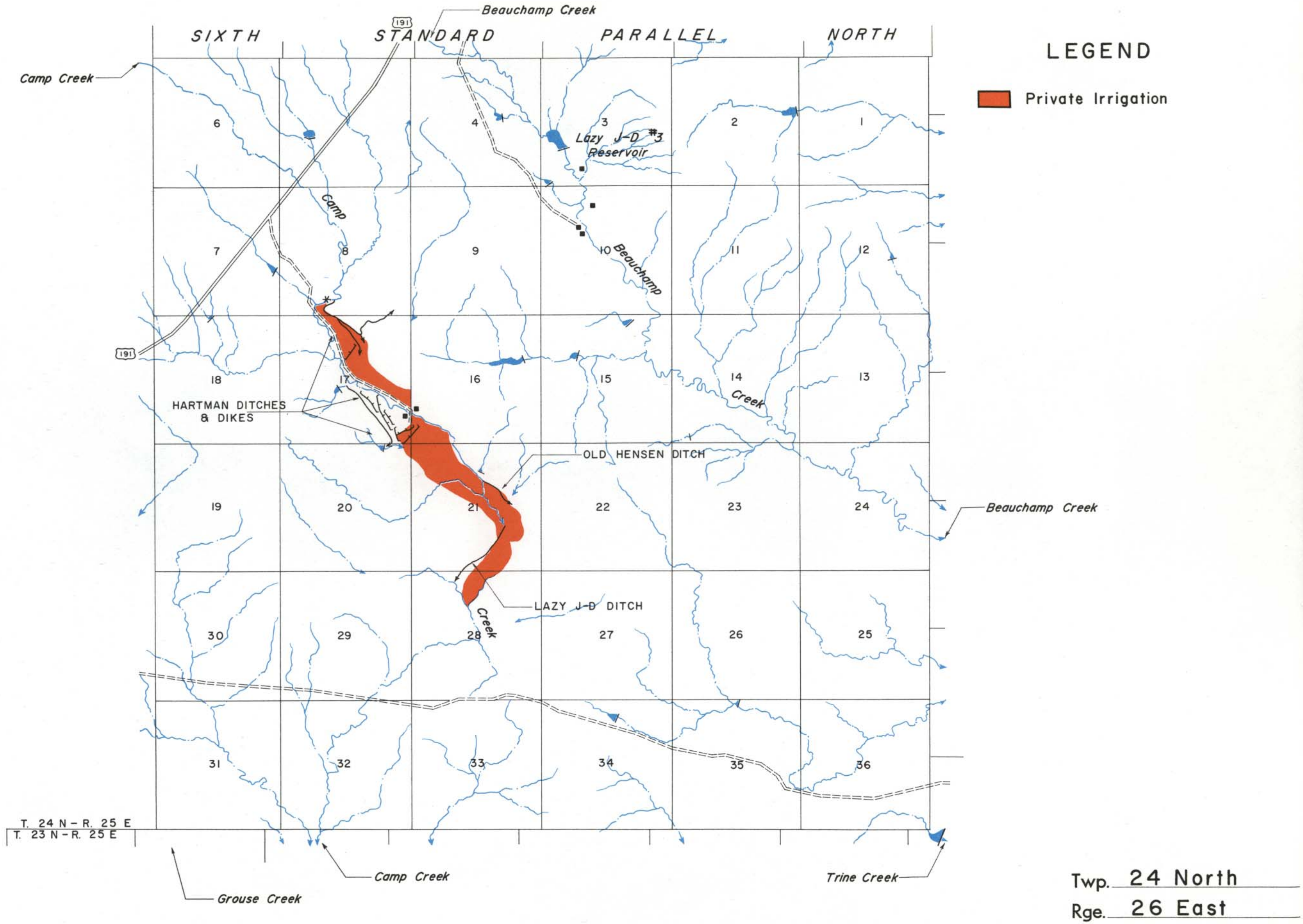
Twp. 24 North

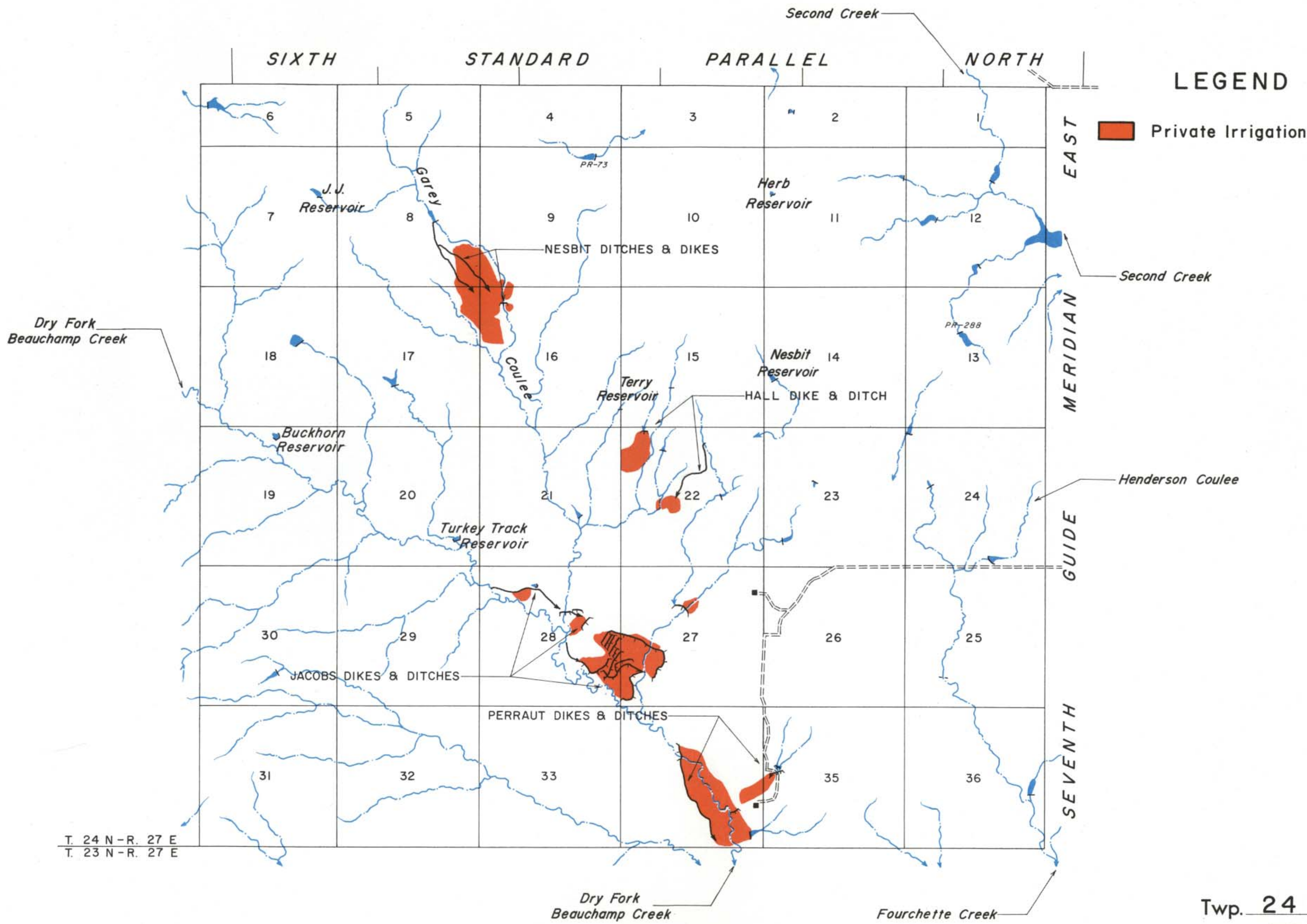
Rge. 24 East



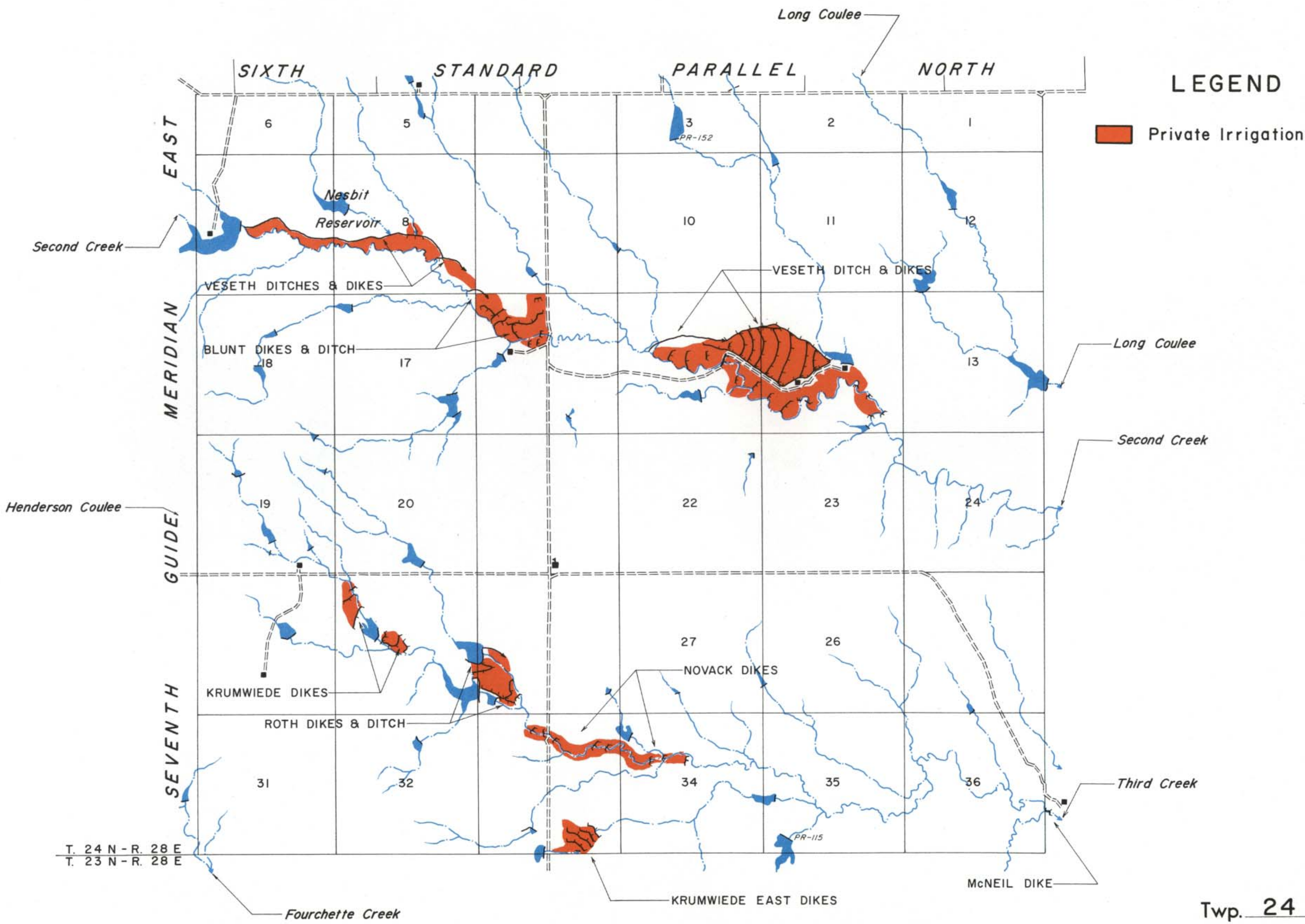
Twp. 24 North

Rge. 25 East


Beauchamp Creek
SIXTH STANDARD PARALLEL NORTH
191
Camp Creek
LEGEND
Private Irrigation
6
4
3
2
1
Lazy J-D #3 Reservoir
Camp
7
8
9
10
Beauchamp
11
12
18
17
16
15
14
13
Creek
HARTMAN DITCHES & DIKES
OLD HENSEN DITCH
19
20
21
22
23
24
Beauchamp Creek
LAZY J-D DITCH
Creek
30
29
28
27
26
25
31
32
33
34
35
36
T. 24 N - R. 25 E
T. 23 N - R. 25 E
Grouse Creek
Camp Creek
Trine Creek
Twp. 24 North
Rge. 26 East

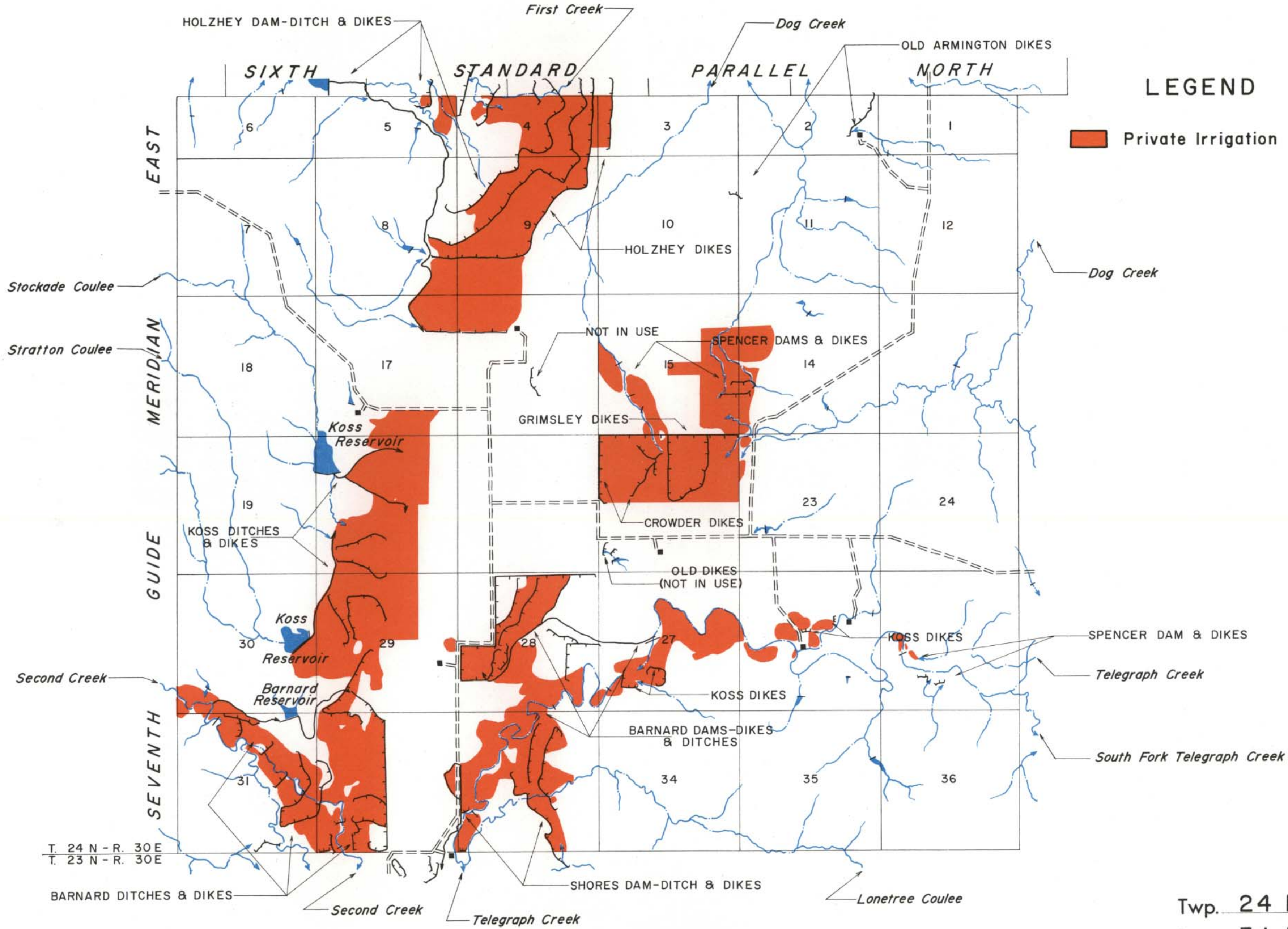


Twp. 24 North
Rge. 28 East



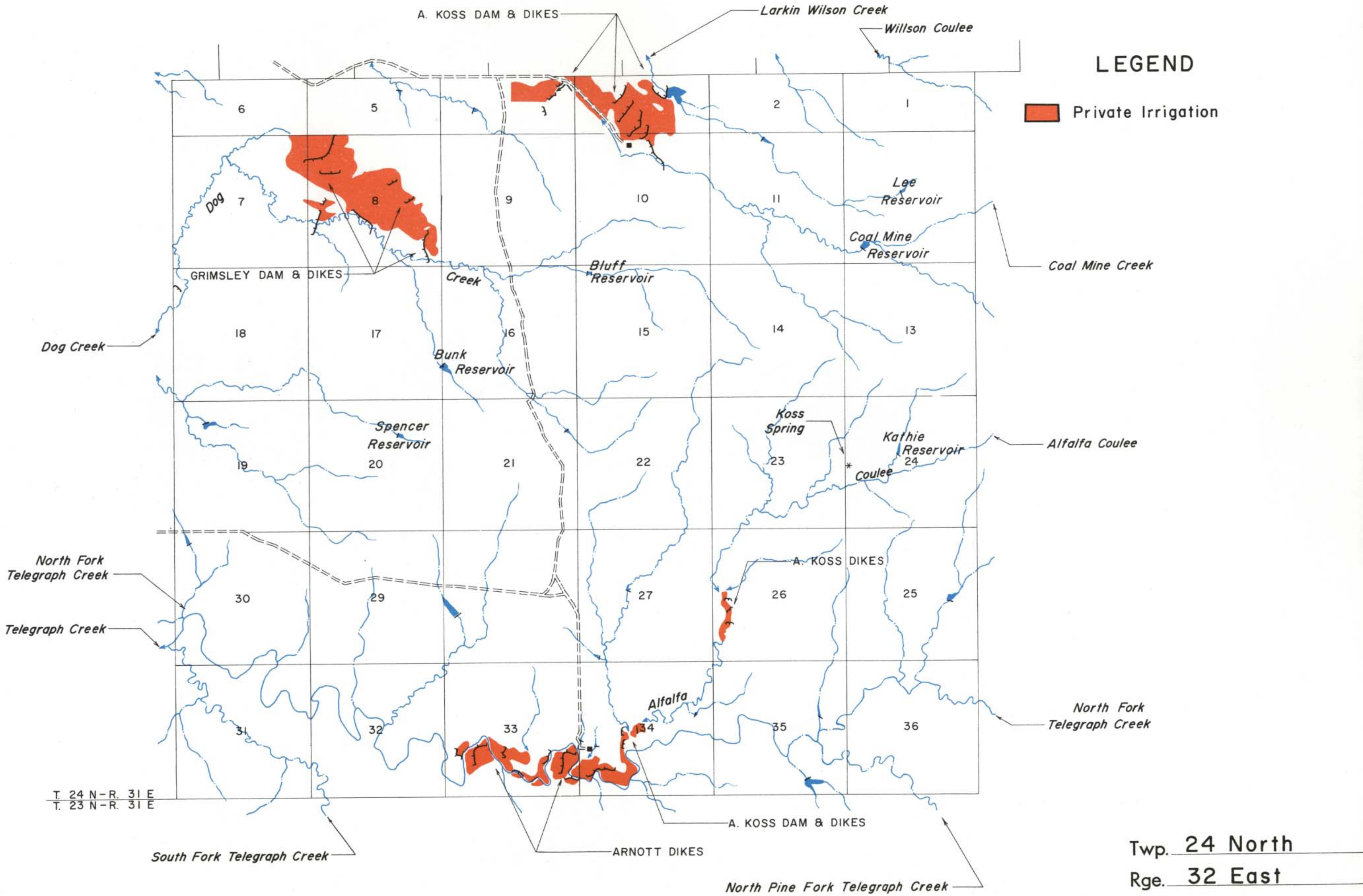
Twp. 24 North

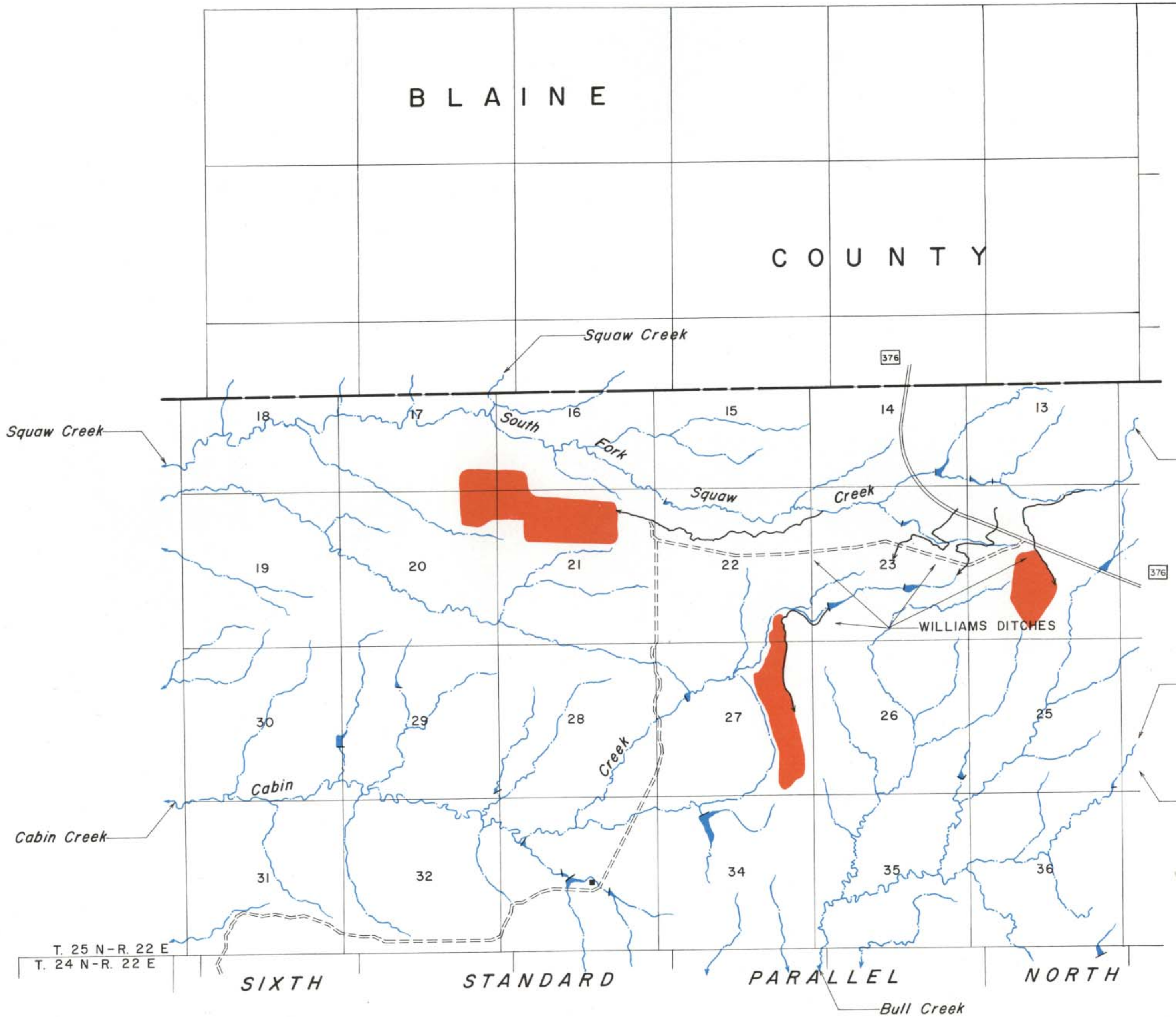
Rge. 29 East



Twp. 24 North

Rge. 31 East


A. KOSS DAM & DIKES
Larkin Wilson Creek
Willson Coulee
LEGEND
Private Irrigation
6
5
2
1
Dog
7
8
9
10
11
Lee Reservoir
Coal Mine Reservoir
Coal Mine Creek
GRIMSLEY DAM & DIKES
Creek
Bluff Reservoir
18
17
16
15
14
13
Dog Creek
Bunk Reservoir
Spencer Reservoir
Koss Spring
Kathie Reservoir
Alfalfa Coulee
19
20
21
22
23
24
Coulee
North Fork Telegraph Creek
A. KOSS DIKES
30
29
27
26
25
Telegraph Creek
Alfalfa
31
32
33
34
35
36
North Fork Telegraph Creek
T. 24 N-R. 31 E
T. 23 N-R. 31 E
A. KOSS DAM & DIKES
South Fork Telegraph Creek
ARNOTT DIKES
North Pine Fork Telegraph Creek
Twp. 24 North
Rge. 32 East

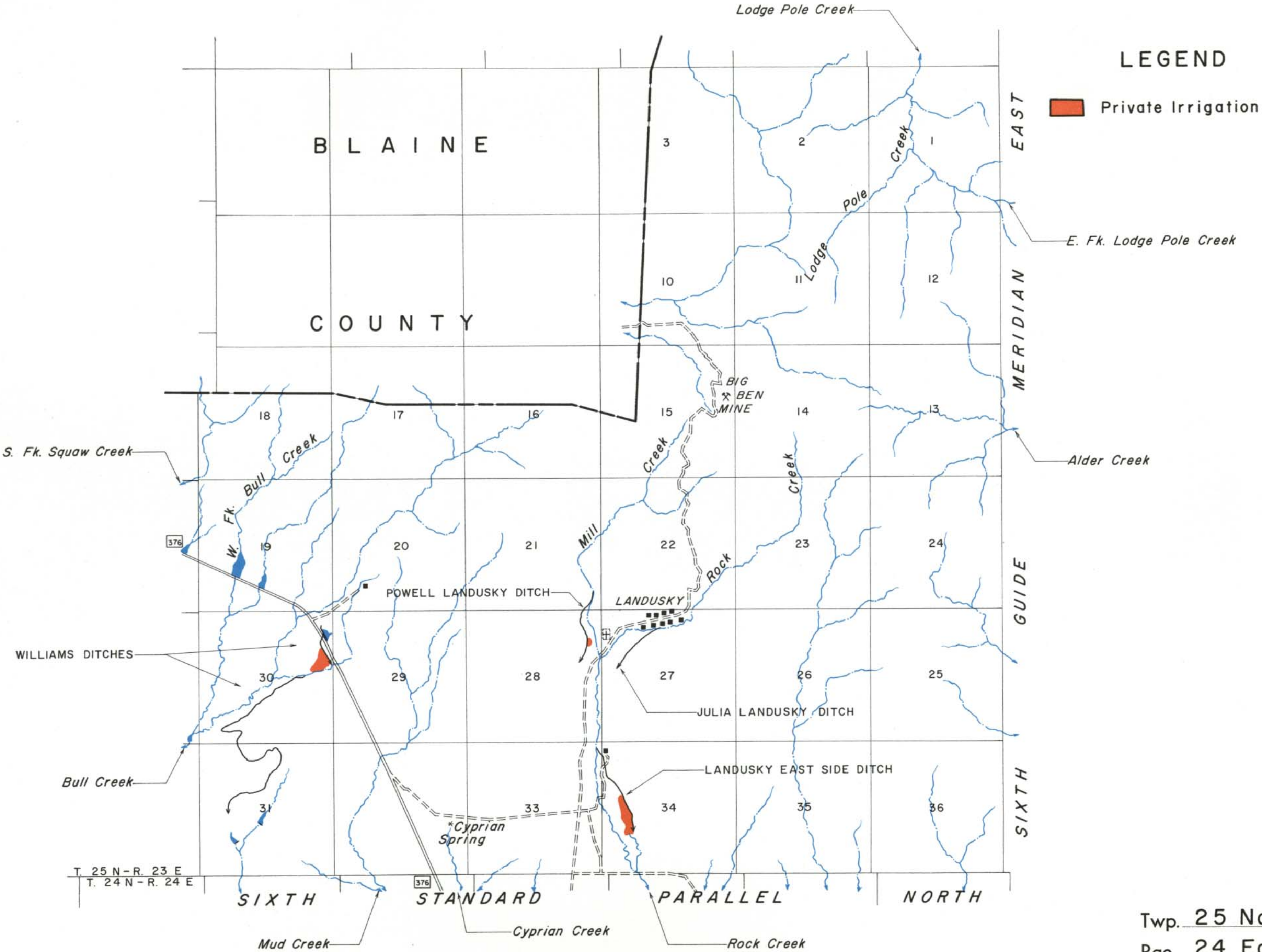


LEGEND

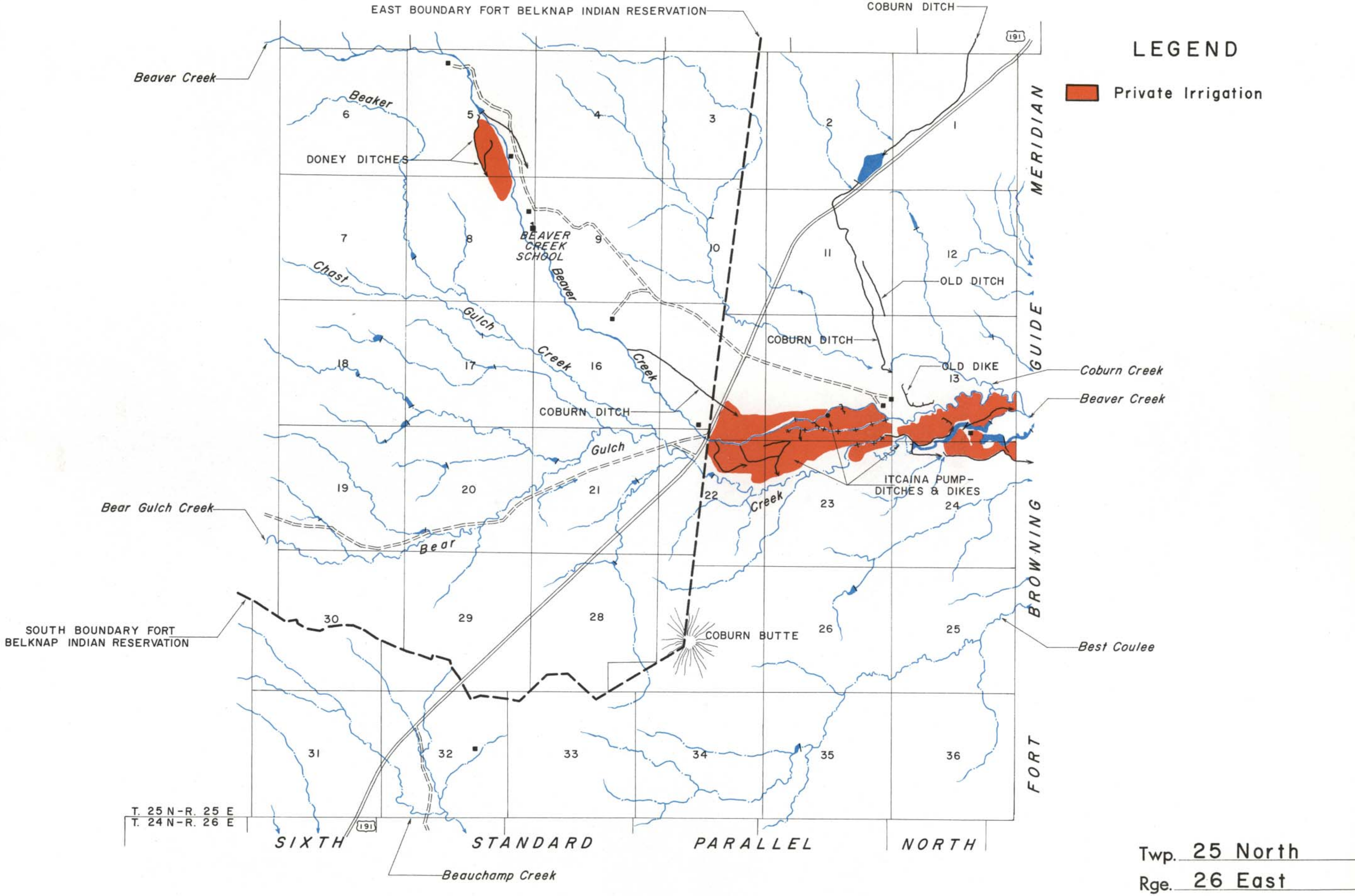
Private Irrigation

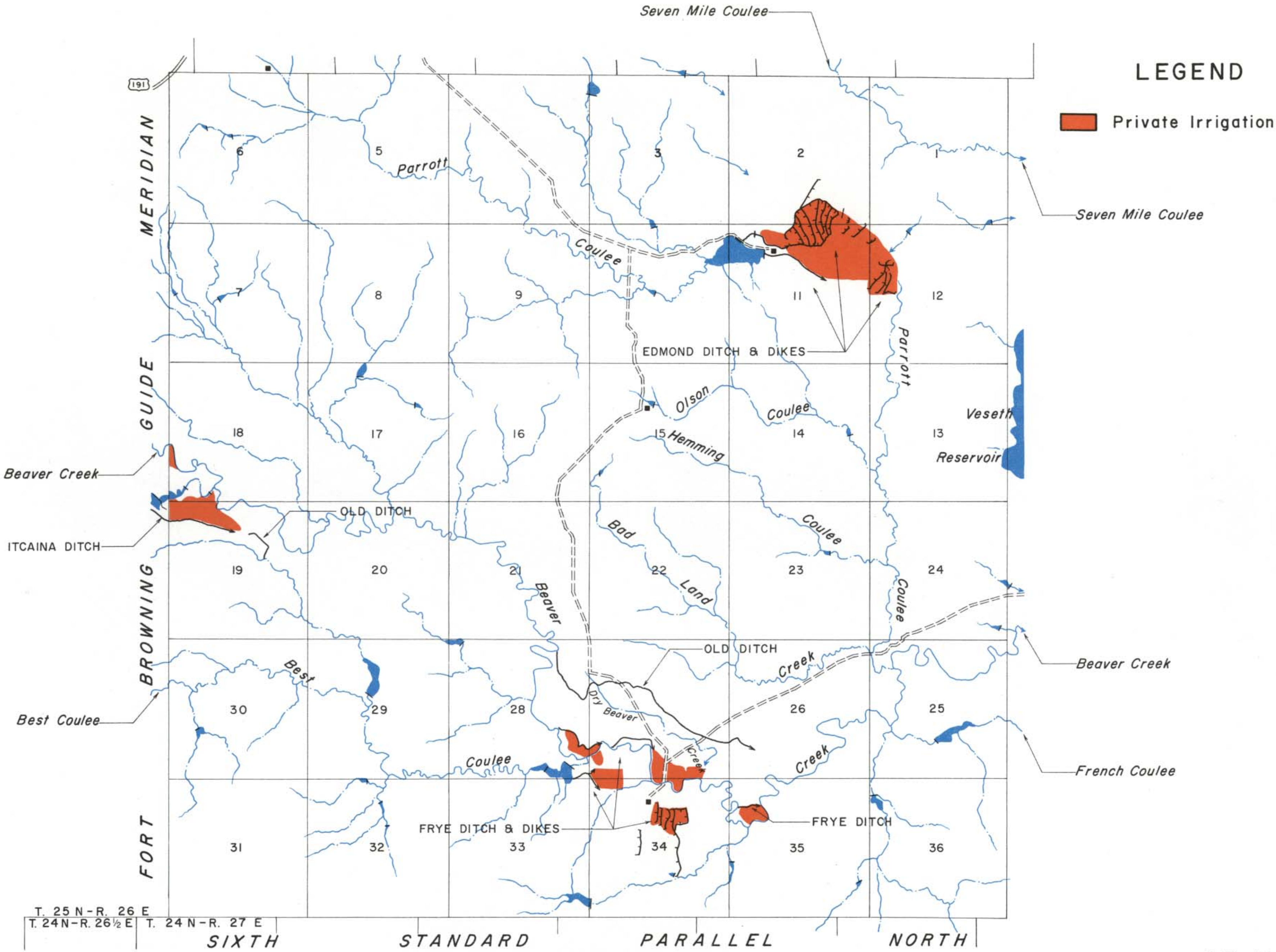
Twp. 25 North

Rge. 23 East



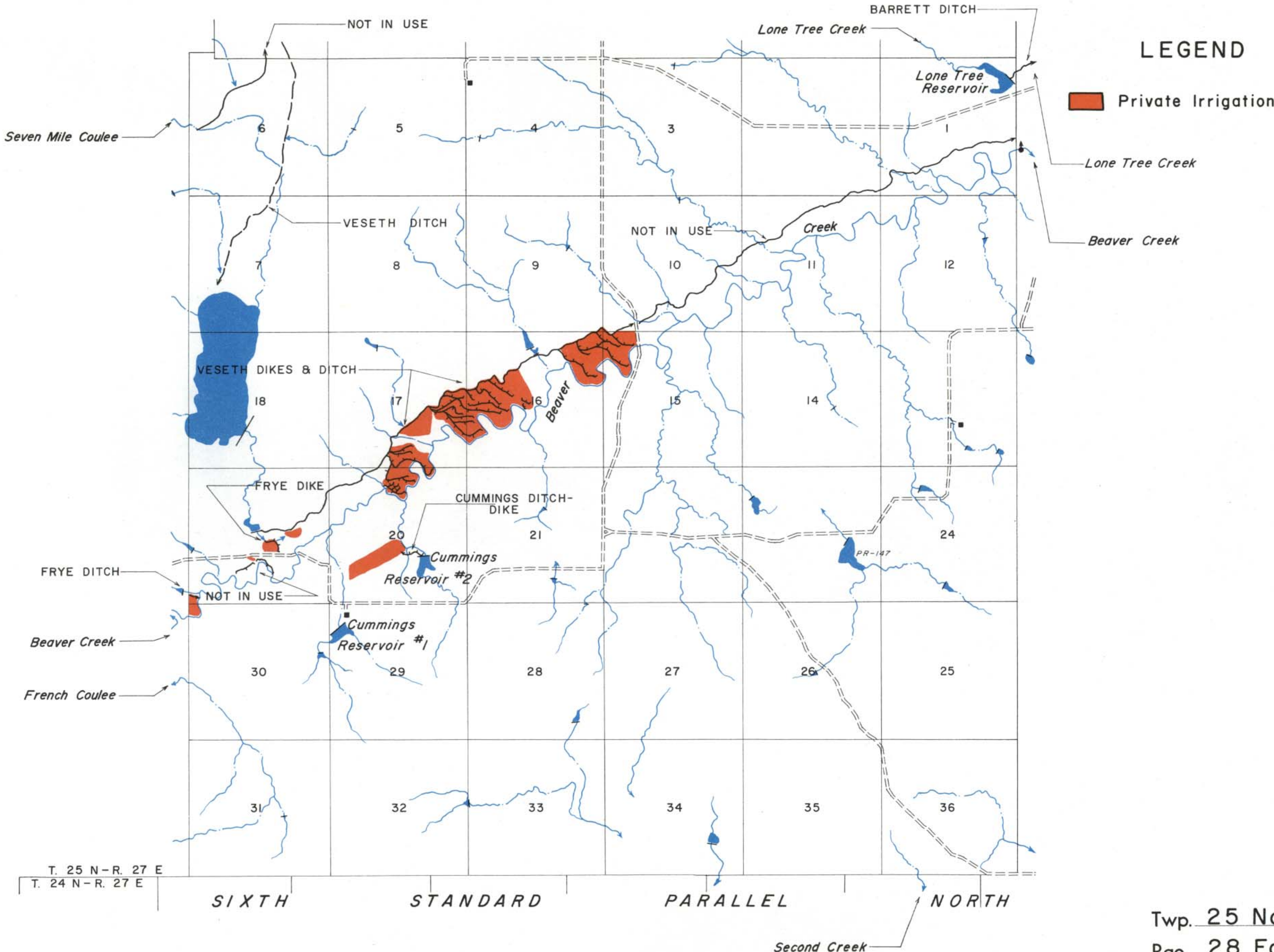
Twp. 25 North
Rge. 24 East


EAST BOUNDARY FORT BELKNAP INDIAN RESERVATION
COBURN DITCH
LEGEND
Private Irrigation
Beaver Creek
Beaker
DONEY DITCHES
BEAVER CREEK SCHOOL
Chast
Gulch
Creek
Beaver
Creek
COBURN DITCH
OLD DITCH
OLD DIKE
Coburn Creek
Beaver Creek
COBURN DITCH
Gulch
ITCAINA PUMP-DITCHES & DIKES
Bear Gulch Creek
Bear
Creek
SOUTH BOUNDARY FORT BELKNAP INDIAN RESERVATION
COBURN BUTTE
Best Coulee
MERIDIAN
GUIDE
BROWNING
FORT
T. 25 N-R. 25 E
T. 24 N-R. 26 E
SIXTH STANDARD PARALLEL NORTH
Beauchamp Creek
191
Twp. 25 North
Rge. 26 East

