State of California

THE RESOURCES AGENCY

STATE WATER RIGHTS BOARD

COW CREEK ADJUDICATION

REPORT ON

WATER SUPPLY AND USE OF WATER

ON

COW CREEK STREAM SYSTEM

SHASTA COUNTY, CALIFORNIA

MAY, 1965

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APPROVAL AND ADOPTION BY
STATE WATER RIGHTS BOARD

The State Water Rights Board approves and adopts this report "Water Supply and Use of Water on Cow Creek Stream System, Shasta County, California" dated May, 1965.

/s/ Kent Silverthorne
Kent Silverthorne, Chairman

/s/ Ralph J. McGill
Ralph J. McGill, Member

/s/ W. A. Alexander
W. A. Alexander, Member

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CHAPTER I. INTRODUCTION

This report presents factual information to aid claimants to water from Cow Creek stream system in preparing their proofs of claims of water rights which must be filed as the next step in the adjudication of water rights now in progress.

The Water Code of the State of California requires in an adjudication proceeding that the State Water Rights Board investigate the stream system, the location and capacity of all conduits diverting water, the lands irrigated or irrigable therefrom, and gather other data which may be required for a proper determination of water rights. This investigation has been made by the Board and the results are set forth in this report. Included are descriptions of the climatic and physical features of the area, water supply, and use of water. The report also summarizes measurements indicating the proper amount of water needed for irrigation of the lands. Appendices and tables are included to present more detailed information. Maps in the back of the report show the location of all streams and conduits, the lands served by them and the pattern of land ownership and use in 1964.

Legal Proceedings

On August 12, 1963, a petition was received by the State Water Rights Board requesting a determination of water rights on a portion of the Cow Creek stream system. The petition limited the determination to "the waters of Cow Creek stream system, excepting Clover Creek, Oak Run Creek, and North Cow Creek." Water rights on these three excluded streams are already defined by court decrees and water users there would derive little benefit from further adjudication proceedings.

A preliminary investigation and report was made by the staff of the State Water Rights Board setting forth facts and conditions on the stream system covered by the petition. On October 18, 1963, the Board concluded that the public interest and necessity would be served by proceeding with the determination requested in the petition and issued an order granting the petition. The order set December 2, 1963, as the date for the examination of the stream system to begin. The order recognized the requirements of Water Code Section 2500 by eliminating from the proceedings rights to extract ground water. Notice of the order was given by publication in the Redding Record Searchlight and Courier-Free Press for four consecutive weeks to notify all water users and others who might have an interest in the matter of the pendency of the proceeding. A copy of the order is included as Appendix D.

Scope of Investigation

Examination of the stream system was commenced by the State Water Rights Board on December 2, 1963, and continued until February 26, 1965.

During this period all physical facts deemed essential to the proper determination of water rights involved in the proceedings were investigated.

A map entitled "Cow Creek Stream System Showing Diversions and Irrigated Lands, Shasta County, California, 1964," was prepared from data collected during the investigation. A copy of this map is included in this report on five sheets as Plate 1 and is referred to as the State Water Rights Board Map. Physical features on the map were obtained from aerial photographs taken in 1952 and 1962. Topography from United States Geological Survey quadrangles prepared in 1953 and 1956 and Shasta County Assessor's maps prepared from the 1962 aerial photos were also used. Names of property owners and location of property lines were obtained from the Shasta County Assessor's records.

Diversion systems, lands irrigated therefrom and crops being grown were determined in the area during the 1964 irrigation season, and are shown on the State Water Rights Board Map. Lands normally irrigated but left fallow or idle and not irrigated in 1964 are shown separately on this map. Lands not previously irrigated but being prepared for future irrigation are also shown separately. Lands shown in Table A-1 as irrigated in 1964, idle in 1964, and under construction in 1964 (i.e. being prepared for irrigation) comprise the lands deemed irrigable from the diversion systems described in Table A-4.

Water Problems

Irrigation in the Cow Creek area first started in the hilly portion of the watershed where streambed gradient was steep enough to allow ditches to be built to divert water to the land by gravity. Irrigation of lands

bording the creek below Palo Cedro where stream gradient is flat came later when pumps were developed which could lift the water out of the entrenched stream channel for application to the land. Still later sprinkler irrigation systems operated in conjunction with pumps came into use to irrigate hilly upper watershed land as well as level valley land. As time passed, progressively more advanced irrigation systems have been developed bringing under irrigation new land not considered irrigable under previous standards of farm practice.

In most years the flows of the main streams such as Old Cow, South Cow, and Cow Creeks are adequate to satisfy present irrigation requirements. However, shortages have occurred in some dry years. In addition, temporary shortages are not uncommon because of diversion of large amounts of water into upper ditches for brief periods of time. While the stream system as a whole may have an adequate water supply, the supply on individual tributaries is occasionally deficient.

The earliest controversy over water in the stream system recorded in Board files is the legal action "The Big Cow Creek Ditch Company v. Peter Hufford, et al." filed in 1929. The plaintiff ditch company had been diverting water from Cow Creek new Millville under a water right permit issued by the State on Application 237. The complaint by the company alleged that the defendants, comprising most of the water users on Old Cow and South Cow Creeks upstream from the company's diversion, were illegally diverting water away from the natural stream channels, thus depriving plaintiff of its prior right to this water.

The Superior Court of Shasta County referred the case to the former State Division of Water Rights as referee. However, it was discovered that

the defendants were improperly served with the complaint, making the reference to the State premature and illegal. A new action was filed, in which the defendants were properly served, and in June of 1931 the plaintiff ditch company petitioned the court to again refer the action to the State. A group of the defendants opposed the petition for reasons not apparent in Board files, and the court refused to grant the petition. Court records show that this action was never carried through to a final decree.

The next attempt to adjudicate water rights in the area occurred in 1937 when the Superior Court of Shasta County referred another suit to the State as referee. This reference actually consisted of two closely related cases involving rights to divert water from the portion of South Cow Creek lying upstream from the South Cow Creek powerhouse. In both actions Pacific Gas and Electric Company was plaintiff and all upstream water users defendants. Following instructions from the court the State Division of Water Resources investigated the South Cow Creek stream system and filed its factual report with the court. Again, as in the previous case of 1929, court records show that this matter was never carried to a conclusion and final decree.

In 1960 an engineer from the Board met with several users on South Cow Creek at their request, to aid in solving a controversy over alleged excessive diversion of water. Investigation showed a shortage of water in certain reaches of the stream which was caused partially by expansion of irrigated acreage and increased use of water.

In the dry years of 1961, 1962, and 1964, summer flow of Cow Creek was very low. Downstream from Millville, some of the pumps diverting from the stream were forced to cease pumping for varying periods of time.

Organization of Report

The report is presented under three chapters as follows: I. Introduction; II. Description of Investigated Area; III. Water Supply and Use of Water. Four appendices follow the text and include (A) Descriptions of Places of Use and Diversion Systems; (B) Records of Water Supply and Use of Water; (C) Applications before the State Water Rights Board; and (D) Order Granting Petition for Determination of Water Rights. Two plates inside the back cover consist of (1) the State Water Rights Board Map, and (2) hydrographs of Cow Creek.

Points of diversion on Old Cow Creek have been numbered consecutively from 1 through 39, starting at the uppermost diversion and continuing downstream. Diversions from South Cow Creek watershed are numbered from 40 through 75; and those below the confluence of these streams 76 through 116.

CHAPTER II. DESCRIPTION OF INVESTIGATED AREA

The Cascade Mountain Range extends over 650 miles through the States of Washington and Oregon and into Northern California. The range is a broad northward-trending series of giant volcanoes ranging in age from Pliocene to Recent (12 million years ago to the erruption of Mount Lassen in 1915). Vast amounts of basaltic and andesitic lava have poured from these volcanoes, raising ground surface by hundreds of feet in the higher watersheds.

Since the formative period, Cow Creek and tributaries have drained rain and melting snow down a small portion of the western flank of these mountains in Shasta County. The Cow Creek tributaries have eroded through the lava cap and exposed the older sandstone or shale formations lying beneath. The porous lava rock along the crest of the mountains provides a valuable natural reservoir for precipitation falling on the ground surface in the winter. Cracks, large fissures, porosity in rocks, and even cavernous tubes within the rock provide the water storage space and, equally important, furnish frictional resistance to flow through the rock, thus reducing water velocity sufficiently to prolong the flow until the summer when it can be used for irrigation.

Water percolating through the lava eventually reaches the underlying relatively impervious sandstone or shale formation. The floor formed by this material conducts the water along the slope of the contact plane until ground surface is intersected on some eroded canyon wall or mountain slope. At such lines of contact large springs are frequently found.

Natural Features

Old Cow Creek and South Cow Creek roughly parallel each other in a southwesterly course from their mountainous source downward to their confluence above the main Cow Creek Valley. The upper three-fourths of the watershed of the stream system consists of fairly steep mountainous slopes covered by coniferous timber of commercial importance or on some dry southerly exposures by thickets of manzanita, ceonothus, and similar brush types with black oak and digger pine.

Old Cow Creek rises at approximately 6,400 feet elevation and flows in a southwesterly direction about 30 miles to its junction with South Cow Creek about three miles east of Millville. The area of the watershed is about 80 square miles. Main tributaries to Old Cow Creek include Hunt Creek, Glendenning Creek, Canyon Creek, and Coal Gulch.

South Cow Creek rises at approximately 6,200 feet elevation and flows in a westerly direction about 26 miles to its junction with Old Cow Creek. The area of this watershed is also about 80 square miles. Some of the larger tributaries are Atkins Creek, Beal Creek, Hamp Creek, and Mill Creek.

The main stem of Cow Creek begins at the confluence of South Cow and Old Cow Creeks and flows westerly for about eight miles, past Millville, and near Palo Cedro turns south and flows eight more miles to its junction with the Sacramento River about four miles east of Anderson. The ground elevation at the mouth is about 325 feet.

One-quarter of the watershed that is near and below the confluence of Old Cow and South Cow Creeks consists essentially of level

valley floor lands rimmed on either side by low confining foothills which support growths of blue oak and native grasses. Thickets of willow, alder, and cottonwood border the stream channel. The stream gradient in this section is relatively flat and the irrigable lands are level and nearly continuous on either side of the stream.

Climate

The climate of the lower part of the stream system is typical of the Upper Sacramento Valley, having moderately cold wet winters and warm dry summers. Winter temperatures at the higher elevations in the upper watershed are considerably colder and snow is common. Over the watershed as a whole about 80 per cent of the precipitation falls in the six-month period from October through March.

Precipitation

The precipitation records maintained at Redding nine miles west of Palo Cedro are indicative of the precipitation pattern in the lower Cow Creek watershed. The 30-year mean monthly precipitation at this station and the 1963-64 monthly precipitation are presented in Table 1.

Precipitation records kept by the Pacific Gas and Electric Company at Kilarc Powerhouse at an elevation of 2,700 feet on Old Cow Creek are representative of upper watershed conditions. The 32-year mean monthly precipitation at this station and the 1963-64 monthly precipitation are presented in Table 1.

Isohyetal maps prepared by the Department of Water Resources for its Bulletin 22, Shasta County Investigation, show mean annual precipitation ranging from 27 inches at the mouth of Cow Creek to about 60 inches at the headwaters.

TABLE 1

MONTHLY PRECIPITATION AT REDDING AND
KILARC POWERHOUSE

In inches

Month	Redding		Kilarc Powerhouse	
	U. S. Weather Bureau mean*	1963-64	32-year mean**	1963-64
October	2.27	2.36	3.39	2.56
November	3.76	8.88	4.99	10.03
December	7.26	0.56	7.06	1.37
January	7.69	5.15	7.06	6.42
February	6.19	0.17	6.43	0.50
March	4.90	1.67	5.58	3.13
April	2.95	0.01	3.94	1.04
May	1.74	0	2.98	2.79
June	1.13	1.68	1.28	2.35
July	0.11	0	0.14	0
August	0.13	0	0.16	0
September	0.61	0.30	0.82	0.63
TOTALS	38.74	20.78	43.83	30.82

* Climatological normal based on the period 1931-1960.

** 1932-33 through 1963-64.

Much of the winter precipitation in the watershed above about 3,500 feet occurs as snow which is retained into the spring months. Summer precipitation consists of infrequent rains of short duration. Such rains, however, are not consistent enough to be relied upon for irrigation needs.

Growing Season

Data published by the United States Weather Bureau show that at Redding temperatures vary from a few degrees below freezing in the winter to a few degrees above 100 in the summer. The length of the growing season is generally limited to the frost-free period between the last freezing temperature (32° or less) in the spring and the first freezing temperature in the fall. The frost-free periods as recorded at the Redding Station for each year since 1948 are presented in Table 2 and average 266 days. The Redding records are presented as indicative of length of growing season in the lower portion of Cow Creek stream system below Millville.

Dates of first and last frosts from records kept at the Volta Powerhouse in the Battle Creek watershed nine miles south of South Cow Creek at elevation 2,200 feet are also presented in Table 2 as an approximation of growing season within the upper Cow Creek stream system above Millville. The average length of the frost-free period there is 218 days. It should be noted that irrigated pasture and certain other crops are able to survive temperatures below freezing and growth is able to proceed at a very slow rate, even during the winter months. The period of active growth generally begins with the advent of warm weather in March and ceases by the end of October when the days become shorter and cooler.

TABLE 2

DATES OF KILLING FROSTS AT REDDING
AND VOLTA POWERHOUSE

Year	Last spring frost		First fall frost		Length of growing season, days	
	Redding	Volta PH	Redding	Volta PH	Redding	Volta PH
1948	May 1	Apr. 3	Dec. 4	Nov. 7	217	218
1949	Feb. 14	Mar. 29	Dec. 11	Dec. 10	300	256
1950	May 4	Apr. 14	Nov. 13	Dec. 1	237	231
1951	Apr. 1	Apr. 30	Nov. 22	Nov. 22	235	206
1952	Mar. 20	Apr. 14	Nov. 24	Nov. 23	248	222
1953	Mar. 17	May 1	Nov. 20	Nov. 19	248	202
1954	Mar. 19	Mar. 17	Nov. 30	Nov. 30	256	258
1955	Apr. 2	Apr. 27	Nov. 12	Nov. 12	224	199
1956	Mar. 6	Mar. 27	Oct. 27	Nov. 20	235	238
1957	Feb. 5	Mar. 22	Dec. 8	Oct. 3	306	195
1958	Jan. 8	Mar. 16	Nov. 17	Nov. 15	313	244
1959	Feb. 8	May 3	Dec. 13	Dec. 8	308	219
1960	Mar. 1	May 21	Nov. 27	Nov. 15	271	178
1961	Jan. 21	Apr. 22	Dec. 10	Oct. 28	323	189
1962	Mar. 10	Mar. 23	Dec. 26	Nov. 29	291	251
1963	Mar. 17	Apr. 21	Dec. 3	Nov. 21	261	214
1964	Mar. 7	May 4	Nov. 13	Nov. 13	251	193
	AVERAGE LENGTH OF GROWING SEASON				266	218

Development

The first development in the Cow Creek area occurred in 1853 when two brothers, S. E. and N. T. Stroud, settled in the Millville area. The settlement grew for a few years and at one time in the early 1860's was supposed to have been the second largest town in Shasta County.

The first resident in the valley below the South Cow Creek Powerhouse was Erastus Wagoner who in about 1855 settled on a homestead which is to this day a part of the Wagoner Ranch.

In 1863 Simon Whitmore settled on land farther east and provided the nucleus for a settlement known as Tamarack for the first 20 years of its existence. Growth here was quite slow until about 1883 when a post office was opened, and the town name changed to Whitmore, in honor of its first settler. By this time several ranches had been established in the area and Whitmore became a small trade center. In those days farming was more diversified than now, with fruit, wheat, corn, hops and vegetables being produced.

Irrigation in the Cow Creek area began shortly after homesteading on many of the ranches. Full development of the lands now being irrigated by diversion from the stream system was slow, however, and it was not until after the turn of the century that some of the ranches were homesteaded and irrigated.

Land ownership in the mountainous upper watershed today consists of large parcels owned and operated by lumber companies to produce pine and fir timber and smaller parcels of irrigated land owned by persons interested primarily in ranching.

A small acreage in the extreme eastern portion of the area is within the Lassen National Forest, and a larger tract of about 9,000 acres in this area comprises Latour State Forest.

The lower watershed near Millville and Palo Cedro is divided into numerous smaller parcels owned mainly by ranchers. However, some of the lower farms have been subdivided and serve as suburbs of Redding and Anderson which are located a few miles to the west.

Soils

The adaptability of soils in the Cow Creek area to irrigated crops is an important consideration in the determination of water rights. This section of the report comments on soil formation in general and describes the properties of some of the common soil types in the Cow Creek area which are irrigated.

The agricultural quality of soil is measured by characteristics such as texture, permeability, fertility, and slope. These characteristics reflect, to a large degree, the nature of the parent rock from which the particular soil was formed. From the day of its creation the parent rock is subjected to the soil forming forces of climate, bacteria, and vegetation which break down the rock and develop a soil mantle with unique properties. The soil thus formed is subject to the erosive action of water and in times of flood may be transported miles downstream to be deposited in the lower valleys as alluvium.

As noted previously the Cow Creek area has been the scene of extensive volcanic activity within fairly recent geologic history. Basaltic and andesitic lava flows and loose volcanic material covered the area with

a blanket or cap, thickest near the headwaters of Cow Creek and tapering off toward the west. Beneath this material and to the west lie older formations, principally shale and sandstone.

The soil series found in the Cow Creek area below Millville were first mapped, classified, and reported by the U. S. Department of Agriculture in a bulletin entitled "Soil Survey of the Redding Area, California" published in 1908. Since then, land classification surveys have been made by the U. S. Bureau of Reclamation in 1957 over the lower portion of the watershed and by the State Department of Water Resources in 1962. In addition to these, the U. S. Soil Conservation Service in cooperation with the State of California is currently conducting a soils survey which includes the mountainous portion of the Cow Creek stream system as well as the lower portion. The published and preliminary results of these various surveys have been used in preparing the following portion of this report.

Lower Area

The irrigated lands in the lower area consist entirely of nearly level valley floor lands lying along the stream channel. With the exception of narrow strips of rocky river wash soils immediately adjacent to stream channels, the level soils in this area are all suitable for irrigation. The best of these are more than 36 inches deep and range in texture from sandy loam to friable clay loam. The poorest of the irrigable soils are shallow and light in texture. They also frequently have high gravel content and may be of steeper slope. Hardpan is quite rare.

A wide variety of soil series is found in the area, depending on the source of parent material and the age of the soil. Some soils

consist of alluvium which originated from the basaltic and andesitic vocanic soils higher in the watershed. These are fertile, well drained, and permeable and textures range from loamy sand to clay loam. These types include the Molinos, Vina, and Los Robles soil series.

Other adjacent soils were deposited as alluvial fans at the mouths of small local tributary streams. These soils reflect the shale or sandstone nature of the parent material lying either beneath or west of the lava flows and are more clayey and less permeable than those deposited by the main Cow Creek tributaries draining the higher watershed. The Myers series is typical of these soils.

Upper Area

The recent alluvial soils found in the valleys in the upper area are generally of the same type and quality as the lower area soils similarly situated. Above 2,000 feet elevation, however, the Nanny series is common as alluvium on level or gently sloping topography. These soils support excellent stands of timber and when cleared produce well under irrigation. Irrigation in the higher portion of the stream system is not restricted to the level valley soils. In several cases steep hillside soils have been irrigated for years. Some of these soil series such as Guenoc, Toomes, and Kilarc would ordinarily be classed as nonirrigable due to their steepness, rockiness and shallowness.

Most of these hillside or plateau soil types were formed in place from unaltered basaltic lava flow rock, or as in the Kilarc soils, from weakly consolidated sandstone. The soils are usually rocky and contain a high percentage of gravel.

CHAPTER III. WATER SUPPLY AND USE OF WATER

Knowledge of the water supply available from the several streams comprising the Cow Creek stream system is a basic prerequisite to a determination of water rights. Data on diversion and use of water are equally important and must be collected and recorded. This chapter presents the results of water supply measurements, measurements of diversion of water and its use.

Water Supply

The water supply of Cow Creek stream system, although unregulated by storage reservoirs, can usually be depended on to satisfy present requirements throughout the irrigation season. However, even in normal water supply years temporary shortages occasionally occur because of uncoordinated diversions through the large ditches. In dry years shortages are of longer duration and may occur throughout the stream system.

Average annual runoff for the entire stream system since 1950 when the United States Geological Survey established the Cow Creek gaging station has been 450,000 acre-feet, equivalent to an average runoff depth of 1.6 feet over the entire watershed area of 430 square miles. South Cow Creek and Old Cow Creek produce about 75,000 acre-feet each.

The runoff records show that for the stream system as a whole about 23 per cent of the annual runoff occurs in the six-month period, April through September. The remaining 77 per cent flows into the Sacramento River during the winter. The summer flows of the Old Cow

Creek and South Cow Creek portions of the watershed, however, are better sustained with the April through September flow comprising about 33 per cent of their total annual runoff. The pattern of Cow Creek annual runoff is shown graphically on Plate 2 at the back of this report. The hydrographs are of the flow of Cow Creek at the U. S. Geological Survey Station during a very wet year (1962-63) and a very dry year (1963-64).

Ideally, water supply is measured on a stream at a point upstream from all diversions. On the Cow Creek stream system, measurements at such points would not give a true measure of water supply since large springs and tributary water courses occur downstream from some of the diversions. As a consequence, streamflow was measured during the investigation at key points which in many cases were a considerable distance downstream from the headwaters. Other factors considered in the selection of measuring stations were accessibility and stream channel conditions which would allow reasonably accurate flow measurements to be made.

To supplement the water supply records provided by the stations of the United States Geological Survey on South Cow Creek and Cow Creek, water stage recorders were installed and maintained by the State Water Rights Board at three other locations. These were on South Cow Creek above the German Ditch, on Glendenning Creek below its confluence with Bear Gulch, and on Cow Creek below the confluence of Old Cow Creek and South Cow Creek. The relationship between gage height as measured by the recorder and discharge as measured by current meter was determined for each of these stations. From this relationship, daily mean discharge in cubic feet per second was obtained and tables prepared and included in Appendix B.

Staff gages were installed at numerous locations in other stream channels. Frequent readings of gage height together with current meter measurements of the flow have been used in estimating flows in these streams. Information on water supply for each major tributary is presented below.

Old Cow Creek

Occasional measurements were made during the 1964 irrigation season of the flow of Old Cow Creek at the Ponderosa Way Bridge just above the Kilarc Powerhouse. Flow past this station plus discharge through the powerhouse comprises the natural flow of Old Cow Creek impaired by diversion through the Murphy Ditch and the Grindlay-Williams Ditch (Diversions 5 and 6, respectively). Any additional impairment caused by the small upper watershed diversions is insignificant.

Discharge through the powerhouse is the sum of the flow measured by the water stage recorder on the Kilarc Powerhouse Ditch (Diversion 3) and the flow measured in the Pacific Gas and Electric Company Canyon Creek Ditch (Diversion 4).

Computed monthly average streamflow below the powerhouse tailrace for 1964 is tabulated below:

Month	Average discharge in cubic feet per second
May	50
June	47
July	34
August	27
September	28

Streamflow downstream from the powerhouse tailrace on Old Cow Creek was sufficient in 1964 to maintain a live stream throughout its length. However, large amounts of return flow from all irrigated lands along the creek were of critical importance in maintaining an adequate water supply to fill the needs of all downstream diverters.

Important tributaries to Old Cow Creek are Hunt Creek and Canyon Creek upstream and Glendenning Creek downstream from the Kilarc Powerhouse.

Glendenning Creek

This creek is the largest tributary to Old Cow Creek below the Kilarc Powerhouse. A water stage recorder was maintained on the stream about 1/8 mile below Ponderosa Way Bridge ($1\frac{1}{4}$ miles upstream from its confluence with Old Cow Creek) during the 1964 irrigation season. The daily mean flow past this station is presented in Table B-2. During August of 1964 the flow averaged 3.4 cubic feet per second. The flow at this point represents the contribution of Glendenning Creek to Old Cow Creek as imparied by diversions to the Grindlay and Neely Ranches, and as augmented by return flow from lands irrigated by the German Ditch (Diversion 43) from South Cow Creek. This return flow reaches Glendenning Creek via Bear Gulch and Dailey Creek and averaged about 1.5 cubic feet per second during the 1964 season. Were it not for water importations through the German Ditch, the flow of Glendenning Creek would be quite small during the summer months.

A staff gage was maintained on Bear Gulch at Tamarack Road to evaluate its contribution to Glendenning Creek and intermittent measurements of flow at this station are presented in Table B-8.

Similar flow records were obtained on Dailey Creek at Tamarack Road and are also contained in Table B-8.

South Cow Creek

A continuous record of flow of South Cow Creek just upstream from the German Ditch diversion dam was obtained by using a water stage recorder during 1964 and is presented in Table B-3. Flow at this station represents the full natural flow of the stream impaired only by a diversion of about 2 cubic feet per second through the Beal Creek Ditch (Diversion 42) after August 29, 1964, when this ditch was first opened for the year. The effect of other upstream diversions is insignificant. Flow past the station averaged 18.2 cubic feet per second during August of 1964.

A few measurements were also made of the flow of South Cow Creek at the Ponderosa Way Bridge two miles downstream from the German Ditch diversion dam. These measurements are shown in Table B-8.

A third point of measurement of South Cow Creek was a short distance above the Wagoner Ditch and above the confluence of South Cow Creek with the tailrace channel (Hooten Gulch) of the South Cow Creek Powerhouse. Table B-8 contains the results of intermittent measurements at this point.

The fourth and last point of measurement on South Cow Creek is at the U. S. Geological Survey gaging station located 2½ miles from its confluence with Old Cow Creek. This station is below all diversions and irrigated lands on the creek and the record of flow represents the contribution of South Cow Creek to Cow Creek as impaired by all upstream

diversions and as enhanced by return flows. Preliminary records of daily mean discharge are presented in Table B-6. During August of 1964 the flow averaged 10.9 cubic feet per second.

The flow of South Cow Creek throughout its length was sufficient to satisfy all irrigation demands in 1964. However, as is true of all streams in the area under investigation, the only way these demands were met was by large amounts of return flow from irrigation.

Atkins Creek

Atkins Creek is tributary to South Cow Creek upstream from Ponderosa Way Bridge. A staff gage was maintained during the 1964 irrigation season in the stream at Bateman Road and frequent streamflow measurements and gage height readings were made. From these measurements daily mean discharge was estimated and is presented in Table B-4. Dry season flow past the station was constant, averaging 2.3 cubic feet per second during August. Water is diverted above the station for irrigation of the Elmer Hufford, Knight, and Worden Ranches.

Mill Creek

Mill Creek is tributary to South Cow Creek from the north. Its discharge is comprised of natural flow in its northern branch, Covey Creek, and of natural flow and water brought in through the German Ditch from South Cow Creek in its southern branch.

A staff gage was maintained in Mill Creek during the 1964 season at the Mill Creek Road. The stream section was rated by current meter and frequent gage height readings were made. The discharge record is presented in Table B-5. This flow was constant, averaging about

6 cubic feet per second during the irrigation season. It represents the water supply available for diversion into the Pacific Gas and Electric Company's Mill Creek Ditch (Diversion 71). It also represents the contribution of water from Mill Creek to South Cow Creek.

Cow Creek

Cow Creek is formed by the confluence of Old Cow Creek and South Cow Creek which contribute water in about equal amounts during the irrigation season. Tributaries to Cow Creek in downstream order are Basin Hollow, Clover Creek, Oak Run Creek, and North Cow Creek, also known as Little Cow Creek.

During the irrigation season of 1964 a water stage recorder was maintained on Cow Creek $1\frac{1}{4}$ miles below the junction of Old Cow and South Cow Creeks. Daily mean discharge obtained at this station is presented in Table B-7. Flow passing the station represents very nearly the entire supply to all lower pumps after about July 1. By this date the downstream tributaries such as Clover Creek, Oak Run Creek, and North Cow Creek contribute very little water. During August of 1964 the flow averaged about 15 cubic feet per second at the station.

