Water Resources Survey

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

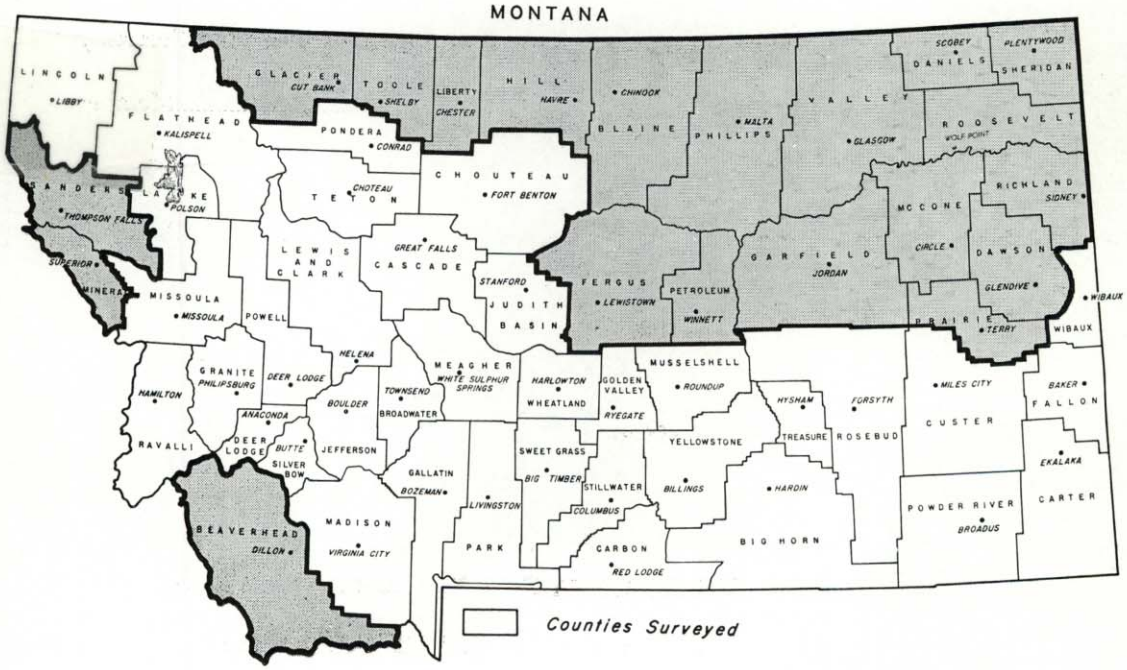
Flathead and Lincoln Counties, Montana

Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June, 1965

WATER RESOURCES SURVEY

FLATHEAD AND LINCOLN COUNTIES MONTANA

Part I
History of Land and Water Use on Irrigated Areas



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June, 1965

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June, 1965

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

Dear Governor Babcock:

Submitted herewith is a consolidated report on the Water Resources Survey of Flathead and Lincoln Counties, Montana.

This work was accomplished with funds made available to the State Engineer by the 38th Legislative Session, 1963, and in co-operation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

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

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

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

The historical data on water rights contained in 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,

EVERETT V. DARLINTON, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid 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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Lynn Purdy.....Glen Lake Irrigation District

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FLATHEAD AND LINCOLN COUNTIES

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 Mettler 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 the Montana gulches brought with them these rules, applying them to agriculture as well as to mining.

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

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

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

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

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

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

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

it within 20 days in the county clerk's office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream one must petition the Distrcit 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.

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 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 him 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 cfs. Today, the Big Hole River with an average flow of about 1,000 cfs. has filings totaling 173.912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected onces since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties; consequently water right filings on these inter-county streams are found distributed in two or more

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

It can readily be 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 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 the 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 aggreived 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 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 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 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 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 prac-

tices 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 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 where water is involved; (4) to help State and Federal agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; (6) and to have a complete inventory of our perfected water rights in case we need to defend these rights against the encroachments of lower states, or Wyoming or Canada.

GROUND WATER

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

It is believed that Montana's ground-water resources are vast and only partly developed. Yet this resource is now undergoing an 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 overuse of ground water in a specific area has started, it is nearly impossible to stop, and may result in painful economic readjustments for the inhabitants of the area concerned.

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

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

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

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

(a) "Ground-Water" means any fresh water under the surface of the land including the water under the bed of any stream, lake, reservoir, or other body of surface water. Fresh water shall be deemed to be 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 State Engineer of the State of Montana.

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

Secton 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 upon in order to establish a water right thereto.

Montana's Ground Water Code originally provided for four different types of forms that could be filed.

Form No. 1 **"Notice of Appropriation of Ground Water"**—shall require answers to such ques-

tions 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, a failure to file the Notice of Appropriation deprives the appropriator of his right to relate the date of the appropriation back upon filing the Notice of Completion. (Form No. 2).

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

Form No. 4 **"Declaration of Vested Ground Water Rights"**—shall be used by persons who have put ground water to a beneficial use (including sub-irrigation or other natural processes), prior to January 1, 1962. The appropriator must within four (4) years after January 1, 1962 (the original law called for two years but the 1965 Legislature extended the time to four years after January 1, 1962) file a declaration in the office of the county clerk of the county in which the claimed right is situated and the declaration shall contain the following information: (1) Name and address of the claimant; (2) the beneficial use on which the claim is based; (3) the date or approximate date of the earliest beneficial use, and how continuous the use has been; (4) the amount of ground water claimed; (5) if the beneficial use has been for irrigation, the acreage and description of lands to which such water has been applied and the name of the owner thereof; (6) the means of withdrawing such water from the ground and the location of each well or other means of withdrawal; (7) the date of commencement and completion of the construction of the well, wells or other works for withdrawal of ground water; (8) the depth of the water table; (9) so far as it may be available, the type, size and depth of each well or the general specifications of any other works for the withdrawal of ground

water; (10) the estimated amount of ground water withdrawn each year; (11) the log of the formations encountered in the drilling of each well; and (12) such other information of similar nature as may be useful in carrying out the policy of the Act.

Failure to file Form No. 4 "Declaration of Vested Ground Water Rights" within the four-year period does not cause a forfeiture of a claimant's vested ground-water rights although he might be called upon at some future time to prove his rights in court. A valid filing of Form No. 4, however, will be accepted by the courts as prima facie evidence of a ground-water right.

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 No. 2 or No. 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 for the county records; transmit the second copy to the Administrator (State Engineer); the third copy to the Montana Bureau of Mines and Geology; and the fourth copy to be retained by the appropriator (person making the filing).

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

The filing of water right records in a central office under control of a responsible State agency, 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 in regard to the distribution and use of water. Deed records of landownership are reviewed and abstracts are checked for water right information when available.

Aerial photography is used by the survey to assure accuracy in mapping the land areas of water use and all the other detailed information which appears on the final colored township maps in Part II. Section and township locations are determined by the photogrammetric system, based on government land office survey plats, plane-table surveys, county maps and by "on the spot" location during the field survey. Noted on the photographs are the location 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 as found at the time of completion of each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

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

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

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

WATER RESOURCES SURVEY

LINCOLN COUNTY

PART I

History of Land and Water Use
On Irrigated Areas

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June, 1965

HISTORY AND ORGANIZATION

The region in the northwest part of the state of Montana and identified by its present name, Lincoln County, had long before the coming of white settlers been the habitat of many Indian tribes. Here they found a realm of their desires; in the lakes, rivers, and streams, fish were in abundance, as were game of different kinds among the foothills and in the valleys. In the country adjacent to the town of Libby, tribes from the west, the Kootenai; tribes from the east, the Blackfeet; as well as other tribes from the north and south, made annual hunting trips into this game paradise.

David Thompson, an employee of the Northwest Fur Company, was the first white person to explore and settle the valley of the Kootenai. In 1806, Thompson discovered and explored the headwaters of the Columbia River and in the next year established the "Kootenai House" near the old site of Jennings in what is now Lincoln County. He wintered there that year, but in the spring returned to Saskatchewan. In the fall of 1808, he returned to the "Kootenai House" to continue exploration of the area and establish other trading posts for the Northwest Fur Company.

Thompson was not only an explorer for the Northwest Fur Company, but also made meterological and astronomical observations. Few changes had to be made in his original maps of this territory. Today, there is a monument dedicated to Thompson at Verendrye, North Dakota, in memory of this great geographer and astronomer.

Lincoln County was created from a portion of Flathead County on July 1, 1909, by the order of the 11th Legislative Assembly. It contains an area of 3,660 square miles of land which is rich in natural resources. It is a mountainous and well timbered region, which still preserves much of the wildness of nature.

Mountain ranges predominant in the county are the Cabinet Range which is located in the southwest; the Purcell Mountains in the north and west; the Flathead Mountains on the east; and the Whitefish Range in the extreme northeast part.

The largest agricultural area is the Tobacco Plains in the northeast, which is virtually the only part of Lincoln County completely clear of timber. Through this area flows the Tobacco River, one of the county's principal streams. Whenever newcomers view the Tobacco Plains, they always wonder how this valley acquired its name. In the year 1880, Jesuit Missionaries gave the Kootenai Indians some tobacco seed which they planted on the plains northeast of Eureka. The tobacco raised was of poor quality and probably never ripened, but it was good enough for the redskins, who had never tasted better. The Indians had a very crude way of planting the tobacco seed. First, they burned brush over the ground to be planted, then scattered the seeds on top of the ground and trusted nature to finish the work. The strangest part of this procedure was that the tobacco actually grew.

The Kootenai River, which carries a larger volume of water than the Missouri, flows through the central part of Lincoln County for a distance of approximately 100 miles. It enters the county on the north from Canada at Gateway and follows a course south and west, leaving the county east of Leonia in Idaho. There is not much farming done along the Kootenai because of its narrow river valleys.

The Yaak Valley in the northwest and the Fisher Valley in the southern part of the county have a few scattered farms and cattle ranches. Some mining activity is noted in both of these areas, but only a few mines are in operation today.

In 1891, when the Great Northern Railway extended its line to Jennings, near the mouth of the Fisher River, a new industry was developed for the people of this region. The new industry was freighting goods by steamboat down the Kootenai from Fort Steele, a mining camp in Canada, to the railroad terminal at Jennings.

The first steamboat to navigate the Kootenai in Montana was the "Annerly," a boat built by Walter P. Jones, a stockman from Texas, and Captain Harry Depew. It was a short boat, only 90 feet long and built to carry 90 tons, but it drew so much water that it could only be used during high water periods. Other boats that operated successfully on the Kootenai during this period of navigation were the "White Swan," "Ruth," "Gwendoline," "North Star," and the "J. D. Farrell." The most successful of small boats was the "White Swan," used chiefly for carrying freight when the other boats were unable to navigate the river during the months of low water. The steamboating period was very important in the history of Lincoln County, as it not only provided an occupation for the people but helped develop many of the present day towns.

The lumber industry today is by far the most important source of income in Lincoln County. Ninety-seven per cent of the land area is covered by forest. Four acres of timber out of each five in the county is classified as commercial timber. About two-fifths of the commercial forest is in saw timber stands, with the remainder composed of poles, saplings, and seedlings. The saw timber is composed of ten species, the most common of which are larch, Douglas fir, spruce, ponderosa pine, and white pine.

The most valuable of the commercial species are the white and ponderosa pine, but these comprise only one-fourth of the commercial timber stands. The other three, larch, Douglas fir, and spruce make up two-thirds of the volume of commercial timber.

In addition to the saw timber, a considerable volume of minor products are also produced from the forest in Lincoln County. These consist chiefly of poles, piling, ties, pulpwood, and Christmas trees. Production of these minor products may be greatly expanded as they come chiefly from the less valuable species such as lodgepole pine, cedar, spruce, and fir.

Of the total volume of commercial timber in Lincoln County, three-fourths belongs in the National Forest, one-fifth to private ownership, with the remaining forest land controlled by the state, county, and public domain.

Two of the largest private owners of forest lands are the J. Neils Lumber Company, who became a subsidiary of the St. Regis Paper Company in 1957, and the Northern Pacific Railroad.

Julius Neils, who founded the J. Neils Lumber Company in Sauk Rapids, Minnesota in 1895, started a venture that through the years has grown into a gigantic operation. This company has had a profound effect on the economy of Lincoln County. In 1963, the Libby and Troy lumber mills of the J. Neils Lumber Company shipped a combined total of 7,578 railroad cars of forest products at a freight cost of more than $4.5 million. Inbound freight during the same year amounted to 3,665 railroad cars, which cost the company approximately $284,966 in freight charges. During 1963, in Montana alone, 1,088 hourly employees of the company earned $5.3 million, and in addition 200 salaried employees earned $1.4 million. Another $2.4 million was paid to independent contractors making a total of more than $9 million earned by workers.

The period between 1922 and 1957 was the greatest for the expansion of the J. Neils Lumber Company in its western operations, in developing their private timber land ownership in the states of Montana and Washington. At the height of this business activity, the St. Regis Paper Company

became interested in their operations because of the big potential for paper products in the resources of forest lands in Montana and Washington.

Constant research is behind all phases of the lumber industry, with the development of new methods and products, notably in the field of gluing and wood chemistry. A multi-million dollar plywood plant was built in Libby in 1962. Plans are now under way to double the capacity of the present stud mill in Libby, which will be another big step toward the development and stabilization of the local economy.

Another industry in the county is the Zonolite Division of the W. R. Grace Company, which operates a vermiculite mine and mill 9 miles northeast of Libby. This is the largest vermiculite deposit in the United States and vermiculite mining operation in the world. The mine is entirely an open-pit operation which operates continually throughout the year. Vermiculite has been mined commercially at the Libby deposit since 1923. The greatest growth of this industry and use of the mineral has been within the last 20 years. Vermiculite concentrates are shipped in bulk form to approximately 50 processing plants distributed throughout North America, of which 20 are Zonolite owned. There are also expanding plants located in foreign countries to which shipments are made from Libby. The entire operation employs about 150 people on a year-round basis.

Uses for vermiculite are many and varied. Probably the major uses are as masonry fill, insulation, and as a light-weight aggregate. The larger size is used as a loose-fill insulation for homes, industrial buildings, cold-storage plants, and as high temperature insulation for other insulating applications. Other uses of vermiculite include: as a soil conditioner, a carrier for chemicals, a conditioner of fertilizers, and even as insulation for hot ingots that are shipped from the blast furnace of steel mills to rolling mills, and literally hundreds of other uses.

Another large development in Lincoln County will take place in the spring of 1966, with the start of construction of the Libby Dam project. This $343 million Kootenai River project, to be built by the Corps of Engineers, will be located 17 miles upstream from Libby and 48 miles downstream from the International Boundary.

The concrete gravity dam will have a crest length of 3,055 feet and will rise 420 feet above its lowest foundation. A two-bay gated spillway is incorporated into the dam at about its midpoint, including four sluice ways through the dam. Initially, the Libby Dam powerhouse will have three 105,000 kw. generating units, and additional space for five more units, bringing the ultimate powerhouse capacity to 840,000 kw. Penstocks 19 feet in diameter will feed water into 165,000 h.p. turbines.

The reservoir behind Libby Dam will back up waters of the Kootenai River for 90 miles, 42 miles of which will extend into Canada. Maximum storage capacity will be 5.9 million acre-feet, with roughly 1 million acre-feet of the total in Canada. Over one-third of the project's total cost, $123 million, will be used in re-locating the main line of the Great Northern Railway.

Two towns, Rexford and Warland, are to be re-located by the construction of the project, involving about 500 people in these communities. Population expansions will occur during the construction period in Libby, Troy, and Eureka. In Libby, it is estimated the population will be increased by an additional 5,500 construction workers and their dependents, which will create severe utility, housing, and school problems in this community.

In Lincoln County the three most important towns are Libby, Troy, and Eureka. Since its beginning, Libby, the county seat, has been chiefly a lumber town with some mining activity. Libby

now has one of the largest and most complete lumber mills in the state and a population of about 2,800.

For many years, Eureka was one of the chief lumbering centers in Montana and had one of the largest lumber mills. However, after the burning of this large mill it has gradually declined, although lumbering is still one of its main industries. Most of the ranching and farming areas in Lincoln County are located near Eureka. Each fall thousands of Christmas trees are shipped from this location and it has become known as the "Christmas Tree Capital of the World." Latest census figures list the population of Eureka as 1,200 people.

Troy was formerly a very important division point on the Great Northern Railway but lost much of its prominence with the rise of Hillyard in Washington as the chief railroad center. The J. Neils Lumber Company mill at Troy provides this community with its main source of income. Troy's population at present is listed at 900 people.

Other small towns and rural communities in Lincoln County are Rexford, Warland, Fortine, Stryker, Trego, and Yaak.

Transportation facilities in the county consist of the Great Northern Railway, Inter-Mountain Bus Lines, federal highways Nos. 2 and 93, state highways Nos. 37 and 202S, and numerous improved county roads. These provide adequate transportation facilities within the county and other parts of the country.

The last census in 1960, listed Lincoln County with a population of 8,693. Plans for construction of new industries and expansion of the present ones should increase its population in the near future.

CLIMATE

Located in the northwest corner of Montana, and bounded on the west by Idaho and on the north by Canada, Lincoln is one of Montana's larger counties. Topography is generally very mountainous, from the northeast slopes of the Cabinet Range southwest of Libby to the Flathead Mountains south of Eureka. The Purcell Mountains cover much of the county north of Libby. The valley-mountain configuration is very complex, and is dominated by the large Kootenai River Valley running roughly southward from Rexford to east of Libby, thence westward to Troy, thence northwest into Idaho. The Yaak River, rising in the Purcell Range west of Rexford, flows west, then southwest, joining the Kootenai a few miles northwest of Troy. As is characteristic of this kind of country, there are many small valleys and streams.

County elevations range from nearly 8,000 feet on a few of the higher peaks to just over 1,800 feet where the Kootenai enters Idaho. Incidentally, the lowest elevation in Montana is located west of Troy. The mountainous character of the county, and its wide elevation ranges within short distances, help to produce large variations in climate. Except for the higher mountain ridges and cultivated or populated valley bottoms, the county has extensive heavy forests, indicative of a climate generally favorable (plenty of precipitation) for vegetation. The single geographic feature of most importance to county climate is the Kootenai Valley — one of the principal tributary valleys of the Upper Columbia River.

Of all Montana counties, the climate of Lincoln County is closest to a Pacific Maritime type; but even here continental (cold winter, warm summer) effects show, for at least a few days every year. Winters are not as wet nor as warm as pure Pacific Coast types, but the summer coastal tendency for dry summers is reflected clearly. The Pacific Northwest characteristic of warm midsummer days (except along the actual coastal strip) is also found in the Lincoln County portion of the

Kootenai Valley – in fact, at the lower end of the Kootenai several hot (95° or warmer) days occur most years. Annual average temperatures show a fairly wide range. Temperature records to date show Libby 32 SSE (McGinnis Meadows), in the northeast foothills of the Cabinet Mountains, averages 40.7° for a year, while Libby itself, on the Kootenai River, averages 45.2°, or 4.5° warmer. For its latitude (south of 49°), winters are not very cold – January averages at 6 stations run from 16.3° (Eureka) to 22.0° at Libby.

Summer days sometimes can be hot – record highs are all well over 100°; 109° at Libby and Rexford. Libby averages 38 days a year with 90° or warmer maximums. But the effects of warm summer days are alleviated by the strong night-time cooling found in mountain valleys during clear summer weather. For example, although Libby maximums average 89.7° in July, minimums average only 45.2°. Really cold winter days are much less common than the warm days of midsummer. At Libby, for example, temperatures reach as cold as 0.° F. only 12 days in an average year. The fairly common large daily differences between high and low temperatures show up, however, in fairly short growing seasons for tender vegetation – as a result, most natural vegetation is of hardy types. Again at Libby, the average 32° freeze-free season runs 79 days, from June 8 to August 27. Between 28° occurrences, however, there are 128 days (May 18-Sept. 22), fairly adequate for varieties not damaged by "light" 32° freezes. Freeze-free seasons are shorter than those at Libby in most of the lateral valleys branching off from the Kootenai River.

Precipitation is more abundant than in most Montana counties, especially along the many mountain ranges. Except in the northeast corner of the county, east of the Purcell Range, winter is the wettest season, with the wettest three months during November to January, inclusive. This is characteristic of U. S. Pacific Maritime climate. Around Fortine and Eureka, however, continental characteristics show up in the yearly precipitation distribution, with a little more than half the yearly average coming during the April-September growing season. In the balance of the county (actually in most of the area with the exception of the Eureka-Fortine section) only about a third of the annual average falls during the year's warmer 6 months. Annual precipitation approaches semi-arid totals in the northeast, to well over 20 inches in many mountainous sections (see table P. 6). Snowfall averages run from 50 to 60 inches in the valley bottoms to several hundred inches along the mountains, with heaviest snows falling on the prevailing windward (west to southwest) slopes in most years. This mountain snowfall is a heavy contribution to the pronounced spring-early summer runoff maximums observed on all streams in the county which rise in mountain country.

Winters are cloudy most of the time, sky cloud cover should average about 80 to 90 per cent in midwinter – the cloudiest sections being in mountainous country, the least cloudy in the somewhat drier northeast corner. On the other hand, summers have a lot of clear sunny weather, and midsummer sky cover may average as low as 30 per cent in the more favored areas. July rainfall averages only 0.63 inch in Libby – indicating that dry weather often occurs in that month. Oppressive heat and humidity combinations are rare. On the warmest days, relative humidity usually will run 20 to 30 per cent – or even less – during the afternoon.

With most valleys pretty well sheltered by rugged mountains, really destructive winds are infrequent, perhaps rare. This corner of Montana has a much lower thunderstorm frequency than counties to the east, and when thunderstorms do occur, they are less forceful, on the average, than elsewhere in the state, although small hail sometimes occurs. In fact, if one recognizes that heavy mountain snowfall is a normal winter part of the county climate complex, it may be concluded that really severe storms are rare in most of Lincoln County.

Tables of condensed temperature and precipitation data, for Lincoln County weather stations, appear below:

TEMPERATURE

	Highest of Record	Date	Lowest of Record	Date	Average Jan.	Average July	Average Annual
Eureka 1924-32	103	7-31-29	–35	12-31-27	19.8	67.5	44.5
Eureka RS 1960-63	103	8-5-60*	–35	1-11-63	16.3	67.3	45.0
Fortine IN 1906-63	107	8-16-17	–49	1-3-24	19.9**	63.0**	41.9**
Libby RS 1895-97 1911-63	109	8-5-61	–46	1-2-24	22.0***	67.5***	45.2***
Libby 32 SSE 1949-63	102	8-4-61	–44	1-30-50	19.5	61.2	40.7
Rexford RS 1953-60	109	7-12-53	–39	1-25-57	21.7	66.9	44.3

PRECIPITATION

	Yearly Average	Growing Season Average	% Falling in Growing Season	Wettest Amount	Wettest Year	Driest Amount	Driest Year
Eureka 1924-32	14.07	7.56	54	21.93	1927	6.99	1931
Eureka RS 1960-63	12.65	6.56	52	18.10	1961	8.71	1962
Fortine IN 1906-63	17.63**	9.19	52	26.27	1951	10.70	1944
Libby RS 1895-97 1911-63	18.47**	6.70	36	27.30	1951	9.18	1935
Libby 32 SSE 1949-63	26.56	9.36	35	33.43	1955	13.10	1952
Rexford RS 1942-60	16.37	6.38	39	24.74	1951	8.41	1952

*also earlier dates, days, months, years
**1931-60
***1933-62

SOILS

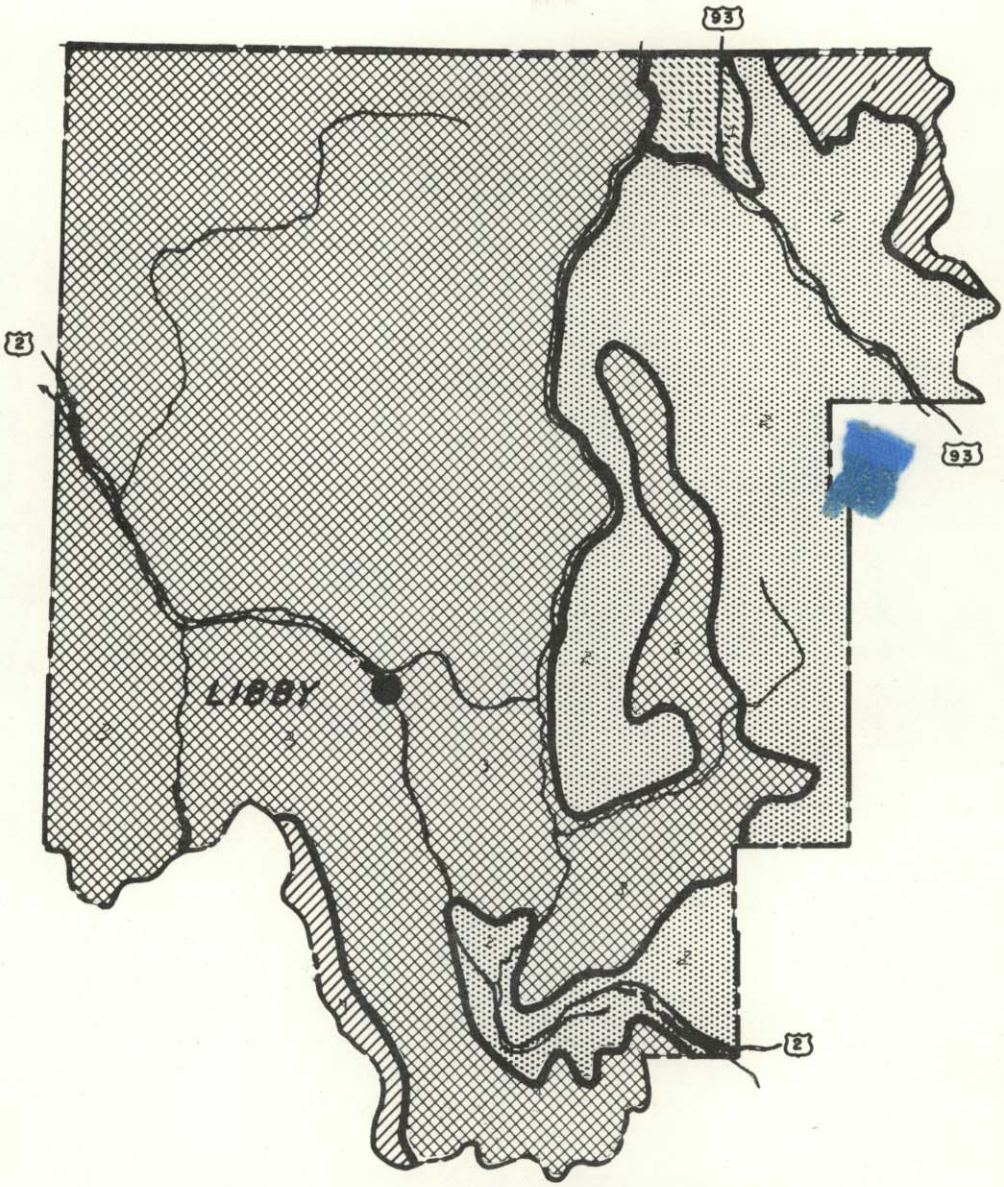
Local rock formations furnish the material for soils found in a given locality. The physiography, drainage and glacial history of the area determined how these materials were deposited and, in fact, account for some of the differences we find in the soils. Soil depth, density, texture and acidity or alkalinity are directly related, within limits, to the material from which the soil was formed.