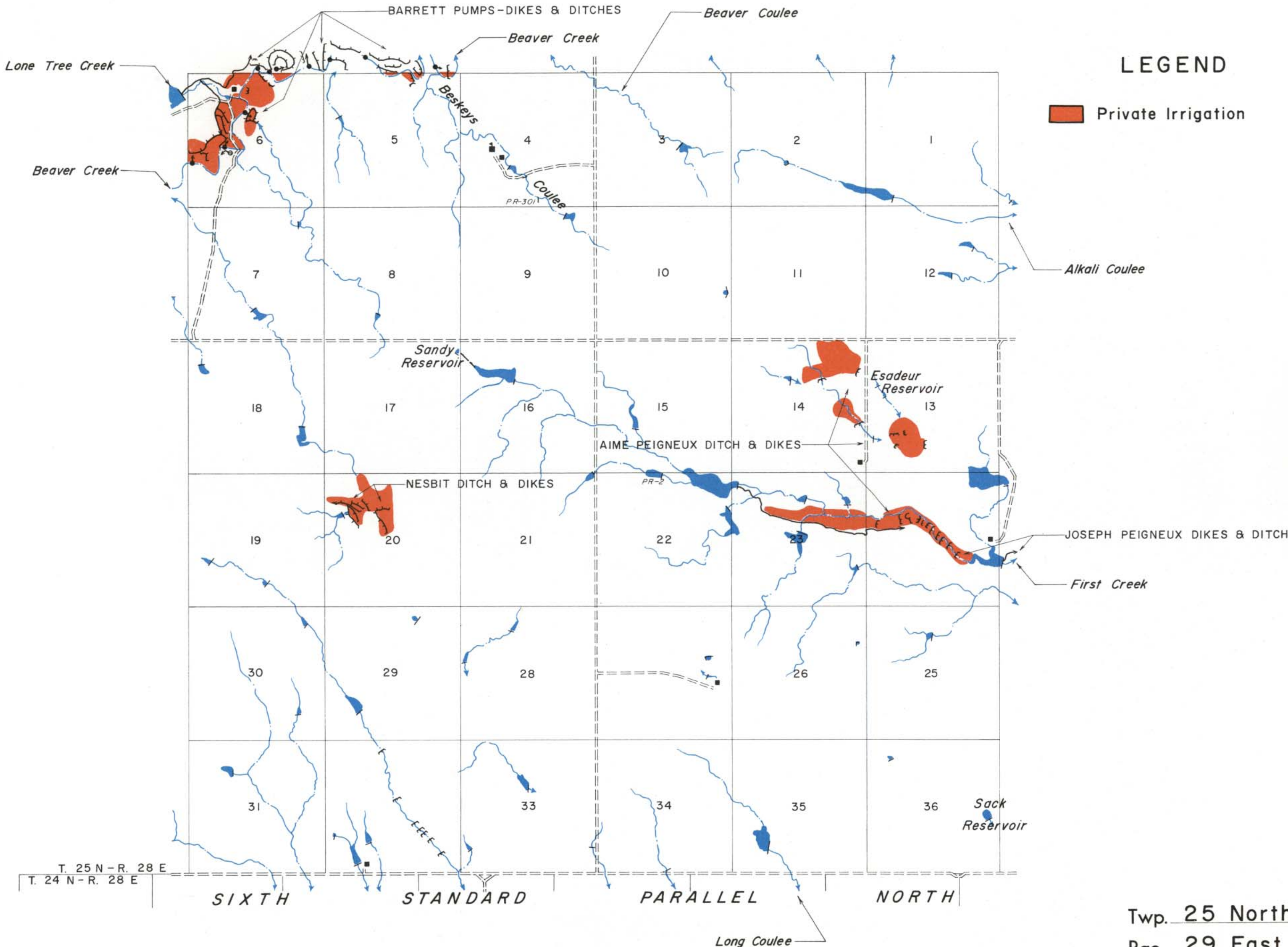


Twp. 25 North

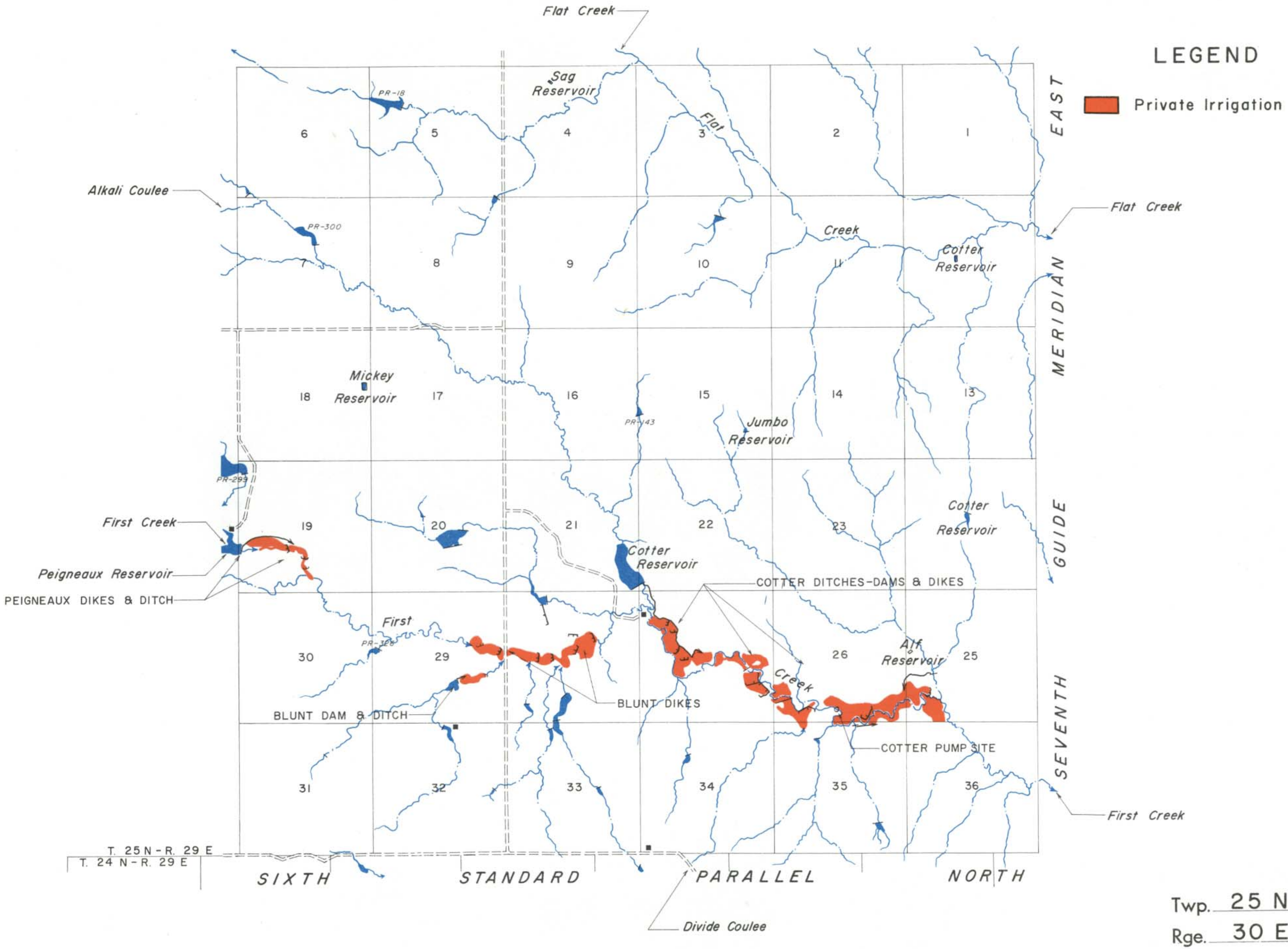
Rge. 27 East



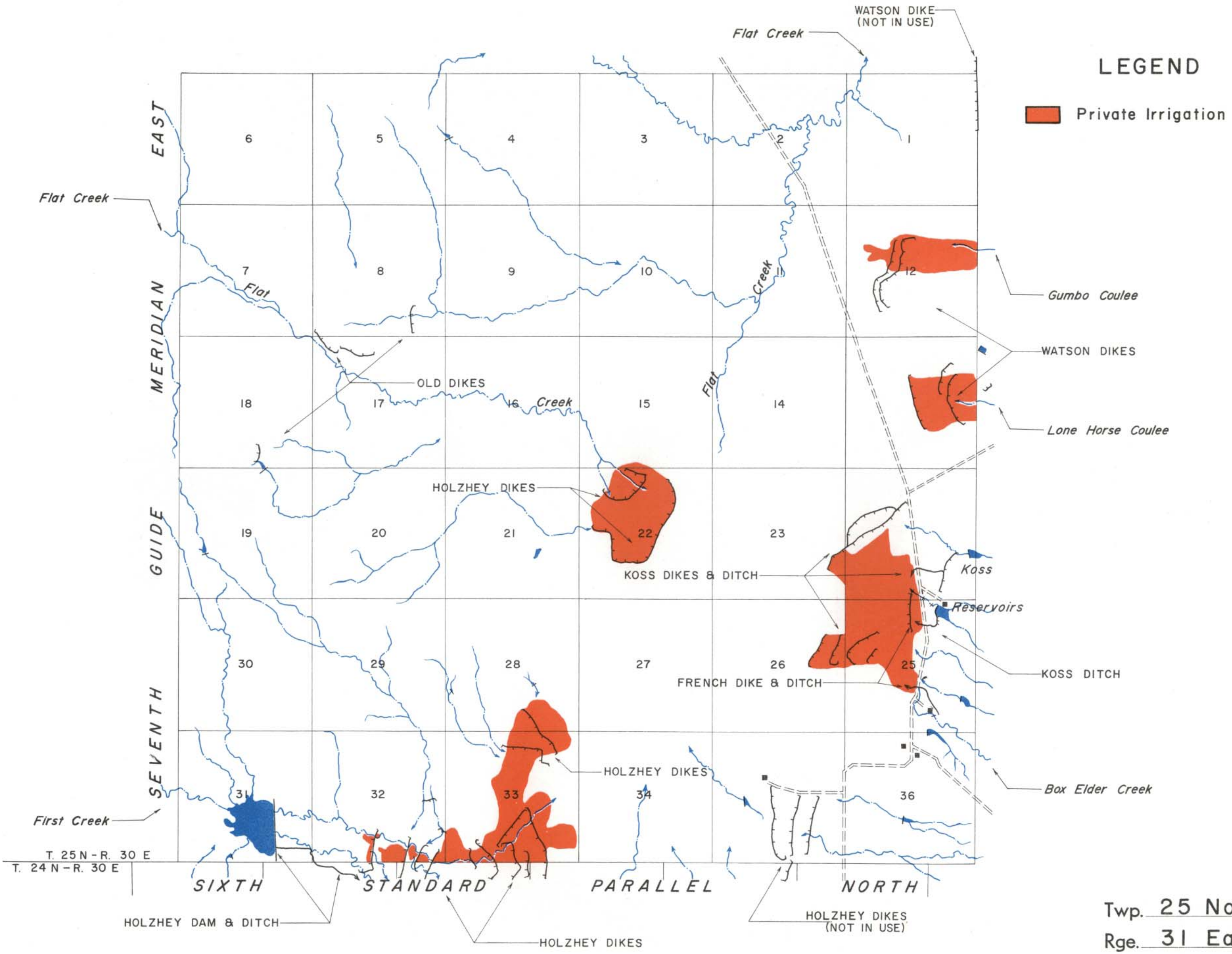
Twp. 25 North
Rge. 28 East



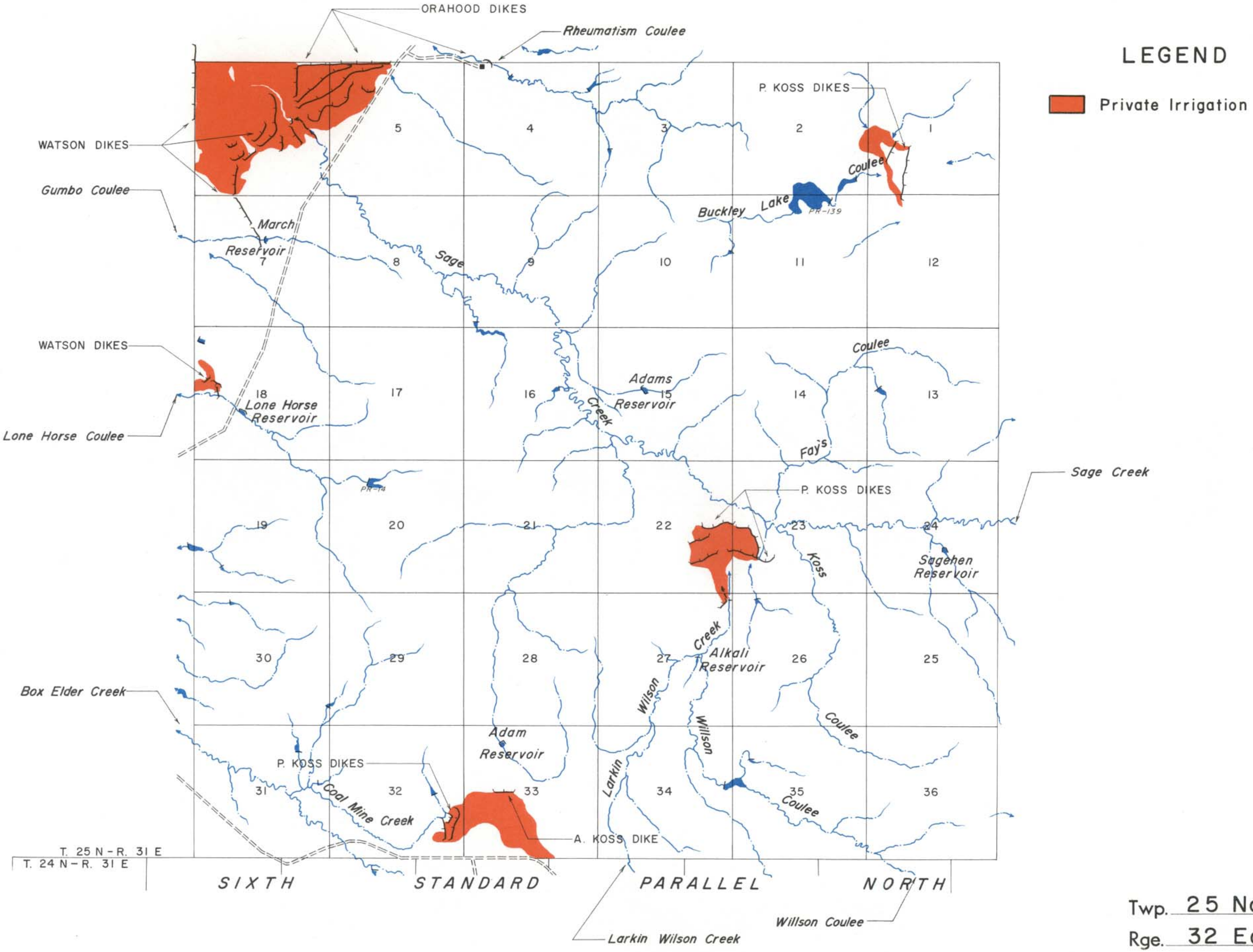
Twp. 25 North
Rge. 29 East



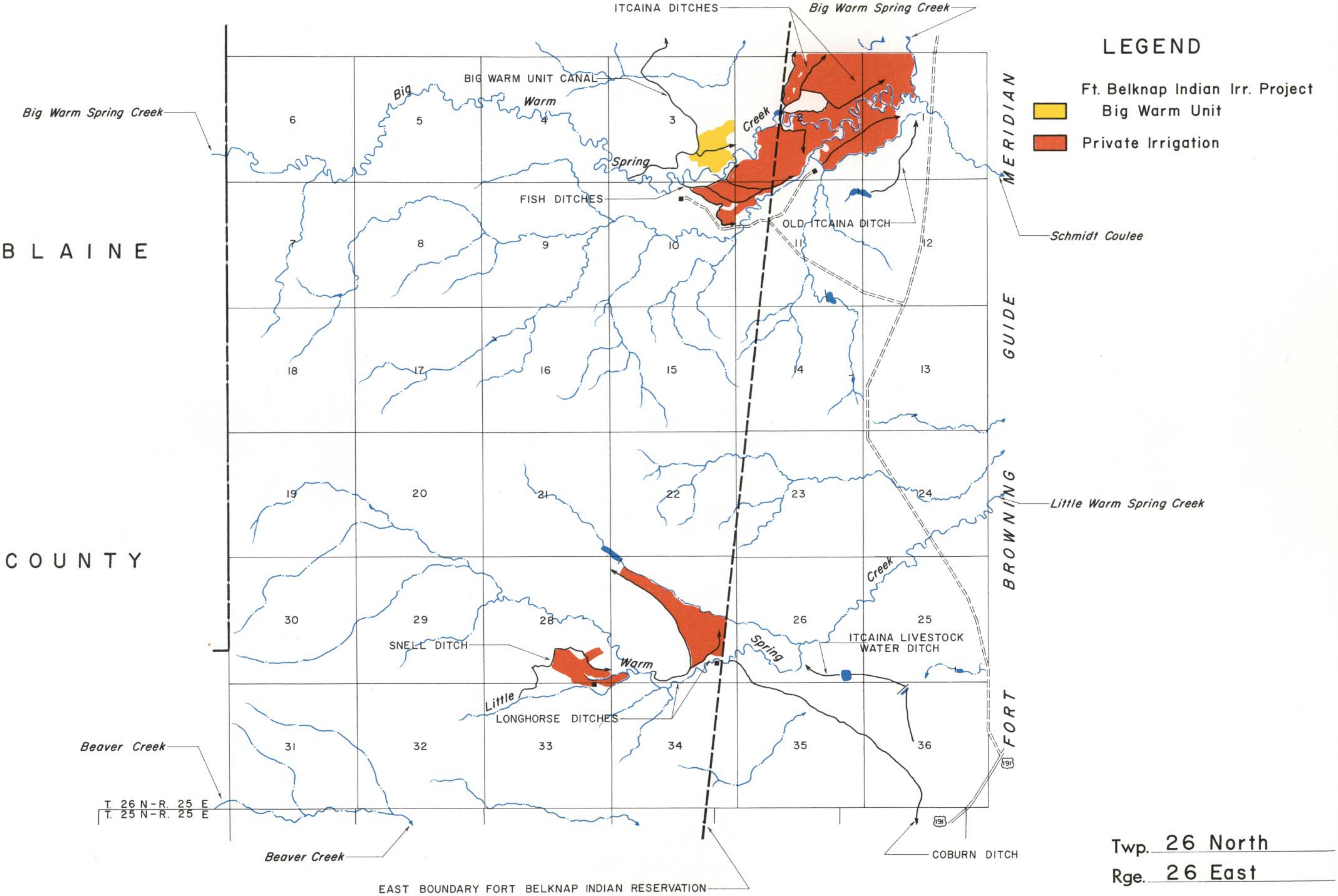
Twp. 25 North
Rge. 30 East



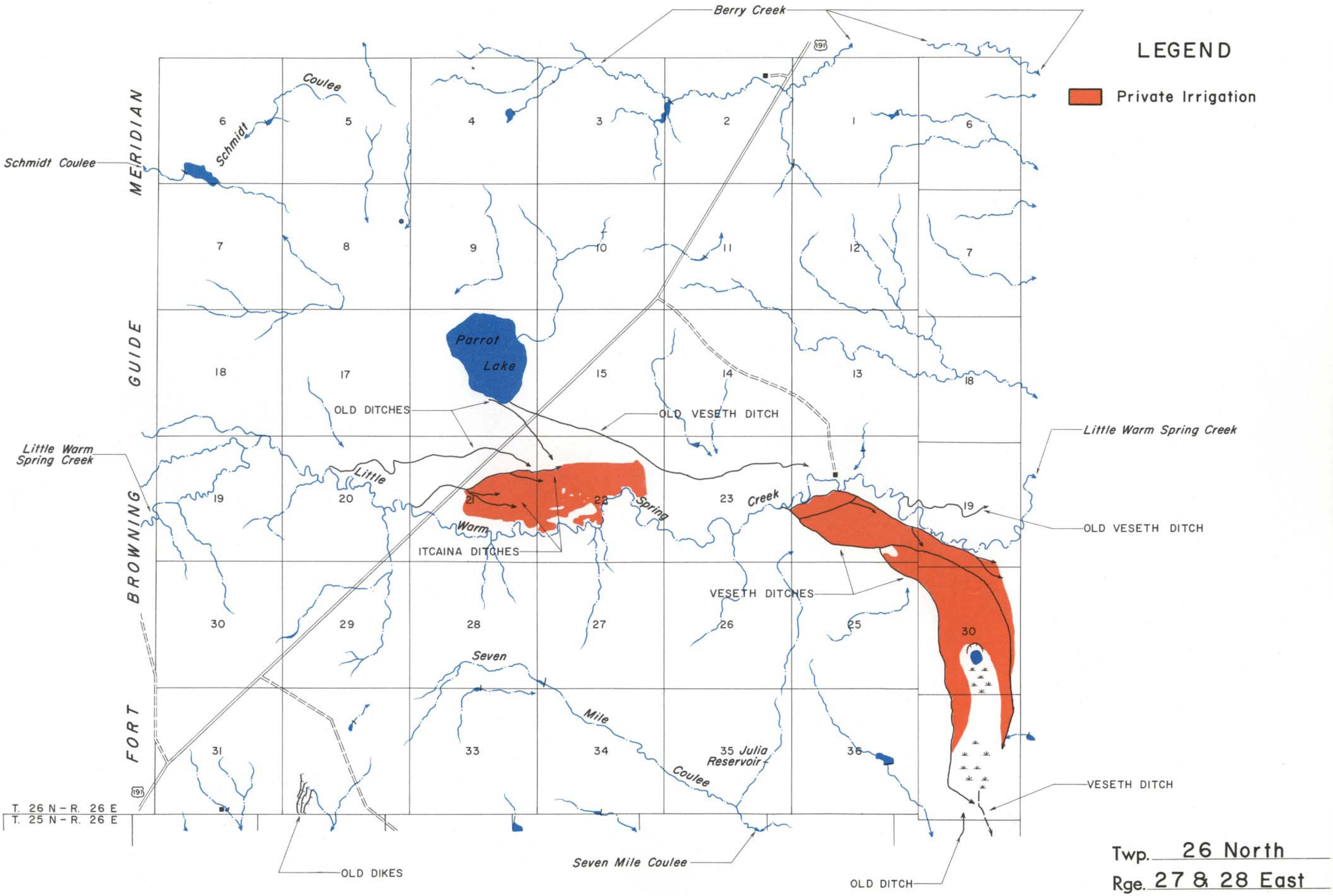
Twp. 25 North
Rge. 31 East



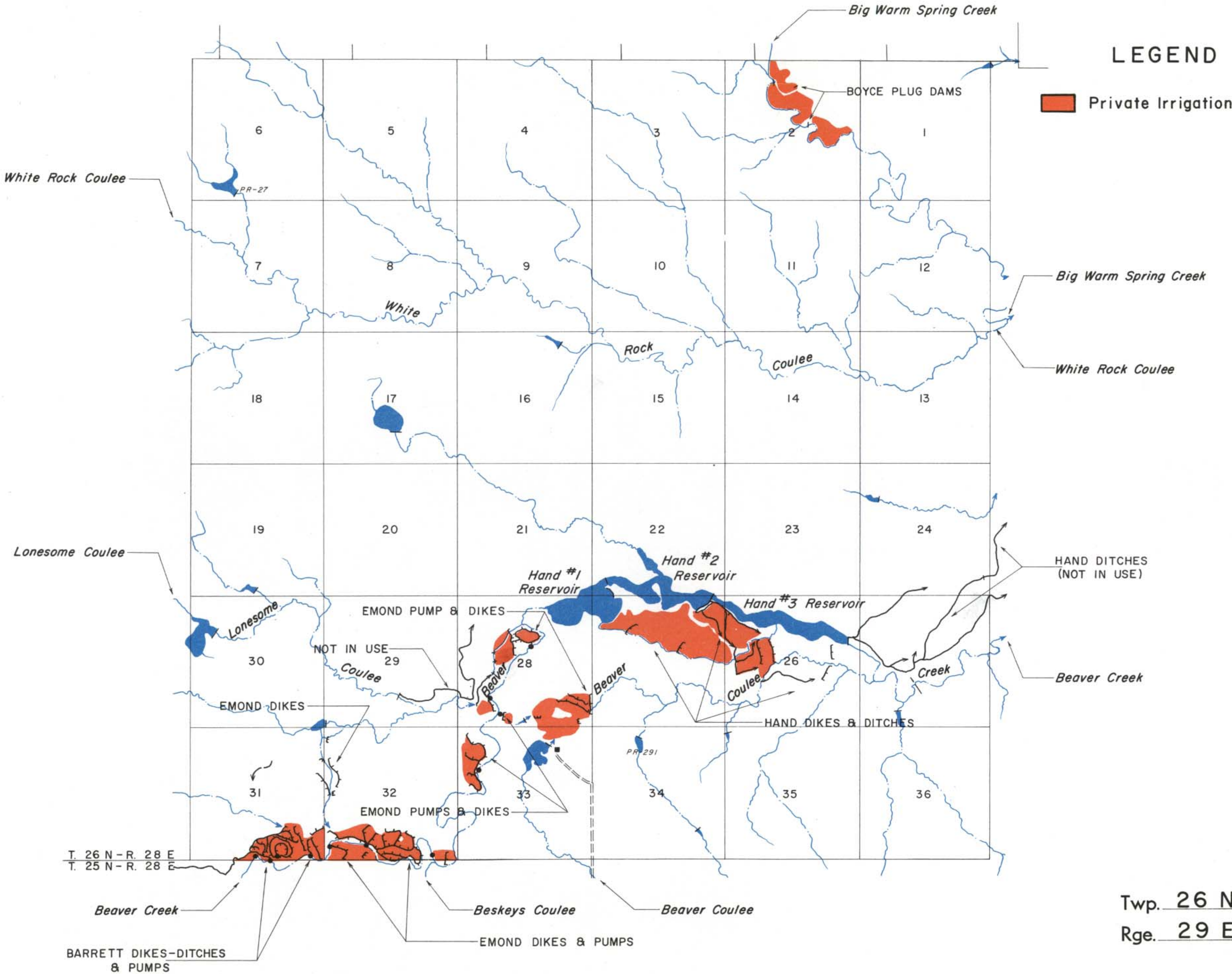
Twp. 25 North
Rge. 32 East



Twp. 26 North
Rge. 26 East

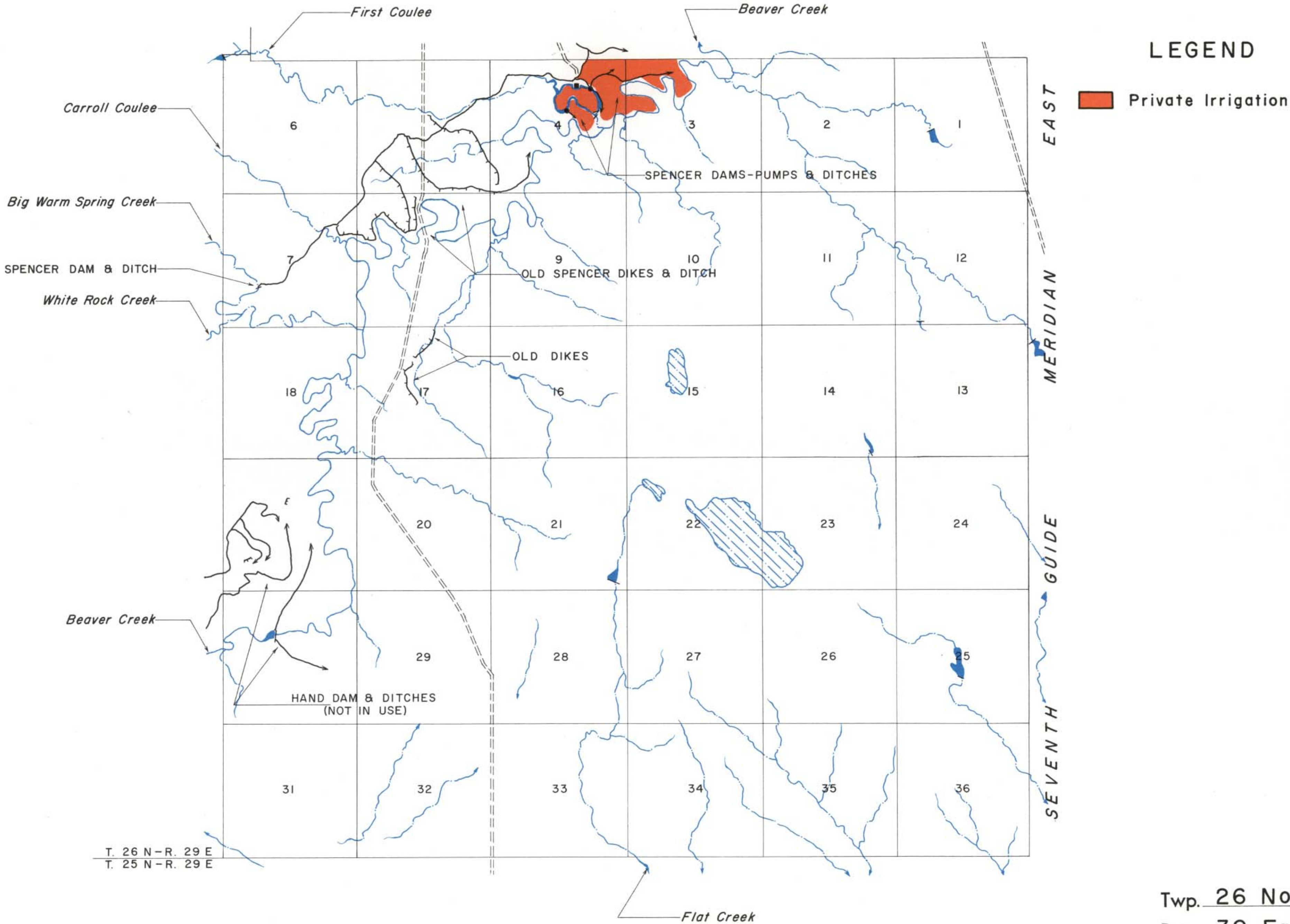


Twp. 26 North
Rge. 27 & 28 East

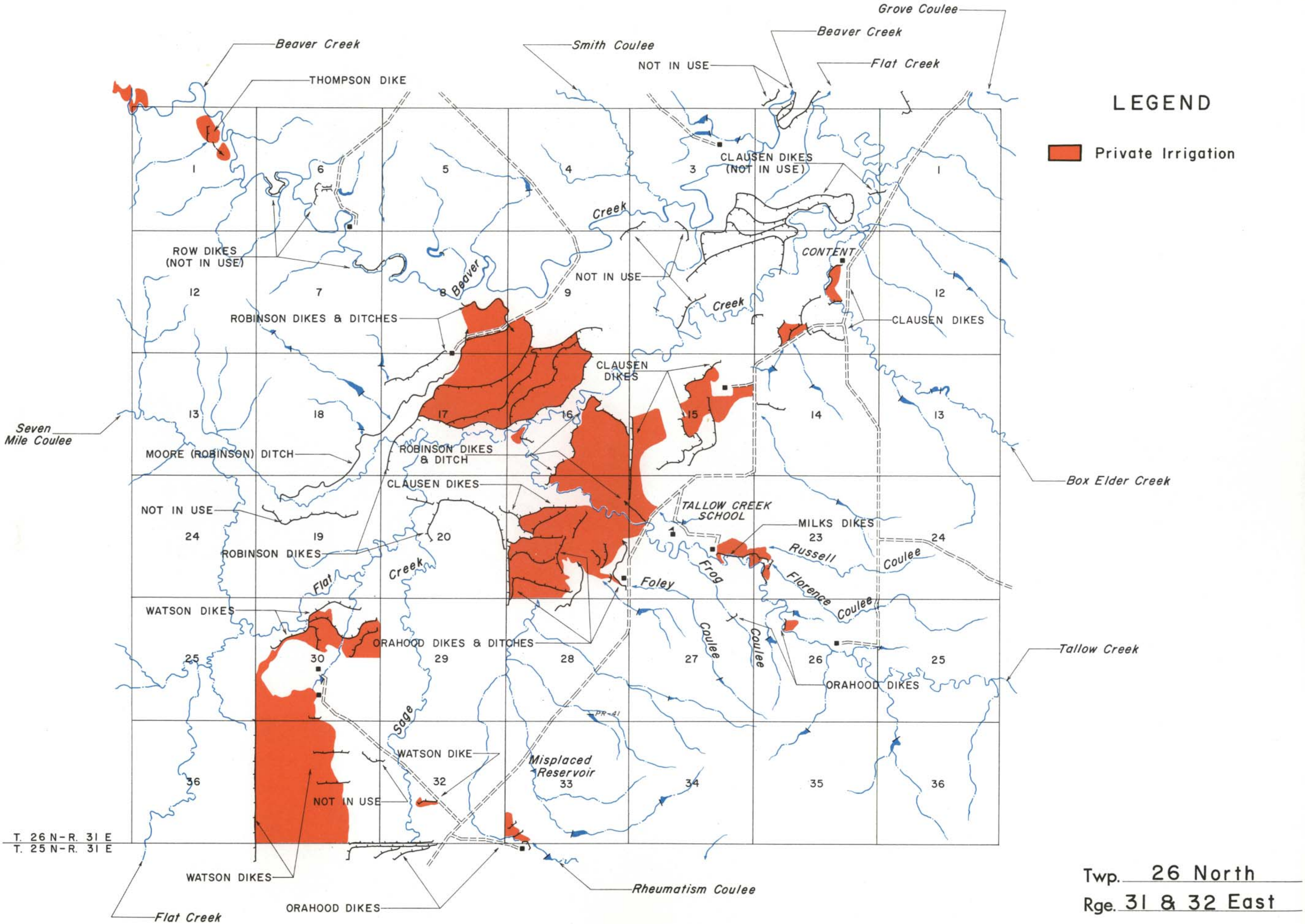


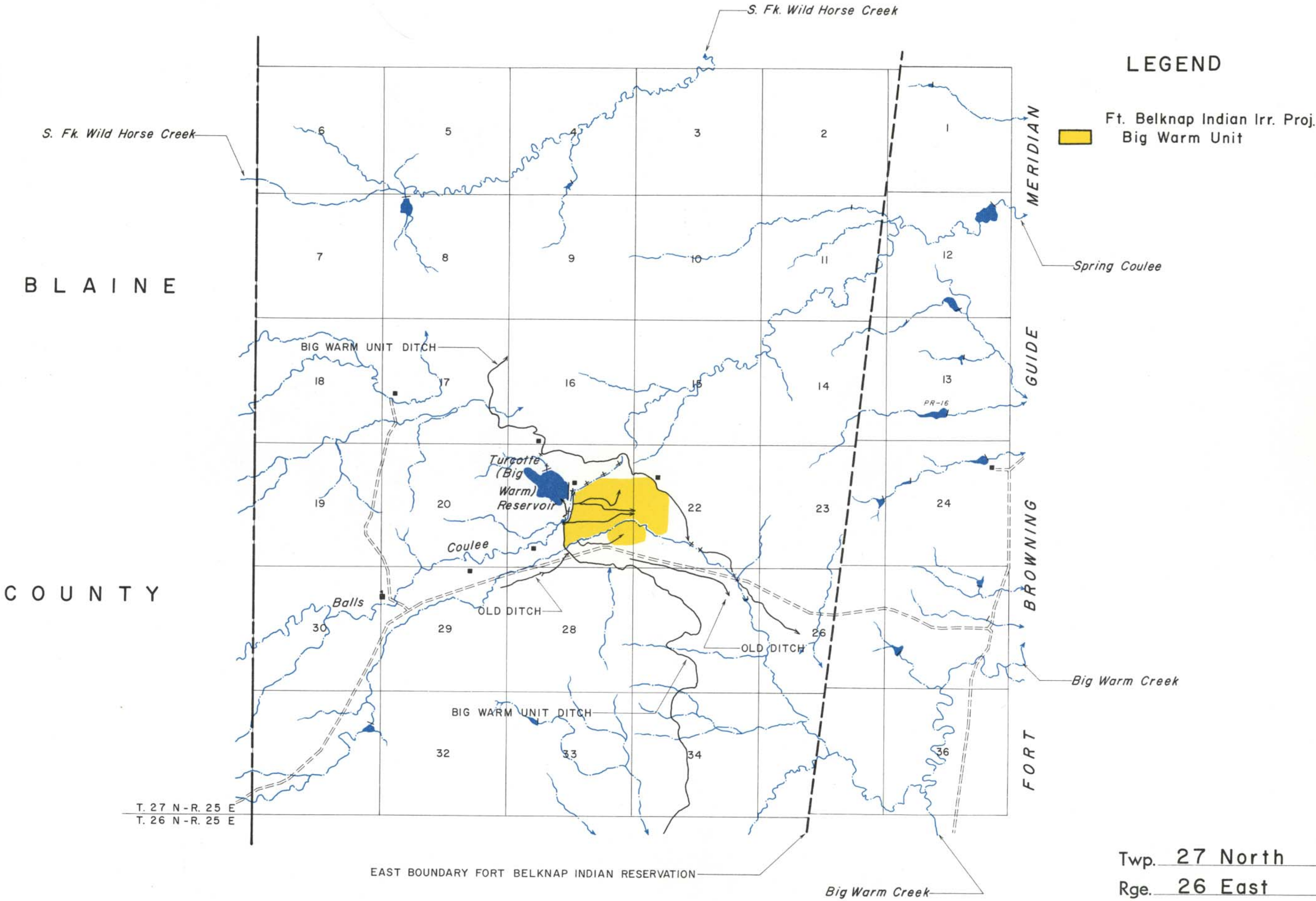
Twp. 26 North

Rge. 29 East



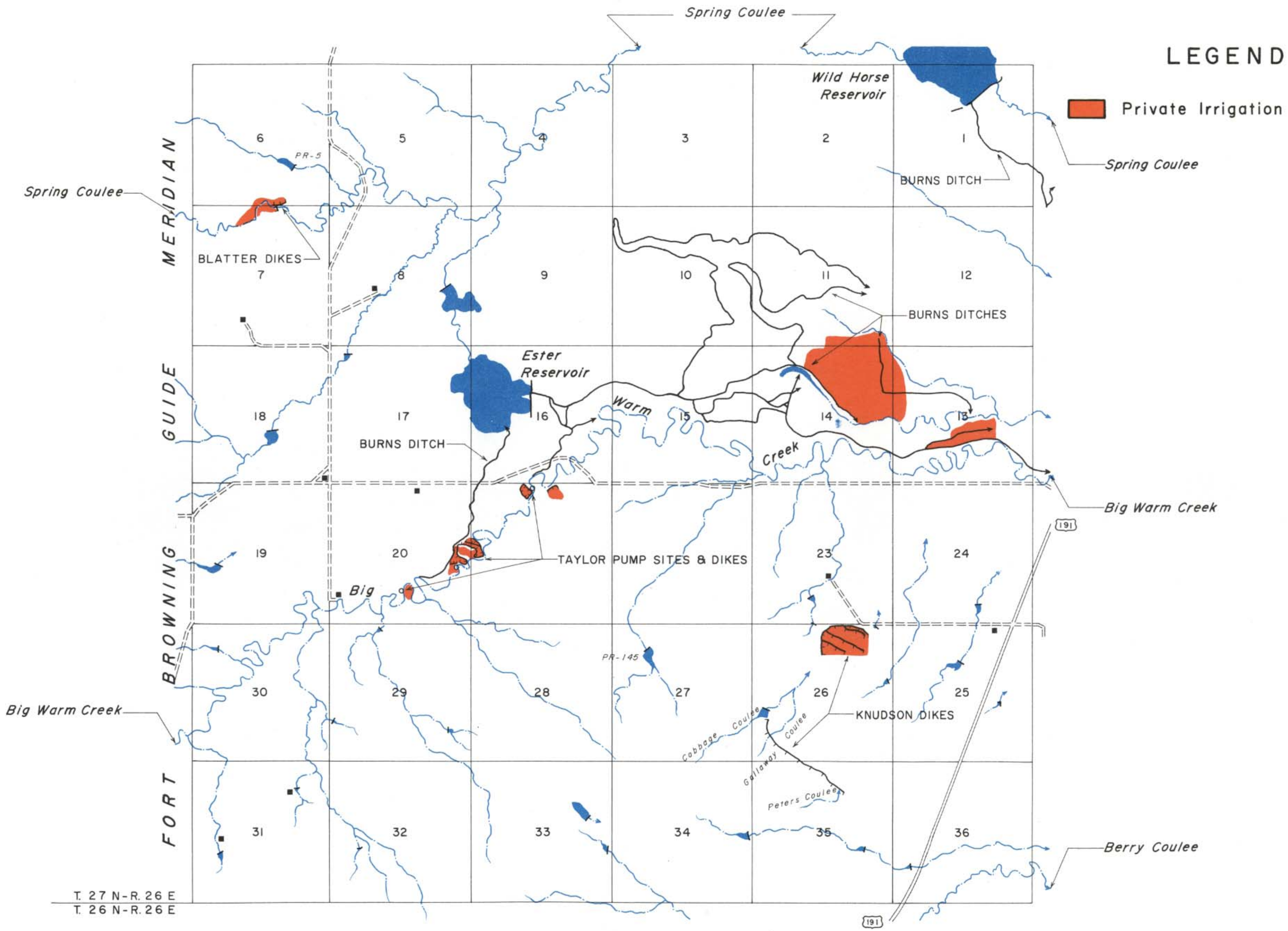
Twp. 26 North
Rge. 30 East


LEGEND
Private Irrigation
Beaver Creek
THOMPSON DIKE
Smith Coulee
NOT IN USE
Beaver Creek
Flat Creek
Grove Coulee
CLAUSEN DIKES (NOT IN USE)
ROW DIKES (NOT IN USE)
Creek
Beaver
CONTENT
NOT IN USE
Creek
CLAUSEN DIKES
ROBINSON DIKES & DITCHES
CLAUSEN DIKES
Seven Mile Coulee
MOORE (ROBINSON) DITCH
ROBINSON DIKES & DITCH
CLAUSEN DIKES
NOT IN USE
TALLOW CREEK SCHOOL
MILKS DIKES
Box Elder Creek
ROBINSON DIKES
Flat
Creek
Foley
Frog
Russell
Coulee
Florence
Coulee
WATSON DIKES
ORAHOOD DIKES & DITCHES
Coulee
Coulee
Tallow Creek
ORAHOOD DIKES
Sage
WATSON DIKE
Misplaced Reservoir
NOT IN USE
PR-41
T. 26 N-R. 31 E
T. 25 N-R. 31 E
WATSON DIKES
ORAHOOD DIKES
Rheumatism Coulee
Flat Creek
Twp. 26 North
Rge. 31 & 32 East

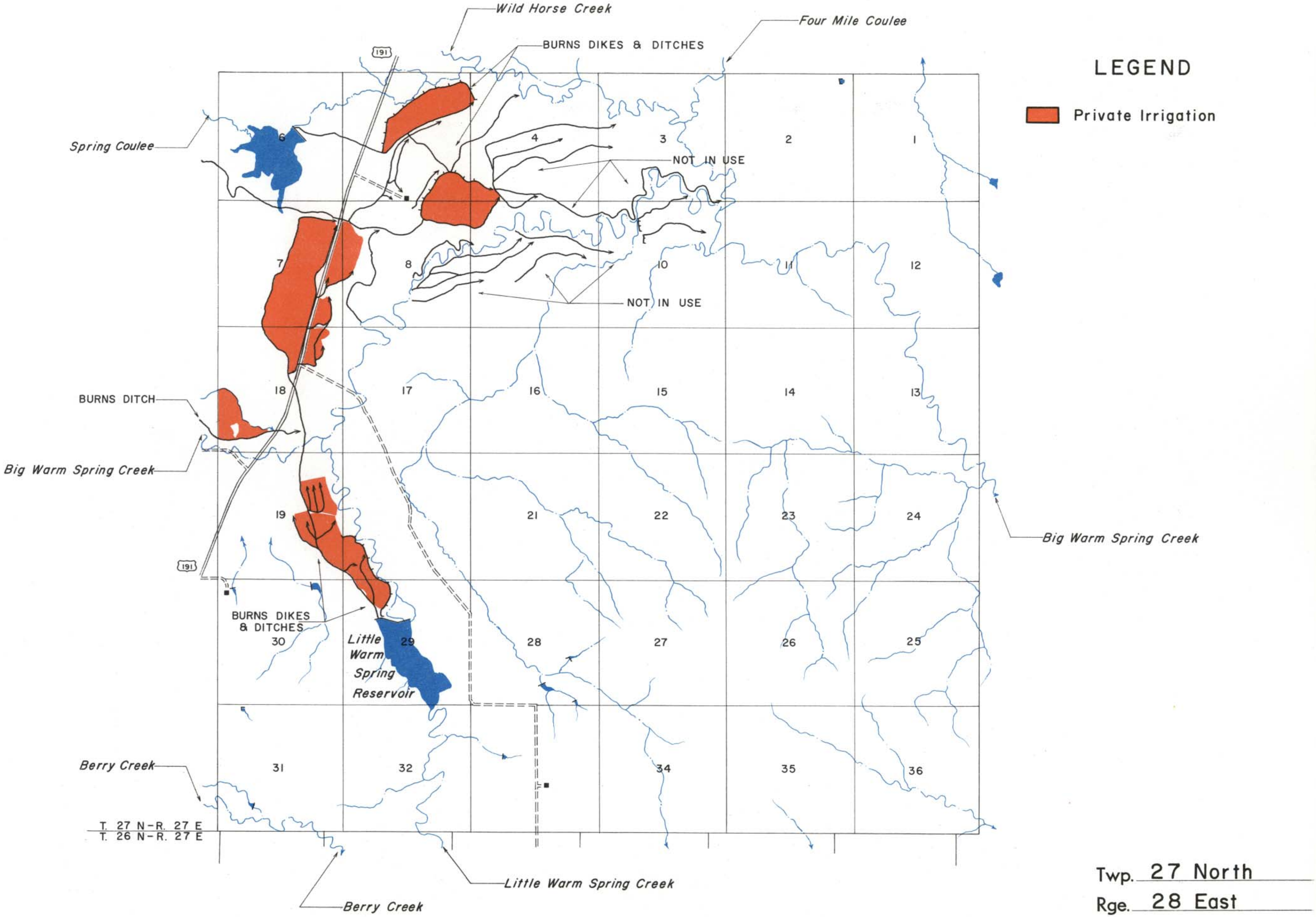


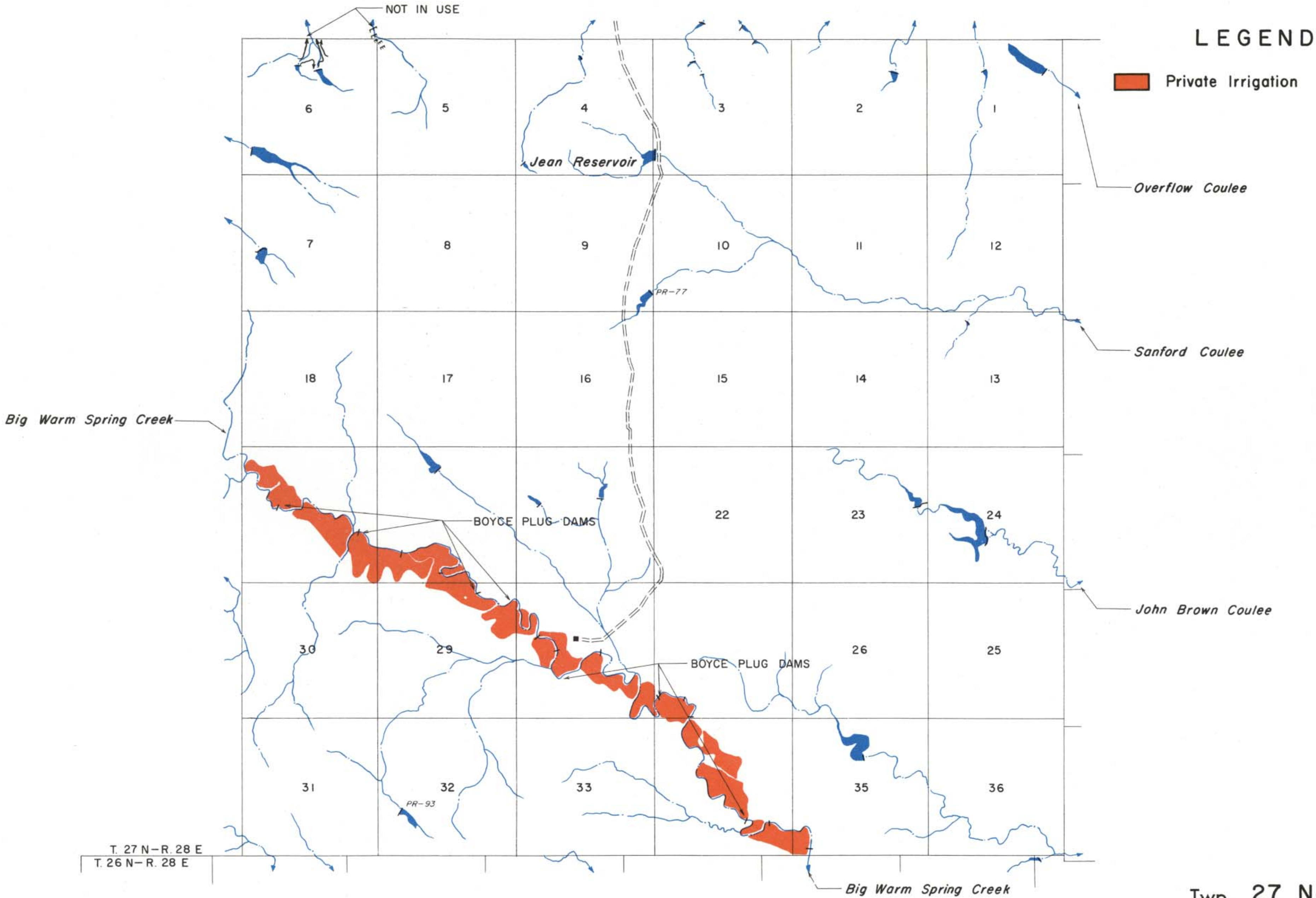
Twp. 27 North