A U. S. Geological Survey gaging station is located on the lower end of Cow Creek about three miles above its confluence with the Sacramento River. Table B-1 presents preliminary records of daily mean discharge at this station for the 1964 irrigation season. During the summer months the flow at this point is a measure of Cow Creek water available to the pumps located downstream. During these months, however, the stage of the Sacramento River is high enough to cause water to back

up in Cow Creek to the Dersch Road Bridge and the water supply below this bridge is a mixture of water from both sources.

During 1964 the flow in Cow Creek (between the junction of Old Cow and South Cow Creeks and its terminous at the Sacramento River) was sufficient to satisfy all irrigation demands except for about one week in late August when at least one pump was forced to shut down because of the low flow. There have been similar reports of insufficient flow in recent years.

Use of Water

Most of the summer flow of the stream system is used in furnishing the consumptive use requirements of irrigated crops. Total simultaneous diversion for irrigation in midsummer is about 170 cubic feet per second. Use of water for power generation is also important, and total simultaneous diversion during the spring runoff is about 100 cubic feet per second. After passing through the powerplants the water is available for diversion for irrigation.

Detailed description of use of water through each diversion system is contained in Table A-4.

Losses in Ditches and Channels

The reduction in ditch flow between the point of diversion and the place of use is termed "ditch loss." Its magnitude depends on several factors including permeability of ditch bank and bed, length of ditch, condition of ditch and wetted perimeter.

The German Ditch was selected for loss measurements as representative of the large ditches in the area. Current meter measurements

were made of ditch flow at the head and 1.38 miles down the ditch at the recorder station above all laterals. This reach of the ditch is reasonably well maintained although there is some leakage from flumes. The ditch runs through heavy timber and there is undoubtedly some water lost to transpiration by this vegetation. Water velocity is swift enough to prevent weed growth which could obstruct the flow of water. In view of all factors affecting ditch loss, it is believed that conditions on the German Ditch are representative of conditions throughout the Cow Creek stream system. The average loss is 1.1 cubic feet per second per mile and the results of the measurements are shown in Table 3. Ditch losses similar to those measured here could be expected on other reasonably maintained Cow Creek ditches of similar size.

The Grindlay lateral of the Grindlay-Williams Ditch was chosen as typical of small ditches. Measurements in August of 1964 show 1.65 cubic feet per second entering the lateral with 0.95 cubic foot per second measured at a point 2.03 miles downstream, above the place of use, indicating a total loss of 0.7 cubic foot per second. Although the ditch is in rather porous soil and the loss is probably a little greater than would be expected in some well maintained ditches of similar size in other areas of the Cow Creek stream system, a loss of this amount probably is not far from average.

Numerous springs throughout the upper half of the Old Cow and South Cow Creek watersheds cause accretions to streamflow that more than offset stream channel losses. There are minor net losses, however, in the lower section of Cow Creek channel. Measurements made in August and in October of 1964 before the first fall rain showed an average channel

TABLE 3

DITCH LOSS MEASUREMENTS ON
GERMAN DITCH
1964

In cubic feet per second

Date	Ditch flow*		Loss
	Head of ditch	At recorder	
June 12	11.7	10.8	0.9
June 26	11.8	10.8	1.0
July 15	11.9	10.1	1.8
July 24	12.4	10.1	2.3
August 7	12.2	10.7	1.5
August 21	12.8	11.2	1.6
September 3	12.1	11.0	1.1
Average	12.1	10.7	1.5

Average loss per mile = 1.1 cubic feet per second

*Measurements made by current meter.

loss of 3 per cent per mile in a two-mile reach of Cow Creek below Millville. Average rate of flow of the creek was about 20 cubic feet per second. The upper point of measurement was just below the confluence of Clover Creek with Cow Creek, and the lower point was just below Silverbridge Road. The amount of water being pumped from the creek between these two points was deducted so as not to be included as a channel loss.

Irrigation Use and Duty of Water

There are about 5,800 acres of land irrigated by diversion from the stream system. Diversion from Old Cow Creek supplies 2,750 acres and diversion from South Cow Creek supplies 1,470 acres, with the remaining 1,580 acres being irrigated by diversion from the main stem of Cow Creek.

There are only minor importations of water into the drainage area. One importation consists of about 0.3 cubic foot per second brought into the Hagaman Gulch watershed from Dickerson Creek to the south. Two small diversions from Dickerson Creek furnish irrigation water to 12.6 acres on the Darrell W. Faber property and domestic water to a cabin on the Clara Firth property. About 0.5 cubic foot per second is imported from Clover Creek through the Guttman Ditch for irrigation of about 25 acres on property owned by R. Whitney.

Irrigated pasture is the largest irrigated crop in the area. Nearly all the remaining irrigated lands are cropped to meadow hay or alfalfa hay, both of which may also be pastured. A large number of small gardens and orchards are also irrigated but do not aggregate a large

acreage. The paragraphs that follow pertain primarily to irrigated pasture but are also applicable to meadow hay and alfalfa whose water requirements are quite similar.

Duty of water is defined for purposes of this report as the number of acres irrigated under existing customs and practices by one cubic foot per second of water flowing continuously.

While it is recognized that there are slight differences in waterholding capacities of the various soils being irrigated, and corresponding variations in duty of water, there is a close enough similarity between the different soil types in this area to treat them as one group without attempting to determine separate water requirements for each soil type. A major difference in water requirement or duty of water was noted, however, for lands irrigated by pump diversions and lands irrigated by gravity diversions, and the following discussion on duty of water treats these two methods of irrigation separately.

Pump Diversions. Fourteen pumps diverting water from Cow Creek were chosen for duty of water measurements. Five diverted water for sprinkler systems, eight diverted water for irrigation by flooding border checks, and one diverted water for use by both methods. Discharge of all fourteen pumps was measured by Cox Flow Meter and monthly records of power consumption were obtained. The acreage irrigated by each pump was measured and the irrigation practices under each system were noted throughout the irrigation season. Land surface of all of the irrigated fields was quite smooth and level. Eleven of the fourteen pumps measured were used in a manner considered to be normal and representative of irrigation practices in the area. These eleven pumps irrigated pastures

growing mixed clover and grass species or crops of alfalfa hay and were operated so as to supply adequate amounts of water to the fields. The season of irrigation ran from about April 10 to October 27 when the first heavy rainfall of the year effectively ended irrigation.

The following tabulation summarizes the duty of water measurements for lands served by the observed pumps in the Cow Creek stream system. Table B-13 sets forth more details of the measurements.

Method of pump irrigation	Depth of applied water, in feet	Duty of water (acres irrigated by 1 cubic foot per second)	
		Entire season	Maximum month
Sprinkler	3.91	102	78
Border Check	4.86	82	59

From these measurements it is concluded that seasonal duty of water requirements for pump-irrigated pasture in the Cow Creek area are one cubic foot per second to 100 acres under sprinkler irrigation and one cubic foot per second to 80 acres under border check. However, during the month of maximum demand the required duties are at the increased rates of one cubic foot per second to 80 acres under sprinklers and one cubic foot per second to 60 acres under border checks which are deemed to be reasonable duties proper for purposes of this report.

The duty of water requirements just described are of similar magnitude to those determined in other adjudications in this vicinity and to those used by the State Department of Water Resources.

Gravity Diversions. In 1964 water stage recorders measured water deliveries through the Bassett Ditch (Diversion 36) and the German Ditch (Diversion 43). The tabulation on the following page presents the duty of water for these ditches. All water diverted by the Bassett Ditch is used for irrigation. On the German Ditch, however, only 73.6 per cent

of the water diverted is for irrigation, and the measured flow through the ditch has been reduced accordingly in the tabulation. The remaining 26.4 per cent is diverted for delivery to Mill Creek and eventual use in generating power at the South Cow Creek Powerhouse.

Ditch	Period of measurement	Acre-feet diverted for irrigation	Acreage irrigated	Duty of water (acres irrigated by 1 cubic foot per second)
Bassett Ditch	May 1-Oct.27	8,724	963	40
German Ditch	May 7-Oct.28	2,800	335	42

In this tabulation the point of measurement of the water diverted through the Bassett Ditch was at the water stage recorder located in the ditch about 0.6 mile below the diversion dam. The point of measurement on the German Ditch was at the recorder located 1.38 miles below the diversion dam. Additional amounts of water to offset ditch losses would have to be diverted at the head of each ditch to obtain these duties.

These measurements indicate that a duty of one cubic foot per second to 40 acres under gravity ditch is reasonable in the Cow Creek stream system. Lands irrigated by gravity diversions are generally of much steeper slope and are much rougher on the surface than the lower lands irrigated by pumps. Consequently, more water is required for their proper irrigation. Many of the ditches in the area have very low duties. In some cases as few as 10 acres are irrigated by one cubic foot per second. However, in view of the excessive amounts of surface drainage from lands irrigated by these diversions observed in 1964, it is reasonable to believe that improved irrigation practices could extend the duty of water to the one cubic foot per second to 40 acres found

Trout fishing is also of importance in the perennial streams. Of perhaps more importance are the salmon and steelhead spawning gravel beds in the middle section of Cow Creek channel and tributaries. The Department of Fish and Game estimates the average fall king salmon run to be 1,460 fish. Spring run salmon are barred from the good spawning areas by diversion dams.

APPENDIX A

DESCRIPTION OF PLACES OF USE AND DIVERSION SYSTEMS

TABLE A-1

DESCRIPTION OF PLACES OF USE

(All descriptions refer to Mount Diablo Base and Meridian)

Abbott, Allan G. and Abbott, Blanche

Lands irrigated in 1964:

11	acres in NE¼ of SE¼ of Section 11, T31N, R2W
0.2	acre in SE¼ of SE¼ of Section 11, T31N, R2W
15	acres in NW¼ of SW¼ of Section 12, T31N, R2W
8.4	acres in NE¼ of SW¼ of Section 12, T31N, R2W
1.0	acre in SW¼ of NW¼ of Section 12, T31N, R2W
11	acres in SE¼ of NW¼ of Section 12, T31N, R2W
16	acres in SW¼ of NE¼ of Section 12, T31N, R2W
12	acres in NW¼ of NE¼ of Section 12, T31N, R2W
19	acres in NE¼ of NE¼ of Section 12, T31N, R2W
2.4	acres in NW¼ of NW¼ of Section 7, T31N, R1W
96.0	acres - Total

Albert, Wertzel and Albert, Mabel H.

Lands irrigated in 1964:

3.2 acres in NW¼ of SE¼ of Section 32, T33N, R1E

Atkins, Leary B.

Lands irrigated in 1964:

4.1	acres in NE¼ of SE¼ of Section 7, T32N, R1E
15	acres in NE¼ of SW¼ of Section 7, T32N, R1E
34	acres in Lot 3 of Section 7, T32N, R1E
3.2	acres in Lot 4 of Section 7, T32N, R1E
2.4	acres in NE¼ of SE¼ of Section 12, T32N, R1W
0.6	acre in SE¼ of SE¼ of Section 12, T32N, R1W
12	acres in SW¼ of SE¼ of Section 12, T32N, R1W
2.4	acres in SE¼ of SW¼ of Section 12, T32N, R1W
21	acres in SW¼ of SW¼ of Section 12, T32N, R1W
94.7	acres - Total

TABLE A-1 (contd.)

Bargsten, Ernest F. and Bargsten, Beverly M.

Lands irrigated in 1964:

24	acres in NW¼ of NE¼ of Section 25, T32N, R2W
2.6	acres in SW¼ of NE¼ of Section 25, T32N, R2W
35	acres in NE¼ of NW¼ of Section 25, T32N, R2W
34	acres in NW¼ of NW¼ of Section 25, T32N, R2W
25	acres in SE¼ of NW¼ of Section 25, T32N, R2W
21	acres in SW¼ of NW¼ of Section 25, T32N, R2W
19	acres in NE¼ of NE¼ of Section 26, T32N, R2W
3.0	acres in NW¼ of NE¼ of Section 26, T32N, R2W
35	acres in SE¼ of NE¼ of Section 26, T32N, R2W
31	acres in SW¼ of NE¼ of Section 26, T32N, R2W
229.6	acres - Total

Beatie, Arthur H. and Beatie, Joy

Lands irrigated in 1964:

22	acres in SW¼ of NW¼ of Section 5, T30N, R3W
25	acres in NW¼ of NW¼ of Section 5, T30N, R3W
47	acres - Total

Lands idle in 1964:

0.4	acre in NE¼ of NW¼ of Section 5, T30N, R3W
9.6	acres in SE¼ of NW¼ of Section 5, T30N, R3W
4.8	acres in SW¼ of NW¼ of Section 5, T30N, R3W
5.0	acres in NW¼ of NW¼ of Section 5, T30N, R3W
19.8	acres - Total

Bingham, B. C.

Lands idle in 1964:

11 acres in NW¼ of NW¼ of Section 10, T31N, R3W

Bishop, Jack and Bishop, Thelma

Lands irrigated in 1964:

0.3 acre in SW¼ of NW¼ of Section 14, T31N, R3W

TABLE A-1 (contd.)

Blomquist, Theodore M. and Blomquist, Catharine A.

Lands irrigated in 1964:

2.2	acres in NE¼ of NW¼ of Section 14, T31N, R3W
23	acres in NW¼ of NW¼ of Section 14, T31N, R3W
9.8	acres in SW¼ of NW¼ of Section 14, T31N, R3W
35.0	acres - Total

Lands idle in 1964:

1.3	acres in NW¼ of NW¼ of Section 14, T31N, R3W

Bogue, H. E. and Bogue, Phyllis

Lands irrigated in 1964:

3.6	acres in SE¼ of SE¼ of Section 15, T32N, R1W
4.4	acres in SW¼ of SE¼ of Section 15, T32N, R1W
7.0	acres in NE¼ of NE¼ of Section 22, T32N, R1W
8.0	acres in NW¼ of NE¼ of Section 22, T32N, R1W
8.3	acres in NE¼ of NW¼ of Section 22, T32N, R1W
31.3	acres - Total

Boksa, Demeter and Boksa, Aurelia

Lands irrigated in 1964:

6.5	acres in SE¼ of NE¼ of Section 7, T32N, R1E

Brady, Jack and Brady, Ruth

Lands irrigated in 1964:

13	acres in SE¼ of NE¼ of Section 18, T32N, R1E
1.4	acres in NE¼ of NE¼ of Section 18, T32N, R1E
14.4	acres - Total

Lands idle in 1964:

12	acres in SE¼ of NE¼ of Section 18, T32N, R1E
3.0	acres in SW¼ of NE¼ of Section 18, T32N, R1E
15.0	acres - Total

TABLE A-1 (contd.)

Brewer, Lowell D. and Brewer, Vietta M.

Lands irrigated in 1964:

9.2	acres in NE¼ of SE¼ of Section 16, T32N, R1W
37	acres in NW¼ of SE¼ of Section 16, T32N, R1W
12	acres in SW¼ of SE¼ of Section 16, T32N, R1W
37	acres in NE¼ of SW¼ of Section 16, T32N, R1W
31	acres in NW¼ of SW¼ of Section 16, T32N, R1W
34	acres in SE¼ of SW¼ of Section 16, T32N, R1W
33	acres in SW¼ of SW¼ of Section 16, T32N, R1W
193.2	acres - Total

Bryant, Robert S. and Bryant, Louise (1/2 interest)
Bryant, William J. and Bryant, Dorothy E. (1/2 interest)

Lands irrigated in 1964:

25	acres in NE¼ of NW¼ of Section 5, T30N, R3W
9.6	acres in SE¼ of NW¼ of Section 5, T30N, R3W
0.8	acre in SW¼ of SE¼ of Section 32, T31N, R3W
4.8	acres in SE¼ of SW¼ of Section 32, T31N, R3W
40.2	acres - Total

Lands under construction in 1964:

7.6	acres in NE¼ of NW¼ of Section 32, T31N, R3W
13	acres in SW¼ of SE¼ of Section 32, T31N, R3W
21	acres in SE¼ of SW¼ of Section 32, T31N, R3W
41.6	acres - Total

Bullard, Harry E. and Bullard, Frona

Lands irrigated in 1964:

2.0 acres in NE¼ of SE¼ of Section 28, T32N, R1W

Carr, Pierre G. and Carr, Susan G.

Lands irrigated in 1964:

9.6	acres in NE¼ of NE¼ of Section 36, T32N, R1W
5.2	acres in SE¼ of NE¼ of Section 36, T32N, R1W
7.4	acres in SW¼ of NE¼ of Section 36, T32N, R1W
22.2	acres - Total

TABLE A-1 (contd.)

Carter, Paul L. and Carter, Juanita

Lands irrigated in 1964:

0.5 acre in NE¼ of SW¼ of Section 20, T31N, R3W

Lands idle in 1964:

2.0 acres in NE¼ of SW¼ of Section 20, T31N, R3W

Chellis, Mary L.

Domestic use in NW¼ of SW¼ of Section 21, T32N, R1E

Cherta, John and Cherta, June

Lands idle in 1964:

4.2 acres in NE¼ of SW¼ of Section 20, T31N, R3W

Clark, William C. and Greer, Anita A.

Lands idle in 1964:

16 acres in SE¼ of SW¼ of Section 20, T31N, R3W

Combs, Leslie and Combs, Ellen

Domestic use in NW¼ of SW¼ of Section 21, T32N, R1E

Covey, Myrtle Jurdy

Lands irrigated in 1964:

5.4 acres in NW¼ of NW¼ of Section 24, T32N, R1W
2.2 acres in SE¼ of NW¼ of Section 24, T32N, R1W
9.0 acres in SW¼ of NW¼ of Section 24, T32N, R1W
16.6 acres - Total

Lands idle in 1964:

5.4 acres in SW¼ of NW¼ of Section 24, T32N, R1W

TABLE A-1 (contd.)

Covey, Harry N. and Covey, Colleen M.

Lands irrigated in 1964:

3.6 acres in NE¼ of NE¼ of Section 23, T32N, R1W

Crowe Hereford Ranch

Lands irrigated in 1964:

13 acres in NE¼ of NW¼ of Section 26, T32N, R2W
15 acres in NW¼ of NW¼ of Section 26, T32N, R2W
4.8 acres in SE¼ of NW¼ of Section 26, T32N, R2W
25 acres in SW¼ of NW¼ of Section 26, T32N, R2W
0.3 acre in NE¼ of SW¼ of Section 26, T32N, R2W
20 acres in NW¼ of SW¼ of Section 26, T32N, R2W
5.2 acres in SE¼ of SW¼ of Section 26, T32N, R2W
22 acres in SW¼ of SW¼ of Section 26, T32N, R2W
2.4 acres in NE¼ of SE¼ of Section 27, T32N, R2W
23 acres in SE¼ of SE¼ of Section 27, T32N, R2W
17 acres in NE¼ of NW¼ of Section 35, T32N, R2W
23 acres in NW¼ of NW¼ of Section 35, T32N, R2W
15 acres in SE¼ of NW¼ of Section 35, T32N, R2W
17 acres in SW¼ of NW¼ of Section 35, T32N, R2W
2.1 acres in NE¼ of SW¼ of Section 35, T32N, R2W
19 acres in NW¼ of SW¼ of Section 35, T32N, R2W
20 acres in SW¼ of SW¼ of Section 35, T32N, R2W
35 acres in NE¼ of NE¼ of Section 34, T32N, R2W
31 acres in SE¼ of NE¼ of Section 34, T32N, R2W
5.8 acres in SW¼ of NE¼ of Section 34, T32N, R2W
6.5 acres in SW¼ of NW¼ of Section 34, T32N, R2W
37 acres in NE¼ of SE¼ of Section 34, T32N, R2W
19 acres in NW¼ of SE¼ of Section 34, T32N, R2W
24 acres in SE¼ of SE¼ of Section 34, T32N, R2W
34 acres in SW¼ of SE¼ of Section 34, T32N, R2W
16 acres in NE¼ of SW¼ of Section 34, T32N, R2W
1.0 acre in NW¼ of SW¼ of Section 34, T32N, R2W
40 acres in SE¼ of SW¼ of Section 34, T32N, R2W
5.6 acres in SW¼ of SW¼ of Section 34, T32N, R2W
5.6 acres in SE¼ of NE¼ of Section 33, T32N, R2W
12 acres in NE¼ of SE¼ of Section 33, T32N, R2W
6.8 acres in NW¼ of SE¼ of Section 33, T32N, R2W
4.2 acres in NW¼ of NW¼ of Section 2, T31N, R2W
17 acres in NE¼ of NE¼ of Section 3, T31N, R2W
24 acres in NW¼ of NE¼ of Section 3, T31N, R2W
0.3 acre in SW¼ of NE¼ of Section 3, T31N, R2W
43 acres in NE¼ of NW¼ of Section 3, T31N, R2W
6.0 acres in NW¼ of NW¼ of Section 3, T31N, R2W
4.0 acres in SE¼ of NW¼ of Section 3, T31N, R2W
35 acres in SW¼ of NW¼ of Section 3, T31N, R2W

Crowe Hereford Ranch (contd.)

Lands irrigated in 1964:

2.2	acres in	NW¼ of SW¼ of Section	3, T31N, R2W
8.4	acres in	SE¼ of NE¼ of Section	4, T31N, R2W
15	acres in	NE¼ of SE¼ of Section	4, T31N, R2W
6.8	acres in	SW¼ of NW¼ of Section	4, T31N, R2W
9.6	acres in	SE¼ of NE¼ of Section	5, T31N, R2W
16	acres in	NE¼ of SE¼ of Section	5, T31N, R2W
25	acres in	NW¼ of SE¼ of Section	5, T31N, R2W
2.8	acres in	SW¼ of SE¼ of Section	5, T31N, R2W
0.9	acre in	NE¼ of SW¼ of Section	5, T31N, R2W
2.3	acres in	SE¼ of SW¼ of Section	5, T31N, R2W
745.6	acres - Total		

Lands idle in 1964:

2.0	acres in	NW¼ of NW¼ of Section	35, T32N, R2W
7.4	acres in	SW¼ of NW¼ of Section	35, T32N, R2W
4.4	acres in	NW¼ of SW¼ of Section	35, T32N, R2W
2.0	acres in	SW¼ of NW¼ of Section	4, T31N, R2W
0.8	acre in	SE¼ of NE¼ of Section	5, T31N, R2W
4.0	acres in	SE¼ of SE¼ of Section	34, T32N, R2W
5.2	acres in	NE¼ of NE¼ of Section	3, T31N, R2W
1.6	acres in	NW¼ of NE¼ of Section	3, T31N, R2W
27.4	acres - Total		

Dargatz, Leo H. and Dargatz, Genieve R.

Lands irrigated in 1964:

11 acres in SW¼ of SE¼ of Section 5, T32N, R1E

Lands idle in 1964:

4.8 acres in SW¼ of SE¼ of Section 5, T32N, R1E

Dicker, C. M., Inc.

Lands irrigated in 1964:

1.0 acre in SE¼ of NW¼ of Section 18, T31N, R3W

Donohue, Paul and Donohue, Doris J.

Lands irrigated in 1964:

20 acres in SE¼ of NE¼ of Section 23, T32N, R1W

Dymesich, George J. and Dymesich, Sophie

Lands irrigated in 1964:

1.4	acres in SW¼ of SW¼ of Section 16, T32N, R1W
5.4	acres in NE¼ of NE¼ of Section 20, T32N, R1W
7.2	acres in NW¼ of NW¼ of Section 21, T32N, R1W
14.0	acres - Total

Lands idle in 1964:

7.0	acres in NW¼ of NW¼ of Section 21, T32N, R1W

Espinosa, Harold C. and Espinosa, Virginia L.

Lands irrigated in 1964:

0.6	acre in SE¼ of NE¼ of Section 13, T31N, R3W
7.0	acres in SW¼ of NE¼ of Section 13, T31N, R3W
4.4	acres in SE¼ of NW¼ of Section 13, T31N, R3W
0.1	acre in NE¼ of SE¼ of Section 13, T31N, R3W
10	acres in NW¼ of SE¼ of Section 13, T31N, R3W
16	acres in SW¼ of SE¼ of Section 13, T31N, R3W
38.1	acres - Total

Lands idle in 1964:

8.8	acres in NW¼ of SE¼ of Section 13, T31N, R3W
1.8	acres in SW¼ of NE¼ of Section 13, T31N, R3W
10.6	acres - Total

Lands under construction in 1964:

12	acres in NE¼ of SE¼ of Section 13, T31N, R3W
4.4	acres in NW¼ of SE¼ of Section 13, T31N, R3W
2.2	acres in SE¼ of SE¼ of Section 13, T31N, R3W
3.6	acres in SW¼ of SE¼ of Section 13, T31N, R3W
22.2	acres - Total

Faber, Darrell W. and Faber, Hazel E.

Lands irrigated in 1964:

10	acres in SE¼ of NW¼ of Section 26, T32N, R1E

TABLE A-1 (contd.)

Farrell, V. R. and Farrell, Henrietta

Lands irrigated in 1964:

1.2	acres in SW¼ of SW¼ of Section 12, T31N, R2W
14	acres in NE¼ of SW¼ of Section 11, T31N, R2W
25	acres in SE¼ of SW¼ of Section 11, T31N, R2W
17	acres in NW¼ of SE¼ of Section 11, T31N, R2W
16	acres in SW¼ of SE¼ of Section 11, T31N, R2W
1.6	acres in NE¼ of NW¼ of Section 14, T31N, R2W
74.8	acres - Total

Fitzpatrick, David P. and Fitzpatrick, Mildred

Lands irrigated in 1964:

33	acres in SW¼ of SE¼ of Section 20, T31N, R3W
10	acres in NW¼ of SE¼ of Section 20, T31N, R3W
0.8	acre in SE¼ of SW¼ of Section 20, T31N, R3W
43.8	acres - Total

Fraley, Harold L. and Fraley, Esther M.

Lands irrigated in 1964:

3.0	acres in SW¼ of NE¼ of Section 17, T31N, R3W
3.6	acres in NE¼ of SW¼ of Section 17, T31N, R3W
26	acres in NE¼ of NW¼ of Section 17, T31N, R3W
22	acres in SE¼ of NW¼ of Section 17, T31N, R3W
54.6	acres - Total

Lands idle in 1964:

13	acres in SE¼ of SW¼ of Section 17, T31N, R3W

Fraser, Thomas and Fraser, Morag

Lands under construction in 1964:

6.0	acres in NE¼ of SW¼ of Section 17, T31N, R3W

Frisbie, E. C.

Lands irrigated in 1964:

11	acres in SW¼ of NW¼ of Section 9, T31N, R3W
8.0	acres in NW¼ of NW¼ of Section 9, T31N, R3W
19.0	acres - Total

TABLE A-1 (contd.)

Gibson, Laine

Lands irrigated in 1964:

2.0 acres in NW¼ of SW¼ of Section 21, T32N, R1E

Gilbert, Roxie R.

Lands irrigated in 1964:

25	acres in NE¼ of SE¼ of Section 17, T32N, R1W
16	acres in NW¼ of SE¼ of Section 17, T32N, R1W
11	acres in SE¼ of SE¼ of Section 17, T32N, R1W
32	acres in SW¼ of SE¼ of Section 17, T32N, R1W
22	acres in NW¼ of NE¼ of Section 20, T32N, R1W
19	acres in NE¼ of NW¼ of Section 20, T32N, R1W
16	acres in NW¼ of NW¼ of Section 20, T32N, R1W
6.0	acres in SE¼ of NW¼ of Section 20, T32N, R1W
22	acres in SW¼ of NW¼ of Section 20, T32N, R1W
169.0	acres - Total

Glassford, Roy and Glassford, Olive E.

Lands irrigated in 1964:

0.6 acre in NE¼ of SW¼ of Section 20, T31N, R3W

Lands idle in 1964:

1.6 acres in NE¼ of SW¼ of Section 20, T31N, R3W

Grindlay, Helen V.

Lands irrigated in 1964:

10	acres in SE¼ of SE¼ of Section 5, T32N, R1E
0.4	acre in SW¼ of SE¼ of Section 5, T32N, R1E
9.8	acres in NE¼ of NE¼ of Section 8, T32N, R1E
12	acres in NW¼ of NE¼ of Section 8, T32N, R1E
1.6	acres in SW¼ of NE¼ of Section 8, T32N, R1E
4.0	acres in NW¼ of NE¼ of Section 9, T32N, R1E
5.4	acres in SW¼ of NE¼ of Section 9, T32N, R1E
0.4	acre in SE¼ of NE¼ of Section 9, T32N, R1E
43.6	acres - Total

Grindlay, Helen V. (contd.)