Lincoln County has been influenced by alpine glaciation. Some areas are covered with material that was picked up, mixed and redeposited either by the ice or by water from the ice as it melted. The variations in soils we see today result from alterations of geologic material by **climate** and **living organisms,** especially vegetation. The length of **time** these forces have been active and the **topography** on which the action has taken place also contribute to these variations.

The Great Soil Groups most widely represented in Lincoln County are Alluvial, Chestnut, Chernozem, Solidized-Solonetz, Gray Wooded and Brown Podzolic soils.

Alluvial soils (Entisols*) are young. They occur usually in small areas along streams and may be flooded periodically. The only development that has occurred in these soils is the darkening of the surface by an accumulation of organic matter. The material below the surface is essentially the same as it was at the time of deposition. These soils are used mainly for production of grain and hay, some of which is irrigated.

Chestnut and Chernozem soils (Mollisols*) have a dark surface soil, usually a clayey, prismatic subsoil and a lime accumulation at 10-25 inches below the surface. This lime horizon may extend



SOIL TYPES-LINCOLN COUNTY

Dominantly Chernozem and Chestnut soils with associated Solodized–Solonetz soils.

Dominantly Gray Wooded soils.

Dominantly Brown Podzolic soils.

Steep mountain lands above 8500 feet.

Note: Alluvial soils occur along most streams but in areas too small to show on the map.

to 50 inches. The Chernozem soils are developed under a higher precipitation (16-24") and have a darker surface than the Chestnut soils (10-16" precipitation). The depth to the lime accumulation may be somewhat greater in the Chernozem soils. These soils are used mainly for grain and hay production and some native range.

Solodized-Solonetz soils (Natrustolls*) generally occur in small areas in association with Chestnut soils. They are characterized by thin platy surface soils over dense hard clay-pan subsoils. The upper part of the subsoil often has a light-colored (bleached) zone 1 - 4 inches thick. This bleached zone should not be confused with the lime zone which is usually found below the clay-pan subsoil. These soils often occur as "Slick spots," "Scab land" or "Micro pits." These show up under cultivation in all but the wettest years as spots — shorter plants surrounded by taller ones on the adjacent soils. There use is generally the same as that of the associated Chestnut soils. Greasewood is often found on Solodized-Solonetz soils in their natural state.

Gray Wooded soils (Alfisols*) occur principally in the mountain regions. The mean annual precipitation varies from about 12-25 inches. The vegetation consists mainly of coniferous forests. A dark surface layer of less than 4 inches may be present just under the forest litter. In the absence of the dark layer, a light gray to white zone 4 to 12 inches thick lies just beneath the litter. The subsoil – a mixture of surface soil and substratum – may extend to depths of 3-4 feet. The major clay accumulation lies below this zone of mixing and may extend to depths of 6 feet in extreme samples. These soils are used mainly for timber production and Christmas trees.

Brown Podzolic soils (Spodosols*) occur principally in the mountain regions. They are found under a mean annual precipitation of 25-50". The most striking feature of these soils is the brown or reddish-brown horizon just under the forest litter. This brown horizon may extend to a depth of 12 inches and is in striking contrast to the gray or nearly white horizon of the Gray Wooded Soil. Timber production and Christmas trees are important uses of these soils.

CROPS AND LIVESTOCK

Lincoln County is located in the extreme northwest part of the State of Montana bordering Idaho on the west and Canada on the north. The county comprises an area of approximately 2,377,-600 acres or nearly 3,600 square miles, most of which is covered by the Kootenai National Forest. Almost all the agriculture producers have some timber or timber products along with their agricultural commodities. Many of the ranchers do considerable work in woodlot and Christmas tree management.

Agricultural commodities produced in the county include: cattle, hay and grain, with some horticultural fruits and vegetables grown for local consumption. The majority of the cattle produced are of the Hereford breed, with a few Angus, Shorthorn, and Charolais varieties.

*Names of same soils used in New Classification System by USDA, SCS, 1960, Soil Classification A Comprehensive System.

Listed below are statistical data compiled on Agricultural Commodities in Lincoln County for the year 1963:

CROP PRODUCTION—HARVESTED ACRES

Crops	— Irrigated — Acres	Yield	— Non-Irrigated — Acres	Yield	Totals — Acres	Yield	Value
Spring Wheat	100	30 bu.	300	19 bu.	400	21 bu.	$ 16,300
Oats	200	53 bu.	400	38 bu.	600	43 bu.	$ 14,700
Barley	100	35 bu.	200	32 bu.	300	33 bu.	$ 8,200
Potatoes	5	130 cwt.	20	45 cwt.	25	60 cwt.	$ 3,700
Alfalfa Hay	2,100	1.95 ton	2,900	1.25 ton	5,000	1.5 ton	$150,000*
All Hay	4,600	1.7 ton	7,600	1.2 ton	12,200	1.36 ton	$338,000
Wild Hay	200	1.2 ton	1,200	1.0 ton	1,400	1.0 ton	$ 22,400**

*at $20.00 per ton
**at $16.00 per ton

ALL CROPS—IRRIGATED AND NON-IRRIGATED

Irrigated Acres	Value	Non-Irrigated Acres	Value
8,005	$172,000.00	8,520	$208,100.00

LIVESTOCK

Class	Head	Value
Sheep and Lambs	500	$ 8,700.00
Hogs and Pigs	700	19,110.00
Chickens	9,500	11,875.00
Dairy Animals	400	87,600.00
All Cattle and Calves	7,600	1,314,800.00

TOTAL CASH RECEIPTS

Crops	Livestock	Total Marketing Receipts	Government Payments	Total	Cash Receipts Per Farm
$282,400.00	$600,900.00	$883,300.00	$17,400.00	$900,700.00	$2,746.00

SNOW SURVEYS

The Soil Conservation Service, in cooperation with other federal, state, private agencies and British Columbia makes snow surveys throughout the winter and spring months to predict streamflow. This information is used by farmers and ranchers to assess the amount of irrigation water that will be available, by irrigation and flood control organizations to manage reservoir operations, by power companies and many other groups and individuals whose operations are related to or dependent on streamflow. This foreknowledge allows water users and managers time to plan operations according to the expected runoff. Farmers and ranchers can plan crops for the coming year. Reservoirs can be operated for maximum efficiency by combining flood control with power generation and irrigation storage. Bankers, railroad managers, equipment builders, and persons in various other businesses can determine and plan for the effect the anticipated water supply may have on their operation. The operation of reservoirs on the Kootenai River and downstream is based on streamflow forecasts from snow survey measurements.

A snow survey consists of measuring the depth and amount of water in the snow, or snow water equivalent. Measurements are taken at the same place each year, using standard snow sampling

equipment. Almost all courses are measured the first of March, April and May, with a few courses measured earlier and later in the season.

Snow courses in the Kootenai River drainage within Lincoln County are shown in the following tabulation.

SNOW COURSES AND SOIL MOISTURE STATIONS

Name	Number	Elevation	Year Established	Dates Measured[1]
Baree Creek	15B11	5500	1956	3, 4, 5, 5½
Baree Trail	15B15	3800	1965	3, 4, 5, 5½
Baree Trail Soil Moisture	15B15M	3800	1964	Monthly
Bassoo Peak	14B03	5150	1961	3, 4, 5
Brush Creek	14A04	5000	1937	3, 4, 5
Grave Creek	14A11	4300	1965	3, 4, 5, 5½, 6
Murphy Lake R. S. Soil Moisture	14A10M	3000	1964	Monthly
Raven R. S. Soil Moisture	15A02M	3050	1964	Monthly
Red Mountain	15A01	6000	1937	3, 4, 5, 5½, 6
Weasel Divide	14A07	5450	1955	3, 4, 5, 5½, 6

Current information on snow surveys and streamflow forecasts can be obtained from the Soil Conservation Service, P. O. Box 855, Bozeman, Montana, or the Soil Conservation Service, Eureka, Montana.

[1]Numerals 1, 2, 3, 4, 5, 5½, 6 refer to January 1, February 1, March 1, April 1, May 1, May 15 and June 1 measurements.

STREAM GAGING STATIONS

The U. S. Geological Survey measures the flow of streams, co-operating with funds supplied by several state and federal agencies. The results have been published yearly in book form by drainage basins as Water-Supply Papers through the year 1960. Beginning with 1961, the 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 covers the stream gaging records which are available for Lincoln County from the beginning of measurements through the water year 1963. 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 is equal to 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.

Kootenai River at Newgate, British Columbia*

The water-stage recorder is at the old highway bridge site, 0.7 mile northwest of Newgate and 0.9 mile north of International Boundary. The drainage area is 7,660 square miles. Records are avail-

able from October 1930 to date (1965). The maximum discharge was 98,200 cfs (May 28, 1948) and the minimum observed, 994 cfs (February 7, 1936). The average discharge for 33 years (1930-63) was 10,380 cfs or 7,515,000 acre-feet per year. The highest annual runoff was 10,320,000 acre-feet (1951) and the lowest 4,433,000 acre-feet (1944). There are diversions above station for irrigation. This is one of the International gaging stations maintained by Canada under agreement with the United States.

Fortine Creek near Trego

The crest-stage gage is on the downstream side of private bridge, a quarter of a mile upstream from Edna Creek, 1 mile downstream from Stewart Creek, and 5 miles southwest of Trego. Prior to September 30, 1953 records were obtained from a staff or wire-weight gage at same site. The drainage area is 112 square miles. Records are available from December 1946 to September 1953 (complete) and annual maximum only for 1954, 1958, 1960 to date (1965). The maximum discharge was 1,810 cfs (May 16, 1950, May 20, 1954) and the minimum observed, 5.0 cfs (September 7, 1949). The average discharge for 6 years (1947-53) was 84.7 cfs or 61,320 acre-feet per year. The highest annual runoff was 82,010 acre-feet (1948) and the lowest 44,870 acre-feet (1953). There are no diversions above station.

Grave Creek near Fortine

The wire-weight gage was 5 miles upstream from confluence with Fortine Creek, and 4 miles northeast of Fortine. The drainage area is 64.9 square miles. Records are available from April to December 1923 and April to June 1924. The maximum discharge observed was 690 cfs (June 11, 1923) and the minimum observed, 18 cfs (April 1-5, 1924). There were no diversions above station.

Tobacco River near Eureka*

The water-stage recorder is 2½ miles northwest of Eureka and 6 miles upstream from mouth. The drainage area is 440 square miles. Records are available from September 1958 to date (1965). The maximum discharge during the period of record was 2,300 cfs (May 27, 1961) and the minimum daily discharge, 20 cfs (January 11, 1963). The maximum discharge known was 2,810 cfs (about May 22, 1948), from slope-area measurements of peak flow at site 1 mile upstream. The average discharge for 5 years (1958-63) was 298 cfs or 215,700 acre-feet per year. The highest annual runoff was 275,200 acre-feet (1960) and the lowest 157,400 acre feet (1963). There are numerous small diversions upstream.

Kootenai River near Rexford

The wire-weight gage was on the downstream side of highway bridge, 300 feet downstream from Sullivan Creek, and 1.1 miles southwest of Rexford. The drainage area is approximately 8,420 square miles. Records are available from April 1929 to October 1940. The maximum discharge observed was 79,900 cfs (June 18, 1933) and the minimum, 1,100 cfs (February 7, 1936). The average discharge for 11 years was 9,614 cfs or 6,960,000 acre-feet. The highest annual runoff was 9,584,000 acre-feet. The highest annual runoff was 9,584,000t (1931). There is one diversion for irrigation of 40 acres above station in Lincoln County. This station was one of the international gaging stations maintained by the United States under agreement with Canada.

Kootenai River at Warland Bridge near Libby*

The water-stage recorder is at county bridge, an eighth of a mile downstream from Barron Creek,

and 14½ miles northeast of Libby. The drainage area is 8,892 square miles. Records are available from July 1961 to date (1965). The maximum discharge was 52,700 cfs (June 1, 1963) and the minimum daily, 1,100 cfs (January 12, 1963). There are diversions for irrigation of about 14,000 acres from tributaries above station in Canada and United States.

Fisher River near Jennings*

The water-stage recorder is 80 feet downstream from bridge, 1 mile downstream from Wolf Creek, 9 miles upstream from mouth, and 9 miles southeast of Jennings. The drainage area is 780 square miles. Records are available from December 1950 to date (1965). The maximum discharge was 6,320 cfs (April 17, 1956) and the minimum daily 50 cfs (December 11, 1961). The average discharge for 12 years (1951-63) was 540 cfs or 390,900 acre-feet per year. The highest annual runoff was 623,300 acre-feet (1956) and the lowest 267,400 (1963). There are numerous small diversions for irrigation above station.

Granite Creek near Libby*

The water-stage recorder is at Glacier Silver Lead Mine, 2½ miles upstream from Cherry Creek and 7 miles southwest of Libby. The drainage area is 23.6 square miles. Records are available from January to December, 1933, August 1936 to November 1943, water year 1959 (annual maximum), July 1960 to date (1965). The maximum discharge observed was 1,960 cfs (April 18, 1938) and the minimum, no flow (January 4, 1933) when the creek was blocked by snow slide. The average discharge for 10 years (1936-43, 1960-63) was 65.8 cfs or 47,640 acre-feet per year. The highest annual runoff was 58,990 acre-feet (1961) and the lowest 31,640 acre-feet (1941). There are no diversions above station.

Kootenai River at Libby*

The water-stage recorder is 1,800 feet downstream from highway bridge at Libby and 1 mile downstream from Libby Creek. The drainage area is approximately 10,240 square miles. Records are available from October 1910 to date (1965). The maximum discharge was 121,000 cfs (June 21, 1916) and the minimum observed, 895 cfs (January 11, 1930), result of discharge measurements. The average discharge for 53 years was 11,970 cfs or 8,666,000 acre-feet per year. The highest annual runoff was 12,010,000 acre-feet (1951) and the lowest 4,710,000 acre-feet (1926). There are diversions for irrigation of about 14,500 acres from tributaries above station in Canada and United States.

Flower Creek near Libby*

The water-stage recorder is half a mile downstream from South Fork, 3½ miles southwest of Libby, and 4½ miles upstream from mouth. The drainage area is 14.9 square miles. Records are available from September 1960 to date (1965). The maximum discharge was 305 cfs (May 27, 1961) and the minimum, 3.8 cfs (January 26, 1962). There are no diversions above station.

Lake Creek at Troy

The water-stage recorder was a quarter of a mile downstream from power plant, half a mile upstream from mouth, and 1½ miles southeast of Troy. The drainage area is 210 square miles. Records are available from January 1945 to September 1957. The maximum discharge was 3,250 cfs (May 30, 1948), and the minimum 2.0 cfs (September 1, 1947, September 15, 1948). The average

discharge for 12 years was 516 cfs or 373,600 acre-feet per year. The highest annual runoff was 464,000 acre-feet (1956) and the lowest 300,300 acre-feet (1952). There is some regulation by small dam at power plant diversions. Natural regulation by Bull and Spar Lakes.

Callahan Creek at Troy

The staff gage was on the upstream side of highway bridge, three-quarters of a mile upstream from mouth, and half a mile south of Troy. The drainage area is 85.8 square miles. Records are available from June to October 1911, April to June 1912 (complete), 1913-16 (fragmentary). The maximum discharge observed was 1,680 cfs (May 23, 1913) and the minimum daily, 12 cfs (October 29-31, 1911). There are a few small diversions for irrigation above station.

Yaak River near Yaak

The water-stage recorder was 300 feet upstream from Whitetail Creek and 4½ miles west of Yaak. The drainage area is 493 square miles. Records are available from April 1957 to September 1962. The maximum discharge during the period of record was 5,280 cfs (May 27, 1961) and the minimum daily 35 cfs (January 21, 1962). The flood in May 1956 reached a discharge of 6,650 cfs at site 4½ miles upstream. The average discharge for 5 years was 536 cfs or 388,000 acre-feet per year. The highest annual runoff was 482,800 acre-feet (1960) and the lowest 269,300 acre-feet (1958). There are no known diversions above station.

Yaak River near Troy*

The water-stage recorder is 400 feet upstream from bridge on U. S. Highway 2, a quarter of a mile upstream from mouth, and 7½ miles northwest of Troy. The drainage area is 766 square miles. Records are available from October 1910 to September 1916 (fragmentary), March 1956 to date (1965). The maximum discharge during the period of record was 12,100 cfs (May 21, 1956) and the minimum daily 80 cfs (January 19, 1957, January 2, 1958). The flood of May to June 1948 reached a discharge of 12,500 cfs and the flood of May 1954 reached a discharge of 13,400 cfs. The average discharge for 7 years (1956-63) was 927 cfs or 671,000 acre-feet per year. The highest annual runoff was 881,900 acre-feet (1960) and the lowest 505,800 acre-feet (1958). There are no known diversions above station.

Kootenai River at Leonia, Idaho*

The water-stage recorder is at Leonia, 450 feet east of Montana-Idaho state line, and half a mile upstream from Boulder Creek. The drainage area is approximately 11,740 square miles. Records are available from March 1928 to date (1965). The maximum discharge was 123,000 cfs (May 28, 1948) and the minimum, 996 cfs (December 9, 1936). The average discharge for 35 years was 13,820 cfs or 10,010,000 acre-feet per year. The highest annual runoff was 13,960,000 acre-feet (1956) and the lowest 5,384,000 acre-feet (1944). There are diversions for irrigation of about 14,-600.00 acres 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

*This gaging station is now in operation (1965).

addition to the miscellaneous discharge measurements which have always been reported. These partial records when correlated with simultaneous discharges of nearby continuous-record stations will give fair indications of available flow.

There are ten crest-stage partial-record stations in the Kootenai River Basin in Lincoln County. Stations are now (1965) being operated on Fortine Creek near Trego, Deep Creek near Fortine, Kootenai River tributary near Rexford, Gold Creek near Rexford, Little Jackson Creek near Libby, Peoples Creek near Libby, Shaughnessy Creek near Libby, Whitetail Creek near Yaak, Cyclone Creek near Yaak, and Fourth of July Creek near Yaak.

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.

ECONOMIC MINERAL RESOURCES

Mining

Placer gold is reported to have been discovered on Libby Creek in 1867, but because of the hostility of the Indians, who killed several prospectors, the placers were not developed until the early 1880's. At this time, Coeur d'Alene prospectors drifted into the district and commenced placer mining in the vicinity of Old Town, located on the west bank of Libby Creek a short distance downstream from Ramsey Creek. Earliest placering was along the banks of Libby Creek or within the stream bed. Subsequently, other deposits were found in older channels above the present creek level and in glacial till. Most productive placers were on Libby, Howard, and Cherry Creeks. Callahan Creek and the West Fisher River and its tributaries were extensively prospected. The larger amount of placer gold mined during the late 1800's and early 1900's came from the Howard Placer (later Libby Placer), and the Vaughan and Greenwell property. Value of placer gold produced from the Libby District between 1902 and 1909 amounted to $52,000.

The Snowshoe, Snowstorm, Branagan, and Keystone and Gold Flint properties were discovered between 1887 and 1905. These properties became major producers in the Libby, Troy, West Fisher River, and Sylvanite Districts, respectively.

Construction on the Great Northern Railway in 1891 through Troy and Libby stimulated lode mining.

Total metal-mining production from the Libby, Troy, and Sylvanite Districts between 1901 and 1957 is valued at $4,955,000; no production figures are available for years prior to 1900. Non-metallic mineral production in recent years is valued at in excess of $2 million per year.

Mining activity in the districts within the last 30 years has been only sporadic. Considerable siliceous gold ore was mined from the Sylvanite District between 1931 and 1937, and blocked-out ore and tailings dumps were milled at the Snowshoe property in the early 1940's and small tonnages milled in 1959-60. Other mines and prospects have intermittently produced small shipments of ore. Placers in Libby and Callahan Creeks have produced small amounts of gold.

Lincoln County is underlain by the Belt Series (Precambrian) composed of argillite, quartzite, and siliceous limestone. The Series is subdivided into the Pre-Ravalli Group (Prichard Formation); Ravalli Group (Ravalli Formation); Piegan Group (Wallace Formation); and the Missoula Group (Striped Peak and Libby Formations). Igneous rocks include stocks of quartz, monzonite, and grano-

diorite, syenite, and augite pyroxenite, and dikes and sills of metadiorite, diorite, quartz, latite and aplite. Cenozoic deposits of lacustrine and silt and clay, glaciofluvial gravel, and recent alluvium fill the Kootenai Valley.

Mineralization in the Libby District, although it may be genetically related to igneous rocks, is concentrated along the Snowshoe fault, which is named for the Snowshoe Mine. The fault extends for 8 miles across tributary drainages of Libby and Cherry Creeks. Most ore bodies in the Troy District occur within the Snowstorm dike north of Callahan Creek and along the Grouse Mountain dike on the southwest flank of Grouse Mountain. Other metadiorite dikes and sills near Troy have been prospected with some success.

Non-metallic minerals mined in the county include vermiculite and barite. Vermiculite accounts for the bulk of mineral production since 1948. This mineral is produced under the trade name "Zonolite" and shipped to processing plants throughout the United States for expansion and marketing.

Libby District

The Libby District lies within the Cabinet Mountains south of Libby. Along its west boundary it is contiguous with the newly established Cabinet Wilderness Area.

This district has produced lead, silver, and gold, most of the district production being attributed to the Snowshoe Mine. Net smelter returns from the property to 1948 amounted to 130,000 tons of ore valued at $1,086,000.

Other properties that have produced are Glacier Silver-Lead, Silver Mountain, and St. Paul mines.

Troy District

In the Troy District, southwest of Troy, lead, zinc, and copper minerals occur in quartz veins within metadiorite dikes that cut the Prichard and Ravalli formations. The district is in the northwest part of the Cabinet Mountains.

Production from the Snowstorm Mine (formerly B & B) is reported to have totaled nearly $4,000,000 in lead, zinc, gold, and silver. Most of the ore was mined and milled between 1917 and 1928.

Other producers in the district were Big Eight, Giant Sunrise, Iron Mask, Silver King, Liberty Metals, Cabinet Queen, Montana Morning, and Grouse Mountain mines.

Barite veins occur on the southwest slope of Copper Mountain in the Troy District, but no production has been reported from barite claims in this area.

West Fisher District

Gold and silver and minor amounts of sulfide minerals are present in quartz veins at the head of the West Fisher River and its tributaries. The larger number of properties are in the Prichard Formation.

Most of the gold ore mined in the district has been from the Fisher Creek property, locally known as the Branagan. This mine is reported to have produced $150,000 between 1901 and 1903. The Midas Mine near Howard Lake shipped concentrates worth $59,000 during the period 1916-33, including some tungsten concentrates during World War I. Other producers have been the Little Anne, American Kootenai, Wayup, Jumbo group, and the Silver Butte and Viking mines.

Sylvanite District

This district is in the Purcell Mountains north of Troy on the west side of the Yaak River.

A total production of 22,400 tons of gold ore valued at $248,000 was produced from the Morning Glory, Keystone, and Gold Flint properties, all reported to be on the same vein. The properties were later consolidated as the New Morning Glory Mine.

A narrow quartz vein contained native gold and several ounces of silver a ton reportedly produced high-grade ore during 1897-98, from the enriched zone of the fissure-filled vein, but production figures for this period are not available.

Warland District

A group of claims in the Salish Mountains (North Star Group) lies northeast of Warland near the periphery of a syenite stock. Quartz veins within the stock contain some gold and copper.

Production from the district has amounted to a few hundred tons of ore.

Rainy Creek District

This district is in the southeast Purcell Mountains northeast of Libby where the Zonolite Company operates an open pit mine within an elongate augite-pyroxenite stock containing vermiculite, hydrobiotite, tremolite (fibrous amphibole astebestos), magnetite, and fluorine-rich apatite. Locally, vanadiferous aegerine-augite is present. Syenite dikes containing feldspar are intrusive into the pyroxenite.

The Zonolite Company operates a 1,000-ton mill, erected in 1948, which produces 350 to 400 tons of vermiculite concentrate per day.

Other Deposits

Barite has been mined from the Kenelty Barite property located south of Loon Lake on a tributary of Elk Creek. The barite vein is in argillite of the Missoula Group (Precambrian).

Shipments of about 300 tons of barite to Clear Lake, Washington, had a specific gravity of 4.25 or greater.

LINCOLN SOIL AND WATER CONSERVATION DISTRICT

Lincoln County is served by the Lincoln Soil and Water Conservation District which was organized in 1943. The area of Lincoln County is 2,377,600 acres.

The district is governed by a board of five supervisors who are elected by the land occupiers of the district. They carry out a program of complete resource conservation including erosion control, water conservation, soil management, land improvement, wildlife management, recreation, and land use adjustment. This program is accomplished by providing assistance to farmers and ranchers, on a voluntary basis, the analyzing of all resources, and the planning and applying of economically sound conservation treatment.

Under State law, the supervisors have the power to call upon local, state, and federal agencies to assist in carrying out a soil and water conservation program. The Lincoln Soil and Water Conservation District has memoranda of understanding with the Soil Conservation Service, Extension Service, U. S. Forest Service, and the State Forestry Department to provide technical assistance to

district co-operators in carrying out a sound soil and water conservation program. Close working relations are maintained with the Agricultural Stabilization and Conservation Committee, The Farmers Home Administration, The Northwest Montana Branch Experiment Station, and the Montana Fish and Game Department.

