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Water Resources Survey

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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

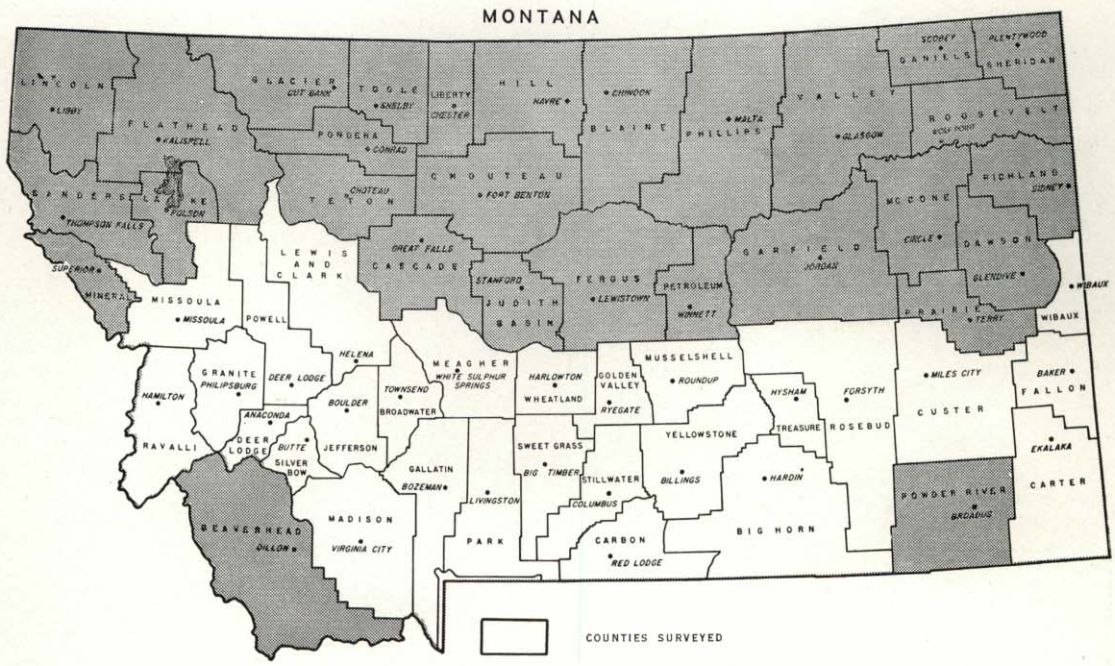
Carter, Fallon, and Wibaux Counties, Montana

Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June, 1960

Ken Shrest 1106

WATER RESOURCES SURVEY

CARTER, FALLON, AND WIBAUX COUNTIES, MONTANA



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June, 1960

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WESTERN LITHO-PRINT, INC., BILLINGS, MONTANA

June, 1960

Honorable J. Hugo Aronson
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Aronson:

Submitted herewith is a consolidated report on the Water Resources Survey of Carter, Fallon and Wibaux Counties, Montana.

This work is being carried on with funds made available to the State Engineer by the 36th Legislative Session, 1959, and in cooperation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

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

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

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

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

Respectfully submitted,

FRED E. BUCK, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid 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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Lester Williams, Commissioner
Mrs. Margaret S. Renshaw, Clerk of the District Court
Ray Nickerson, Clerk and Recorder — J. Schallenberger, Assessor

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Gene Hoff ..... County Extension Agent, Carter and Fallon Counties
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Regional Forester ..... U. S. Dept. of Agriculture, Forest Service
W. B. Wallace ..... Area Administrator, U. S. Bureau of Land Management

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

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CARTER, FALLON, AND WIBAUX COUNTIES

FOREWORD

MONTANA'S WATER RIGHT PROBLEMS

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

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

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

1. The use of water may be acquired by both riparian and non-riparian landowners.

2. It allows diversion of water regardless of the reduction of the water supply in the stream.

3. The value of the right is determined by the priority of the appropriation; i.e., first in time is first in right.

4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.

5. A right to the use of water is considered property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion of

water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of it within 20 days in the County Clerk's Office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

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

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

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge, upon petition of the owners of at least 15 per cent of the water rights affected, must appoint a water commissioner to distribute the water. After the Commissioner has been appointed the Judge gives him full instructions on how the water is to be apportioned and distributed in accordance with the terms of the decree.

The recordings 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 and extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once, six appropriators each claimed all of the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of 50 cfs. Today, the Big Hole River with an average flow of 1,129 cfs has filings totaling 173,912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties; consequently, water right filings on these inter-county streams are found distributed in two or more

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

It can be readily seen that this system of recording offers little protection to rights in the use of water until they are determined by an adjudication. In other words, an appropriator does not gain a clear title to his water right until after adjudication and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes very costly when they are prolonged for years. It is estimated that litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly a half a 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, it 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 sub-divided in later years and the water not proportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water right ownership on deeds and abstracts.

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

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

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

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

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

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 maintain their flow during dry seasons. The amount of water stored underground is far greater at any given instant 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 the dry seasons.

It is believed that Montana's ground water resource is vast and only partly developed. Yet this resource is now undergoing a rapidly accelerating development as the need for its use increases and economical energy for pumping becomes available. Continued rapid development will undoubtedly cause waste and depletion of ground water in areas where it is not plentiful. Experience in other states has shown that once overuse of ground water in a specific area has started, it is nearly impossible to stop it, and may result in painful economic readjustments for the inhabitants of the area concerned.

Practical steps aimed at conserving ground water resources and correcting related deficiencies in surface water laws are necessary in Montana. Proposed ground water codes have been rejected by four sessions of the Montana Legislative Assembly, (1951, 1953, 1955, 1959) and proposed improvements of existing surface water laws have also failed to be enacted. The formulation and presentation of a workable ground water code, designed to protect and conserve Montana's ground water resources, to the next Legislature are essential if Montana is to avoid the problems that plague some of our sister states.

A ground water code must be based on full consideration of the intimate relation of

ground water and surface water. A central filing office where all filings, well logs, and other records (past, present, and future) for all water in use—ground or surface—should be provided for by any water code. Accurate records concerning water rights and amount of water available are essential in the administration and investigation of water resources. The availability of these records in a central office under the control of a responsible State agency will surely provide a stronger and more accurate basis for the negotiation of interstate water compacts, as well as set up a means for rapid evaluation of data for in-State litigation.

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 of land ownership. 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 as follows: From the files of the county courthouse the data required includes; land ownership, water right records (decrees and appropriations), articles of incorporation of ditch companies and any other legal papers in regard to the distribution and use of water. Deed records of land ownership 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 of the reports. 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 the means of aerial projection. From the base map color separation maps are made and may include three to ten over-lay separation plates, depending on the number of irrigation systems within the township.

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

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

WATER RESOURCES SURVEY

FALLON COUNTY, MONTANA

PART I

HISTORY OF LAND AND WATER USE
ON IRRIGATED AREAS

Published By
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1960

HISTORY AND ORGANIZATION

Fallon County was once a part of Custer County when Montana became a state on September 8, 1889. During the early history of the area of what is now Fallon County, Miles City was the county seat. On December 9, 1913, Fallon became a county in Montana by a special act of the state legislature and Ekalaka named the county seat. In 1914, an election was held to determine the permanent location of the county seat, and as a result Fallon County's head of government was moved to Baker. Another change took place in 1917, when a large portion of the southern part was separated from Fallon County and organized into Carter County.

The present boundaries of Fallon County are; Wibaux and Prairie Counties on the North, Custer on the West, Carter on the South, and the States of North and South Dakota on the East.

Agriculture today as in the early days, is the most predominate and stable source of income for the residents of Fallon County. For more recent developments in the county see the Economic Mineral Deposits of this report.

The livestock industry has, since its induction in Fallon County in 1880, played an important role in the economic development of the county.

Until 1880, the vast plains of Eastern Montana belonged to the buffalo, with 2,650 of these animals killed in the area by David Harrison Russell and his partner Isaac Downing as late as 1881 and 1882. These were but a remnant of the vast buffalo herds that roamed the plains and in a few years were extinct, with large herds of Texas Cattle taking their place on the range. The Texas Cattle could be bought cheap and by trailing them to the northern ranges to feed for a season or two, would make better beef and bring their owners a good profit.

It was in the years of 1880 to 1890, that the Texas Cattle were run on the northern ranges on such a large scale that the stockmen were known as "cattle kings." The ranches were far apart and their operations covered large areas. Many of these cattle outfits had more than 30,000 head running over a range as large as some of our Eastern states.

In what is now Fallon County, in the year 1888 only one large cattle outfit had its headquarters here, that was the Standard Cattle Company whose headquarters were on Little Beaver Creek, 17 miles south and east of Baker, Montana. The Standard Cattle Company had been running cattle around Moorcroft, Wyoming and Belle Fourche, South Dakota before coming here. Mr. John Porter trailed the first herd from Belle Fourche to Beaver Creek in 1888, and became the first foreman of the new ranch. The ranch at its peak of operations had 20,000 head of cattle on the range branded 101, the brand name of the Standard Cattle Company.

There were many other large ranches which formed a circle around the 101, to the South was the Mill Iron and the Hash Knife Ranches. These ranches were located here a few years before the 101. To the South and East in South Dakota, was the L S Ranch owned

by Edward Lemmon. In North Dakota and near where the city of Marmarth is now located, was the OX Ranch owned by Towers and Gudgell. The OX Ranch had about 25,000 head of cattle and they would sometimes brand as many as 5,000 calves in the spring of the year. Near Medora, North Dakota, and northeast of the 101 Ranch, were the Maltese Cross and Elk Horn Ranches owned by Theodore Roosevelt. West of the Roosevelt Ranches and near the Montana line was the 777 Ranch, which is one of the largest, having 30,000 to 40,000 head.

The large cattle companies which had operated here from the early 1880's until 1905, finally sold out because smaller ranches were becoming more numerous and made it difficult for the larger outfits to operate. Most of the smaller ranchers got their start by working for the large cattle companies, saving their earnings and buying a few head of stock whenever they could, and in that way gained considerable experience in livestock operations. Many of them started before the land was surveyed and squatted on the land they wanted for their operation and headquarters. The larger cattle companies had no hay for winter feeding, while the smaller cattle ranches put up hay to carry over their stock during the winter months without severe losses.

When the Standard Cattle Company sold out, E. A. Mulkey became owner and continued to operate with the same brand. Mr. Mulkey had about 3,000 head of cattle and had worked for the Standard Cattle Company for several years, and by saving his money he was able to start ranching for himself.

Besides E. A. Mulkey, some of the other more prominent ranchers and pioneer stockmen in Fallon County were; Charles Clark, Peter Duhamel, Richard Morris, Fred Hasty, William Fulton, Charles G. Vincelette, Nels Rasmussen, Lewellyn Price, John Caldwell, Charles Nofsker, and Oden Myhre.