Rge. 26 East

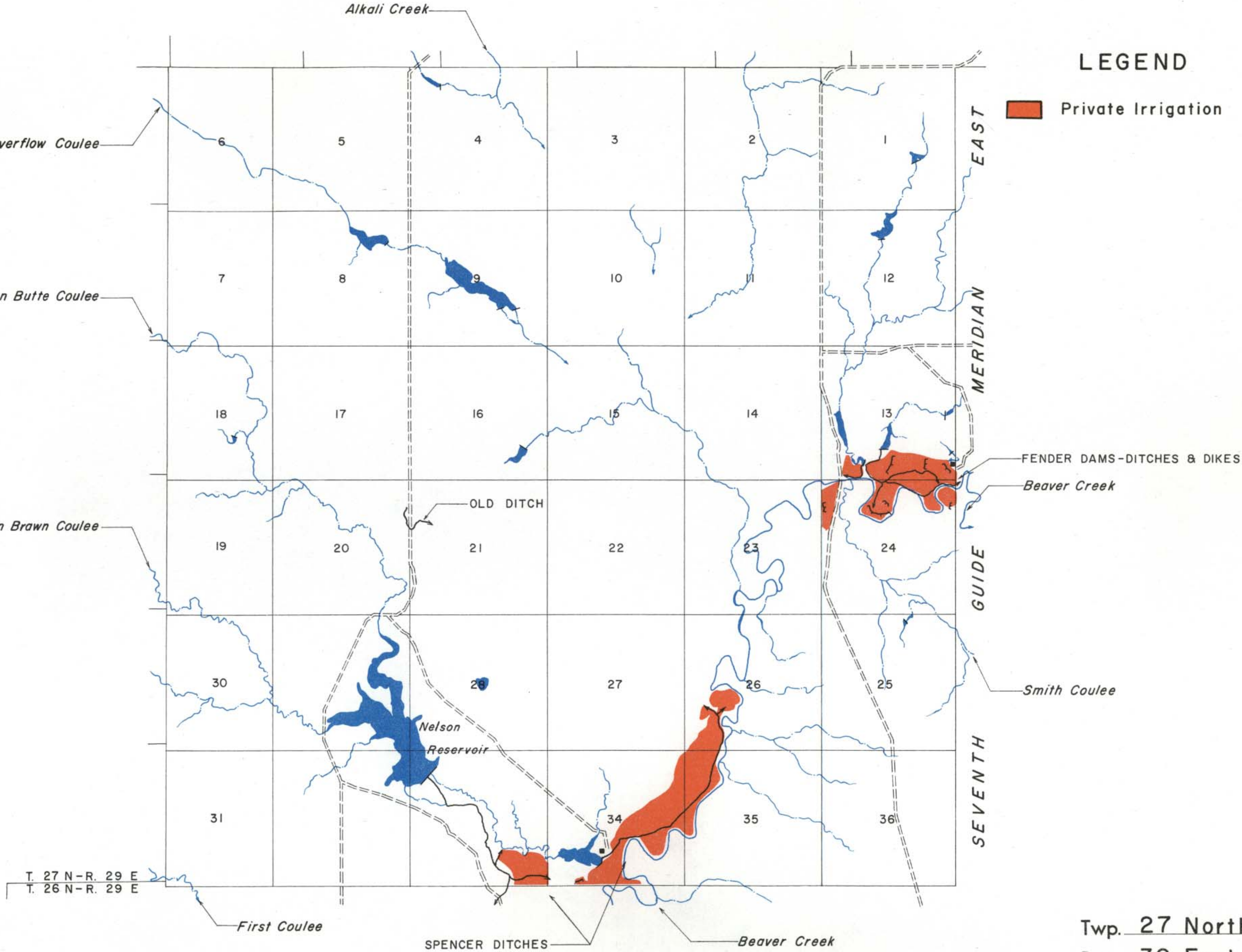


Twp. 27 North
Rge. 27 East


Wild Horse Creek
BURNS DIKES & DITCHES
Four Mile Coulee
LEGEND
Private Irrigation
Spring Coulee
191
NOT IN USE
NOT IN USE
BURNS DITCH
Big Warm Spring Creek
Big Warm Spring Creek
BURNS DIKES & DITCHES
Little Warm Spring Reservoir
Berry Creek
Berry Creek
Little Warm Spring Creek
T. 27 N-R. 27 E
T. 26 N-R. 27 E
1
2
3
4
6
7
8
10
11
12
13
14
15
16
17
18
19
21
22
23
24
25
26
27
28
29
30
31
32
34
35
36
Twp. 27 North
Rge. 28 East

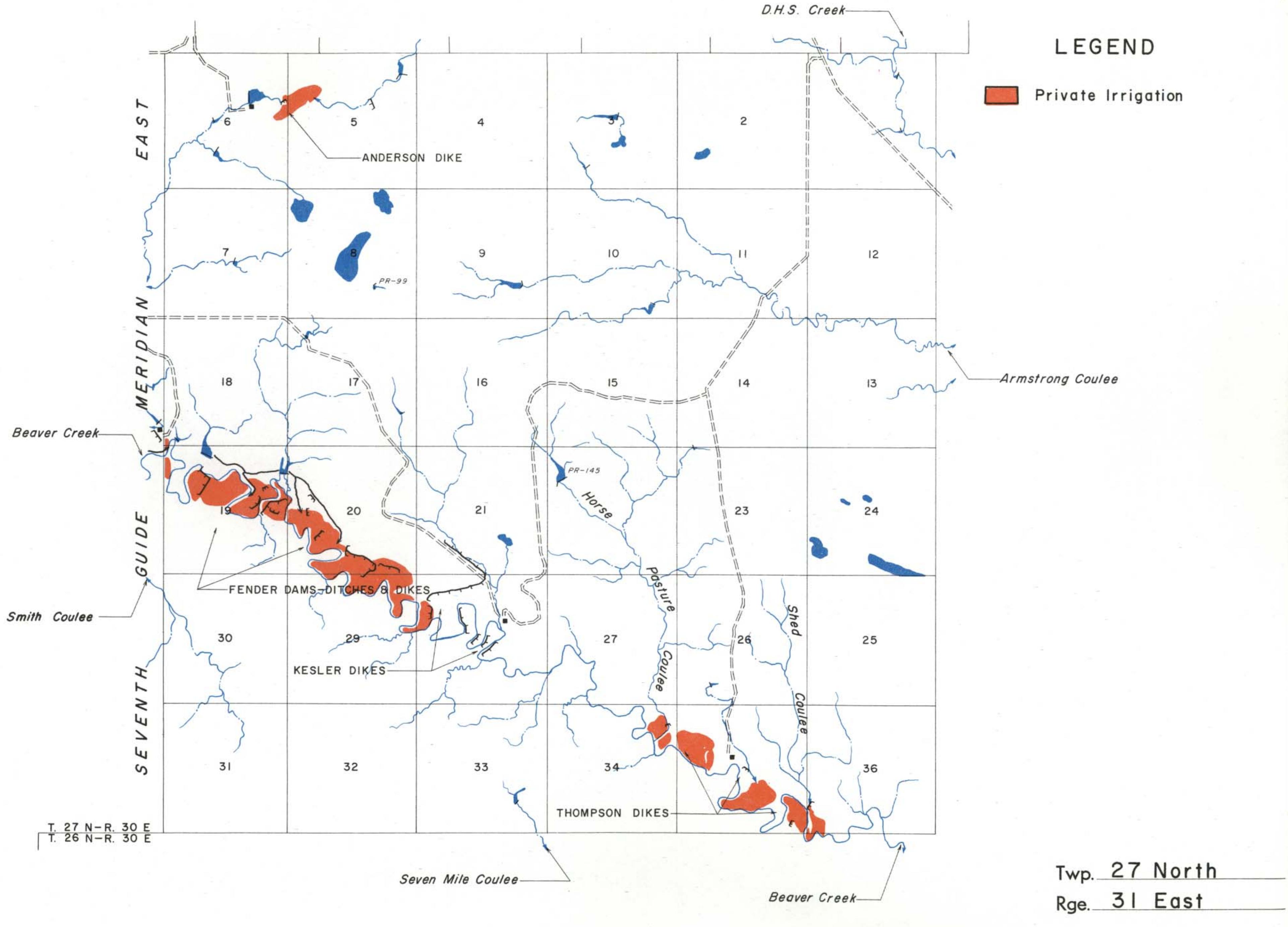


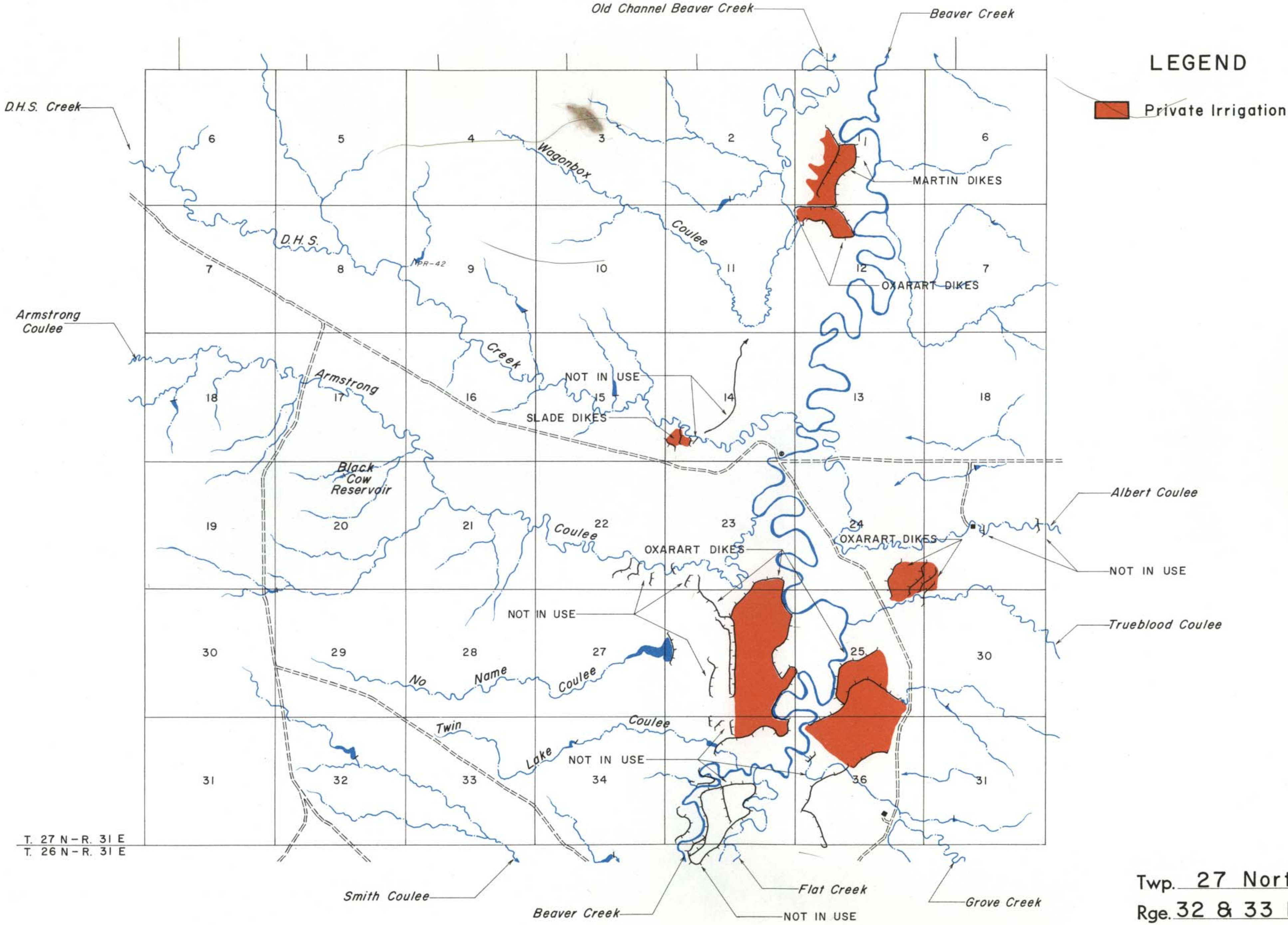
Twp. 27 North
Rge. 29 East



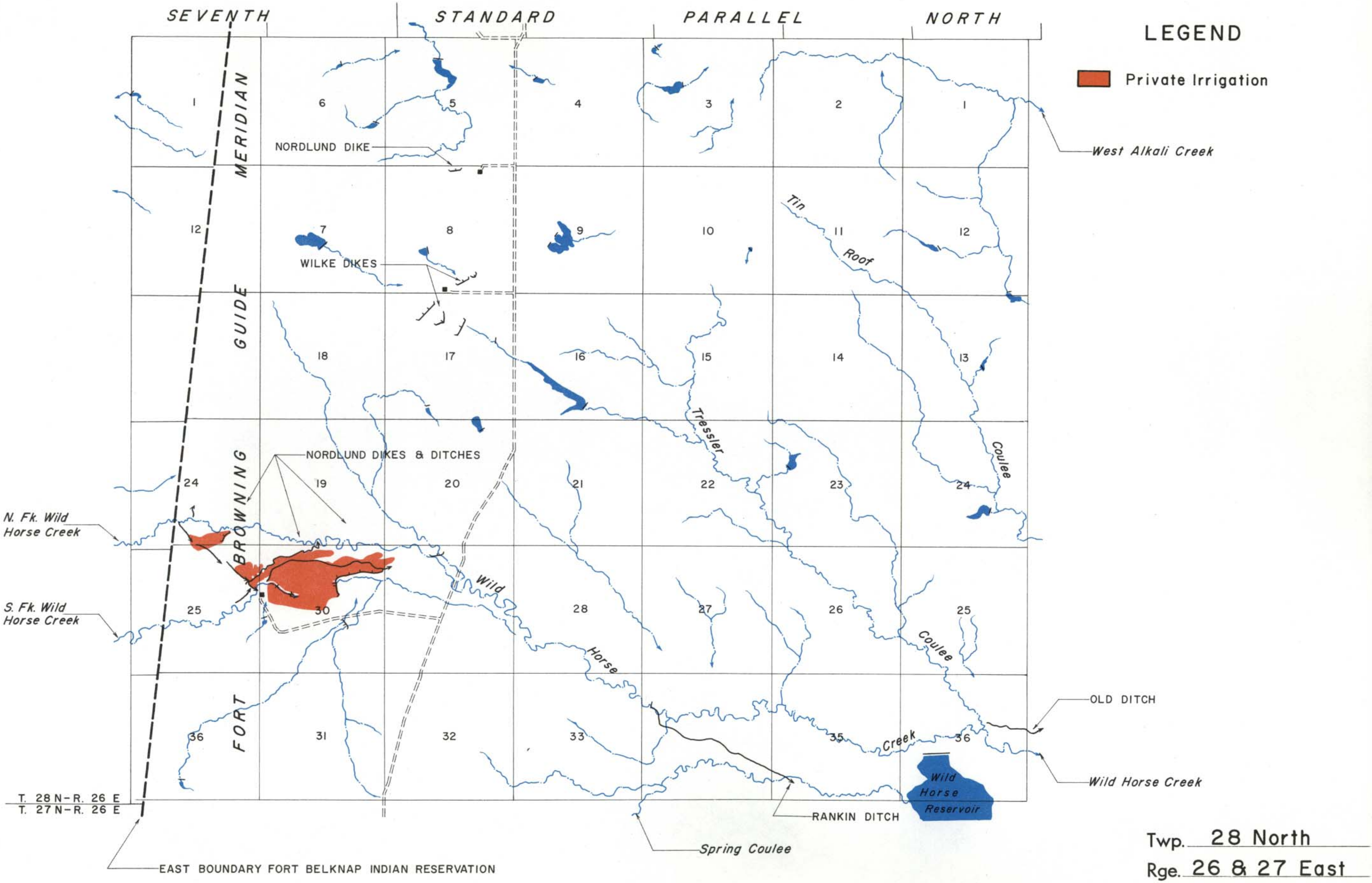
Twp. 27 North

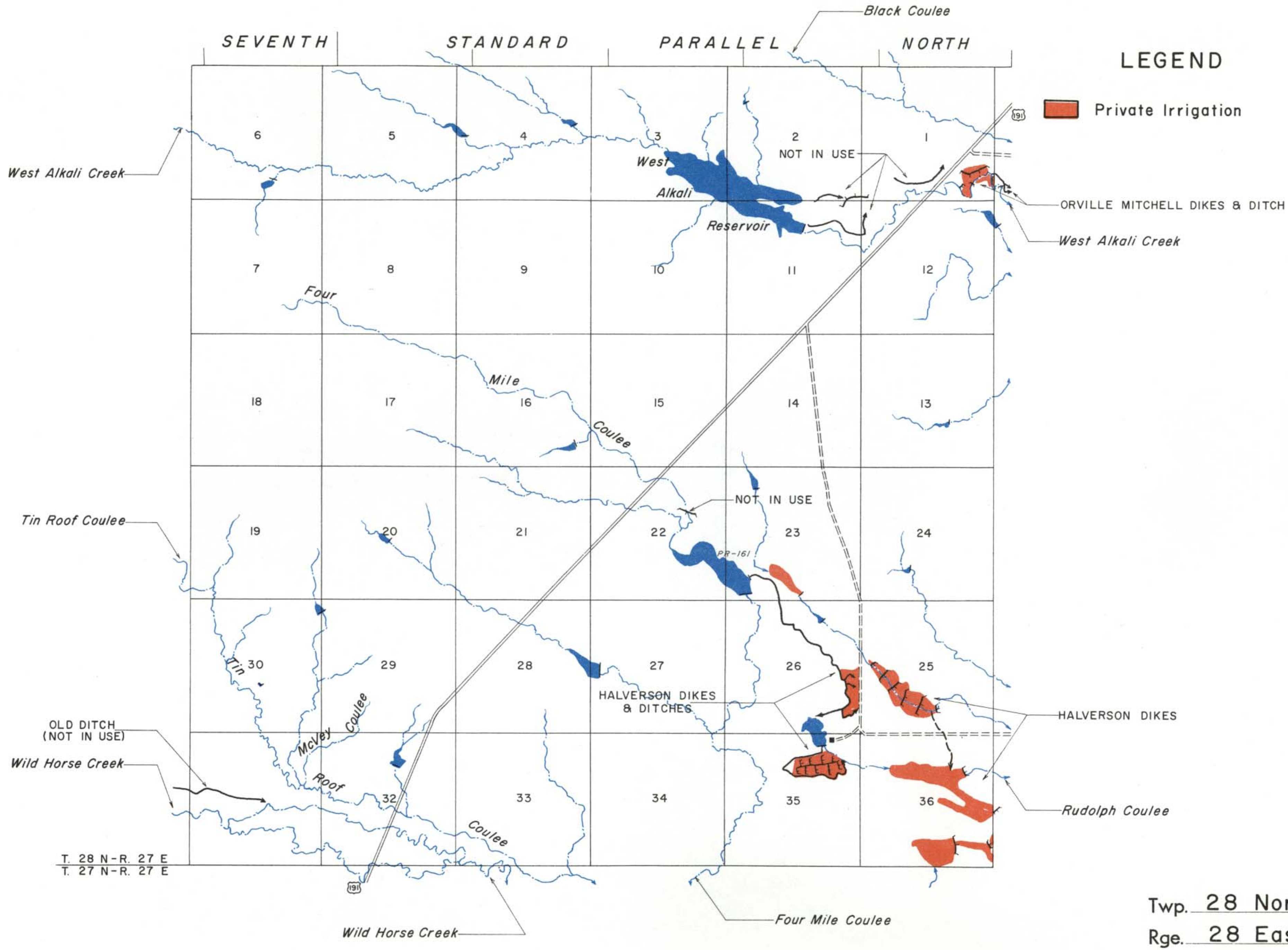
Rge. 30 East


LEGEND
Private Irrigation
D.H.S. Creek
ANDERSON DIKE
Armstrong Coulee
Beaver Creek
Smith Coulee
FENDER DAMS-DITCHES & DIKES
KESLER DIKES
THOMPSON DIKES
Seven Mile Coulee
Beaver Creek
Horse Pasture Coulee
Shed Coulee
PR-99
PR-145
SEVENTH GUIDE MERIDIAN EAST
T. 27 N-R. 30 E
T. 26 N-R. 30 E
Twp. 27 North
Rge. 31 East



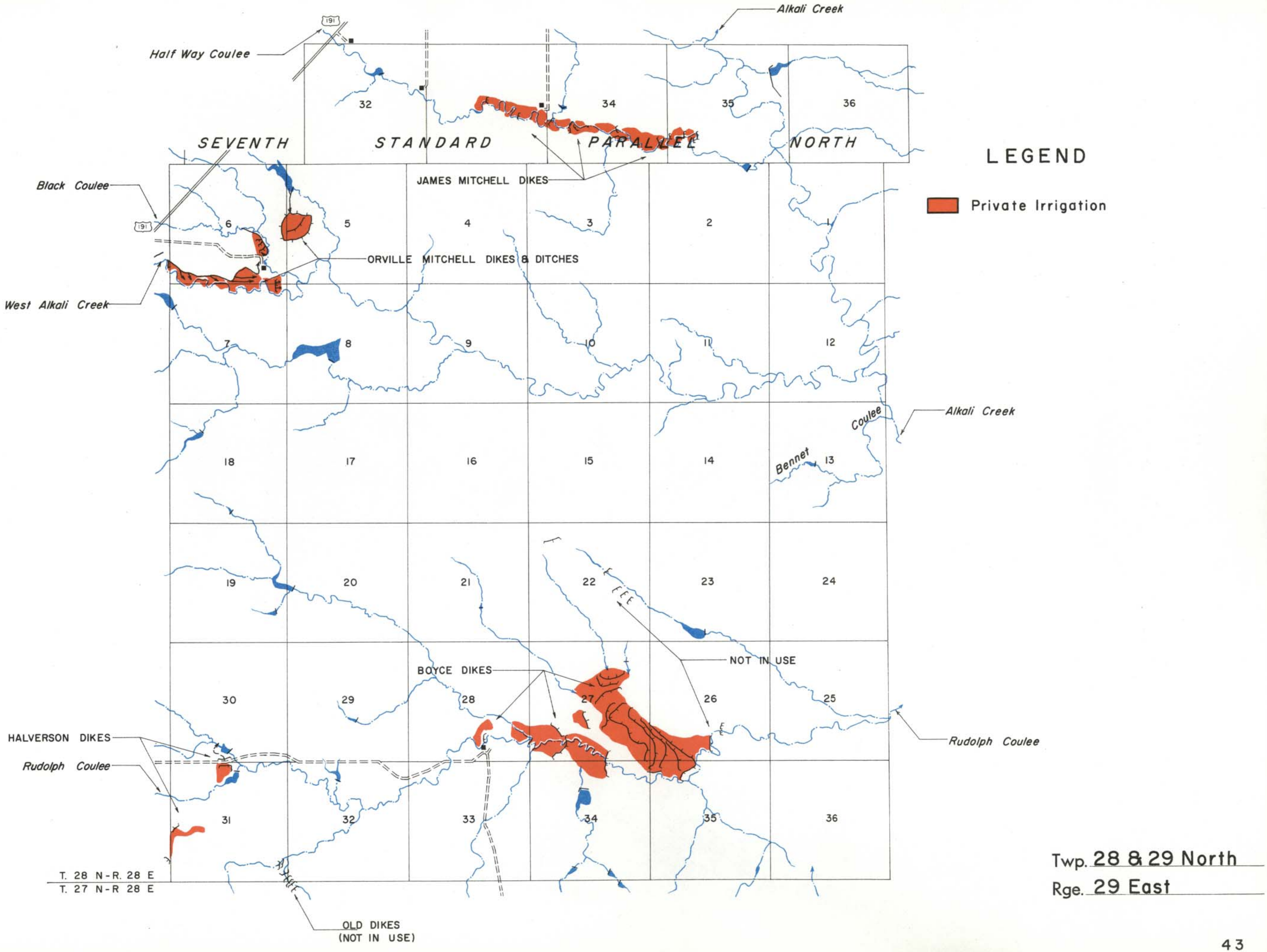
Twp. 27 North
Rge. 32 & 33 East


SEVENTH STANDARD PARALLEL NORTH
MERIDIAN
GUIDE
BROWNING
FORT
LEGEND
Private Irrigation
NORDLUND DIKE
WILKE DIKES
NORDLUND DIKES & DITCHES
West Alkali Creek
Tin Roof
Tressler
Coulee
N. Fk. Wild Horse Creek
S. Fk. Wild Horse Creek
Wild Horse Creek
Coulee
OLD DITCH
Wild Horse Creek
Wild Horse Reservoir
RANKIN DITCH
Spring Coulee
T. 28 N-R. 26 E
T. 27 N-R. 26 E
EAST BOUNDARY FORT BELKNAP INDIAN RESERVATION
Twp. 28 North
Rge. 26 & 27 East