The Soil Conservation Service assists the district by furnishing and interpreting basic data on soils and plant cover and other features of the land.

Technical data are interpreted in terms of acceptable alternative uses and treatments to help guide the farm and ranch operator in developing sound conservation plans. It also aids co-operators in performing operations requiring technical skills beyond the experience of the individuals involved.

The office of State Forester and Forest Service co-operate with the district by co-ordinating the programs in forestry.

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

One of the major problems of this district is to acquaint the urban people with the need for conservation.

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

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

There are 11,500 acres of dry cropland, 3,000 acres of tame pasture, 40,870 acres of rangeland, 530,000 acres of woodland, and 6,000 acres of land considered other land, such as townsites, roads, and highways.

It is estimated that about 7,000 acres can be irrigated. The Glen Lake Irrigation District is the major irrigation project in operation in the district. Water diverted from the numerous creeks that flow out of the mountains is in most cases adequate for the land now irrigated, but many irrigable areas are without water. For the most part individual diversion systems are maintained for each farm with the exception of the Glen Lake Irrigation District. The type of irrigation used most generally is flooding out of field laterals and contour ditches and sprinkler irrigation systems. The trend is to more sprinkler irrigation systems for more efficient use of water and less erosion.

There are 1,749,527 acres of federal land in Lincoln County. Almost all of the federal land is Forest Service land. There is a small amount of Bureau of Land Management land. The major enterprises on agricultural lands are livestock production, grain and hay crops, and Christmas trees. Beef cattle, sheep, and swine are produced. Cash crops produced are small grains.

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

Since the district was organized assistance has been given on proper cropping systems on over 17,500 acres, improved water application on 5,420 acres, drainage installed on 2,954 acres requiring over 45 miles of drain ditch, irrigation ditch construction in the amount of 120 miles, water control structures installed number over 400, sprinkler irrigation systems installed are 54, range improvement on 22,028 acres, seeding of pasture and range on 5,100 acres, 22 springs developed, 62 ponds stocked with fish, 700 acres improved wildlife habitat, 126,500 acres of woodland harvest cutting, 64,600 acres of woodland intermediate cutting, 27,800 acres of woodland pruning, 82,900 acres of woodland thinning, 700 acres planted to trees, and other approved conservation measures.

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

The Lincoln Soil and Water Conservation District owns equipment which is available to district co-operators on a rental basis to carry out needed conservation measures. The equipment consists of a ditcher, grass-legume seeder, fertilizer spreader, land plane, plow, scraper, and weed sprayer.

Co-operative efforts of land owners and operators, other groups and agencies have contributed to the over-all success of the district.

FISH AND GAME

Lincoln County, located in the northwestern corner of Montana, is truly a tall timber country. Tall, dense growths of evergreens, high alpine meadows, precipitous mountains, and sparkling streams are typical of the area.

The Kootenai River twists into Lincoln County from Canada, moves briefly into Idaho and crosses the border once more into Canada. Sharing their waters with the mighty Kootenai are such well-known streams as the Fisher, Tobacco, and Yaak Rivers, as well as many smaller tributaries. A variety of game fish are to be found in these streams, including cutthroat, whitefish, and Dolly Varden. A great number of crystal lakes also await the fisherman. Cutthroat trout inhabit the higher lakes while many of the lower ones contain rainbow and brook trout.

The wild jumble of green forested mountains offer sanctuary to a variety of game birds and animals. Even caribou, probably visitors from Canada, have been seen along the Yaak River, but this is the promised land of white-tailed deer and black bear. No other part of Montana can boast the distribution of white-tailed deer, and probably more black bears are found here than in any other part of Montana. The much sought elk and largest of game animals, moose, roam the mountains also and in the tangled undergrowth offer a real challenge to the best of hunters. Giant grizzly bears, prized trophy of any game hunter, are now found in but a few states, but find the wild northwestern Cabinet Mountains to their liking. Bighorn sheep range along the Kootenai River Valley.

As one would suspect, this is also the domain of native mountain grouse. Ruffled, blue, and Franklin's (Spruce) grouse are widespread and an occasional ptarmigan shows up in the higher elevations.

The recreational potential of Lincoln County remains practically untouched, and as population continues to expand, this area will undoubtedly become recognized as one of the major repositories for natural beauty and outdoor recreation.

KOOTENAI NATIONAL FOREST

Most of the area now comprising the Kootenai National Forest was set aside by proclamation of President Cleveland on February 22, 1897, and was known as the Lewis and Clark Forest Reserve, Northern Division.

Kootenai National Forest was established by Presidential proclamation in 1906 and comprised that area north of the Kootenai River. The area south of the river was included in the Cabinet National Forest, but on June 25, 1908 was added to the Kootenai along with a portion of the Lewis and Clark, not including the Fortine Ranger District. The Kootenai's Fortine District was in the Blackfoot National Forest until June 22, 1935, when it was added to the Kootenai.

The earliest Forest Rangers on what is now the Kootenai National Forest were Joe Eastland, Fred Herrig, and Charlie Myers. They received their appointments from the Department of the Interior in 1900 and 1901 and were assigned to the Lewis and Clark Forest Reserve, Northern Division. Their supervisor was William Brennan, with headquarters in Kalispell. Work of the early Rangers consisted primarily of patrolling the forest to prevent timber trespass, game law violations, and forest fires, constructing trails and estimating timber volumes. Required equipment was a saddle horse and gun. Qualifications were the ability to ride and shoot, plus expert woodsmanship. Rangers were furnished an axe, saw, and a shiny silver badge. Pay was $60 per month.

There were no Ranger Districts as we know them today. Rangers were assigned at large within the forest. Primary responsibility for patrol and trail construction within a certain section was sometimes delegated to a particular Ranger. In these cases, the Ranger was responsible for construction of his own headquarters, usually a log cabin with a shake roof and dirt floor.

Of the 1,818,469 acres of Kootenai National Forest land, 1,606,139 acres are within Lincoln County. There are smaller acreages within Montana's Flathead and Sanders Counties, and Idaho's Bonner and Boundary Counties. Approximately 70% of Lincoln County's land surface is National Forest.

National Forests are managed and developed under a multiple use concept. In the face of a growing interest in outdoor recreation, a growing need for greater supplies of clear, clean water, more trees to yield good wood, more grass to feed livestock, and more food and homes for wild animals, fish, and birds, the multiple use approach was proved the most effective form of forest land management to provide the greatest overall benefits from these public lands. This resource management concept provides for the conservation of the basic land resources while producing high level sustained yields of water, recreation, timber, forage, and wildlife. Multiple use management permits more than one use of areas while avoiding conflicts with the development and use of other resources. Timber resources are managed to provide a continuous supply of lumber and other forest products, to demonstrate good forestry practice, and to improve cover and food for wildlife. Ranges are managed to provide a sustained supply of forage and browse for livestock and game animals. Forests and water courses are managed to preserve their beauty for recreational enjoyment and provide a favorable habitat for game and fish. Watersheds are managed and protected to safeguard water supplies, prevent erosion, and reduce floods. One of the indispensible roles of these public lands is to continue forever the gathering, storing, and regulation of the flow of great quantities of water.

Lumbering is the principal industry in Lincoln County. National Forest land, with the production of approximately 172,000,000 board feet of timber each year, in this county plays an important part in this industry. This is enough lumber to build 18,000 average size homes. The St. Regis Paper Company plant at Libby is the largest lumber manufacturing plant in Montana.

Christmas tree cutting is another important industry in Lincoln County. National Forest lands produced more than 50,000 bales of Christmas trees in 1963.

Water is undoubtedly the most valuable resource on the public land of Lincoln County. Water stored in the heavy snows on National Forest land is released into the Columbia River system in warmer months and makes significant contributions to irrigation, power production, domestic and industrial needs in the local area as well as throughout the Columbia River Valley. The domestic water supplies of Fortine, Eureka, Troy, and Libby come from Kootenai National Forest watershed lands.

Watershed conditions are generally good in Lincoln County. Recognizing the importance of favorable soil-water conditions as the foundation for all other uses and resource management, the Forest Service gives first consideration to soil and water in all planning. Timber is cut and roads are built with adequate provision for preventing harmful erosion and stream pollution. Fire prevention and suppression, balancing the number of livestock against available forage, maintaining wildlife numbers within the support capacity of these public lands, and the control of insects and diseases all contribute to watershed protection on National Forest lands.

There has been a steady increase in the outdoor recreational use of National Forest lands. In 1963, a total of 170,000 recreation visits were recorded on National Forest lands in Lincoln County. In recent years several campgrounds have been rehabilitated and many new ones constructed. At the present time there are 24 developed camp and picnic areas. They provide a total of 211 family camping and picnic units.

Outdoor recreation use is expected to increase with the advent of the Libby Dam. This project will furnish an excellent base for water-oriented recreation.

Part of the Cabinet Mountain Wild Area is within Lincoln County. A very popular recreation site is the Ross Creek Cedar Grove and its self-guiding nature trail. Recently two new scenic areas were established in the county. Ten Lakes, a beautiful high ridge location, is in the northeastern part of the county. Northwest Peak Scenic Area is in northwestern Lincoln County. In addition to these attractions, National Forest lands offer beautiful mountain lakes, quiet mountain trails, and excellent hunting and fishing.

Most of the National Forest land in this county is easily accessible by automobile. Because of the accessibility and the number of game animals in the area, these public lands are popular with hunters. The area provides sportsmen with bear, elk, mule and white-tail deer, moose, mountain goats, mountain sheep, and upland game birds.

Insects and disease represent the greatest threat to the National Forest lands. They destroy more timber than forest fires. Unless insects and disease are brought under control, they can eliminate entire species. This in turn would have serious impact on other resources: Forage, wildlife, recreation, and water.

In 1910 a devastating forest fire swept the principal industry of Lincoln County, then a thinly settled region with no means of rapid communication. Despite the best efforts of the settlers and the Forest Service, untold timber wealth went up in flames. A total of 224,220 acres of National

Forest land was burned. Fifty million board feet of merchantable timber was destroyed. Another 25 million feet was fire killed, but this was salvageable.

During the summer fire season, the Forest Service assigns top priority to fire suppression. Improved roads, technological advances in equipment, and fire suppression techniques all contribute to steady reduction of the burned acreage. The majority of the forest fires in Lincoln County are caused by lightning.

Seventy-seven ranchers graze livestock in the Kootenai National Forest within Lincoln County. These grazing allotments provide forage for approximately 2,400 cattle. Rapid regeneration of timber makes grazing on National Forest land in Lincoln County transistory.

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

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

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
*Missouri River	107,339.50	24,787.33	132,126.83
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	111,914.00	21,097.00	133,011.00
Smith River	32,934.00	19,679.00	52,613.00
Sun River	124,474.58	4,385.00	128,859.58
Marias River	114,685.42	13,415.88	128,101.30
Teton River	74,653.00	15,882.33	90,535.33
Musselshell River	64,789.00	57,870.00	122,659.00
Milk River	2,334.00	2,595.33	4,929.33
Yellowstone River	303,501.00	96,148.00	399,649.00
Stillwater River	27,489.00	16,403.00	43,892.00
Clark Fork River	91,768.00	24,195.00	115,963.00
Big Horn River	65,395.00	25,579.00	90,974.00
Tongue River	28,170.00	7,762.00	35,932.00
Powder River	35,948.00	2,299.00	38,247.00
Little Missouri River	42,513.00	1,499.00	44,012.00
Grand Total Missouri River Basin	**1,393,189.50**	**358,995.87**	**1,752,185.37**
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
Bitterroot 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 in the Counties Completed to Date	**1,796,400.95**	**382,630.29**	**2,179,031.24**

*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 LINCOLN COUNTY BY RIVER BASINS

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
COLUMBIA RIVER BASIN			
Columbia River	0	0	**0**
Kootenai (Kootenay) River	40.00	0	**40.00**
Young (Deer) Creek	50.00	15.00	**65.00**
Spring Creek	45.00	0	**45.00**
Sophie (Myrtle) Creek	143.00	0	**143.00**
Murray Creek	190.00	40.00	**230.00**
Sophie Lake	0	0	**0**
Phillips Creek	215.00	0	**215.00**
Dodge (Carrol) Creek	10.00	0	**10.00**
Tobacco River	492.00	9.00	**501.00**
Fortine Creek	21.00	176.00	**197.00**
Swamp Creek	0	0	**0**
Cayuse (Brush) Creek	22.00	0	**22.00**
Unnamed Spring	15.00	0	**15.00**
Edna Creek	54.00	0	**54.00**
Cripple (Ant) Creek	398.00	0	**398.00**
Brimstone (Porter) Creek & Spring	21.00	0	**21.00**
Murphy Creek	86.00	14.00	**100.00**
Laughing Water Creek	16.00	10.00	**26.00**
Deep Creek	83.00	60.00	**143.00**
Crystal Lake	6.00	5.00	**11.00**
Unnamed Spring	34.00	3.00	**37.00**
Meadow Creek	42.00	0	**42.00**
**Grave (Graves) Creek	1,027.10	103.50	**1,130.60**
Unnamed Spring	5.00	0	**5.00**
No. Br. Grave Creek	10.00	0	**10.00**
Unnamed Creek and Spring	68.00	0	**68.00**
Mud Creek	43.00	0	**43.00**
**Therriault Creek	792.11	121.50	**913.61**
Sherman Creek	8.00	0	**8.00**
Glenn (Lake) Creek	9.00	0	**9.00**
Sinclair (Cedar Swamp) (St. Clair) Creek	562.00	15.00	**577.00**
Spring Creek	92.00	0	**92.00**
Unnamed Spring	6.00	0	**6.00**
Indian Creek	739.00	213.00	**952.00**
Edwards (Desrosier) (Chief) Creek	198.00	0	**198.00**
Dry Creek	195.00	0	**195.00**
Total Tobacco River and Tributaries	**5,044.21**	**730.00**	**5,774.21**
Poverty Creek	35.00	0	**35.00**
Pinkham Creek	45.00	0	**45.00**
Slick Gulch	0	0	**0**
Unnamed Spring	5.00	0	**5.00**
Ten Mile Creek	54.00	0	**54.00**
Fisher River	37.00	0	**37.00**
Loon Lake	0	0	**0**
Pleasant Valley Fisher River	0	0	**0**
Lynch Lake	0	0	**0**
Island Creek	0	0	**0**
Island Lake	0	0	**0**
Coniff (Meadow) Creek	131.00	0	**131.00**
Harper Creek	27.00	0	**27.00**
McGinnis Creek	202.00	0	**202.00**
Houghten Creek	0	0	**0**

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

**Includes Glen Lake Irrigation District. Source of Water, 50% Grave and Therriault Creeks.

IRRIGATION SUMMARY OF LINCOLN COUNTY BY RIVER BASINS

RIVER BASIN COLUMBIA RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
So. and East Forks Houghten Creek	21.00	0	21.00
East Fisher Creek	56.00	0	56.00
Owl (Deep) Creek	8.00	0	8.00
Silver Butte Creek	107.00	0	107.00
Schrieber Creek	50.00	0	50.00
Spring (Little) Creek	10.00	0	10.00
Wolf Creek	63.00	0	63.00
Total Fisher River and Tributaries	**712.00**	**0**	**712.00**
Nixon Spring	30.00	0	30.00
Michaels Draw and Springs	25.00	0	25.00
Libby Creek	85.00	0	85.00
Swamp Creek	40.00	0	40.00
Blackjack Creek	3.00	0	3.00
Detgen Creek	10.00	0	10.00
Elliot Creek	0	20.00	20.00
McMillian Creek	170.00	0	170.00
Flower (Flour) Creek	63.00	0	63.00
Parmenter Creek	15.00	0	15.00
Pipe Creek	0	0	0
Doak Creek	50.00	0	50.00
Bobtail Creek	40.00	0	40.00
Unnamed Creek	0	55.00	55.00
Hughes Creek	10.00	0	10.00
Quartz Creek	55.00	0	55.00
Bitterman Spring	6.00	0	6.00
O'Brien Creek	0	0	0
Rabbit Creek	4.00	0	4.00
Lake Creek	0	0	0
Camp (Stage Barn) Creek	44.00	0	44.00
Porcupine Creek	2.00	0	2.00
Keeler Creek	2.00	0	2.00
No. Fk. Keeler Creek	6.00	0	6.00
Felix Creek	0	0	0
Unnamed Spring	2.00	0	2.00
Falls Creek	32.92	0	32.92
Spring Creek	1.00	0	1.00
Milner Lake	0	33.00	33.00
Yaak River	0	0	0
No. Fk. Yaak River	0	0	0
Wood Creek	0	0	0
Robard (Dog) Creek	21.00	0	21.00
So. Fk. Yaak River	0	0	0
Fix Creek	9.00	0	9.00
Clay Creek	0	62.00	62.00
Total Yaak River and Tributaries	**30.00**	**62.00**	**92.00**
Pine Creek	0	0	0
Bear Creek	4.00	0	4.00
Lime Creek	10.00	13.00	23.00
Total Kootenai River and Tributaries	**7,328.13**	**968.00**	**8,296.13**
Clark Fork River	0	0	0
Thompson River	0	0	0
Thompson Lakes	0	0	0
Davis (Fruit) Creek	42.00	0	42.00
Total Clark Fork River and Tributaries	**42.00**	**0**	**42.00**
Grand Total Lincoln County	**7,370.13**	**968.00**	**8,338.13**

GLEN LAKE IRRIGATION DISTRICT

HISTORY

The Northwest Irrigation Company, a company formed by members of the Frost family, were the first users of water under what is now called the Glen Lake Irrigation District.

In July 1909, Frank Marsh, an engineer from Kalispell, established a surveyor's camp at Glen Lake for the proposed construction of the Glen Lake Irrigation District Ditch. The following year, on January 8, 1910, a petition was filed in the District Court of Lincoln County for the establishment and organization of the district. F. P. Garey was elected President; L. J. B. Chapman, Secretary; A. T. Purdy, M. P. Shenefelt and F. P. Garey were appointed Commissioners.

The original district contained a total of 4,245 acres and was bonded by $112,000 to finance construction of the ditch. Most of the funds for building of the ditch were raised by the farmers within the district. Initial construction of the main canal was made by Peter Nelson in June of 1914, with the water being diverted from Therriault Creek and spilled into Lick Lake. From Lick Lake the ditch continues on to Glen Lake, from where the main canal supplies water to the project lands.

The farmer-investor members of the district had dreams of a very prosperous future for their farm holdings under the new district. They did not realize, however, that the long ditch with its many flumes and syphons was an expensive item to build and maintain. For the first ten years the costs were pro-rated to users of water at about $1.58 per acre per year, but this amount only paid the interest on the bonds. Many of the farmers in the district signed up for all of their farm land, including land that had never been cultivated and in many cases land that had never been cleared. Their plans were to increase their acreage of cropland immediately and make a big profit from the grain and livestock they raised. Some of them even mortgaged their land to build fine homes and other new farm buildings.

The members of the district also underestimated the time and money necessary to prepare the new land for irrigation and the cost of maintaining such a long ditch system. Other problems they encountered were in the application of water to a soil that was often sandy and underlaid with gravel, not realizing the amount of irrigation water it would require to raise a crop. They expected the thin top soil of this plains area to produce crops indefinitely without any additional treatment of the soil to renew its fertility. By 1920, the payments on the principal of the bonds became due and with a large part of the original acreage included in the district withdrawn, it was necessary that the assessment on the remaining acreage be increased to $5.00 per acre. The increased assessment was too late for the district to meet its obligations, and so it finally went broke, but later the district was reorganized on a more sound financial basis. Under the new reorganization additional water was appropriated and a ditch constructed from Grave Creek to supplement the water supply of the Glenn Lake Project.

PRESENT STATISTICS

Location: Lands irrigated by the district are located in parts of Section 19, T. 36N., R. 26W.; Sections 2, 3, 4, 5, 9, 10, 11, 12, 13 and 24, T. 36N., R. 27W.; and in Sections 33, 34, 35 and 36, T. 37N., R. 27W. Glen Lake is located in Sections 21, 22 and 27 and Lick Lake in the NW¼ of Section 26, T. 36N., R. 26W.

Length and Capacity of Canals: The main canal from Glen Lake has a total length of 15 miles with a carrying capacity of approximately 100 c.f.s. The supply canal from Grave Creek is 7 miles

in length with a carrying capacity of 75 c.f.s. The other supply ditch from Therriault Creek is about three-fourths of a mile in length and has a capacity of 80 c.f.s.

Size and Capacity of Reservoirs: The capacity of Glen Lake and Lick Lake Reservoirs is unknown, however Glen Lake covers a surface area of 300 acres and Lick Lake a surface area of 15 acres.

Operation and Maintenance: The total water charge for the district in 1964 was $5.00 per acre which included operation and maintenance. This amount may vary from year to year, depending upon repairs and replacements needed for the project works.

Present Users: There are 44 members purchasing water for their lands in the district.

Acreage Irrigated: When the district was formed it included more than 4,000 acres but about one-half of this acreage has been removed as undesirable land for irrigation purposes. In 1964, the district had 1,428.21 acres irrigated with a potential acreage under present works of 839 acres, making a total of 2,267.21 maximum acres.

WATER RIGHT DATA

The water rights appurtenant to the Glen Lake Irrigation District are as follows:

An appropriation by A. L. Jaqueth and W. B. Rhoades from Grave Creek, dated 5-18-05 for 15,000 miner's inches. (Ref. Book 36 Water Rights, page 594, Flathead County.)

An appropriation by the Glen Lake Irrigation District from Grave Creek, dated 6-15-15 for 1,200 miner's inches. (Ref. Book 25 Water Rights, page 334, Lincoln County.)

An appropriation by the Glen Lake Irrigation District from Grave Creek, dated 10-8-15 for 2,000 miner's inches. (Ref. Book 25 Water Rights, page 338, Lincoln County.)

An appropriation by L. H. Bradburn et al from Therriault Creek, dated 6-12-96 for 2,000 miner's inches. (Ref. Book 16 Water Rights, page 285, Flathead County.)

An appropriation by F. P. Garey and A. T. Purdy from Therriault Creek, dated 1-22-12 for 2,000 miner's inches. (Ref. Book 25 Water Rights, page 69, Lincoln County.)

An appropriation by the Northwest Irrigation Company from Therriault Creek, dated 10-29-98 for 6,500 miner's inches. (Ref. Book 16 Water Rights, page 350, Flathead County.)

An appropriation by W. B. Rhoades from Glen Lake, dated 4-28-05 for 6,000 miner's inches. (Ref. Book 36 Water Rights, page 592, Flathead County.)

An appropriation by W. B. Rhoades et al from Lick Lake, dated 5-2-05 for 6,000 miner's inches. (Ref. Book 36 Water Rights, page 593, Flathead County).

An appropriation by Glen Lake Irrigation District from Glen Lake, dated 10-5-15 for 4,000 miner's inches. (Ref. Book 25 Water Rights, page 337, Lincoln County.)