Fallon County has gradually developed from a strictly livestock operation (1880-1900) to a diversified type of agriculture, (1959) with livestock and grain crops being the main production.

There are now 324 farms in the county which average 3,225 acres in size. Nearly all of the farm operators have a few dairy cattle, swine, and poultry, the produce of which is practically all consumed in the county.

Dry-land grain farming is carried on in nearly all parts of the county, with the largest percentage done in the Eastern half. Wheat, both spring and winter, is the primary cash grain crop. The 86,000 acres of wheat is divided about equally between the two classes, with winter wheat averaging 16 bushels per acre and spring wheat averaging 12 bushels per acre. Nearly all of the grain is planted on summer fallow land. This county has a reputation of growing high protein wheat, which commands a premium price nearly every year. Barley, the second largest grain crop, corn, and oats are produced on nearly all farms and are used as a feed base. Most farm operators have sufficient dry-land hay to meet their requirements.

The income from livestock and grain crops is about equal in the county. Cattle and sheep produce 95 per cent of the income from livestock with the revenues from the sale

of livestock exceeding 1¼ million dollars annually. Assessors' records show there are approximately 23,000 cattle and 6,000 sheep in the county. The sheep are raised mostly in farm flocks with only one range operator who has over 1,300 head of sheep. The average herd of cattle is 75-80 head, considerably less than the large cattle herds of the 1880 to 1890 period. However, there are a few operators who have herds of 500 to 1,000 head.

The town of importance in Fallon County is Baker, the county seat, which was named after the Superintendent of Construction for the Chicago, Milwaukee, St. Paul & Pacific Railroad that passes through the town. Baker is also noted for its natural gas wells that are located in all directions from the town itself. The huge gas anticline furnishes gas for many towns and cities in Montana, North and South Dakota. Plevna is the only other town of any size in the county. It is noted for its sparkling water supply furnished to the town's people from a well that was drilled to a depth of almost 1,000 feet. Other small rural communities in the county are; Westmore, Willard, Knobs, McKenzie, Webster, and Ollie.

Transportation facilities within the county are adequate for its present needs. The Chicago, Milwaukee, St. Paul & Pacific Railroad enters the county from the East, passing through the towns of Baker and Plevna in the central part. Ollie, a small rural community in the extreme northeastern corner of the county is served by a branch line of the Northern Pacific Railway, which branches off its main line at Beach, North Dakota. Highway transportation is provided by U. S. Highway No. 12 which begins at Miles City and crosses the central part of the county, passing through the towns of Plevna and Baker then continues on East into North Dakota. The only other improved paved road is State Highway No. 7, which starts at Baker and follows a southwesterly direction, terminating at Ekalaka in Carter County. The county maintains a fairly good system of improved gravel and graded roads to all the outlying rural areas. Bus travel is available at points along U. S. Highway No. 12 and numerous trucking firms handle shipments of freight along the same route.

CLIMATE

With its eastern edge forming part of Montana's Dakota Boundary, Fallon is one of the State's Southeastern counties. It is usually considered to be one of Montana's "plains" counties, even though parts are quite hilly. Elevations range from around 4,000 ft. above sea level on some of the higher hills to a little less than 2,600 ft. where the area's principal drainages leave the county. As is the case with most counties that lie south of the Yellowstone River in this area, the principal drainages flow generally northward. None of these drainages are particularly large, and the main streams are O'Fallon Creek, flowing northward through the western part of the county; Little Beaver Creek, draining most of the southeast corner; and Pennel, Cabin and Beaver Creeks in the northern half.

Lacking any of the rugged topography and large elevation differences that feature Montana's mountainous areas, orographic effects on climate are relatively small. Variations in temperature and rainfall across the county are not large, but they exist, and are economically important to the area. Even here the hilly areas usually receive more precipitation year after year than the lower elevation areas, and on clear, windless nights valley bottoms or flat areas can and do become several degrees colder than hillside areas.

The climate is decidedly Continental, with cold, dry winters, and quite warm summers. Between 65 and 75 per cent of a normal year's precipitation falls during the April 1-

September 30 season, permitting a rather extensive "dry-land" agriculture even though annual totals are those usually producing a "semi-arid" classification. Summertime afternoons sometimes are quite hot, particularly in the lower elevation northern section of the county, with maximums reaching 100° or a little warmer in these hotter areas on a few days near midsummer almost every year. On the other hand, 100-degree temperatures are seldom noted in areas lying above 3,000 ft. elevation. Summer heat is seldom oppressive, however, because nighttime minimums generally run below 60°. At Plevna, the only point in the county where temperature records have been kept for many years, July maximums average about 87°, but minimums average a pleasantly cool 57°—both about 2-3° cooler than along the Yellowstone Valley bottom to the northwest.

Winters generally have several spells of cold weather, and several subzero occurrences are noted every year December-March. January average temperature at Plevna is 14.5° (Maximum 26.5°, Minimum 2.5°). Severe winter storms are unusual, however, because snowfall in the county is light, running 30 to 40 inches a year at Plevna.

Dry years can and do occur (see table), but precipitation averages from 11.2 inches in the driest areas to nearly 14 inches a year in the wetter sections. Heavy rainstorms are not common, but wet months (5.15 inch at Baker in June, 1941; 6.51 at Plevna in June, 1947) are not unusual. Records of cloudiness and sunshine for the county are not available, but there is much sunny weather throughout the year, except for the usual rainy period from mid-May to July each year. Summer mornings generally are clear, but afternoon cloudiness, sometimes with thunderstorms, is common. Severe weather of several types can occur, but only rarely. Tornadoes have been observed, but only at the rate of one every 10 to 15 years. Thunderstorms occasionally produce damaging hail and lightning, but really severe thunderstorms occur less than once a year, and usually affect only small areas. Windy weather is fairly common, but damaging speeds are unusual. Blizzard conditions occur for short periods a time or two each winter, but severe blizzards are uncommon, occurring on the order of about once every five or ten years. Listed below is a limited tabulation of weather data observed in Fallon County over the years:

FALLON COUNTY WEATHER DATA

Station	Years of Record	Average Annual Temperature	Highest	Lowest	Years of Record	Average Annual Precipitation	Wettest Year	Driest Year
Plevna	46[2]	43.2[1]	111	—52	46[2]	13.39[1]	22.61 (1941)	6.67 (1952)
Baker	---	-----	-----	---	34[3]	13.31[1]	24.35 (1927)	7.72 (1952)
Knobs	---	-----	-----	---	7[4]	11.57	16.88 (1953)	6.47 (1952)
Mac Kenzie	---	-----	-----	---	8[5]	11.21	17.48 (1953)	4.60 (1952)
Ismay (Custer County)	---	-----	-----	---	19[6]	13.76	19.04 (1941)	6.36 (1952)

[1]1931-1955 [2]1913-1958 [3]1925-1958 [4]1952-1958 [5]1951-1958 [6]1940-1958

SOILS

Fallon County lies in the Great Plains portion of Eastern Montana. The County is drained by O'Fallon Creek and Cabin Creek, tributaries of the Yellowstone River, and Beaver Creek, a tributary of the Little Missouri River. Physiographically the County consists of eroded shale plains with a few sandstone buttes and remnants of old alluvial deposits which occur as gravel capped table lands. Alluvial soils occur as relatively narrow bands along streams.

Factors influencing soil formation are less varied than in many sections of Montana, therefore there are relatively few kinds of soils. Clay loams, loams, and sandy textures predominate but some clay soils are found. Soils are intermediate in character between Brown and Chestnut Zonal soils.

The greatest acreage is suited primarily for range use. Between 15 and 20 percent of the County has soils that are moderately well suited for dry farming. Because of low rainfall crop yeilds are low and crop failure hazards are moderately high. A relatively high percentage of alluvial soils are used for cultivation and most of these are well suited for both dry farming and irrigated agriculture.

SOURCES OF WATER SUPPLY

(See page 14 of Part I of the Carter County report.)

STREAM GAGING STATIONS

(See page 15 of Part I of the Carter County report.)

ECONOMIC MINERAL DEPOSITS

The dominant geological feature of Fallon County is the Cedar Creek anticline. This great upfold or arch is an elongate feature extending from the Dakota line southeast of Baker northwestward past Glendive. Fallon County bedrock is all of the "soft" or sedimentary type, with the Fort Union formation being the most recent and the Pierre shale, in the center of the anticline, being the oldest at the surface.

Fallon County has no lode (hard rock) metallic mineral deposits, but is presently Montana's greatest producer of petroleum. Lignite coal occurs in the Fort Union formation, and trace amounts of uranium salts are associated with some of the lignite. Ground water is a mineral resource of great, but little considered, importance. Sand, gravel, and aggregate materials are scarce.

Oil and Gas

Fallon County leads the State in oil production and is exceeded only by Glacier and Toole Counties in the production of natural gas. The several oil and gas fields (not including the Fallon County portion of the Pine unit field, described in Wibaux County) extend

along the Cedar Creek anticline from the Wibaux County line to the Dakota border southeast of Baker.[1]

Cabin Creek Oil and Gas Field.—Discovery well drilled by Shell Oil Company in sec. 33, T. 10 N., R. 58 E., completed June 1953.

Production[2]

Oil	1959	4,347,532 bbls.
Total through	1959	14,927,000 bbls.
Gas	1959	970,766 million cu. ft.
	1958	789,456 million cu. ft.

Wills Creek Oil Field.—A small non-unitized extension of the Cabin Creek unit, discovered by Shell in 1957.

Production

Oil	1959	355,524 bbls.
Total through	1959	594,000 bbls.

Monarch Oil field.—Discovery by Shell in sec. 23, T. 9 N., R. 58 E., completed December 1958.

Production

Oil	1959	110,287 bbls.
Total through	1959	117,000 bbls.

Cupton Oil Field.—Discovery well by Rothschild in sec. 15, T. 9 N., R. 59 E., completed August 1955.

Production

Oil	1959	13,073 bbls.
Total through	1959	99,000 bbls.

Cedar Creek Gas Field.—Discovery well by Eastern Montana Oil and Gas in sec. 20, T. 14 N., R. 55 E., completed December 1912. Also known as Baker-Glendive gas field, the field extends from Dakota border north through Wibaux County. Production is from Judith River and Eagle horizons of Pierre shale. Most of the oil fields along the Cedar Creek anticline are below the gas field and produce from much deeper horizons.

Production

Gas	1959	5,058,820 million cu. ft.
	1958	5,387,597 million cu. ft.

1. Description and history of the Cedar Creek anticline and related oil and gas fields is presented in "Oil and Gas in Montana," Montana Bureau of Mines and Geology Bulletin No. 15 (In press.)

2. Production figures from Annual Review of Montana Oil and Gas Commission.

Pennel Oil Field.—Discovery well by Shell in sec. 36, T. 8 N., R. 59 E., completed October 1955.

Production		
Oil	1959	519,016 bbls.
Total through	1959	2,233,000 bbls.