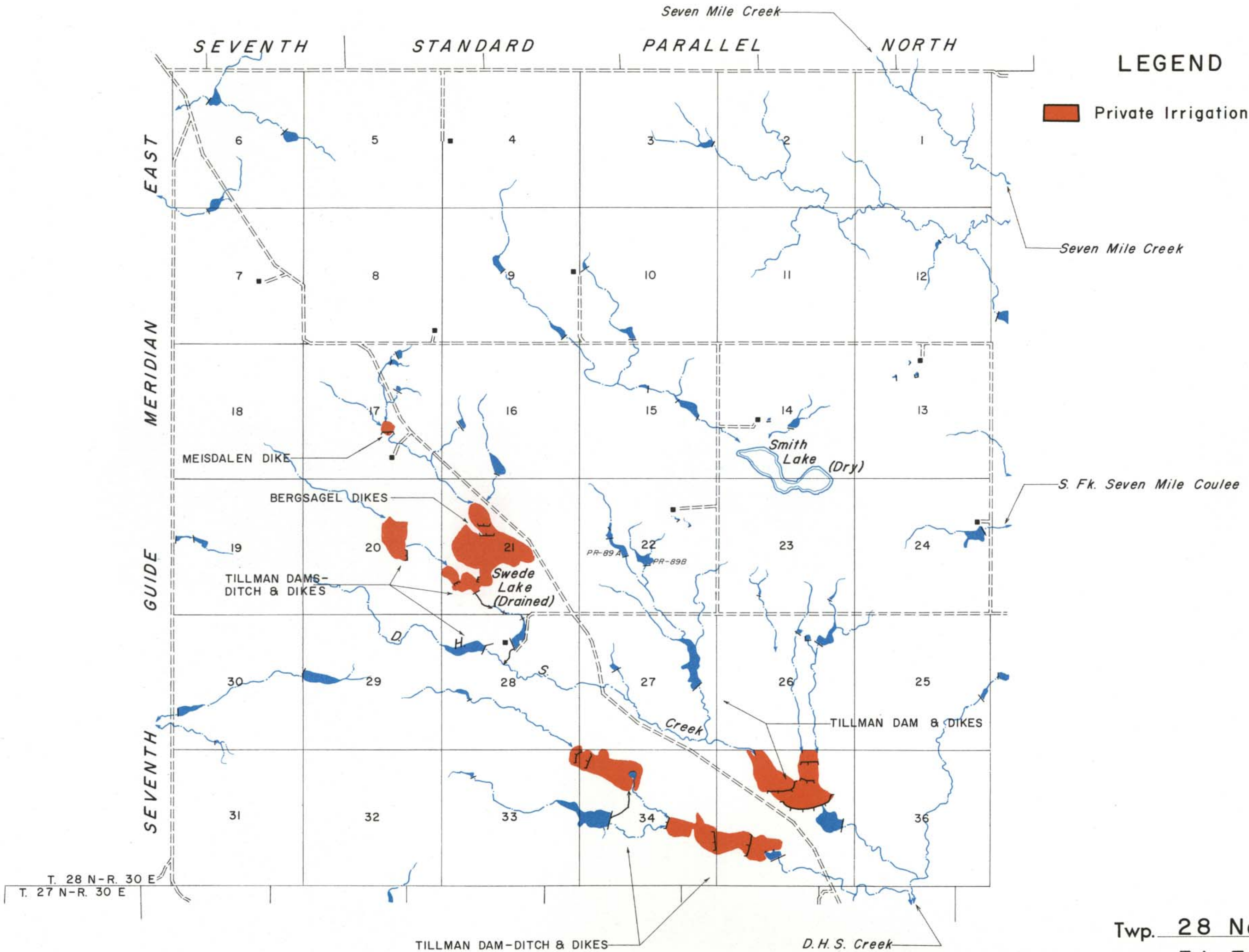


Twp. 28 North

Rge. 28 East

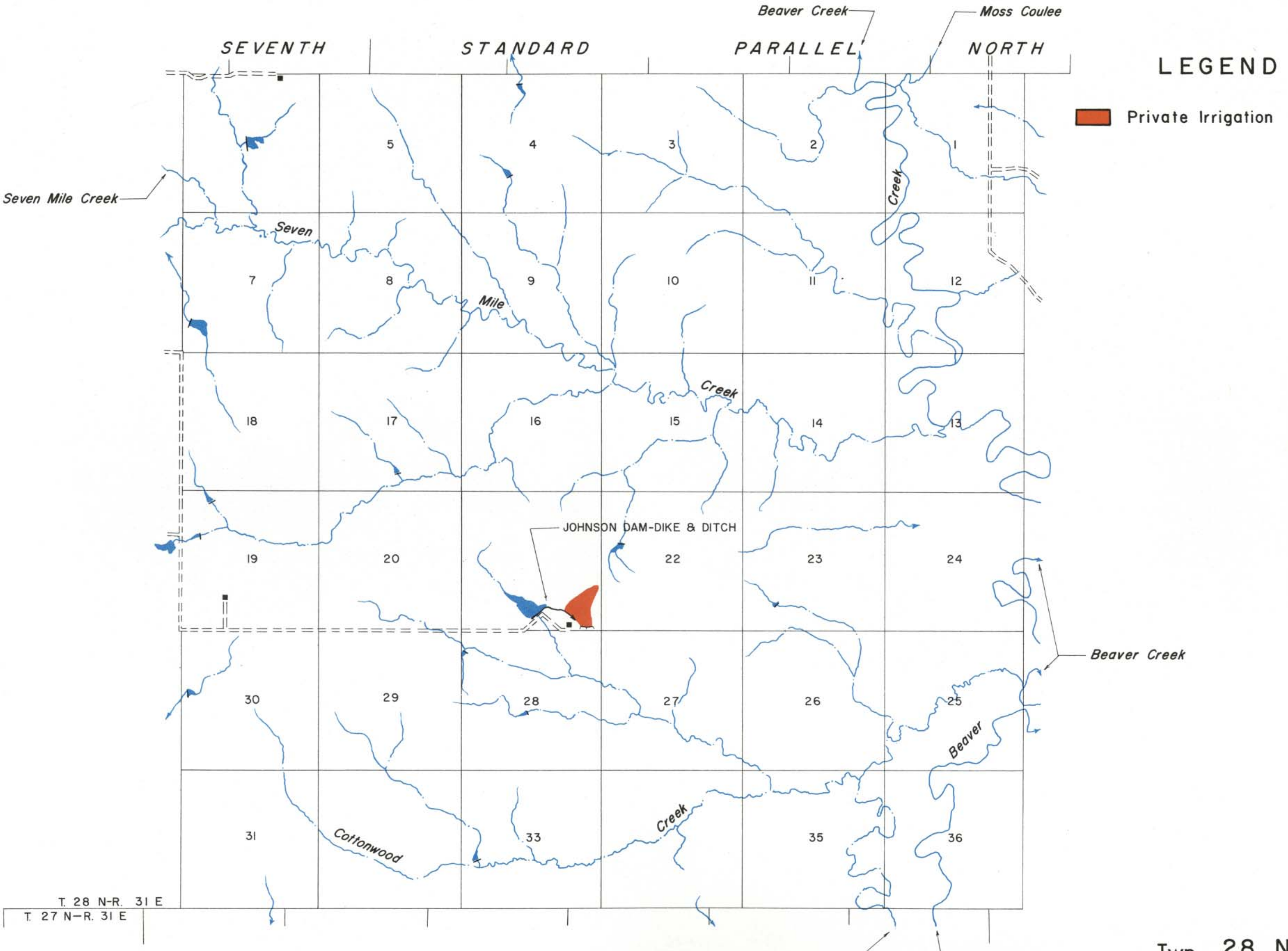


Half Way Coulee
191
Alkali Creek
32
34
35
36
SEVENTH STANDARD PARALLEL NORTH
LEGEND
Private Irrigation
JAMES MITCHELL DIKES
Black Coulee
191
6
5
4
3
2
1
ORVILLE MITCHELL DIKES & DITCHES
West Alkali Creek
7
8
9
10
11
12
Alkali Creek
Coulee
Bennet
18
17
16
15
14
13
19
20
21
22
23
24
NOT IN USE
BOYCE DIKES
30
29
28
27
26
25
HALVERSON DIKES
Rudolph Coulee
Rudolph Coulee
31
32
33
34
35
36
T. 28 N-R. 28 E
T. 27 N-R 28 E
OLD DIKES
(NOT IN USE)
Twp. 28 & 29 North
Rge. 29 East

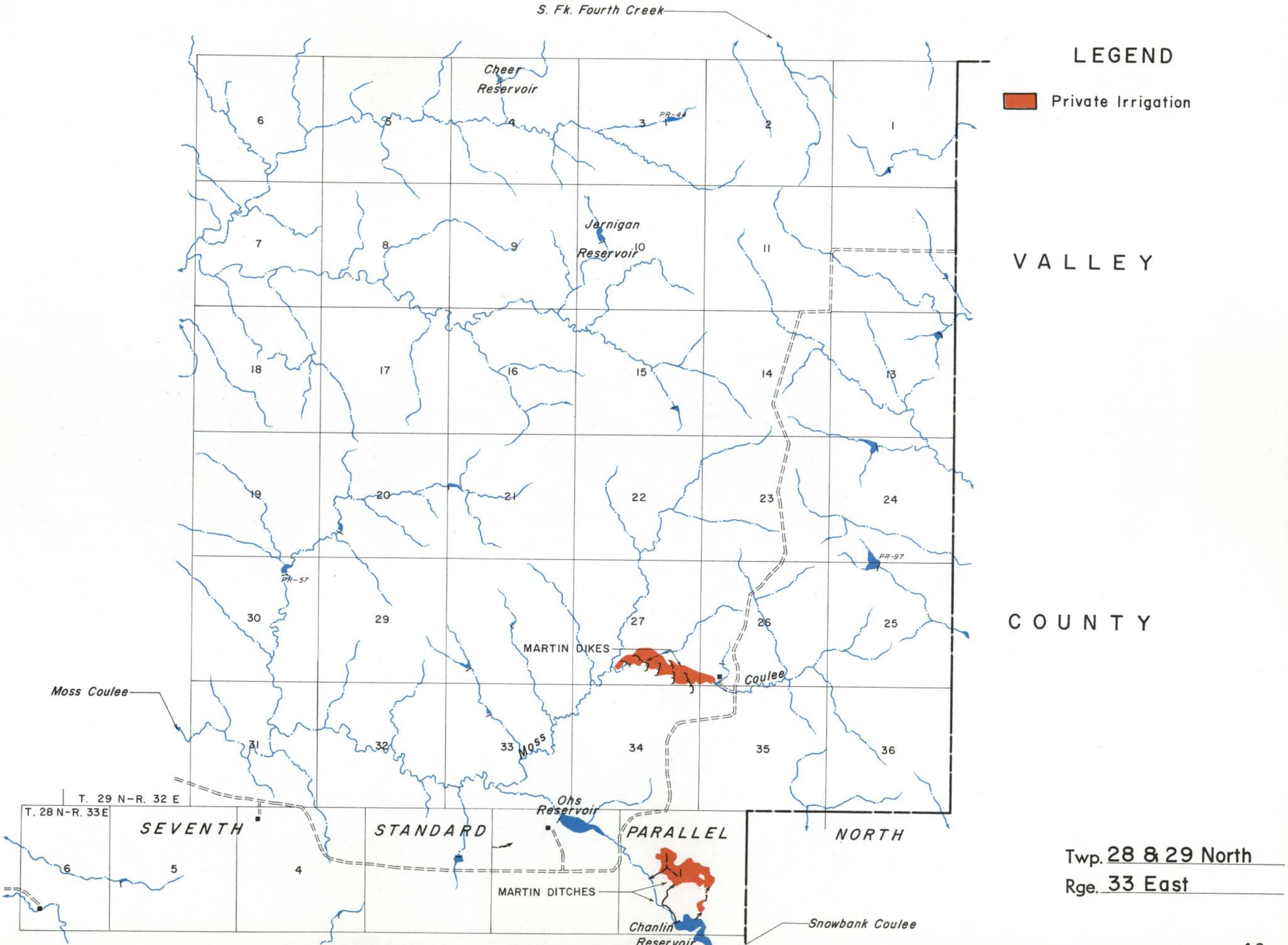


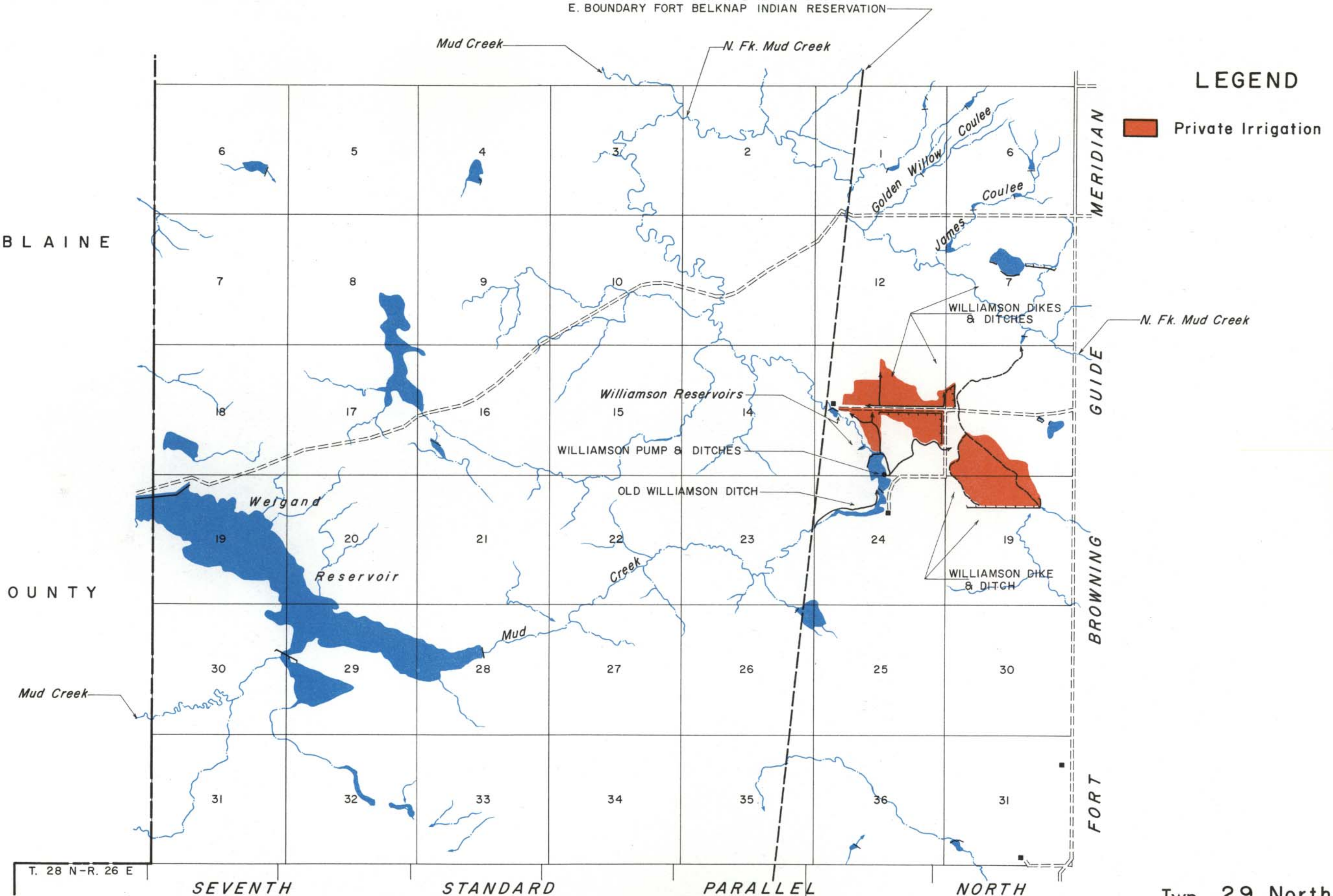
Twp. 28 North

Rge. 31 East



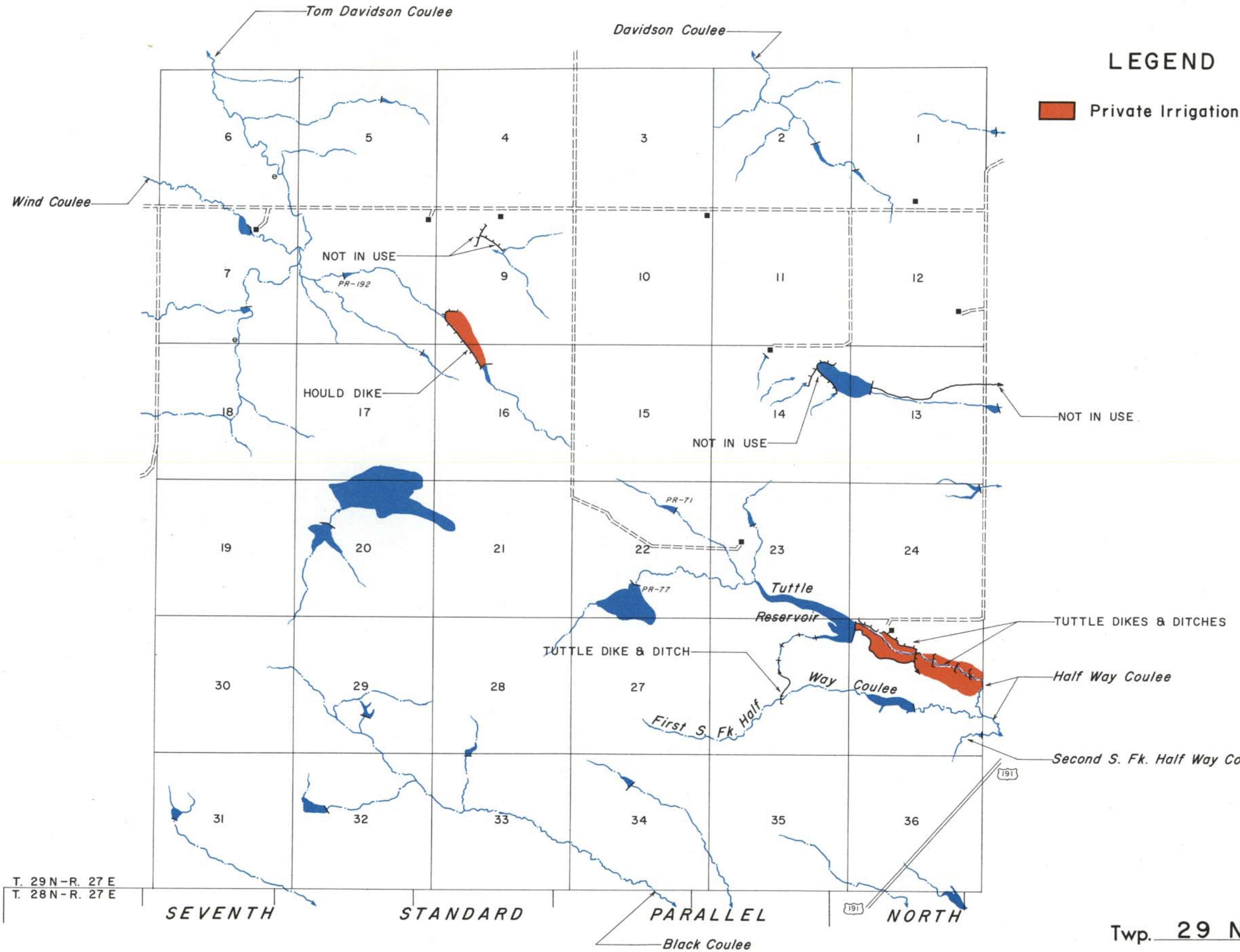
Twp. 28 North
Rge. 32 East


S. Fk. Fourth Creek
LEGEND
Private Irrigation
VALLEY
COUNTY
Cheer Reservoir
PR-44
Jernigan Reservoir
PR-97
PR-57
MARTIN DIKES
Coulee
Moss Coulee
Moss
Ohs Reservoir
T. 29 N-R. 32 E
T. 28 N-R. 33 E
SEVENTH
STANDARD
PARALLEL
NORTH
MARTIN DITCHES
Chanlin Reservoir
Snowbank Coulee
1 2 3 4 5 6 7 8 9 10 11 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 29 30 31 32 33 34 35 36
6 5 4
Twp. 28 & 29 North
Rge. 33 East



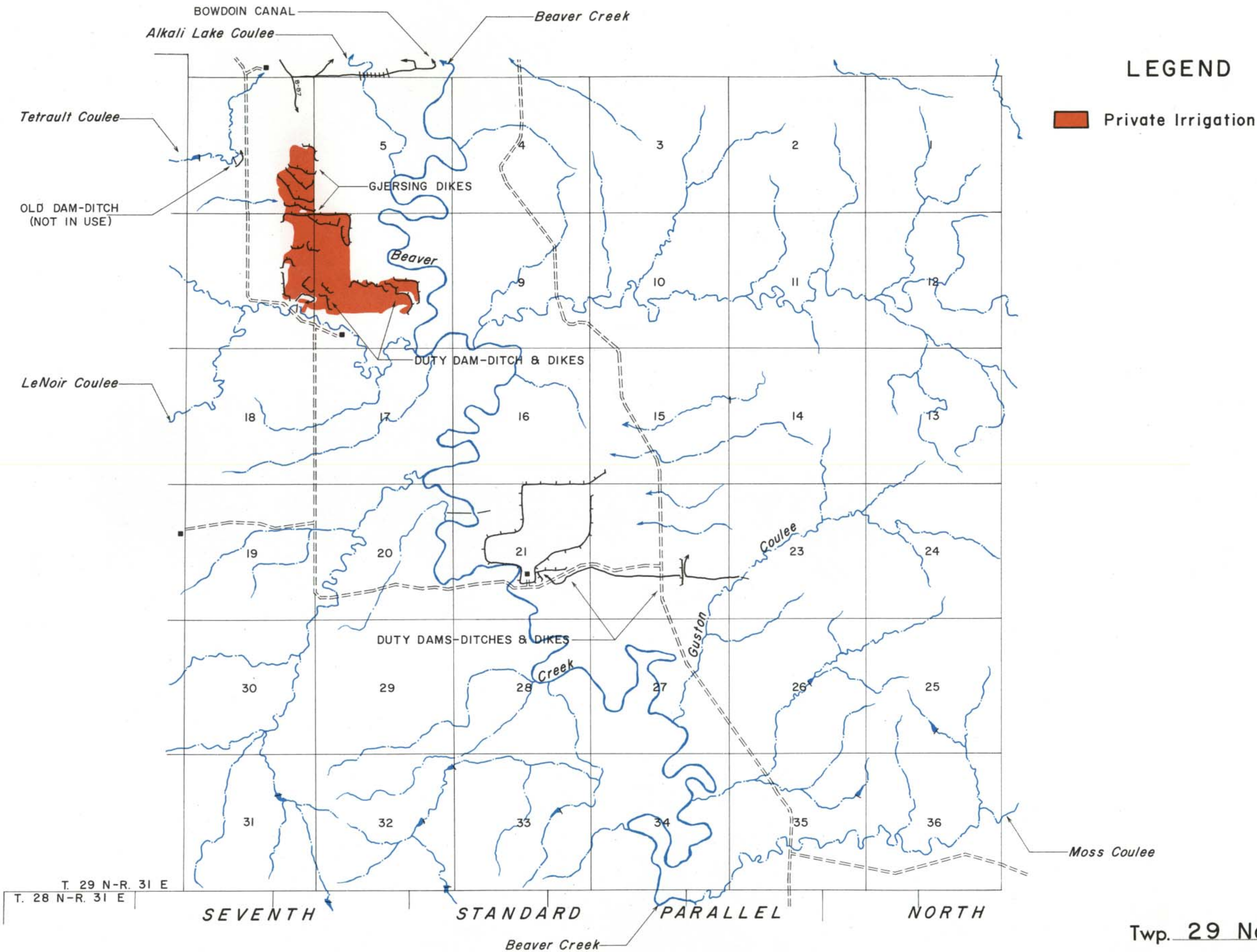
Twp. 29 North

Rge. 26 & 27 East

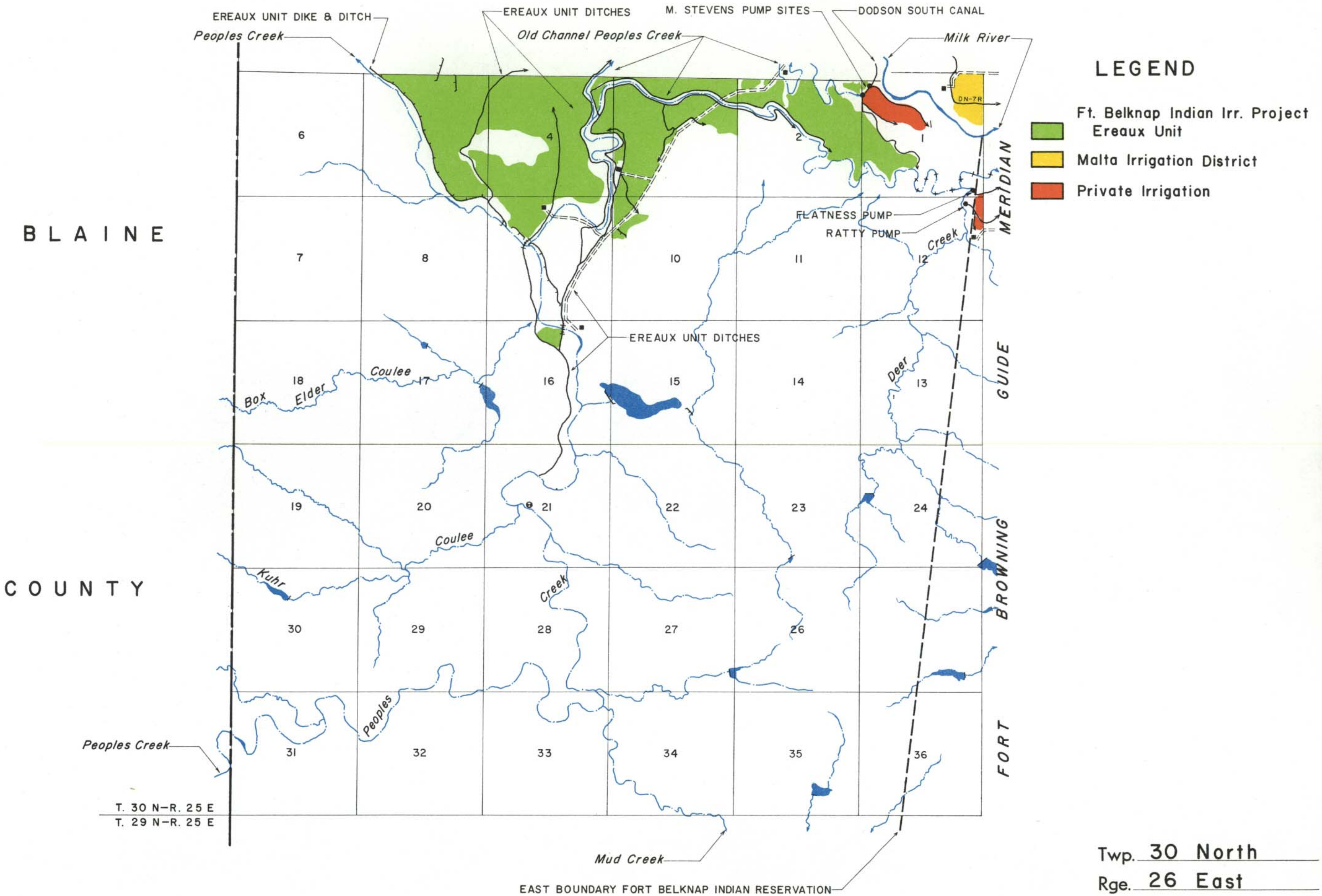


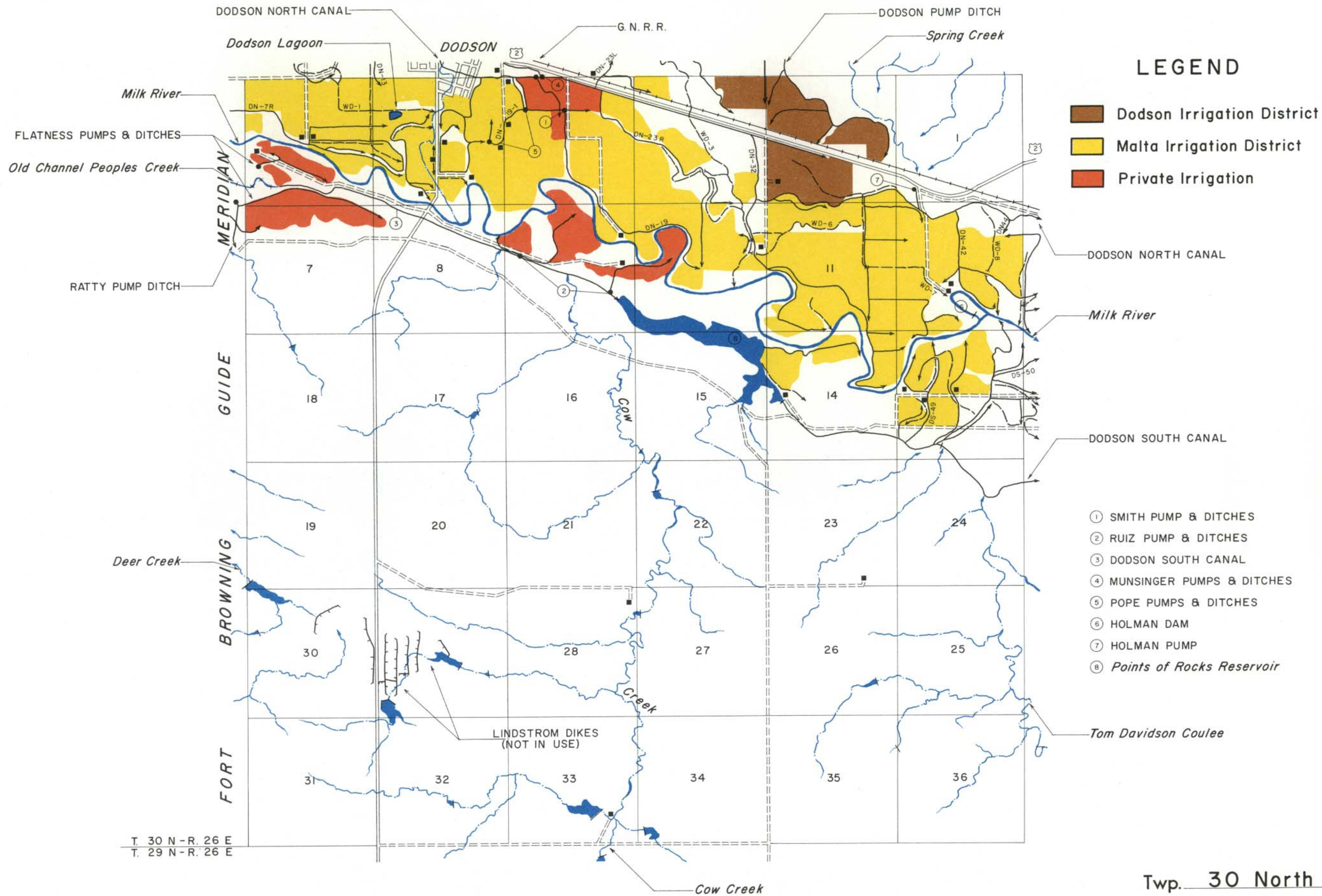
Twp. 29 North

Rge. 28 East

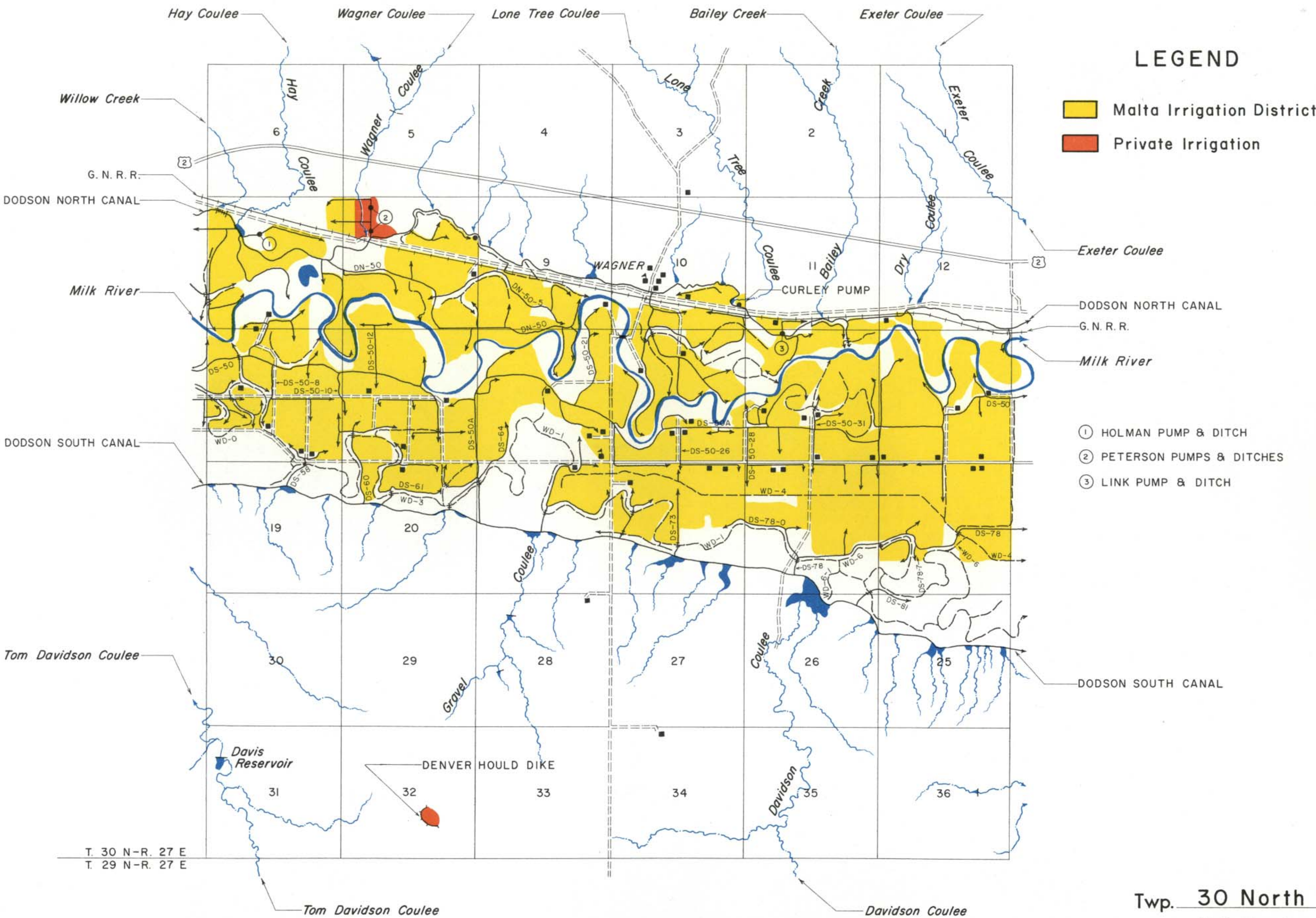


Twp. 29 North
Rge. 32 East


EREAUX UNIT DIKE & DITCH
Peoples Creek
EREAUX UNIT DITCHES
Old Channel Peoples Creek
M. STEVENS PUMP SITES
DODSON SOUTH CANAL
Milk River
DN-7R
LEGEND
Ft. Belknap Indian Irr. Project Ereaux Unit
Malta Irrigation District
Private Irrigation
BLAINE
COUNTY
FLATNESS PUMP
RATTY PUMP
Creek
Deer
EREAUX UNIT DITCHES
Box Elder Coulee
Coulee
Kuhr
Creek
Peoples
Peoples Creek
MERIDIAN
GUIDE
BROWNING
FORT
Mud Creek
EAST BOUNDARY FORT BELKNAP INDIAN RESERVATION
T. 30 N–R. 25 E
T. 29 N–R. 25 E
6
4
2
1
7
8
10
11
12
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
27
26
25
31
32
33
34
35
36
Twp. 30 North
Rge. 26 East