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
COLUMBIA RIVER BASIN							
*Columbia River	0	0	0				
Kootenai (Kootenay) River	15	1,921,356.00	48,033.90				
Young (Deer) Creek	8	1,945.00	48.62				
Spring Creek	2	1,240.00	31.00				
Farrell Creek	1	50.00	1.25				
Well	2	64.00	1.60				
Sophie (Myrtle) Creek	7	3,700.00	92.50				
Unnamed Spring	1	200.00	5.00				
Unnamed Spring	1	All	---				
Campbell Creek Spring	1	---	---				
Murray Creek	2	500.00	12.50				
Unnamed Spring	1	40.00	1.00				
Sophie Lake	3	4,400.00	110.00				
Phillips Creek	23	12,170.00	304.25				
Blacktail Creek	1	500.00	12.50				
So. Fk. Phillips Creek	1	1,000.00	25.00				
Spion Kap Creek	3	190.00	4.75				
Unnamed Spring	1	All	---				
Big Springs	1	All	---				
Copper Creek	1	200.00	5.00				
George Birds Springs	1	200.00	5.00				
Tetrault (Irene) Lake	1	---	---				
Unnamed Spring (Baillie)	1	---	---				
Ennis Creek	1	All	---				
Spring Brook (Pond) Creek	2	200.00	5.00				
Dodge (Carrol) Creek	6	418.55	10.46				
Tobacco River	13	459,984.00	11,499.60				
Fortine Creek	14	22,265.00	556.62				
Carlson Creek	1	160.00	4.00				
Swamp Creek	2	20,200.00	505.00				
Ten Mile Creek	1	200.00	5.00				
Unnamed Spring	1	All	---				
Lake Creek	1	40.00	1.00				
Unnamed Spr.	1	20.00	.50				
Cayuse (Brush) Creek	3	400.00	10.00				
Unnamed Spring	1	40.00	1.00				
Jim Creek	0	0	0				
Stewart Creek	5	1,560.00	39.00				
Edna Creek	3	650.00	16.25				
Lime Creek	1	150.00	3.75				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	1	All	---				
A Small Lake	1	80.00	2.00				
Cripple (Ant) Creek	6	760.00	19.00				
Unnamed Springs	4	All	---				
Brimstone (Porter) creek	4	1,050.00	26.25				
Unnamed Sp'g	1	4.00	.10				
Unnamed Sp'g	1	400.00	10.00				

*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—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Murphy Creek	11	1,760.00	44.00				
Unnamed Stream	3	All	---				
Laughing Water Cr.	2	40.00	1.00				
Murphy Lake	0	0	0				
Dickey Cr.	1	400.00	10.00				
Dickey Lake	1	4,000.00	100.00				
Deep Creek	12	18,705.00	467.63				
No. Fk. Deep Cr.	1	---	---				
Grant's Spring	1	40.00	1.00				
Crystal Lake (Waste)	1	80.00	2.00				
Unnamed Spring	1	40.00	1.00				
Meadow Creek	5	4,760.00	119.00				
Marl Lake Creek	1	160.00	4.00				
Marl Lake	1	---	---				
Roberts Cr.	1	80.00	2.00				
A Certain Lake	1	All	---				
Barnaby Lake	0	0	0				
Frank's Lake	1	200.00	5.00				
Lake Creek	1	400.00	10.00				
Graves (Grave) Creek	24	117,759.00	2,943.98				
Unnamed Spring	2	All	---				
Dahlberg Spring	1	80.00	2.00				
Hughes Creek	2	8,000.00	200.00				
Lost Lake	0	0	0				
Unnamed Spring	1	All	---				
Mud Creek	5	960.00	24.00				
Therriault Creek	29	18,430.00	460.75	498	1	140.00	3.50
Griffith Creek	1	2,000.00	50.00				
Sherman Creek	2	560.00	14.00				
Unnamed Spring	1	400.00	10.00				
Unnamed Creek	1	80.00	2.00				
Glenn (Lake) Creek	2	125.00	3.13				
Glen Lake	8	11,720.00	293.00				
Lick Lake	1	6,000.00	150.00				
Unnamed Spring	1	40.00	1.00				
Glen Creek	0	0	0				
Burton (Salzer) (Nelson) Cr.	4	720.00	18.00				
Unnamed Sp'g.	1	All	---				
Unnamed Spring	1	50.00	1.25				
Unnamed Spring	1	60.00	1.50				
Enos (Twin) Lakes	3	5,320.00	133.00				
Unnamed Spring	1	40.00	1.00				
Sinclair (Cedar Swamp) (St. Clair) Creek	36	12,230.00	305.75				
Unnamed Springs	6	960.00	24.00				
Stahl Lake	1	---	---				
Spring Creek	6	2,510.00	62.75				
Ksanka Creek	0	0	0				
Unnamed Creek	1	All	---				
Canyon Creek	1	All	---				
Costich Lake	1	400.00	10.00				
Cold Spring	1	160.00	4.00				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Mill Springs	1	5.00	.12				
Clark Lake	2	600.00	15.00				
Unnamed Springs	2	20.00	.50				
Indian Creek	25	7,430.00	185.75				
Unnamed Spring	2	40.00	1.00				
Galena and Maple Springs	1	100.00	2.50				
Edwards (Derosier) (Chief) Creek	11	2,150.00	53.75	*1347	4	260.00	6.50
Fallon Creek	1	400.00	10.00	*(Located Flathead County			
Frank's Spring	1	--	---	Courthouse)			
John's Spring	1	---	---				
Unnamed Spring	2	40.00	1.00				
Dry Creek	1	60.00	1.50	*1614	2	40.00	1.00
Unnamed Sp'g	1	---	---	*(Located Flathead County			
Unnamed Spring	1	20.00	.50	Courthouse)			
Rich Spring	1	150.00	3.75				
Unnamed Spring	1	1,000.00	25.00				
Berger Lake	1	320.00	8.00				
Unnamed Spring	1	80.00	2.00				
Unnamed Spring	2	40.00	1.00				
Unnamed Spring	1	40.00	1.00				
Madden Lake	0	0	0				
Unnamed Spring	1	160.00	4.00				
Total Tobacco River and Tirbutaries	**317**	**739,927.00**	**18,498.18**				
Louis Spring	3	120.00	3.00				
Unnamed Spring (Fewkes)	1	2,000.00	50.00				
Poverty Creek	2	180.00	4.50				
Collar (Pinkham) Sp'g	2	600.00	15.00				
Sullivan Creek	5	3,800.00	95.00				
Unnamed Spring	2	120.00	3.00				
Pinkham Creek	14	132,240.00	3,306.00				
Cooks Run	0	0	0				
Unnamed Springs	2	288.00	7.20				
Slick Gulch	0	0	0				
Unnamed Springs	1	All	---				
Unnamed Springs	1	---	---				
Unnamed Spring	1	10.00	0.25				
Four Springs	1	All	---				
Weaver Creek	1	200.00	5.00				
Boulder Creek	1	80.00	2.00				
Gold Creek	1	300.00	7.50				
Burwell Spring	1	100.00	2.50				
Unnamed Spring	1	40.00	1.00				
Big Creek	2	6,200.00	155.00				
Peck (Gulch) Creek	4	440.00	11.00				
McGuire Creek	4	1,440.00	36.00				
Tweed (Waterfall) Cr.	1	80.00	2.00				
Parsnip Creek	1	280.00	7.00				
Giebler (Gibler) Creek	3	880.00	22.00				
Sheep Creek	2	100.00	2.50				
Ural Creek	2	440.00	11.00				
Ten Mile Creek	2	520.00	13.00				
Five Mile Creek	3	620.00	15.50				
Unnamed Spring	1	---	---				
Bristow Creek	1	2,000.00	50.00				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Spring	1	80.00	2.00				
Unnamed Spring	2	40.00	1.00				
Warland (Lost) Creek	3	660.00	16.50				
Barron Creek	3	1,100.00	27.50				
Cripple Horse Creek	3	400.00	10.00				
Unnamed Spring	1	All	---				
Jackson Creek	1	200.00	5.00				
Canyon Creek	1	100.00	2.50				
Theodore Niens Sp'g.	1	All	---				
Unnamed Spring	1	40.00	1.00				
Dunn Creek	3	440.00	11.00				
Fisher River	6	48,840.00	1,221.00				
Loon Lake	0	0	0				
Pleasant Valley Fisher River	0	0	0				
Lynch Lake	0	0	0				
Island Creek	0	0	0				
Island Lake	0	0	0				
Coniff (Meadow) Creek	3	680.00	17.00				
Towin Creek	1	500.00	12.50				
Unnamed Spring	1	---	---				
Sipe Creek	2	400.00	10.00				
Barnum Creek	1	400.00	10.00				
Unnamed Sp'g.	1	800.00	20.00				
Thompson Lakes	0	0	0				
Slimmer Creek	3	2,600.00	65.00				
Tallulah (Gorman) Creek	1	8.00	.20				
Davis (Fruit) Creek	1	100.00	2.50				
Unnamed Stream	1	---	---				
McGinnis Creek	5	360.00	9.00				
Fergie Creek	1	200.00	5.00				
Doe Creek	1	All surplus	---				
Unnamed Stream	1	---	---				
Ferguson Creek	1	100.00	2.50				
Slater Creek	1	All	---				
Raven Creek	2	300.00	7.50				
Houghten Creek	1	100.00	2.50				
E. Fk. Houghten Cr.	2	80.00	2.00				
S. Fk. Houghten Cr.	2	80.00	2.00				
Sedlak Creek	1	All	---				
East Fisher Creek	2	600.00	15.00				
Owl (Deep) Creek	1	200.00	5.00				
Silver Butte Creek	5	123,500.00	3,087.50				
Unknown Creek	3	600.00	15.00				
Barree Creek and Lake	1	200.00	5.00				
Gold Hill Creek	1	80.00	2.00				
Iron Meadow Cr.	2	280.00	7.00				
Trapper Creek	1	200.00	5.00				
No. Fk. Silver Butte Creek	1	500.00	12.50				
Porcupine Creek	1	200.00	5.00				
Harris Creek	1	2,000.00	50.00				
Unnamed Spring	1	All	---				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Hunter Creek	1	240.00	6.00				
West Fisher Creek	15	77,525.00	1,938.12				
Mill Creek	5	12,500.00	312.50				
Standard Creek	0	0	0				
Great Northern Creek	1	500.00	12.50				
Spring Creek	1	200.00	5.00				
Lake Creek	3	4,650.00	116.25				
Fourth of July Creek	1	40.00	1.00				
Bramlet Creek	9	7,610.00	190.25				
Bramlet Lake	2	1,100.00	27.50				
Unnamed Sp'g.	1	40.00	1.00				
Rush Creek	1	800.00	20.00				
Miller Creek	4	22,160.00	554.00				
So. Fk. Miller Cr.	2	400.00	10.00				
No. Fk. Miller Cr.	2	400.00	10.00				
Schrieber Creek	1	---	---				
Coyote Creek	1	200.00	5.00				
Spring (Little) Creek	3	400.00	10.00				
Unnamed Spring	1	400.00	10.00				
McKillop Creek	1	200.00	5.00				
Snell (Tyrol) Creek	1	160.00	4.00				
Cow Creek	1	200.00	5.00				
E. Fk. Cow Creek	1	80.00	2.00				
W. Fk. Cow Creek	1	40.00	1.00				
Wolf Creek	12	22,450.00	561.25				
Lost Creek	1	100.00	2.50				
Little Wolf Creek	2	620.00	15.50				
Calx Creek	2	All	---				
Tamarack Creek	2	All	---				
Richards Creek	2	360.00	9.00				
Cody Creek	0	0	0				
Balsemer Creek	1	160.00	4.00				
Total Fisher River and Tributaries	**140**	**337,443.00**	**8,436.07**				
Unnamed Spring	1	40.00	1.00				
Jennings Creek	1	4.00	.10				
Bogarts Spring	2	20,040.00	501.00				
Unnamed Stream	1	40.00	1.00				
Canoe Gulch	2	180.00	4.50				
Johnson Draw	1	All	---				
Nixon Spring	2	100.00	2.50				
Unnamed Spring	1	1,600.00	40.00				
Unnamed Creek	1	80.00	2.00				
Rainy Creek	7	18,860.00	471.50				
Carney Creek	2	140.00	3.50				
Spring Gulch	1	80.00	2.00				
Unnamed Spring	1	800.00	20.00				
Mills Spring	1	200.00	5.00				
Michael Draw	1	120.00	3.00				
Unnamed Spring	1	All	---				
Sheldon Creek	1	100.00	2.50				
Unnamed Spring	1	120.00	3.00				
Unnamed Spring	1	---	---				
Unnamed Spring	1	All	---				
Postnacher Spring	1	40.00	1.00				
Spring Creek	1	40.00	1.00				
Libby Creek	48	338,169.00	8,454.23				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Howard Creek	2	2,000.00	50.00				
Howard (Cleveland) Lake	1	500.00	12.50				
Ramsey Creek	8	8,208.00	205.20				
Poorman Creek	6	13,600.00	340.00				
Pratt Creek	1	1,600.00	40.00				
Little Cherry Creek	3	6,000.00	150.00				
Bear Creek	8	9,360.00	234.00				
Cable Creek	2	900.00	22.50				
Swamp Creek	5	840.00	21.00				
Rhinehart Creek	1	5.00	.12				
Schnieder Creek	2	160.00	4.00				
Cowell (McDonald) Creek	2	2,480.00	62.00				
Blackjack Creek	1	120.00	3.00				
Detgen Creek	1	80.00	2.00				
Larch Creek	1	40.00	1.00				
Elliot Creek	3	505.00	12.63				
Unnamed Spring	1	---	---				
Unnamed Spring	1	4.00	.10				
Spring Creek	6	238.00	5.95				
Balsemer Creek	1	40.00	1.00				
Martinsen Spring	1	All	---				
Unnamed Spring	2	440.00	11.00				
Getner (Ratier) Creek	7	1,125.00	28.12				
Beaver Creek	1	216.00	5.40				
Unnamed Stream	1	All	---				
McMillian's Creek	7	660.00	16.50				
William's (Gulch) Cr.	2	120.00	3.00				
Unnamed Spring	1	80.00	2.00				
McGuire Creek	3	560.00	14.00				
Unnamed Spring	1	80.00	2.00				
Unnamed Creek	1	---	---				
Big Spring	1	500.00	12.50				
Unnamed Spring	1	All	---				
Unnamed Spring	1	20.00	.50				
Unnamed Spring	1	400.00	10.00				
Spring Creek	1	40.00	1.00				
Swede Gulch	2	80.00	2.00				
Unnamed Spring	1	10.00	.25				
Unnamed Spring	1	40.00	1.00				
Granite Creek	46	346,820.00	8,670.50				
Granite Lake	1	4,000.00	100.00				
Horse Creek	4	21,600.00	540.00				
Shaughnessy Creek	3	1,600.00	40.00				
Snow Creek	1	40.00	1.00				
Big Cherry Creek	21	308,630.00	7,715.75				
Snowshoe Creek	3	3,500.00	87.50				
Leigh Creek	12	25,400.00	635.00				
Smearl Creek	1	200.00	5.00				
Prospect Creek	4	6,240.00	156.00				
Unnamed Stream	1	20.00	.50				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	1	80.00	2.00				
Davis Creek	1	2,000.00	50.00				
No. Fk. Davis Creek	1	2,000.00	50.00				
Total Libby Creek and Tributaries	**241**	**1,111,390.00**	**27,784.75**				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Johnson Creek	1	40.00	1.00				
Flower (Flour) Creek	19	44,400.00	1,110.00				
E. Branch Flower Cr.	6	1,156.00	28.90				
Unnamed Spring	4	---	---				
Unnamed Spring	1	24.00	.60				
Unnamed Spring	1	400.00	10.00				
Unnamed Spring	1	20.00	.50				
Unnamed Spring	1	120.00	3.00				
Hillside Spring	1	80.00	2.00				
Parmenter Creek	21	276,858.00	6,921.45				
Unnamed Creek	2	160.00	4.00				
Unnamed Spring	1	50.00	1.25				
Spring Creek	1	40.00	1.00				
Unnamed Stream	1	200.00	5.00				
Unnamed Spring	1	200.00	5.00				
Unnamed Creek	1	.80	.02				
Unnamed Spring	1	200.00	5.00				
Pipe Creek	14	47,480.00	1,187.00				
Brandt Creek	2	800.00	20.00				
Carrigan Creek	1	400.00	10.00				
Noisy Creek	1	2,000.00	50.00				
Fall Creek	1	200.00	5.00				
Doak Creek	3	4,400.00	110.00				
Meadow Creek	1	600.00	15.00				
Unnamed Stream	1	---	---				
Unnamed Creek	1	60.00	1.50				
Bobtail Creek	16	4,280.00	107.00				
Unnamed Creek	1	80.00	2.00				
Hughes Creek	1	100.00	2.50				
Unnamed Spring	1	---	---				
Spring Creek	1	20.00	.50				
Cedar Creek	7	2,350.00	58.75				
Unnamed Spring	1	40.00	1.00				
Quartz Creek	6	23,360.00	584.00				
Unnamed Spring	1	20.00	.50				
Burrell Creek	2	400.00	10.00				
Bluff Spring	1	---	---				
China (Chinee) Creek	1	250.00	6.25				
Cabinet Creek	2	154.00	3.85				
Unnamed Spring	2	8.00	.20				
Mahoney Springs	5	2,000.00	50.00				
Unnamed Spring	1	80.00	2.00				
Unnamed Spring	1	100.00	2.50				
Unnamed Creek	1	40.00	1.00				
Unnamed Spring	1	40.00	1.00				
O'Brien Creek	8	8,000.00	200.00				
E. Fk. O'Brien Creek	1	200.00	5.00				
Noseeum Creek	1	120.00	3.00				
No. Fk. O'Brien Creek	1	40.00	1.00				
Unnamed Spring	1	40.00	1.00				
O'Brien Springs	1	1,000.00	25.00				
Pass Creek	1	120.00	3.00				
Rabbit Creek	3	1,400.00	35.00				
Lake Creek	8	116,600.00	2,915.00				
Bull Lake	0	0	0				
Noggle Creek	1	100.00	2.50				
Payne Creek	1	400.00	10.00				
Unnamed Creek	2	520.00	13.00				
Crowell Creek	1	200.00	5.00				
Stanley Creek	1	1,000.00	25.00				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Spring Creek	1	600.00	15.00				
Dry Creek	2	640.00	16.00				
Camp (Stage Barn) Creek	10	1,760.00	44.00	1352	4	330.00	8.25
Porcupine Creek	4	580.00	14.50				
Twin Creek	1	200.00	5.00				
Keeler Creek	8	25,460.00	636.50				
W. Br. Keeler Cr.	1	1,500.00	37.50				
No. Fk. Keeler Cr.	6	4,300.00	107.50				
Hiawatha Spring	2	80.00	2.00				
Little Creek	1	200.00	5.00				
Copper (Powell) Cr.	7	14,060.00	351.50				
Sunrise Creek	2	550.00	13.75				
Grouse Lake	1	1,000.00	25.00				
Iron Creek	10	13,340.00	333.50				
So. Fk. Iron Creek	1	200.00	5.00				
Bill's Creek	1	400.00	10.00				
Unnamed Spring	1	All	---				
Unnamed Spring	2	All	---				
Chase Lake	1	80.00	2.00				
Unnamed Spring	1	700.00	17.50				
Unnamed Spring	1	100.00	2.50				
Felix Creek	4	720.00	18.00				
Mineral Spring	1	All	---				
Unnamed Spring	2	All	---				
Unnamed Spring	1	200.00	5.00				
Unnamed Spring	1	30.00	.75				
Falls Creek	22	20,662.92	516.58				
Swanson Creek	1	400.00	10.00				
Milner Lake	1	40.00	1.00				
Spring Creek	5	882.00	22.05				
Crystal Springs	1	100.00	2.50				
Unnamed Spring	2	440.00	11.00				
Heryakha Creek	2	10,000.00	250.00				
Unnamed Spring	1	40.00	1.00				
French Creek	2	60.00	1.50				
Total Lake Creek and Tributaries	**124**	**218,144.92**	**5,453.63**				
Callahan Creek	21	190,120.00	4,753.00				
Goat Creek	1	400.00	10.00				
Unnamed Spring	1	80.00	2.00				
No. Fk. Callahan Cr.	2	2,000.00	50.00				
So. Fk. Callahan Cr.	3	4,000.00	100.00				
Gordon Creek	2	600.00	15.00				
Black Bear Creek	1	All	---				
Unnamed Creek	1	80.00	2.00				
Three Mile Creek	5	11,340.00	283.50				
Bob's Creek	1	800.00	20.00				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	1	--	---				
Hale Creek	1	400.00	10.00				
Unnamed Spring	1	All	---				
Rightbower Creek	1	120.00	3.00				
Unnamed Springs and Creek	1	150.00	3.75				
Dobson (Halverson) Creek	2	240.00	6.00				
Slee Lake	0	0	0				
Unnamed Spring	2	40.80	1.02				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Spring	1	120.00	3.00				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	1	20.00	.50				
Rush Creek	1	200.00	5.00				
Unnamed Spring	1	4.00	.10				
Unnamed Stream	1	40.00	1.00				
Alvord Lake	2	All	---				
Unnamed Spring	1	80.00	2.00				
Unnamed Spring	1	All	---				
Unnamed Spring	1	20.00	.50				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	1	80.00	2.00				
Unnamed Spring	2	4,000.00	100.00				
Unnamed Spring	1	40.00	1.00				
Unnamed Creek	2	40.00	1.00				
C.C.C. Camp Spring	1	2,000.00	50.00				
Unnamed Spring	1	10.00	.25				
Ruby Creek	5	1,500.00	37.50				
Unnamed Spring	1	40.00	1.00				
Unnamed Spring	1	10.00	.25				
Star Creek	2	2,500.00	62.50				
Yaak River	24	496,260.00	12,406.50				
E. Fk. Yaak River	5	15,400.00	385.00				
Caribou Creek	1	1,000.00	25.00				
Solo Joe Creek	2	1,300.00	32.50				
Blacktail Creek	2	740.00	18.50				
Windy Creek	2	400.00	10.00				
No. Fk. Yaak River	0	0	0				
Wood Creek	0	0	0				
Robard (Dog) Cr.	1	120.00	3.00				
Johnson (Rat) Cr.	1	200.00	5.00				
Unnamed Stream	1	80.00	2.00				
Pinetopper's Camp Spring	1	400.00	10.00				
Lap Creek	1	80.00	2.00				
Vinal Creek	3	480.00	12.00				
Unnamed Spring	1	40.00	1.00				
So. Fk. Yaak River	3	180.00	4.50				
Fix Creek	1	80.00	2.00				
Clay Creek	4	2,640.00	66.00				
John's Creek	1	10.00	.25				
Camp Creek	1	200.00	5.00				
Fowler Creek	4	480.00	12.00				
Beaver (Deer) Cr.	2	800.00	20.00				
Unnamed Spring	1	1,000.00	25.00				
Unnamed Spring	1	200.00	5.00				
Lang Creek	1	160.00	4.00				
Cool Creek	1	1,000.00	25.00				
Gus Creek	1	80.00	2.00				
Pheasant Creek	1	---	---				
Spread Creek	1	1,200.00	30.00				
Meadow Creek	1	200.00	5.00				
Cyclone Creek	3	32,400.00	810.00				
Little Creek	1	200.00	5.00				
Burnt (Grizzley) Cr.	1	80.00	2.00				
Crawford Creek	5	440.00	11.00				
Unnamed Spring	1	80.00	2.00				
Independence Creek	3	4,100.00	102.50				
Fourth of July Creek	21	15,200.00	380.00				

WATER RIGHT DATA—LINCOLN COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

STREAM	APPROPRIATIONS (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	DECREED RIGHTS Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Watson Creek	1	200.00	5.00				
Unnamed Spring	1	100.00	2.50				
Unnamed Spring	1	100.00	2.50				
Unnamed Spring	1	---	---				
Unnamed Spring	2	200.00	5.00				
Wampoo Creek	2	4,080.00	102.00				
Arbo Creek	1	400.00	10.00				
Prospect Creek	1	20,000.00	500.00				
Farrow (Ferrel) Cr.	5	1,280.00	32.00				
Kilbrennan (Florence) Creek	7	66,560.00	1,664.00				
Unnamed Stream	1	80.00	2.00				
Kilbrennan Lake	0	0	0				
Lake (Feeder) Cr.	1	2,000.00	50.00				
Total Yaak River and Tributaries	**128**	**672,230.00**	**16,805.75**				
Pine Creek	6	3,450.00	86.25				
Bear Creek	3	---	---				
Unnamed Spring	1	---	---				
Black Diamond Sp'g	1	---	---				
Lime Creek	5	344.00	8.60				
Unnamed Spring	1	--	---				
Eberhart Creek	1	40.00	1.00				
Curley Creek	2	66.60	1.66				
Unnamed Stream	2	80.00	2.00				
Unnamed Stream	1	80.00	2.00				
Unnamed Spring	1	- -	---				
Unnamed Spring	2	---	---				
Unnamed Springs	2	---	---				
Kingsley Creek	1	80.00	2.00				
Clark Fork River	0	0	0				
Thompson River	0	0	0				
Thompson Lakes	0	0	0				
Davis (Fruit) Creek	1	100.00	2.50				
Tallulah (Gorman) Creek	1	80.00	2.00				
Flathead River	0	0	0				
Stillwater River	2	274.00	6.85				
No. Fk. Stillwater River	2	11,760.00	294.00				
Unnamed Spring	1	---	---				
Unnamed Stream	3	1,280.00	32.00				
Grand Total Lincoln County	**1,428**	**5,889,190.67**	**147,229.76**				

DRAINAGES IN LINCOLN COUNTY NOT LOCATED

STREAM	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Clear Water Creek	1	320.00	8.00
Deer Creek	1	10,000.00	250.00
Divide Creek	1	100.00	2.50
Doyle Creek	1	400.00	10.00
Edith Lake	1	All	---
Gladstone Gulch	1	200.00	5.00
Gold Run Creek	1	150.00	3.75
Herman Creek	1	1,000.00	25.00
Horse Ranch Creek	1	225.00	5.62
Jimmy Creek	1	1,000.00	25.00
Jurden Creek	1	300.00	7.50
Kinnettler Creek	1	200.00	5.00
Metcalf Spring	1	50.00	1.25
McCormick Creek	1	100.00	2.50
Nelson Creek	1	250.00	6.25
Pine Lake	1	20,000.00	500.00
Pique Lake	1	6,000.00	150.00
Sink Creek	1	40.00	1.00
Slide Creek	1	200.00	5.00
Spring Brook	1	300.00	7.50
Tidemon Gulch	1	200.00	5.00
Unnamed Creek	1	---	---
Unnamed Creek	1	500.00	12.50
Unnamed Spring	1	36.00	.90
Unnamed Spring	1	80.00	2.00
Unnamed Spring	1	40.00	1.00
Unnamed Stream	1	200.00	5.00
Unnamed Stream	1	200.00	5.00
Total	**28**	**42,091.00**	**1,052.27**

WATER RESOURCES SURVEY

Lincoln County, Montana

PART II

Maps Showing Irrigated Areas

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1965

CANADA INTERNATIONAL BOUNDARY

DRAINAGE MAP OF

Lincoln County

Showing Irrigated Areas

FLATHEAD COUNTY

SANDERS COUNTY

MAP INDEX

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

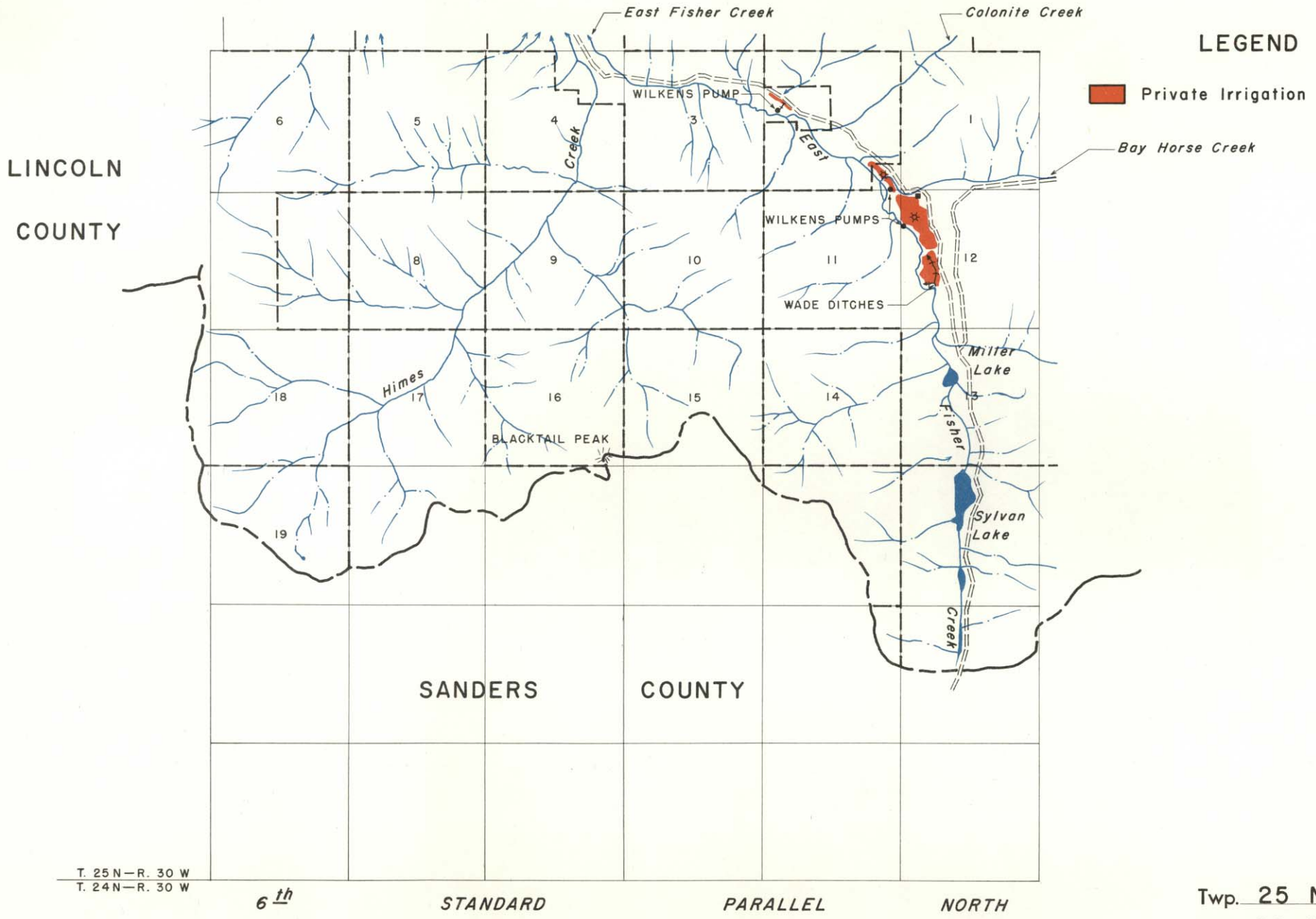
- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