Lands idle in 1964:

22	acres in NE¼ of NE¼ of Section 8, T32N, R1E
14	acres in NE¼ of NE¼ of Section 9, T32N, R1E
17	acres in NW¼ of NE¼ of Section 9, T32N, R1E
0.6	acre in SW¼ of NE¼ of Section 9, T32N, R1E
0.4	acre in NE¼ of NW¼ of Section 9, T32N, R1E
2.0	acres in SE¼ of NW¼ of Section 9, T32N, R1E
56.0	acres - Total

Hall, Jura Lawrence

Lands irrigated in 1964:

14	acres in NE¼ of SW¼ of Section 13, T31N, R3W
9.6	acres in SE¼ of SW¼ of Section 13, T31N, R3W
14	acres in SW¼ of SW¼ of Section 13, T31N, R3W
17	acres in NW¼ of SW¼ of Section 13, T31N, R3W
54.6	acres - Total

Harris, John M. and Harris, Fanny B.

Lands irrigated in 1964:

1.0 acre in SW¼ of NW¼ of Section 17, T31N, R3W

Hawes, Melvin

Lands irrigated in 1964:

1.6	acres in SW¼ of NE¼ of Section 8, T30N, R3W
2.0	acres in NW¼ of NE¼ of Section 8, T30N, R3W
35	acres in NE¼ of NW¼ of Section 8, T30N, R3W
12	acres in SE¼ of NW¼ of Section 8, T30N, R3W
2.4	acres in SW¼ of NW¼ of Section 8, T30N, R3W
6.0	acres in NW¼ of NW¼ of Section 8, T30N, R3W
59.0	acres - Total

Lands under construction in 1964:

25	acres in SE¼ of NW¼ of Section 8, T30N, R3W
10	acres in SW¼ of NW¼ of Section 8, T30N, R3W
17	acres in NE¼ of SW¼ of Section 8, T30N, R3W
6.4	acres in NW¼ of SW¼ of Section 8, T30N, R3W
3.2	acres in SE¼ of SW¼ of Section 8, T30N, R3W
61.6	acres - Total

TABLE A-1 (contd.)

Hawes, Roy B.

Lands idle in 1964:

3.2	acres in NE¼ of SW¼ of Section 5, T30N, R3W
13	acres in SE¼ of SW¼ of Section 5, T30N, R3W
7.2	acres in SW¼ of SE¼ of Section 5, T30N, R3W
23.4	acres - Total

Lands under construction in 1964:

8.8	acres in NE¼ of SW¼ of Section 5, T30N, R3W
38	acres in NW¼ of SW¼ of Section 5, T30N, R3W
20	acres in SE¼ of SW¼ of Section 5, T30N, R3W
38	acres in SW¼ of SW¼ of Section 5, T30N, R3W
104.8	acres - Total

Herman, William F. and Herman, Helen E.

Lands irrigated in 1964:

19	acres in NE¼ of NW¼ of Section 29, T31N, R3W
7.2	acres in NW¼ of NW¼ of Section 29, T31N, R3W
26.2	acres - Total

Lands idle in 1964:

9.2	acres in NE¼ of NW¼ of Section 29, T31N, R3W
3.6	acres in NW¼ of NW¼ of Section 29, T31N, R3W
12.8	acres - Total

Hoffman, Margot

Lands irrigated in 1964:

2.5 acres in NE¼ of NW¼ of Section 29, T31N, R3W

Hufford, Albert F. and Hufford, Doris

Lands irrigated in 1964:

1.4	acres in SE¼ of NE¼ of Section 29, T31N, R3W
8.0	acres in SW¼ of NE¼ of Section 29, T31N, R3W
24	acres in NW¼ of NE¼ of Section 29, T31N, R3W
33.4	acres - Total

Hufford, Elmer

Lands irrigated in 1964:

20	acres in NW¼ of NE¼ of Section 34, T32N, R1W
29	acres in NE¼ of NW¼ of Section 34, T32N, R1W
24	acres in NW¼ of NW¼ of Section 34, T32N, R1W
25	acres in SE¼ of NW¼ of Section 34, T32N, R1W
21	acres in SW¼ of NW¼ of Section 34, T32N, R1W
11	acres in NE¼ of NE¼ of Section 7, T32N, R2E
12	acres in NW¼ of NW¼ of Section 8, T32N, R2E
142	acres - Total

Hufford, Jennie

Lands irrigated in 1964:

0.4	acre in NE¼ of SW¼ of Section 11, T31N, R2W

Hufford, Jesse D., Jr.

Lands irrigated in 1964:

32	acres in SE¼ of SE¼ of Section 14, T31N, R3W
20	acres in SW¼ of SE¼ of Section 14, T31N, R3W
9.2	acres in NE¼ of SW¼ of Section 14, T31N, R3W
25	acres in SE¼ of NW¼ of Section 14, T31N, R3W
7.2	acres in SW¼ of NW¼ of Section 14, T31N, R3W
93.4	acres - Total

Hufford, Jesse, Estate of

Lands irrigated in 1964:

18	acres in NW¼ of SW¼ of Section 19, T32N, R1W
31	acres in SW¼ of SW¼ of Section 19, T32N, R1W
9.6	acres in NE¼ of NW¼ of Section 30, T32N, R1W
37	acres in NW¼ of NW¼ of Section 30, T32N, R1W
3.6	acres in SW¼ of NW¼ of Section 30, T32N, R1W
9.4	acres in NE¼ of SE¼ of Section 24, T32N, R2W
30	acres in SE¼ of SE¼ of Section 24, T32N, R2W
20	acres in SW¼ of SE¼ of Section 24, T32N, R2W
1.4	acres in SE¼ of SW¼ of Section 24, T32N, R2W
34	acres in NE¼ of NE¼ of Section 25, T32N, R2W
3.4	acres in NW¼ of NE¼ of Section 25, T32N, R2W
33	acres in SE¼ of NE¼ of Section 25, T32N, R2W
16	acres in SW¼ of NE¼ of Section 25, T32N, R2W
1.2	acres in NE¼ of SE¼ of Section 25, T32N, R2W
11	acres in NW¼ of SE¼ of Section 25, T32N, R2W
7.6	acres in NE¼ of SW¼ of Section 25, T32N, R2W
266.2	acres - Total

Hufford, Jesse, Estate of (contd.)

Lands idle in 1964:

5.0 acres in NE¼ of SE¼ of Section 25, T32N, R2W
1.8 acres in NW¼ of SE¼ of Section 25, T32N, R2W
6.8 acres - Total

Hunt, W. H., Estate Company

Lands irrigated in 1964:

20 acres in NW¼ of NW¼ of Section 15, T31N, R2W
13 acres in NE¼ of NW¼ of Section 15, T31N, R2W
11 acres in NW¼ of NE¼ of Section 15, T31N, R2W
4.2 acres in NE¼ of NE¼ of Section 15, T31N, R2W
2.5 acres in SW¼ of SE¼ of Section 10, T31N, R2W
36 acres in SE¼ of SE¼ of Section 10, T31N, R2W
12 acres in NW¼ of NW¼ of Section 14, T31N, R2W
9.0 acres in SE¼ of SW¼ of Section 11, T31N, R2W
35 acres in SW¼ of SW¼ of Section 11, T31N, R2W
0.4 acre in NE¼ of SW¼ of Section 11, T31N, R2W
143.1 acres - Total

Hutchins, William L. and Hutchins, Mary Jane

Lands idle in 1964:

1.0 acre in SW¼ of NE¼ of Section 32, T33N, R1E
2.0 acres in SE¼ of NE¼ of Section 32, T33N, R1E
3.0 acres - Total

Johnson, J. George and Johnson, Ruth J.

Lands idle in 1964:

1.0 acre in NE¼ of SW¼ of Section 20, T31N, R3W

Jones, Ellis T.

Lands irrigated in 1964:

12 acres in NE¼ of SE¼ of Section 11, T31N, R2W
2.6 acres in SE¼ of SE¼ of Section 11, T31N, R2W
14.6 acres - Total

TABLE A-1 (contd.)

Jones, Jesse C.

Lands irrigated in 1964:

2.8 acres in SW¼ of SE¼ of Section 11, T31N, R2W
3.5 acres in NW¼ of SE¼ of Section 11, T31N, R2W
4.2 acres in NE¼ of SE¼ of Section 11, T31N, R2W
2.9 acres in SE¼ of SE¼ of Section 11, T31N, R2W
13.4 acres - Total

Jungsten, Henry J. and Jungsten, E.

Lands irrigated in 1964:

4.6 acres in NE¼ of SW¼ of Section 23, T32N, R1W

Junkans, Elmer W. and Junkans, Verne

Lands irrigated in 1964:

5.6 acres in NW¼ of NE¼ of Section 10, T31N, R3W
35 acres in NE¼ of NW¼ of Section 10, T31N, R3W
29 acres in SE¼ of NW¼ of Section 10, T31N, R3W
69.6 acres - Total

Knight, Remi C.

Lands irrigated in 1964:

14 acres in NW¼ of NE¼ of Section 7, T32N, R2E
16 acres in SW¼ of NE¼ of Section 7, T32N, R2E
1.0 acre in NE¼ of NW¼ of Section 7, T32N, R2E
30 acres in SE¼ of NW¼ of Section 7, T32N, R2E
5.8 acres in NW¼ of SE¼ of Section 7, T32N, R2E
9.8 acres in NE¼ of SW¼ of Section 7, T32N, R2E
76.6 acres - Total

Lands idle in 1964:

4.2 acres in SW¼ of NE¼ of Section 7, T32N, R2E

Power generation in SW¼ of NE¼ of Section 7, T32N, R2E

Domestic use in SW¼ of NW¼ of Section 18, T32N, R1E, and
NW¼ of SW¼ of Section 18, T32N, R1E

Koehler, Roderick

Lands irrigated in 1964:

6.6	acres in NE¼ of SW¼ of Section 15, T32N, R1W
6.8	acres in NW¼ of SW¼ of Section 15, T32N, R1W
2.0	acres in SW¼ of SW¼ of Section 15, T32N, R1W
0.3	acre in NE¼ of SE¼ of Section 16, T32N, R1W
19	acres in SE¼ of SE¼ of Section 16, T32N, R1W
8.4	acres in SW¼ of SE¼ of Section 16, T32N, R1W
43.1	acres - Total

Lansing, Lucille

Lands irrigated in 1964:

25	acres in SE¼ of NE¼ of Section 35, T32N, R1W
18	acres in SW¼ of NE¼ of Section 35, T32N, R1W
22	acres in SE¼ of NW¼ of Section 35, T32N, R1W
5.3	acres in SW¼ of NW¼ of Section 35, T32N, R1W
1.6	acres in NE¼ of SE¼ of Section 35, T32N, R1W
10	acres in SE¼ of NW¼ of Section 36, T32N, R1W
32	acres in SW¼ of NW¼ of Section 36, T32N, R1W
6.6	acres in NE¼ of SW¼ of Section 36, T32N, R1W
34	acres in NW¼ of SW¼ of Section 36, T32N, R1W
154.5	acres - Total

Lands idle in 1964:

9.4	acres in SE¼ of NE¼ of Section 35, T32N, R1W
0.4	acre in SW¼ of NE¼ of Section 35, T32N, R1W
3.6	acres in NE¼ of SE¼ of Section 35, T32N, R1W
13.4	acres - Total

LaTour State Forest

Domestic use in SE¼ of SE¼ of Section 1, T32N, R2E

Leggett, Howard M. and Leggett, Gladys A.

Lands irrigated in 1964:

32	acres in SE¼ of NE¼ of Section 8, T31N, R3W
16	acres in SW¼ of NE¼ of Section 8, T31N, R3W
8.8	acres in NW¼ of SE¼ of Section 8, T31N, R3W
56.8	acres - Total

Leggett, Howard M. and Leggett, Gladys A. (contd.)

Lands idle in 1964:

32	acres in NE¼ of SE¼ of Section 8, T31N, R3W
31	acres in NW¼ of SE¼ of Section 8, T31N, R3W
18	acres in SE¼ of SE¼ of Section 8, T31N, R3W
36	acres in SW¼ of SE¼ of Section 8, T31N, R3W
2.8	acres in SE¼ of SW¼ of Section 8, T31N, R3W
119.8	acres - Total

Lynes, Ronald E. and Lynes, Vivian F.

Lands irrigated in 1964:

19	acres in SW¼ of NE¼ of Section 14, T31N, R3W
0.1	acre in NW¼ of NE¼ of Section 14, T31N, R3W
1.6	acres in NE¼ of SE¼ of Section 14, T31N, R3W
5.6	acres in NW¼ of SE¼ of Section 14, T31N, R3W
6.8	acres in SE¼ of NW¼ of Section 14, T31N, R3W
33.1	acres - Total

Lands idle in 1964:

6.0	acres in NE¼ of SE¼ of Section 14, T31N, R3W

MacMillan, Emma B.

Lands irrigated in 1964:

1.5	acres in SW¼ of SE¼ of Section 28, T33N, R1E

Maynard, R. and Maynard, E. D.

Lands irrigated in 1964:

4.4	acres in SE¼ of NE¼ of Section 19, T31N, R3W
20	acres in NE¼ of SE¼ of Section 19, T31N, R3W
24.4	acres - Total

Lands idle in 1964:

24	acres in SE¼ of NE¼ of Section 19, T31N, R3W

McKee, Charles N. and McKee, Jane E.

Lands irrigated in 1964:

0.4	acre in NE¼ of SW¼ of Section 20, T31N,R3W

McKee, Charles N. and McKee, Jane E. (contd.)

Lands idle in 1964:

4.6 acres in NE¼ of SW¼ of Section 20, T31N, R3W

McTimmonds, Guy W. and McTimmonds, Pat L.

Lands irrigated in 1964:

25	acres in NE¼ of NE¼ of Section 21, T32N, R1E
12	acres in SE¼ of NE¼ of Section 21, T32N, R1E
37	acres - Total

Miller, C. Elbert, Weller, Edward F. and Weller, Lucille M.

Lands irrigated in 1964:

16	acres in NE¼ of NE¼ of Section 22, T32N, R1E
8.8	acres in SE¼ of NE¼ of Section 22, T32N, R1E
24.8	acres - Total

Mix, Robert H.

Lands irrigated in 1964:

2.6 acres in NE¼ of SW¼ of Section 21, T32N, R1E

Morelli, Virginia Lee

Lands irrigated in 1964:

13	acres in SW¼ of SE¼ of Section 28, T32N, R1E
4.8	acres in SE¼ of SW¼ of Section 28, T32N, R1E
17	acres in SE¼ of SE¼ of Section 30, T32N, R1E
15	acres in SW¼ of SW¼ of Section 30, T32N, R1E
28	acres in NW¼ of NW¼ of Section 31, T32N, R1E
3.8	acres in SW¼ of NW¼ of Section 31, T32N, R1E
81.6	acres - Total

Lands idle in 1964:

6.6	acres in SE¼ of SW¼ of Section 28, T32N, R1E
1.6	acres in SE¼ of SW¼ of Section 30, T32N, R1E
0.5	acre in SW¼ of SW¼ of Section 30, T32N, R1E
8.7	acres - Total

Morse, Alvin and Morse, Donna

Lands idle in 1964:

10 acres in SE¼ of SW¼ of Section 20, T31N, R3W

Murphy, Richard M.

Lands irrigated in 1964:

21	acres in NE¼ of NW¼ of Section 28, T33N, R1E
18	acres in NW¼ of NW¼ of Section 28, T33N, R1E
28	acres in SE¼ of NW¼ of Section 28, T33N, R1E
32	acres in SW¼ of NW¼ of Section 28, T33N, R1E
26	acres in NE¼ of SW¼ of Section 28, T33N, R1E
40	acres in NW¼ of SW¼ of Section 28, T33N, R1E
9.2	acres in SW¼ of SW¼ of Section 28, T33N, R1E
6.0	acres in NE¼ of NE¼ of Section 29, T33N, R1E
30	acres in SE¼ of NE¼ of Section 29, T33N, R1E
9.6	acres in SW¼ of NE¼ of Section 29, T33N, R1E
11	acres in NW¼ of SE¼ of Section 29, T33N, R1E
39	acres in NE¼ of SE¼ of Section 29, T33N, R1E
269.8	acres - Total

Murphy, Tal E. and Murphy, Marian L.

Lands irrigated in 1964:

2.2 acres in SE¼ of SW¼ of Section 29, T31N, R3W

Neely, Laurence C.

Lands irrigated in 1964:

0.1	acre in NW¼ of SW¼ of Section 8, T32N, R1E
3.0	acres in NW¼ of NE¼ of Section 17, T32N, R1E
6.2	acres in NE¼ of NW¼ of Section 17, T32N, R1E
12	acres in SE¼ of NW¼ of Section 17, T32N, R1E
4.8	acres in NE¼ of SW¼ of Section 17, T32N, R1E
26.1	acres - Total

Lands idle in 1964:

1.9	acres in NW¼ of NE¼ of Section 17, T32N, R1E
4.6	acres in SW¼ of NE¼ of Section 17, T32N, R1E
1.2	acres in NE¼ of NW¼ of Section 17, T32N, R1E
7.0	acres in SE¼ of NW¼ of Section 17, T32N, R1E
0.6	acre in NE¼ of SW¼ of Section 17, T32N, R1E
15.3	acres - Total

North Valley Title and Escrow Company

Lands irrigated in 1964:

5.0 acres in NE¼ of NW¼ of Section 29, T31N, R3W

Otten, Alex J. and Otten, Esther E.

Lands irrigated in 1964:

19 acres in NE¼ of NE¼ of Section 8, T31N, R3W
4.0 acres in NW¼ of NE¼ of Section 8, T31N, R3W
23.0 acres - Total

Owbridge, June M.

Lands irrigated in 1964:

13.6 acres in NE¼ of NW¼ of Section 8, T32N, R1E
1.3 acres in SE¼ of NW¼ of Section 8, T32N, R1E
4.3 acres in SW¼ of NW¼ of Section 8, T32N, R1E
19.2 acres - Total

Lands idle in 1964:

7.2 acres in NE¼ of NW¼ of Section 8, T32N, R1E

Pacific Gas and Electric Company

Domestic use in NW¼ of NW¼ of Section 33, T33N, R1E

Lands irrigated in 1964:

5.4 acres in NE¼ of SE¼ of Section 23, T32N, R1W
0.5 acre in NW¼ of SW¼ of Section 24, T32N, R1W
5.9 acres - Total

Power generation in Kilarc Powerhouse within NW¼ of NW¼ of Section 33, T33N, R1E, and in South Cow Creek Powerhouse within NW¼ of SE¼ of Section 6, T31N, R1W

Parker, James and Parker, M. E.

Lands irrigated in 1964:

4.4 acres in SW¼ of NE¼ of Section 20, T32N, R1W
8.8 acres in SE¼ of NW¼ of Section 20, T32N, R1W
4.4 acres in SW¼ of NW¼ of Section 20, T32N, R1W
29 acres in NE¼ of SW¼ of Section 20, T32N, R1W
30 acres in NW¼ of SW¼ of Section 20, T32N, R1W
1.6 acres in SE¼ of SW¼ of Section 20, T32N, R1W
9.2 acres in SW¼ of SW¼ of Section 20, T32N, R1W
87.4 acres - Total

Parker, James and Parker, M. E. (contd.)

Lands idle in 1964:

4.8	acres in SW¼ of NE¼ of Section 20, T32N, R1W
3.0	acres in SE¼ of NW¼ of Section 20, T32N, R1W
7.8	acres - Total

Pearson, Glenn

Lands irrigated in 1964:

0.4	acre in SE¼ of SE¼ of Section 29, T31N, R3W
18	acres in SW¼ of SE¼ of Section 29, T31N, R3W
10	acres in NE¼ of NE¼ of Section 32, T31N, R3W
6.4	acres in SE¼ of NE¼ of Section 32, T31N, R3W
40	acres in SW¼ of NE¼ of Section 32, T31N, R3W
40	acres in NW¼ of NE¼ of Section 32, T31N, R3W
0.8	acre in NE¼ of SE¼ of Section 32, T31N, R3W
38	acres in NW¼ of SE¼ of Section 32, T31N, R3W
22	acres in NE¼ of SW¼ of Section 32, T31N, R3W
17	acres in NE¼ of NW¼ of Section 32, T31N, R3W
17	acres in SE¼ of NW¼ of Section 32, T31N, R3W
209.6	acres - Total

Peterson, Charlie E. and Peterson, Corinne J.

Lands irrigated in 1964:

11	acres in SW¼ of SW¼ of Section 11, T32N, R1W
5.2	acres in SE¼ of SW¼ of Section 11, T32N, R1W
4.4	acres in SE¼ of SE¼ of Section 11, T32N, R1W
29	acres in NW¼ of NW¼ of Section 14, T32N, R1W
11	acres in NE¼ of NW¼ of Section 14, T32N, R1W
0.1	acre in NE¼ of NE¼ of Section 14, T32N, R1W
60.7	acres - Total

Lands under construction in 1964:

10	acres in SE¼ of NW¼ of Section 14, T32N, R1W
14	acres in SW¼ of NW¼ of Section 14, T32N, R1W
24	acres - Total

Plath, William F. and Plath, Donna C.

Domestic use in SW¼ of NW¼ of Section 23, T32N, R1W

Powell, Byron T. and Powell, Elma B.

Lands irrigated in 1964:

1.7 acres in NW¼ of NW¼ of Section 13, T32N, R1W

Reimer, George and Reimer, Dorothy

Lands irrigated in 1964:

30 acres in NW¼ of NE¼ of Section 21, T32N, R1E
3.4 acres in SW¼ of NE¼ of Section 21, T32N, R1E
20 acres in NE¼ of NW¼ of Section 21, T32N, R1E
7.0 acres in SE¼ of NW¼ of Section 21, T32N, R1E
60.4 acres - Total

Lands idle in 1964:

2.0 acres in NW¼ of NE¼ of Section 21, T32N, R1E
1.8 acres in SW¼ of NE¼ of Section 21, T32N, R1E
3.8 acres - Total

Roberts, David E.

Domestic use in SW¼ of NE¼ of Section 13, T31N, R3W

Robinson, James W. and Robinson, Willie Ola

Lands idle in 1964:

2.5 acres in NE¼ of SW¼ of Section 20, T31N, R3W
2.5 acres in SE¼ of SW¼ of Section 20, T31N, R3W
5.0 acres - Total

Roesner, Elmer W.

Lands irrigated in 1964:

2.0 acres in SE¼ of NW¼ of Section 14, T31N, R3W

Roland, Henry E. and Roland, Syble C.

Lands irrigated in 1964:

4.0 acres in NE¼ of NE¼ of Section 34, T32N, R1W
10 acres in SE¼ of NE¼ of Section 34, T32N, R1W
25 acres in SW¼ of NE¼ of Section 34, T32N, R1W
0.2 acre in NW¼ of NW¼ of Section 35, T32N, R1W
5.0 acres in SW¼ of NW¼ of Section 35, T32N, R1W
44.2 acres - Total

Rose, Ellis E. and Rose, Yoko

Lands irrigated in 1964:

1.0 acre in NW¼ of NE¼ of Section 36, T32N, R1W
1.4 acres in SW¼ of NE¼ of Section 36, T32N, R1W
2.4 acres- Total

Rynd, Donald E. and Rynd, Shelley

Lands irrigated in 1964:

4.0 acres in NW¼ of SW¼ of Section 21, T32N, R1E

Schmitt, James W. and Schmitt, Shirley J.

Lands irrigated in 1964:

0.8 acre in SE¼ of SW¼ of Section 16, T32N, R1W
4.9 acres in NE¼ of NE¼ of Section 20, T32N, R1W
2.0 acres in NE¼ of NW¼ of Section 21, T32N, R1W
7.7 acres - Total

Lands idle in 1964:

0.6 acre in NE¼ of NW¼ of Section 21, T32N, R1W

Schulz, Walter P. and Schulz, Mary V.

Lands idle in 1964:

5.2 acres in SW¼ of SW¼ of Section 4, T31N, R3W
1.2 acres in SW¼ of NW¼ of Section 9, T31N, R3W
25 acres in NW¼ of NW¼ of Section 9, T31N, R3W
31.4 acres - Total

Scott Lumber Company

Lands idle in 1964:

3.2 acres in NE¼ of NE¼ of Section 28, T32N, R2E
5.2 acres in SE¼ of NE¼ of Section 28, T32N, R2E
8.4 acres - Total

Scott, C. Emlen

Lands irrigated in 1964:

7.4 acres in SE¼ of SW¼ of Section 33, T33N, R1E

Scott, Earl F. and Scott, Elinor

Domestic use in NE¼ of SW¼ and NW¼ of SW¼ of Section 21, T32N, R1E

Shufelberger, Vern and Shufelberger, Rose

Lands irrigated in 1964:

25	acres in SE¼ of NE¼ of Section 9, T31N, R3W
9.6	acres in SW¼ of NE¼ of Section 9, T31N, R3W
26	acres in SE¼ of NW¼ of Section 9, T31N, R3W
22	acres in SW¼ of NW¼ of Section 9, T31N, R3W
82.6	acres - Total

Lands idle in 1964:

15	acres in SW¼ of NE¼ of Section 9, T31N, R3W
1.0	acre in SE¼ of NW¼ of Section 9, T31N, R3W
16.0	acres - Total

Skipworth

Lands idle in 1964:

0.8	acre in NE¼ of NE¼ of Section 32, T33N, R1E
0.3	acre in NW¼ of NE¼ of Section 32, T33N, R1E
0.3	acre in SW¼ of NE¼ of Section 32, T33N, R1E
0.8	acre in SE¼ of NE¼ of Section 32, T33N, R1E
2.2	acres - Total

Smith, Donald V.

Lands irrigated in 1964:

4.0 acres in SE¼ of NW¼ of Section 36, T32N, R1W

Staiger, J. Dana and Staiger, Bon

Lands idle in 1964:

2.0	acres in NE¼ of NE¼ of Section 33, T32N, R1W
4.6	acres in NW¼ of NE¼ of Section 33, T32N, R1W
19	acres in SE¼ of NE¼ of Section 33, T32N, R1W
8.0	acres in SW¼ of NE¼ of Section 33, T32N, R1W
33.6	acres - Total

TABLE A-1 (contd.)

Stone, F. C., Stone, Geneva E.
Stone, Charles W. and Stone, Clara E.

Lands irrigated in 1964:

11	acres in NW¼ of SE¼ of Section 20, T31N, R3W
0.4	acre in NE¼ of SW¼ of Section 20, T31N, R3W
11.4	acres - Total

Swoboda, John F. and Swoboda, Lucille

Lands irrigated in 1964:

0.4	acre in NW¼ of NE¼ of Section 29, T31N, R3W
0.8	acre in NE¼ of NW¼ of Section 29, T31N, R3W
12	acres in SE¼ of NW¼ of Section 29, T31N, R3W
13.2	acres - Total

Lands idle in 1964:

11 acres in SE¼ of NW¼ of Section 29, T31N, R3W

Swoboda, Lawrence J. and Swoboda, Helen

Lands irrigated in 1964:

14 acres in SW¼ of NE¼ of Section 29, T31N, R3W

Tippin, Jerry W. and Tippin, Gloria

Lands irrigated in 1964:

2.5 acres in NE¼ of NW¼ of Section 29, T31N, R3W

Turk, Ellen H. and Cook, Roger D.

Lands irrigated in 1964:

4.2 acres in SE¼ of SW¼ of Section 17, T32N, R1E

Tuttle, Carl F. Jr., and Tuttle, Vivian W.

Lands irrigated in 1964:

38	acres in NE¼ of NE¼ of Section 9, T31N, R3W
2.0	acres in SE¼ of NE¼ of Section 9, T31N, R3W
4.0	acres in SW¼ of NE¼ of Section 9, T31N, R3W
30	acres in NW¼ of NE¼ of Section 9, T31N, R3W
74.0	acres - Total

Lands idle in 1964:

0.8	acre in NE¼ of NE¼ of Section 9, T31N, R3W
4.4	acres in SE¼ of NE¼ of Section 9, T31N, R3W
10	acres in SW¼ of NE¼ of Section 9, T31N, R3W
20	acres in NE¼ of NW¼ of Section 9, T31N, R3W
8.4	acres in SE¼ of NW¼ of Section 9, T31N, R3W
43.6	acres - Total

Wagoner, W. G.