Fertile Prairie Oil Field.—Discovery well by Mon-O-Co in sec. 18, T. 7 N., R. 61 E., completed November 1954.

Production		
Oil	1959	5,689 bbls.
Total through	1959	128,000 bbls.

Plevna Gas Field.—Discovery well by F. H. Baker in sec. 28, T. 5 N., R. 60 E., completed January 1956.

Production		
Gas	1959	211,657 million cu. ft.
	1958	216,589 million cu. ft.

Little Beaver Oil Field.—Discovery well by Shell in sec. 13, T. 4 N., R. 61 E., completed July 1952.

Production		
Oil	1959	180,163 bbls.
Total through	1959	1,068,000 bbls.

East Little Beaver Oil Field.—Discovery well by Montana-Dakota Utilities Company in sec. 17, T. 4 N., R. 62 E., completed August 1936.

Production		
Oil	1959	98,856 bbls.
Total through	1959	261,000 bbls.

Large reserves of oil and gas are present in Fallon County. Production should continue for many years. The extraction of the maximum amount of oil and gas constitutes a technological problem of great importance to the petroleum industry. Secondary recovery methods aimed at increasing the ultimate recovery are presently (1960) being tested in the Cabin Creek unit. The reader is referred to the reports of the Montana Oil and Gas Commission for further details of production and reserves.

Coal

Lignite coal seams occur in the Fort Union formation. Old (1910) U. S. Geological Survey reports indicate that 11 to 13 seams of lignite ranging in thickness from a few inches to about 7 feet are present in the Fort Union formation of Fallon County.

Outcrops of 3-to 5-foot seams may be found in the vicinity of Plevna, north of Calumet, and along the valley of O'Fallon Creek.

Lignite reserves in Fallon County have been listed by the U. S. Geological Survey as being upwards of 2½ billion tons. However, the lignite is sub-commercial at this time (also, see remarks pertaining to lignite value in Carter County section).

Ground Water

Ground water produced from the Fort Union and Hell Creek formations and the Fox Hills sandstone is of great importance for domestic and stock use in Fallon County. The petroleum industry, also, makes use of good quality ground water for industrial applications.

An extensive artesian basin formed by the Ekalaka syncline is present along O'Fallon Creek, and many artesian wells have been drilled in this area. The possibility of over use and the wasting of ground water from the artesian aquifers in the Fort Union, Hell Creek, and Fox Hills formation constitutes conservation problems for the future.

Sand, Gravel, Aggregate, and Road Metal

Fallon County is poor in the basic sand and gravel construction materials. Only one source of high grade sand and gravel in the County is designated on the 1938 edition of the Montana Sand and Gravel Map (U. S. Geological Survey). The location is north of Webster in secs. 1 and 2, T 4 N., R. 59 E. However, it is not unlikely that small deposits occur along the courses of Little Beaver, O'Fallon, and Sandstone Creeks.

Good aggregate and road metal material could be washed from weathered deposits of the scoria (clinker) formed by the natural burning of lignite seams.

LITTLE BEAVER SOIL CONSERVATION DISTRICT

The Little Beaver Soil Conservation District was originally organized in 1942 in Fallon and Carter Counties. It included all of the drainage area of the Little Beaver Creek. It also included the portion of Fallon County south of the aforementioned area. The total area of the original district was 425,417 acres, of which 274,466 acres were in Fallon County and 150,951 acres in Carter County.

District boundaries have been changed several times so that now the Little Beaver SCD coincides with the Fallon County lines. The acreage of Fallon County is approximately 1,045,120 acres and the number of operating units is about 360.

The production of livestock is the main enterprise in this district, as about three-fourths of its acres are in native rangeland or tame dryland pastures. Winter feed for livestock has been one of the primary problems in this district. Progress toward alleviating this need has been good in the time the district has been operating. Water spreading on level lands and seeding down of lands to dryland hay mixtures has helped greatly. Many operators produce corn in rotation with wheat for late fall grazing and silage production. Grain hays such as oats are also important. Much use is being made of commercially prepared livestock pellets (cake), particularly for use in the fall of the year until a complete winter feeding program is in effect. A shortage of summer range is the main problem of most units and generally

it will regulate the number of stock a man can handle year in and year out. As a result of having a generally sufficient winter feed base, operators have a tendency to overgraze summer range. This situation is true in too many cases and is a real conservation objective in all of the district's activities.

At this time the Little Beaver SCD has about 950,000 acres of land considered as agricultural lands. The balance of the area in the district is primarily government lands. There are at present 203 co-operators within the Little Beaver SCD.

Since the district was organized in 1942 the following amounts of the more important conservation practices have been applied to the land: Contour stripcropping (6,360 ac.), straight stripcropping (142,219 ac.), grass seeding (42,343 ac.), brush control (3,448 ac.), shelterbelt tree plantings (762 ac.), diversion dams (89), irrigation reservoirs (39), stockwater ponds (871), spring developments (102), waterspreading (4,922 ac.), and stockwater wells (307).

About one-fifth of the county land is devoted to annual crops, or about 230,000 acres. The county wheat acres remain fairly constant at 85,000 acres, and the production is the hard variety of red spring and winter wheat. Nearrly all wheat planted is on summerfallowed land.

Fallon County in 1958, was one of the first five counties in Montana to be designated by the Secretary of Agriculture for participation in the Great Plains Conservation Program. Since that time, work has progressed at a very satisfactory rate as evidenced by the following: Twenty-one conservation plans and resulting contracts have been developed to aid farmers and ranchers to apply all of the needed conservation practices to their units. This means to the operator that he will receive over a designated period of time, cost-sharing on the needed practices. The length of the contracts will run from three to ten years depending upon the operator's ability to get the job done. Also there are nineteen more applications on hand for assistance. These contracts and applications cover approximately 290,000 acres of Fallon County.

About 208,000 acres of cropland and potential cropland have been soil surveyed and there are about 224,000 acres of rangelands upon which range site and condition surveys have been made as a technical service of the Soil Conservation Service through the Little Beaver SCD. This type of technical service, plus engineering and water type surveys, geologic assistance and help in the fields of agronomy, range management, biology, plant materials and woodland, are all made available to farmers and ranchers co-operating with their local soil conservation district, and furnished by the Soil Conservation Service.

The co-operator actually develops his own conservation plan from the above information furnished to him with the assistance of a planning technician. When the operator is furnished this information, he then knows what he has to work with, by actually receiving a resource inventory of his farm. From this, he can logically and economically plan to apply the needed conservation practices to his land to stabilize his operation and conserve the land resources for future generations.

FISH AND GAME

Fallon County is located in an area where water is at a premium. Most streams go dry in the summer months running water only in the spring. Some warm water fishing is provided through the storage waters in farm ponds which vary in size from one to fifty acres. These ponds are important to other forms of wildlife such as ducks and antelope as they often provide the only water in an otherwise dry area. Warm water fish for these ponds are provided by the U. S. Fish Cultural Station at Miles City.

Antelope, mule deer, sage and sharptail grouse can be found in nearly every part of the county in varying densities. Fur bearers, such as muskrat and mink, although occurring in the county, are not numerous. Beaver, common on the larger water courses, are actively pursued by licensed trappers each year. As is the case with most southeastern Montana counties, a great variety of song birds, hawks, and rodents also occur here. Coyotes and bobcats are still to be found in this county although less numerous in those areas where a conflict exists with producers of livestock.

IRRIGATION SUMMARY OF FALLON COUNTY BY RIVER BASINS

	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
MISSOURI RIVER BASIN			
***Yellowstone River**	0	0	0
O'Fallon Creek	249.00	0	249.00
Unnamed Creek	214.00	0	214.00
Lone Tree Creek	29.00	0	29.00
Milk Creek	0	0	0
Unnamed Stream	134.00	0	134.00
South Fork Milk Creek	0	0	0
Unnamed Stream	29.00	0	29.00
Unnamed Stream	312.00	0	312.00
Lame Jones Creek	0	0	0
Unnamed Stream	87.00	0	87.00
Hay Creek	0	0	0
Unnamed Stream	36.00	0	36.00
Scroggin Creek	118.00	0	118.00
Hay Creek	211.00	0	211.00
Cottonwood Creek	161.00	0	161.00
South Fork Cottonwood Creek	63.00	0	63.00
Unnamed Stream	39.00	0	39.00
North Fork Cottonwood Creek	119.00	0	119.00
Unnamed Stream	62.00	0	62.00
Sandstone Creek	45.00	35.00	80.00
Red Butte Creek	280.00	0	280.00
Pennell Creek	117.00	0	117.00
Cabin Creek	0	0	0
Horse Creek	137.00	12.00	149.00
Total Yellowstone River and Tributaries	**2,442.00**	**47.00**	**2,489.00**
Little Missouri River	0	0	0
Box Elder Creek	64.00	0	64.00
Unnamed Tributary Box Elder Creek	42.00	0	42.00
Coal Bank Creek	0	0	0
South Fork Coal Bank Creek	108.00	0	108.00
Runoff	41.00	0	41.00
Little Beaver Creek	75.00	0	75.00
Dry Creek or Unnamed Fork Little Beaver Creek	64.00	0	64.00
Chimney Creek	41.00	0	41.00
Total Little Missouri River and Tributaries	**435.00**	**0**	**435.00**
Total Irrigation in Fallon County (Yellowstone and Little Missouri River Basins)	**2,877.00**	**47.00**	**2,924.00**

*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 — FALLON COUNTY

STREAM	Total No. of Filings	APPROPRIATIONS (Filings of Record) Total Miner's Inches	Total Cu. Ft. Per Sec.
MISSOURI RIVER BASIN			
***Yellowstone River**	0	0	0
O'Fallon Creek	8	28,900	722.50
Spring Creek	1	1,000	25.00
Unnamed Coulees	3	360	9.00
Lone Tree Creek	1	All	All
Milk Creek	2	700	17.50
South Fork Milk Creek	0	0	0
Dry Creek	1	500	12.50
Ash Creek	0	0	0
MacKenzie Creek	1	500	12.50
Unnamed Stream	1	1,000	25.00
Miles City Creek	1	2,000	50.00
Lame Jones Creek	6	4,400	110.00
Sparks Creek	1	500	12.50
Deep (Ash) Creek	7	2,100	52.50
Cripple Creek	2	700	17.50
Mail Box Creek	1	500	12.50
Hay Creek	1	800	20.00
T. G. Creek	1	0	0
Scroggin Creek	1	960	24.00
Hay Creek	2	2,521.33	63.04
Cottonwood Creek	5	6,500	162.50
Sandstone Creek	18	25,850	646.25
Dry Water Course	1	1,000	25.00
Bone Pile Creek	2	5,800	145.00
Red Butte Creek	3	10,240	256.00
Hay Creek	2	3,200	80.00
Timber Creek	2	1,000	25.00
Dead Jones Creek	1	40	1.00
South Fork Sandstone Creek	5	5,276	131.90
Pennell Creek	9	5,420	135.50
Unnamed Coulee	1	400	10.00
Station Creek	1	200	5.00
Unnamed Coulee	1	372	9.30
Lawrence Creek	1	500	12.50
North Fork Pennell Creek	1	400	10.00
Dry Creek	2	1,000	25.00