TRANSPORTATION

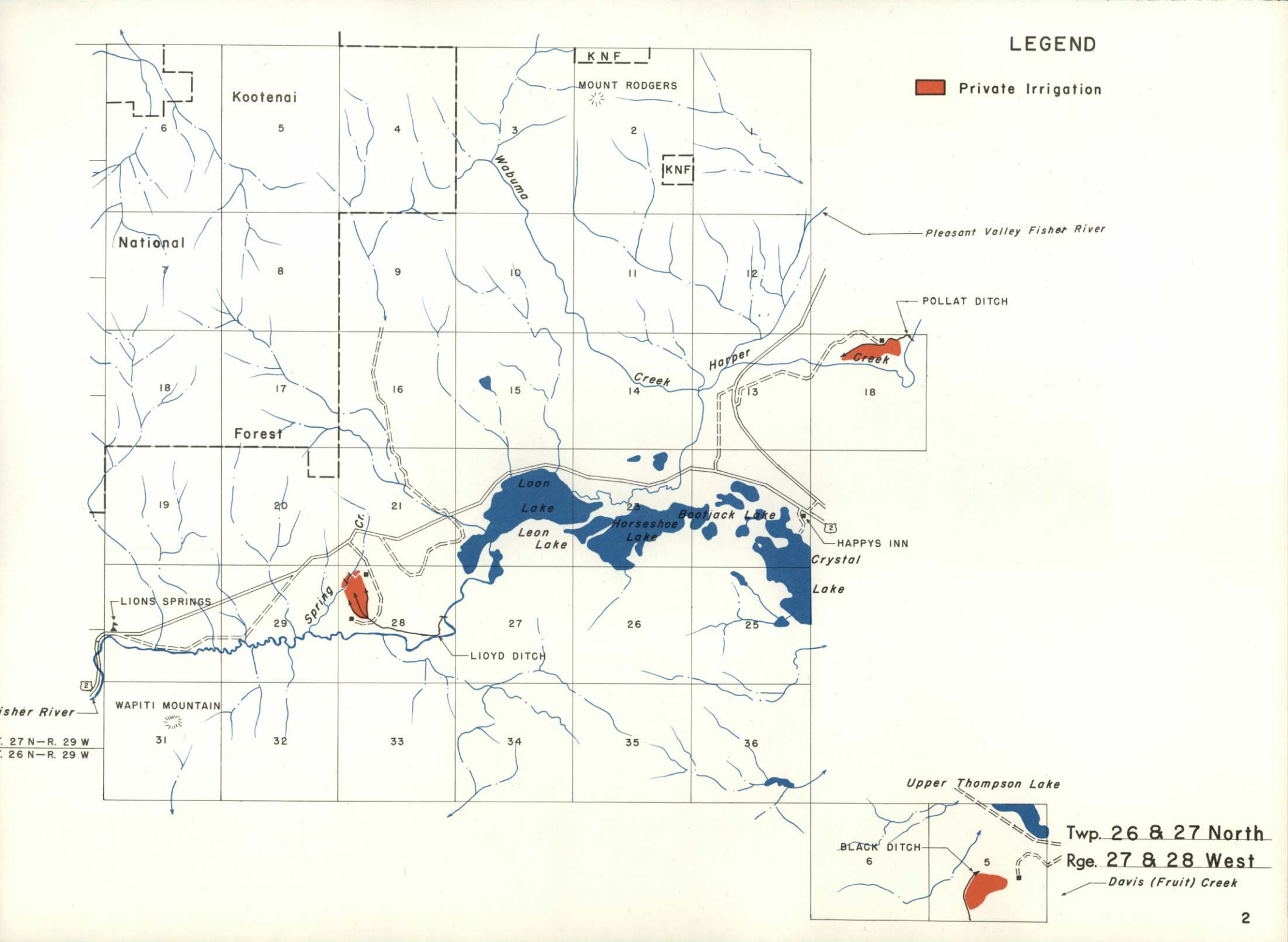
- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U.S. HIGHWAY
- AIRPORT

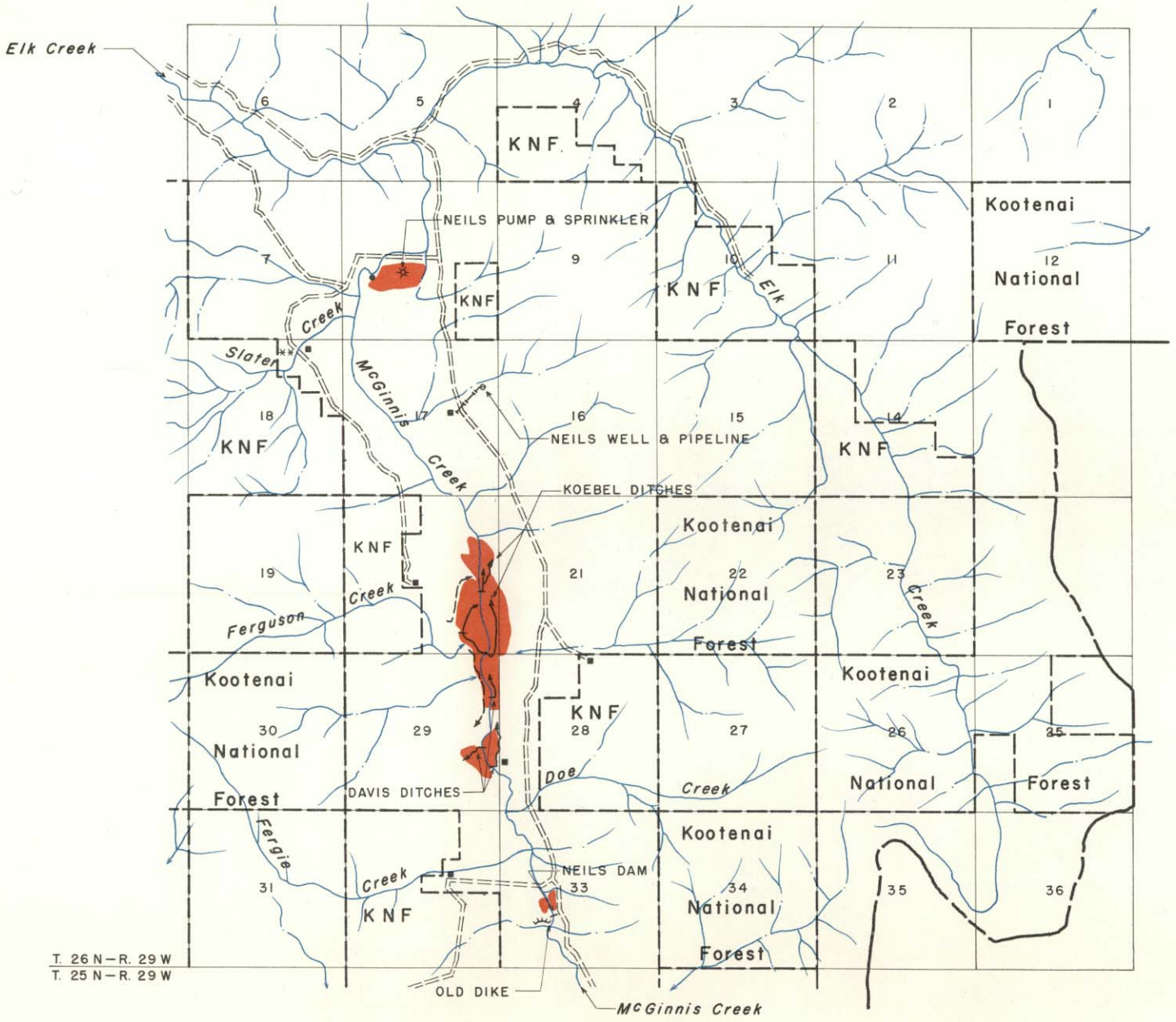
STRUCTURES & UNITS

- 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. 25 North
Rge. 29 West


LEGEND
Private Irrigation
KNF
MOUNT RODGERS
KNF
Kootenai
National
Forest
Wabuma
Creek
Pleasant Valley Fisher River
POLLAT DITCH
Harper
Creek
Loon
Lake
Leon
Lake
Horseshoe
Lake
Bootjack Lake
Crystal
Lake
HAPPYS INN
LIONS SPRINGS
Spring
Cr.
LIOYD DITCH
WAPITI MOUNTAIN
isher River
T. 27 N—R. 29 W
T. 26 N—R. 29 W
Upper Thompson Lake
BLACK DITCH
Twp. 26 & 27 North
Rge. 27 & 28 West
Davis (Fruit) Creek