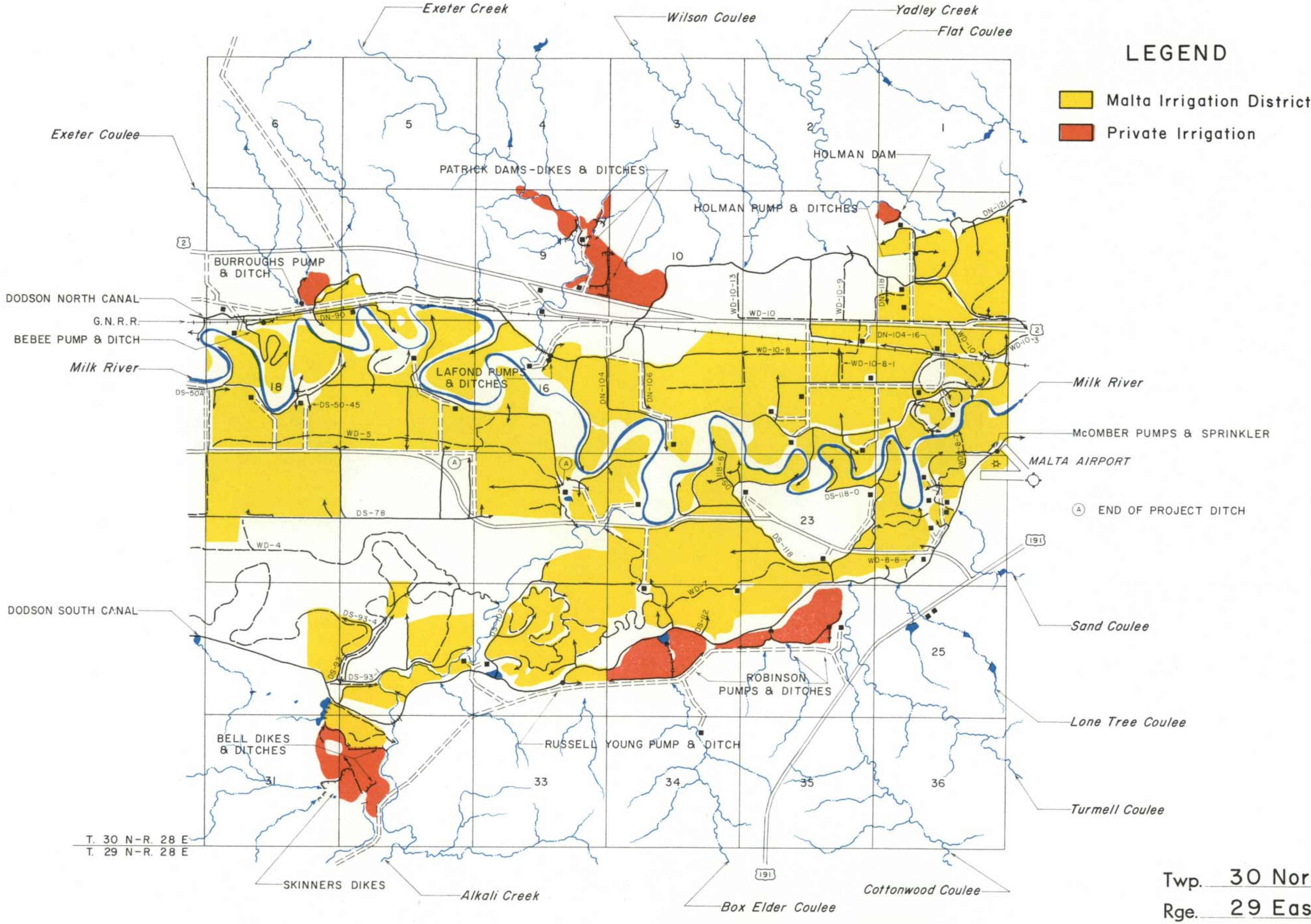


Twp. 30 North
Rge. 27 East

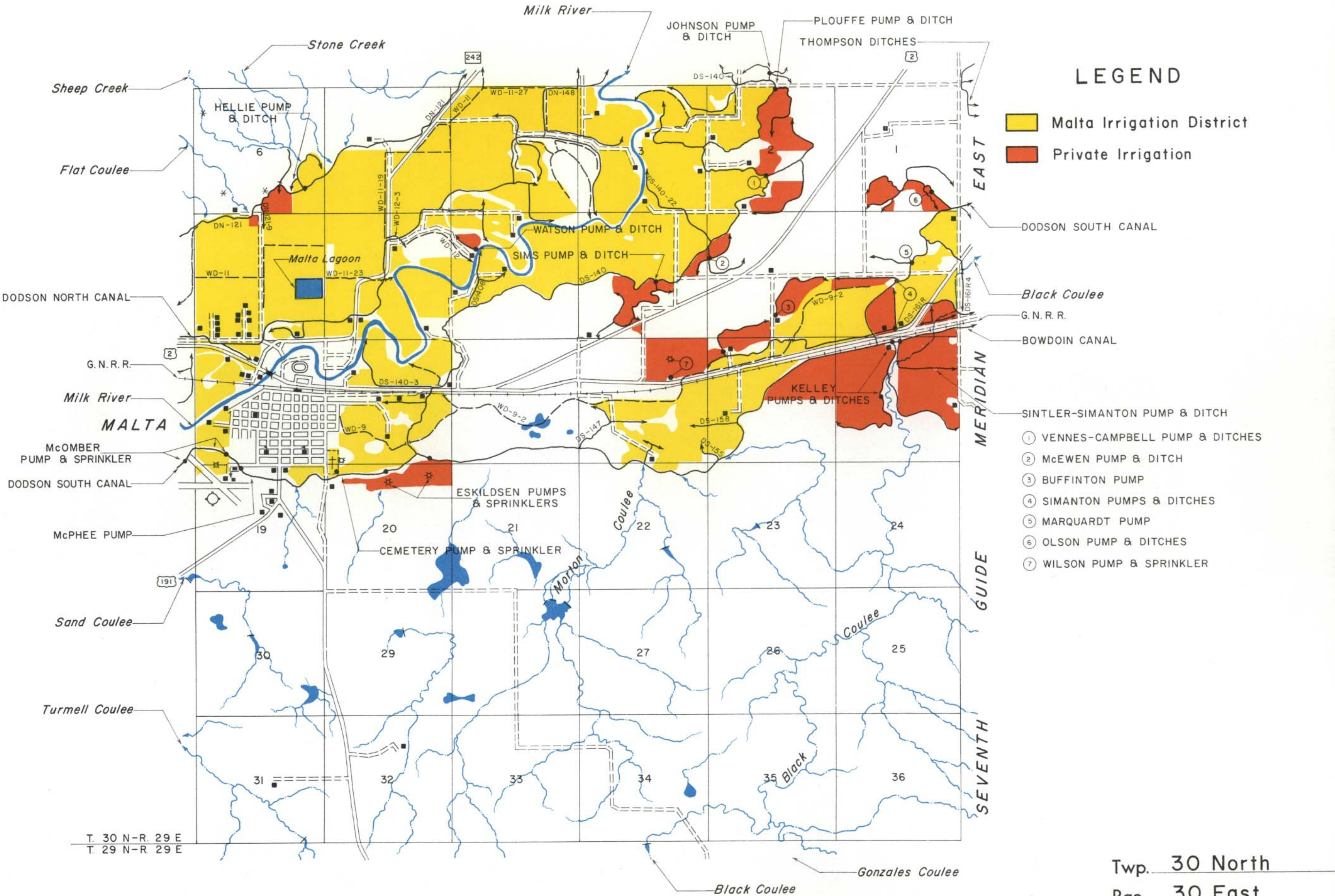


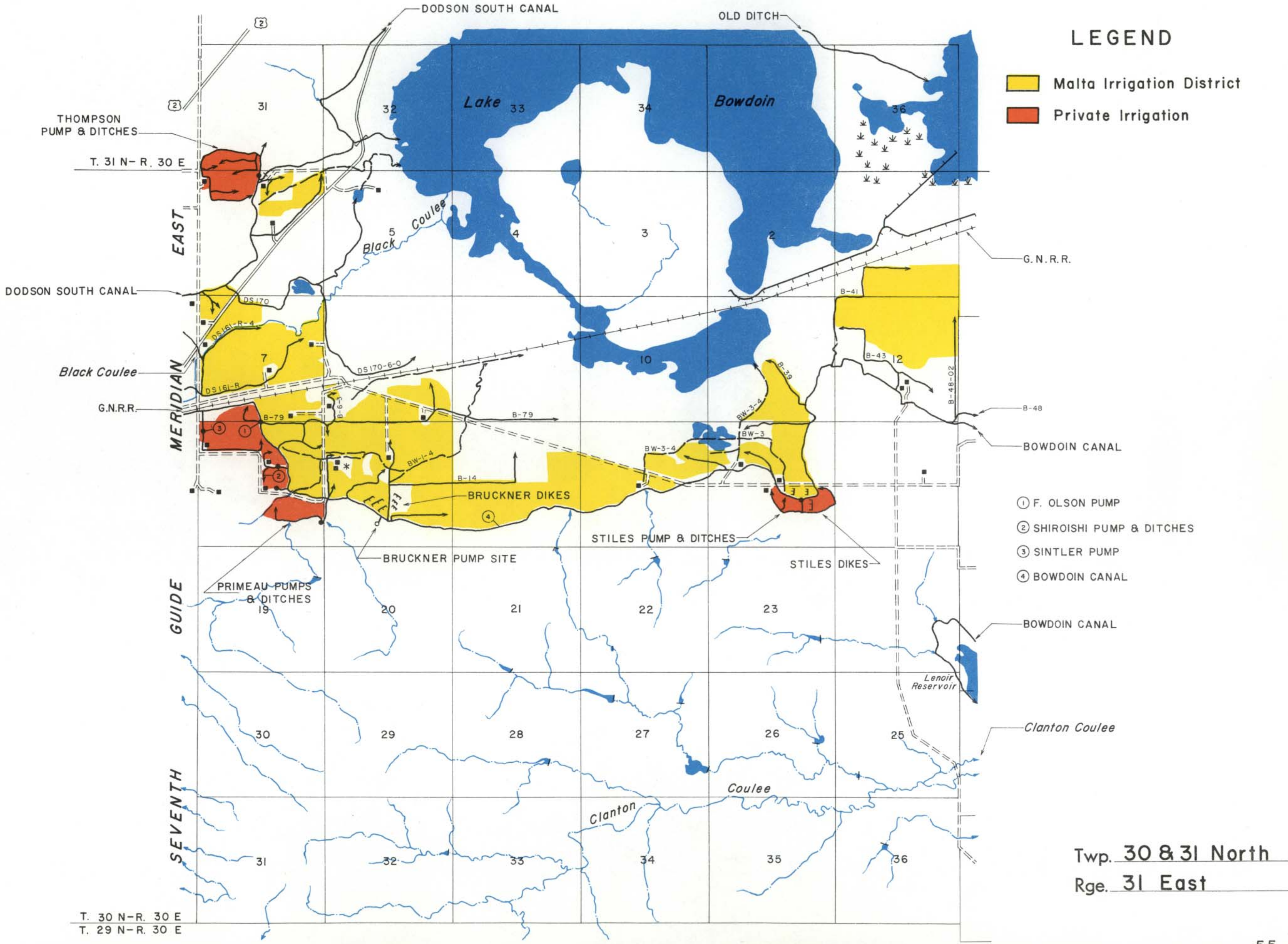
Twp. 30 North

Rge. 28 East

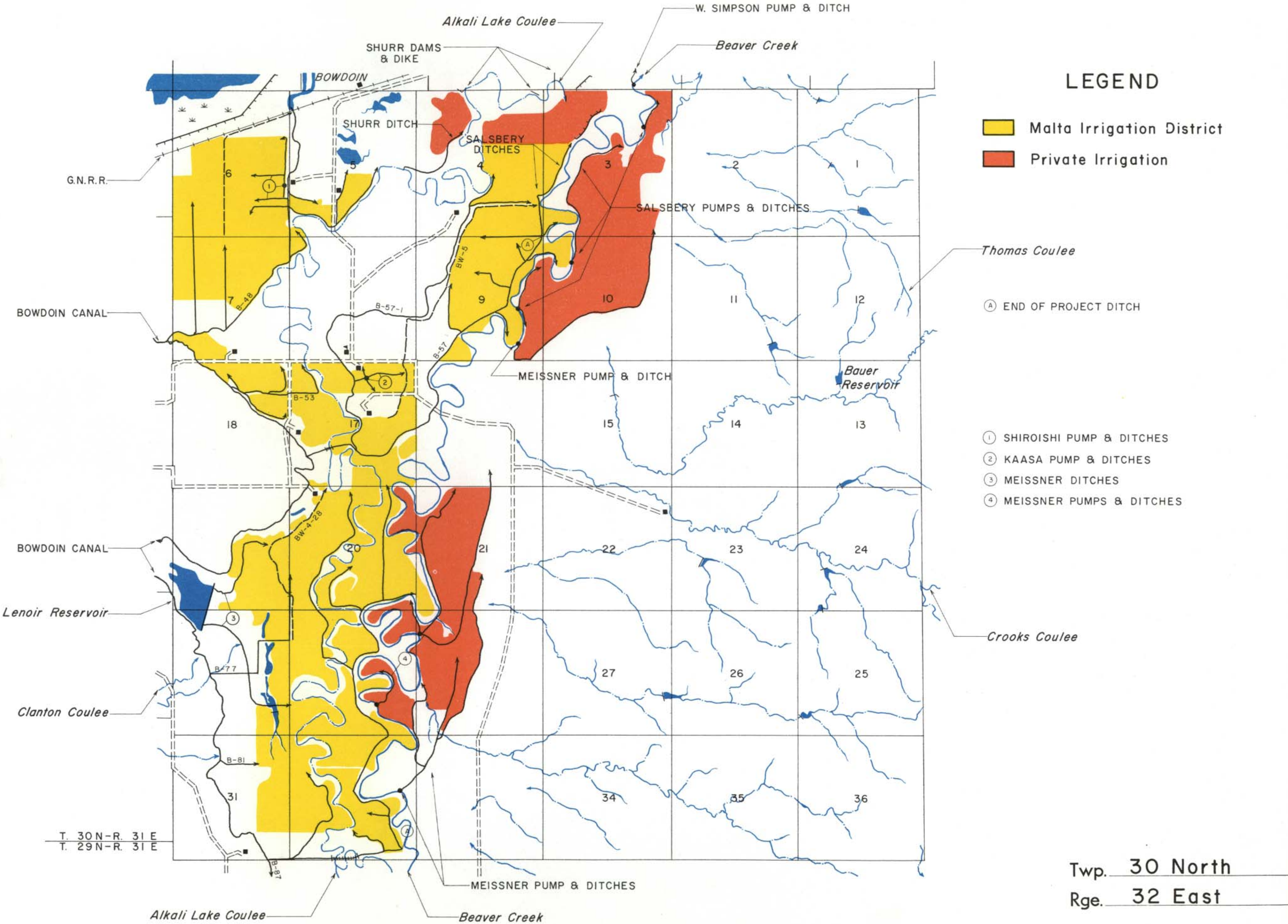


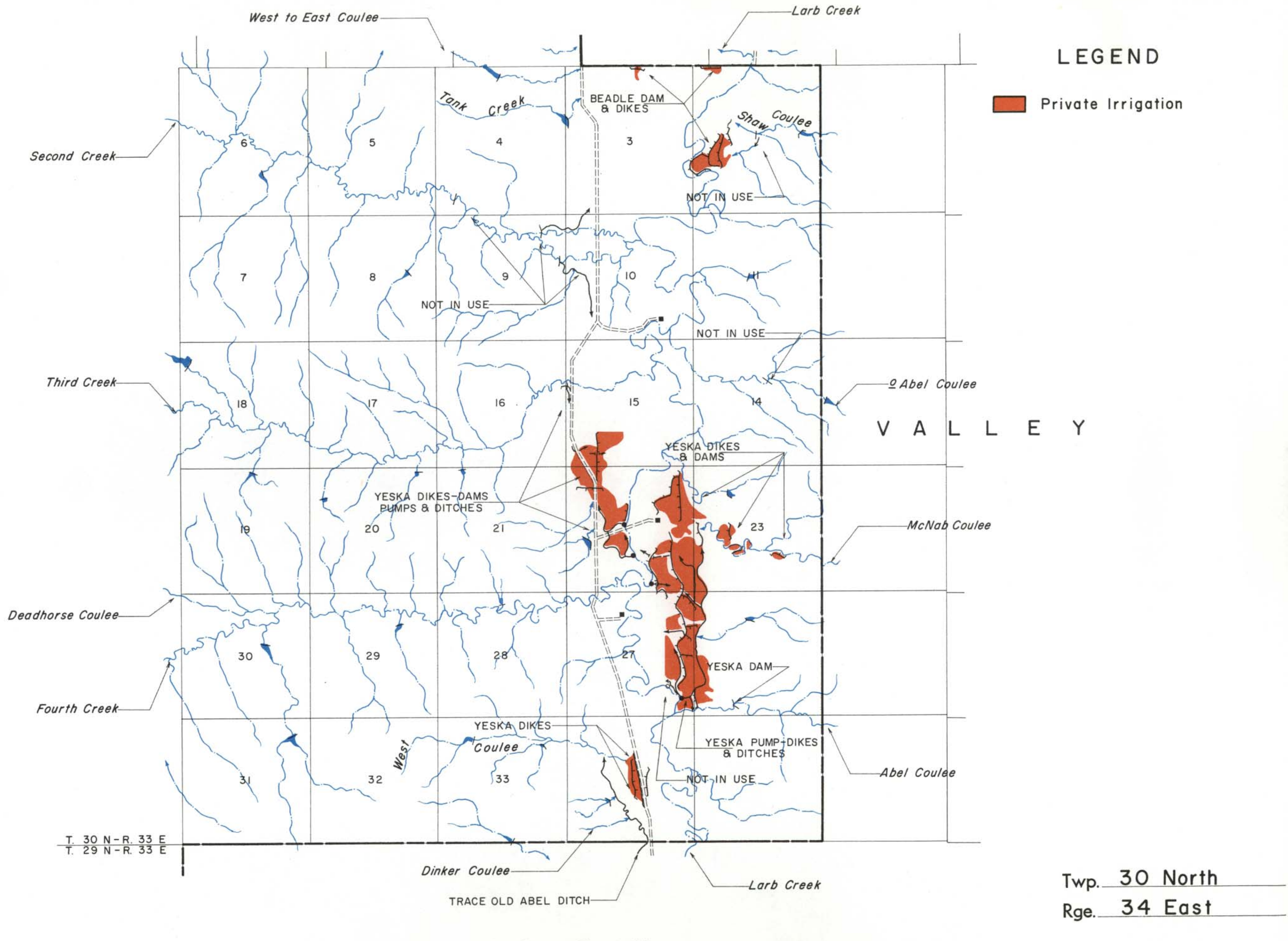
Twp. 30 North
Rge. 29 East

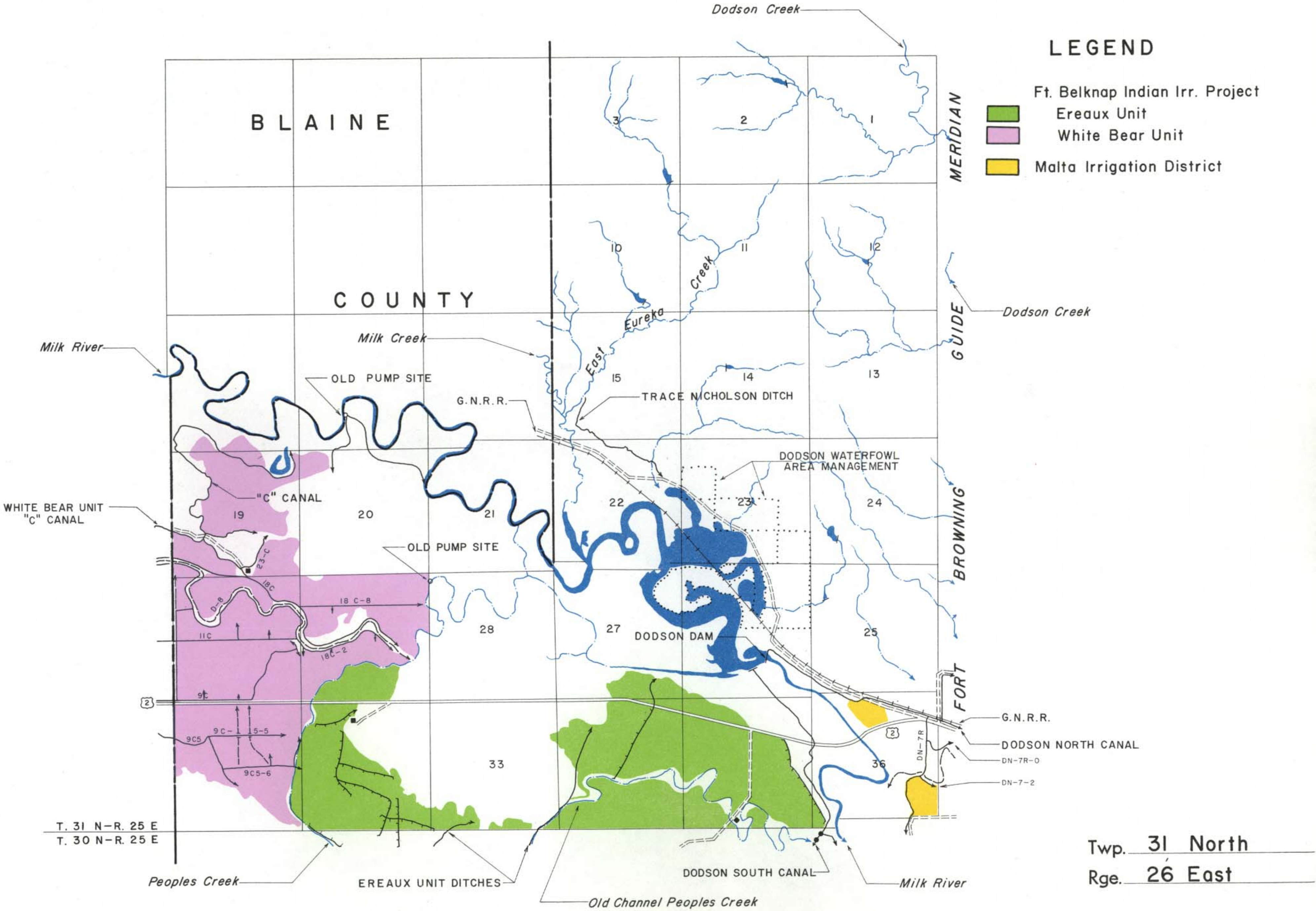

LEGEND
Malta Irrigation District
Private Irrigation
Milk River
Stone Creek
Sheep Creek
Flat Coulee
JOHNSON PUMP & DITCH
PLOUFFE PUMP & DITCH
THOMPSON DITCHES
HELLIE PUMP & DITCH
Malta Lagoon
WATSON PUMP & DITCH
SIMS PUMP & DITCH
DODSON SOUTH CANAL
DODSON NORTH CANAL
Black Coulee
G. N. R. R.
BOWDOIN CANAL
MALTA
McOMBER PUMP & SPRINKLER
DODSON SOUTH CANAL
KELLEY PUMPS & DITCHES
SINTLER-SIMANTON PUMP & DITCH
ESKILDSEN PUMPS & SPRINKLERS
McPHEE PUMP
CEMETERY PUMP & SPRINKLER
Morton Coulee
Sand Coulee
Turmell Coulee
Black Coulee
Gonzales Coulee
① VENNES-CAMPBELL PUMP & DITCHES
② McEWEN PUMP & DITCH
③ BUFFINTON PUMP
④ SIMANTON PUMPS & DITCHES
⑤ MARQUARDT PUMP
⑥ OLSON PUMP & DITCHES
⑦ WILSON PUMP & SPRINKLER
SEVENTH GUIDE MERIDIAN EAST
T. 30 N-R. 29 E
T. 29 N-R. 29 E
Twp. 30 North
Rge. 30 East

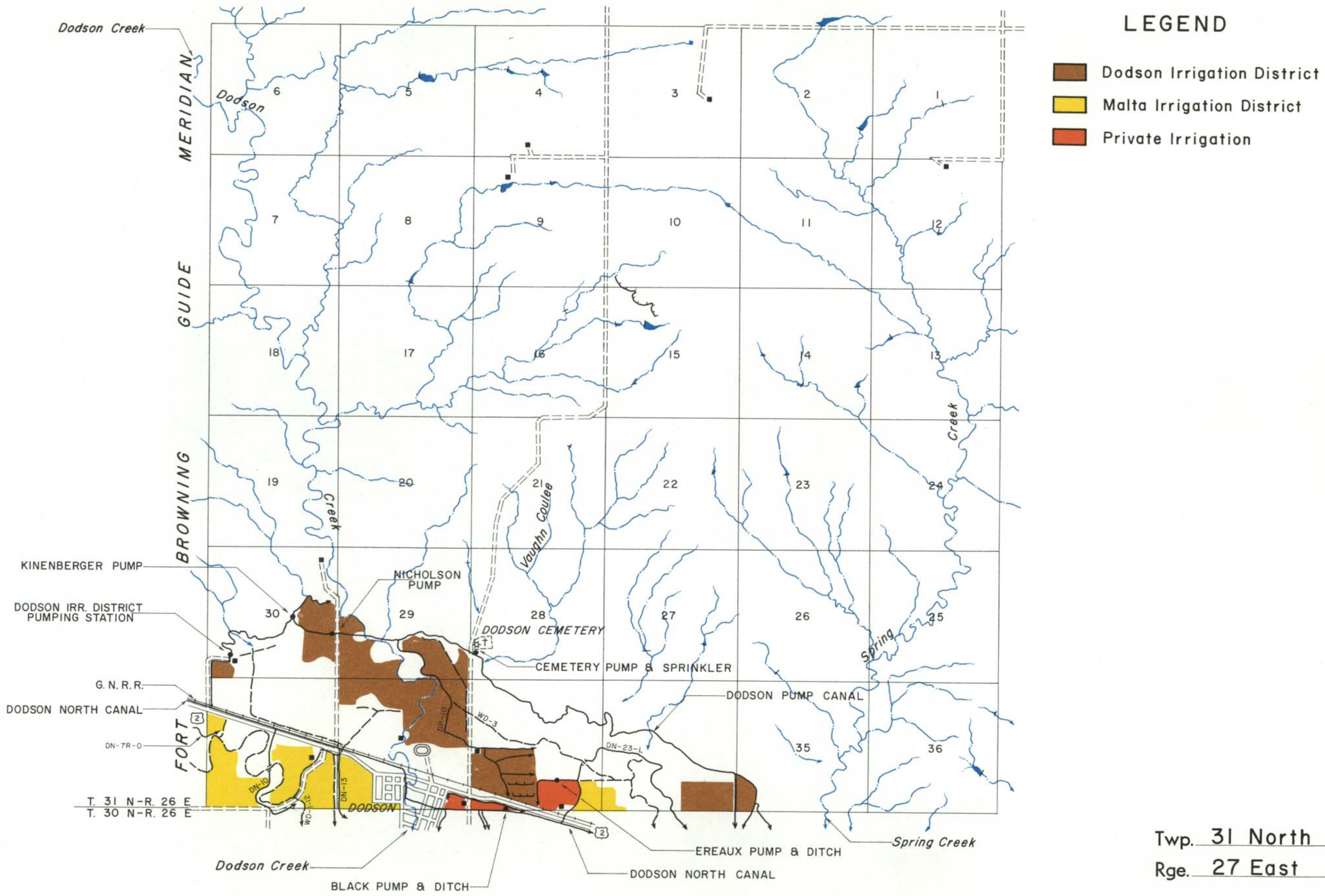


Twp. 30 & 31 North
Rge. 31 East


W. SIMPSON PUMP & DITCH
Alkali Lake Coulee
Beaver Creek
SHURR DAMS & DIKE
BOWDOIN
SHURR DITCH
SALSBERY DITCHES
SALSBERY PUMPS & DITCHES
G.N.R.R.
BOWDOIN CANAL
MEISSNER PUMP & DITCH
Thomas Coulee
Bauer Reservoir
Lenoir Reservoir
Clanton Coulee
Crooks Coulee
MEISSNER PUMP & DITCHES
Alkali Lake Coulee
Beaver Creek
T. 30N-R. 31 E
T. 29N-R. 31 E
B-48
BW-5
B-57-1
B-57
B-53
BW-4-28
B-77
B-81
B-87
1 2 3 4 5 6 7 9 10 11 12 13 14 15 17 18 20 21 22 23 24 25 26 27 31 34 35 36
LEGEND
Malta Irrigation District
Private Irrigation
(A) END OF PROJECT DITCH
(1) SHIROISHI PUMP & DITCHES
(2) KAASA PUMP & DITCHES
(3) MEISSNER DITCHES
(4) MEISSNER PUMPS & DITCHES
Twp. 30 North
Rge. 32 East

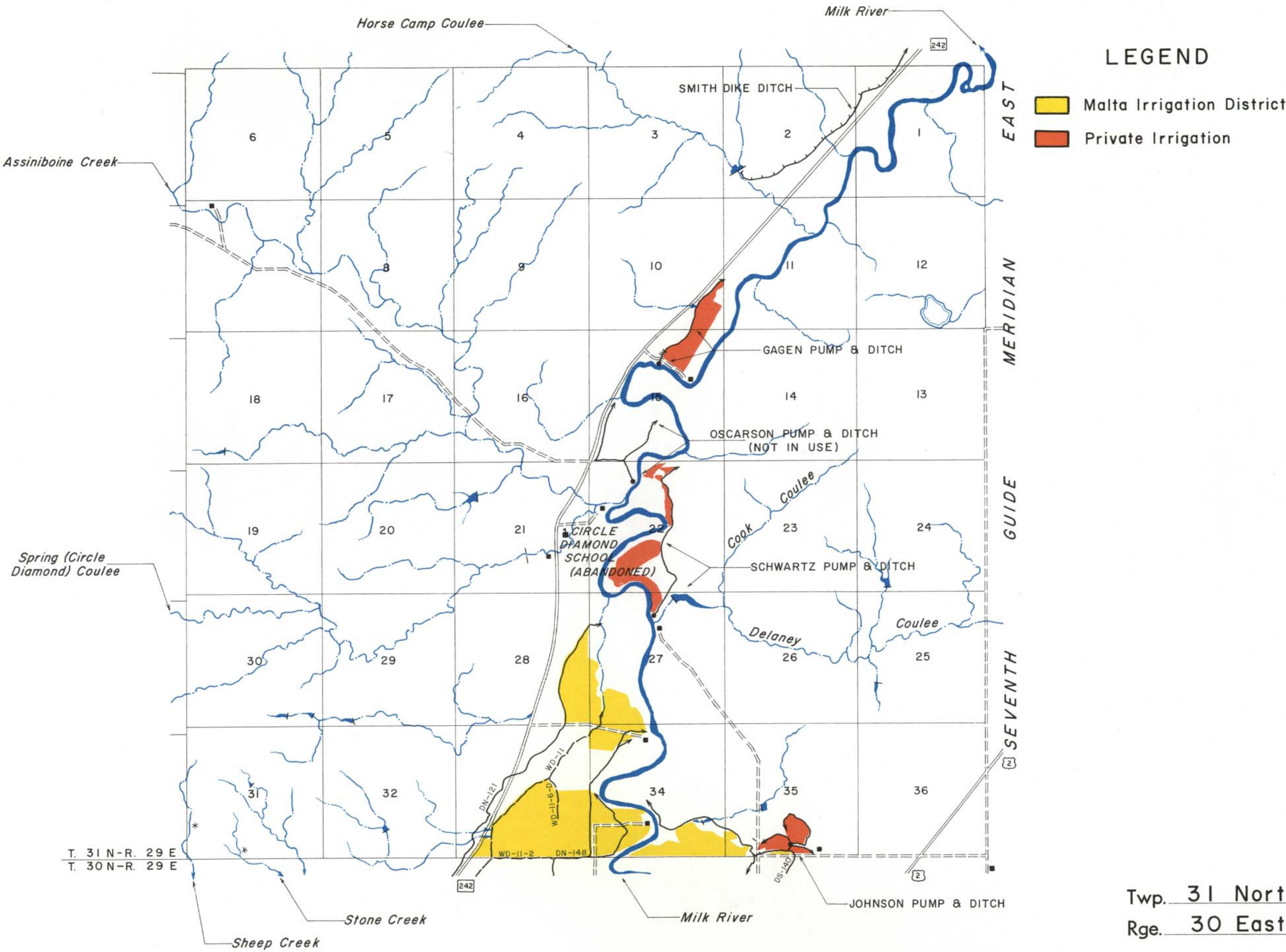

LEGEND
Private Irrigation
West to East Coulee
Larb Creek
Tank Creek
BEADLE DAM & DIKES
Shaw Coulee
Second Creek
NOT IN USE
Third Creek
2 Abel Coulee
VALLEY
YESKA DIKES & DAMS
YESKA DIKES-DAMS PUMPS & DITCHES
McNab Coulee
Deadhorse Coulee
Fourth Creek
YESKA DAM
YESKA DIKES
West Coulee
YESKA PUMP-DIKES & DITCHES
Abel Coulee
T. 30 N-R. 33 E
T. 29 N-R. 33 E
Dinker Coulee
Larb Creek
TRACE OLD ABEL DITCH
COUNTY
Twp. 30 North
Rge. 34 East


LEGEND
Ft. Belknap Indian Irr. Project
Ereaux Unit
White Bear Unit
Malta Irrigation District
BLAINE
COUNTY
MERIDIAN
GUIDE
BROWNING
FORT
Dodson Creek
Milk River
Milk Creek
OLD PUMP SITE
G.N.R.R.
TRACE NICHOLSON DITCH
East Eureka Creek
DODSON WATERFOWL AREA MANAGEMENT
WHITE BEAR UNIT "C" CANAL
"C" CANAL
DODSON DAM
DODSON NORTH CANAL
DN-7R-0
DN-7-2
DN-7R
T. 31 N-R. 25 E
T. 30 N-R. 25 E
Peoples Creek
EREAUX UNIT DITCHES
Old Channel Peoples Creek
DODSON SOUTH CANAL
Twp. 31 North
Rge. 26 East