*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 — FALLON COUNTY

STREAM	Total No. of Filings	APPROPRIATIONS (Filings of Record) Total Miner's Inches	Total Cu. Ft. Per Sec.
Dry Coulee	1	600	15.00
Y. V. Draw	1	2,000	50.00
Coulee	1	400	10.00
Cabin Creek	0	0	0
North Fork Cabin Creek	1	1,000	25.00
Gumbo Draw	1	320	8.00
Horse Creek	1	160	4.00
Unnamed Draw	1	100	2.50
Total Yellowstone River and Tributaries	**103**	**119,219.33**	**2,980.49**
Little Missouri River	0	0	0
Box Elder Creek	4	3,700	92.50
Horse Creek	4	0	0
Squabble Creek	1	1,200	30.00
Coal Bank Creek	0	0	0
North Fork Coal Bank Creek	1	200	5.00
Soft Water Draw	1	200	5.00
Unnamed Streams	1	All	All
South Fork Coal Bank Creek	1	500	12.50
Sheep Creek	1	500	12.50
Soda Creek	1	200	5.00
Little Beaver Creek	12	16,283	407.07
Greasewood Creek	0	0	0
Higgins Creek	1	300	7.50
Bone Creek	1	500	12.50
Hay Creek	2	700	17.50
Butte Creek	1	200	5.00
West or Unnamed Fork Hay Creek	2	1,200	30.00
Fletcher Creek	4	2,100	52.50
South Bone Creek	3	3,000	75.00
Unnamed Fork Little Beaver Creek	1	375	9.38
Harris Creek or Draw	2	1,400	35.00
Hamilton Creek	1	200	5.00
Trail Creek	4	2,000	50.00
Unnamed Stream	1	500	12.50
South Fork Trail Creek	2	400	10.00
Coyote Creek	1	All	All
Duck Creek	1	500	12.50
South Fork Duck Creek	1	500	12.50

WATER RIGHT DATA — FALLON COUNTY

STREAM	APPROPRIATIONS (Filings of Record) Total No. of Filings	Total Miner's Inches	Total Cu. Ft. Per Sec.
Geo. Hill Spring	2	400	10.00
Dry Creek or Unnamed			
Fork Little Beaver Creek	4	2,100	52.50
North Fork Dry Creek	1	200	5.00
Carney Creek	1	1,000	25.00
Chimney Creek	5	7,900	197.50
Peterson Creek	1	200	5.00
Unnamed Stream	1	500	12.50
Richards Creek	3	5,000	125.00
Collins and Richards Springs	2	1,000	25.00
Coyote Butte Creek	1	200	5.00
"101" Draw	2	1,200	30.00
Big Flat Draw	2	600	15.00
McLaughlin Creek	1	300	7.50
Mud Creek	1	20	.50
Unnamed Stream	1	10,000	250.00
Hidden Water Creek	2	1,500	37.50
North Fork Hidden Water Creek	2	123,000	3,075.00
Beaver Draw	1	3,000	75.00
Unnamed Fork Hidden Water Creek	1	400	10.00
Unnamed Fork Little Beaver Creek	1	All	All
Porcupine Creek	0	0	0
Unnamed Fork Porcupine Creek	1	120	3.00
Bad Land Creek	1	500	12.50
Coral or Corral Creek	1	100	2.50
Sand Creek	1	All	All
Unnamed Fork Corral Creek	1	All	All
Waterhole Creek	1	240	6.00
Nameless Draw	1	1,000	25.00
Beaver Creek	4	4,100	102.50
East Fork Beaver Creek or Preston,			
or Middle Creek	2	2,000	50.00
Bull Run Creek	2	16,000	400.00
Unnamed Fork Bull Run Creek	1	2,021.33	50.53
Otter Creek	1	All	All
Spring Creek	1	2,000,000	50,000.00
South Fork Spring Creek	1	100	2.50
Total Little Misouri River and Tributaries	**105**	**2,221,359.33**	**55,533.98**
Total Missouri River Basin	**208**	**2,340,578.66**	**58,514.47**

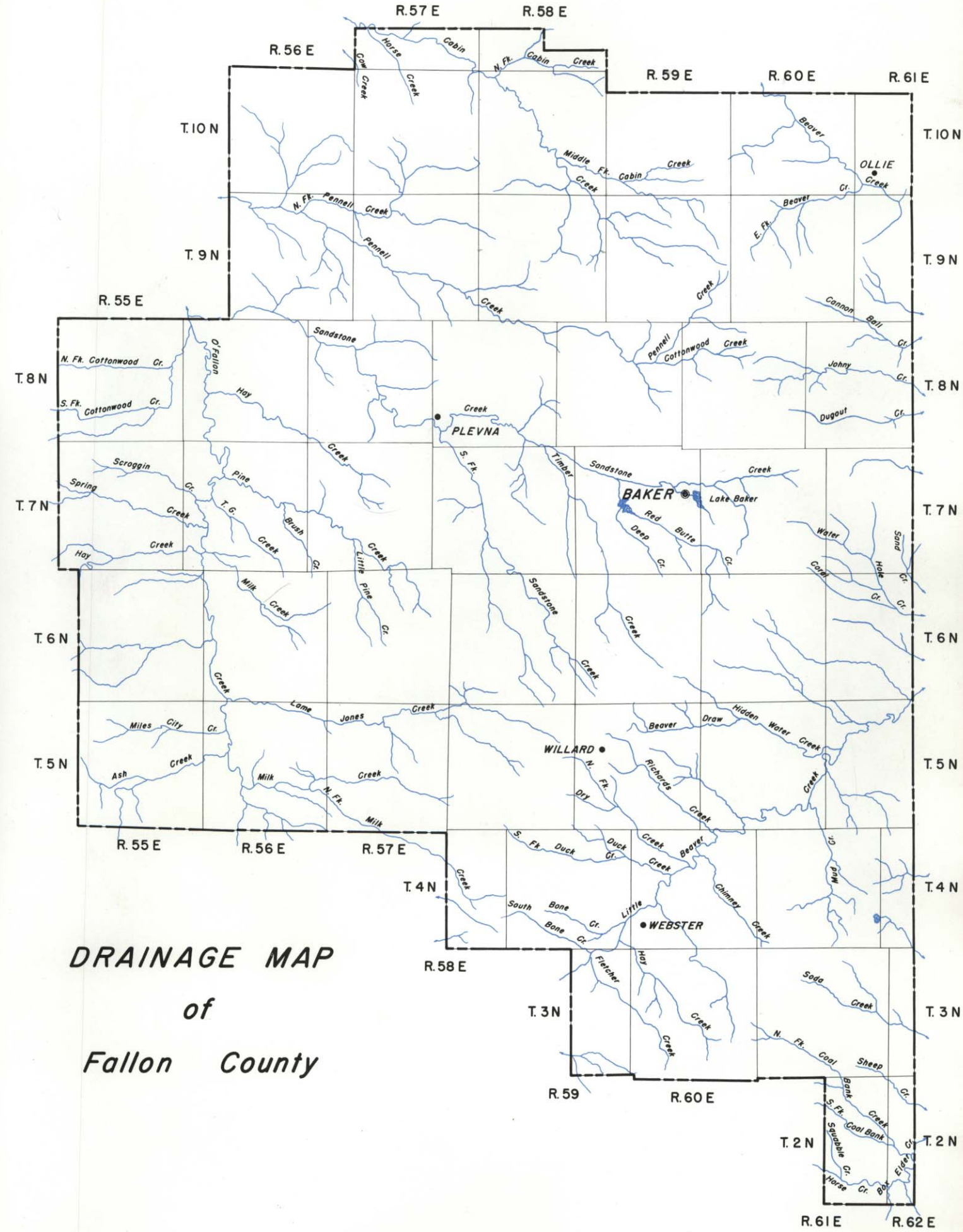
WATER RESOURCES SURVEY

FALLON COUNTY, MONTANA

PART II

MAPS SHOWING IRRIGATED AREAS

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1960



DRAINAGE MAP of Fallon County

MAP INDEX

ALL MAPS HAVE BEEN MADE FROM AERIAL PHOTOGRAPHS

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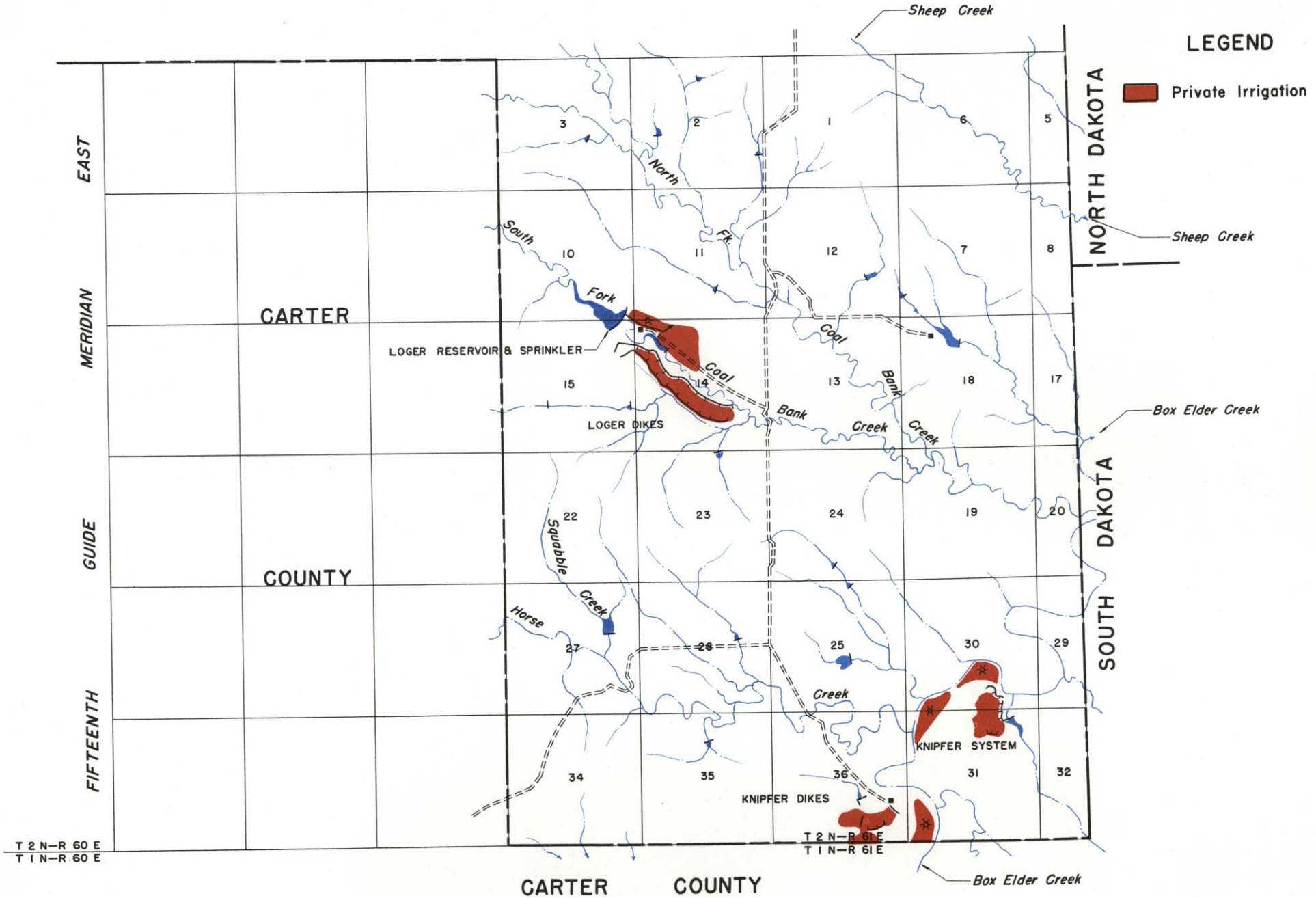