LEGEND

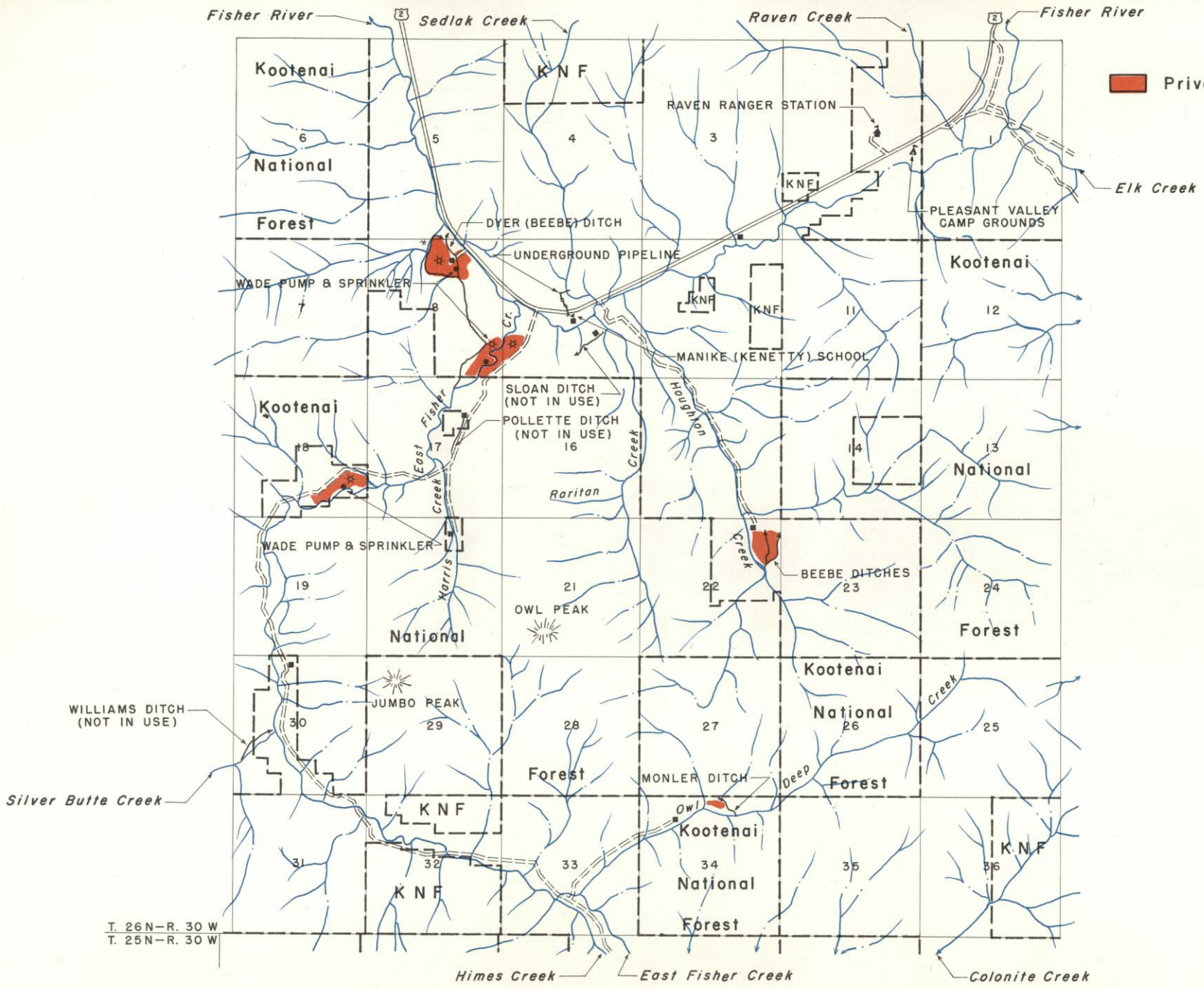
Private Irrigation

SANDERS

COUNTY

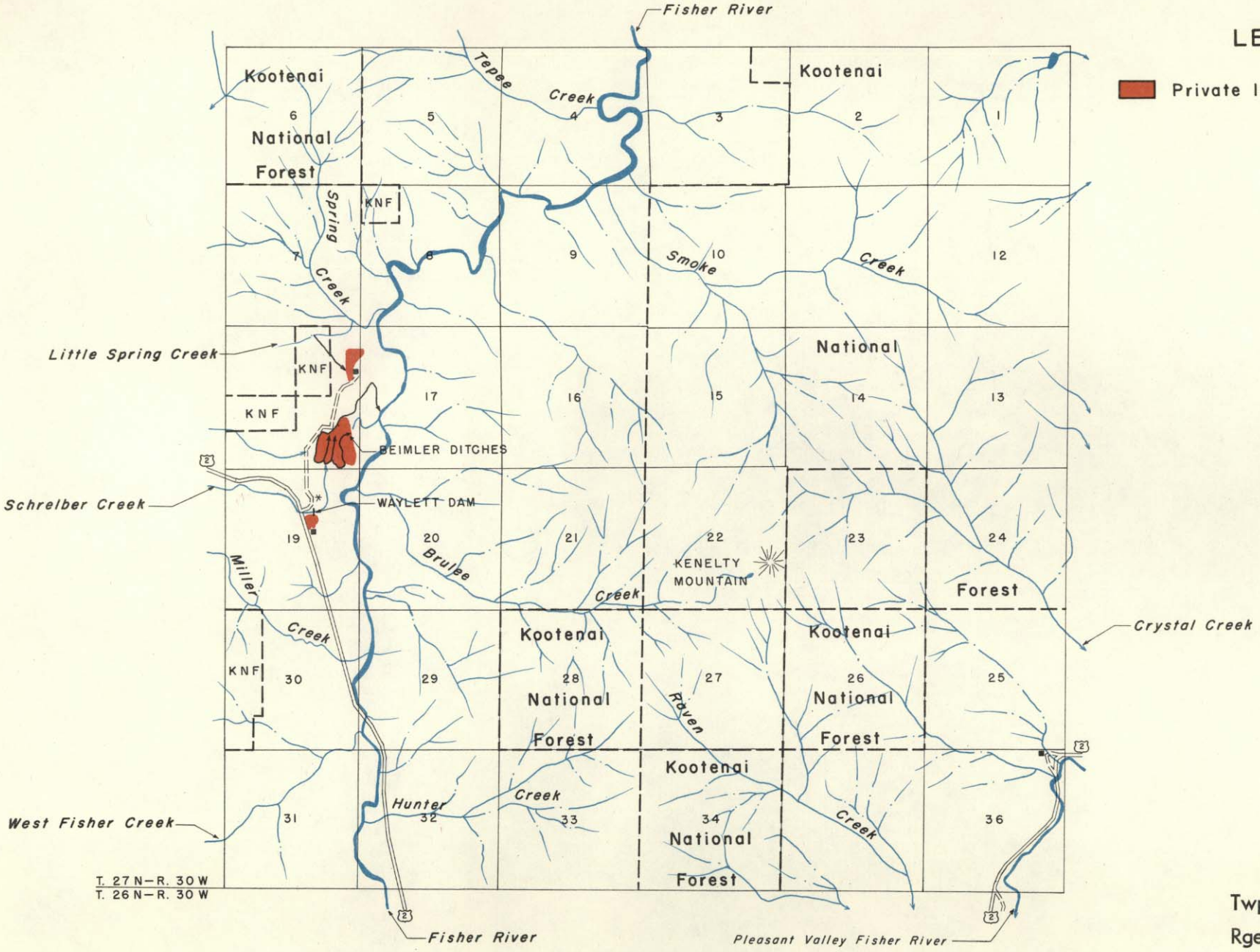
Twp. 26 North

Rge. 28 West



Twp. 26 North

Rge. 29 West

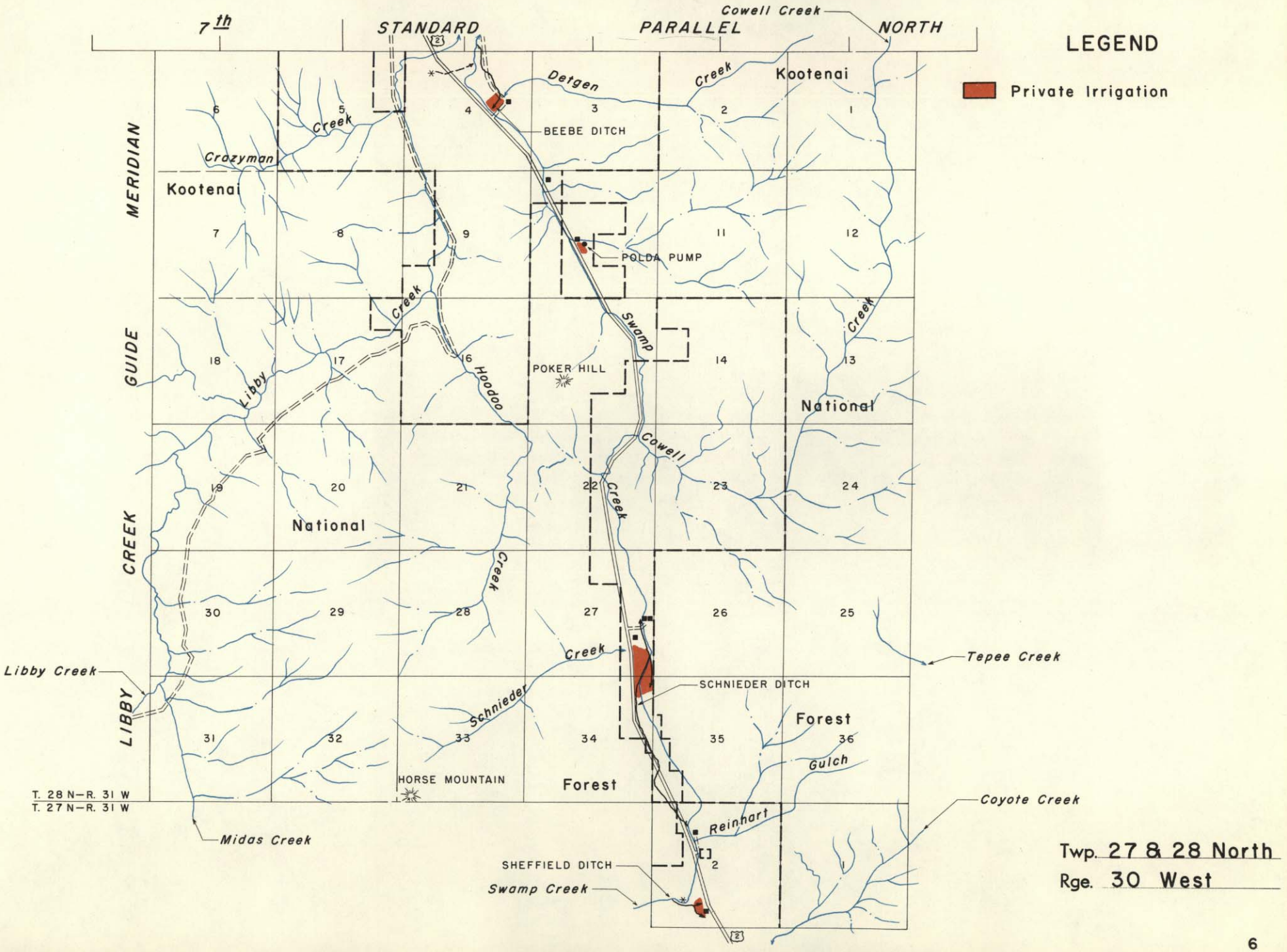


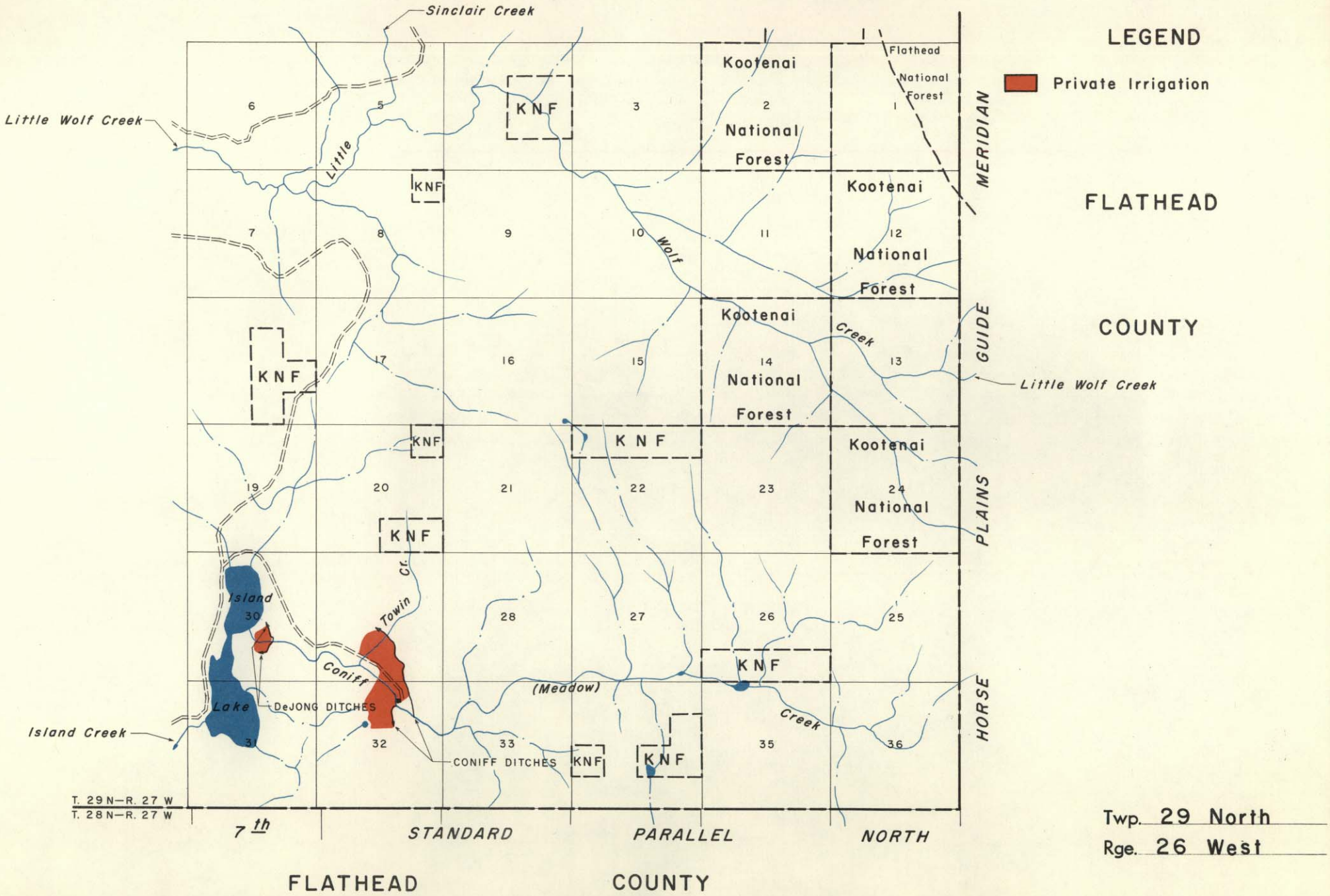
LEGEND

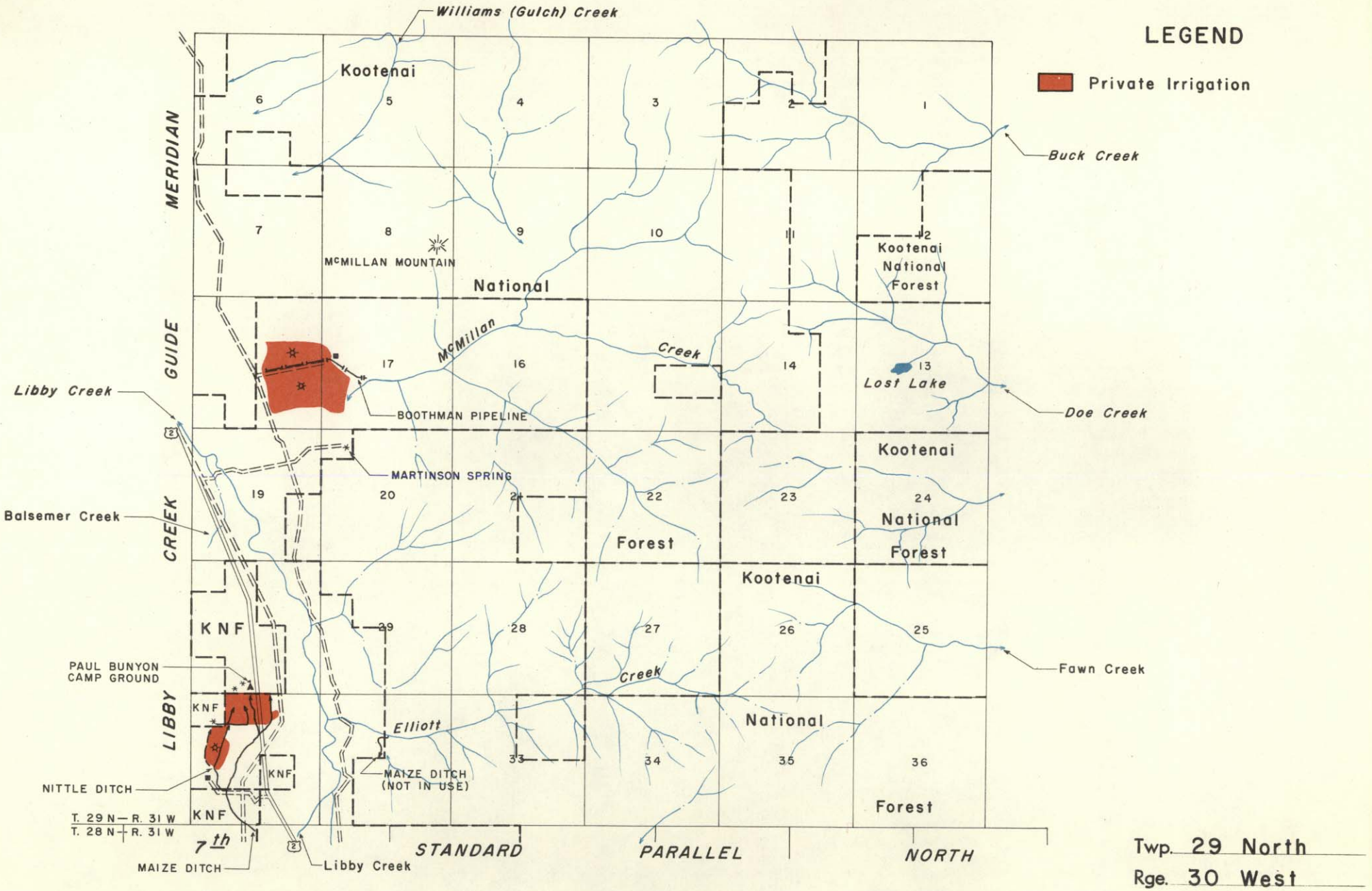
Private Irrigation

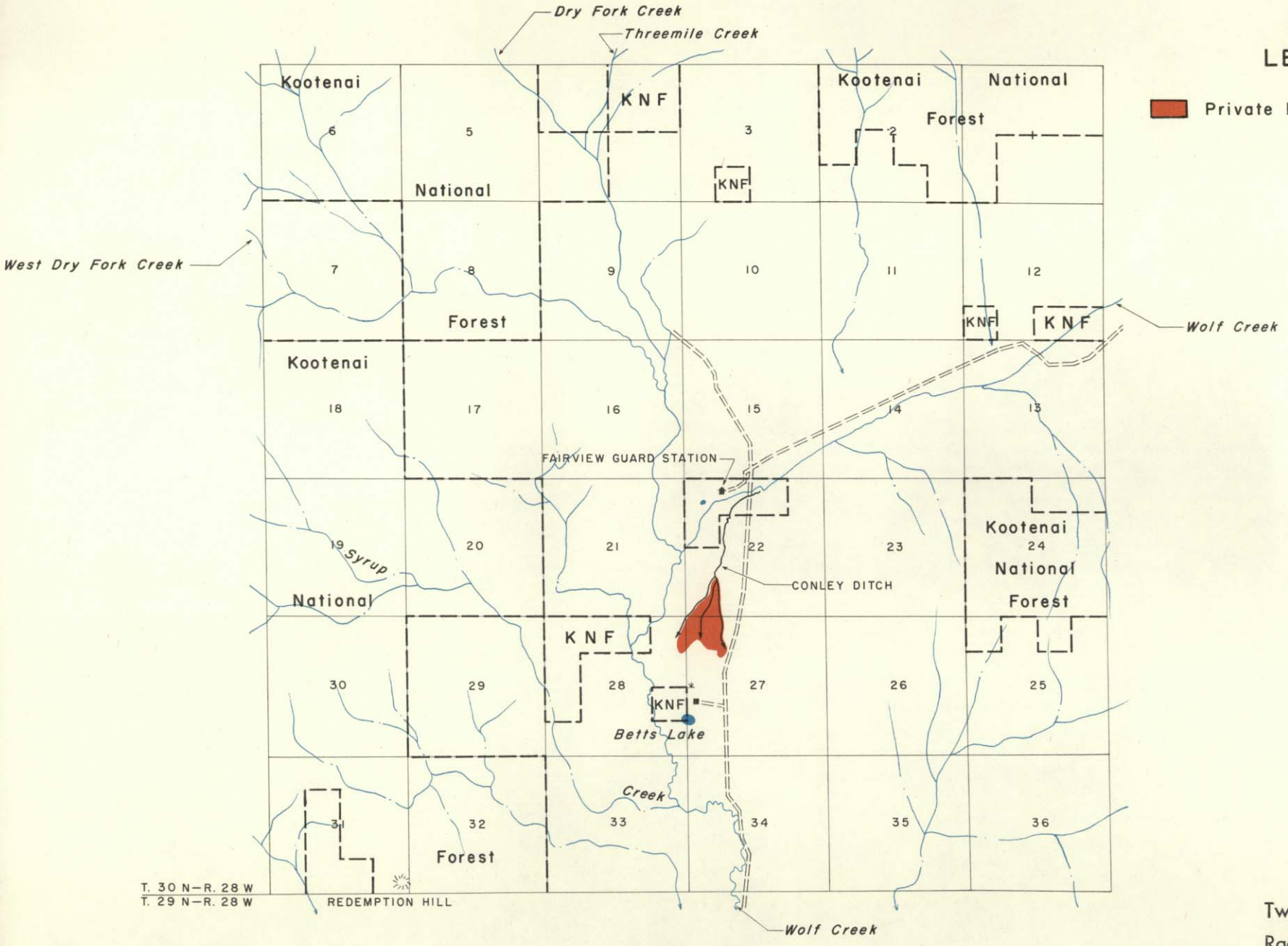
Twp. 27 North

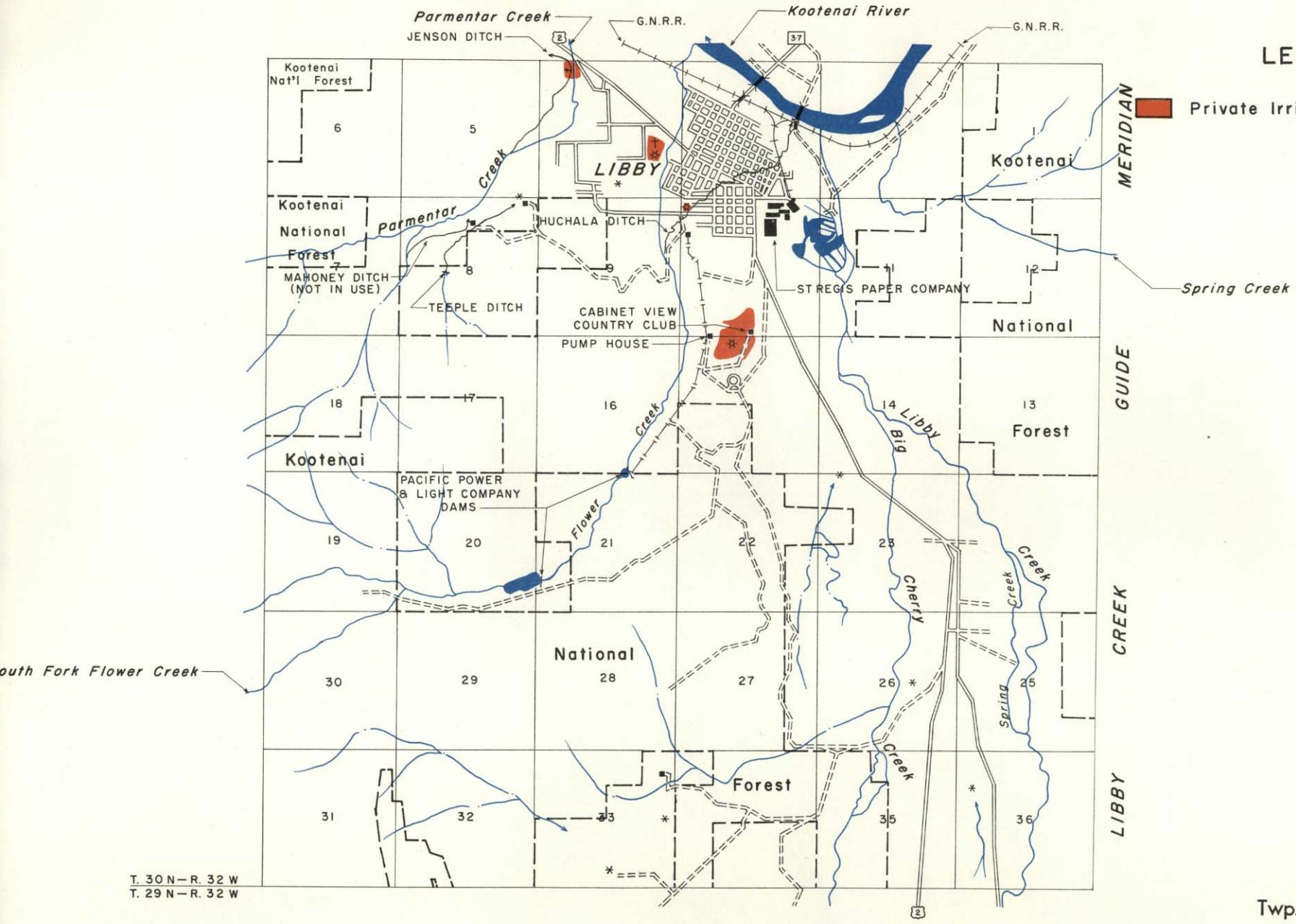
Rge. 29 West


7th STANDARD PARALLEL NORTH
Cowell Creek
LEGEND
Private Irrigation
MERIDIAN
GUIDE
CREEK
LIBBY
Detgen Creek
Kootenai
BEEBE DITCH
Crazyman Creek
Kootenai
POLDA PUMP
Swamp Creek
Hoodoo Creek
POKER HILL
National
Cowell Creek
National
Libby Creek
Tepee Creek
SCHNIEDER DITCH
Schnieder Creek
Forest
Gulch
HORSE MOUNTAIN
Forest
Coyote Creek
Reinhart
SHEFFIELD DITCH
Swamp Creek
Midas Creek
T. 28 N—R. 31 W
T. 27 N—R. 31 W
Twp. 27 & 28 North
Rge. 30 West


Sinclair Creek
Little Wolf Creek
Little
Wolf
Creek
Island
Lake
Island Creek
Towin
Coniff
(Meadow)
Creek
Ck.
DeJONG DITCHES
CONIFF DITCHES
KNF
Kootenai
National
Forest
Flathead
National
Forest
Little Wolf Creek
Island Creek
T. 29 N—R. 27 W
T. 28 N—R. 27 W
7th
STANDARD
PARALLEL
NORTH
MERIDIAN
GUIDE
PLAINS
HORSE
FLATHEAD
COUNTY
LEGEND
Private Irrigation
FLATHEAD
COUNTY
Twp. 29 North
Rge. 26 West


LEGEND
Private Irrigation
Williams (Gulch) Creek
Buck Creek
Doe Creek
Fawn Creek
Libby Creek
Balsemer Creek
MERIDIAN
GUIDE
CREEK
LIBBY
Kootenai
National
Forest
McMILLAN MOUNTAIN
McMillan
Creek
Lost Lake
BOOTHMAN PIPELINE
MARTINSON SPRING
KNF
PAUL BUNYON
CAMP GROUND
Elliott
Creek
MAIZE DITCH
(NOT IN USE)
NITTLE DITCH
T. 29 N — R. 31 W
T. 28 N — R. 31 W
7th
MAIZE DITCH
Libby Creek
STANDARD
PARALLEL
NORTH
Twp. 29 North
Rge. 30 West


Dry Fork Creek
Threemile Creek
West Dry Fork Creek
Wolf Creek
Kootenai
National
Forest
KNF
FAIRVIEW GUARD STATION
CONLEY DITCH
Syrup
Betts Lake
Creek
REDEMPTION HILL
T. 30 N—R. 28 W
T. 29 N—R. 28 W
Wolf Creek
LEGEND
Private Irrigation
Twp. 30 North
Rge. 27 West

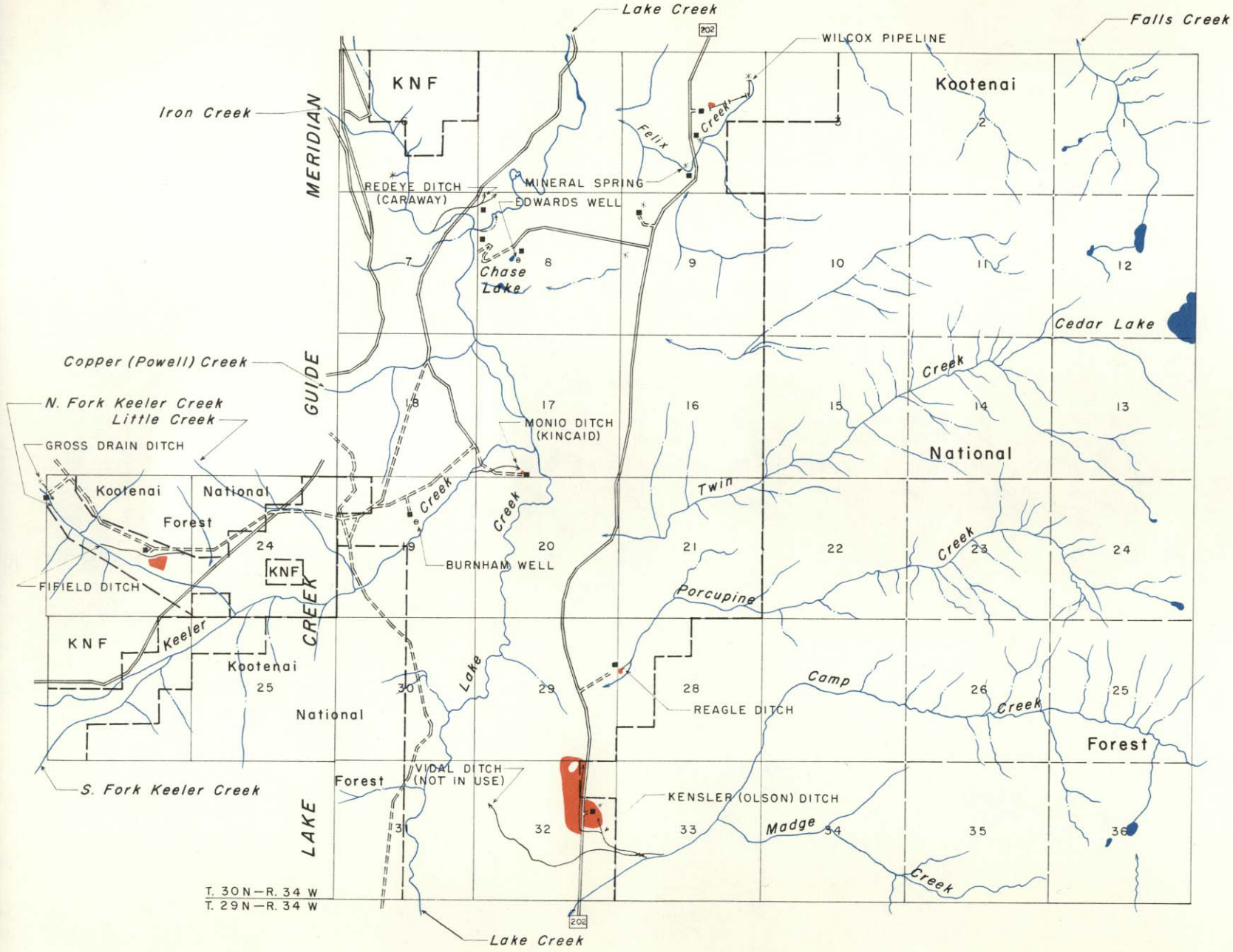


LEGEND

Private Irrigation

Twp. 30 North

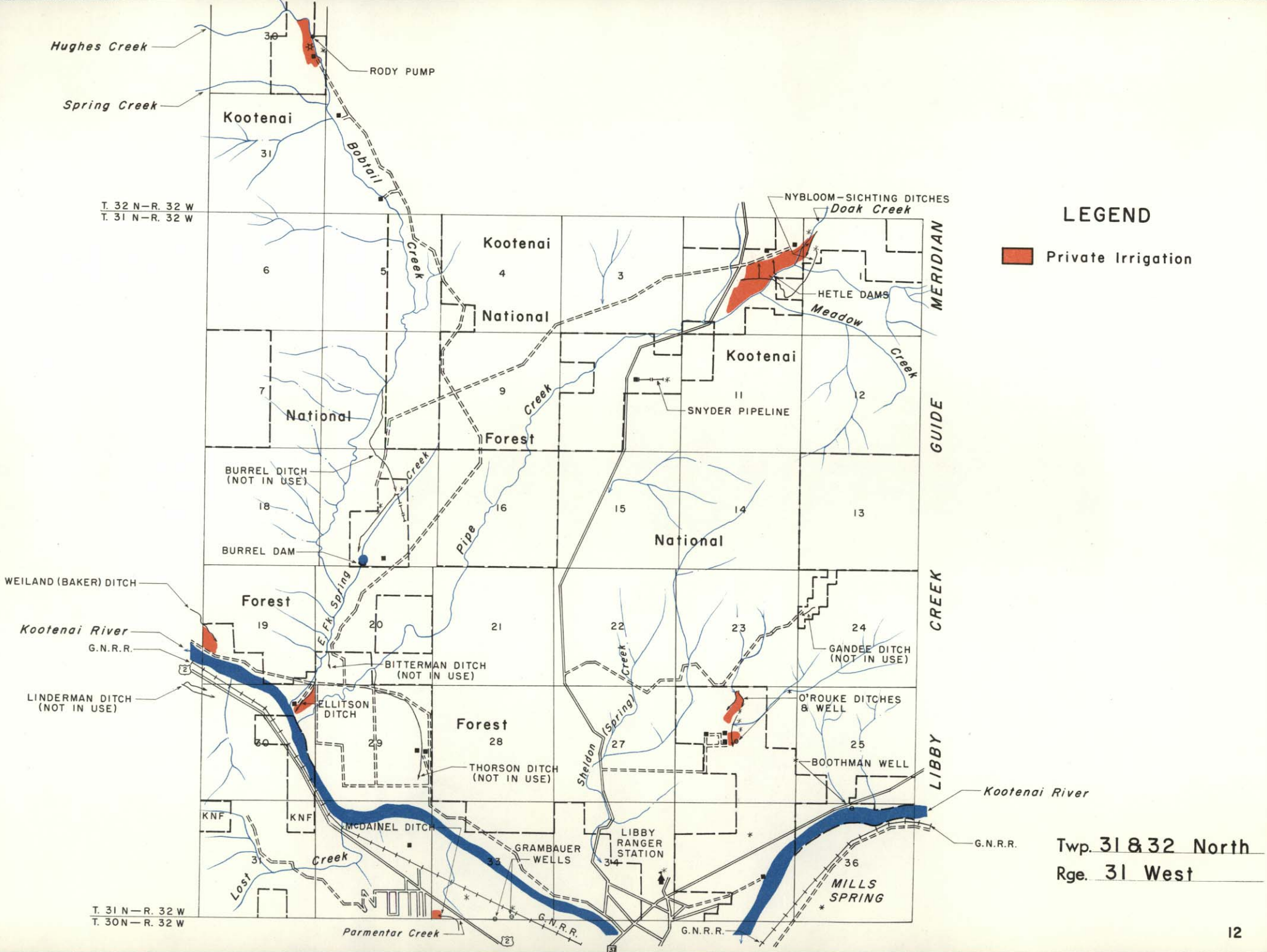
Rge. 31 West

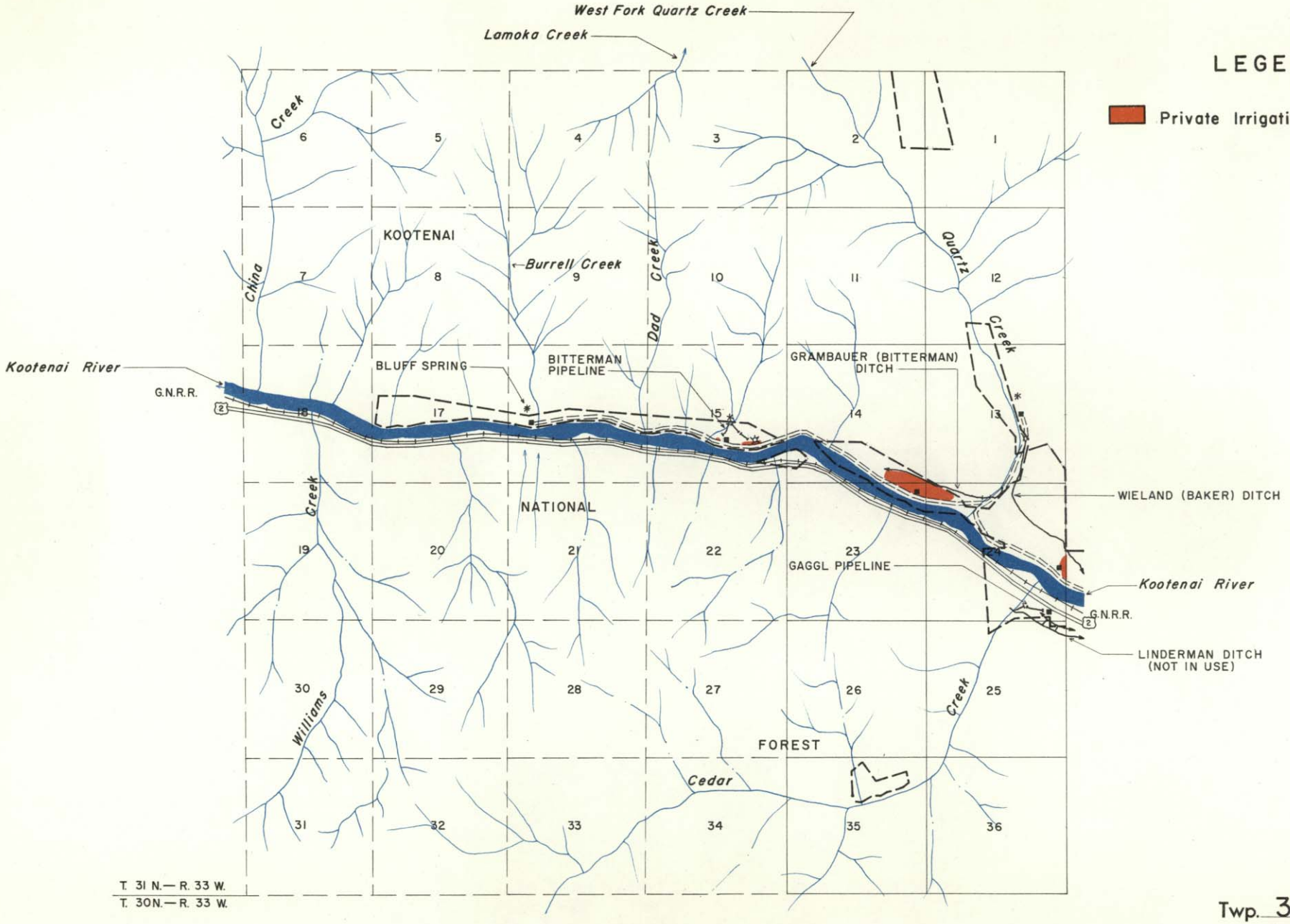


LEGEND

Private Irrigation

Twp. 30 North
Rge. 33 & 34 West

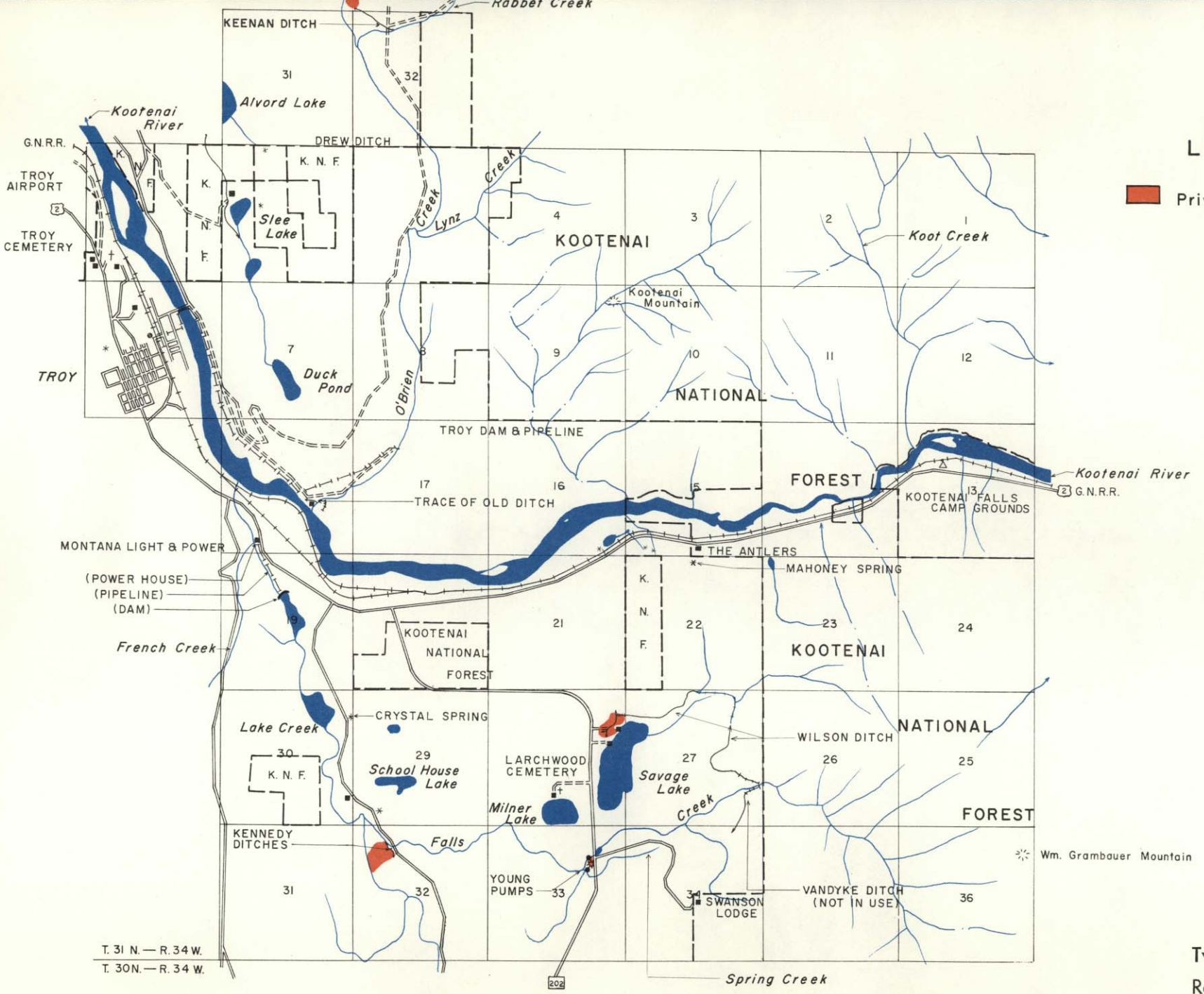

Hughes Creek
Spring Creek
RODY PUMP
Kootenai
Bobtail Creek
T. 32 N—R. 32 W
T. 31 N—R. 32 W
NYBLOOM—SICHTING DITCHES
Doak Creek
HETLE DAMS
Meadow Creek
MERIDIAN
GUIDE
CREEK
LIBBY
National
Forest
SNYDER PIPELINE
BURREL DITCH (NOT IN USE)
BURREL DAM
Pipe Creek
E. Fk. Spring Creek
WEILAND (BAKER) DITCH
Kootenai River
G.N.R.R.
LINDERMAN DITCH (NOT IN USE)
BITTERMAN DITCH (NOT IN USE)
ELLITSON DITCH
THORSON DITCH (NOT IN USE)
GANDEE DITCH (NOT IN USE)
O'ROUKE DITCHES & WELL
BOOTHMAN WELL
Sheldon (Spring) Creek
KNF
McDAINEL DITCH
Lost Creek
GRAMBAUER WELLS
LIBBY RANGER STATION
MILLS SPRING
Parmentar Creek
LEGEND
Private Irrigation
Twp. 31 & 32 North
Rge. 31 West