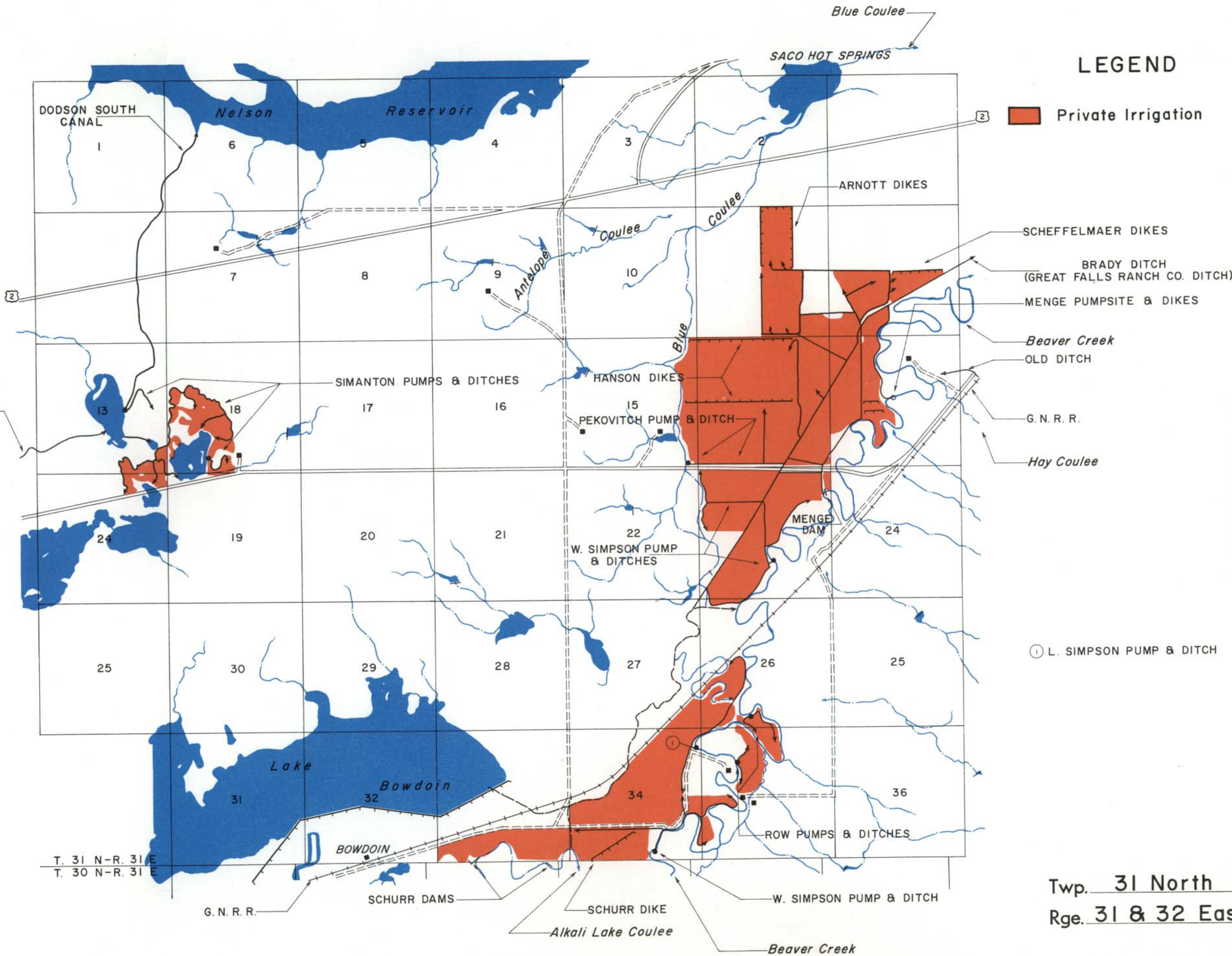


Twp. 31 North

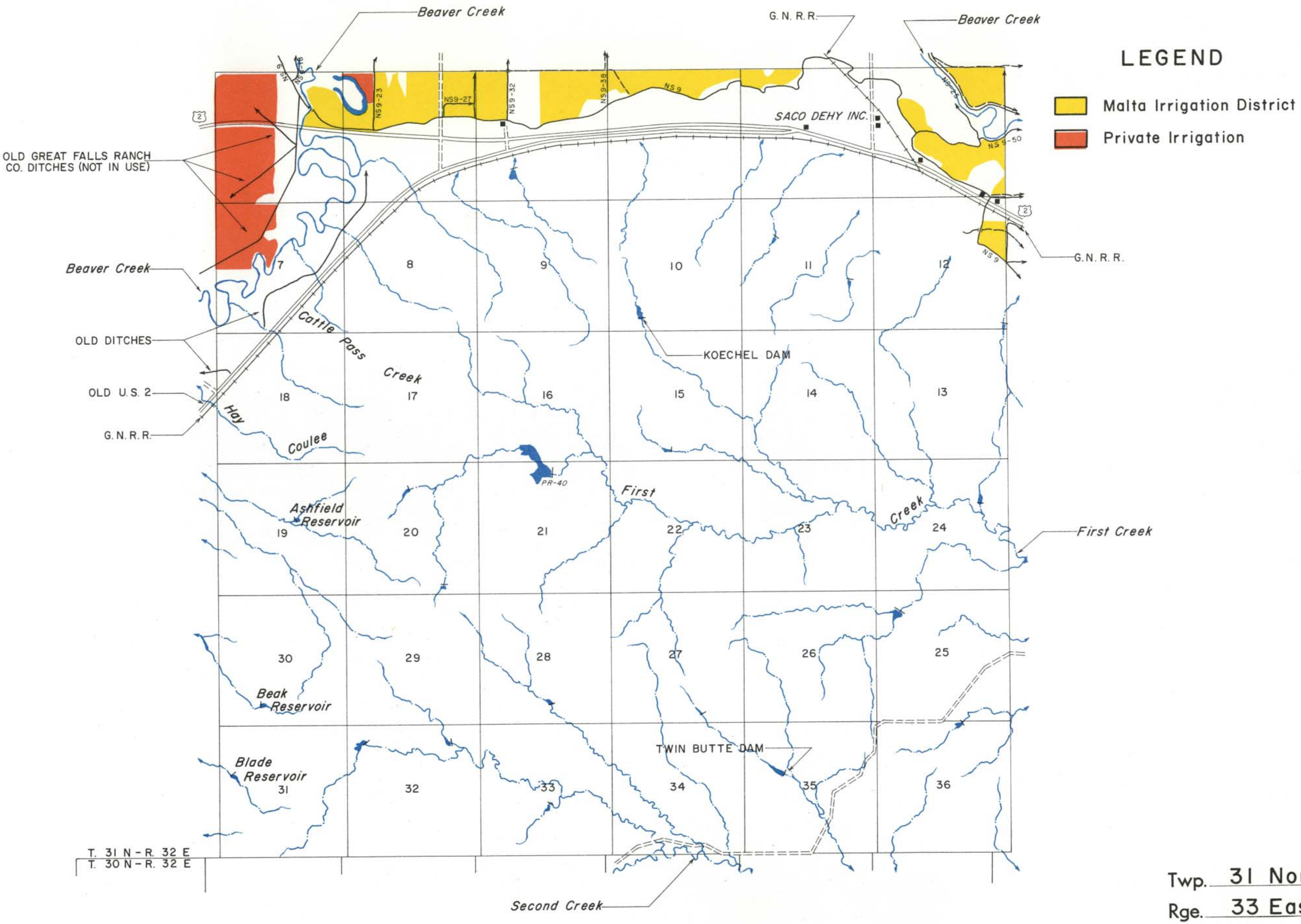
Rge. 27 East



Twp. 31 North
Rge. 30 East

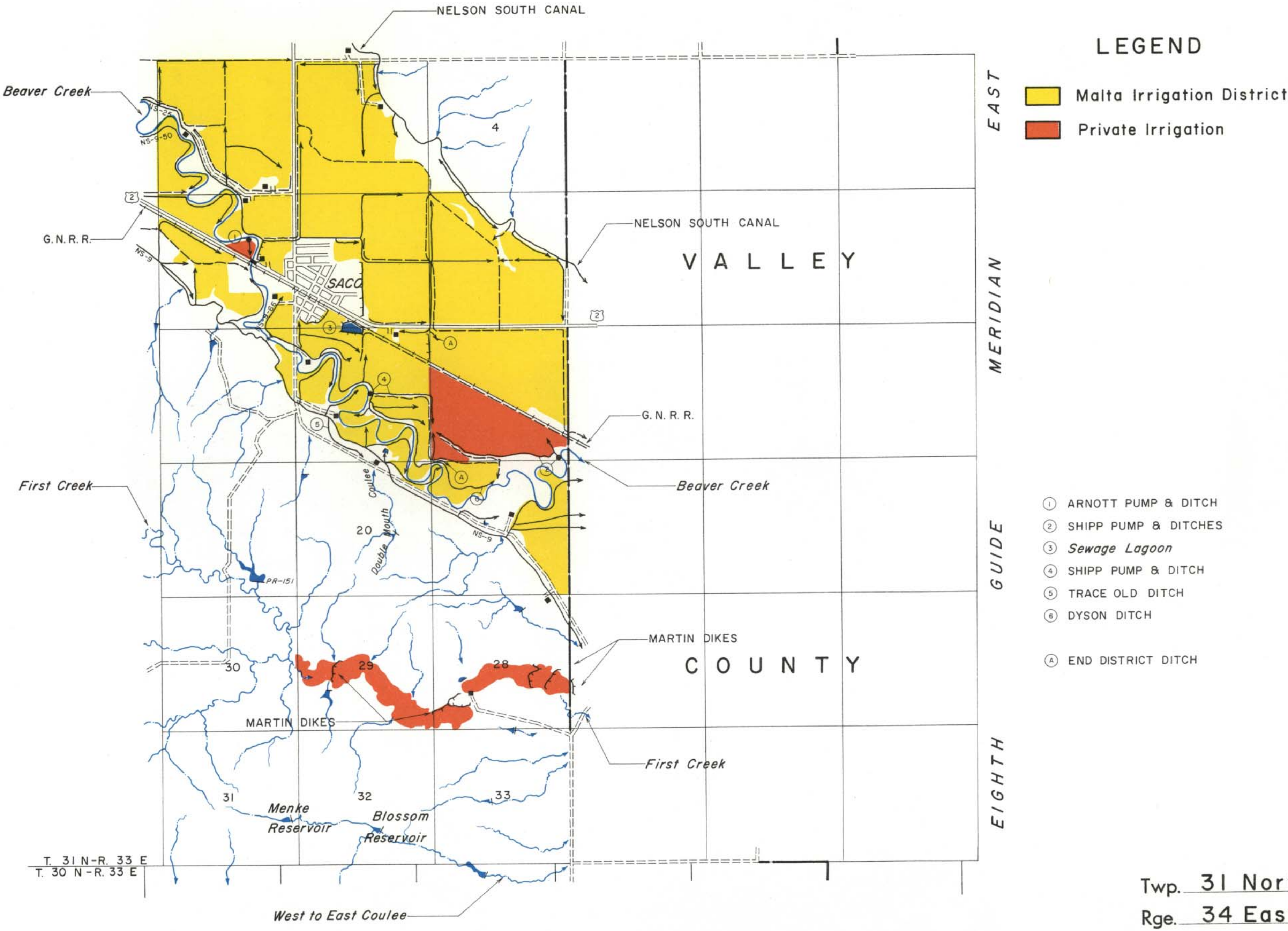


Twp. 31 North
Rge. 31 & 32 East



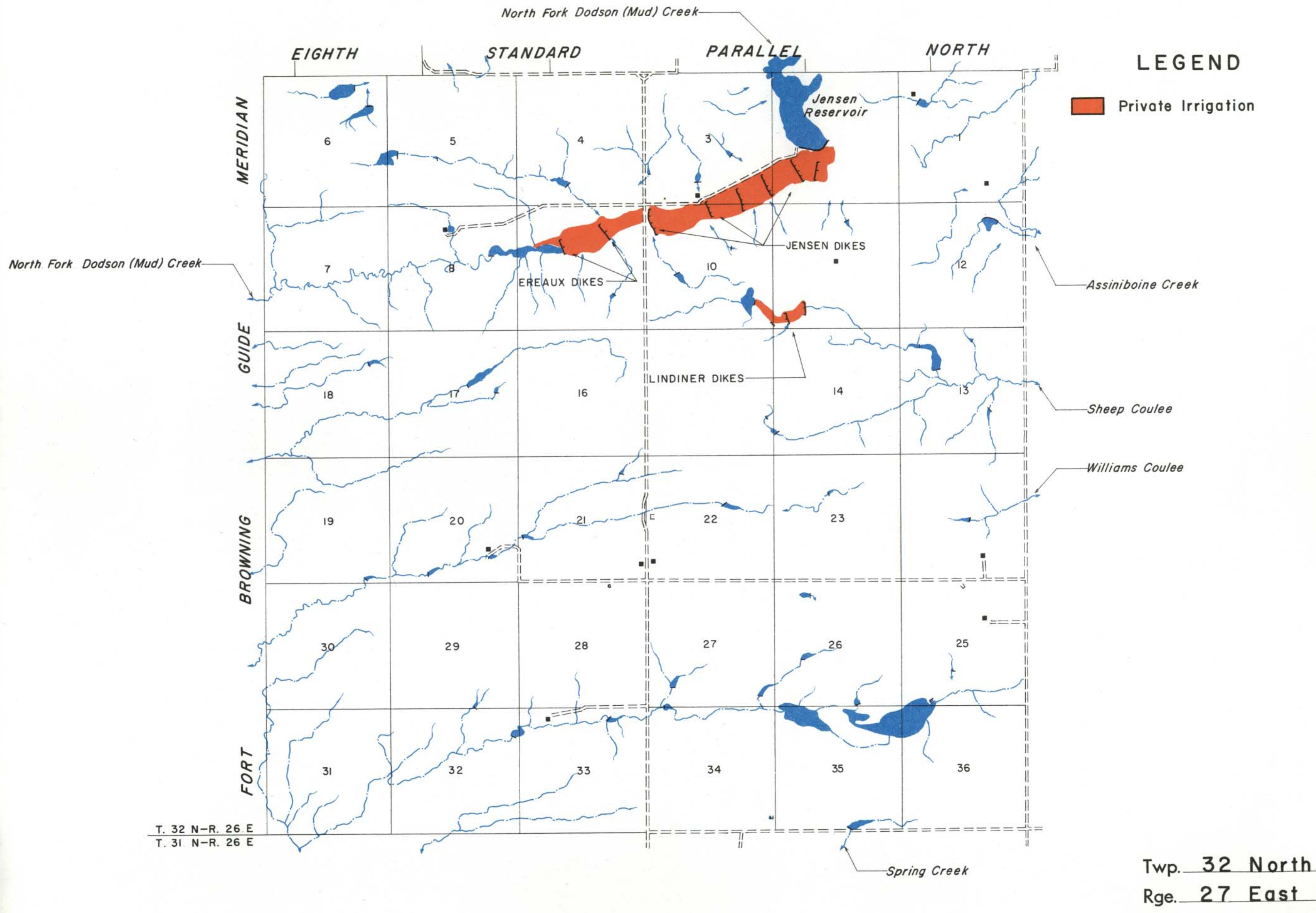
Twp. 31 North

Rge. 33 East

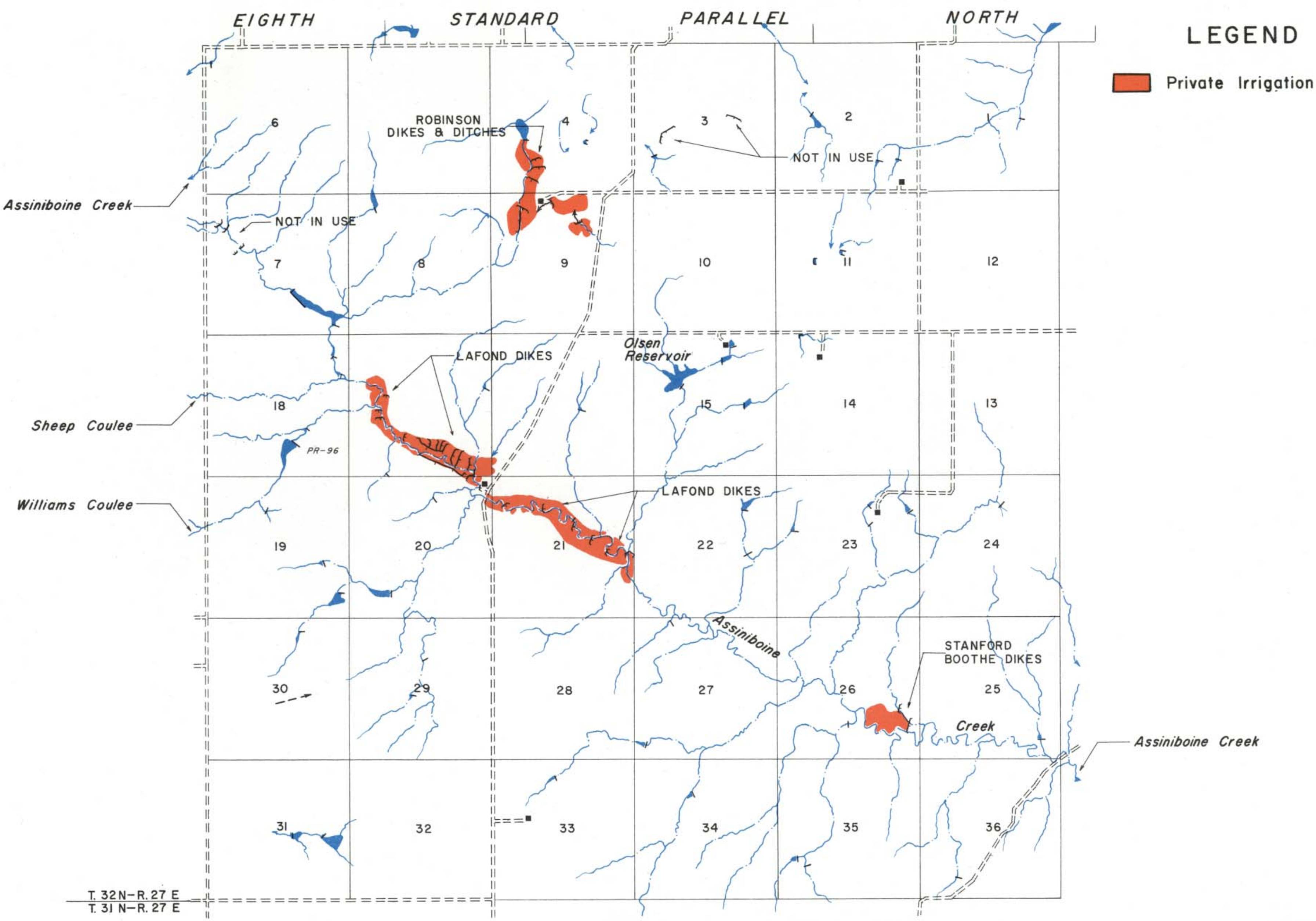


Twp. 31 North

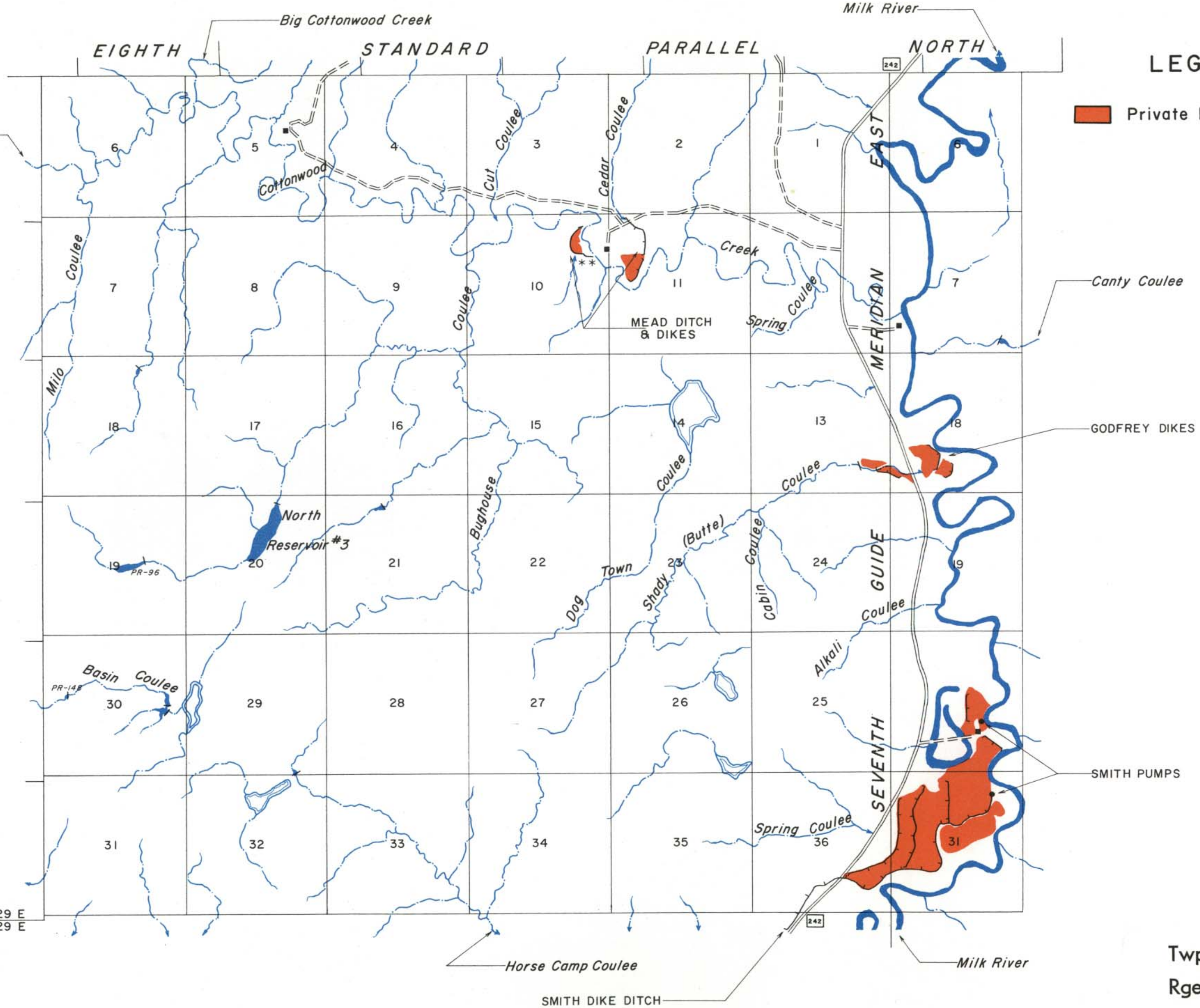
Rge. 34 East



North Fork Dodson (Mud) Creek
EIGHTH STANDARD PARALLEL NORTH
LEGEND
Private Irrigation
MERIDIAN
GUIDE
BROWNING
FORT
Jensen Reservoir
JENSEN DIKES
EREAUX DIKES
LINDINER DIKES
North Fork Dodson (Mud) Creek
Assiniboine Creek
Sheep Coulee
Williams Coulee
Spring Creek
6
5
4
3
1
7
8
10
12
18
17
16
14
13
19
20
21
22
23
30
29
28
27
26
25
31
32
33
34
35
36
T. 32 N–R. 26 E
T. 31 N–R. 26 E
Twp. 32 North
Rge. 27 East



Twp. 32 North
Rge. 28 East

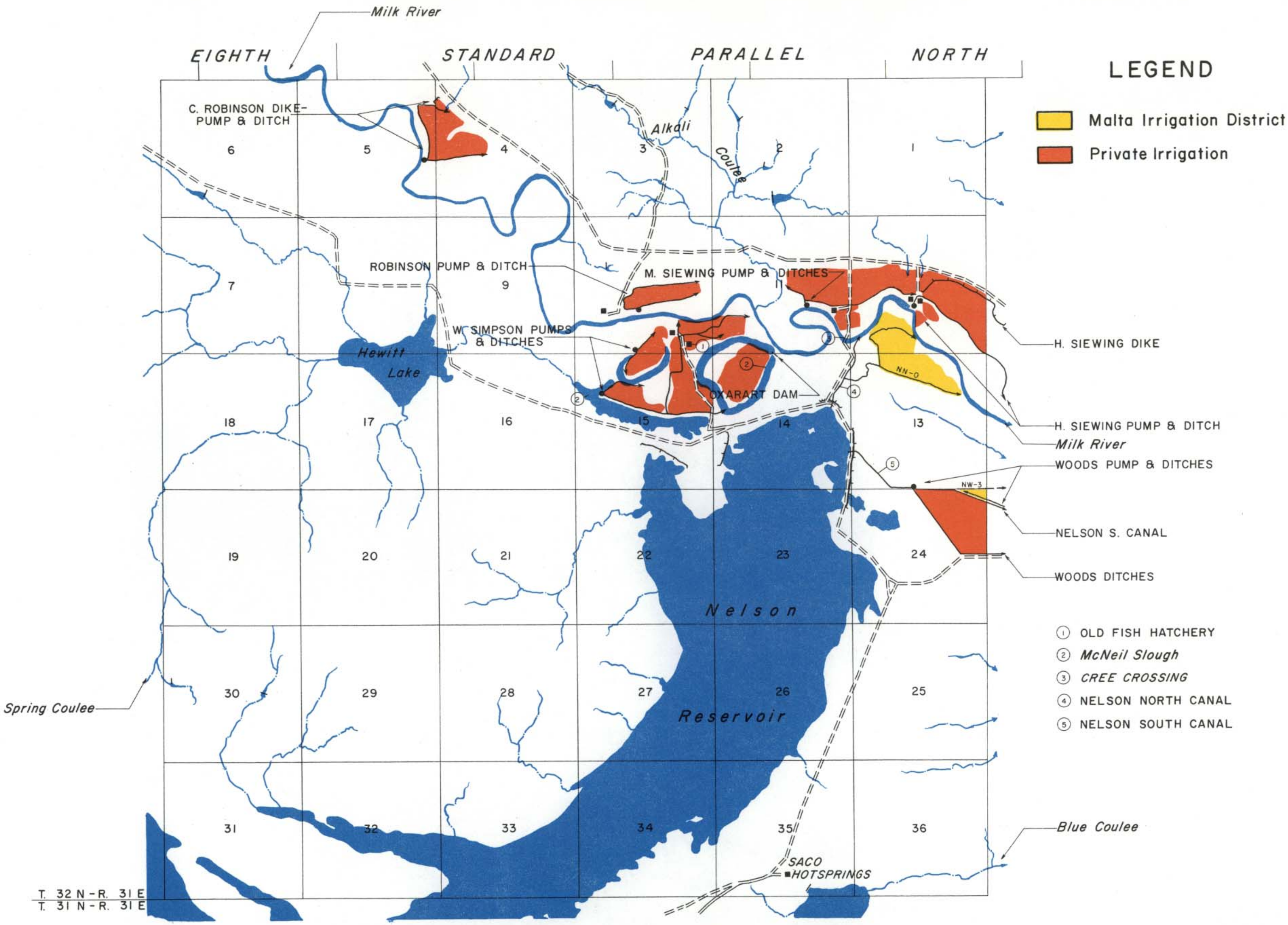


LEGEND

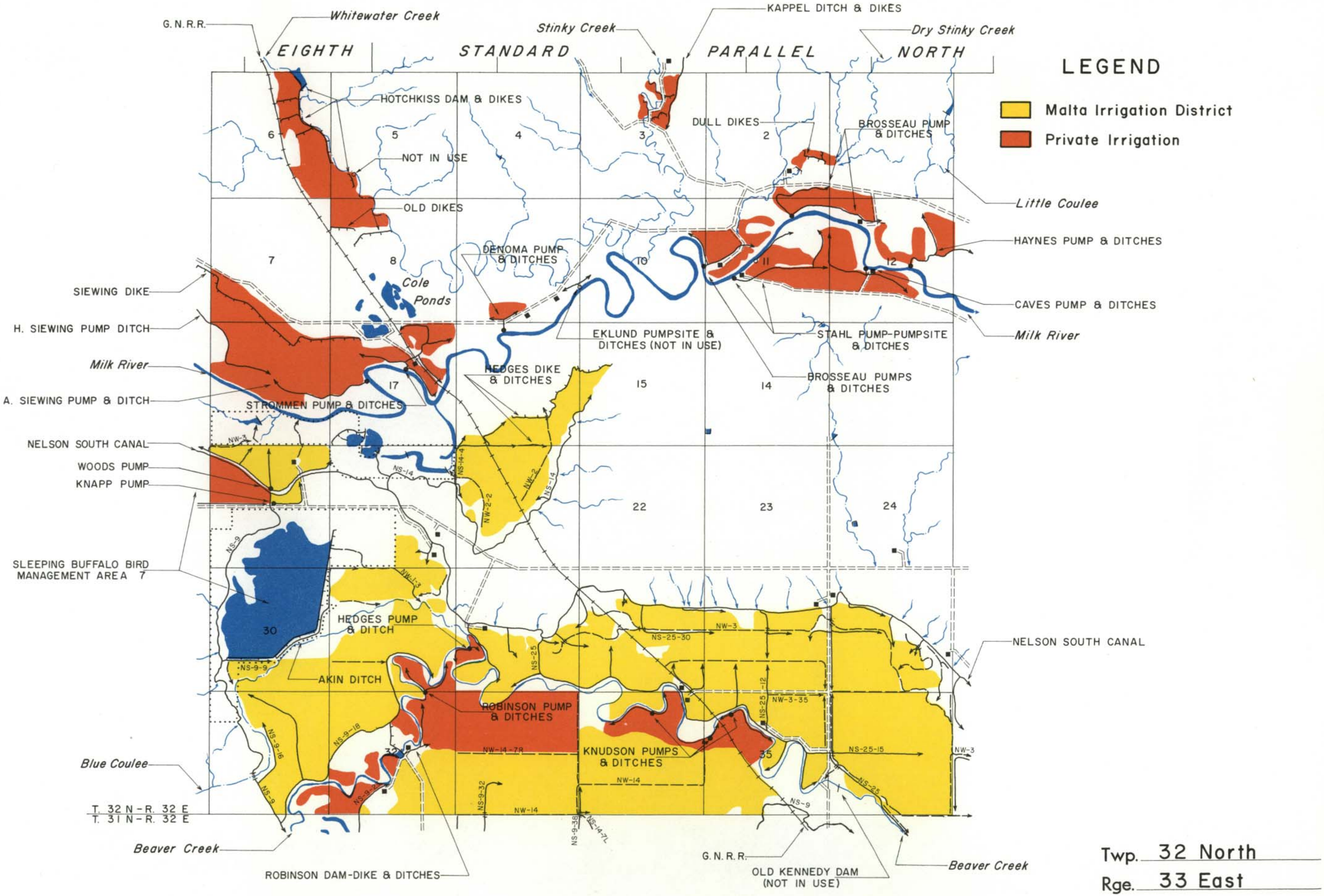
Private Irrigation

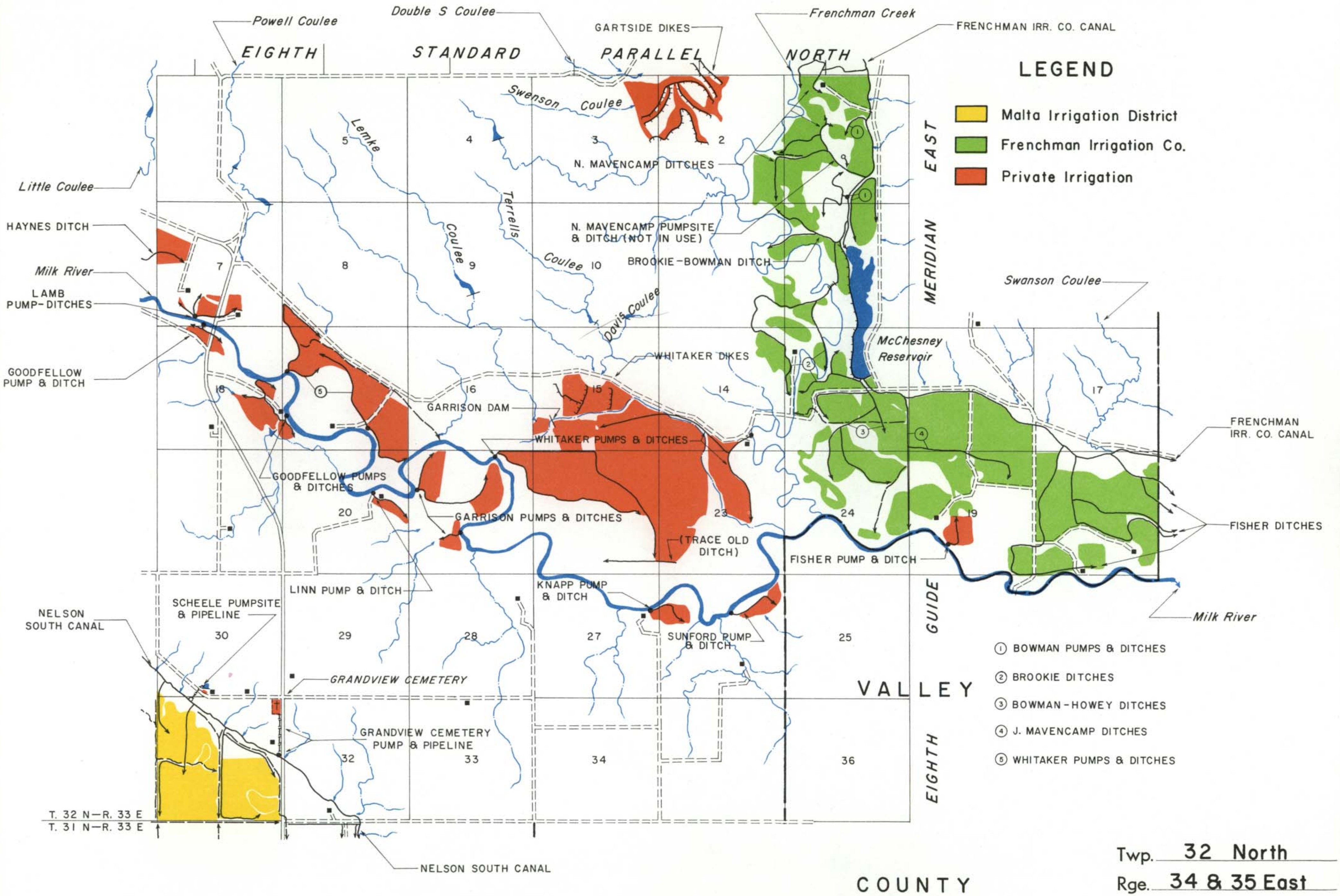
Twp. 32 North

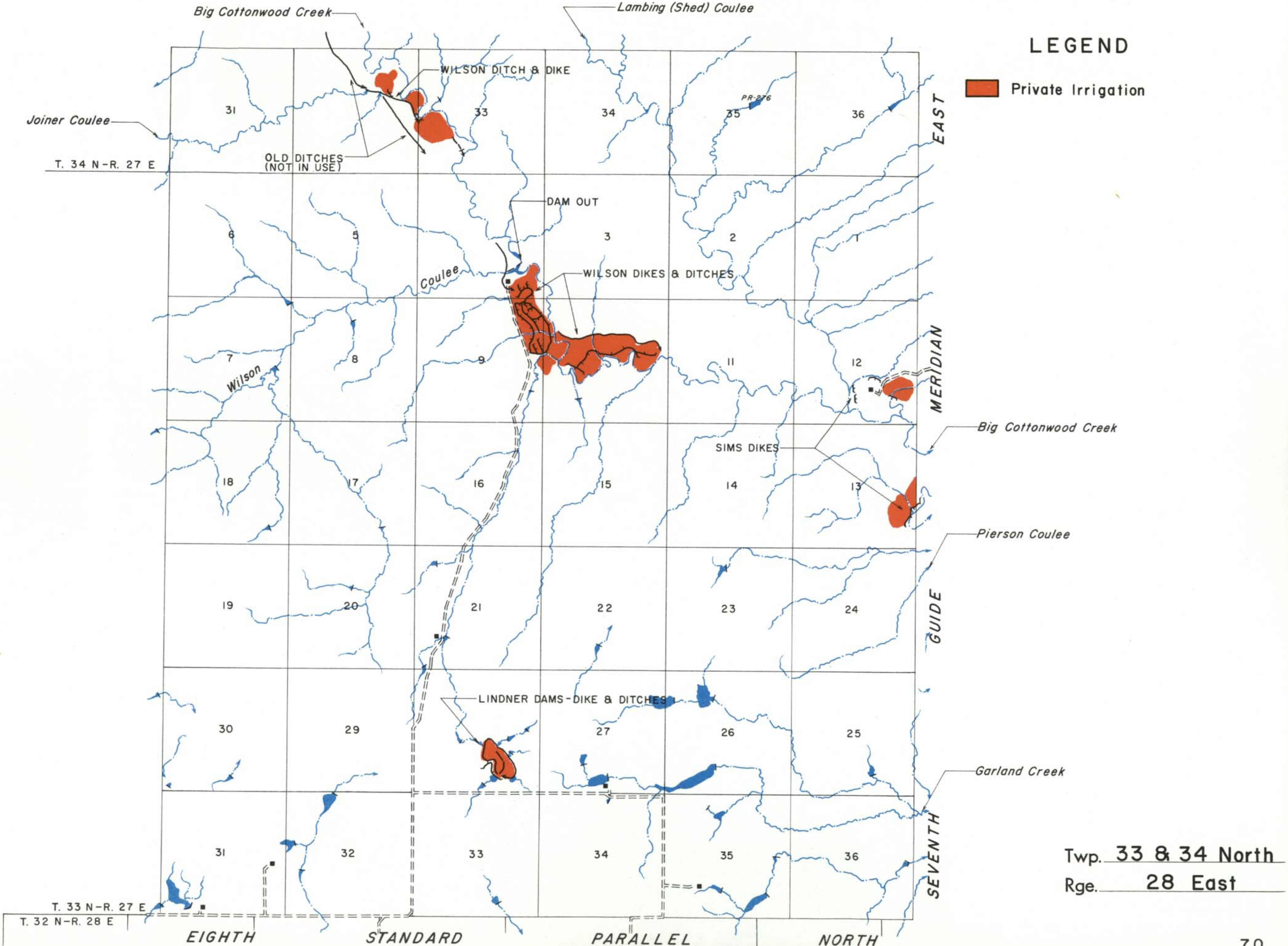
Rge. 30 & 31 East



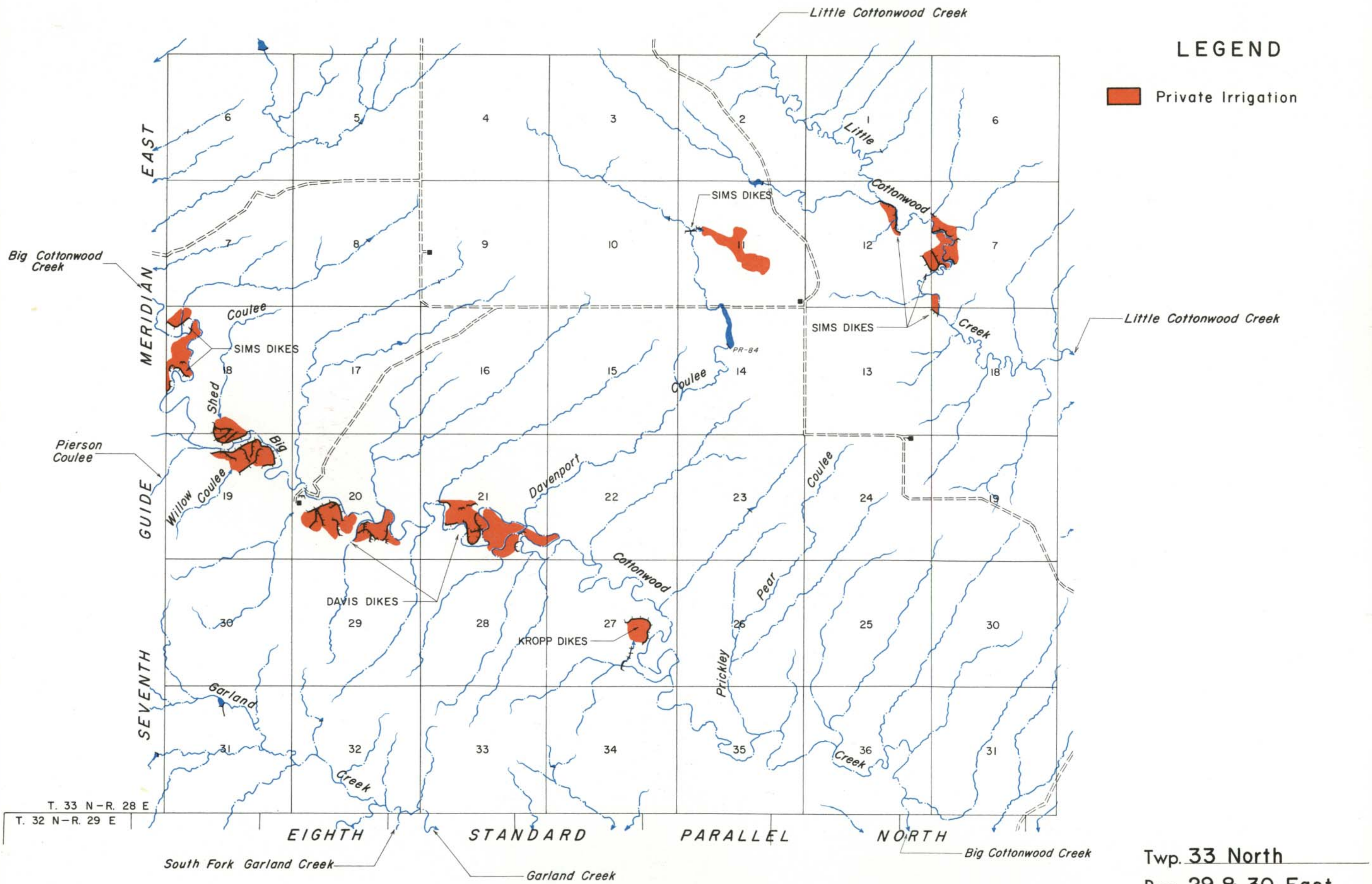
Twp. 32 North
Rge. 32 East


EIGHTH STANDARD PARALLEL NORTH
G.N.R.R.
Whitewater Creek
Stinky Creek
KAPPEL DITCH & DIKES
Dry Stinky Creek
LEGEND
Malta Irrigation District
Private Irrigation
HOTCHKISS DAM & DIKES
DULL DIKES
BROSSEAU PUMP & DITCHES
NOT IN USE
OLD DIKES
Little Coulee
HAYNES PUMP & DITCHES
DENOMA PUMP & DITCHES
Cole Ponds
SIEWING DIKE
H. SIEWING PUMP DITCH
CAVES PUMP & DITCHES
Milk River
EKLUND PUMPSITE & DITCHES (NOT IN USE)
STAHL PUMP-PUMPSITE & DITCHES
Milk River
HEDGES DIKE & DITCHES
BROSSEAU PUMPS & DITCHES
A. SIEWING PUMP & DITCH
STROMMEN PUMP & DITCHES
NELSON SOUTH CANAL
WOODS PUMP
KNAPP PUMP
SLEEPING BUFFALO BIRD MANAGEMENT AREA 7
HEDGES PUMP & DITCH
AKIN DITCH
NELSON SOUTH CANAL
ROBINSON PUMP & DITCHES
KNUDSON PUMPS & DITCHES
Blue Coulee
T. 32 N - R. 32 E
T. 31 N - R. 32 E
Beaver Creek
G.N.R.R.
Beaver Creek
ROBINSON DAM-DIKE & DITCHES
OLD KENNEDY DAM (NOT IN USE)
Twp. 32 North
Rge. 33 East