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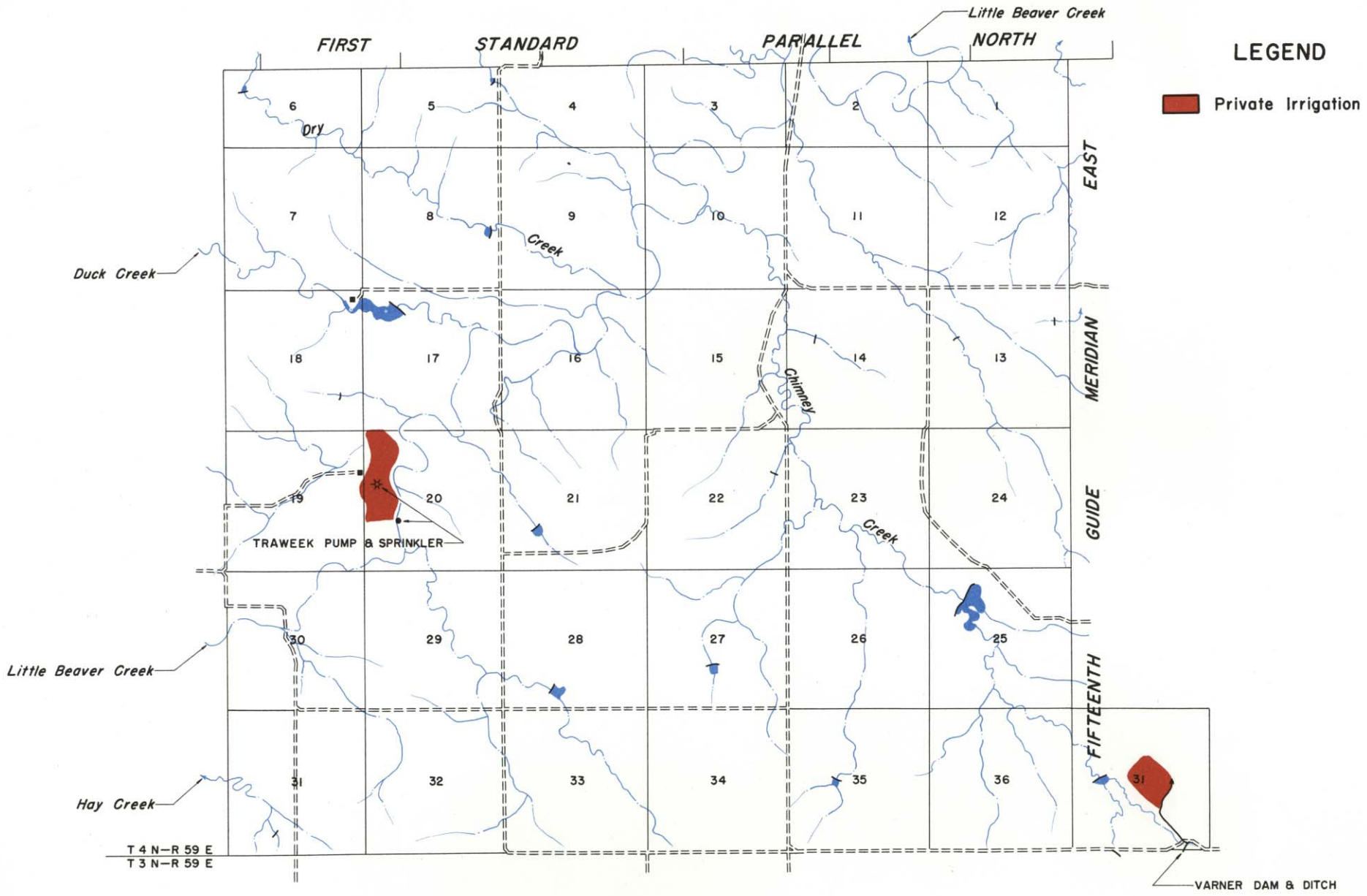

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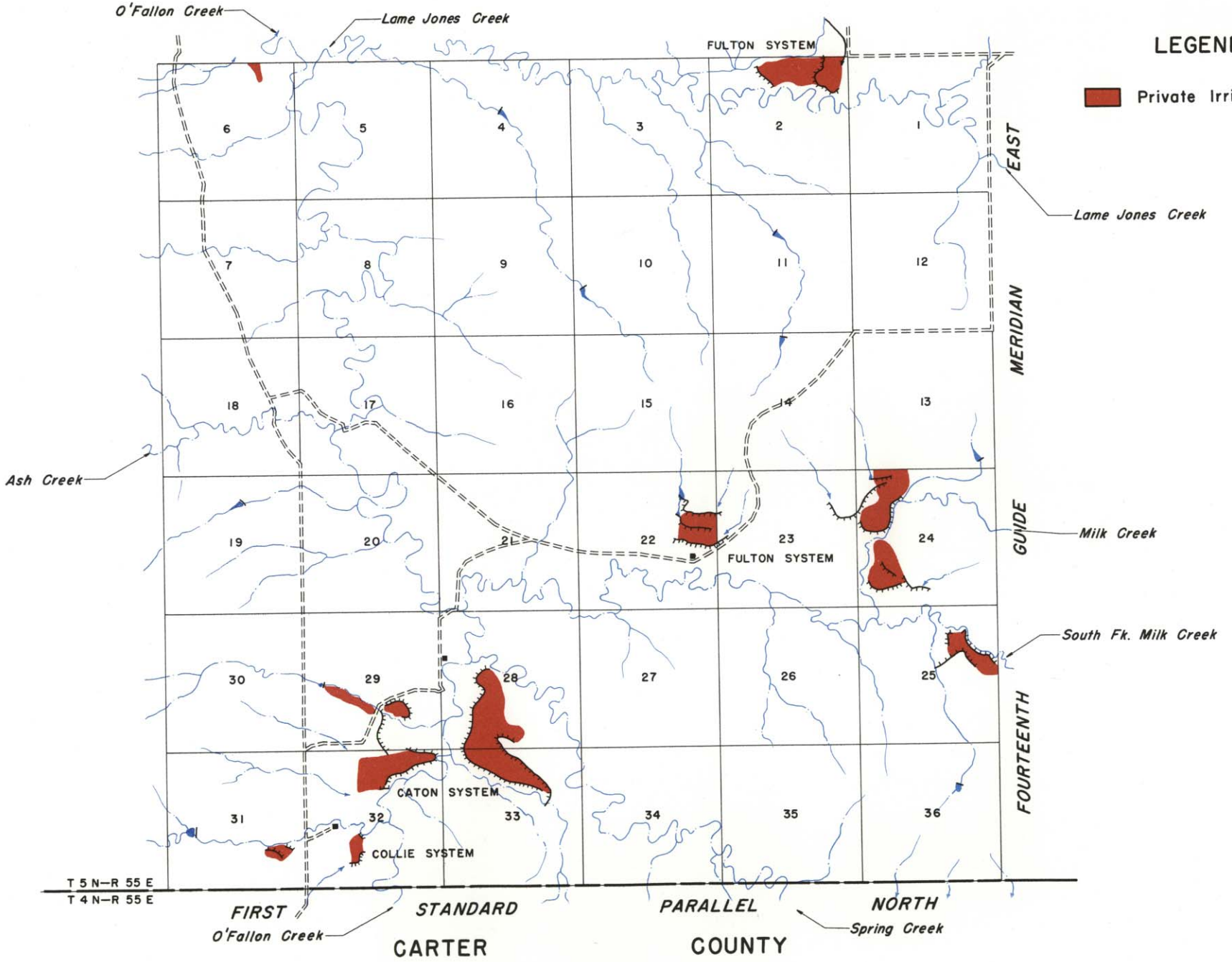