LEGEND

Private Irrigation

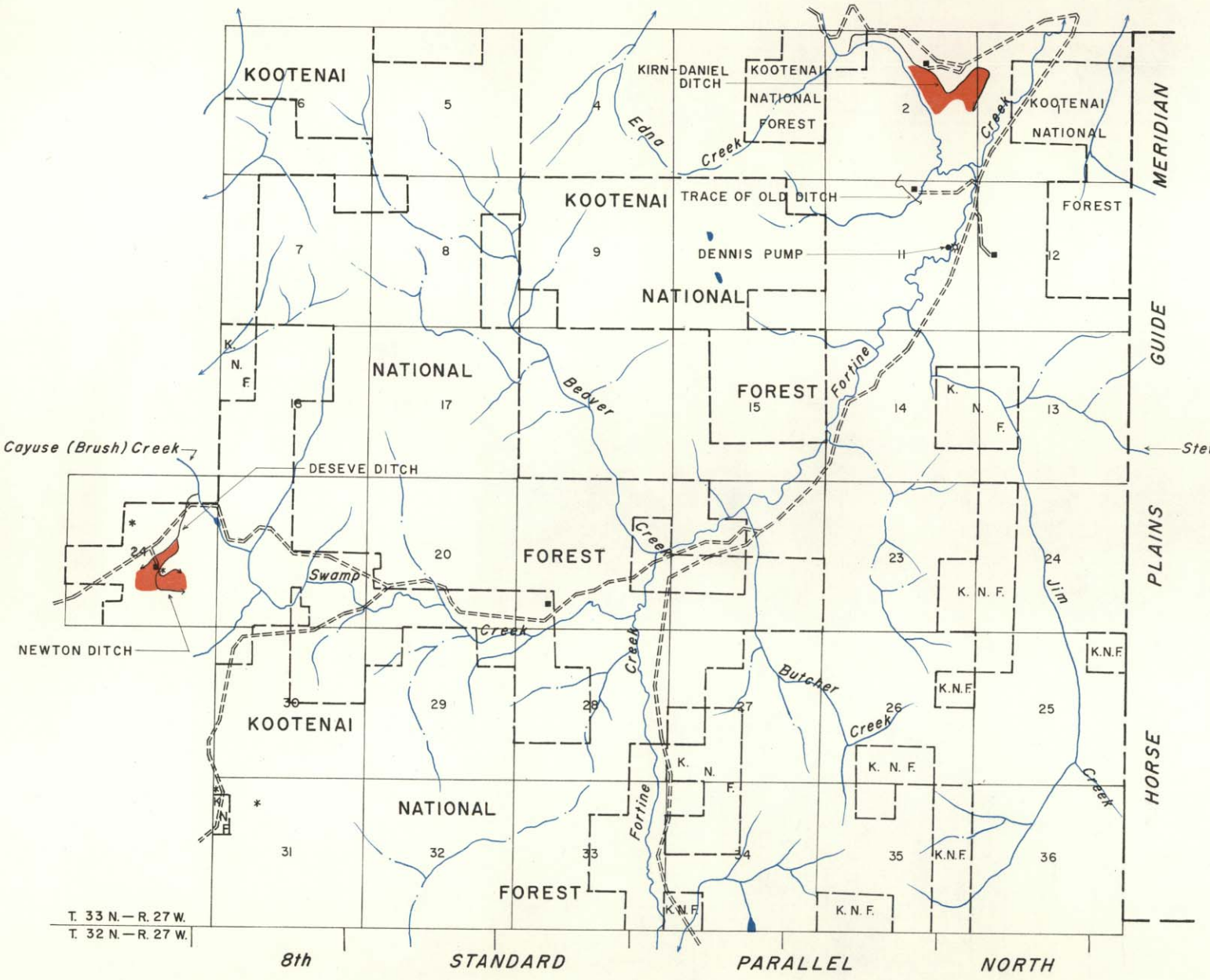
Twp. 31 North
Rge. 32 West



LEGEND

Private Irrigation

Twp. 31 & 32 North
Rge. 33 & 34 West



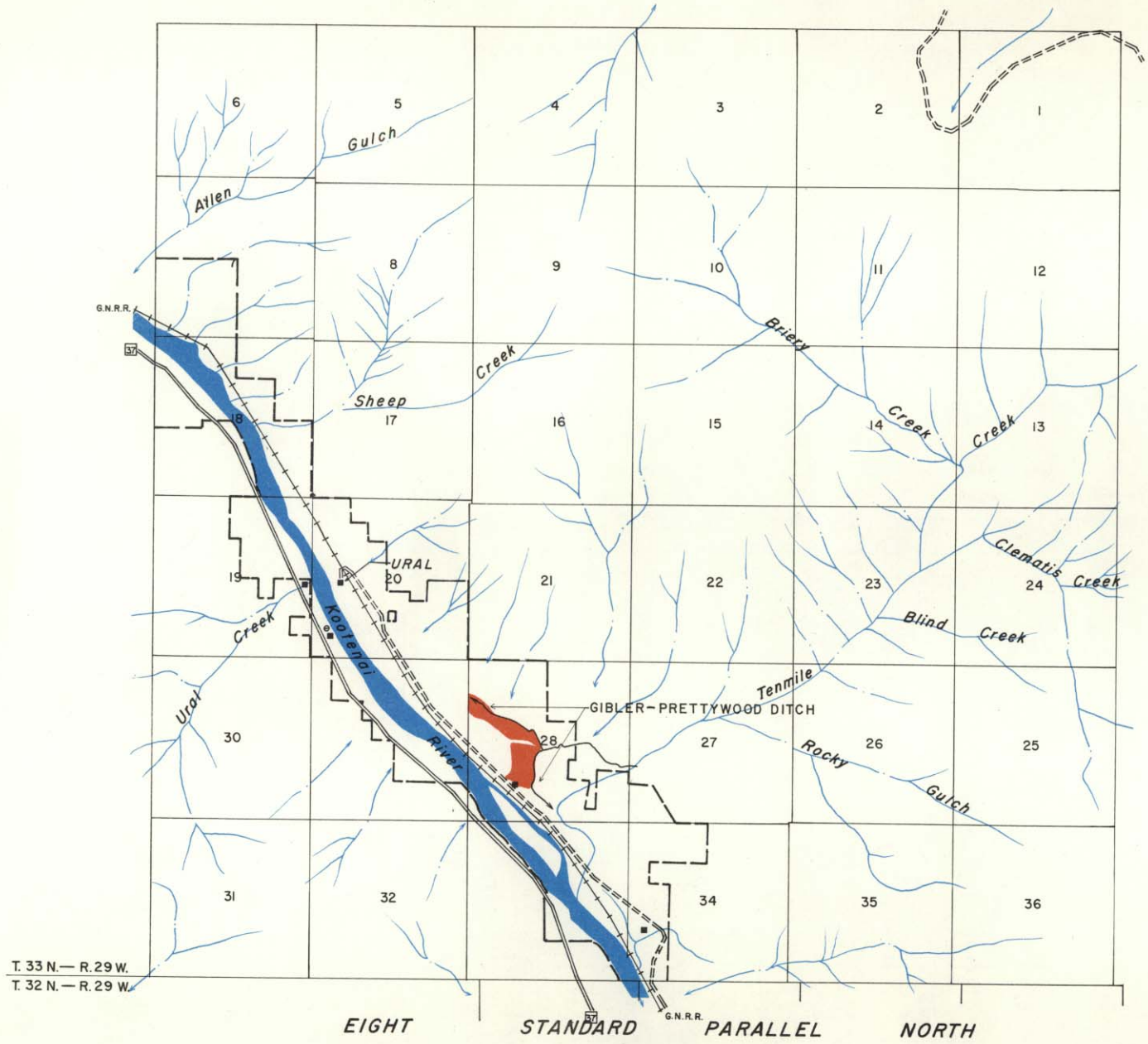
LEGEND

Private Irrigation

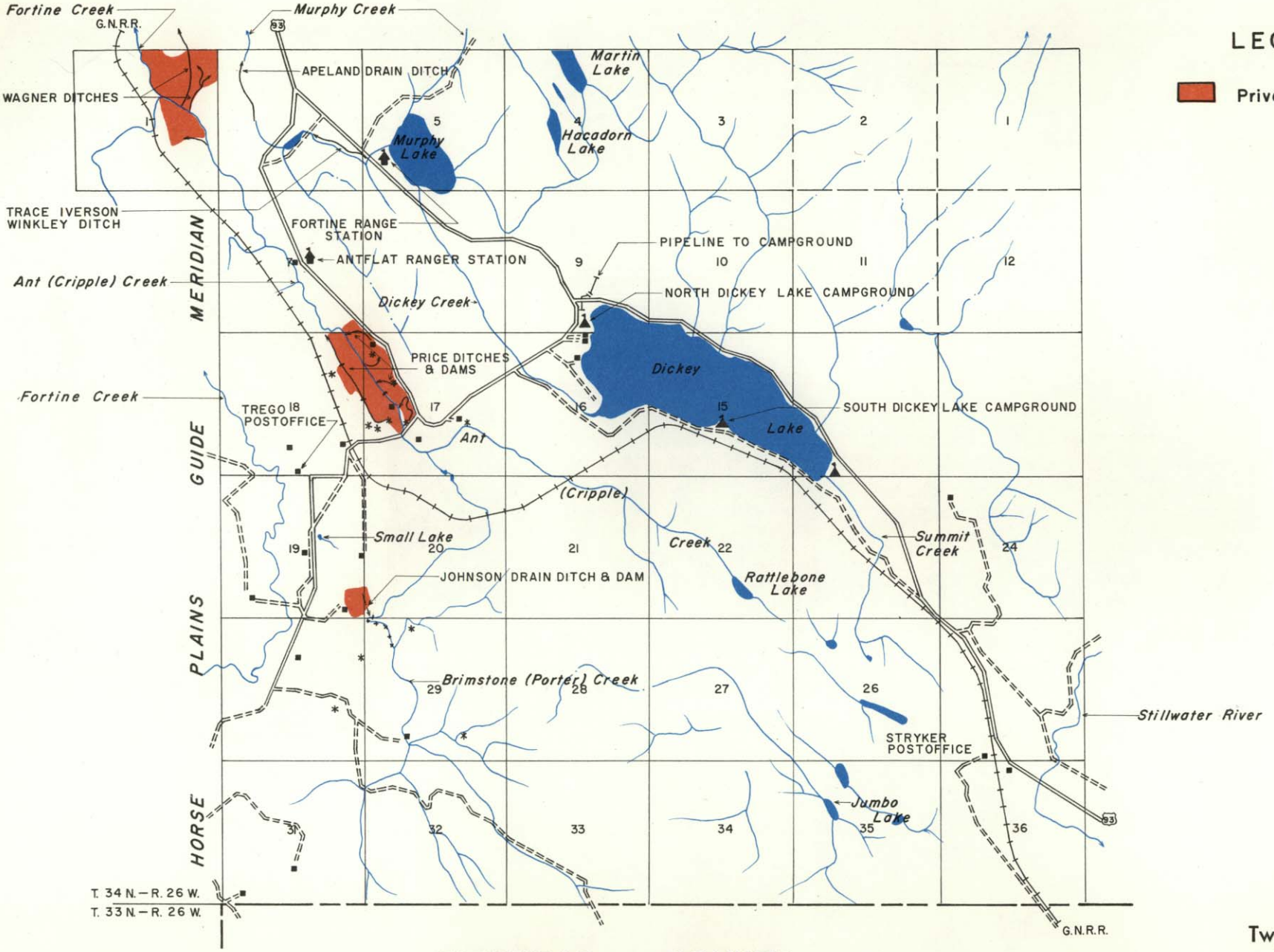
FLATHEAD

COUNTY

Twp. 33 North
Rge. 26 & 27 West



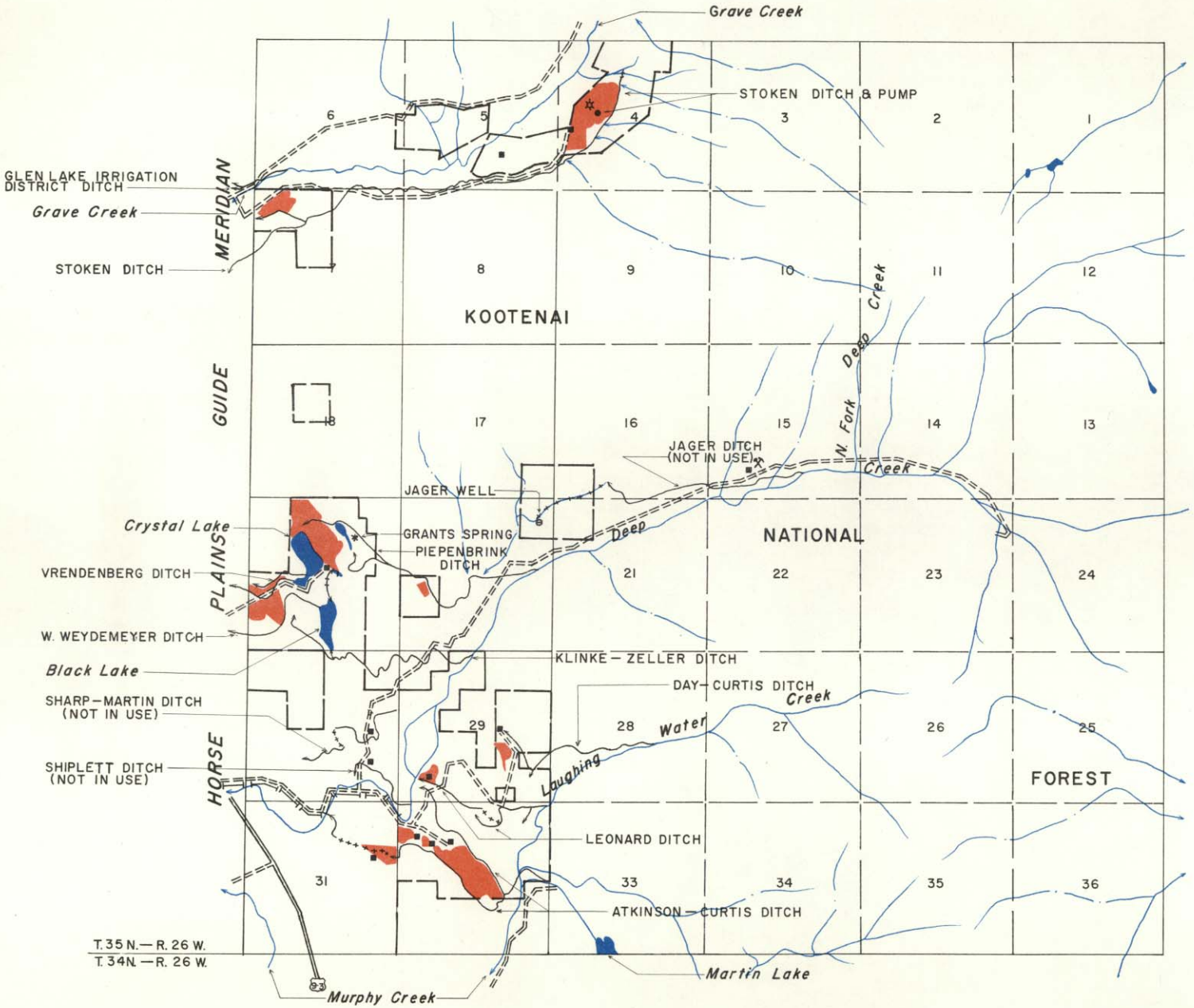
Twp. 33 North
Rge. 28 West



LEGEND

Private Irrigation

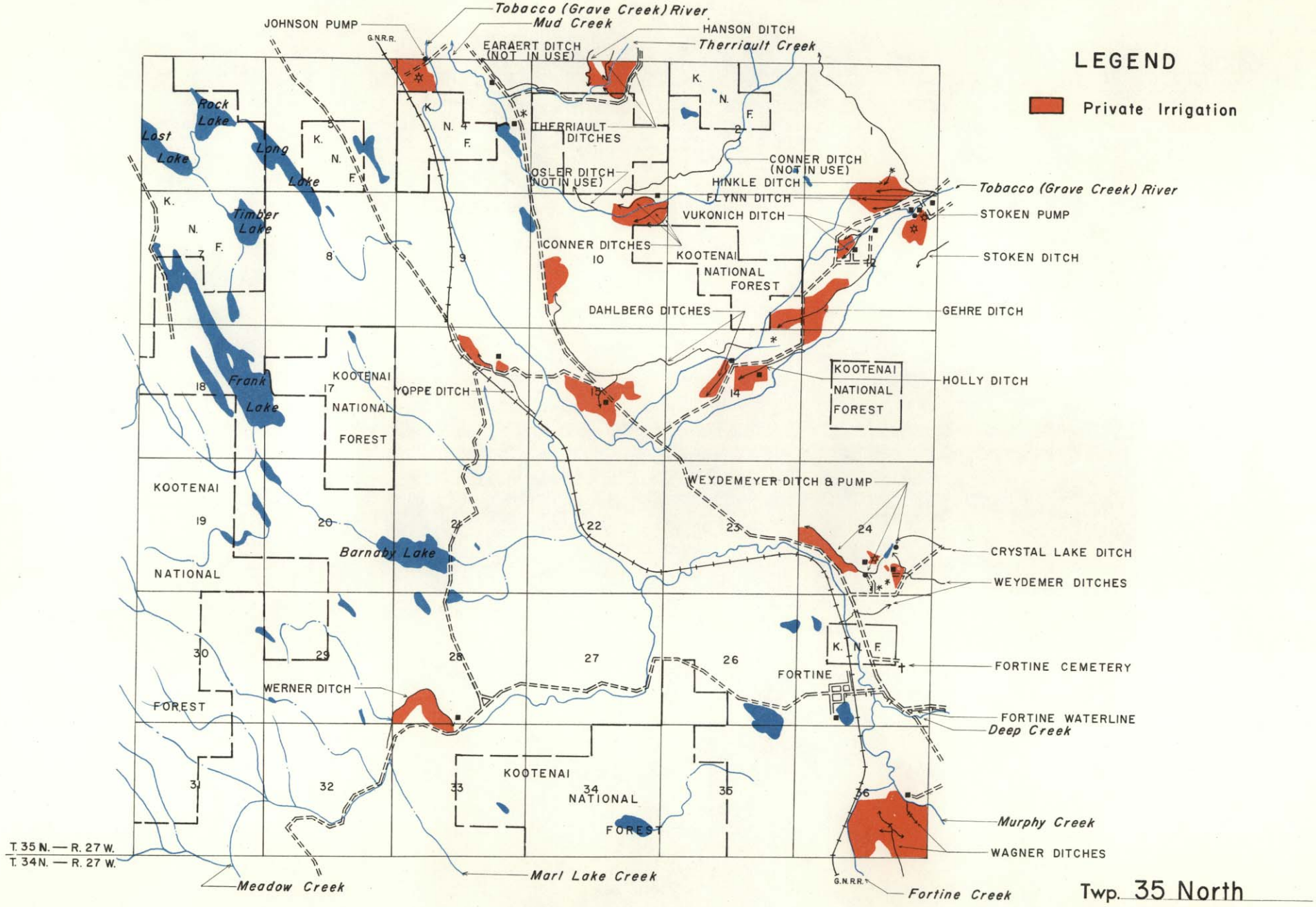
Twp. 34 North
Rge. 25 & 26 West

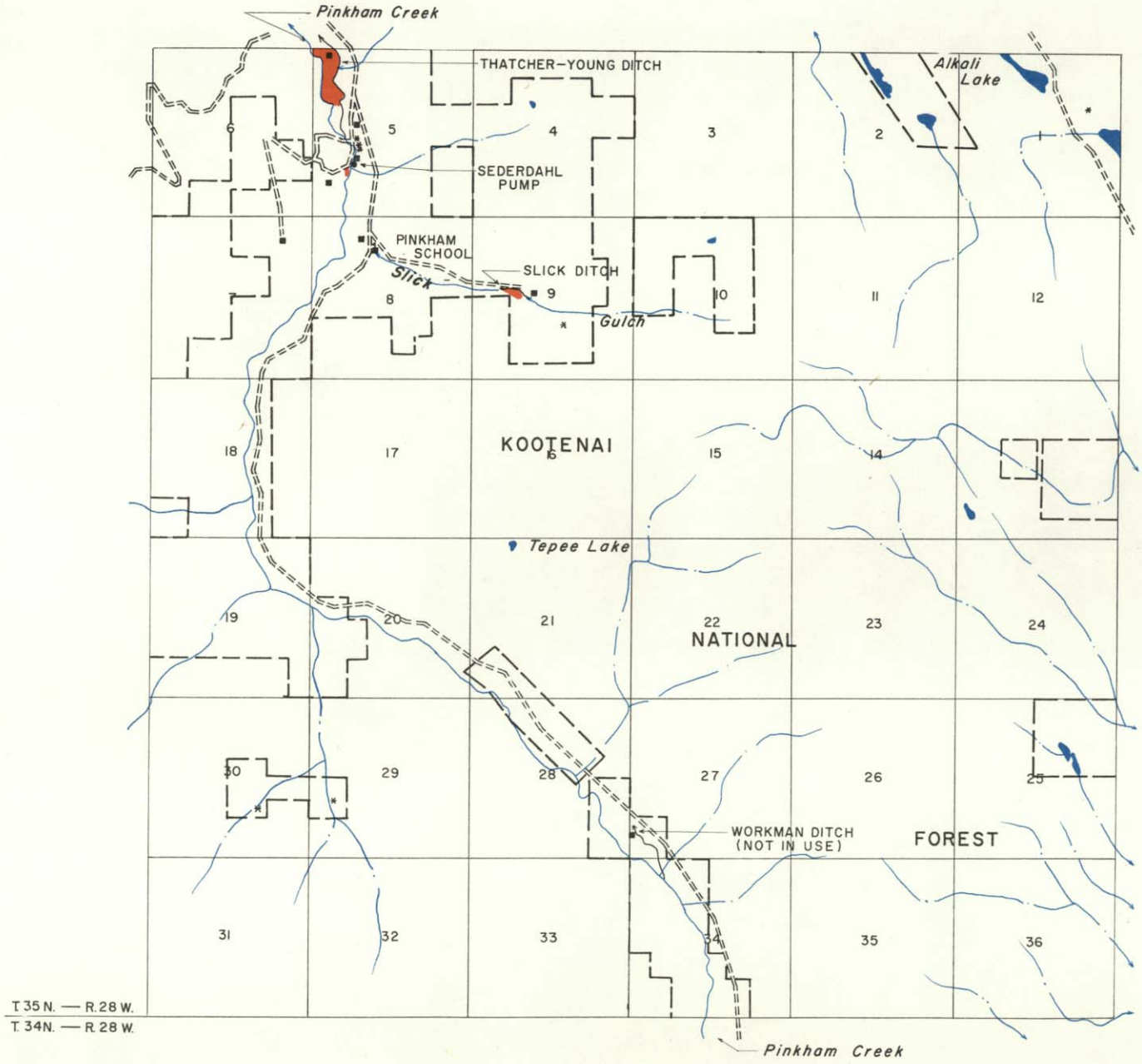


LEGEND

Private Irrigation

Twp. 35 North
Rge. 25 West

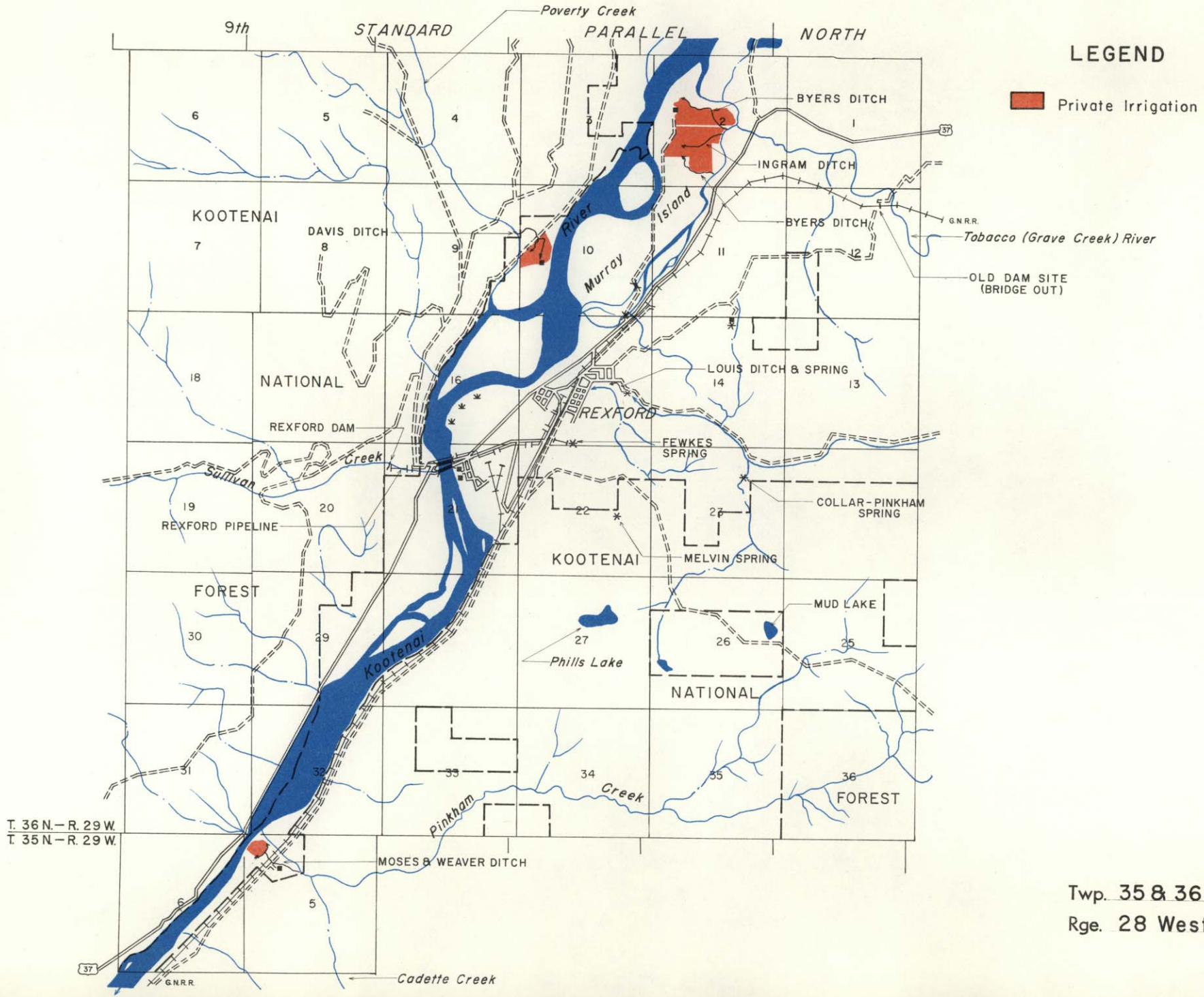

LEGEND
Private Irrigation
JOHNSON PUMP
G.N.R.R.
Tobacco (Grave Creek) River
Mud Creek
HANSON DITCH
Therriault Creek
EARAERT DITCH (NOT IN USE)
THERRIAULT DITCHES
OSLER DITCH (NOT IN USE)
CONNER DITCH (NOT IN USE)
HINKLE DITCH
FLYNN DITCH
VUKONICH DITCH
STOKEN PUMP
STOKEN DITCH
CONNER DITCHES
KOOTENAI NATIONAL FOREST
DAHLBERG DITCHES
GEHRE DITCH
HOLLY DITCH
YOPPE DITCH
WEYDEMEYER DITCH & PUMP
CRYSTAL LAKE DITCH
WEYDEMER DITCHES
FORTINE CEMETERY
FORTINE
FORTINE WATERLINE
Deep Creek
WERNER DITCH
Murphy Creek
WAGNER DITCHES
Fortine Creek
Meadow Creek
Marl Lake Creek
Rock Lake
Lost Lake
Long Lake
Timber Lake
Frank Lake
Barnaby Lake
T. 35 N. — R. 27 W.
T. 34 N. — R. 27 W.
Twp. 35 North
Rge. 26 West



LEGEND

Private Irrigation

Twp. 35 North
Rge. 27 West

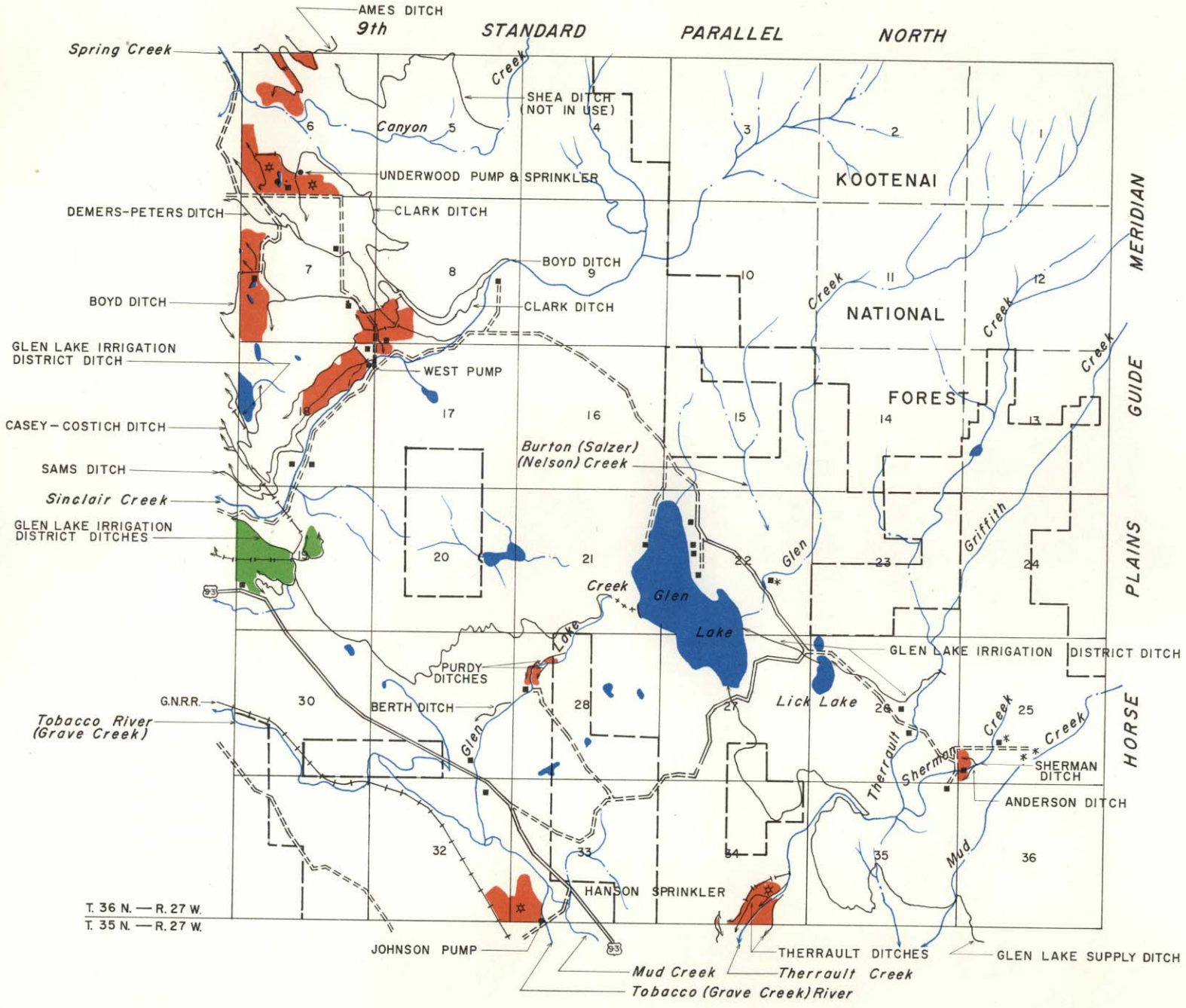


LEGEND

Private Irrigation

Twp. 35 & 36 North

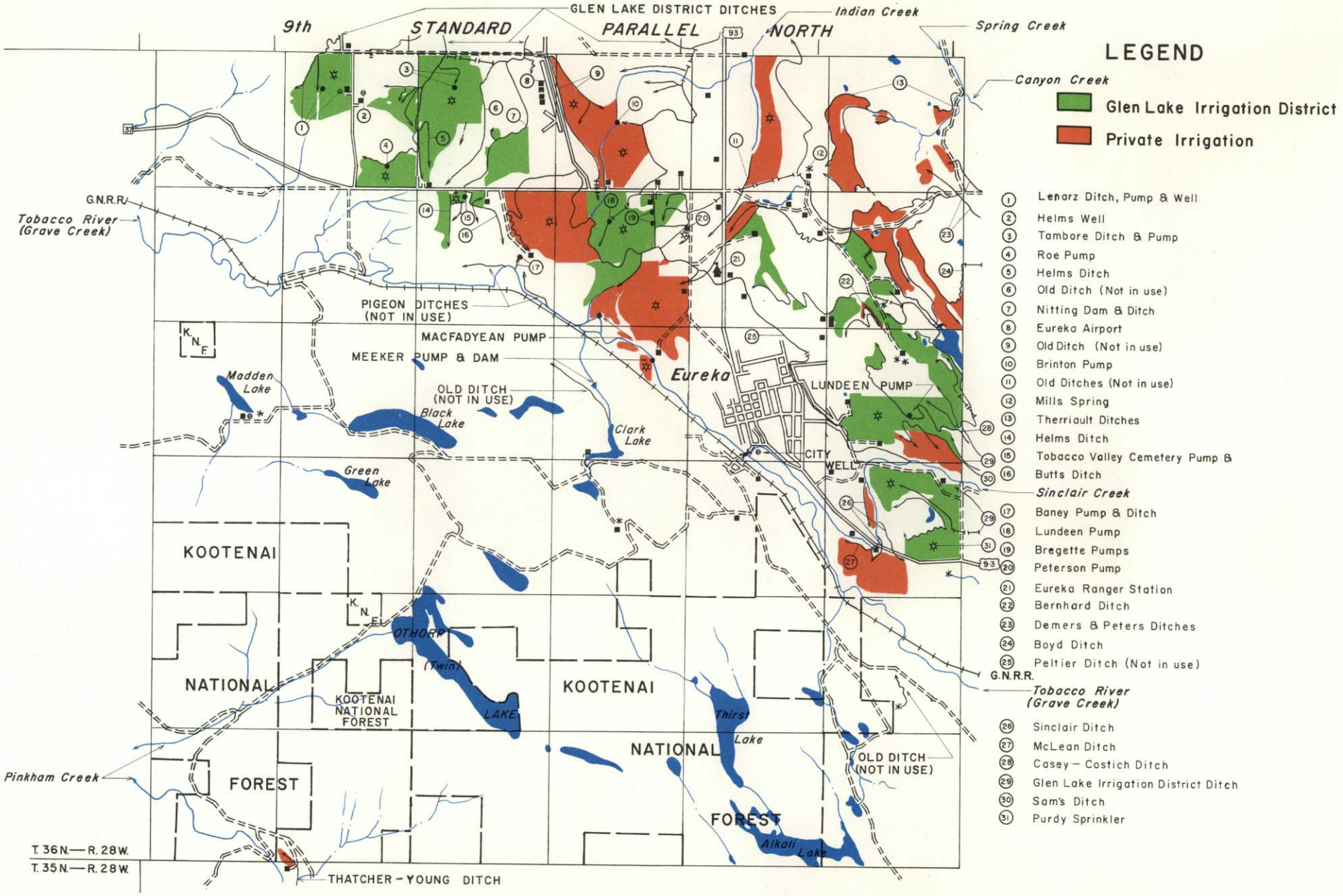
Rge. 28 West



LEGEND

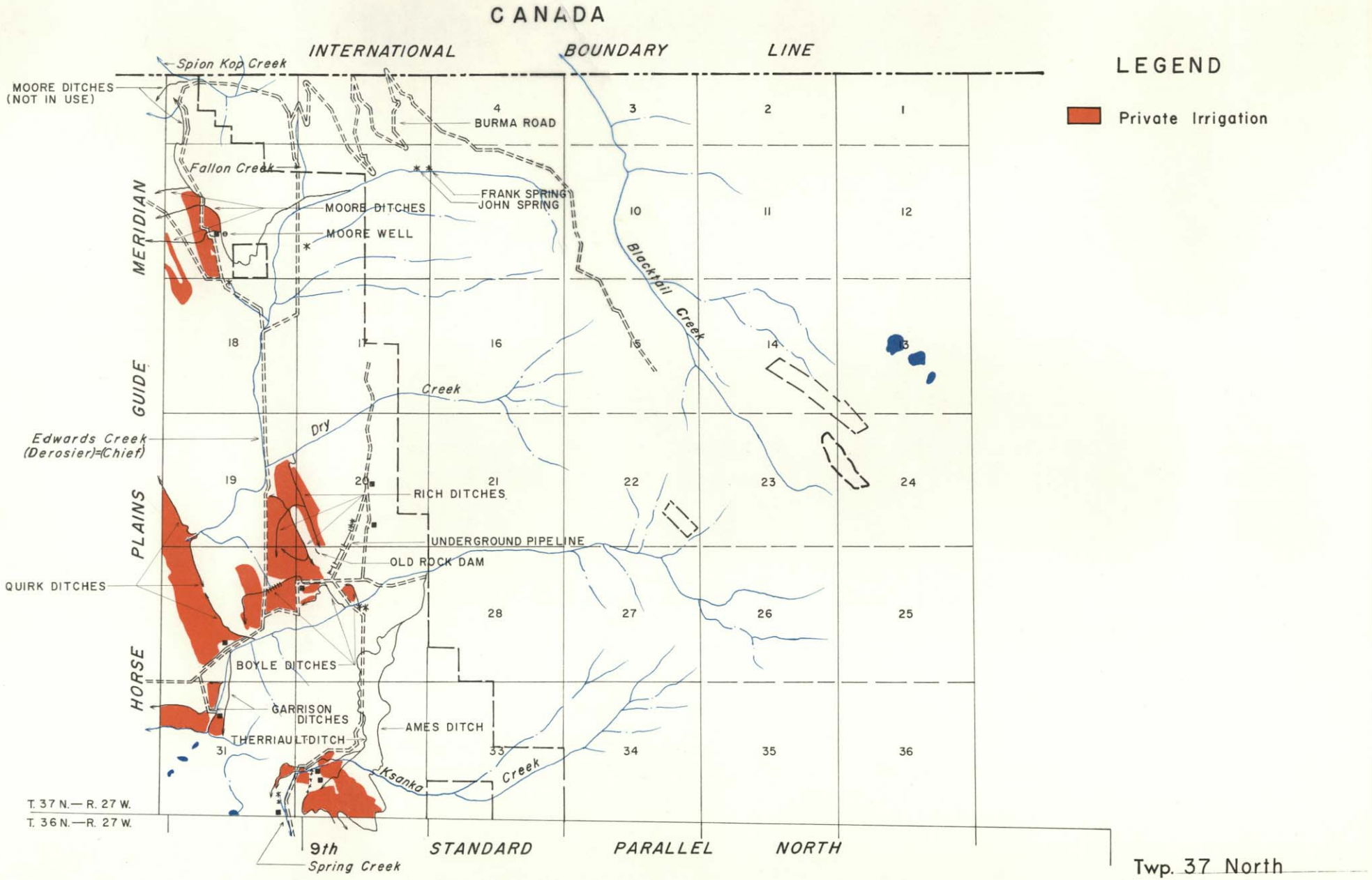
- Glen Lake Irrigation District
- Private Irrigation

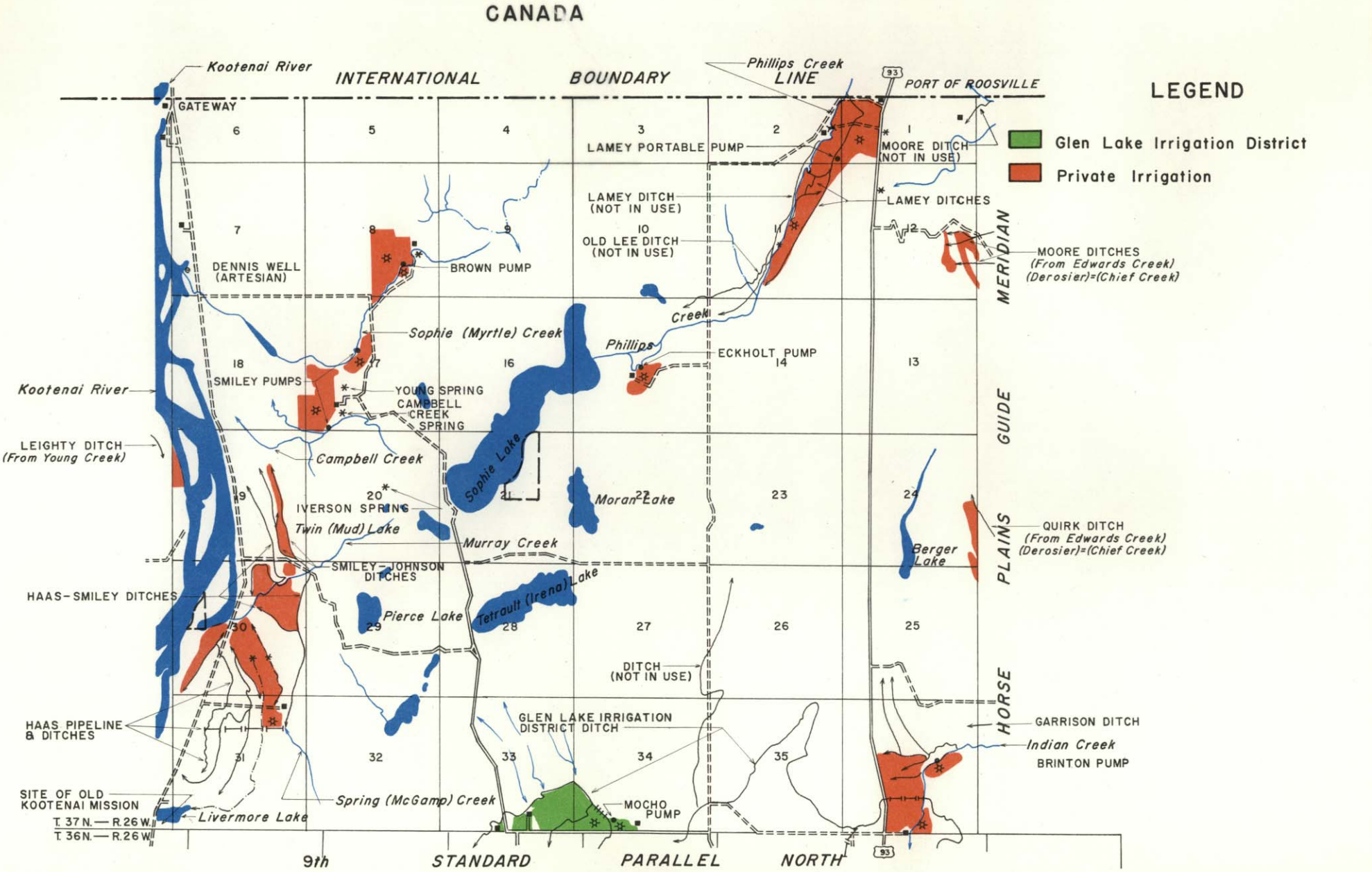