Lands irrigated in 1964:

1.1	acres in NE¼ of SW¼ of Section 6, T31N, R1W
1.2	acres in NW¼ of SW¼ of Section 6, T31N, R1W
0.1	acre in SE¼ of SW¼ of Section 6, T31N, R1W
2.4	acres - Total

Lands idle in 1964:

1.3 acres in NW¼ of SW¼ of Section 6, T31N, R1W

Walker, Archie D. Jr., et al. (c/o Shasta Forests Company)

Lands irrigated in 1964:

11	acres in SW¼ of NE¼ of Section 15, T32N, R1E
4.0	acres in NW¼ of NW¼ of Section 15, T32N, R1E
23	acres in SE¼ of NW¼ of Section 15, T32N, R1E
26	acres in SW¼ of NW¼ of Section 15, T32N, R1E
0.3	acre in NW¼ of SE¼ of Section 15, T32N, R1E
10	acres in SE¼ of SE¼ of Section 15, T32N, R1E
15	acres in NE¼ of SW¼ of Section 15, T32N, R1E
4.6	acres in NW¼ of SW¼ of Section 15, T32N, R1E
1.2	acres in NE¼ of NE¼ of Section 16, T32N, R1E
2.4	acres in SE¼ of NE¼ of Section 16, T32N, R1E
0.3	acre in NW¼ of NW¼ of Section 22, T32N, R1E
15	acres in SE¼ of NW¼ of Section 22, T32N, R1E
24	acres in SW¼ of NW¼ of Section 22, T32N, R1E
2.8	acres in NE¼ of SW¼ of Section 22, T32N, R1E
0.8	acre in SW¼ of SW¼ of Section 29, T32N, R1E
140.4	acres - Total

Walker, Archie D. Jr., et al. (c/o Shasta Forests Company) (contd.)

Lands idle in 1964:

0.2 acre in NE¼ of NW¼ of Section 15, T32N, R1E
2.4 acres in SE¼ of NW¼ of Section 15, T32N, R1E
2.6 acres - Total

Lands under construction in 1964:

1.2 acres in NW¼ of NW¼ of Section 22, T32N, R1E
15 acres in SE¼ of NW¼ of Section 22, T32N, R1E
3.1 acres in SW¼ of NW¼ of Section 22, T32N, R1E
19.3 acres - Total

Weir, Frank B. and Weir, Betty C.

Lands irrigated in 1964:

3.5 acres in SE¼ of SE¼ of Section 20, T32N, R1E

Lands idle in 1964:

3.5 acres in SE¼ of SE¼ of Section 20, T32N, R1E

Welch, Alvador

Lands irrigated in 1964:

2.8 acres in NE¼ of SE¼ of Section 19, T32N, R1W
14 acres in NW¼ of SE¼ of Section 19, T32N, R1W
2.6 acres in SE¼ of SE¼ of Section 19, T32N, R1W
15 acres in SW¼ of SE¼ of Section 19, T32N, R1W
11 acres in NE¼ of SW¼ of Section 19, T32N, R1W
31 acres in SE¼ of SW¼ of Section 19, T32N, R1W
76.4 acres - Total

Wetzel, Wesley and Wetzel, Maxine Thompson

Lands irrigated in 1964:

15 acres in NE¼ of NW¼ of Section 14, T31N, R3W

Whitmore State Forestry Station

Domestic use in SW¼ of NW¼ of Section 17, T32N, R1E

Wiley, Marvin L.

Lands irrigated in 1964:

5.9	acres in SW¼ of SE¼ of Section 20, T32N, R1E
12	acres in SE¼ of SE¼ of Section 20, T32N, R1E
17.9	acres - Total

Williams, Wallace B.

Lands irrigated in 1964:

1.2	acres in SE¼ of NE¼ of Section 32, T33N, R1E
11	acres in SW¼ of NE¼ of Section 32, T33N, R1E
12	acres in NW¼ of SE¼ of Section 32, T33N, R1E
28	acres in NW¼ of SW¼ of Section 5, T32N, R1E
6.1	acres in SW¼ of SW¼ of Section 5, T32N, R1E
22	acres in NE¼ of SE¼ of Section 6, T32N, R1E
15	acres in SE¼ of SE¼ of Section 6, T32N, R1E
95.3	acres - Total

Lands idle in 1964:

1.6	acres in NW¼ of SE¼ of Section 32, T33N, R1E
6.2	acres in SW¼ of SW¼ of Section 5, T32N, R1E
4.8	acres in SE¼ of SE¼ of Section 6, T32N, R1E
12.6	acres - Total

Lands under construction in 1964:

5.2	acres in NW¼ of SW¼ of Section 5, T32N, R1E
0.4	acre in SW¼ of SW¼ of Section 5, T32N, R1E
5.6	acres - Total

Worden, Gilbert T. and Worden, Betty J.

Lands irrigated in 1964:

5.2	acres in NE¼ of NE¼ of Section 24, T32N, R1E
3.6	acres in NW¼ of NE¼ of Section 24, T32N, R1E
17	acres in SW¼ of NE¼ of Section 24, T32N, R1E
2.8	acres in NE¼ of NW¼ of Section 24, T32N, R1E
3.1	acres in NW¼ of NW¼ of Section 24, T32N, R1E
33	acres in SE¼ of NW¼ of Section 24, T32N, R1E
8.2	acres in SW¼ of NW¼ of Section 24, T32N, R1E
72.9	acres - Total

Lands idle in 1964:

1.9 acres in SW¼ of NE¼ of Section 24, T32N, R1E

Power generation in SW¼ of NE¼ of Section 24, T32N, R1E

Wurst, Leroy G.

Lands irrigated in 1964:

10	acres in SE¼ of SE¼ of Section 10, T32N, R1W
9.6	acres in SW¼ of SE¼ of Section 10, T32N, R1W
33	acres in NE¼ of NE¼ of Section 15, T32N, R1W
35	acres in NW¼ of NE¼ of Section 15, T32N, R1W
8.4	acres in SE¼ of NE¼ of Section 15, T32N, R1W
20	acres in SW¼ of NE¼ of Section 15, T32N, R1W
116.0	acres - Total

Zeis, Melvin

Lands idle in 1964:

4.9 acres in SE¼ of SW¼ of Section 20, T31N, R3W

TABLE A-2

LOCATION OF POINTS OF DIVERSION

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Latour Springs	1	Lot 10, Sec. 1 T32N, R2E	SW Corner, Sec. 1 T32N, R2E	N 31° E	5,300
		NE¼ SE¼, Sec. 3 T32N, R2E	SE Corner, Sec. 3 T32N, R2E	N 20° W	1,620
		SE¼ SE¼, Sec. 32 T33N, R2E	SE Corner, Sec. 32 T33N, R2E	N 16° W	1,310
No. One Road Pumps	2	SW¼ NW¼, Sec. 20 T33N, R2E	NW Corner, Sec. 20 T33N, R2E	S 38° E	1,800
		NW¼ NW¼, Sec. 24 T33N, R1E	NW Corner, Sec. 24 T33N, R1E	S 53° E	1,220
Kilarc Powerhouse Ditch	3	SW¼ NE¼, Sec. 25 T33N, R1E	N¼ Corner, Sec. 25 T33N, R1E	S 10° E	1,690
Canyon Creek Ditch	4	SW¼ SW¼, Sec. 24 T33N, R1E	SW Corner, Sec. 24 T33N, R1E	N 10° E	730
		NE¼ SE¼, Sec. 23 T33N, R1E	E¼ Corner, Sec. 23 T33N, R1E	S 36° W	1,020
Murphy Ditch	5	SW¼ SE¼, Sec. 23 T33N, R1E	S¼ Corner, Sec. 23 T33N, R1E	N 83° E	1,160
Grindlay-Williams Ditch	6	NW¼ SW¼, Sec. 27 T33N, R1E	W¼ Corner, Sec. 27 T33N, R1E	S 27° E	540
MacMillan Spring	7	SW¼ SE¼, Sec. 28 T33N, R1E	SE Corner, Sec. 28 T33N, R1E	N 82° W	1,550
Murphy Upper Springs	8	SW¼ SW¼, Sec. 21 T33N, R1E	SW Corner, Sec. 21 T33N, R1E	N 53° E	480
Murphy Lower Springs	9	SW¼ NE¼, Sec. 28 T33N, R1E	N¼ Corner, Sec. 28 T33N, R1E	S 5° E	1,970
		NE¼ NW¼, Sec. 28 T33N, R1E	N¼ Corner, Sec. 28 T33N, R1E	S 4° W	1,250

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Murphy Lower Springs (contd.)	9	NW¼ NW¼, Sec. 28 T33N, R1E	NW Corner, Sec. 28 T33N, R1E	S 84° E	960
Kilarc Domestic Spring	10	SE¼ NW¼, Sec. 33 T33N, R1E	N¼ Corner, Sec. 33 T33N, R1E	S 23° W	1,900
Williams Lower Ditch	11	NW¼ NE¼, Sec. 32 T33N, R1E	NE Corner, Sec. 32 T33N, R1E	S 50° W	1,880
Grindlay Upper Glendenning Creek Ditch	12	NE¼ NW¼, Sec. 10 T32N, R1E	N¼ Corner, Sec. 10 T32N, R1E	Due South	1,140
Grindlay Lower Glendenning Creek Ditch	13	NE¼ NE¼, Sec. 9 T32N, R1E	E¼ Corner, Sec. 9 T32N, R1E	N 50° W	1,750
Grindlay South Glendenning Creek Ditch	14	NE¼ NE¼, Sec. 9 T32N, R1E	E¼ Corner, Sec. 9 T32N, R1E	N 50° W	1,750
Scott Spring	15	SE¼ SW¼, Sec. 33 T33N, R1E	S¼ Corner, Sec. 33 T33N, R1E	N 51° W	1,050
Neely Glendenning Creek Ditch	16	NW¼ SW¼, Sec. 9 T32N, R1E	W¼ Corner, Sec. 9 T32N, R1E	S 23° E	1,170
Neely Spring	17	NW¼ NE¼, Sec. 17 T32N, R1E	N¼ Corner, Sec. 17 T32N, R1E	S 31° E	870
Owbridge East Ditch	18	SE¼ NW¼, Sec. 8 T32N, R1E	N¼ Corner, Sec. 8 T32N, R1E	Due South	2,160
Dargatz Spring	19	NW¼ SE¼, Sec. 5 T32N, R1E	S¼ Corner, Sec. 5 T32N, R1E	N 23° E	1,760
Owbridge Upper East Side Ditch	20	SE¼ SW¼, Sec. 5 T32N, R1E	S¼ Corner, Sec. 5 T32N, R1E	N 10° W	230
Owbridge Upper West Side Ditch	21	NE¼ NW¼, Sec. 8 T32N, R1E	N¼ Corner, Sec. 8 T32N, R1E	S 71° W	200
Owbridge Lower East Side Ditch	22	NE¼ NW¼, Sec. 8 T32N, R1E	N¼ Corner, Sec. 8 T32N, R1E	S 46° W	1,720

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Owbridge Lower West Side Ditch	23	NE¼ NW¼, Sec. 8 T32N, R1E	N¼ Corner, Sec. 8 T32N,R1E	S 46° W	1,750
Atkins Ash Creek Ditch	24	SW¼ NW¼, Sec. 8 T32N, R1E	W¼ Corner, Sec. 8 T32N,R1E	N 60° E	910
Atkins Upper Spring	25	NE¼ SW¼, Sec. 7 T32N, R1E	SW Corner, Sec. 7 T32N,R1E	N 60° E	3,300
Atkins Lower Spring	26	NE¼ SW¼, Sec. 7 T32N, R1E	NW Corner, Sec. 7 T32N, R1E	S 39° E	3,570
Atkins Domestic Spring	27	Lot 4, Sec. 7 T32N, R1E	SW Corner, Sec. 7 T32N, R1E	N 40° E	670
Brown-Grover Ditch	28	Lot 3, Sec. 7 T32N, R1E	SW Corner, Sec. 7 T32N, R1E	N 16° E	2,700
Koehler Ditch	29	NW¼ SE¼, Sec. 15 T32N, R1W	E¼ Corner,Sec. 15 T32N, R1W	S 86° W	1,600
Peterson Dam	30	NE¼ NW¼, Sec. 14 T32N, R1W	N¼ Corner, Sec. 14 T32N, R1W	S 18° W	340
Parker-Hufford Ditch	31	SE¼ SE¼, Sec. 16 T32N, R1W	SE Corner, Sec. 16 T32N, R1W	N 25° W	1,260
Plath Pipeline	32	SW¼ NW¼, Sec. 23 T32N, R1W	W¼ Corner, Sec. 23 T32N, R1W	N 26° E	1,120
Bogue Pipeline	33	SW¼ NW¼, Sec. 23 T32N, R1W	W¼ Corner, Sec. 23 T32N, R1W	N 26° E	1,120
Bogue Reservoirs	34	NE¼ NE¼, Sec. 22 T32N, R1W	NE Corner, Sec. 22 T32N, R1W	S 3° E	700
Parker Ditch	35	NE¼ NE¼, Sec. 20 T32N, R1W	NE Corner, Sec. 20 T32N, R1W	S 51° W	1,270
Bassett Ditch	36	SE¼ NW¼, Sec. 20 T32N, R1W	W¼ Corner, Sec. 20 T32N, R1W	N 79° W	1,710
Crowe Lower Ditch	37	NE¼ SW¼, Sec. 26 T32N, R2W	SW Corner, Sec. 26 T32N, R2W	N 51° E	2,350

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Crowe Pump	38	SW¼ SE¼, Sec. 5 T31N, R2W	S¼ Corner, Sec. 5 T31N, R2W	N 9° E	1,020
Crowe Reservoir Ditch	39	SE¼ NW¼, Sec. 9 T31N, R2W	N¼ Corner, Sec. 9 T31N, R2W	S 6° W	1,730
Grouse Spring	40	SW¼ NW¼, Sec. 12 T32N, R2E	NW Corner, Sec. 12 T32N, R2E	S 6° E	1,930
Beal Spring	41	NE¼ NE¼, Sec. 28 T32N, R2E	NE Corner, Sec. 28 T32N, R2E	S 12° W	920
Beal Creek Ditch	42	NW¼ NW¼, Sec. 30 T32N, R2E	NW Corner, Sec. 30 T32N, R2E	S 68° E	520
German Ditch	43	SE¼ SE¼, Sec. 23 T32N, R1E	SE Corner, Sec. 23 T32N, R1E	N 59° E	1,100
Hufford-Knight Ditch	44	SE¼ SW¼, Sec. 5 T32N, R2E	S¼ Corner, Sec. 5 T32N, R2E	N 32° W	760
Atkins Mill Ditch	45	NW¼ NW¼, Sec. 8 T32N, R2E	NW Corner, Sec. 8 T32N, R2E	S 81° E	1,040
Knight South Ditch	46	SE¼ NE¼, Sec. 7 T32N, R2E	NE Corner, Sec. 7 T32N, R2E	S 30° W	1,970
Worden Ditch	47	NE¼ NE¼, Sec. 24 T32N, R1E	NE Corner, Sec. 24 T32N, R1E	Due West	820
Hagaman Gulch Ditch	48	SW¼ NW¼, Sec. 27 T32N, R1E	W¼ Corner, Sec. 27 T32N, R1E	N 65° E	1,000
Morelli-Carr Ditch	49	SE¼ NW¼, Sec. 30 T32N, R1E	N¼ Corner, Sec. 30 T32N, R1E	S 5° W	2,470
Upper Hamp Creek Ditch	50	NW¼ NE¼, Sec. 32 T32N, R1E	N¼ Corner, Sec. 32 T32N, R1E	S 73° E	380
Lower Hamp Creek Ditch	51	SE¼ SW¼, Sec. 30 T32N, R1E	S¼ Corner, Sec. 30 T32N, R1E	N 5° W	540
Morelli Domestic Spring	52	SE¼ SE¼, Sec. 25 T32N, R1W	SE Corner, Sec. 25 T32N, R1W	N 12° W	1,270

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal Sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Lansing South Ditch	53	NE¼ NE¼, Sec. 36 T32N, R1W	NE Corner, Sec. 36 T32N, R1W	S 60° W	90
Rose Ditch	54	NE¼ NE¼, Sec. 36 T32N, R1W	NE Corner, Sec. 36 T32N, R1W	S 60° W	220
Lansing North Ditch	55	NE¼ NE¼, Sec. 36 T32N, R1W	NE Corner, Sec. 36 T32N, R1W	S 52° W	360
Rose Domestic Spring	56	NW¼ NE¼, Sec. 36 T32N, R1W	NE Corner, Sec. 36 T32N, R1W	S 80° W	1,800
Carr Stockwater Pump	57	NE¼ NE¼, Sec. 36 T32N, R1W	NE Corner, Sec. 36 T32N,R1W	S 49° W	1,730
Carr Domestic Pump	58	SW¼ NE¼, Sec. 36 T32N, R1W	NE Corner, Sec. 36 T32N, R1W	S 53° W	2,870
Lansing Domestic Spring	59	SE¼ NW¼, Sec. 1 T31N, R1W	W¼ Corner, Sec. 1 T31N, R1W	N 82° E	2,100
E. Hufford Ditch	60	SW¼ NE¼, Sec. 35 T32N, R1W	N¼ Corner, Sec. 35 T32N, R1W	S 1° E	2,040
Rolands-Staiger Ditch	61	SW¼ NE¼, Sec. 35 T32N, R1W	N¼ Corner, Sec. 35 T32N, R1W	S 2° E	2,070
E. Hufford Domestic Spring	62	SW¼ NE¼, Sec. 3 T31N, R1W	N¼ Corner, Sec. 3 T31N, R1W	S 12° E	2,380
Staiger Pump	63	NE¼ NE¼, Sec. 33 T32N, R1W	NE Corner, Sec. 33 T32N, R1W	S 46° E	1,600
South Cow Creek Powerhouse Ditch	64	NE¼ NW¼, Sec. 33 T32N, R1W	N¼ Corner, Sec. 33 T32N, R1W	S 9° W	330
Neely Bear Gulch Ditch	65	NW¼ SE¼, Sec. 17 T32N, R1E	SE Corner, Sec. 17 T32N, R1E	S 43° W	2,700
Turk and Cook Ditch	66	NW¼ NW¼, Sec. 20 T32N, R1E	NW Corner, Sec. 20 T32N, R1E	S 87° E	560
Covey North Springs	67	SW¼ NW¼, Sec. 24 T32N, R1W	W¼ Corner, Sec. 24 T32N, R1W	N 12° E	980

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Covey North Springs (contd.)	67	NE¼ NE¼, Sec. 23 T32N, R1W	NE Corner, Sec. 23 T32N, R1W	S 5° W	1,140
		SE¼ NE¼, Sec. 23 T32N, R1W	E¼ Corner, Sec. 23 T32N, R1W	N 7° W	1,250
Covey Main Spring	68	SW¼ NW¼, Sec. 24 T32N, R1W	W¼ Corner, Sec. 24 T32N, R1W	N 75° E	1,560
Covey Creek Ditch	69	NW¼ SE¼, Sec. 23 T32N, R1W	S¼ Corner, Sec. 23 T32N, R1W	N 18° E	1,800
Bullard Pump	70	NE¼ SE¼, Sec. 28 T32N, R1W	E¼ Corner, Sec. 28 T32N, R1W	S 84° W	760
Mill Creek Ditch	71	SW¼ SE¼, Sec. 28 T32N, R1W	S¼ Corner, Sec. 28 T32N, R1W	N 55° E	730
Wagoner Ditch	72	NW¼ SW¼, Sec. 6 T31N, R1W	SW Corner, Sec. 6 T31N, R1W	N 20° E	2,120
Abbott Ditch	73	SW¼ SW¼, Sec. 6 T31N, R1W	NW Corner, Sec. 7 T31N, R1W	S 70° E	730
Jennie Hufford Pump	74	NE¼ SW¼, Sec. 11 T31N, R2W	S¼ Corner, Sec. 11 T31N, R2W	N 11° W	2,160
Hunt Pump	75	NE¼ NW¼, Sec. 15 T31N, R2W	N¼ Corner, Sec. 15 T31N, R2W	S 86° W	640
Espinosa Pumps	76	SE¼ NE¼, Sec. 13 T31N, R3W	E¼ Corner, Sec. 13 T31N, R3W	N 80° W	1,250
Roberts Pump	77	SW¼ NE¼, Sec. 13 T31N, R3W	N¼ Corner, Sec. 13 T31N, R3W	S 12° E	1,625
Hall South Pump	78	NW¼ SW¼, Sec. 13 T31N, R3W	SW Corner, Sec. 13 T31N, R3W	N 28° E	1,840
Hall North Pump	79	NW¼ SW¼, Sec. 13 T31N, R3W	SW Corner, Sec. 13 T31N, R3W	N 37° E	1,840
J. Hufford Pump	80	NE¼ SE¼, Sec. 14 T31N, R3W	E¼ Corner, Sec. 14 T31N, R3W	Due South	800

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner, in feet
Lynes Pump	81	SW¼ NE¼, Sec. 14 T31N, R3W	N¼ Corner, Sec. 14 T31N, R3W	S 27° E	1,780
Wetzel Pump	82	SE¼ NW¼, Sec. 14 T31N, R3W	N¼ Corner, Sec. 14 T31N, R3W	S 15° W	1,400
Meineken Pump	83	SE¼ NW¼, Sec. 14 T31N, R3W	NW Corner, Sec. 14 T31N, R3W	S 41° E	2,075
Blomquist Pump	84	SW¼ NW¼, Sec. 14 T31N, R3W	NW Corner, Sec. 14 T31N, R3W	S 32° E	1,900
Bishop Pump	85	SW¼ NW¼, Sec. 14 T31N, R3W	NW Corner, Sec. 14 T31N, R3W	S 5° E	1,800
Junkans South Pump	86	SE¼ NW¼, Sec. 10 T31N, R3W	N¼ Corner, Sec. 10 T31N, R3W	S 2° W	2,000
Junkans North Pump	87	NE¼ NW¼, Sec. 10 T31N, R3W	N¼ Corner, Sec. 10 T31N, R3W	S 27° W	1,375
Bingham Pump	88	NW¼ NW¼, Sec. 10 T31N, R3W	NW Corner, Sec. 10 T31N, R3W	S 48° E	1,830
Bingham Domestic Pump	89	NW¼ NW¼, Sec. 10 T31N, R3W	NW Corner, Sec. 10 T31N, R3W	S 42° E	1,550
Tuttle Pump	90	SE¼ NE¼, Sec. 9 T31N, R3W	NE Corner, Sec. 9 T31N, R3W	S 2° W	1,400
Shufelberger Pump	91	SE¼ NE¼, Sec. 9 T31N, R3W	NE Corner, Sec. 9 T31N, R3W	S 21° W	1,800
Schulz Pump	92	SE¼ NW¼, Sec. 9 T31N, R3W	NW Corner, Sec. 9 T31N, R3W	S 41° E	2,225
Frisbie Pump	93	NW¼ NW¼, Sec. 9 T31N, R3W	NW Corner, Sec. 9 T31N, R3W	S 32° E	1,325
Otten Pump	94	NW¼ NE¼, Sec. 8 T31N, R3W	NE Corner, Sec. 8 T31N, R3W	S 60° W	1,925
Leggett Pump	95	SW¼ NE¼, Sec. 8 T31N, R3W	NE Corner, Sec. 8 T31N, R3W	S 47° W	2,740

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner, in feet
Fraley North Pump	96	NE¼ NW¼, Sec. 17 T31N, R3W	NW Corner, Sec. 17 T31N, R3W	S 83° E	1,800
Dicker Reservoir	97	SE¼ NW¼, Sec. 18 T31N, R3W	N¼ Corner, Sec. 18 T31N, R3W	S 12° W	1,880
Harris Pump	98	SW¼ NW¼, Sec. 17 T31N, R3W	NW Corner, Sec. 17 T31N, R3W	S 24° E	1,660
Fraser Pump	99	NE¼ SW¼, Sec. 17 T31N, R3W	SW Corner, Sec. 17 T31N, R3W	N 34° E	3,000
Fraley South Pump	100	SE¼ SW¼, Sec. 17 T31N, R3W	SW Corner, Sec. 17 T31N, R3W	N 70° E	1,900
Maynard Pump	101	SW¼ NW¼, Sec. 20 T31N, R3W	NW Corner, Sec. 20 T31N, R3W	S 10° E	1,550
Kirkman Pump	102	NE¼ SW¼, Sec. 20 T31N, R3W	W¼ Corner, Sec. 20 T31N, R3W	Due East	1,500
Glassford Pump	103	NE¼ SW¼, Sec. 20 T31N, R3W	W¼ Corner, Sec. 20 T31N, R3W	S 82° E	1,650
Carter-McKee Pump	104	NE¼ SW¼, Sec. 20 T31N, R3W	W¼ Corner, Sec. 20 T31N, R3W	S 75° W	1,900
Stone-Fitzpatrick Pump	105	SE¼ SW¼, Sec. 20 T31N, R3W	S¼ Corner, Sec. 20 T31N, R3W	N 12° W	1,100
Morse Pump	106	SE¼ SW¼, Sec. 20 T31N, R3W	S¼ Corner, Sec. 20 T31N, R3W	N 19° W	350
A. F. Hufford Pump	107	NE¼ NW¼, Sec. 29 T31N, R3W	N¼ Corner, Sec. 29 T31N, R3W	S 30° W	75
Herman Pump	108	NE¼ NW¼, Sec. 29 T31N, R3W	N¼ Corner, Sec. 29 T31N, R3W	S 8° W	625
Swoboda Brothers Pump	109	NW¼ NE¼, Sec. 29 T31N, R3W	N¼ Corner, Sec. 29 T31N, R3W	S 9° E	1,500
Pearson Pump	110	SW¼ SE¼, Sec. 29 T31N, R3W	S¼ Corner, Sec. 29 T31N, R3W	N 4° E	600

TABLE A-2 (contd.)

Name of diversion system	Number of diversion on State Water Rights Board Map	Location of point of diversion: Legal sub-division in which diversion occurs MDB&M	Reference corner for distance and bearing MDB&M	Bearing from reference corner	Distance from reference corner in feet
Beatie Pump	111	NW¼ NW¼, Sec. 5 T30N, R3W	NW Corner, Sec. 5 T30N, R3W	S 53° E	1,450
Beatie Stockwater Pump	112	NW¼ NW¼, Sec. 5 T30N, R3W	NW Corner, Sec. 5 T30N, R3W	S 51° E	1,480
Bryant Pump	113	SE¼ NW¼, Sec. 5 T30N, R3W	NW Corner, Sec. 5 T30N, R3W	S 49° E	2,700
R. Hawes West Pump	114	SE¼ SW¼, Sec. 5 T30N, R3W	SW Corner, Sec. 5 T30N, R3W	N 53° E	2,520
R. Hawes East Pump	115	SE¼ SW¼, Sec. 5 T30N, R3W	SW Corner, Sec. 5 T30N, R3W	N 71° E	2,460
M. Hawes Pump	116	NW¼ NW¼, Sec. 8 T30N, R3W	N¼ Corner, Sec. 8 T30N, R3W	Due South	150

TABLE A-3

SUMMARY OF IRRIGATION DIVERSION SYSTEMS
AND LANDS IRRIGATED
1964

Name of owner	Diversion number	Name of diversion	Acreage irrigated * Under diversion	Total
Abbott, Allan G.	73	Abbott Ditch	96.0	96.0
Albert, Wertzel	6	Grindlay-Williams Ditch	3.2	3.2
Atkins, Leary B.	24	Atkins Ash Creek Ditch	4.1	
	25	Atkins Upper Spring	50.8	
	26	Atkins Lower Spring	16.4	
	28	Brown-Grover Ditch	23.4	94.7
Bargsten, Ernest F.	36	Bassett Ditch	229.6	229.6
Beatie, Arthur H.	111	Beatie Pump	66.8	66.8
Bingham, B. C.	88	Bingham Pump	11	11
Bishop, Jack	85	Bishop Pump	0.3	0.3
Blomquist, Theodore M.	84	Blomquist Pump	36.3	36.3
Bogue, H. E.	34	Bogue Reservoirs	31.3	31.3
Boksa, Demeter	24	Atkins Ash Creek Ditch	6.5	6.5
Brady, Jack	43	German Ditch	29.4	29.4
Brewer, Lowell D.	28	Brown-Grover Ditch	193.2	193.2
Bryant, Robert S.	113	Bryant Pump	40.2	40.2
Bullard, Harry E.	70	Bullard Pump	2.0	2.0
Carr, Pierre G.	49	Morelli-Carr Ditch	22.2	22.2
Carter, Paul L.	102	Kirkman Pump	2.0	
	104	Carter-McKee Pump	0.5	2.5
Cherta, John	102	Kirkman Pump	4.2	4.2

* Lands under development or construction for irrigation in 1964 are not included.