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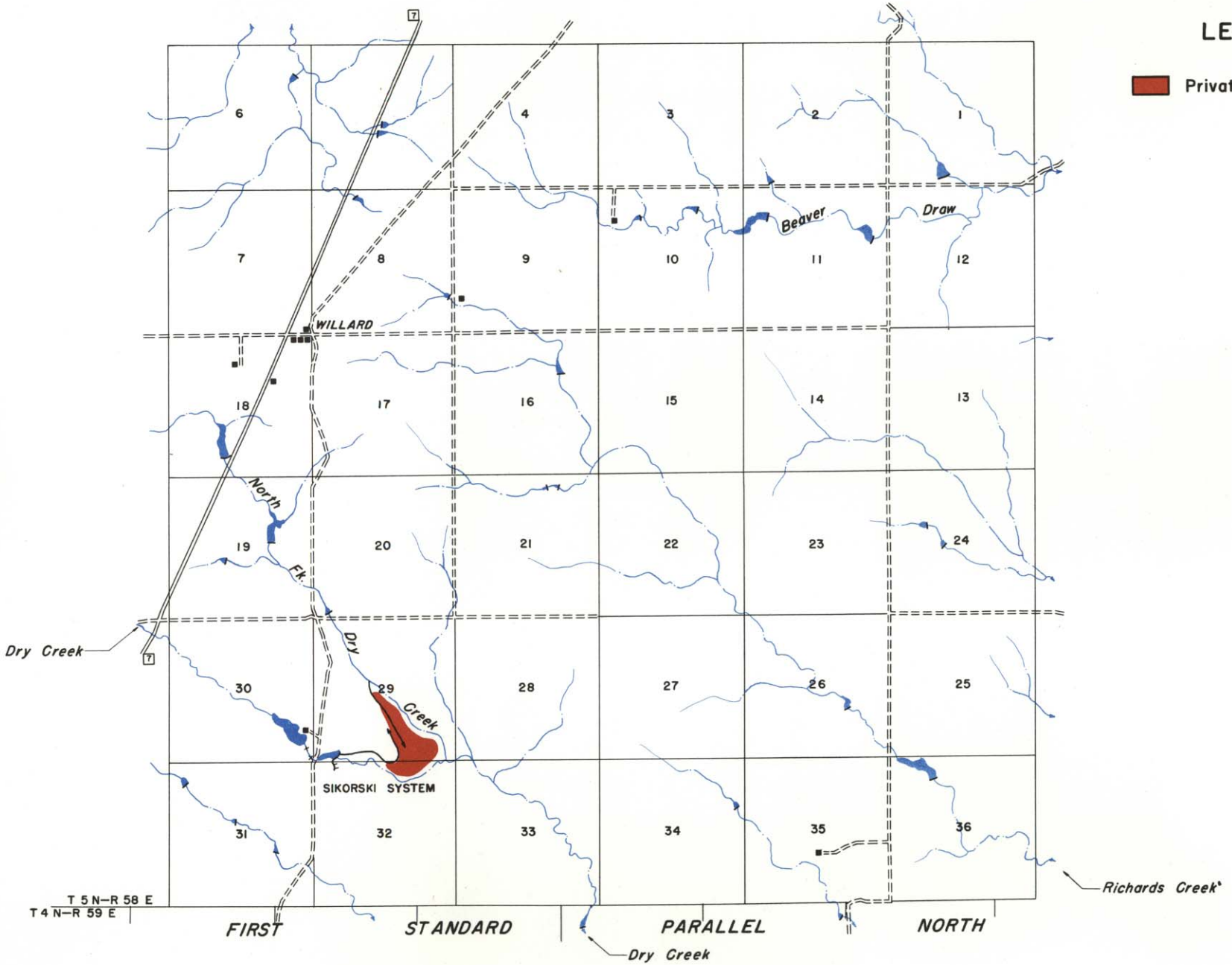

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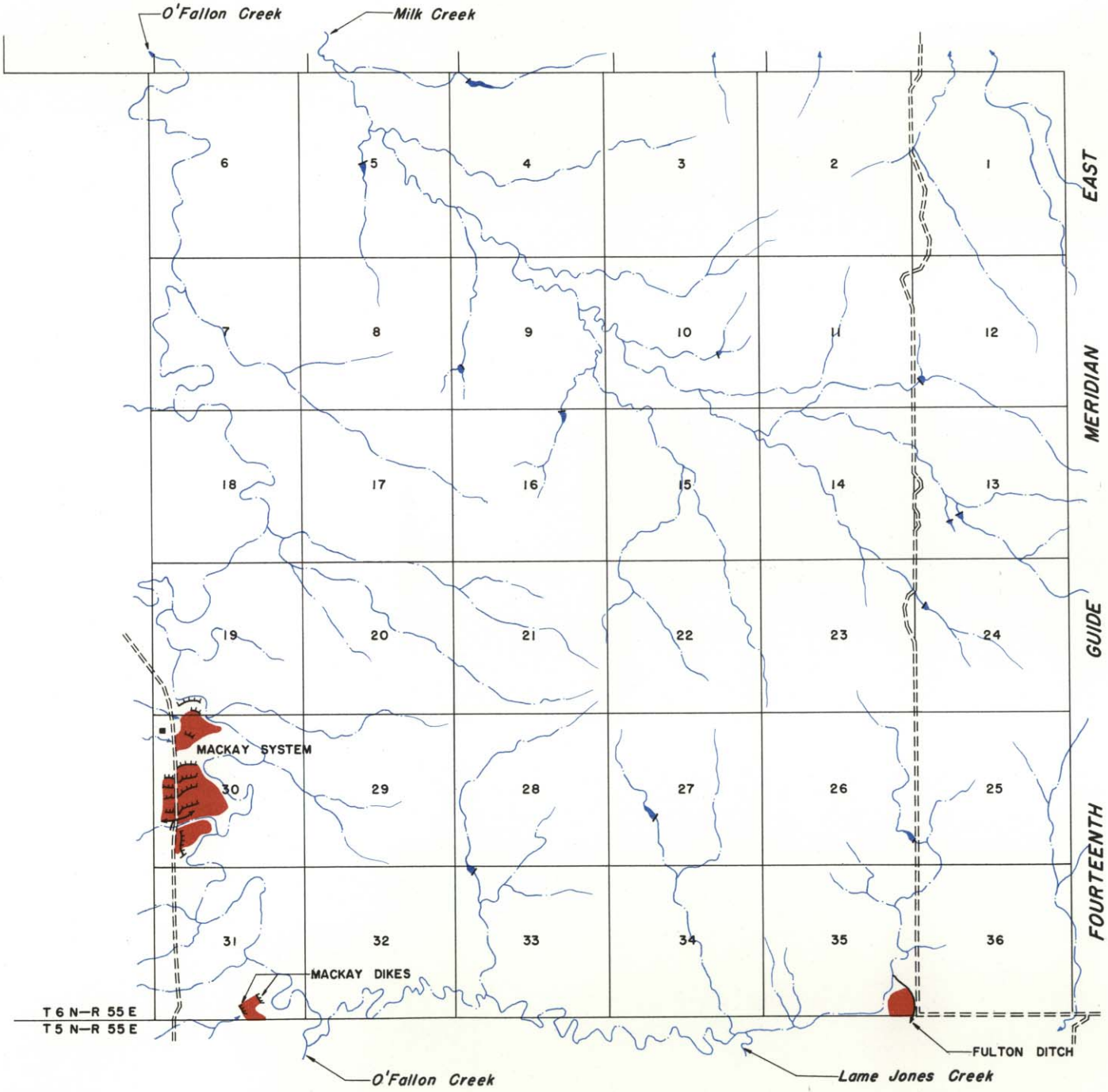

LEGEND

Private Irrigation

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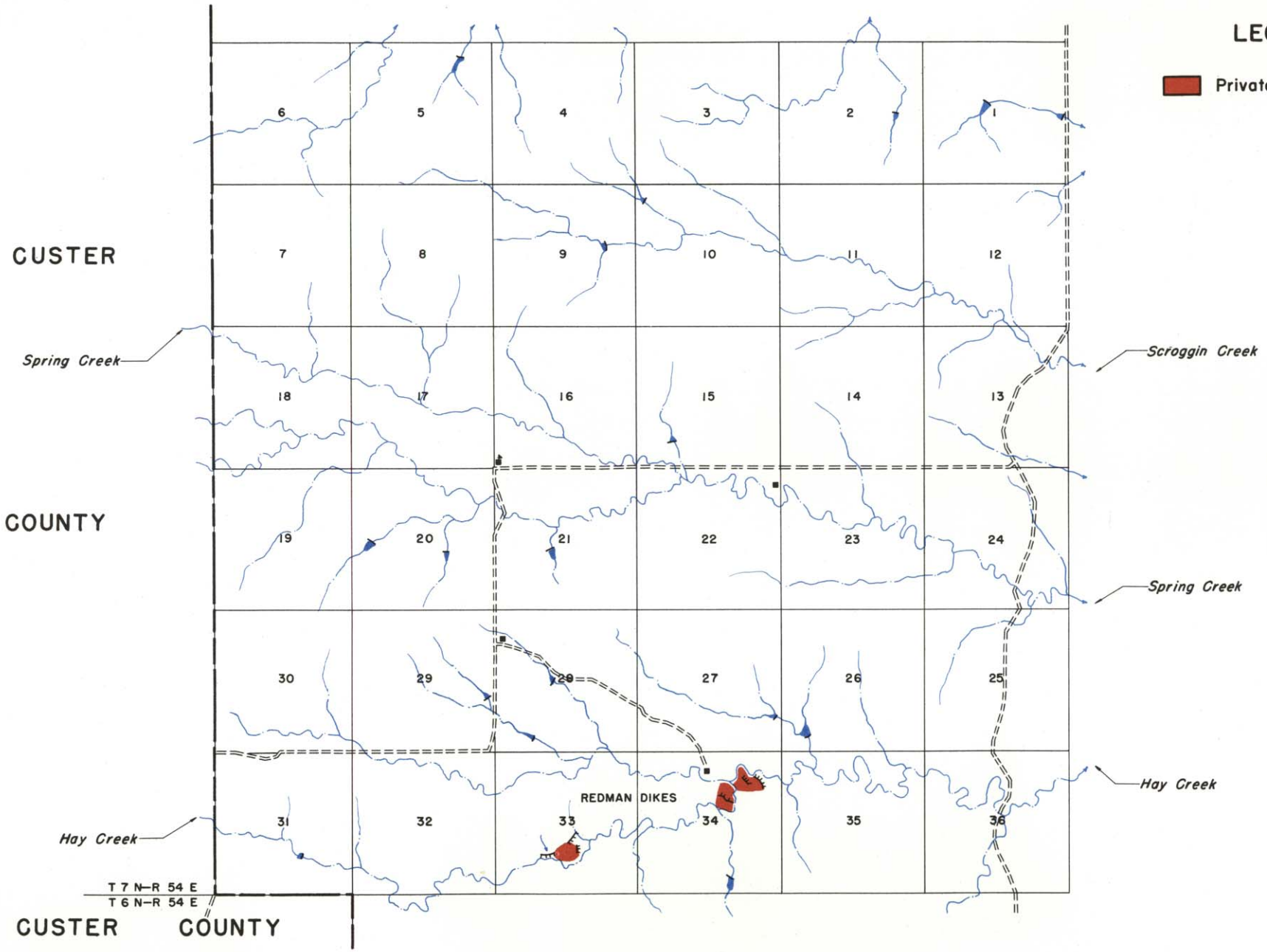