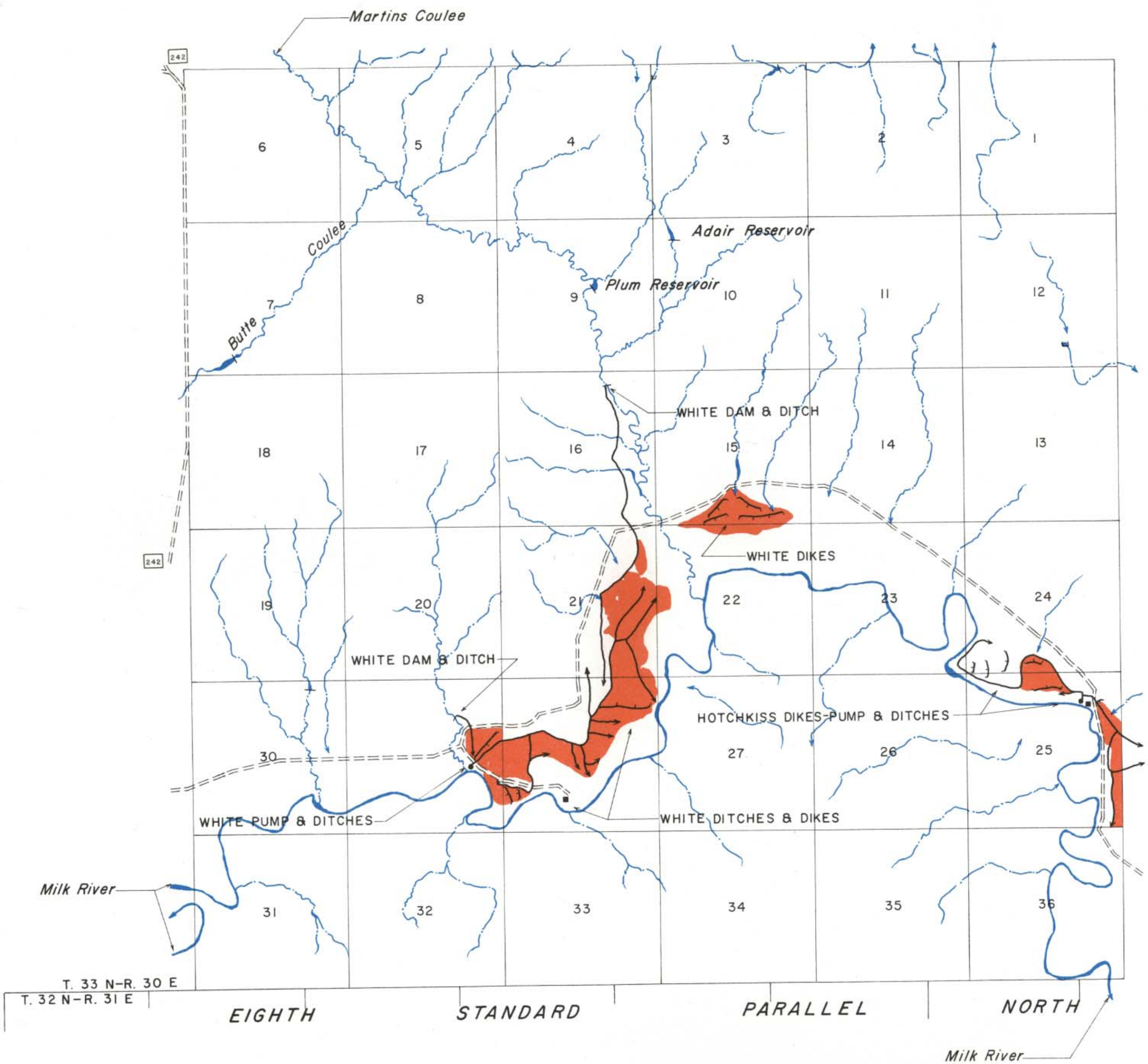

EIGHTH STANDARD PARALLEL NORTH
Powell Coulee
Double S Coulee
GARTSIDE DIKES
Frenchman Creek
FRENCHMAN IRR. CO. CANAL
LEGEND
Malta Irrigation District
Frenchman Irrigation Co.
Private Irrigation
Swenson Coulee
Lemke
Little Coulee
HAYNES DITCH
Milk River
LAMB PUMP-DITCHES
GOODFELLOW PUMP & DITCH
N. MAVENCAMP DITCHES
Terrells
Coulee
N. MAVENCAMP PUMPSITE & DITCH (NOT IN USE)
BROOKIE-BOWMAN DITCH
Davis Coulee
EAST MERIDIAN
Swanson Coulee
McChesney Reservoir
WHITAKER DIKES
GARRISON DAM
WHITAKER PUMPS & DITCHES
FRENCHMAN IRR. CO. CANAL
GOODFELLOW PUMPS & DITCHES
GARRISON PUMPS & DITCHES
(TRACE OLD DITCH)
FISHER DITCHES
FISHER PUMP & DITCH
Milk River
LINN PUMP & DITCH
KNAPP PUMP & DITCH
NELSON SOUTH CANAL
SCHEELE PUMPSITE & PIPELINE
SUNFORD PUMP & DITCH
GUIDE
GRANDVIEW CEMETERY
VALLEY
GRANDVIEW CEMETERY PUMP & PIPELINE
EIGHTH
① BOWMAN PUMPS & DITCHES
② BROOKIE DITCHES
③ BOWMAN-HOWEY DITCHES
④ J. MAVENCAMP DITCHES
⑤ WHITAKER PUMPS & DITCHES
T. 32 N-R. 33 E
T. 31 N-R. 33 E
NELSON SOUTH CANAL
COUNTY
5 4 3 2 7 8 9 10 18 16 15 14 17 20 23 24 19 30 29 28 27 25 32 33 34 36
Twp. 32 North
Rge. 34 & 35 East



Twp. 33 & 34 North
Rge. 28 East



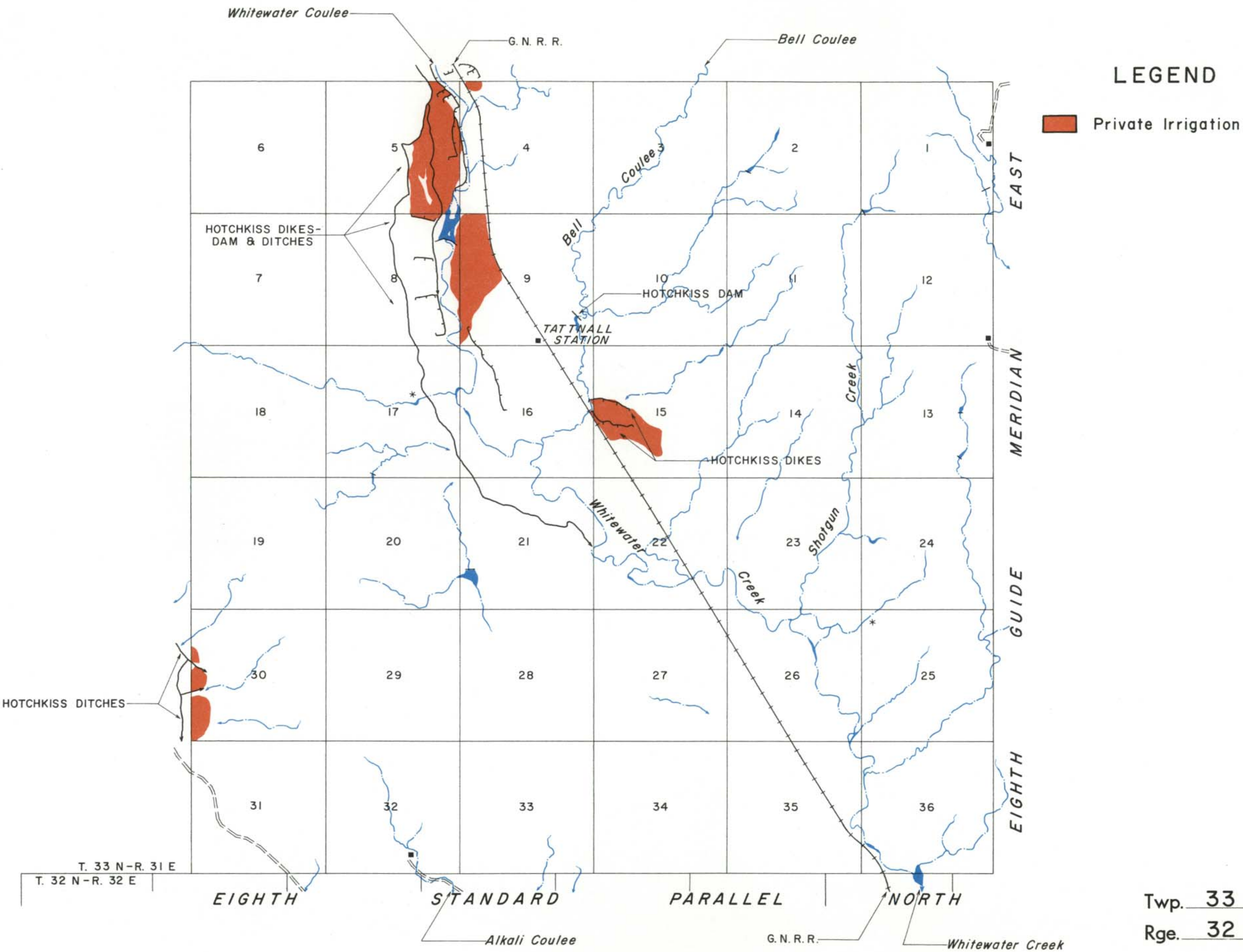
Twp. 33 North
Rge. 29 & 30 East



LEGEND

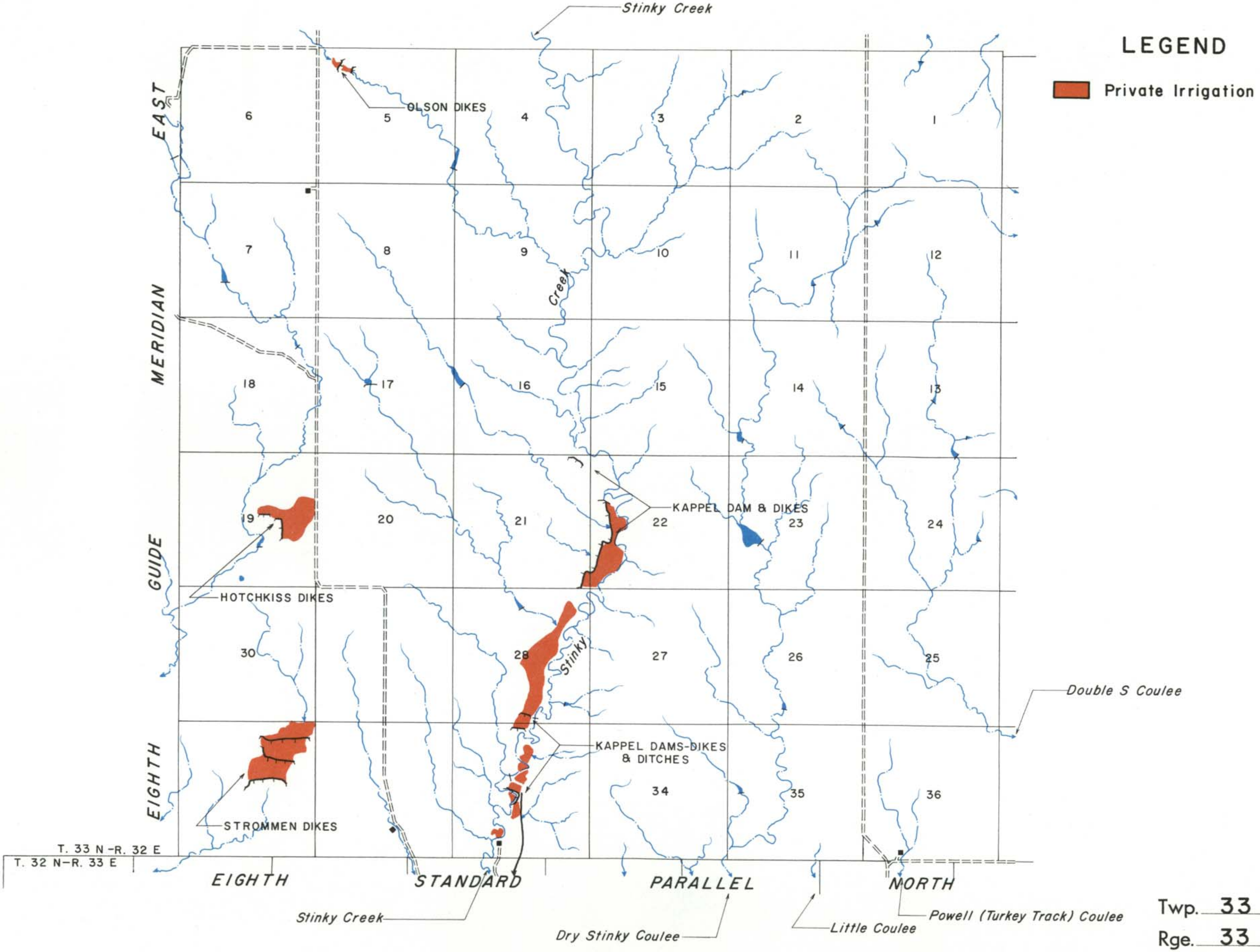
Private Irrigation

Twp. 33 North
Rge. 31 East



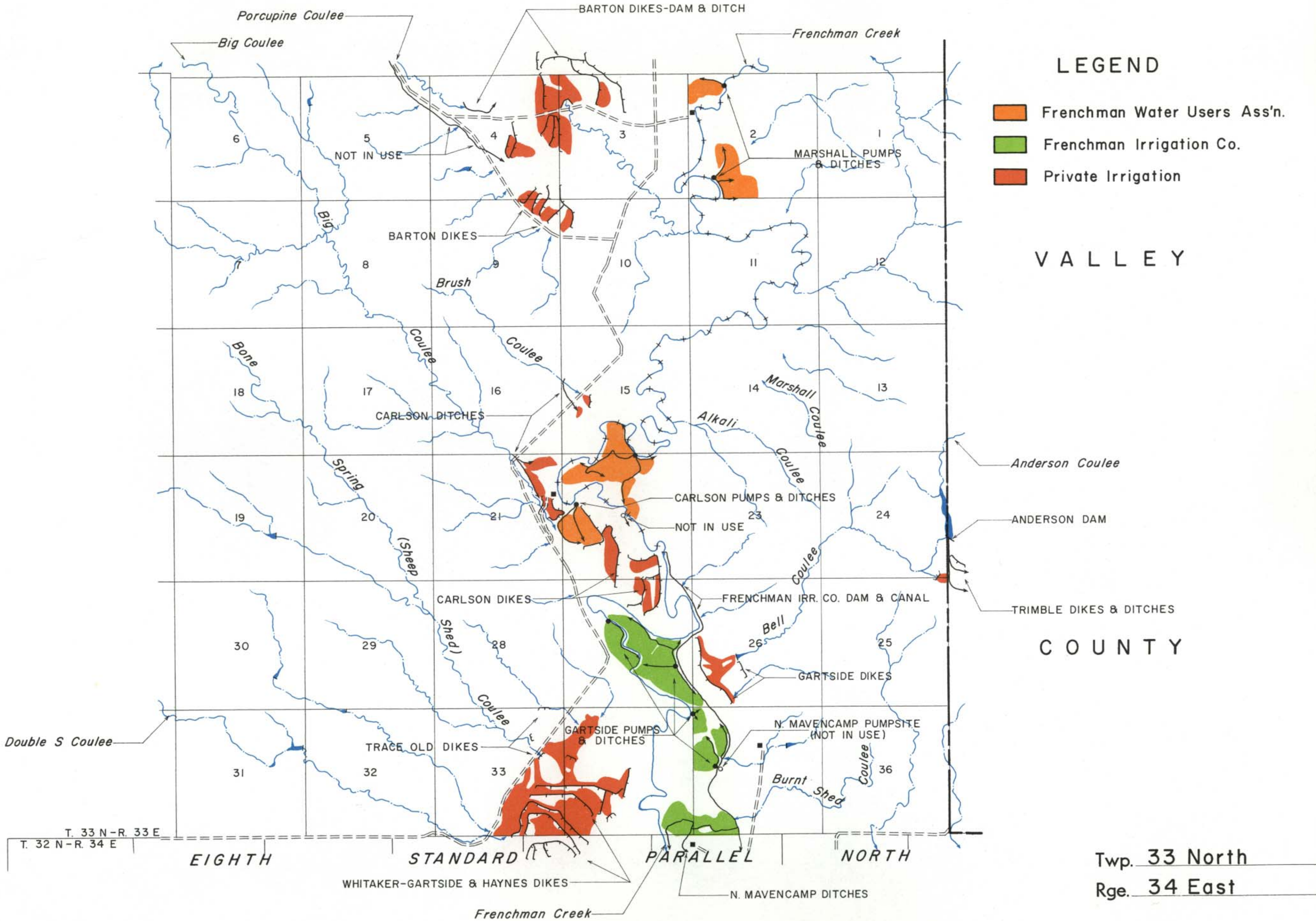
Twp. 33 North

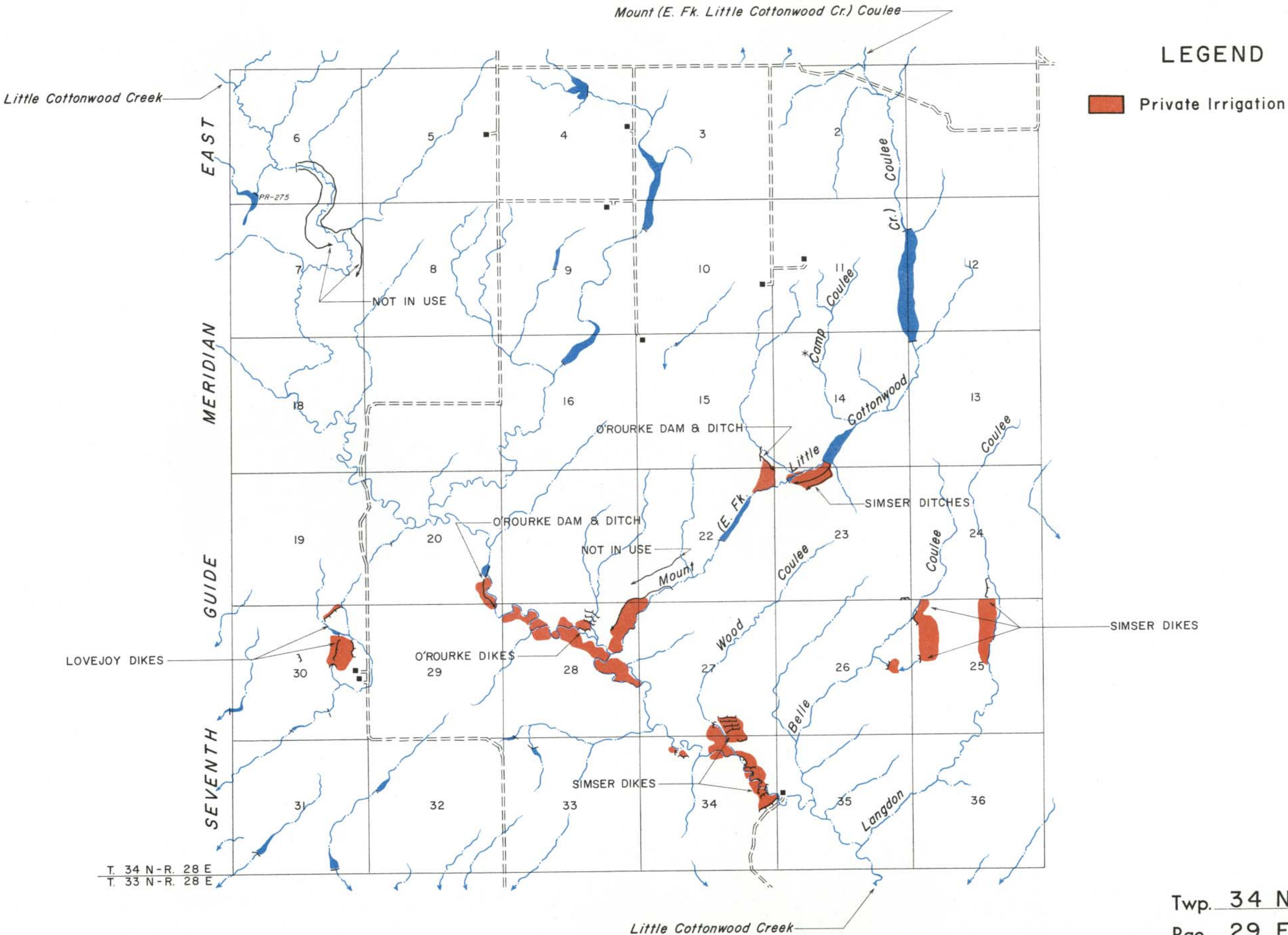
Rge. 32 East



Twp. 33 North

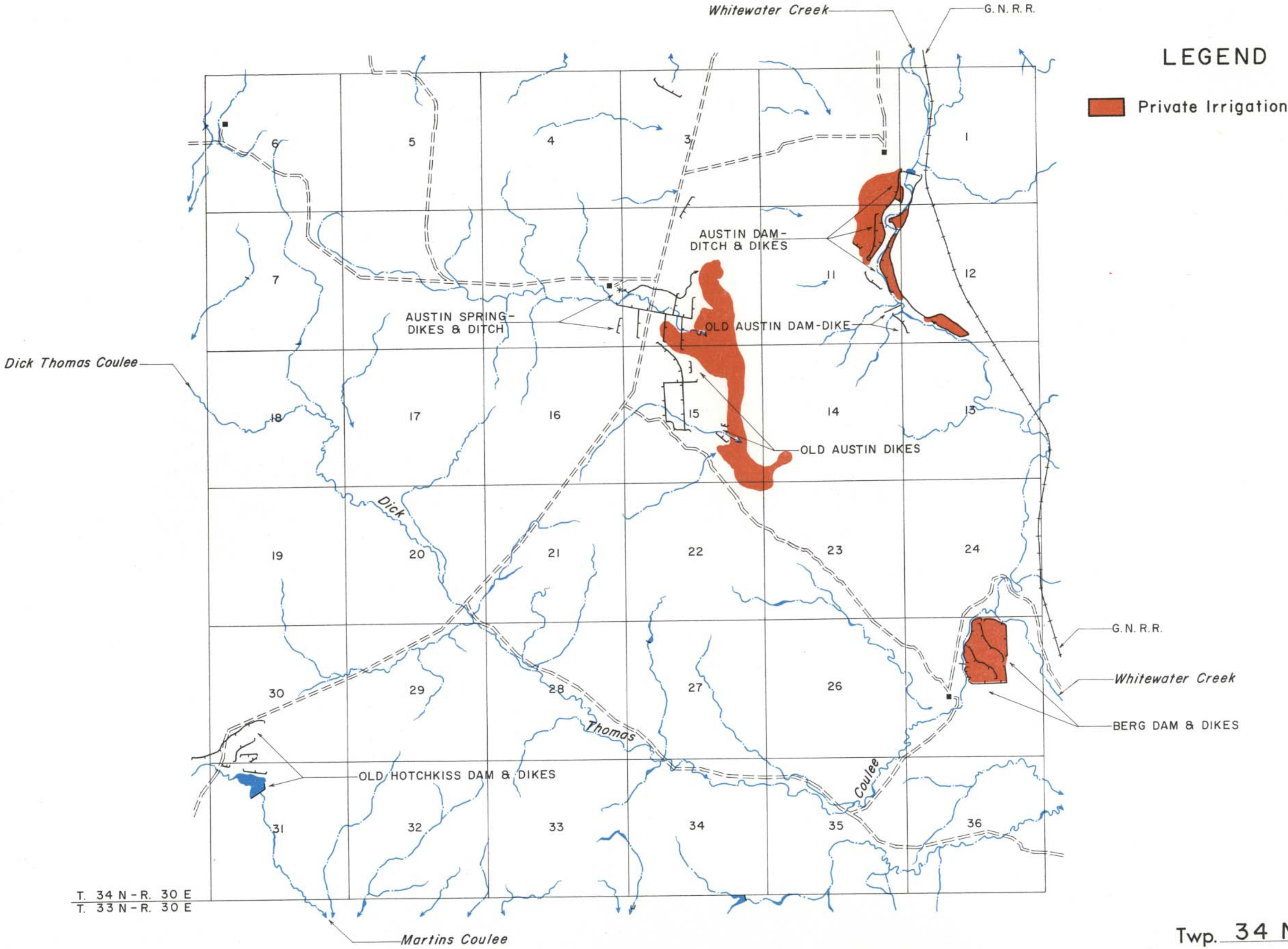
Rge. 33 East


LEGEND
Frenchman Water Users Ass'n.
Frenchman Irrigation Co.
Private Irrigation
VALLEY
COUNTY
Porcupine Coulee
Big Coulee
BARTON DIKES-DAM & DITCH
Frenchman Creek
NOT IN USE
MARSHALL PUMPS & DITCHES
BARTON DIKES
Brush
Coulee
Big
Bone
Coulee
Spring
(Sheep
Shed)
Coulee
Marshall
Coulee
Alkali
Coulee
Bell
Coulee
CARLSON DITCHES
CARLSON PUMPS & DITCHES
NOT IN USE
Anderson Coulee
ANDERSON DAM
CARLSON DIKES
FRENCHMAN IRR. CO. DAM & CANAL
TRIMBLE DIKES & DITCHES
GARTSIDE DIKES
GARTSIDE PUMPS & DITCHES
N. MAVENCAMP PUMPSITE (NOT IN USE)
TRACE OLD DIKES
Double S Coulee
Burnt
Shed
Coulee
T. 33 N - R. 33 E
T. 32 N - R. 34 E
EIGHTH
STANDARD
PARALLEL
NORTH
WHITAKER-GARTSIDE & HAYNES DIKES
Frenchman Creek
N. MAVENCAMP DITCHES
6
5
4
3
2
1
7
8
9
10
11
12
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
26
25
31
32
33
36
Twp. 33 North
Rge. 34 East