TABLE A-3 (contd.)

Name of owner	Diversion number	Name of diversion	Acreage irrigated* Under diversion	Total
Clark, William C.	102	Kirkman Pump	16	16
Covey, Myrtle Jurdy	67	Covey North Spring	8.2	
	68	Covey Main Spring	13.8	22.0
Covey, Harry N.	67	Covey North Spring	3.6	
	68	Covey Main Spring	supplemental	3.6
Crowe Hereford Ranch	36	Bassett Ditch	630.0	
	37	Crowe Lower Ditch	133.0	
	38	Crowe Pump	10	773.0
Dargatz, Leo H.	19	Dargatz Spring	15.8	15.8
Dicker, C. M., Inc.	97	Dicker Reservoir	1.0	1.0
Donohue, Paul	67	Covey North Spring	13.4	
	68	Covey Main Spring	6.6	20.0
Dymesich, George J.	28	Brown-Grover Ditch	21.0	21.0
Espinosa, Harold C.	76	Espinosa Pumps	48.7	48.7
Faber, Darrell W.	42	Beal Creek Ditch	10.0	10.0
Farrell, V. R.	73	Abbott Ditch	74.8	74.8
Fitzpatrick, David P.	105	Stone-Fitzpatrick Pump	43.8	43.8
Fraley, Harold L.	96	Fraley North Pump	54.6	
	100	Fraley South Pump	13	67.6
Frisbie, E. C.	93	Frisbie Pump	19.0	19.0
Gibson, Laine	43	German Ditch	2.0	2.0
Gilbert, Roxie R.	28	Brown-Grover Ditch	166.0	
	35	Parker Ditch	3.0	169.0
Glassford, Roy	102	Kirkman Pump	1.6	
	103	Glassford Pump	0.6	2.2

TABLE A-3 (contd.)

Name of owner	Diversion number	Name of diversion	Acreage irrigated* Under diversion	Total
Grindlay, Helen V.	6	Grindlay-Williams Ditch	56.0	
	12	Grindlay Upper Glendenning Creek Ditch	34.0	
	13	Grindlay Lower Glendenning Creek Ditch	7.0	
	14	Grindlay South Glendenning Creek Ditch	2.6	99.6
Hall, Jura Lawrence	78	Hall South Pump	32.1	
	79	Hall North Pump	22.5	54.6
Harris, John M.	98	Harris Pump	1.0	1.0
Hawes, Melvin	116	M. Hawes Pump	59.0	59.0
Hawes, Roy B.	114	R. Hawes West Pump	10.4	
	115	R. Hawes East Pump	13	23.4
Herman, William F.	108	Herman Pump	39.0	39.0
Hoffman, Margot	108	Herman Pump	2.5	2.5
Hufford, Albert F.	107	A. F. Hufford Pump	33.4	33.4
Hufford, Elmer	44	Hufford-Knight Ditch	11.2	
	45	Atkins Mill Ditch	11.8	
	60	E. Hufford Ditch	119.0	142.0
Hufford, Jennie	74	Jennie Hufford Pump	0.4	0.4
Hufford, Jesse. D., Jr.	80	J. Hufford Pump	93.4	93.4
Hufford, Jesse, Estate of	31	Parker-Hufford Ditch	193.2	
	36	Bassett Ditch	79.8	273.0
Hunt, W. H., Estate Co.	73	Abbott Ditch	112.9	
	75	Hunt Pump	30.2	143.1
Hutchins, William L.	6	Grindlay-Williams Ditch	3.0	3.0
Johnson, J.	102	Kirkman Pump	1.0	1.0
Jones, Ellis T.	73	Abbott Ditch	14.6	14.6
Jones, Jesse C.	73	Abbott Ditch	13.4	13.4
Jungsten, Henry J.	69	Covey Creek Ditch	4.6	4.6

TABLE A-3 (contd.)

Name of owner	Diversion Number	Name of diversion	Acreage irrigated* Under diversion	Total
Junkans, Elmer	86	Junkans South Pump	29	
	87	Junkans North Pump	40.6	69.6
Knight, Remi C.	44	Hufford-Knight Ditch	44.2	
	45	Atkins Mill Ditch	31.6	
	46	Knight South Ditch	4.2	80.0
Koehler, Roderick	29	Koehler Ditch	37.5	
	31	Parker-Hufford Ditch	5.6	43.1
Lansing, Lucille	53	Lansing South Ditch	121.7	
	55	Lansing North Ditch	46.2	167.9
Leggett, Howard M.	95	Leggett Pump	176.6	176.6
Lynes, Ronald E.	81	Lynes Pump	39.1	39.1
Maynard, R.	101	Maynard Pump	48.4	48.4
MacMillan, Emma B.	7	MacMillan Spring	1.5	1.5
McKee, Charles N.	102	Kirkman Pump	4.6	
	104	Carter-McKee Pump	0.4	5.0
McTimmonds, Guy W.	43	German Ditch	37	37
Miller, C. Elbert and Weller, Edward F.	43	German Ditch	24.8	24.8
Mix, Robert H.	43	German Ditch	2.6	2.6
Morelli, Virginia Lee	42	Beal Creek Ditch	24.4	
	48	Hagaman Gulch Ditch	supplemental	
	49	Morelli-Carr Ditch	46.8	
	50	Upper Hamp Creek Ditch	17	
	51	Lower Hamp Creek Ditch	2.1	90.3
Morse, Alvin	106	Morse Pump	10	10
Murphy, Richard M.	5	Murphy Ditch	269.8	
	8	Murphy Upper Spring	supplemental	
	9	Murphy Lower Springs	supplemental	269.8
Murphy, Tal E.	110	Pearson Pump	2.2	2.2
Neely, Laurence C.	16	Neely Glendenning Creek Ditch	10	
	17	Neely Spring	9.2	
	24	Atkins Ash Creek Ditch	0.1	
	65	Neely Bear Gulch Ditch	22.1	41.4

TABLE A-3 (contd.)

Name of owner	Diversion number	Name of diversion	Acreage irrigated* Under diversion	Total
North Valley Title and Escrow Company	108	Herman Pump	5.0	5.0
Otten, Alex J.	94	Otten Pump	23.0	23.0
Owbridge, June M.	20	Owbridge Upper East Side Ditch	11.6	
	21	Owbridge Upper West Side Ditch	9.2	
	22	Owbridge Lower East Side Ditch	2.6	
	23	Owbridge Lower West Side Ditch	2.7	
	24	Atkins Ash Creek Ditch	0.3	26.4
Pacific Gas & Electric Company	68	Covey Main Spring	5.9	5.9
Parker, James	31	Parker-Hufford Ditch	82.5	
	35	Parker Ditch	12.7	95.2
Pearson, Glenn	110	Pearson Pump	209.6	209.6
Peterson, Charlie E.	28	Brown-Grover Ditch	60.7	60.7
Powell, Byron T.	28	Brown-Grover Ditch	1.7	1.7
Reimer, George	43	German Ditch	64.2	64.2
Robinson, James W.	102	Kirkman Pump	5.0	5.0
Roesner, Elmer W.	83	Meineken Pump	2.0	2.0
Roland, Henry E.	61	Rolands-Staiger Ditch	44.2	44.2
Rose, Ellis	54	Rose Ditch	2.4	2.4
Rynd, Donald E.	43	German Ditch	4.0	4.0
Schmitt, James W.	28	Brown-Grover Ditch	8.3	8.3
Schulz, Walter P.	92	Schulz Pump	31.4	31.4
Scott Lumber Company	41	Beal Spring	8.4	8.4

TABLE A-3 (contd.)

Name of owner	Diversion number	Name of diversion	Acreage irrigated* Under diversion	Total
Scott, C. Emlen	15	Scott Spring	7.4	7.4
Shufelberger, Vern	91	Shufelberger Pump	98.6	98.6
Skipworth	6	Grindlay-Williams Ditch	2.2	2.2
Smith, Donald V.	55	Lansing North Ditch	4.0	4.0
Staiger, J. Dana	61	Rolands-Staiger Ditch	33.6	33.6
Stone, F. C.	105	Stone-Fitzpatrick Pump	11.4	11.4
Swoboda, John F.	109	Swoboda Brothers Pump	24.2	24.2
Swoboda, Lawrence J.	109	Swoboda Brothers Pump	14	14
Tippin, Jerry W.	108	Herman Pump	2.5	2.5
Turk, Ellen H. and Cook, Roger D.	66	Turk and Cook Ditch	4.2	4.2
Tuttle, Carl F., Jr.	90	Tuttle Pump	119.6	119.6
Wagoner, W. G.	72	Wagoner Ditch	3.7	3.7
Walker, Archie D., Jr. (c/o Shasta Forests Company)	43	German Ditch	142.2	
	50	Upper Hamp Creek Ditch	0.8	143.0
Weir, Frank B.	43	German Ditch	7.0	7.0
Welch, Alvador	31	Parker-Hufford Ditch	52.8	
	36	Bassett Ditch	23.6	76.4
Wetzel, Wesley	82	Wetzel Pump	15	15
Wiley, Marvin L.	43	German Ditch	17.9	17.9
Williams, Wallace B.	6	Grindlay-Williams Ditch	25.6	
	11	Williams Lower Ditch	82.3	107.9
Worden, Gilbert T.	47	Worden Ditch	74.8	74.8
Wurst, Leroy G.	28	Brown-Grover Ditch	116.0	116.0
Zeis, Melvin	102	Kirkman Pump	4.9	4.9
		Totals	5,774.9	5,774.9

TABLE A-4

DESCRIPTION OF DIVERSION SYSTEMS

The diversion systems from the portion of Cow Creek stream system under investigation, as numbered on the State Water Rights Board Map, are described below. All location descriptions refer to Mount Diablo Base and Meridian. Periods of records concerning diversions and water supply are for the 1964 season unless specified otherwise.

Diversion 1 called Latour Springs, includes three springs developed for fire protection purposes in the upper watershed.

Latour State Forest has constructed 500-gallon storage tanks at each spring cooperatively with Shasta Forests Company, agent for the owners on whose lands the developments have been built.

The springs are located as follows:

Lot 10 of Section 1, T32N, R2E, within Old Cow Creek watershed
NE¼ of SE¼ of Section 3, T32N, R2E, within South Cow Creek watershed
SE¼ of SE¼ of Section 32, T33N, R2E, within South Cow Creek watershed

Diversion 2 called No. One Road Pumps, consists of two portable pumps, one on the east side of West Hunt Creek within the SW¼ of NW¼ of Section 20, T33N, R2E, and the other on the west side of West Canyon Creek within the NW¼ of NW¼ of Section 24, T33N, R1E.

The pumps lift water into elevated steel tanks for filling water trucks used by Kimberly-Clark Corporation in maintaining their logging roads in the vicinity. The installations are just off the Corporation's main logging road, called One Road. West Hunt Creek was flowing about 1 cubic foot per second in the fall of 1964.

Diversion 3 is the Kilarc Powerhouse Ditch from the south side of Old Cow Creek within the $SW\frac{1}{4}$ of $NE\frac{1}{4}$ of Section 25, T33N, R1E.

A concrete dam 50 feet long and 13 feet high diverts water into the ditch about 10 feet wide and 5 feet deep. About 250 feet below the diversion point a 5.5-foot concrete critical-depth meter equipped with a water stage recorder measures the flow.

The amount diverted is adjusted and occasionally reduced so as to satisfy the diversion requirements of the Grindlay-Williams Ditch (Diversion 6) which diverts from Old Cow Creek below this ditch and above the Kilarc Powerhouse tailrace. Daily mean discharge as measured by the critical-depth meter for a portion of 1964 is set forth in Table B-9. During the entire 1963-64 water year ending September 30, 1964, 22,242 acre-feet were measured flowing past the meter. Daily discharge varied from a maximum of 55 cubic feet per second on May 6 and 7 to no flow during a 17-day shutdown period in April.

A short distance below the measuring station a siphon carrying water diverted from Canyon Creek (Diversion 4) discharges into the ditch. About 0.25 mile below the recorder the ditch enters a tunnel 950 feet in length which carries the water through a steep sidehill. The 3.5-mile conduit terminates in the Kilarc Forebay on top of the ridge known as Miller Mountain. A steel penstock conducts the water from the forebay to the Kilarc Powerhouse on the south bank of Old Cow Creek below Ponderosa Road Bridge. The installation is owned by the Pacific Gas and Electric Company. Pertinent powerhouse statistics are given on the following page.

Installed generating capacity	3,000 kilowatts
Maximum daily mean discharge of ditch in 1963-64 water year. Contribution from Canyon Creek siphon not included	55.4 cubic feet per second
Forebay capacity	30.4 acre-feet
Penstock size	48 inch to 36 inch
Penstock length	4,801 feet
Static head	1,192 feet
Type of wheel	2 Pelton single impulse wheels
Date built	1903

Water available for diversion decreases during the summer and by the latter part of September 1964 only about 22 cubic feet per second was passing the recorder. The powerhouse is operated mostly on base load so as to maintain a reasonably constant tailrace discharge into Old Cow Creek.

Diversion 4 is the Canyon Creek Ditch which diverts water from both the west and east branches of Canyon Creek. The west branch diversion point is within the NE¼ of SE¼ of Section 23, T33N, R1E, and the east branch diversion point is within the SW¼ of SW¼ of Section 24, T33N, R1E. Total ditch flow was measured at 3.26 and 2.41 cubic feet per second on July 6 and August 13, 1964, respectively. Capacity is estimated to be 5 cubic feet per second.

The diversion on the west branch consists of an earth dam about 1.5 feet high and 10 feet long which diverts the entire flow of the stream during the summer months into an earth ditch about 3 feet wide and 1 foot deep. On August 13, 1964, the flow was estimated to be 1 cubic foot per second. This ditch extends about 0.3 mile to the second point of diversion on the east

branch. A concrete dam about 1.5 feet high and 22 feet long diverts the entire flow of this branch during the summer months into the ditch which is enlarged at this point to about 3 feet wide and 2 feet deep. The combined flow is then conducted about 0.7 mile to a concrete box on the north canyon wall of Old Cow Creek. A 3.5-foot Cipolletti weir measures the ditch flow at this point before it enters the 2-foot diameter, 0.25 mile long inverted siphon which carries the water across Old Cow Creek for discharge into the Kilarc Powerhouse Ditch (Diversion 3) for use in generating power at the Kilarc Powerhouse owned by the Pacific Gas and Electric Company.

Diversion 5 is the Murphy Ditch from the west side of West Canyon Creek within the SW¼ of SE¼ of Section 23, T33N, R1E.

A rock dam about 5 feet long and 1 foot high diverts most of the flow during the summer months into a ditch about 3 feet wide and 1 foot deep. On July 1, 1964, the measured flow about 0.25 mile above the place of use was the full ditch capacity of 1.0 cubic foot per second, while on August 13 the amount being diverted at the diversion dam was 0.48 cubic foot per second. The ditch is about 2.7 miles long and irrigates 269.8 acres on the Richard M. Murphy Ranch. Supplemental water is supplied to these lands by springs on the Murphy Ranch (Diversions 8 and 9).

Diversion 6 is the Grindlay-Williams Ditch from the south side of Old Cow Creek within the NW¼ of SW¼ of Section 27, T33N, R1E.

A log and rock dam 25 feet long and 2 feet high diverts water into a ditch about 4 feet wide and 1 foot deep which carries the combined water for the Helen V. Grindlay and Wallace B. Williams Ranches and several smaller parcels.

About 0.25 mile below the point of diversion the flow is separated by a proportional divider so dimensioned that 5/9 of the amount diverted flows into the upper Grindlay lateral and 4/9 flows into the lower Williams lateral. The capacity of the Grindlay lateral immediately below the division point is about 2.5 cubic feet per second. A 2-foot weir was installed in the lateral 2 miles below the division point for the 1964 irrigation season. Discharge at this point varied from 1.4 cubic feet per second in June to 1.0 cubic foot per second in August. The lateral continues 2.75 miles to the Grindlay Ranch, crossing enroute the Kilarc Powerhouse penstock before leaving the Old Cow Creek Canyon and traversing more level country within the Glendenning Creek watershed. The ditch normally irrigates 56.0 acres of pasture, orchard, and garden on the Grindlay Ranch; however, in 1964, 22.2 acres of the place of use were not irrigated.

1.75
2.75
4.5

The Williams lateral is about 3 feet wide and 1 foot deep. The capacity is 2.1 cubic feet per second, and the ditch flow about 1.1 miles below the point of division just above all takeouts varied from 2.1 to 1.0 cubic feet per second during 1964. In recent years the place of use has been divided and the water diverted now serves four users.

The first takeout consists of a 1-inch pipe submerged in the ditch above Ponderosa Way. About 400 feet of 1-inch plastic pipe leads across Ponderosa Way to the Skipworth property where water diverted is used to irrigate 2.2 acres of pasture by flooding. This right is reportedly 1 miner's inch or 0.02 cubic foot per second and represents a part of the old appropriative right for the Williams Ranch.

The second takeout is 100 feet downstream from the Skipworth pipe and consists of a gravity diversion into a 1-inch plastic pipe. A short

length of this pipe delivers the water to a 1/4-horsepower electric powered pump which provides pressure for domestic use at a house trailer on a 5-acre parcel owned by W. L. Hutchins. The property was reportedly deeded 1 miner's inch or 0.02 cubic foot per second of the Williams Ranch old appropriative right.

The next two branches from the Williams lateral divert a portion of the flow westerly for irrigation of 25.6 acres of pasture, orchard, and garden on the Williams Ranch on both sides of Ponderosa Way, although in 1964, 1.6 acres of the place of use were not irrigated.

The main ditch continues about 1/4 mile and terminates on the Albert property where 3.2 acres are irrigated. This property has reportedly been allotted 10 miner's inches or 0.2 cubic foot per second of the Williams Ranch old appropriative right.

Drainage from all lands irrigated from the Williams lateral collects in three reservoirs on the Williams property where it is used for recreation and fish culture. Overflow and seepage from these reservoirs is intercepted by the Williams Lower Ditch (Diversion 11) and conveyed to the Williams Lower Ranch.

Use of water from the diversion is summarized below:

Name	Irrigated acreage
Helen V. Grindlay	56.0 acres
Skipworth	1.0 acre
W. L. Hutchins	domestic
Wallace B. Williams	25.6 acres
H. Albert	3.2 acres
Total	85.8 acres

Diversion 7 is the MacMillan Spring in the Old Cow Creek watershed within the SW¼ of SE¼ of Section 28, T33N, R1E.

At the spring a wooden settling tank is used to collect water for diversion into a 1-inch pipe for conveyance to the place of use about 0.25 mile away. Use is for domestic purposes and irrigation of 1.5 acres of lawn, garden, and orchard on the Emma B. MacMillan property.

Diversion 8 is the Murphy Upper Spring within the SW¼ of SW¼ of Section 21, T33N, R1E.

The spring has been excavated creating a 10-foot by 6-foot pool which leads into a wooden box 10 feet long by 4 feet wide. The water is then diverted into a 4-inch pipe for sprinkler irrigation by gravity of 25.0 acres of hay and pasture land on the upper bench of the Richard M. Murphy Ranch. Flow through the pipe on August 13, 1964, was 17 gallons per minute equivalent to 0.04 cubic foot per second.

Diversion 9 consists of the Murphy Lower Springs within the NW¼ of NW¼, NE¼ of NW¼, and SE¼ of NE¼, of Section 28, T33N, R1E. Several springs are grouped under this diversion.

The uppermost one is on the upper bench of the Murphy Ranch. The spring has been excavated and the flow diverted into a ditch 1 foot wide and 0.5 foot deep. On August 13, 1964, the flow of this spring was measured at 18 gallons per minute equal to 0.04 cubic foot per second, however, most of the other springs were not flowing on this day. The ditch extends easterly and irrigates pasture and hay land on the upper bench. Supplemental water is also served to these lands from Diversions 5 and 8 and from several undeveloped springs.

Drainage from the upper bench and other undeveloped springs is picked up at several points for gravity sprinkler irrigation and flood

irrigation of hay and pasture lands on the middle bench. Several small ditches have been constructed to control the flow from the spring areas across a half-mile front extending generally east to west, and conduct the water onto the ridges of the rolling terrain for irrigation of pasture. The total acreage irrigated on the Richard M. Murphy Ranch by this diversion and by Diversions 5 and 8 in 1964 was 269.8 acres.

Diversion 10 is the Kilarc Domestic Spring within the SE¼ of NW¼ of Section 33, T33N, R1E. Spring discharge is about 0.10 cubic foot per second.

The spring is located above the Kilarc Powerhouse on the south canyon slope above Old Cow Creek. It has been excavated and enclosed by a concrete dam 20 feet long and 2 feet high. Excess flow is carried off in an 8-inch bypass pipe. About 300 feet of 4-inch pipe diverts water to a 5,000 gallon storage tank. From this tank 760 feet of 2-inch pipe delivers water to the Kilarc Powerhouse where it is used for domestic purposes in the powerhouse and two residences across Old Cow Creek on property of the Pacific Gas and Electric Company.

Diversion 11 is the Williams Lower Ditch from the southeast side of Old Cow Creek within the NW¼ of NE¼ of Section 32, T33N, R1E.

A rock and board dam about 45 feet long and 2 feet high across the creek diverts a portion of the flow into a rectangular wooden flume 18 inches wide, 1 foot deep, and 90 feet long which discharges into an earth ditch 3 feet wide and 1 foot deep. On August 24, 1964, the full ditch capacity of 2.26 cubic feet per second was being diverted although only 1.14 cubic feet per second reached the place of use about 1.5 miles below the diversion point.

Just above the place of use the ditch divides into two branches which circle the irrigated pasture on the west and east. The ditch flood irrigates 82.3 acres of pasture on the Wallace B. Williams Lower Ranch. Of this total, 11.0 acres were not irrigated in 1964.

Substantial amounts of water draining from lands irrigated from the Williams lateral of the Grindlay-Williams Ditch (Diversion 6) and from springs are intercepted by this ditch. In fact, the diversion works on Old Cow Creek have not been used for several years and all water applied to the place of use has been intercepted in this manner. In 1964 the Old Cow Creek diversion works were rebuilt and first used in late August.

Diversion 12 is the Grindlay Upper Glendenning Creek Ditch from the north side of Glendenning Creek within the NE¼ of NW¼ of Section 10, T32N, R1E.

A low rock dam about 15 feet long has been used to divert water into a ditch 3 feet wide and 1 foot deep. Capacity of the ditch is about 2 cubic feet per second. It is about 0.5 mile long and is used to irrigate by flooding 34.0 acres of pasture adjacent to Glendenning Creek on the Helen V. Grindlay property. This diversion was not used during 1964, although water was available in the creek.

Diversion 13 is the Grindlay Lower Glendenning Creek Ditch from the north side of Glendenning Creek within the NE¼ of NE¼ of Section 9, T32N, R1E.

A log and rock dam 9 feet long and 1 foot high diverts water into a ditch 1.5 feet wide and 1 foot deep. On August 19, 1964, the full ditch capacity of 0.5 cubic foot per second was being diverted. The place of use

consists of 7.0 acres of irrigated pasture on the Helen V. Grindlay property beginning about 100 feet below the diversion dam. This acreage is adjacent and below the place of use under Diversion 12 and may receive drainage from that system.

Diversion 14 is the Grindlay South Glendenning Creek Ditch from the south side of Glendenning Creek within the NE¼ of NE¼ of Section 9, T32N, R1E.

A rock and earth dam 8 feet long and 1 foot high diverts water into a ditch 1.5 feet wide and 0.5 foot deep which carries the water about 100 feet to the place of use. On August 19, 1964, about 0.1 cubic foot per second was being diverted. Ditch capacity is about 0.2 cubic foot per second. The pasture is irrigated by flooding and contains 2.6 acres adjacent to the creek on the Helen V. Grindlay property.

Diversion 15 is the Scott Spring within the SE¼ of SW¼ of Section 33, T33N, R1E. The spring is in the Old Cow Creek watershed but does not produce enough water to contribute to the flow of the creek.

The entire spring flow is diverted into a small ditch about 300 feet long which conducts the water around the place of use consisting of 7.4 acres of pasture on the E. Scott property. In 1964 the spring flow was insufficient to adequately irrigate the entire place of use.

Diversion 16 is the Neely Glendenning Creek Ditch from the south side of Glendenning Creek within the NW¼ of SW¼ of Section 9, T32N, R1E.

A rock dam has been used to divert water into a ditch about 2 feet wide and 1 foot deep. Capacity of the ditch is about 1 cubic foot per

second. It is about 0.5 mile in length and was used to irrigate 10 acres of pasture and orchard on the Laurence C. Neely property lying northeast of the intersection of Ponderosa Way and Tamarack Road. The diversion has not been used for several years.

Diversion 17 is the Neely Spring about 200 feet south of Glendenning Creek within the NW¼ of NE¼ of Section 17, T32N, R1E. Discharge of the spring was 1.50 cubic feet per second on June 17, 1964.

The entire spring flow is diverted into two earth ditches about 2 feet wide and 0.5 foot deep, for flood irrigation of 9.2 acres of hay and pasture land adjacent to the spring and to Glendenning Creek on the Laurence C. Neely property.

On June 17, 1964, about 0.9 cubic foot per second was diverted into the north ditch lateral and 0.6 cubic foot per second to the high or south lateral.

Diversion 18 is the Owbridge East Ditch from the north side of an unnamed waste water gulch within the SE¼ of NW¼ of Section 8, T32N, R1E.

This diversion, located east of Ponderosa Way, in years past conducted water westerly across Ponderosa Way for irrigation of land on the June M. Owbridge property lying on both sides of Ash Creek. The ditch is no longer used and much of the land previously irrigated by this diversion is now served by Diversions 20, 21, 22, and 23. Water formerly available for diversion consisted of return flow from lands irrigated by the Grindlay lateral of the Grindlay-Williams Ditch (Diversion 6).

Appropriative rights on file for this diversion consist of licenses issued on Applications 3256 and 8522 which are described in Appendix C.

Diversion 19 is the Dargatz Spring, tributary to Ash Creek, a small tributary to Glendenning Creek. The spring is located in the NW¼ of SE¼ of Section 5, T32N, R1E. Its flow on September 1, 1964, was 0.43 cubic foot per second and on November 5, 1964, was 0.50 cubic foot per second.

A concrete box 2.5 feet high and 18 feet long has been built around the lower side of the spring forming a pool. Three conduits lead from the box, two serving the Leo H. Dargatz property and one serving the Helen V. Grindlay property.

At the south end of the box a 10-inch tile pipe conducts a portion of the water southerly for use on the Dargatz property. About 600 feet below the spring a 1-inch pipe taps the large pipe and conducts a small flow down the hill for domestic use at the ranch house. Just below this point a valve in the 10-inch main may turn the water down the hill through an old abandoned water-powered mill and into a gravity irrigation system. The next connection a few feet away consists of another domestic service pipe for a second house. The 10-inch pipe continues about 1,000 feet and discharges into a ditch system for irrigation of the southerly portion of the pasture on this ranch.

Near the north end of the spring box a 10-inch glory hold spillway is used to conduct water from the spring box into the spring channel for diversion downstream into a ditch for irrigation of the northern part of the Dargatz pasture. Return flow from this land accumulates in the water course formed by the spring called Ash Creek. At one time a pump and sprinkler system was used to redivert this water and irrigate 4.8 acres of pasture adjacent to the channel. This land was not irrigated in 1964. The

two conduit systems that were used in 1964 irrigated a total of 11 acres of pasture by wild flooding on the Leo H. Dargatz Ranch.