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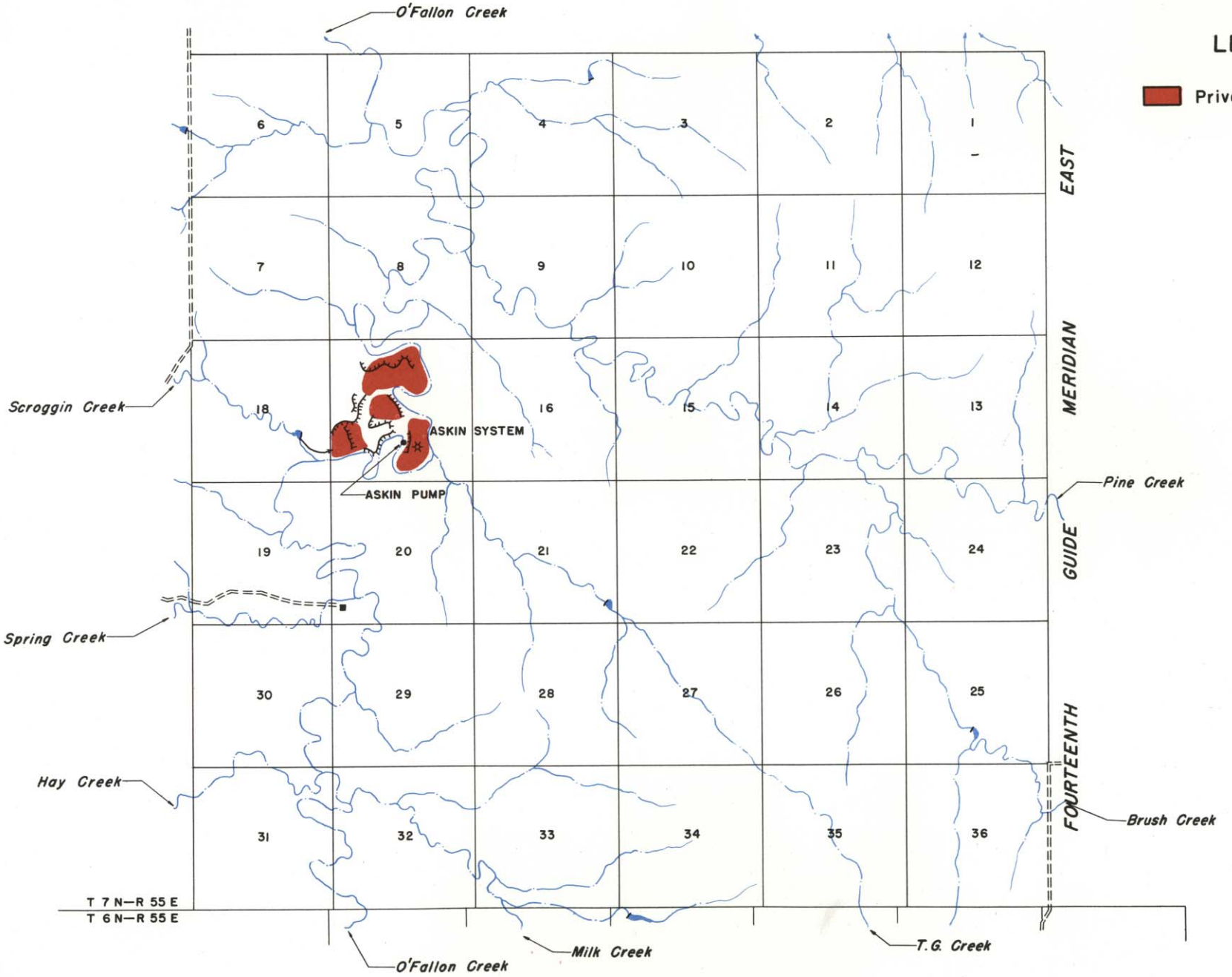

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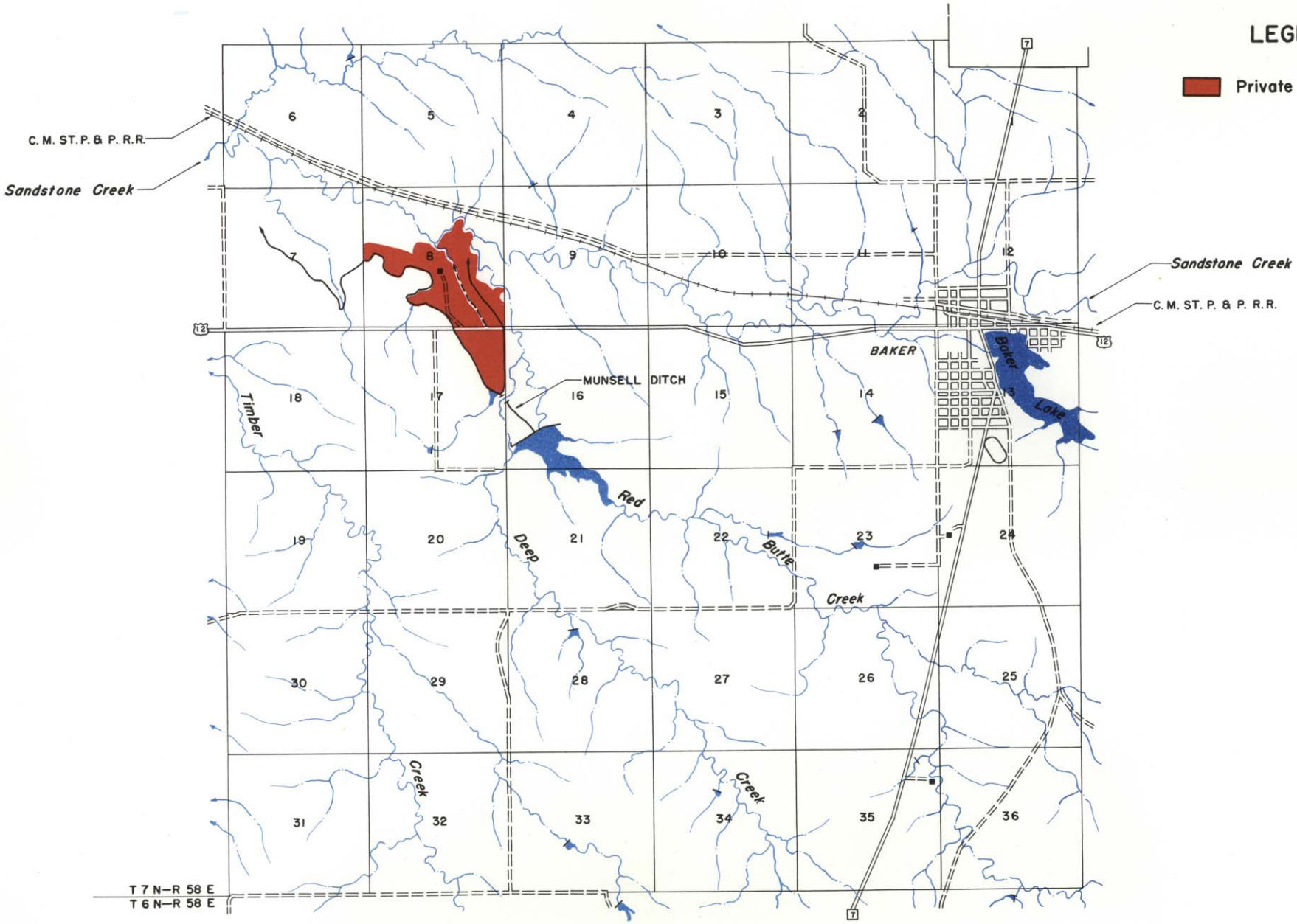

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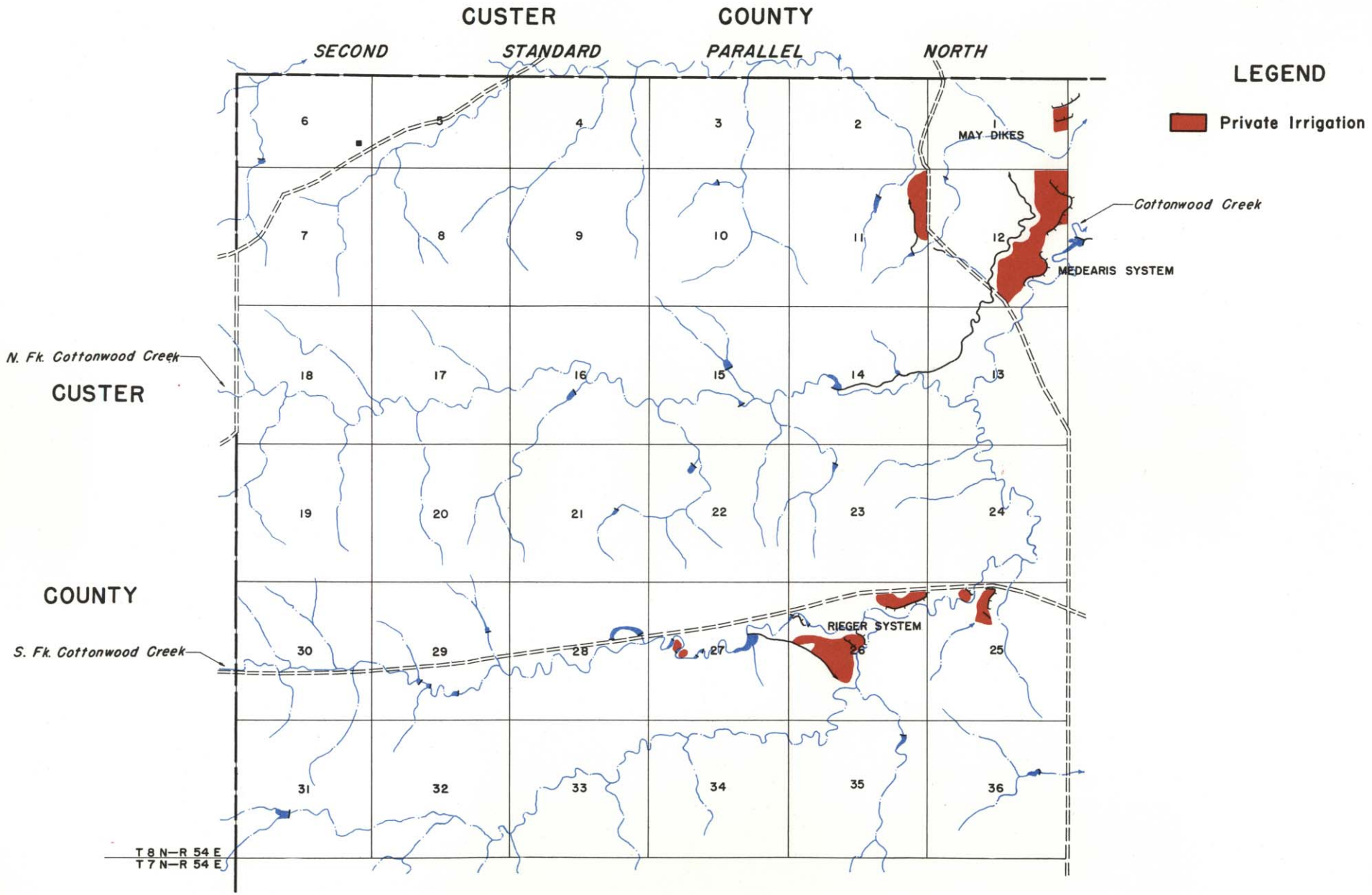