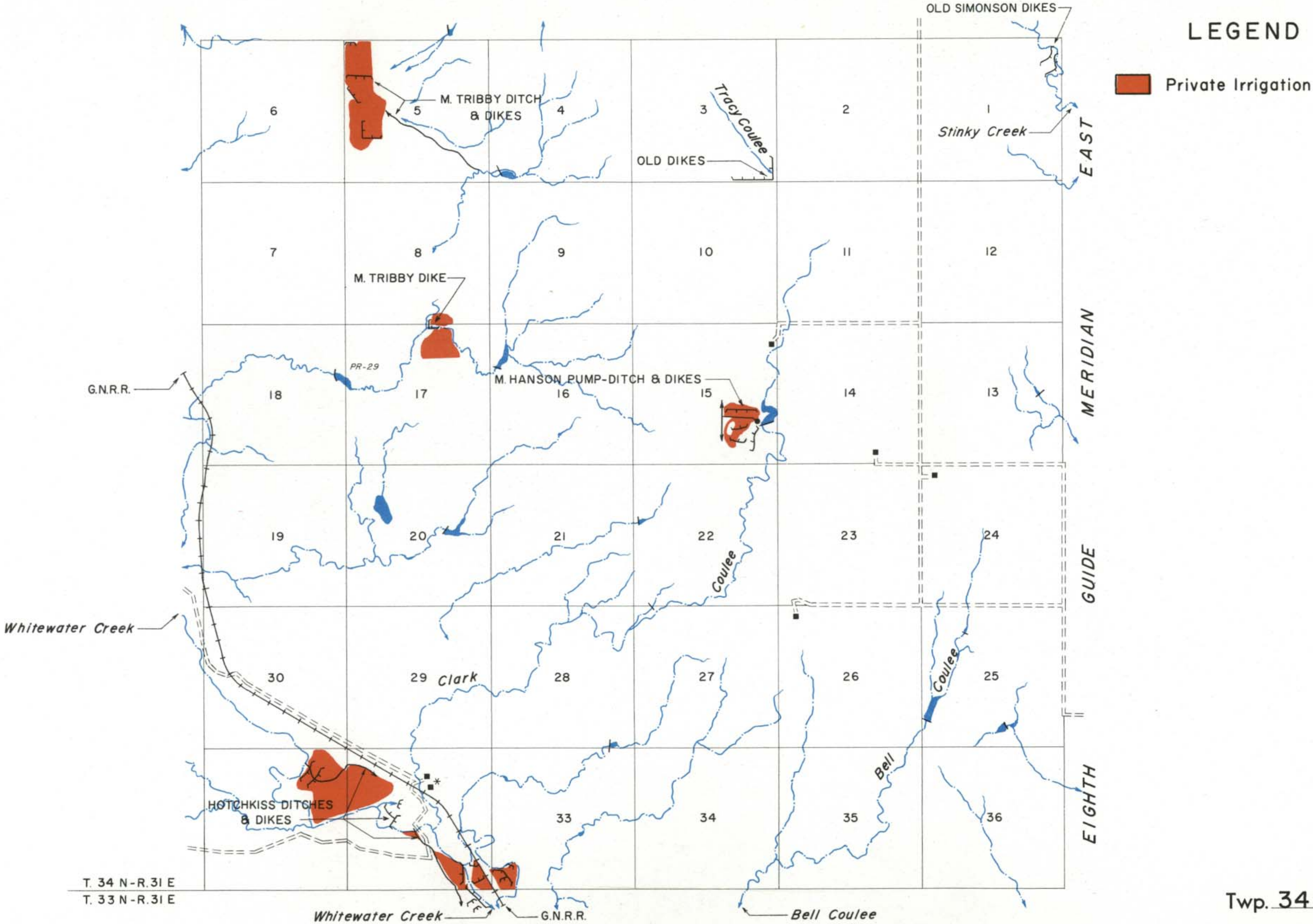
Twp. 34 North

Rge. 29 East



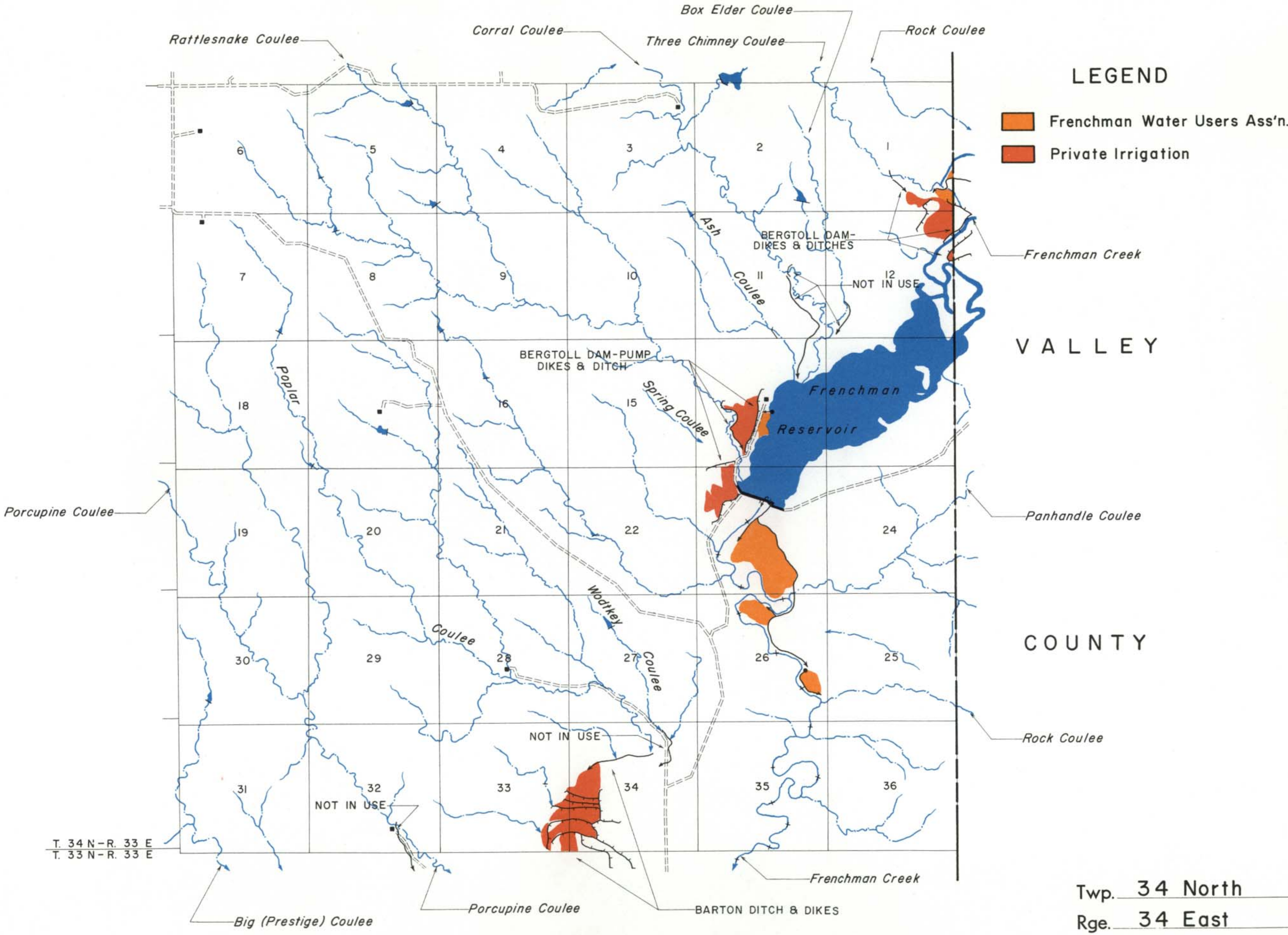
Twp. 34 North

Rge. 31 East

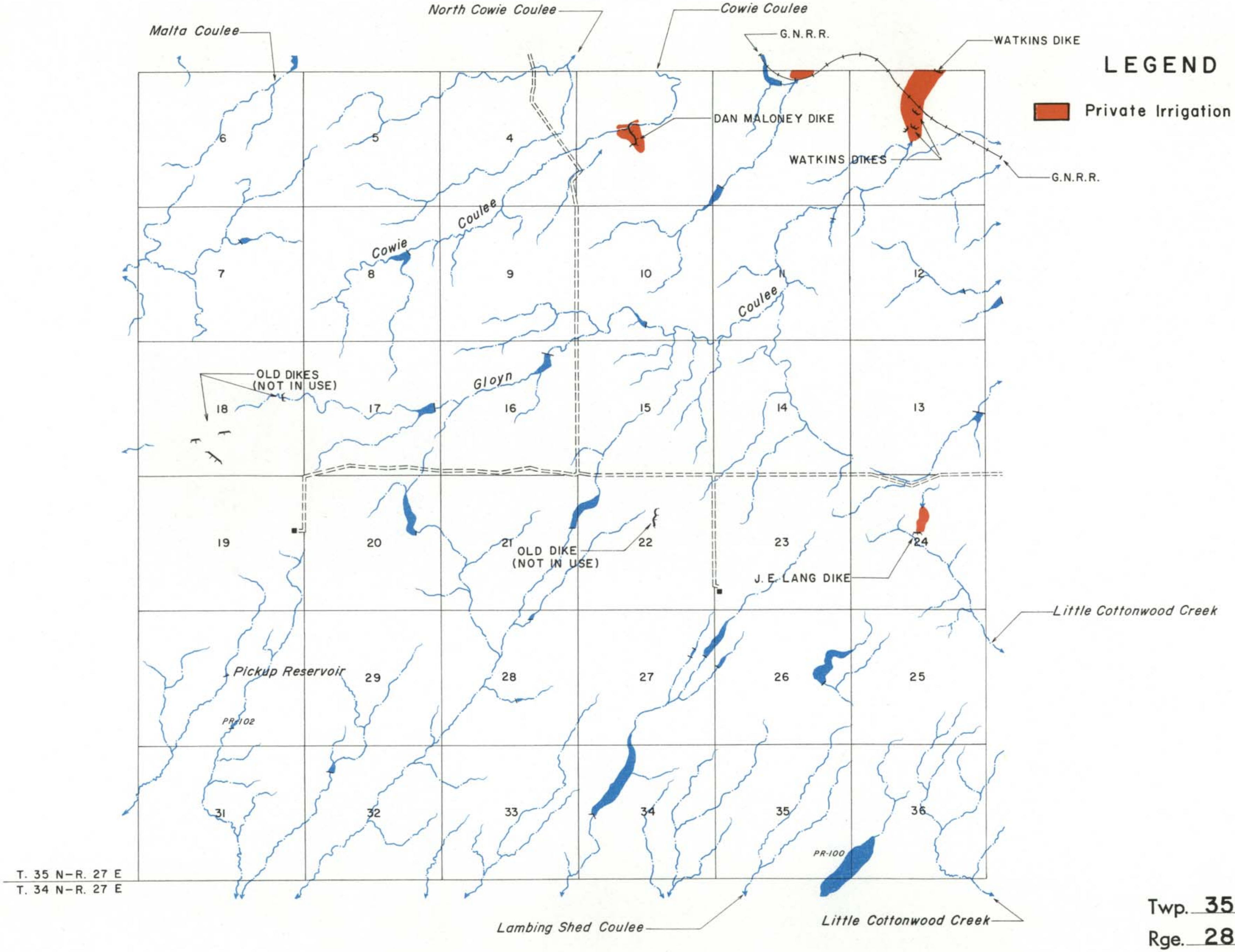


Twp. 34 North

Rge. 32 East

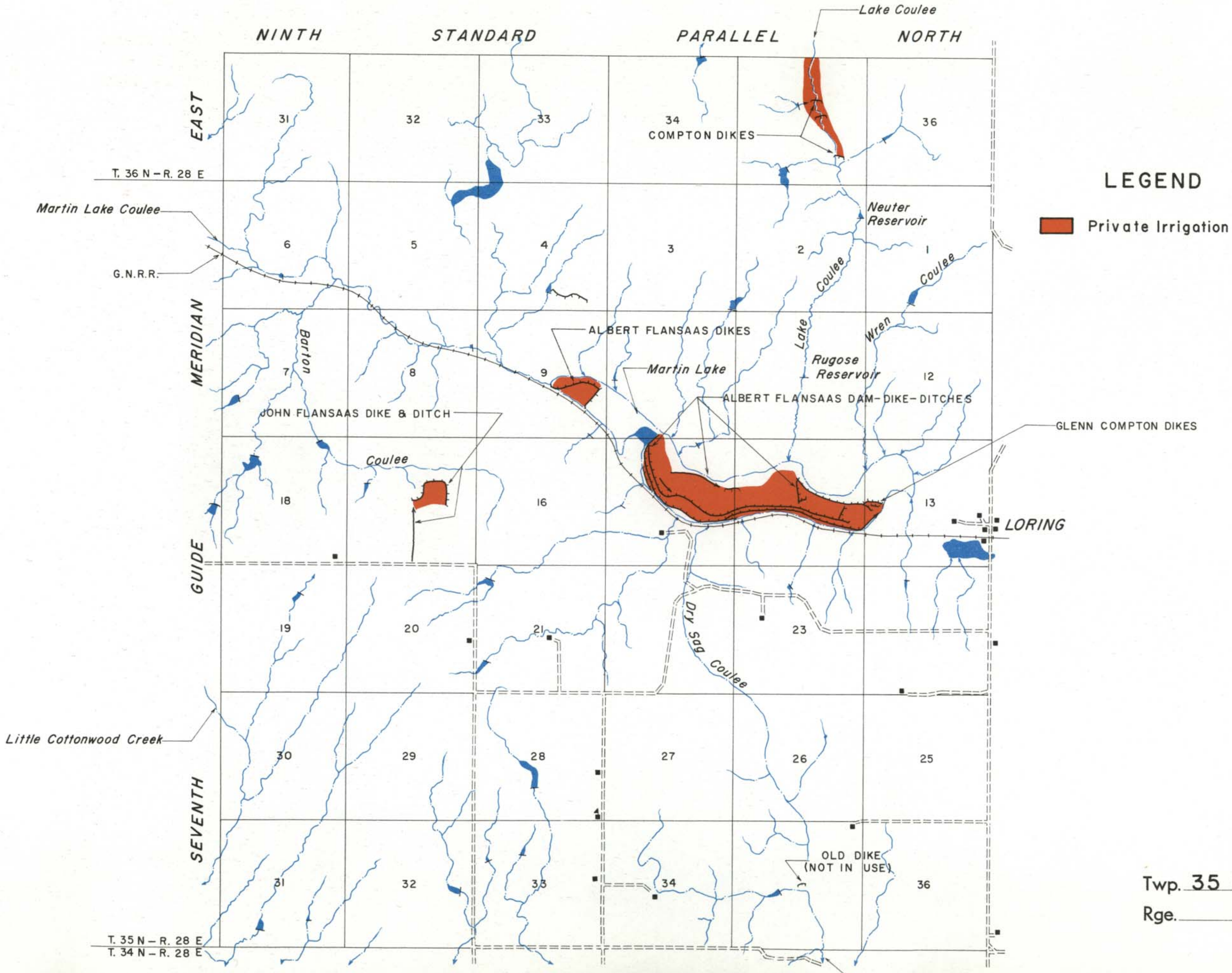


Twp. 34 North
Rge. 34 East



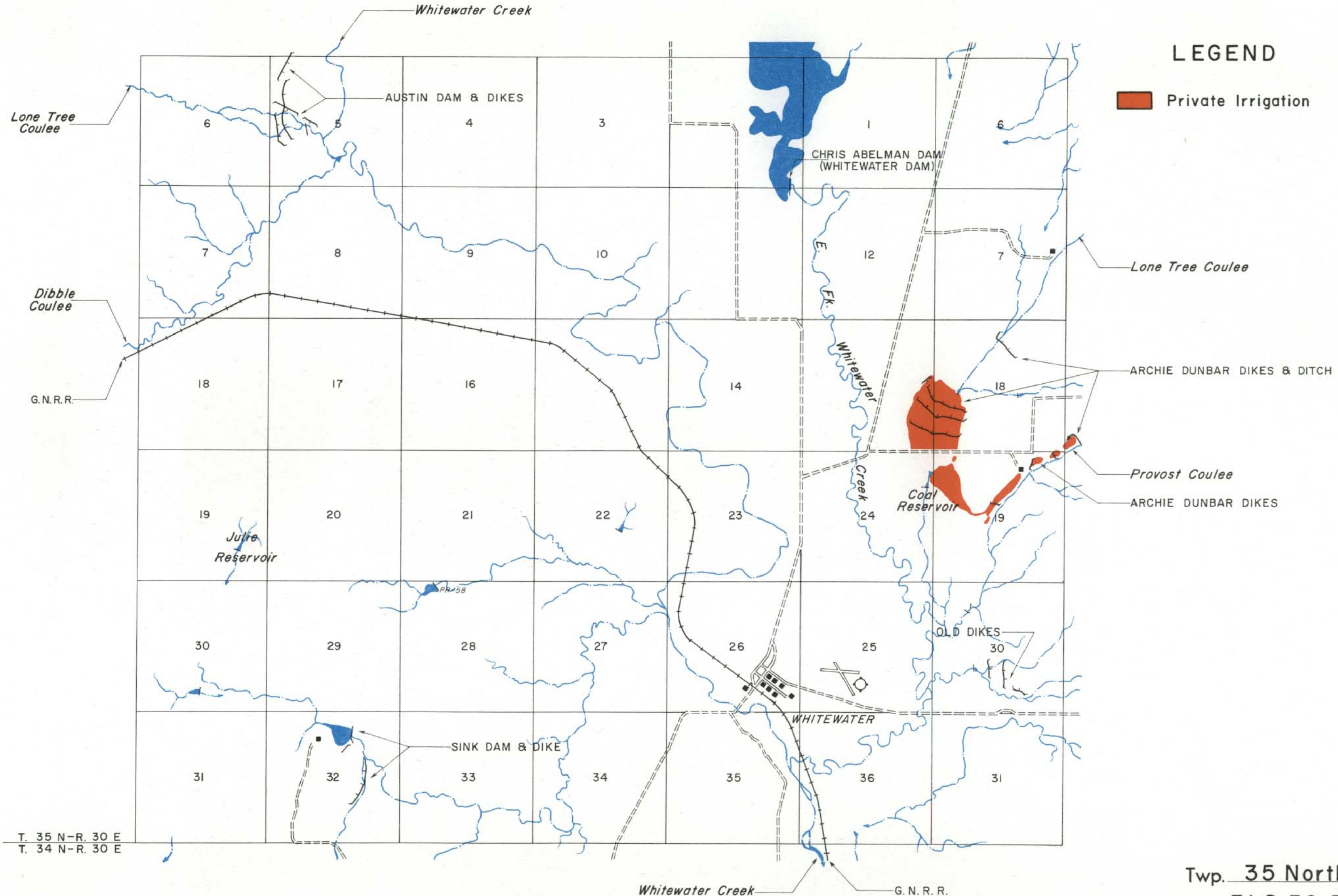
Twp. 35 North

Rge. 28 East

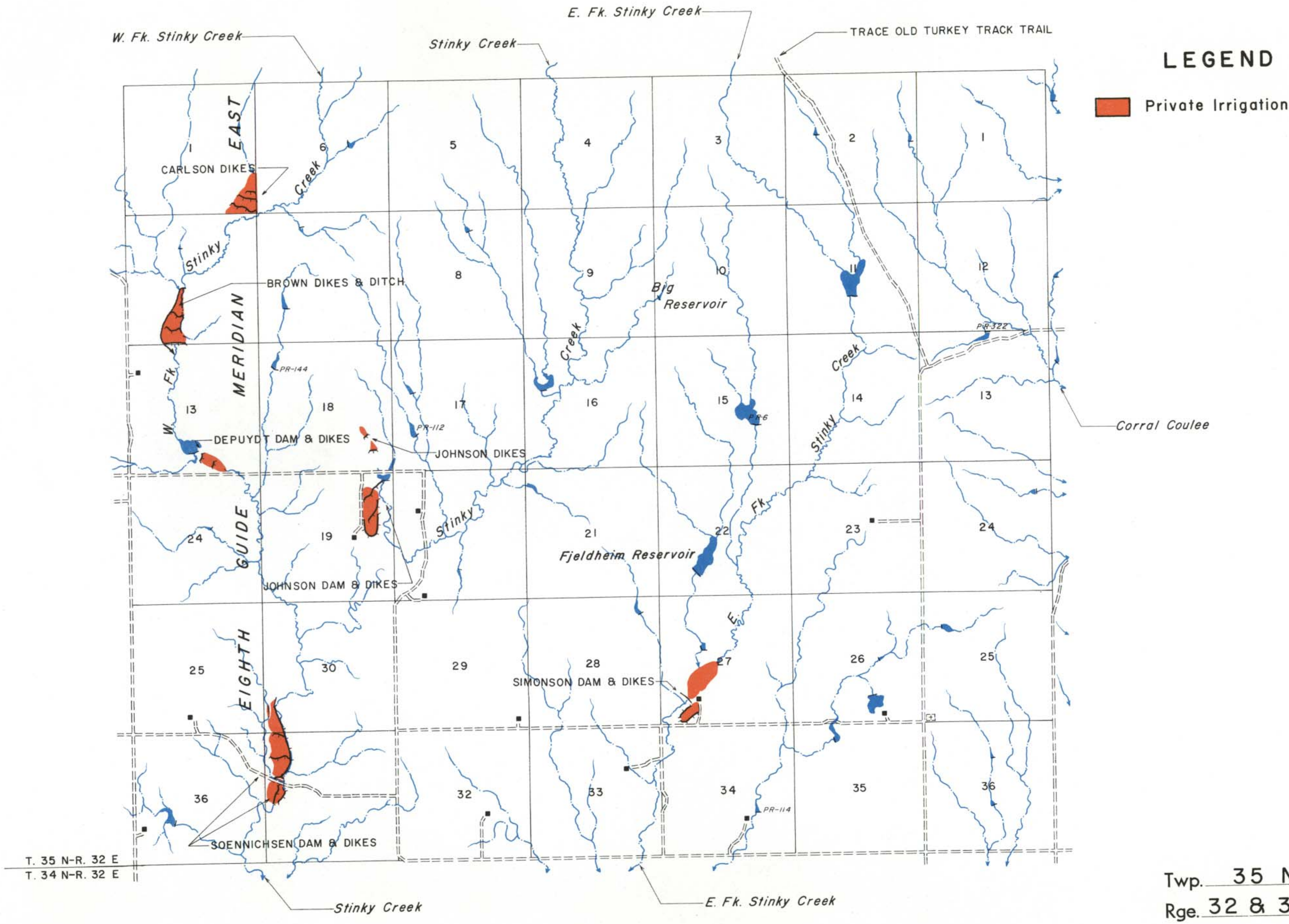


Twp. 35 & 36 North

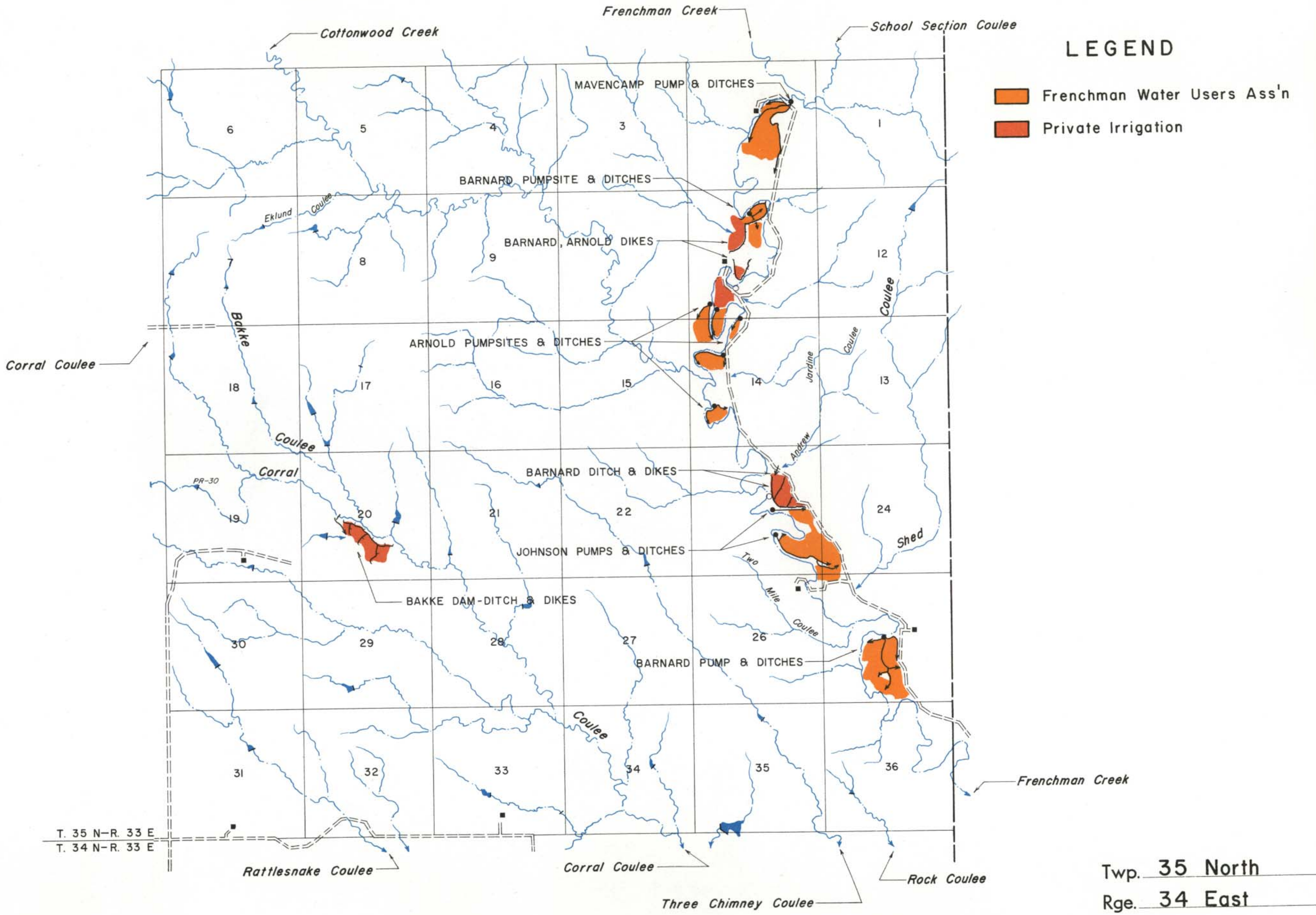
Rge. 29 East



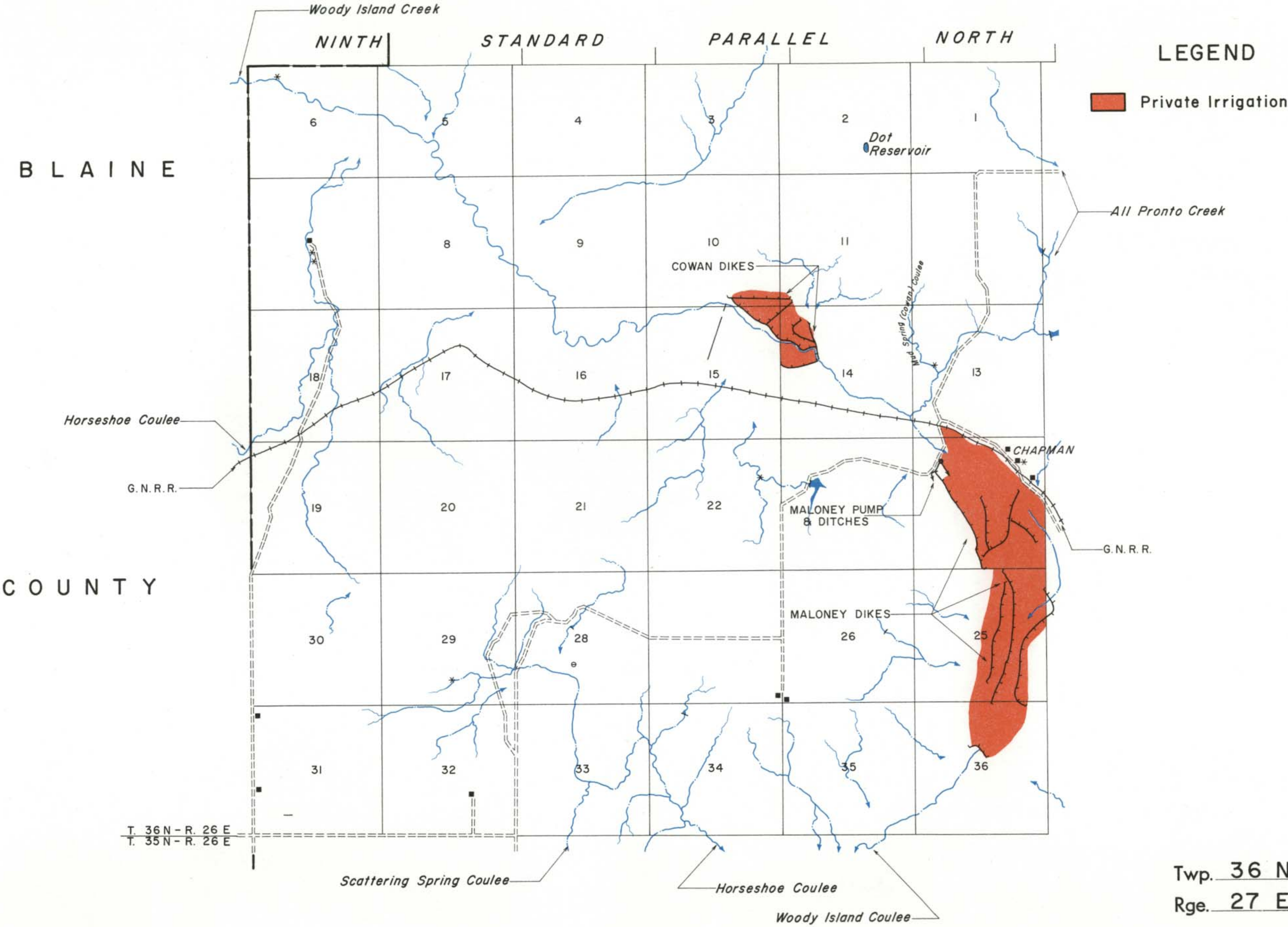
Twp. 35 North
Rge. 31 & 32 East



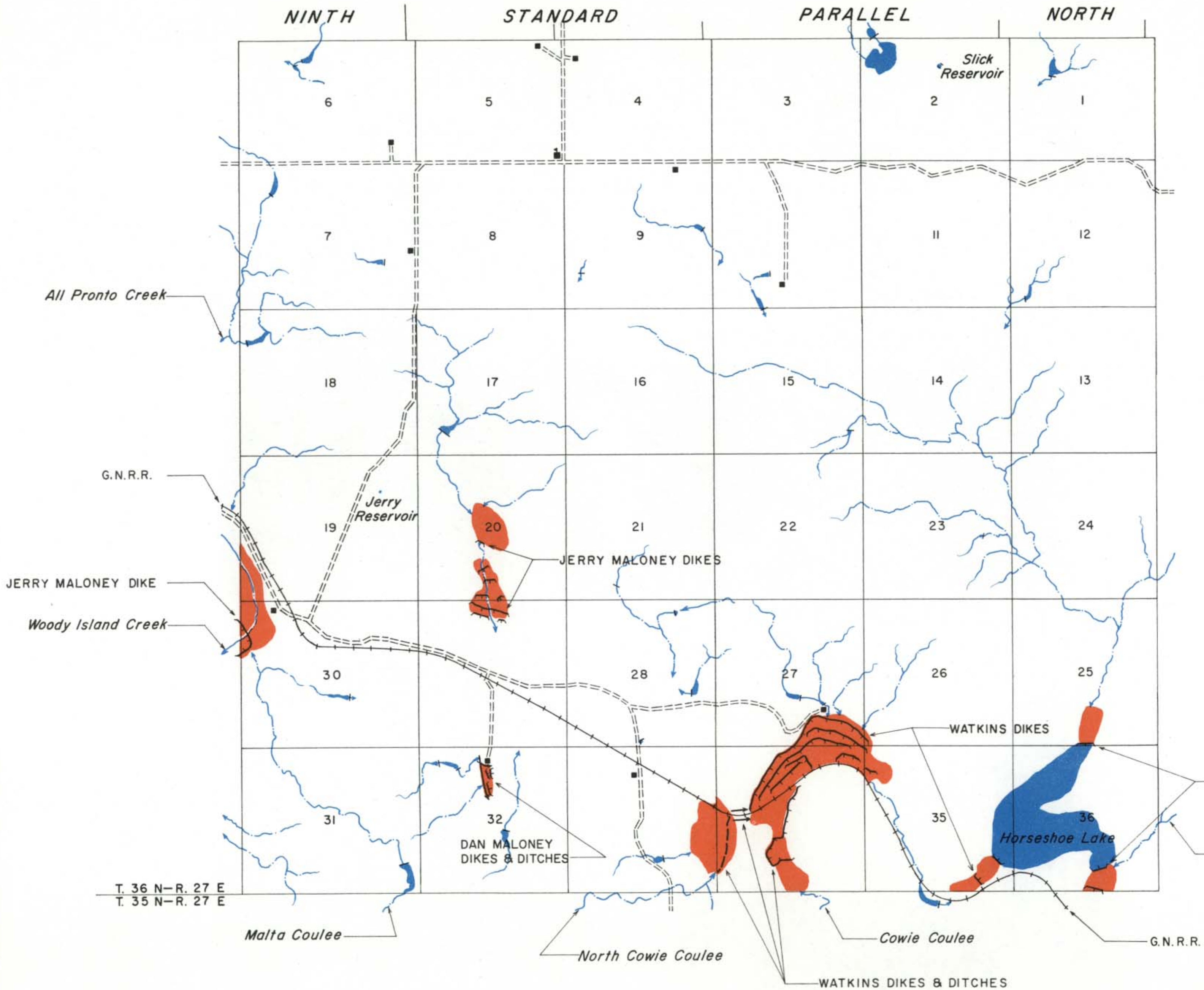
Twp. 35 North
Rge. 32 & 33 East



Twp. 35 North
Rge. 34 East



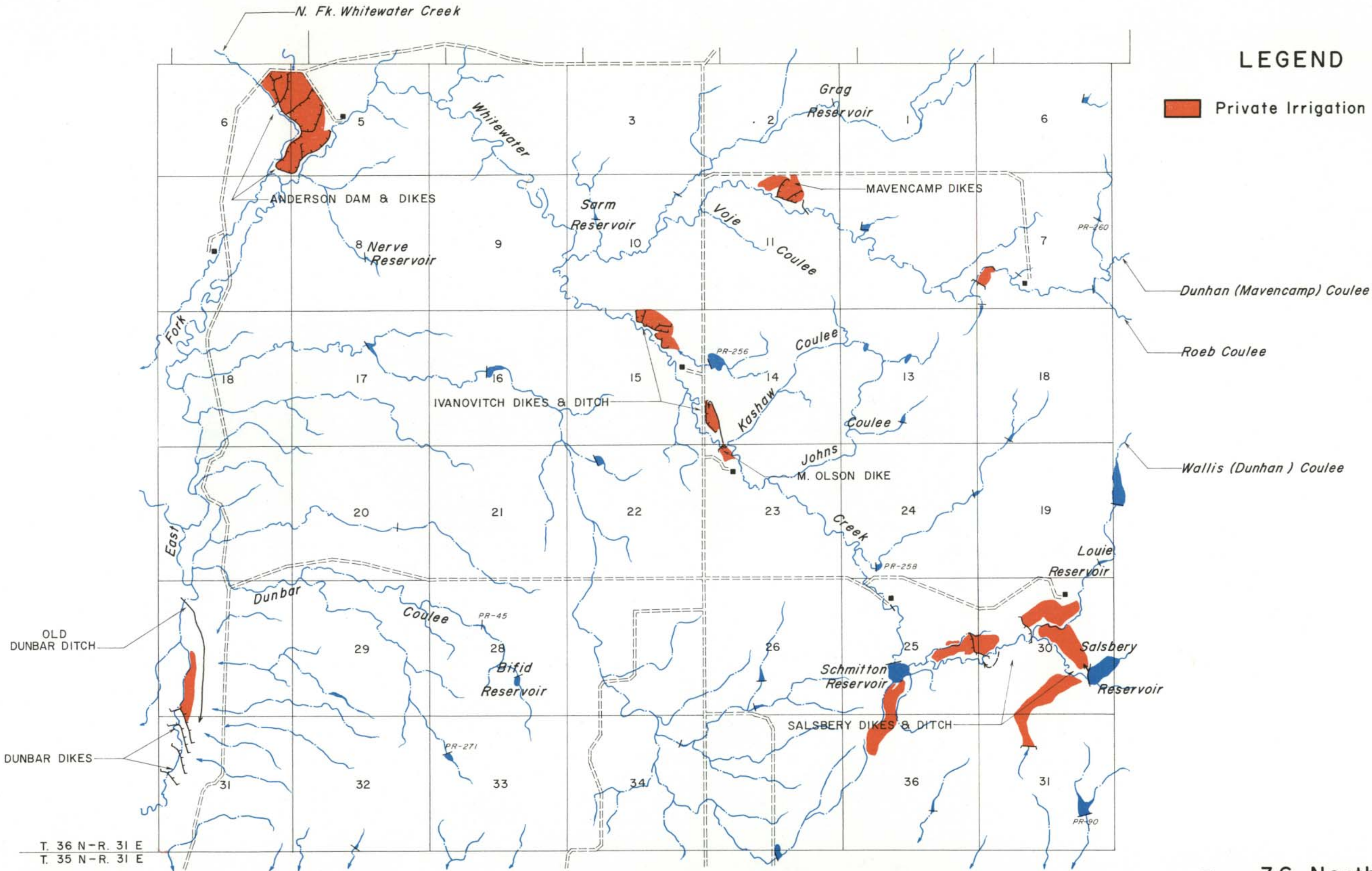
Twp. 36 North
Rge. 27 East



LEGEND

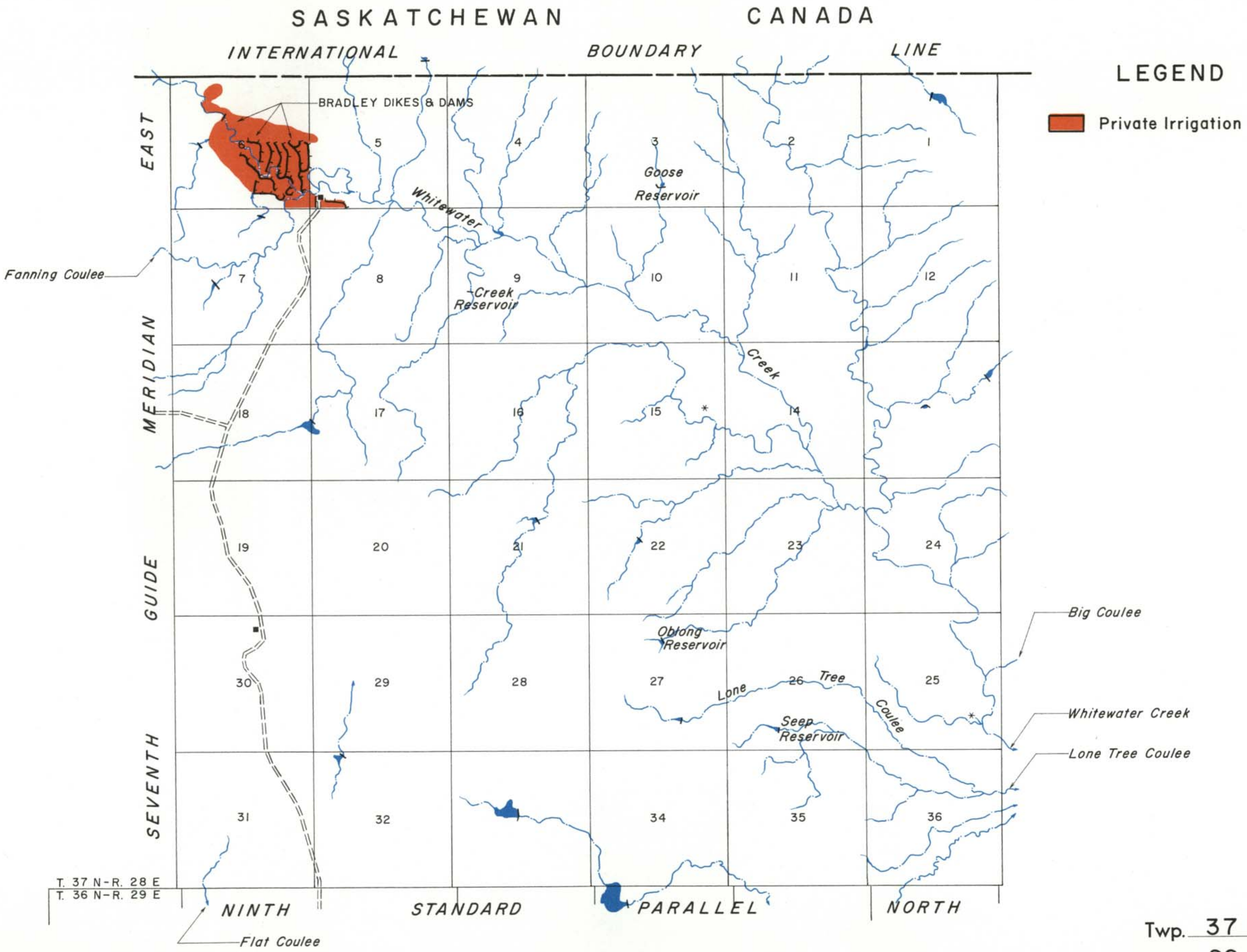
Private Irrigation

Twp. 36 North
Rge. 28 East



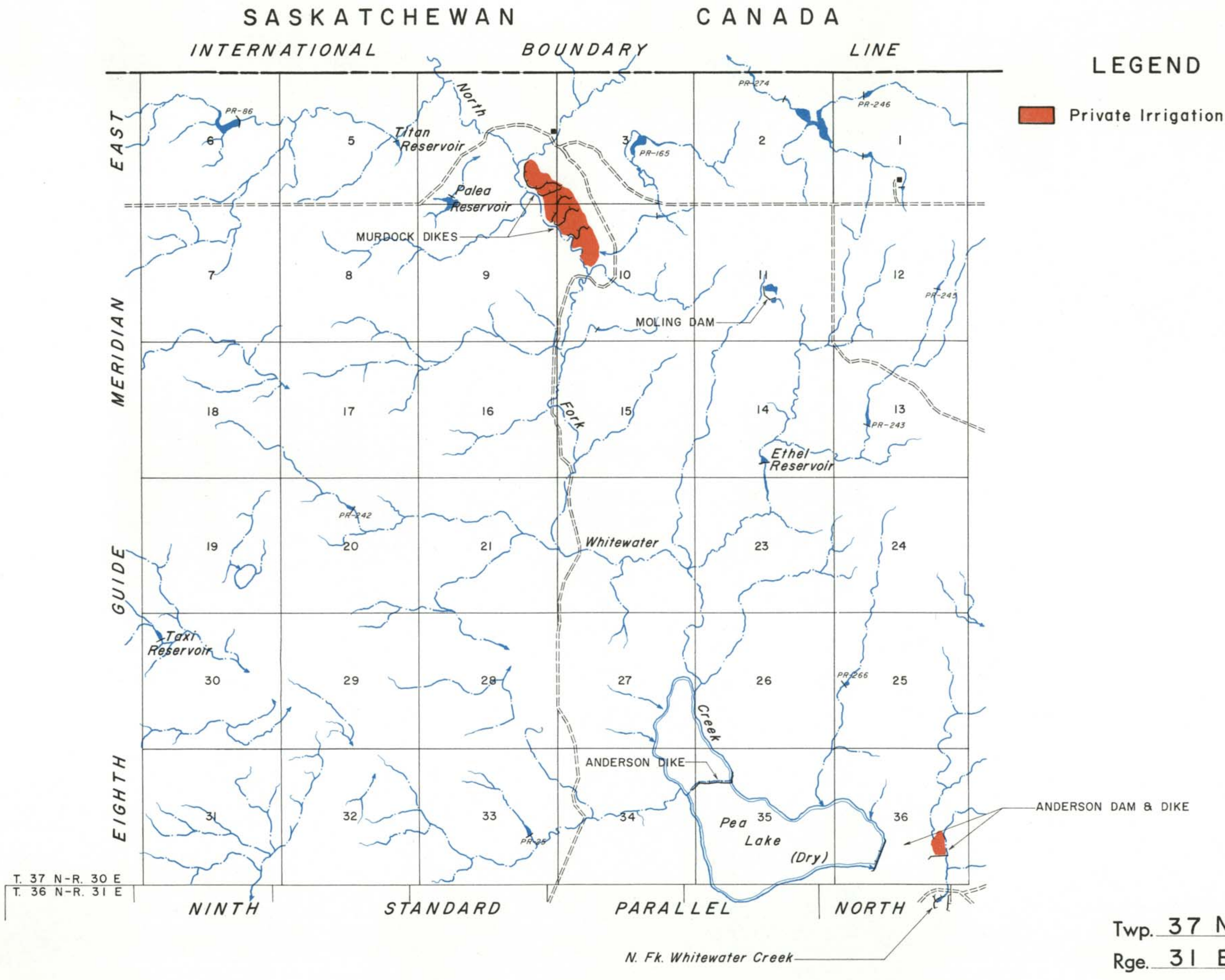
Twp. 36 North

Rge. 32 & 33 East



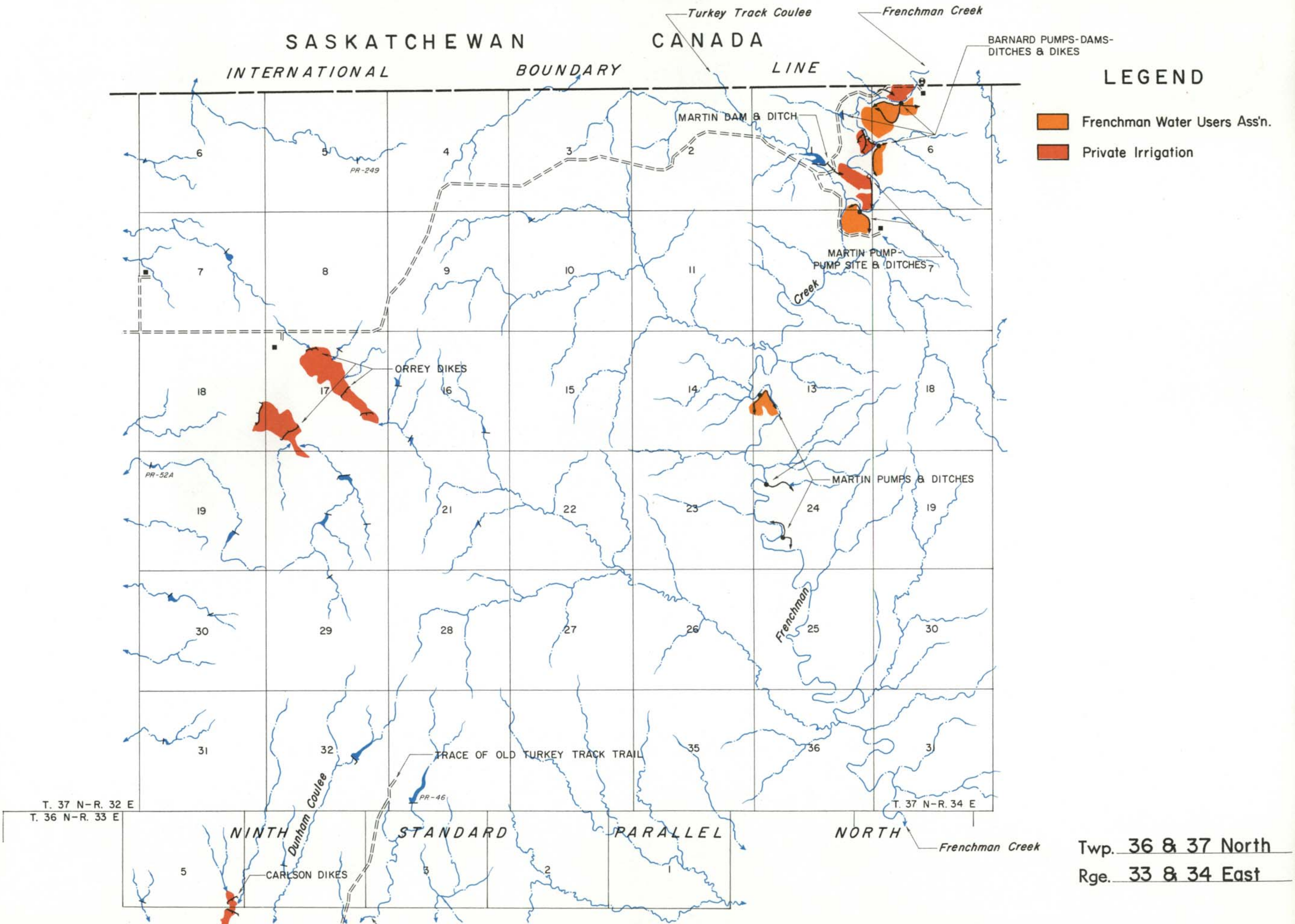
Twp. 37 North

Rge. 29 East



Twp. 37 North

Rge. 31 East


SASKATCHEWAN CANADA
INTERNATIONAL BOUNDARY LINE
Turkey Track Coulee
Frenchman Creek
BARNARD PUMPS-DAMS-DITCHES & DIKES
LEGEND
Frenchman Water Users Ass'n.
Private Irrigation
MARTIN DAM & DITCH
PR-249
MARTIN PUMP-PUMP SITE & DITCHES
Creek
ORREY DIKES
MARTIN PUMPS & DITCHES
PR-52A
Frenchman
TRACE OF OLD TURKEY TRACK TRAIL
Dunham Coulee
PR-46
T. 37 N-R. 32 E
T. 36 N-R. 33 E
T. 37 N-R. 34 E
NINTH STANDARD PARALLEL NORTH
CARLSON DIKES
Frenchman Creek
Twp. 36 & 37 North
Rge. 33 & 34 East