The third conduit leading from the spring box is a 2-inch pipe, paralleling the 10-inch line mentioned above, which carries domestic water 0.3 mile across Ponderosa Way for service at the Grindlay house.

Diversion 20 is the Owbridge Upper East Side Ditch from the east side of Ash Creek within the SE¼ of SW¼ of Section 5, T32N, R1E.

A rock and board dam 1 foot high and 5 feet long diverts water into the ditch which is about 2 feet wide, 0.5 foot deep, and 600 feet long. On August 21, 1964, the full ditch capacity of about 0.3 cubic foot per second was being diverted. It is used to flood irrigate 11.6 acres of pasture adjacent to the creek on the June M. Owbridge property. Of this total, 2.0 acres were not irrigated in 1964.

Diversion 21 is the Owbridge Upper West Side Ditch from the west side of Ash Creek within the NE¼ of NW¼ of Section 8, T32N, R1E.

An earth dam 1 foot high and 6 feet long diverts water into a ditch 2 feet wide, 0.5 foot deep, and 600 feet long for flood irrigation of 9.2 acres of pasture adjacent to the stream on the June M. Owbridge property. Of this total, 5.2 acres were not irrigated in 1964. On August 21, 1964, about 0.2 cubic foot per second was being diverted. Ditch capacity is about 0.4 cubic foot per second.

Diversion 22 is the Owbridge Lower East Side Ditch from the east side of Ash Creek within the NE¼ of NW¼ of Section 8, T32N, R1E.

A small earth dam diverts water into a ditch 1.5 feet wide, 0.5

foot deep, and 600 feet long for flood irrigation of 2.6 acres of pasture adjacent to the creek on the June M. Owbridge property. On August 21, 1964, the full ditch capacity of about 0.15 cubic foot per second was being diverted. Water available for diversion is nearly all return flow from lands above, irrigated by the upper ditches on Ash Creek.

Diversion 23 is the Owbridge Lower West Side Ditch from the west side of Ash Creek within the NE¼ of NW¼ of Section 8, T32N, R1E.

An earth and rock dam 6 feet long and 1 foot high diverts water into an earth ditch 2 feet wide, 0.5 foot deep, and 600 feet long for flood irrigation of 2.7 acres of pasture adjacent to the stream channel on the June M. Owbridge property. On August 21, 1964, the full ditch capacity of about 0.1 cubic foot per second was being diverted. Water available for diversion is nearly all return flow from lands irrigated by the upper ditches on Ash Creek.

Diversion 24 is the Atkins Ash Creek Ditch from the northwest side of Ash Creek within the SW¼ of NW¼ of Section 8, T32N, R1E.

A log and earth dam 4 feet high and 8 feet long diverts water into a ditch 2 feet wide, 0.5 foot deep, and 600 feet long. On September 1, 1964, 0.54 cubic foot per second was being diverted. Ditch capacity is about 0.75 cubic foot per second. The place of use consists of 4.1 acres of flood irrigated pasture on the Leary B. Atkins property. Water available for diversion is nearly all return flow from the upper irrigated lands along Ash Creek.

This diversion also irrigates 6.5 acres owned by Demeter Boksa, 0.3 acre owned by June M. Owbridge, and 0.1 acre owned by Laurence C. Neely.

Diversion 25 is the Atkins Upper Spring in the Glendenning Creek watershed within the NE¼ of SW¼ of Section 7, T32N, R1E.

The entire output of the spring, amounting to about 1.5 cubic feet per second, is diverted into a ditch about 2 feet wide and 1 foot deep. A short distance below the spring the ditch divides, one lateral irrigating pasture land to the north, and the other continuing westerly to serve pasture lands higher on the hill. The flow in the westerly lateral can be regulated by a reservoir holding about 3 acre-feet. The diversion flood irrigates a total of 50.8 acres on the Leary B. Atkins property. Most of the water draining from these lands is intercepted by the ditch leading from Atkins Lower Spring (Diversion 26).

Diversion 26 is the Atkins Lower Spring just south of Glendenning Creek channel within the NE¼ of SW¼ of Section 7, T32N, R1E.

The entire spring output of about 0.5 cubic foot per second is diverted into a ditch about 2 feet wide and 1 foot deep which runs parallel to Glendenning Creek and Old Cow Creek for about 1 mile. The place of use consists of 16.4 acres of flood irrigated pasture on the Leary B. Atkins property lying on the sidehill between the ditch and the creek. This ditch intercepts water draining from lands irrigated by the Atkins Upper Spring (Diversion 25).

Diversion 27 is the Atkins Domestic Spring within Lot 4 of Section 7, T32N, R1E. The spring is in the Old Cow Creek watershed but does not produce enough water to contribute to the flow of the creek.

A 2-inch iron pipe buried in the spring area develops a flow of about 1 gallon per minute. The pipeline is about 100 feet long and irrigates

an adjacent 0.2 acre of garden near the ranch buildings on the Leary B. Atkins property.

Diversion 28 is the Brown-Grover Ditch from the north side of Old Cow Creek within Lot 3 of Section 7, T32N, R1E.

A rock and log dam 2 feet high and 50 feet long diverts a portion of the flow into a ditch 6 feet wide and 2 feet deep. A spillway near the head of the ditch controls the amount diverted.

Measurements of ditch flow in 1964 are summarized below:

Date	Location	Cubic feet per second
May 7	above Atkins lateral	7.6
July 16	above Atkins lateral	8.2
September 3	above Atkins lateral	11.2
September 3	head of ditch	15.2

On September 3 water was spilling over the ditch bank above Atkins lateral and the capacity of the ditch is estimated to be 12 cubic feet per second.

The ditch is about 4.2 miles in length and serves irrigation water to five ranches. There is one lateral to each ranch and proportional dividers in the ditch automatically divide the flow to each in the proportions tabulated below, in downstream order. The tabulation also shows the total irrigated acreage on each ranch which claims a right to water from the diversion.

Name	Portion of flow	Irrigated acreage
Leary B. Atkins	1/12	23.4
Charlie E. Peterson	1/12	60.7
Leroy G. Wurst	2/12	116.0
Lowell D. Brewer	4/12	193.2
Roxie R. Gilbert	4/12	166.0
	Total	559.3

The lateral for the Leary B. Atkins Ranch is about 0.8 mile below the diversion works on the south ditch bank. The place of use consists of flood irrigated pasture. The northern portion of the field is irrigated by a branch lateral which flumes across the main ditch. Drainage from these lands also irrigates 4.5 acres of pasture on the Peterson Ranch within the SE¼ of SE¼ of Section 11, and the NE¼ of NE¼ of Section 14 which is included in the acreage shown above for Peterson and 1.7 acres owned by Byron T. Powell within the NW¼ of NW¼ of Section 13, all being within T32N, R1W. After irrigating Atkins and Peterson lands the drainage water collects in Coal Gulch and is available for diversion at Peterson Dam (Diversion 30) just downstream.

The next lateral, on the south side of the main ditch about 0.75 mile below the Atkins lateral, flood irrigates pasture land on the Peterson Ranch between the ditch and Coal Gulch.

The third lateral which serves the Wurst property is about 0.4 mile below the Peterson lateral. It flood irrigates pasture lying on both sides of the main ditch.

The main ditch continues an additional 1.6 miles to the Brewer Ranch division point. The irrigated land served by this lateral is south and east of Fern Road. Several pickup ditches are used to spread the water and prevent it from collecting in gulches that cut across the irrigated land. Several culverts are used to carry the water south across Whitmore Road for irrigation of 21 acres of pasture on the George J. Dymesich property and 8.3 acres of pasture on the James W. Schmitt property. There were 7.0 acres and 0.6 acre, respectively, on these two ranches that were not irrigated in 1964.

The ditch terminates on the Roxie R. Gilbert property west of Fern Road. Water supplied to the higher fields is collected in pickup ditches and conducted south across Whitmore Road to serve land on that side.

The total acreage normally irrigated by the Brown-Grover Ditch is 590.3 acres.

Most of the drainage from the lands served by this ditch returns to Old Cow Creek upstream from the diversion works for the Bassett Ditch (Diversion 36).

Diversion 29 is the Koehler Ditch from the south side of Old Cow Creek within the NW¼ of SE¼ of Section 15, T32N, R1W.

A rock dam 2 feet high and 15 feet long diverts a portion of the flow into a ditch 6 feet wide and 1 foot deep. On May 21, 1964, the ditch flow near the head was at full capacity of 8.9 cubic feet per second. The ditch is about 0.3 mile long and flood irrigates 37.3 acres of pasture on the Roderick Koehler property.

A large portion of the water applied to the land drains off with about 1/4 of the drainage returning directly to Old Cow Creek and 3/4 being intercepted by the Parker-Hufford Ditch (Diversion 31).

Diversion 30 is the Peterson Dam on Coal Gulch within the NE¼ of NW¼ of Section 14, T32N, R1W.

An earth dam about 24 feet high and 250 feet long has been built across the channel. On the south abutment a 10-foot wide spillway 5 feet below dam crest will be used as the intake to an earth irrigation ditch constructed in 1964. The ditch, which is about 3 feet wide and 1 foot deep,

will conduct the water about 1,100 feet to the place of use consisting of 24.4 acres of flood irrigated pasture on the Charlie E. Peterson property, lying between Coal Gulch and Old Cow Creek. This diversion was not ready for use in 1964. In addition to the proposed irrigation use, the regulatory reservoir created by the dam has been used for stock water and fish culture. Capacity of the reservoir is estimated to be 40 acre-feet.

During the irrigation season most of the water flowing into the reservoir is return flow from the Leary B. Atkins property irrigated from the Brown-Grover Ditch (Diversion 28).

Diversion 31 is the Parker-Hufford Ditch from the south side of Old Cow Creek within the SE¼ of SE¼ of Section 16, T32N, R1W.

A concrete and flashboard dam 30 feet long and 3 feet high diverts a portion of the flow into a concrete-walled channel leading about 100 feet to the earth ditch which is about 5 feet wide and 2 feet deep. A 10-foot spillway in the concrete section of the ditch is used to control the amount of water diverted.

On both May 12 and July 15, 1964, ditch flow 300 feet above the siphon was at full ditch capacity of 10 cubic feet per second. At the diversion dam 6.7 cubic feet per second was being diverted on May 12. Ditch flow between these two points is augmented by drainage from lands irrigated by the Koehler Ditch (Diversion 29). The overall length of the ditch is about 4 miles and it serves a narrow strip of land on the side hill south of Old Cow Creek.

The acreage irrigated and the reported ditch ownership are tabulated below in downstream order.

Name	Reported ditch right	Irrigated acreage
Roderick Koehler	1/4	5.6
Alvador Welch	1/4	52.8
James Parker	1/4	82.5
Estate of Jess Hufford, Sr.	1/4	193.2
	Total	334.1

The pasture on the Koehler property north of Whitmore Road is irrigated by several cuts in the ditch bank. The ditch crosses Whitmore Road in an 18-inch inverted steel siphon about 500 feet long. About 1.25 miles below the siphon a division box automatically turns 1/3 of the remaining water north into a lateral for irrigation of pasture land on the Parker property. This lateral also furnishes supplemental water to the westerly portion of the area irrigated by the Parker Ditch (Diversion 35) lower on the side hill.

About 1 mile below the Parker lateral a division box automatically divides the remaining water, half to the Welch property and half to the Hufford property.

The Hufford lateral continues about 0.5 mile before reaching its service area of flood irrigated pasture adjacent to the creek on property of the Estate of Jess Hufford. A total of 6.8 acres were not irrigated in 1964. The lands irrigated by the ditch contribute large amounts of return flow to Old Cow Creek.

Diversion 32 is the Plath Pipeline from the east side of Fern Spring channel within the SW¼ of NW¼ of Section 23, T32N, R1W. Measured spring flow was 0.16 cubic foot per second on August 28, 1964.

A 1-inch steel pipe buried in the channel about 20 feet below the spring diverts water to a small tank which serves domestic needs at the William F. Plath house adjacent to the channel. A small lawn area around the house is also served.

Diversion 33 is the Bogue Pipeline from Fern Spring within the SW¼ of NW¼ of Section 23, T32N, R1W. Flow of the spring was 0.16 cubic foot per second on August 28, 1964.

A 1-inch plastic pipe submerged in the excavated spring conducts domestic water about 3,000 feet along the west side of the spring channel for use at two houses on the H. E. Bogue property.

Diversion 34 includes the three Bogue Reservoirs that are filled by Fern Spring and its channel. They are within the NE¼ of NE¼ of Section 22, T32N, R1W.

A small ditch about 400 feet long is used to divert water from the spring channel into the first reservoir lying south of the channel. A 2-inch pipe through the embankment conveys the regulated flow from this reservoir to two small fields north of the spring channel planted to pasture and irrigated by sprinklers. Two other regulating reservoirs in series on the spring channel are used to irrigate by a gravity system pasture land lying south of the spring channel. There are 31.3 acres irrigated by this system on the H. E. Bogue property. After about the first week in June of 1964 contributions from this spring reaching Old Cow Creek were negligible.

Diversion 35 is the Parker Ditch from the south side of Old Cow Creek within the NE¼ of NE¼ of Section 20, T32N, R1W.

A low rock dam diverts a portion of the flow into a ditch 3 feet wide and 1 foot deep. On May 29, 1964, the full ditch capacity of 2.6 cubic feet per second was being diverted and on July 23, 1964, 2.1 cubic feet per second were being diverted. The ditch conducts the water about 1,000 feet to the place of use consisting of 12.7 acres of flood irrigated pasture adjacent to the creek on the James Parker property and 3.0 acres owned by Roxie R. Gilbert. The westerly portion of the irrigated land receives drainage from lands higher on the hill irrigated by the Parker-Hufford Ditch (Diversion 31).

Diversion 36 is the Bassett Ditch from the north side of Old Cow Creek within the SE¼ of NW¼ of Section 20, T32N, R1W.

Diversion is by a concrete and flashboard dam 5 feet high and 83 feet long into a ditch 10 feet wide and 2 feet deep. The overall length of the ditch is about 8 miles. It supplies irrigation water to pasture and hay lands sloping toward Old Cow Creek, and in its last 3 miles serves lands bordering Basin Hollow, a small tributary to Cow Creek from the north.

A water stage recorder was maintained in the ditch 0.5 mile below the diversion works at a point just above the first lateral. The daily mean record of flow obtained at this station is presented in Table B-11.

During 1964, the maximum flow in the ditch at the recorder station was 30 cubic feet per second and the minimum was 18.5 cubic feet per second. The average flow during the irrigation season was 24 cubic feet per second. The recorded flow includes about 0.25 cubic foot per second drainage from the Gilbert lands irrigated by the Brown-Grover Ditch

(Diversion 28). The Bassett Ditch is operated so as to divert the entire flow of Old Cow Creek when its flow recedes to about 25 cubic feet per second. Lands irrigated by the ditch, however, return substantial amounts of water to the creek. Return flow from lands irrigated within the watershed of Basin Hollow flow about 2.5 miles down that stream to its confluence with the main stem of Cow Creek. Intermittent observations of the flow of Basin Hollow at its confluence with Cow Creek are contained in Table B-8. During the irrigation season this water is entirely return flow.

The Bassett Ditch irrigates four ranches as set forth in the following tabulation, in downstream order.

Name	Reported ditch right	Acreage irrigated
Alvador Welch	2/20	23.6
Estate of Jess Hufford, Sr.	3/20	79.8
Ernest F. Bargsten	3/20	229.6
Crowe Hereford Ranch	12/20	630.0
	Total	963.0

The ditch delivers water to its laterals through headgates proportioned so as to automatically turn out the correct amount. The first is 0.5 mile below the diversion dam on the south side of the ditch where 2/20 of the flow is diverted into the Welch lateral for irrigation of pasture lands on this ranch.

The second lateral is on the south ditch bank at the east property line of the Hufford Ranch about 0.6 mile below the Welch lateral. At this point 2/20 of the original amount diverted less losses to this point is taken into a lateral which borders the old county road for about 0.75 mile for irrigation on the Hufford Ranch of lands south of this road. About 0.3 mile below this second lateral a third division box separates the remaining

1/20 of total ditch flow for use by the Hufford Ranch south of the old road. Three small reservoirs on the ranch are kept full with drainage water from these lands.

About 0.6 mile below the lower Hufford lateral a division box diverts 3/20 of the original amount to the south for use on the Bargsten property. This lateral divides immediately into a branch running east for irrigation of that part of the ranch, and a westerly branch along the side hill for irrigation of the portion of the ranch north and west of the ranch buildings.

The remaining 12/20 of total ditch diversion is for the Crowe Hereford Ranch. The ditch crosses the Whitmore Road and continues about 1 mile to the first division point on the ranch. The south lateral irrigates pasture northwest of the road before crossing the road for irrigation of a large block of pasture extending for over a mile on the west side of Old Cow Creek.

The north lateral continues on for about 1.75 miles to a division box on the southeast side of Whitmore Road. The largest of these conveys water east and then south around a knoll for irrigation of a large area of pasture on rolling hills sloping south to Old Cow Creek. The smaller one leads through a saddle to the southwest, along the Whitmore Road, and into the Basin Hollow watershed. About 0.3 mile below this division, the north lateral is tapped by a small diameter pipe for domestic use at the ranch buildings of the Crowe upper ranch below the ditch. This lateral is then used to irrigate 30.9 acres of pasture immediately below the ranch on the north side of Basin Hollow. This stream channel, or an alternate parallel ditch, is used to convey the remaining water about

1 mile, crossing to the south side of Whitmore Road, for irrigation of a strip of pasture on the south side of Basin Hollow lying east of the main ranch headquarters. Return flow reaching the channel of Basin Hollow is available for diversion by the Crowe Pump (Diversion 38). There were 8.6 acres on the Crowe Ranch that were not irrigated in 1964.

Diversion 37 is the Crowe Lower Ditch from the south side of Old Cow Creek within the NE¼ of SW¼ of Section 26, T32N, R2W.

Diversion is by a rock dam sealed by plastic sheeting about 30 feet long and 2 feet high. A vertical flashboard headgate controls the amount of water entering the ditch. Ditch flow near the head was 5.6 cubic feet per second on May 8, 1964, and 6.1 cubic feet per second on July 16, 1964. Ditch capacity is about 6.5 cubic feet per second. The ditch is about 2 miles long and flood irrigates 133.0 acres of pasture on the Crowe Hereford Ranch lying east and south of Old Cow Creek. Of this total, 18.8 acres were not irrigated in 1964.

During late summer the diversion is operated so as to divert nearly the entire flow of the creek. The Bassett Ditch (Diversion 36) next upstream also diverts nearly the entire flow of Old Cow Creek in late summer and the flow in the creek reaching the Crowe Lower Ditch during this part of the season is nearly all return flow from lands irrigated from the Bassett Ditch and the Parker-Hufford Ditch (Diversion 31). Return flow from the Crowe Lower Ditch is sufficient to maintain a continuous stream in Old Cow Creek to its confluence with South Cow Creek. During August of 1964 the flow of Old Cow Creek reaching this point of confluence was between 5 and 10 cubic feet per second.

Diversion 38 is the Crowe Pump from the north side of Basin Hollow within the SW¼ of SE¼ of Section 5, T31N, R2W.

Diversion is by centrifugal pump driven by a 5-horsepower electric motor. Suction lift is about 3 feet through a 3-inch pipe and discharge lift is about 22 feet through a 2-inch pipe. Measured pump discharge was 117 gallons per minute. Pressure on the discharge side of the pump was 52 pounds per square inch. A 4-inch diameter sprinkler system is used for irrigation of 10 acres of pasture north of the pump on the Crowe Hereford Ranch near the ranch headquarters. All water available for diversion at this point during the irrigation season is return flow from Crowe Hereford Ranch lands upstream irrigated by the Bassett Ditch (Diversion 36).

Diversion 39 is the Crowe Reservoir Ditch from the northwest side of Old Cow Creek within the SE¼ of NW¼ of Section 9, T31N, R2W.

A low diversion dam across the creek diverts water into a ditch about 500 feet long which delivers the water to a reservoir with a surface area of 3 acres. The earth embankment creating the reservoir is about 300 feet long. A spillway at the northwest abutment conveys excess water about 0.25 mile to Old Cow Creek.

The reservoir is used for fish culture and stockwatering on the Crowe Hereford Ranch.

Diversion 40 is Grouse Spring near the summit of McMullen Mountain in the South Cow Creek watershed. The spring is within the SW¼ of NW¼ of Section 12, T32N, R2E.

Water is stored at the spring in a 5,000-gallon tank. A 2-inch steel pipe then conveys the water about 4,000 feet to a second 5,000-gallon

tank at the Latour State Forest headquarters for domestic use.

The camp is closed for about four months during the winter but as many as 40 people are housed there during the summer, including a fire crew, forestry crew, and prisoners engaged in conservation work.

Diversion 41 is Beal Spring within the NE¼ of NE¼ of Section 28, T32N, R2E.

At one time the spring flow was diverted by a low earth and rock dam into a ditch 3 feet wide and 1 foot deep which conducted the water along the contour of the hill for about 1,400 feet to the place of use on the "Old Joe Beal Place" now owned by the Scott Lumber Company. The place of use consisted of 8.4 acres of irrigated pasture. In the fall of 1964 the spring flow was about 1.5 cubic feet per second. The diversion has not been used for several years.

Diversion 42 is the Beal Creek Ditch from the south side of Beal Creek within the NW¼ of NW¼ of Section 30, T32N, R2E.

A rock and brush dam about 20 feet long and 5 feet high diverts a portion of the flow into the earth ditch about 3 feet wide and 1 foot deep.

Ditch capacity is about 4 cubic feet per second. The low flow of Beal Creek at this diversion during 1964 was about 5 cubic feet per second. On September 3, 1964, the ditch flow was 1.7 cubic feet per second above all laterals at the Johnson Spring Road.

About 1.8 miles below the diversion point a division box separates 1/3 of the flow into a lateral about 700 feet long leading westerly for irrigation of 10 acres of pasture on the Darrell W. Faber property.

Drainage from this land may be collected in a small reservoir. About 12.6 acres of pasture on the south side of the Faber property are irrigated by diversion from Dickerson Creek which is in the Bear Creek watershed.

The remaining 2/3 of the water continues in the main ditch south of the Faber lateral in a westerly direction for about 2 miles to the Old Garden Ranch now owned by Virginia Lee Morelli. This ranch is reportedly entitled to 1/3 of the water diverted. The main ditch divides into north and south branches before reaching the place of use on this ranch which consists of 24.4 acres. The north branch joins the Hagaman Gulch Ditch (Diversion 48) before reaching the irrigated land. During the summer months the entire flow of Hagaman Gulch is return flow from the Faber lands irrigated from Beal Creek Ditch.

The last 1/3 interest in the ditch was at one time owned by the Clinton Hufford Ranch on the north side of Hamp Creek. This ranch is now owned by Virginia Lee Morelli. Any unused water in Beal Creek Ditch plus return flows from the Garden Ranch collect naturally in Hamp Creek and flow about 1 mile down this stream for diversion into the Hamp Creek Ditch (Diversion 50) for irrigation of 17 acres of pasture owned by Mrs. Morelli. About 0.8 acre owned by A. Walker, Jr., et al. is also irrigated.

The Beal Creek Ditch was not used during 1963 and in 1964 was first opened on August 29.

Diversion 43 is the German Ditch from the north side of South Cow Creek within the SE¼ of SE¼ of Section 23, T32N, R1E.

Water is diverted by a rock and board dam about 5 feet high and 30 feet long into an earth ditch about 9 feet wide and 2 feet deep. A

wooden headgate and spillway at the head of the ditch control the amount of water diverted. The ditch closely follows South Cow Creek for 1.38 miles where it has gained sufficient elevation above the creek to turn north out of the canyon towards the service area which consists of widely scattered parcels of land on the level divide between South Cow Creek and Old Cow Creek. Most of the service area is tributary to Glendenning Creek or Old Cow Creek and return flow from irrigated land augments the flow of these two creeks. The overall length of the ditch is about 6 miles.

A staff gage was maintained at the head of the ditch during 1964, and the section was rated by current meter. Water stage recorders were kept in South Cow Creek just above the diversion point and in the ditch 1.38 miles below the diversion dam at the point where the ditch turns north. Discharge records obtained by these recorders are presented in Tables B-3 and B-12, respectively. Daily mean flow in the ditch at the recorder during the period of record varied from 9.6 to 13.7 cubic feet per second.

The diversion system is owned by the South Cow Creek Ditch Association composed of the shareholders listed on the following page. The lands shown under the name of Shasta Forests Company are administered by this company but are actually owned by other people, as shown on the State Water Rights Board Map.

Owner	Shares	Reported water right, in cubic feet per second (each share = 10 miner's inches measured under 4-inch pressure)	Extent of use
Shasta Forests Company			
Millers Meadow			Irr. of 10.0 acres
Hufford Place			Irr. of 42.1 acres
Dailey Place			Irr. of 90.1 acres
Total	25	5.00	
Pacific Gas & Electric Company	14.9	2.98	Power generation at South Cow Creek Powerhouse
George Reimer	4.1	.82	Irr. of 64.2 acres
Guy McTimmonds	2.5	.50	Irr. of 37.0 acres
Jack Brady	2.5	.50	Irr. of 29.4 acres
Edward Weller and C. Elbert Miller	4.0	.80	Irr. of 24.8 acres
Marvin Wiley	2.0	.40	Irr. of 17.9 acres
Frank Weir	0.5	.10	Irr. of 7.0 acres
Robert Mix	0.2	.04	Irr. of 2.6 acres
Laine Gibson	0.2	.04	Irr. of 2.0 acres
Mary Chellis	0.2	.04	Domestic
Donald Rynd	0.2	.04	Irr. of 4.0 acres
Leslie Combs	0.1	.02	Domestic
Remi C. Knight	0.1	.02	Domestic at five houses
Totals	56.5	11.30	331.1 acres

In addition to the shareholders listed on the Association books other users receive water either directly from the ditch or as drainage or return flow. These are listed below:

Name	Amount	Extent of use
Earl F. Scott		Domestic
Whitmore State Forestry Station		Domestic use at the station consisting of about 1 acre of lawn and garden, about 3 houses and a barracks. Service to about 20 people during the summer
Ellen H. Turk and Roger D. Cook		Domestic use and irrigation of 4.2 acres of garden, pasture and Christmas trees

The Neely property consisting of 22.3 acres of irrigated pasture south of Tamarack Road and east of Whitmore State Forestry Station is irrigated from Neely Bear Gulch Ditch (Diversion 65) by return flow from lands irrigated from the German Ditch draining into the gulch.

The German Ditch is operated to divert a constant flow throughout the irrigation season and sufficient water was always available in South Cow Creek in 1964 for a full ditch. All division boxes on the ditch are proportioned to automatically deliver the proper amount of water to each shareholder. A ditch tender is employed to maintain and repair the diversion dam and ditch and keep all division boxes clear of debris.

The first lateral from the ditch leads northeasterly about 2 miles to the Miller and Weller property, the Millers Meadow property and the Dailey place, both administered by Shasta Forests Company. The Miller and Weller property has a small regulatory reservoir which is kept full by

a branch of the lateral. Water is also used for domestic purposes at the houses near the reservoir. The main branch of the lateral continues north on the east side of the Miller and Weller pasture across the Bateman Road and irrigates the Millers Meadow place. The last ranch served by this lateral is the Dailey place. Two branches of the lateral are used on this ranch, one irrigating the northern portion and the other serving the southern part. Some regulation is provided by a reservoir near the eastern edge of the pasture.

After about June 1 of each year the flow of Dailey Creek below the Dailey place is return flow from water supplied to this ranch from the German Ditch. Frequent measurements of flow in Dailey Creek were taken at Tamarack Road in 1964, and these records are presented in Table B-8 to indicate the magnitude of return flow reaching Glendenning Creek from this source.

At the same point of beginning on the German Ditch for the lateral just described, a second lateral leads north 0.25 mile for irrigation of the Hufford place administered by Shasta Forests Company.