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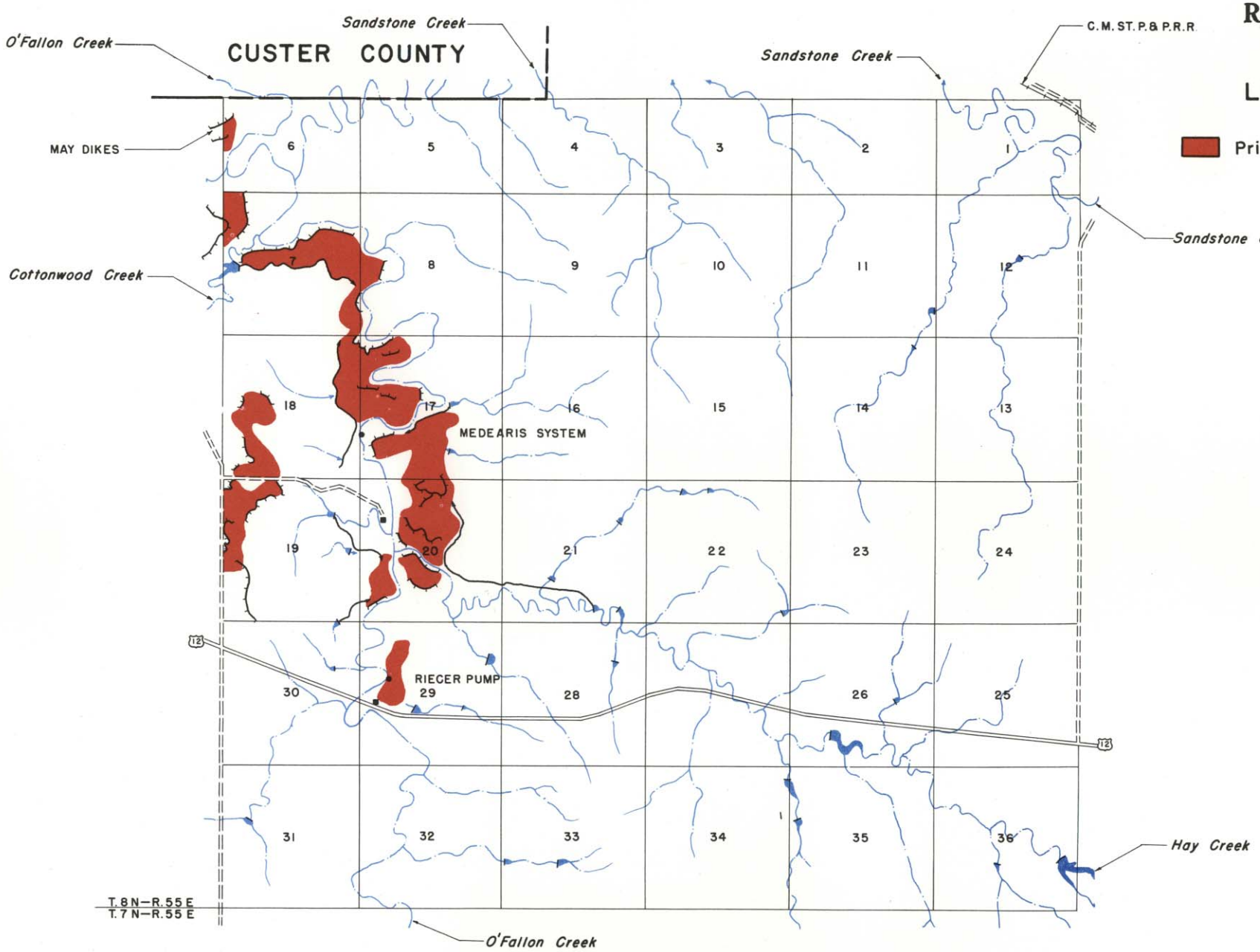

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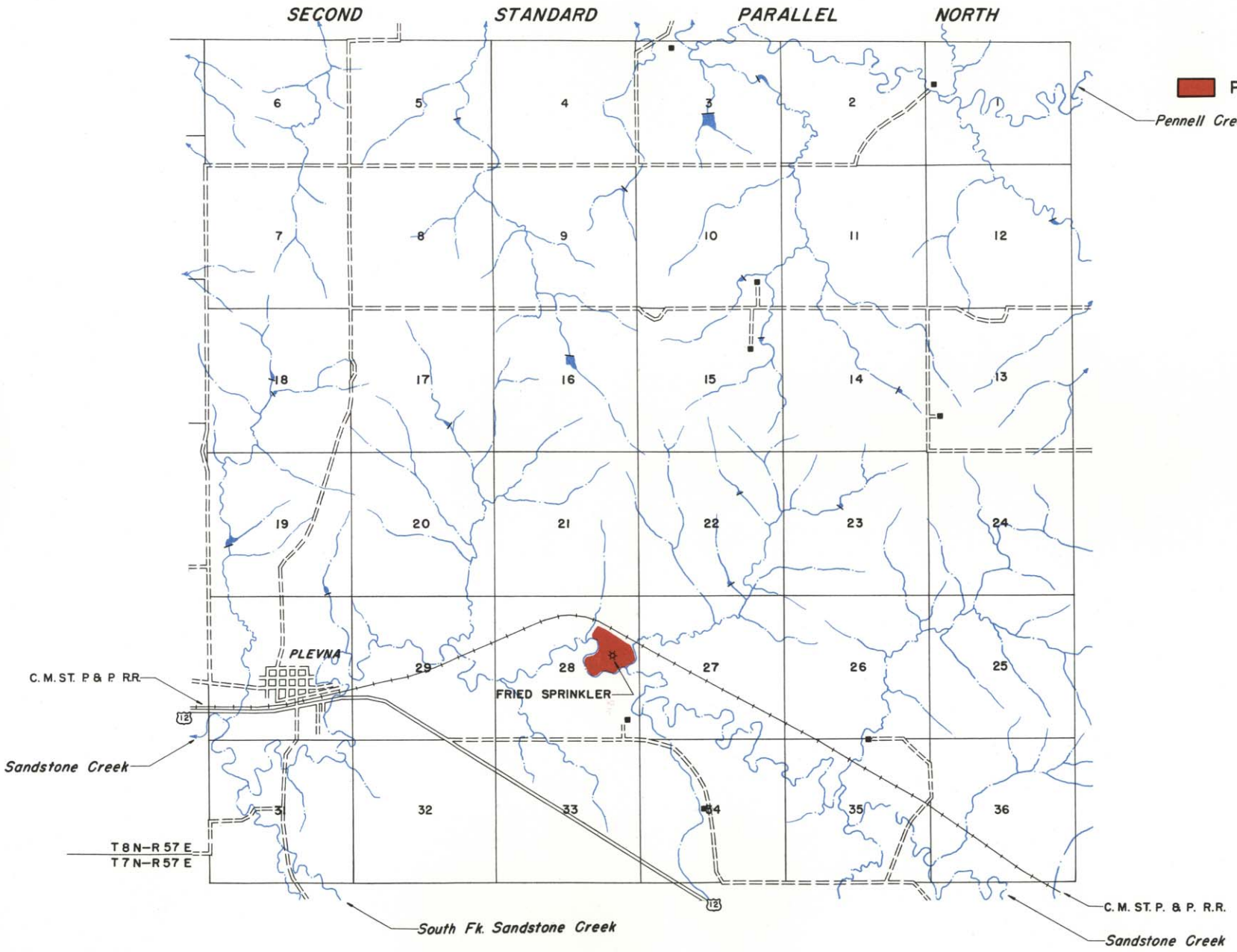

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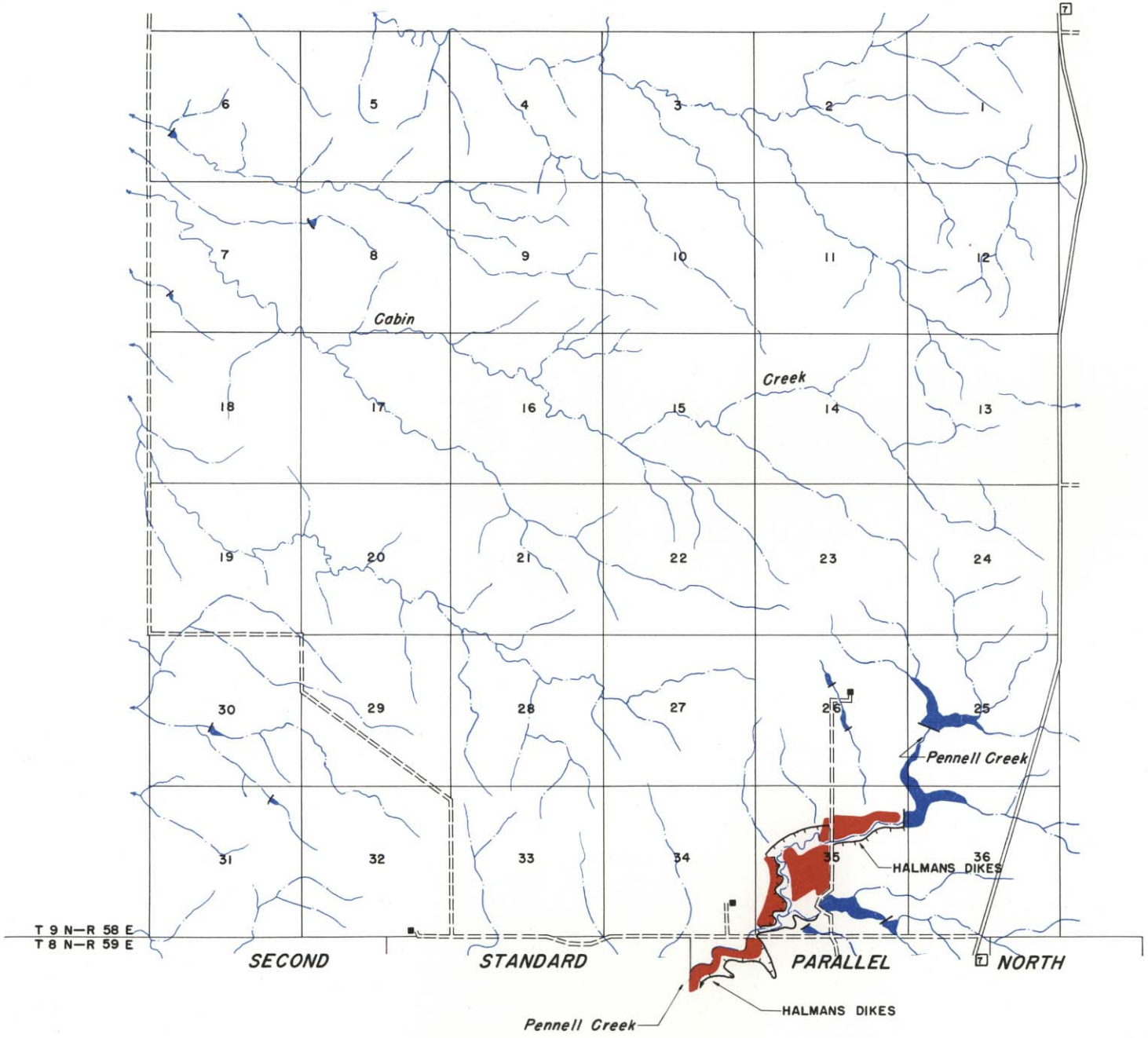

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