Twp. 36 North
Rge. 26 West

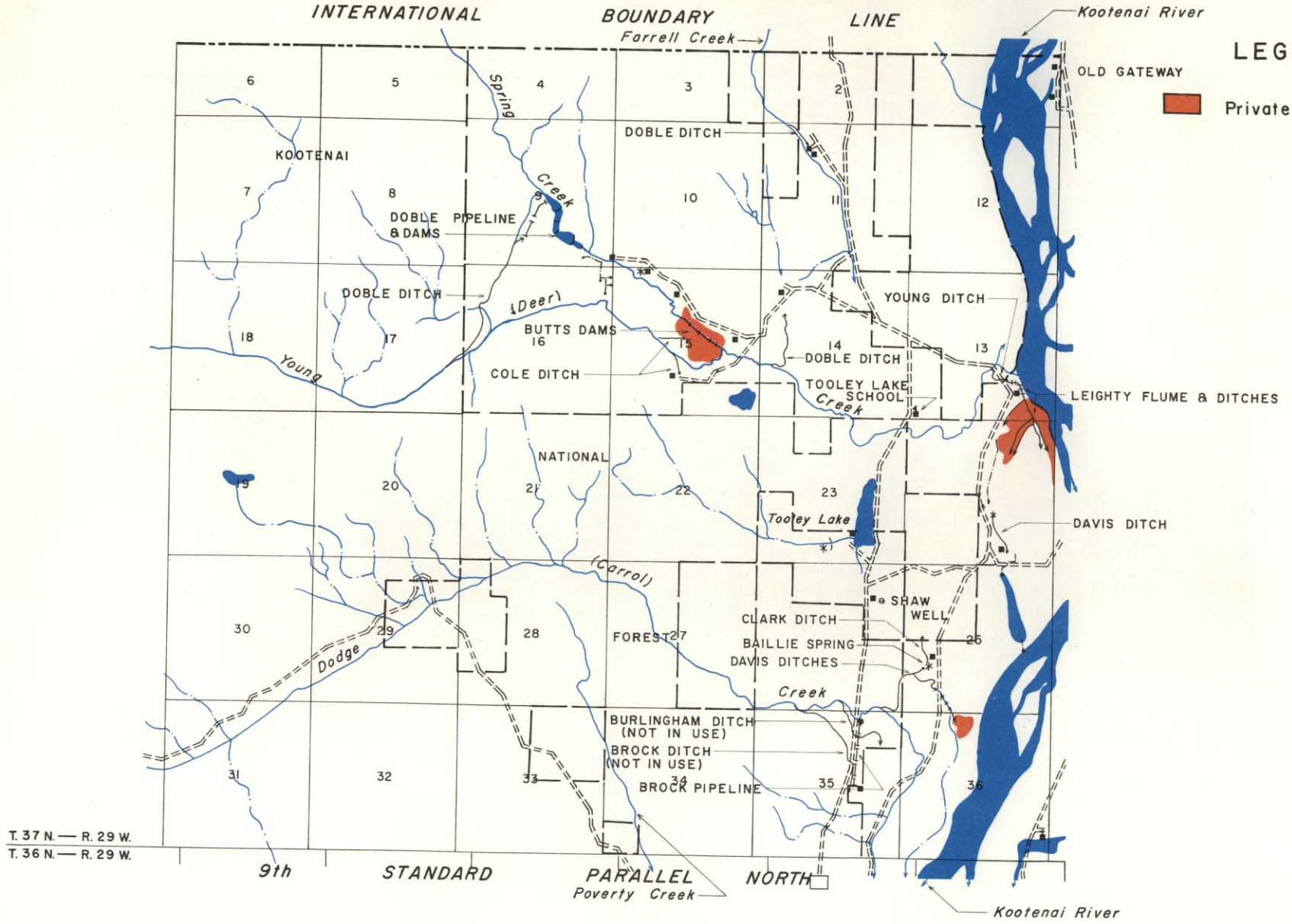


Twp. 36 North

Rge. 27 West


CANADA
INTERNATIONAL BOUNDARY LINE
Spion Kop Creek
MOORE DITCHES (NOT IN USE)
BURMA ROAD
Fallon Creek
FRANK SPRING
JOHN SPRING
MOORE DITCHES
MOORE WELL
Blacktail Creek
MERIDIAN
GUIDE
Dry Creek
Edwards Creek (Derosier)=(Chief)
RICH DITCHES
UNDERGROUND PIPELINE
OLD ROCK DAM
PLAINS
QUIRK DITCHES
HORSE
BOYLE DITCHES
GARRISON DITCHES
AMES DITCH
THERRIAULT DITCH
Ksanka Creek
T. 37 N. — R. 27 W.
T. 36 N. — R. 27 W.
9th STANDARD PARALLEL NORTH
Spring Creek
LEGEND
Private Irrigation
Twp. 37 North
Rge. 26 West


CANADA
INTERNATIONAL BOUNDARY LINE
Kootenai River
Phillips Creek
PORT OF ROOSVILLE
GATEWAY
LAMEY PORTABLE PUMP
MOORE DITCH (NOT IN USE)
LAMEY DITCH (NOT IN USE)
LAMEY DITCHES
OLD LEE DITCH (NOT IN USE)
MOORE DITCHES (From Edwards Creek) (Derosier)=(Chief Creek)
DENNIS WELL (ARTESIAN)
BROWN PUMP
Sophie (Myrtle) Creek
Phillips Creek
ECKHOLT PUMP
SMILEY PUMPS
YOUNG SPRING
CAMPBELL CREEK SPRING
Kootenai River
LEIGHTY DITCH (From Young Creek)
Campbell Creek
Sophie Lake
Moran Lake
IVERSON SPRING
Twin (Mud) Lake
Murray Creek
Berger Lake
QUIRK DITCH (From Edwards Creek) (Derosier)=(Chief Creek)
SMILEY-JOHNSON DITCHES
HAAS-SMILEY DITCHES
Pierce Lake
Tetrault (Irena) Lake
DITCH (NOT IN USE)
GLEN LAKE IRRIGATION DISTRICT DITCH
HAAS PIPELINE & DITCHES
GARRISON DITCH
Indian Creek
BRINTON PUMP
SITE OF OLD KOOTENAI MISSION
Spring (McGamp) Creek
MOCHO PUMP
Livermore Lake
T. 37 N. — R. 26 W.
T. 36 N. — R. 26 W.
9th STANDARD PARALLEL NORTH
MERIDIAN
GUIDE
PLAINS
HORSE
LEGEND
Glen Lake Irrigation District
Private Irrigation
Twp. 37 North
Rge. 27 West



Twp. 37 North
Rge. 28 West