The main ditch continues nearly due west for about 0.75 mile to the third lateral which leads north a short distance to a point of division. The eastern branch conveys water for irrigation of the McTimmonds property and the western branch irrigates the Reimer lands. A 2-inch pipe in the McTimmonds branch conveys domestic water about 0.3 mile north to the ranch buildings. The Reimer place of use also includes a small orchard and a forested area growing Christmas trees. A small regulatory reservoir near the ranch headquarters is kept full by a branch ditch.

Return flow from water applied to the Hufford place, McTimmonds Ranch, and Reimer Ranch provides water to Bear Gulch and is available for diversion below into the Neely Bear Gulch Ditch (Diversion 65). Intermittent measurements of the flow in Bear Gulch are set forth in Table B-8.

The fourth lateral from the main ditch is about 0.5 mile below the McTimmonds and Reimer lateral. It provides domestic service and a small amount of irrigation water to 6 properties just north of Ponderosa Way. The first takeout on this lateral automatically diverts the correct proportion of flow to the Mix property where it is used for domestic purposes and irrigation of orchard and garden. A small reservoir at the lower end of the property is also maintained full. The next takeout serves domestic water to the Scott house. The third one automatically conveys the proper amount of water to the Gibson property where it is used for domestic purposes and irrigation of garden and lawn. Two small reservoirs are used to regulate the water. This property has been purchased from Theodore D. and Mary L. Chellis. The fourthtakeout consists of an automatic division box where water is taken for domestic purposes at a house trailer on the Chellis property. Below this the remaining water is used on the Rynd and Combs properties. Three takeouts are used for irrigation of orchard and pasture on the Rynd place lying partly north of the lateral and partly south of the main German Ditch. Regulation is provided by a small reservoir in the eastern part of the parcel. The last use on this lateral is for domestic purposes on the Combs property. Any unused water in the lateral may be spilled back into the main German Ditch at this point.

The fifth lateral off the south bank of the German Ditch conveys water across to the south side of Ponderosa Way for domestic and irrigation

use on the Weir and Wiley Ranches. The Weir Ranch irrigated lands consist of pasture of which 3.5 acres were idle in 1964, whereas the Wiley lands include pasture and about 3 acres of apple orchard. Drainage from these two places flows toward South Cow Creek rather than towards Glendenning Creek as is true on all other lands irrigated from the German Ditch. However, no return flow was observed reaching South Cow Creek from either ranch.

The sixth lateral serves the Brady Ranch, Whitmore State Forestry Station, and the Turk and Cook Ranch. About 0.4 mile below its head the lateral divides into two equal branches, one leading to the irrigated pasture and orchard lands on the Brady Ranch, and the other toward the Forestry Station storage tanks about 220 feet below the division point. Water is conducted from the lowermost tank to the station through about 0.7 mile of 2-inch pipe. All water in excess of the capacity and needs of the station water supply system amounting to about 0.5 cubic foot per second is spilled into a natural water course at the storage tanks. This water flows northeasterly across Ponderosa Way and past the old Miller Sawmill log pond where it is diverted into the Turk and Cook Ditch (Diversion 66).

The seventh and last lateral is the Knight Pipeline. A 4-inch pipe is submerged in an excavated section of the German Ditch and conveys a small flow 1 mile northerly to the town of Whitmore. The system serves domestic water to four houses south of the county road owned by Remi C. Knight and one house to the north owned by J. G. Reynolds.

The German Ditch below the Knight Pipeline carries water to the lowermost user, the Pacific Gas and Electric Company. The terminus of the

German Ditch is about one mile below the Knight Pipeline in a natural water course within Mill Creek watershed. The power company uses the streambed of Mill Creek to conduct the water to its Mill Creek Ditch (Diversion 71) for eventual use in generating power at the South Cow Creek Powerhouse.

On August 12, 1964, the flow of the German Ditch just above the Knight Pipeline was 1.4 cubic feet per second.

Diversion 44 is the Hufford-Knight Ditch from the northwest side of Atkins Creek within the SE¼ of SW¼ of Section 5, T32N, R2E.

A rock dam about 1 foot high and 5 feet long diverts water into a ditch 6 feet wide, 1 foot deep, and about 1.25 miles long. Flow in the ditch 800 feet below the diversion dam was 3.1 cubic feet per second on May 22 and at full ditch capacity of 3.3 cubic feet per second on July 15, 1964. At a point below all Hufford turnouts the flow was 2.7 cubic feet per second on July 17. Beginning about 0.25 mile below the diversion works there are several takeouts used to flood irrigate pasture and orchard owned by Elmer Hufford.

About 0.75 mile below the diversion dam water may be turned into 2,200 feet of 6-inch steel penstock for generation of power at a 5 kilowatt Pelton wheel powerplant near the creek under a head of 152 feet. Power generated is used on the Remi C. Knight Ranch. The lower end of the penstock is tapped by a small pipe which supplies domestic water to a house on the Knight Ranch to the east of the penstock. Water discharging through the powerplant tailrace is diverted into a ditch and used for irrigation of the lower pasture on the Knight Ranch.

A short distance below the penstock intake a 1-inch pipe submerged in the main ditch conducts domestic water about 0.5 mile southwesterly to ranch buildings on the Knight property.

The main ditch continues on for flood irrigation of the principal body of pasture on the Knight Ranch. One high lateral supplies water to a regulating reservoir on the north edge of the irrigated lands.

Total acreage irrigated from the ditch consists of 11.2 acres on the Elmer Hufford property and 44.2 acres on the Remi C. Knight property. Supplemental water is furnished to some of these lands on both ranches by the Atkins Mill Ditch (Diversion 45).

Diversion 45 is the Atkins Mill Ditch from the northwest side of Atkins Creek within the NW¼ of NW¼ of Section 8, T32N, R2E.

A low rock dam 14 feet long diverts water into a ditch 4 feet wide, 1 foot deep and about 0.75 mile long. On May 22, 1964, ditch flow above all takeouts was at full ditch capacity of 2.0 cubic feet per second. On May 22 and July 17, 1964, ditch flow below all Hufford takeouts was 1.1 and 0.34 cubic feet per second, respectively. The diversion flood irrigates 11.8 acres of pasture owned by Elmer Hufford and 31.6 acres of pasture on the Remi C. Knight property. Ditch flow is augmented by drainage from the Hufford-Knight Ditch (Diversion 44) which runs parallel at a higher level on the hill. It is reported that many years ago the ditch provided power for a mill.

Diversion 46 is the Knight South Ditch from the southeast side of Atkins Creek within the SE¼ of NE¼ of Section 7, T32N, R2E.

A low rock dam has been used to divert water into a ditch 2 feet wide, 1/2 foot deep, and about 500 feet long. The dam has been washed

out and the diversion was not used in 1964. The place of use consists of 4.2 acres of irrigated pasture adjacent to the creek on the Remi C. Knight property.

Diversion 47 is the Worden Ditch from the west side of Atkins Creek within the NE¼ of NE¼ of Section 24, T32N, R1E.

A concrete and flashboard dam 4 feet high and 40 feet long diverts water into a ditch 9 feet wide and 2 feet deep. Ditch flow at a point about 400 feet below the head was at full ditch capacity of 4.4 cubic feet per second on May 20, 1964. On July 16 ditch flow was 3.3 cubic feet per second. About 0.2 mile below the dam a ditch lateral may be used to take water across Atkins Creek through a 12-inch pipe for irrigation of a strip of pasture adjacent to the east creek bank.

The main ditch continues southward high on the side hill for about 0.3 mile to an intake structure for a 14-inch penstock where water may be diverted through 300 feet of pipe to a small Pelton wheel power-plant on the bank of Atkins Creek. Plant head is about 57 feet. The power generated is used for domestic purposes on the Gilbert T. Worden Ranch.

The main ditch turns northwesterly and circles the principal body of irrigated land for about 0.5 mile and terminates in a small regulating reservoir. A portable pump in this reservoir is used to operate a sprinkler system for irrigation of pasture to the west and south.

There are 74.8 acres of pasture irrigated by this diversion on the Worden property of which 1.9 acres were not irrigated in 1964.

Diversion 48 is the Hagaman Gulch Ditch from the south side of Hagaman Gulch within the SW¼ of NW¼ of Section 27, T32N, R1E.

Diversion is by an earth and log dam about 1½ feet high and 10 feet long which diverts the entire flow of the gulch into a ditch about 1½ feet wide and 1 foot deep. In May 1964 ditch flow at Ponderosa Way was estimated at 0.3 cubic foot per second, all of which was natural flow of Hagaman Gulch. Capacity of the ditch is about 1½ cubic feet per second. The ditch runs westerly across Ponderosa Way about 0.9 mile to the place of use consisting of 24.4 acres of flood irrigated pasture on the Virginia Lee Morelli Ranch. During 1964, 6.6 acres normally irrigated were left idle.

About 1/4 mile above the place of use a lateral from the Beal Creek Ditch (Diversion 42) joins the ditch from the south. The combined flow can be divided again before reaching the place of use - one branch going to the westerly portion and one to the easterly portion. The water available for diversion during the summer months is nearly all return flow from the northern portion of the Faber Ranch which is irrigated from Beal Creek Ditch. Since Beal Creek Ditch was not opened until August 29, 1964, very little water was available for diversion into Hagaman Gulch Ditch in 1964.

Diversion 49 is the Morelli-Carr Ditch from the south side of South Cow Creek within the SE¼ of NW¼ of Section 30, T32N, R1E.

A log and rock dam 3 feet high and 20 feet long diverts a portion of the flow into a ditch about 3 feet wide, 1 foot deep and about 1¼ miles long. On June 15, 1964, the flow in the ditch was 1.4 cubic feet

per second and on July 23 it was 1.5 cubic feet per second. Capacity of the ditch is about 2 cubic feet per second. The ditch irrigates a few acres north of Hamp Creek. However, most of the water is carried across Hamp Creek to the main body of irrigated land. There are 46.8 acres of hay and pasture land on the Virginia Lee Morelli property served by this ditch. The ditch continues on and irrigates 22.2 acres of hay and pasture land on the Pierre G. Carr property.

Diversion 50 is the Upper Hamp Creek Ditch from the north side of Hamp Creek within the NW¼ of NE¼ of Section 32, T32N, R1E.

An earth dam 25 feet long and 5 feet high diverts the entire flow during the irrigation season into a ditch 2 feet wide, 1 foot deep and about 0.75 mile long. Capacity is about 1 cubic foot per second. The ditch divides into two branches before reaching the 17 acres of irrigated pasture on the ridge between South Cow Creek and Hamp Creek owned by Virginia Lee Morelli. This ditch also irrigates 0.8 acre of pasture on the Archie D. Walker, Jr., property lying to the east. The natural flow of Hamp Creek is small during the late summer and the main purpose of this ditch is to divert the 1/3 share of water brought in through the Beal Creek Ditch (Diversion 42).

Because Beal Creek Ditch was not opened until August 29, 1964, very little, if any, use was made of this diversion in 1964.

Diversion 51 is the Lower Hamp Creek Ditch from the south side of Hamp Creek within the SE¼ of SW¼ of Section 30, T32N, R1E.

There was no diversion dam in 1964. However, the ditch is about 3 feet wide and 1 foot deep and has a capacity of about 1 cubic

foot per second. It extends about 1,600 feet westerly and serves the same general place of use as the Morelli-Carr Ditch (Diversion 49). It also serves 2.1 acres lying above this ditch on the Virginia Lee Morelli property. During the irrigation season the flow of Hamp Creek consists almost entirely of return flow from lands irrigated by the Beal Creek Ditch (Diversion 42). The diversion was not used in 1964.

Diversion 52 is the Morelli Domestic Spring within the SE¼ of SE¼ of Section 25, T32N, R1W, tributary to South Cow Creek.

A 1-inch pipe diverts water from the spring about 1,000 feet southeasterly to the Virginia Lee Morelli house where it is used for domestic purposes.

Diversion 53 is the Lansing South Ditch from the south side of South Cow Creek within the NE¼ of NE¼ of Section 36, T32N, R1W.

A concrete and flashboard dam 26 feet long and 2 feet high diverts water into a section of 30-inch pipe which delivers the water to the ditch which is about 4 feet wide, 1 foot deep and 2 miles in length. Flow in the ditch 0.75 mile below the diversion dam but above all turnouts was 2.7 cubic feet per second on May 28, 1964, and at full ditch capacity of 3.6 cubic feet per second on July 24. About 0.75 mile below the diversion dam the ditch reaches the upper edge of the place of use which consists of 121.7 acres of pasture on the Lucille Lansing Ranch adjacent to the south bank of South Cow Creek. Of this total 13.4 acres were not irrigated in 1964.

The upper lateral of the ditch terminates in a small regulating reservoir near the ranch headquarters where a 7½-horsepower electric

powered pump lifts the water for sprinkler irrigation of several acres of pasture above the ditch.

A lower lateral continues westerly through the middle of the irrigated lands and conveys water for an additional 0.75 mile for irrigation of a narrow strip of pasture adjacent to the creek.

Diversion 54 is the Rose Ditch from the north side of South Cow Creek within the NE¼ of NE¼ of Section 36, T32N, R1W.

A rock dam 35 feet long and 2 feet high diverts water into an earth ditch 1 foot wide and 1/2 foot deep. Capacity of the ditch is about 0.5 cubic foot per second, although on June 15, 1964, only about one gallon per minute was reaching the place of use. The ditch conveys water about 2,000 feet to the place of use consisting of 2.4 acres of lawn and orchard near the ranch house on the Ellis E. Rose property. Any drainage is intercepted by the Lansing Upper Ditch (Diversion 55) which runs beneath and parallel to the Rose Ditch.

Diversion 55 is the Lansing North Ditch from the north side of South Cow Creek within the NE¼ of NE¼ of Section 36, T32N, R1W.

A low rock dam diverts water into the ditch which is 3 feet wide and 1 foot deep. Ditch flow 0.6 mile below the diversion dam above all turnouts was at full ditch capacity of 3.8 cubic feet per second on May 28, 1964. On July 24 flow was 1.9 cubic feet per second. The ditch is about 1.5 miles long and irrigates 4.0 acres of pasture on the Donald V. Smith property and 46.2 acres of pasture on the Lucille Lansing Ranch lying north of the creek in a narrow strip.

Diversion 56 is the Rose Domestic Spring within the NW¼ of NE¼ of Section 36, T32N, R1W, tributary to South Cow Creek.

A 1-inch pipe diverts water southerly from the spring about 1,000 feet to the Ellis E. Rose house for domestic use.

Diversion 57 is the Carr Stock Water Pump from the south side of South Cow Creek within the NE¼ of NE¼ of Section 36, T32N, R1W.

Diversion is by a centrifugal pump driven by a 3/4-horsepower electric motor. Suction lift is about 6 feet through a 3/4-inch pipe and discharge lift is about 14 feet through a 3/4-inch pipe. Pump discharge is about 20 gallons per minute. The pump operates on a 40-pound pressure tank system and supplies water to the barns nearby for use by livestock on the Pierre G. Carr property.

Diversion 58 is the Carr Domestic Pump from the south side of South Cow Creek within the SW¼ of NE¼ of Section 36, T32N, R1W, about 1,000 feet downstream from the Carr Stockwatering Pump (Diversion 57).

Diversion is by a small pump driven by a 1/2-horsepower electric motor. Suction lift is about 15 feet through a 1-inch pipe. Static lift above the pump is about 9 feet through a 3/4-inch outlet pipe about 100 feet in length. Capacity of the pump is estimated to be 20 gallons per minute. The water enters a 40-pound pressure tank system for domestic use at the Pierre G. Carr residence.

Diversion 59 is the Lansing Domestic Spring within the SE¼ of NW¼ of Section 1, T31N, R1W, tributary to South Cow Creek.

A 2-inch pipeline diverts water from the spring about 0.8 mile northerly for domestic use at two houses on the Lucille Lansing Ranch.

Diversion 60 is the E. Hufford Ditch from the north side of South Cow Creek within the SW¼ of NE¼ of Section 35, T32N, R1W.

A rock and log dam 3 feet high and 35 feet long diverts a portion of the flow into a ditch 5 feet wide, 2 feet deep and about 1.4 miles long. About 1/2 mile below the head the ditch divides, one lateral continuing parallel to the creek on the north and the other crossing by flume to the south side of the creek. Ditch flow above the division and about 0.4 mile below the diversion point was at full ditch capacity of 9.6 cubic feet per second on May 28, 1964. On July 23, the flow was 7.7 cubic feet per second. Both laterals of the ditch irrigate a total of 119.0 acres of hay and pasture land on the Elmer Hufford Ranch.

Diversion 61 is the Rolands-Staiger Ditch from the north side of South Cow Creek within the SW¼ of NE¼ of Section 35, T32N, R1W.

A rock and log dam 2 feet high and 30 feet long diverts water into a ditch 4 feet wide and 1 foot deep. About 0.25 mile below the head the ditch divides into two laterals -- one continuing along the north side of the creek for irrigation of Rolands lands and the other lateral crossing by flume to the south side for irrigation of land on the Rolands and Staiger Ranches. Ditch flow just above the division point was 7.4 and 4.2 cubic feet per second on May 28 and July 23, 1964, respectively. Ditch capacity is about 7.5 cubic feet per second. From the point of division, the north lateral is about 0.5 mile long and the south lateral 1.75 miles long. Both laterals run very close to the corresponding branches of the E. Hufford Ditch (Diversion 60), and

several small flumes are required to carry water for the Rolands lands across the laterals of the E. Hufford Ditch. A section of the extreme end of the south lateral, which serves the Staiger Ranch, has been concrete lined to conserve water. The diversion irrigates a total of 44.2 acres of pasture on the Henry E. Rolands property and 33.6 acres of pasture on the J. Dana Staiger lands. The ditch right is reportedly divided 2/3 to Rolands and 1/3 to Staiger. The Staiger lands were not irrigated in 1964.

Diversion 62 is the E. Hufford Domestic Spring within the SW¼ of NE¼ of Section 3, T31N, R1W, tributary to South Cow Creek.

A 1-inch pipeline diverts water from the spring about 1 mile northerly where a pipe lateral branches off supplying domestic water to the Peter Hufford house south of the creek. The other branch of the pipeline conveys domestic water north about 1,000 feet across the creek to the Elmer Hufford house.

Diversion 63 is the Staiger Pump from the north side of South Cow Creek within the NE¼ of NE¼ of Section 33, T32N, R1W.

Diversion is by a piston type pump driven by a 3/4-horsepower electric motor. Suction lift is about 5 feet through a 1¼-inch pipe and discharge lift is about 80 feet through a 1¼-inch pipe. Rate of pump discharge is about 4 gallons per minute. An automatic float arrangement in the tank controls pump operation. About 300 feet of pipe conducts the water to a 1,000-gallon tank which furnishes pressure and storage for the place of use which consists of 1.0 acre of garden and orchard on the J. Dana Staiger property.

Diversion 64 is the South Cow Creek Powerhouse Ditch from the south side of South Cow Creek within the NE¼ of NW¼ of Section 33, T32N, R1W. A rock fill dam 13 feet high and 90 feet long faced on the top and downstream side with 2-inch planks diverts water into a wooden and concrete headgate structure. The ditch is about 10 feet wide and 3 feet deep and is about 2.25 miles long to the forebay on the ridge top above the Pacific Gas and Electric Company's South Cow Creek Powerhouse. The plant was built in 1904.

About 0.25 mile below the diversion dam a spillway structure in the canal can be used to spill water back to the creek. The flow is measured by a 4-foot concrete Parshall flume a short distance below the ditch spillway. A water stage recorder maintains continuous records of discharge and a portion of the 1963-64 record is presented in Table B-10. During the 1963-64 water year ending September 30, 1964, 26,345 acre-feet were measured flowing past the recorder. Daily discharge varied from a maximum of 65 cubic feet per second on January 20 to a no-flow shutdown period of 4 days in May. During the low flow months of August and September 1964 an average of 13.5 cubic feet per second was passing through the ditch. Pertinent powerhouse features are given below:

Installed generating capacity	1,800 kilowatts
Maximum daily mean discharge of canal in 1963-64 water year (as measured by the Parshall flume)	65 cubic feet per second
Forebay capacity	5.4 acre-feet
Penstock size and length (one penstock)	30-inch steel pipe 3,706 feet long and 42-inch woodstave pipe 781 feet long
Static head	715 feet
Type of wheel	2 Pelton single overhung impulse wheels

The Mill Creek Ditch (Diversion 71) discharges into the pool behind the diversion dam and the combined flow from this source and South Cow Creek is diverted into the South Cow Creek Powerhouse Ditch.

The powerhouse is operated on base load and causes little fluctuation in flow below the tailrace which discharges into Hooten Gulch about 0.5 mile above the confluence of the gulch and South Cow Creek.

Leakage through the diversion dam and from the ditch which runs along the hillside parallel to the creek maintain a live stream in South Cow Creek in the reach between the diversion dam and Hooten Gulch.

Diversion 65 is the Neely Bear Gulch Ditch from the west side of Bear Gulch within the NW¼ of SE¼ of Section 17, T32N, R1E.

A rock and log dam 2 feet high and 3 feet long diverts water into an earth ditch about 2 feet wide and 1/2 foot deep. Capacity of the ditch is about 2.5 cubic feet per second. It conveys water about 700 feet to the place of use consisting of 22.1 acres of irrigated hay and pasture land on the Laurence C. Neely property just south of Tamarack Road. In 1964, 5.3 acres were not irrigated.

Flow in Bear Gulch during most of the irrigation season consists entirely of return flow from the Reimer, McTimmonds, and Shasta Forests Company lands irrigated by the German Ditch.

Diversion 66 is the Turk and Cook Ditch from the west side of an unnamed stream within the NW¼ of NW¼ of Section 20, T32N, R1E.

Diversion is by a low earth dam near the old Miller Sawmill log pond into a ditch about 2 feet wide and 1/2 foot deep. Capacity of the ditch is about 1 cubic foot per second. Flow available for diversion consists entirely of water from the German Ditch (Diversion 43) which is surplus to the needs and capacity of the system serving the Whitmore State Forestry Station. The ditch diverts the entire flow of the stream although there are several wooden spillways in the ditch which can spill surplus water back to the stream.

About 1,400 feet below the point of diversion a 3-inch pipe and a 2-inch pipe convey portions of the water northwesterly about 300 feet for gravity sprinkler irrigation of 2.7 acres of Christmas trees and garden. The ditch continues on a short distance where the remaining water is applied to about 1.5 acres of pasture. Total acreage irrigated is 4.2 acres on property owned by Ellen H. Turk and Roger D. Cook.

Diversion 67 is the Covey North Springs located in a group near the headwaters of Covey Creek within the NE¼ and SE¼ of NE¼ of Section 23, and SW¼ of NW¼ of Section 24, T32N, R1W. Combined flow of the springs is about 0.5 cubic foot per second.

The most southerly spring has been excavated and a pump installed which delivers domestic water through 100 feet of 3/4-inch pipe to the house just to the south on the Myrtle Jurdy Covey property. Water flowing from the spring group is controlled by small ditches which irrigate, together with water from Covey Main Spring (Diversion 68) 3.6

acres of pasture on the Harry N. Covey property, 8.2 acres of pasture on the Myrtle Jurdy Covey property, and 13.4 acres of pasture on the Paul Donohue property north of Whitmore Road.

Diversion 68 is the Covey Main Spring near the headwaters of Covey Creek within the SW¼ of NW¼ of Section 24, T32N, R1W.

A collecting ditch at the base of a springy area concentrates the flow at the diversion point where a box divides the water 2/3 to the Myrtle Jurdy Covey and Harry N. Covey properties to the north and 1/3 to Paul Donohue property to the west. The spring produces a developed flow of about 0.5 cubic foot per second.

A few feet below the division box the Myrtle Covey lateral divides again with one branch leading northwest for irrigation of a few acres of pasture on the south side of the Whitmore Road. The main Covey branch continues north across the Whitmore Road for irrigation of orchard and pasture on the Myrtle Covey property and pasture on the Harry Covey property adjoining to the west.

The Donohue lateral carries water westerly where it divides into a ditch and pipe irrigation system serving the pasture and orchard on the Donohue property on both sides of Whitmore Road.

The diversion irrigates 13.8 acres on the M. J. Covey property of which 5.4 acres were not irrigated in 1964; 3.6 acres on the Harry Covey property; and 6.6 acres on the Paul Donohue property. The Harry Covey and Donohue lands also receive supplemental water from Covey North Springs (Diversion 67). South of the Donohue property there are 5.9 acres irrigated on property of the Pacific Gas and Electric Company. Return flow from all of these springs collects in the Covey Creek.

Diversion 69 is the Covey Creek Ditch from the northwest side of Covey Creek within the NW¼ of SE¼ of Section 23, T32N, R1W.

An earth and rock dam 1 foot high and 6 feet long diverts water into a ditch 2 feet wide and 1/2 foot deep. On October 14, 1964, about 0.3 cubic foot per second was being diverted. Capacity is about 0.5 cubic foot per second. Water is conveyed about 800 feet to a small pond about 75 feet in length formed by an earth dam 4 feet high and 50 feet long. There is no outlet pipe through the dam. The water is used for stockwatering and subirrigation of 4.6 acres of pasture below the pond on the Henry J. Jungsten property.

Diversion 70 is the Bullard Pump from the south side of Mill Creek within the NE¼ of SE¼ of Section 28, T32N, R1W.

Water is diverted by a centrifugal pump driven by a 2-horsepower electric motor. Suction lift is about 7 feet through a 1½-inch pipe and discharge lift is about 33 feet through a 1¼-inch pipe. Pump capacity is about 30 gallons per minute. About 150 feet of 1¼-inch pipe convey the water to a storage tank and the place of use on the Harry E. Bullard property consisting of 2.0 acres of orchard and garden. This diversion supplements water supplied to the property from a well.

Diversion 71 is the Mill Creek Ditch from the southeast side of Mill Creek within the SW¼ of SE¼ of Section 28, T32N, R1W.

A concrete dam 2½ feet high and 35 feet long diverts water into an earth ditch about 5 feet wide and 2 feet deep. Water available

for diversion consists of water imported through the German Ditch under shares held by the Pacific Gas and Electric Company, plus the natural flow of Mill Creek and its tributary, Covey Creek. From May 14 to October 1 of 1964, the flow in Mill Creek available for diversion as measured at the Mill Creek Road, varied from 6.8 cubic feet per second to 5.6 cubic feet per second. On August 12, 1964, 1.4 cubic feet per second was entering Mill Creek via the German Ditch, indicating, by subtraction, that the natural flow of Mill Creek at the Mill Creek Road was 4.3 cubic feet per second on that day. Covey Creek contributes a constant flow of about 1 cubic foot per second to Mill Creek above the road. Capacity of the ditch is about 12 cubic feet per second.

The ditch is about 0.25 mile in length to its terminous in the pool in South Cow Creek created by the diversion dam for the South Cow Creek Powerhouse Ditch (Diversion 64). This dam diverts water from both sources - Mill Creek and South Cow Creek - for generation of power at the South Cow Creek Powerhouse owned by the Pacific Gas and Electric Company.

Diversion 72 is the Wagoner Ditch from the east side of the east channel of South Cow Creek above its confluence with the tailrace discharge from South Cow Creek Powerhouse in Hooten Gulch. The South Cow Creek channel divides into two branches a short distance upstream from this diversion point. The diversion is within NW¼ of SW¼ of Section 6, T31N, R1W. Measured ditch flow varied from the full ditch capacity of 0.85 cubic foot per second on June 25, 1964, to 0.77 cubic foot per second on August 31.

A concrete dam about 30 feet long and 3½ feet high diverts water into an earth ditch about 2½ feet wide and 6 inches deep. About 700 feet from the head of the ditch a concrete stilling tank is used to convey a portion of the water through about 1,400 feet of 2½-inch steel pipe to the W. G. Wagoner house for domestic use. At the end of the ditch a portion of the water is conducted by 250 feet of 1¼-inch pipe easterly across Hooten Gulch and the Powerhouse Road to livestock barns and sheds for stock water use on the Wagoner ranch. The ditch is also used to flood irrigate 3.7 acres of pasture on the ranch just south of the concrete stilling tank. Of this total 1.3 acres were not irrigated in 1964.

Diversion 73 is the Abbott Ditch from the south side of the east channel of South Cow Creek within SW¼ of SW¼ of Section 6, T31N, R1W.

A concrete and flashboard dam 6 feet high and 30 feet long diverts the water into a ditch 7 feet wide and 2 feet deep. Water available for diversion consists principally of water discharged into Hooten Gulch through the South Cow Creek Powerhouse tailrace, although a small amount is also contributed by the eastern channel of South Cow Creek and return flow from lands irrigated by the Wagoner Ditch (Diversion 72).

Ditch flow in 1964 above the Pine Timber Gulch siphon and above all takeouts was as follows:

Date	Flow, in cubic feet per second
May 8	3.2
May 14	9.2
May 29	9.8
June 12	9.3
June 19	15.5*
July 14	11.7
July 27	15.3

* Full ditch capacity

Water entering the ditch is controlled by a headgate at the diversion dam and a second headgate just above the ditch siphon under Pine Timber Gulch. The ditch is about three miles long and provides irrigation water to five ranches. The following tabulation lists these ranches in downstream order and also shows the reported ditch rights and irrigated acreage on each.

Name	Reported ditch right	Irrigated acreage
Allan G. Abbott	8/16	96.0
Ellis T. Jones	1/16	14.6
Jesse C. Jones	1/16	13.4
V. R. Farrell	4/16	74.8
W. H. Hunt Estate Co.	2/16	112.9
	Total	311.7

The ditch follows the contour of the side hill and numerous laterals on the north ditch bank are used to flood irrigate the pasture and hay lands which lie between the ditch and South Cow Creek.

Diversion 74 is the Jennie Hufford Pump from the north side of South Cow Creek within the NE¼ of SW¼ of Section 11, T31N, R2W.

Water is diverted by a centrifugal pump driven by a small gasoline engine. Total lift is about 10 feet through a 2-inch intake pipe. Pump capacity is estimated to be 100 gallons per minute. The water is conveyed westerly through about 80 feet of 2-inch pipe to the place of use which consists of 0.4 acre of garden and orchard on the Jennie Hufford property.

Diversion 75 is the Hunt Pump from the south side of South Cow Creek within the NE¼ of NW¼ of Section 15, T31N, R2W.

Water is diverted by a 12-inch propeller type pump driven by a 20-horsepower electric motor. Total lift is about 12 feet through a 14-inch pipe. Pump discharge rate is 3,200 gallons per minute. The pump discharges directly into an earth ditch 7 feet wide and 1½ feet deep which conveys the water southerly and then westerly along the perimeter of the irrigated land. The place of use contains three units totaling 30.2 acres of border-checked pasture on the W. H. Hunt Estate Company property.

Diversion 76 is for the Espinosa Pumps from the south side of Cow Creek within the SE¼ of NE¼ of Section 13, T31N, R3W.

A temporary earth and rock dam across the creek diverts a portion of the flow into an earth ditch about 30 feet long leading to a sump for the two pumps under this diversion.

Both centrifugal pumps are driven by 7½-horsepower electric motors which lift the water about 13 feet through separate 5-inch intake pipes. On the discharge side of each pump the water is raised an additional 10 feet through 6-inch pipes. Rate of discharge of each pump is estimated to be 225 gallons per minute. The pumps irrigate 48.7 acres of pasture on the Harold C. Espinosa property of which 10.6 acres were not irrigated in 1964. The upper pump is used to irrigate the eastern and southern portions of the service area. The water draining from the eastern flood irrigated field collects in a pond near the lane leading to the ranch headquarters and is picked up by a third pump and applied by sprinklers to the southern field near State Highway 44. An additional 19 acres to the east were being prepared in 1964 for irrigation by construction of about 300 feet of 6-inch pipe and gravity ditch around this acreage.

The lower pump discharges into about 300 feet of wooden flume and then into a ditch for flood irrigation of the western portion of the service area on the Espinosa Ranch.

Diversion 77 is the Roberts Pump from the north side of Cow Creek within the SW¼ of NE¼ of Section 13, T31N, R3W.

In 1964 the pump was installed a few feet downstream from the confluence of Basin Hollow and Cow Creek. This centrifugal pump is driven by a portable gasoline engine. Suction lift is about 1 foot through a 1½-inch pipe and discharge lift is about 10 feet through a 1½-inch pipe. Pump capacity is about 50 gallons per minute. The diversion irrigates a garden about 30 feet by 15 feet adjacent to the creek on the David E. Roberts property.

Diversion 78 is the Hall South Pump from the south side of Cow Creek within the NW¼ of SW¼ of Section 13, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 10 feet through a 3½-inch pipe and discharge lift is about 18 feet through a 2-inch pipe. The pump discharges 104 gallons per minute while operating at a pressure of 64 pounds per square inch on the discharge line. A 5-inch aluminum sprinkler system is used to irrigate 32.1 acres of pasture adjacent to the creek on the Jura Lawrence Hall property.

Diversion 79 is the Hall North Pump from the north side of Cow Creek within the NW¼ of SW¼ of Section 13, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 15-horsepower electric motor. Suction lift is about 7 feet through a 3½-inch

pipe and discharge lift is about 4 feet through a 2-inch pipe. Pump discharge was 229 gallons per minute while operating at a pressure of 56 pounds per square inch on the discharge line. A 5-inch sprinkler system is used to irrigate 22.5 acres of pasture adjacent to the creek on the Jura Lawrence Hall property.

Diversion 80 is the J. Hufford Pump from the south side of Cow Creek within the NE¼ of SE¼ of Section 14, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 15-horsepower electric motor. Capacity of the pump is about 1,200 gallons per minute. Suction lift is about 12 feet through a 12-inch pipe. Discharge lift is about 20 feet through a pipe varying from 8 to 12 inches. A 14-inch concrete pipe conducts the water south under State Highway 44 to 52 acres of border-checked pasture. Drainage from this field collects in a reservoir adjacent to the highway at the northwestern corner of the field. A gravity ditch system, including a pipe under the highway, conveys water from the reservoir north about 1,000 feet to an additional 19 acres of border-checked pasture. One branch of this ditch serves the pasture lying east of the old highway and one branch carries a portion of the water across the old highway to serve the west pasture. Water draining from the east pasture is also conducted under the highway and reused on the west pasture. There are 93.4 acres irrigated by this diversion system on the Jesse Hufford, Jr., property.

Diversion 81 is the Lynes Pump from the south side of Cow Creek within the SW¼ of NE¼ of Section 14, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 6 feet through a 3-inch pipe and discharge lift is about 6 feet through a 2-inch pipe. The capacity of the pump is about 250 gallons per minute. A 5-inch sprinkler system is used to irrigate 39.1 acres of pasture and alfalfa adjacent to the creek on the Ronald E. Lynes property. Of this total, 6 acres were not irrigated in 1964.

Diversion 82 is the Wetzel Pump from the north side of Cow Creek within the SE¼ of NW¼ of Section 14, T31N, R3W, upstream from the old State Highway 44 bridge.

Water is diverted by a centrifugal pump driven by a 5-horsepower electric motor. Suction lift is about 7 feet through a 1½-inch pipe and discharge lift is about 15 feet through a 1¼-inch pipe. Capacity is estimated to be 50 gallons per minute. A 4-inch sprinkler system is used to irrigate 15 acres of pasture on the Wesley Wetzel property just east of old State Highway 44.

Diversion 83 is the Meineken Pump from the north side of Cow Creek within the SE¼ of NW¼ of Section 14, T31N, R3W, a short distance downstream from the old State Highway 44 bridge.

Water is diverted by a small gear-type pump driven by a gasoline engine. Suction lift is about 3 feet through a 2-inch pipe and discharge lift is about 15 feet through a 2-inch pipe. Pump capacity is about 60 gallons per minute. The pipe conducts the water about 350 feet northeasterly across the pasture irrigated by the Blomquist Pump (Diversion 84) to the place of use on the Elmer W. Roesner property. In 1964 the diversion system served only domestic needs at

the dwelling on the property. However, there are 2.0 acres of pasture which have been irrigated in the past.

Diversion 84 is the Blomquist Pump from the north side of Cow Creek within the SW¼ of NW¼ of Section 14, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 25-horsepower electric motor. Suction lift is about 7 feet through a 4-inch pipe, and discharge lift is about 12 feet through a 5-inch pipe. Capacity of the pump is 503 gallons per minute. A 5-inch sprinkler system is used to irrigate 36.3 acres of pasture adjacent to Cow Creek and west of State Highway 44, on the Theodore M. Blomquist property. About 1.3 acres of this total at the northern end of the field were not irrigated in 1964.

Diversion 85 is the Bishop Pump from the south side of Cow Creek south of Millville within the SW¼ of NW¼ of Section 14, T31N, R3W.

Water is diverted by a portable pump driven by a small gasoline engine. Suction lift is about 20 feet through a 1½-inch plastic pipe and discharge lift is about 20 feet through a 2-inch steel pipe. Pump capacity is about 50 gallons per minute. About 100 feet of 2-inch pipe convey the water to the place of use which was under development. In 1964 the diversion irrigated 0.3 acre of garden on the Jack Bishop property.

Diversion 86 is the Junkans South Pump from the south side of Cow Creek within the SE¼ of NW¼ of Section 10, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 5-horsepower electric motor. Suction lift is about 15 feet through a 6-inch pipe and discharge lift is about 7 feet through a 6-inch pipe. Pump discharge rate is 490 gallons per minute. A 10-inch buried concrete pipe conducts the water southwesterly about 500 feet to a ditch which is used to irrigate 29 acres of border-checked pasture on the Elmer W. Junkans property adjacent to the creek.

Diversion 87 is the Junkans North Pump from the north side of Cow Creek within the NE¼ of NW¼ of Section 10, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 20-horsepower electric motor. Suction lift is about 6 feet through a 4-inch pipe. Discharge lift is about 20 feet through a 6-inch pipe. The discharge rate is 326 gallons per minute at a pressure of 33 pounds per square inch on the discharge line. The water is conducted north through about 1,300 feet of buried 6-inch pipe for sprinkler irrigation of 40.6 acres of pasture on the Elmer W. Junkans property.

Diversion 88 is the Bingham Pump from the north side of Cow Creek within the NW¼ of NW¼ of Section 10, T31N, R3W, about 100 feet upstream from the Bingham Domestic Pump (Diversion 89).

This diversion has been abandoned and all that remained in 1964 was an old V-shaped wooden flume which at one time conveyed water from the pump north to the place of use consisting of 11 acres of pasture on the B. C. Bingham property.

Diversion 89 is the Bingham Domestic Pump from the north side of Cow Creek within the NW¼ of NW¼ of Section 10, T31N, R3W.

The 1½-inch centrifugal pump at this diversion has been abandoned and no water was diverted in 1964. Total lift was about 25 feet. About 300 feet of 3/4-inch steel pipe conveyed the water to the house on the B. C. Bingham property for domestic use.

Diversion 90 is the Tuttle Pump from the north side of Cow Creek within the SW¼ of NE¼ of Section 9, T31N, R3W.

Water is diverted by a centrifugal pump with 8-inch intake and discharge lines. The pump is driven by a 15-horsepower electric motor. Total suction lift is about 10 feet. Discharge rate is 1,240 gallons per minute. A 14-inch concrete buried pipe system is used to irrigate 119.6 acres of border-checked pasture on the Carl F. Tuttle, Jr., property. In 1964, 43.6 acres normally irrigated were idle.

Diversion 91 is the Shufelberger Pump from the south side of Cow Creek within the SE¼ of NE¼ of Section 9, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 15 feet through a 6-inch pipe and discharge lift is about 20 feet through a 6-inch pipe. Pump capacity is about 700 gallons per minute. The water enters either an irrigation system consisting of 6-inch steel pipe for irrigation of border-checked fields adjacent to the pump on the east and west side, or the main system consisting of about 4,000 feet of 14-inch concrete pipe running generally through the center of the irrigated fields parallel to Cow Creek. The diversion irrigates 98.6 acres of border-checked pasture on the Vern Shufelberger property. In 1964, 16 acres of pasture were idle.

Diversion 92 is the Schulz Pump from the north side of Cow Creek within the SE¼ of NW¼ of Section 9, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. The suction lift is about 7 feet through an 8-inch pipe and discharge lift is about 15 feet through about 30 feet of 8-inch pipe. Capacity of the pump is estimated to be 1,000 gallons per minute. A ditch and border-checked irrigation system is used to irrigate 31.4 acres of pasture on the Walter P. Schulz property lying within the angle formed by the junction of Oak Run Creek and Cow Creek. This diversion was not used during 1964.

Diversion 93 is the Frisbie Pump from the south side of Cow Creek just above its junction with Oak Run Creek within the NW¼ of NW¼ of Section 9, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 17 feet through a 5-inch pipe and discharge lift is about 2 feet through a 4-inch pipe. Pump discharge is estimated to be 300 gallons per minute. The water is conveyed by ditch to 19 acres of border-checked irrigated pasture on the E. C. Frisbie property.

Diversion 94 is the Otten Pump from the east side of Cow Creek within the NW¼ of NE¼ of Section 8, T31N, R3W, a short distance downstream from Silverbridge Road.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 12 feet through a 4-inch pipe and discharge lift is about 10 feet through a 2½-inch pipe. Pump

discharge rate is 153 gallons per minute. About 400 feet of 6-inch pipe and 900 feet of 4-inch buried pipe are coupled to a sprinkler system for irrigation of 23 acres of pasture on the Alex J. Otten property.

Diversion 95 is the Leggett Pump from the east side of Cow Creek within the $SW\frac{1}{4}$ of $NE\frac{1}{4}$ of Section 8, T31N, R3W.

Water is diverted by a turbine pump driven by a 20-horsepower electric motor. The pump is installed in a 4-foot diameter vertical concrete sump about 50 feet from the creek bank. The lift to the pump discharge elbow is about 13 feet and the discharge lift is about 14 feet through a 12-inch pipe. Pump capacity is estimated to be 1,800 gallons per minute. Water is discharged into a buried irrigation pipe which runs easterly across the north pasture to Silverbridge Road and then into a ditch that runs south parallel to the road. Water may also be discharged into a ditch about 4 feet wide and 1 foot deep which runs south through pasture land parallel to the creek.

The new State Highway 44, completed in 1964, passes through the middle of the ranch but no facilities have been built to carry the ditches across it to the southerly portion of the place of use. Irrigation of these fields would require a new pump in Cow Creek south of the new highway bridge.

The place of use under the old irrigation system before the new highway was built consisted of 176.6 acres of irrigated pasture and general crops on the Howard M. Leggett property. In 1964, only 56.8 acres of pasture north of the highway were irrigated.

Remnants of the abandoned Big Cow Creek Ditch which served this ranch and others until about 1943 can be seen leading into the property from the east. This ditch crossed the ranch and a portion of the water was carried across Cow Creek by flume about 1,000 feet downstream from the present Leggett Pump.

Use of water on the ranch is covered under licenses issued on Applications 237 and 14586 which are explained in more detail in Appendix C.

Diversion 96 is the Fraley North Pump from the east side of Cow Creek within the NE¼ of NW¼ of Section 17, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 6 feet through an 8-inch pipe and discharge lift is about 20 feet through 30 feet of 6-inch pipe when pumping for irrigation of the pasture on the northerly bench. A 12-inch pipe and gravity ditch conduct the water to the north pasture which is irrigated by border checks. When pumping into the ditch leading to the south pasture the discharge lift is only about 12 feet. Measured pump discharge was 740 gallons per minute when irrigating the south pasture. Drainage from the south fields collects in a sump located at the southeast corner where a sump pump lifts the water into two ditches which are used to irrigate by border checks two fields containing 15 acres. There are 54.6 acres of pasture, alfalfa and sudan grass irrigated by this diversion system on the Harold L. Fraley property.

Diversion 97 is the Dicker Reservoir on an unnamed stream west of Deschutes Road within the SE¼ of NW¼ of Section 18, T31N, R3W.

An earth dam 24 feet high and 275 feet long across the stream stores winter runoff in the reservoir which has a capacity of 25 acre-feet. Height of the dam from stream channel to spillway is 22.5 feet. There is no outlet pipe.

The reservoir is used for recreational and stockwatering purposes and for irrigation of 1 acre of shade trees and pasture near the reservoir. It is owned by C. M. Dicker, Inc. A portable pump powered by a gasoline engine lifts water from the reservoir into a 2-inch pipe and sprinkler system. Storage is covered by water right Application 19280 which is described in Appendix C.

Diversion 98 is the Harris Pump from the west side of Cow Creek within the SW¼ of NW¼ of Section 17, T31N, R3W.

Water is diverted by a portable pump driven by a small gasoline engine. Total lift is about 23 feet through a 1½-inch intake pipe and 1-inch plastic discharge pipe. Pump capacity is about 30 gallons per minute. The pump irrigates 1 acre of orchard, garden, and lawn near the dwelling on the John M. Harris property.

Diversion 99 is the Fraser Pump from the west side of Cow Creek within the NE¼ of SW¼ of Section 17, T31N, R3W.

Water is diverted by a centrifugal pump driven by a portable gasoline engine which develops about 10-horsepower. Suction lift is about 6 feet through a 5-inch pipe and discharge lift is about 18 feet

through a 4-inch pipe. Pump discharge rate is about 600 gallons per minute. The pump discharges into a 12-inch wide wooden flume about 100 feet long for use on the Thomas Fraser property. This development is new, and no crop had been planted or irrigated in 1964. About 6 acres are under development.

Diversion 100 is the Fraley South Pump from the east side of Cow Creek within the SE¼ of SW¼ of Section 17, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 15 feet through an 8-inch pipe and discharge lift is about 12 feet through an 8-inch pipe. Capacity is estimated to be 600 gallons per minute. About 750 feet of 12-inch concrete pipe conveys the water east through the center of the irrigated pasture. A ditch system is then used to irrigate the pasture by border checks and about 2 acres of olive trees all on the Harold L. Fraley property. This diversion normally irrigates 13 acres. However, the diversion was not used during 1964.

Diversion 101 is the Maynard Pump from the west side of Cow Creek within the SW¼ of NW¼ of Section 20, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 20-horsepower electric motor. Suction lift is about 8 feet through an 8-inch pipe and discharge lift is about 25 feet through 50 feet of pipe varying from a 6-inch to a 12-inch diameter. The measured discharge rate of the pump is 800 gallons per minute. A 14-inch concrete pipe conducts the water southwesterly under Deschutes Road to the place

of use consisting of 48.4 acres of border-checked pasture on the R. and E. D. Maynard property. In 1964 the northerly 24.0 acres were not irrigated.

Diversion 102 is the Kirkman Pump from the west side of Cow Creek within the NE¼ of SW¼ of Section 20, T31N, R3W.

This diversion system has been abandoned and the former irrigated pasture owned by Lawrence and Marie Kirkman and served by the pump has been subdivided into 9 small parcels. The new owners are listed below together with acreage formerly irrigated by this pump and acreage now irrigated by different diversions.

Name	Acreage formerly irrigated by Kirkman Pump	Acreage now irrigated by other diversions	Diversion Number
R. Glassford	2.2	0.6	103
P. Carter	2.5	0.5	104
C. McKee	5.0	0.4	104
J. Cherta	4.2		
J. Johnson	1.0		
J. Robinson	5.0		
W. Clark, et al.	16		
M. Zeis	4.9		
A. Morse	10.0	10.0	106
Total	50.8	11.5	

In 1960 a centrifugal pump driven by a 15-horsepower electric motor was in place at the point of diversion. It discharged into about 200 feet of 10-inch iron pipe for irrigation by border checks of 51 acres of pasture south of the pump and adjacent to the creek. Several of the new parcels created by the subdivision are served water by new diversions from the creek as shown in the tabulation above. However, most of the former place of use was not irrigated during 1964.

Diversion 103 is the Glassford Pump from the west side of Cow Creek within the NE¼ of SW¼ of Section 20, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 1½-horsepower electric motor. Suction lift is about 3 feet through a 1½-inch pipe and discharge lift is about 20 feet through a 1¼-inch pipe. Pump discharge rate is about 30 gallons per minute. About 150 feet of 1¼-inch pipe conveys the water to the place of use consisting of 0.6 acre of garden on the Roy Glassford property. Diversion 102 formerly served this property.

Diversion 104 is the Carter-McKee Pump from the west side of Cow Creek within the NE¼ of SW¼ of Section 20, T31N, R3W.

Water is diverted by a centrifugal pump driven by a small gasoline engine. Suction lift is about 8 feet through a 2-inch pipe and discharge lift is about 10 feet through a 2-inch pipe. Pump discharge rate is about 50 gallons per minute. About 100 feet of 3-inch pipe carries the water to the place of use. In 1964, the place of use consisted of 0.5 acre of garden on the Paul L. Carter property and 0.4 acre of garden on the Charles N. McKee property adjoining on the south. An informal rotation system is practiced by the two owners. Diversion 102 formerly served this property.

Diversion 105 is the Stone-Fitzpatrick Pump from the east side of Cow Creek within the SE¼ of SW¼ of Section 20, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Intake and discharge pipes are 8-inch. Suction lift is about 3 feet and static lift above the pump is about 30 feet.

Measured discharge rate of the pump is 985 gallons per minute. The water is pumped into about 1,000 feet of 14-inch underground pipe. The system irrigates by border check 11.4 acres of pasture on the S. C. Stone property and 43.5 acres of pasture on the contiguous David P. Fitzpatrick property. Water from this pump also irrigates about 0.3 acre of orchard on the Fitzpatrick property just east of the pump.

Application 17636 is on file with the State Water Rights Board to cover this diversion and details are set forth in Appendix C. The water right permit is owned 4/5 by Fitzpatrick and 1/5 by Stone and rotation in use of water is practiced by the owners in this proportion. The water is turned north to Stone and south to Fitzpatrick at a point about 1,000 feet east of the pump at the eastern edge of the service area.

Diversion 106 is the Morse Pump from the west side of Cow Creek within the SE¼ of SW¼ of Section 20, T31N, R3W.

The pump and motor have been removed and all that remained at the point of diversion in 1964 were the electrical service and meter.

The place of use on the Alvin Morse property consisted of pasture adjacent to the creek and garden and orchard west of the house totaling 10 acres. At one time this land was also irrigated from Diversion 102.

Diversion 107 is the A. F. Hufford Pump on the east side of Cow Creek within the NE¼ of NW¼ of Section 29, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 3 feet through an 8-inch pipe and discharge lift is about 20 feet through 220 feet of pipe varying

from 8 to 12 inches in diameter. Measured capacity of the pump is 1,180 gallons per minute. The water enters a ditch system which irrigates 32.7 acres of pasture west of Silverbridge Road on the Albert F. Hufford property through border checks. Three small orchards totaling 0.7 acre and a lawn near the ranch headquarters south of a gulch, tributary from the east, are also irrigated.

Application 12138 is on file with the State Water Rights Board for this diversion system. Details of the appropriation are given in Appendix C.

Diversion 108 is the Herman Pump from the west side of Cow Creek within the NE¼ of NW¼ of Section 29, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 15-horsepower electric motor. Suction lift is about 10 feet through a 4-inch pipe and dishcarge lift is about 15 feet through a 4-inch pipe. Pump capacity is estimated to be 300 gallons per minute. The pump discharges into a 5-inch sprinkler system which irrigates pasture land as set forth below:

Name	Irrigated acreage
William F. Herman	39
North Valley Title and Escrow Company	5.0
Jerry W. Tippin	2.5
Margot Hoffman	2.5
Total	49.0

During 1964, 12.8 acres of pasture normally irrigated on the Herman property were not irrigated.

Diversion 109 is the Swoboda Brothers Pump from the west side of Cow Creek within the NW¼ of NE¼ of Section 29, T31N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 11 feet through a 6-inch pipe and discharge lift is about 15 feet through a 6-inch pipe. Pump capacity is estimated to be 700 gallons per minute. The water is conducted westerly through about 400 feet of 12-inch pipe and then discharged into a ditch which runs south for about 1,300 feet through the center of the John F. Swoboda property. Near the pump the water may be turned into a ditch which runs south for about 1,100 feet for irrigation of the Lawrence J. Swoboda property adjacent to the creek. The two ranches share in the diversion equally by rotation.

The place of use on the John F. Swoboda property consists of 24.2 acres of border-checked pasture, walnuts and grain. Only 13.2 acres of this total were irrigated in 1964. On the Lawrence J. Swoboda property 14 acres of border-checked pasture are irrigated.

Application 11695 has been filed with the State Water Rights Board and covers a portion of this use. It is explained in more detail in Appendix C.

Diversion 110 is the Pearson Pump on the east side of Cow Creek within the SW¼ of SE¼ of Section 29, T31N, R3W.

Water is diverted by a pump driven by a 15-horsepower electric motor. Lift from water surface to pump discharge elbow is about 20 feet. Measured capacity of the pump is 1,540 gallons per minute. The water is delivered through a 12-inch pipe to a 16-inch pipe system for irrigation of border-checked pasture. Drainage collects in an excavated sump about 40 by 125 feet in area located near the southeast corner of this field.

A sump pump driven by a 30-horsepower electric motor pumps the water through a 5-inch pipe and discharges it into a sprinkler system for irrigation of a large area of pasture adjoining the border-checked field on the south and east. The diversion system irrigates a total of 209.6 acres on the Glenn Pearson property and 2.2 acres of Tal E. Murphy property adjacent to the creek.

Application 11528 is on file with the State Water Rights Board and covers a portion of this use. It is explained in more detail in Appendix C.

Diversion 111 is the Beatie Pump from the west side of Cow Creek within the NW¼ of NW¼ of Section 5, T30N, R3W.

Water is diverted by a centrifugal pump driven by a 10-horsepower electric motor. Suction lift is about 10 feet through a 10-inch pipe and discharge lift is about 18 feet through an 8-inch pipe. Capacity is estimated to be 900 gallons per minute. A gravity ditch system irrigates 66.8 acres of border-checked pasture on the Arthur H. Beatie property. Of this acreage about 19.8 acres were not irrigated during 1964.

Diversion 112 is the Beatie Stock Water Pump from the west side of Cow Creek, a few feet downstream from the Beatie Pump (Diversion 111) within the NW¼ of NW¼ of Section 5, T30N, R3W.

Water is diverted by a jet pump driven by a 1/2-horsepower electric motor. Water is lifted to the pump about 24 feet. The water is conveyed through about 500 feet of 3/4-inch plastic pipe in a southwesterly direction to a stockwatering tank in the pasture. Pump discharge rate is about 5 gallons per minute.

Diversion 113 is the Bryant Pump from the east side of Cow Creek within the SE¼ of NW¼ of Section 5, T30N, R3W.

Water is diverted by a centrifugal pump driven by a 30-horsepower electric motor. Suction lift is about 5 feet through a 5-inch pipe and discharge lift is about 18 feet through an 8-inch pipe. Pump capacity is estimated to be 800 gallons per minute. The water can be conveyed north through 2,200 feet of 8-inch pipe for sprinkler irrigation of 33 acres of pasture planted during the summer of 1964. An additional 41.6 acres of pasture are under development. The pump also irrigates 7.2 acres of mixed orchard trees south of the pump. The property is owned by William J. Bryant, et al.

Diversion 114 is the proposed R. Hawes West Pump from the west side of Cow Creek within the SE¼ of SW¼ of Section 5, T30N, R3W.

During 1964, 104.8 acres adjacent to the creek and north of Dersch Road were being leveled and prepared for irrigated pasture on the Roy Hawes property. The pump will supply water to this land and an additional 10.4 acres of formerly irrigated pasture adjacent to the creek.

Diversion 115 is the R. Hawes East Pump from the east side of Cow Creek just north of Dersch Road within the SE¼ of SW¼ of Section 5, T30N, R3W.

The pump has been removed but formerly irrigated 13 acres of pasture, garden, and orchard adjacent to the creek on the Roy Hawes property.

Diversion 116 is the M. Hawes Pump from the west side of Cow Creek just below Dersch Road Bridge within the NW¼ of NW¼ of Section 8, T30N, R3W. It is the lowermost diversion from Cow Creek.

Water is diverted by a centrifugal pump driven by a 30-horsepower electric motor. The 12-inch suction pipe lifts the water about 10 feet. On the discharge side of the pump, a 12-inch pipe under a static head of about 10 feet discharges the water into a buried 16-inch concrete pipe irrigation system. The measured pump discharge rate is 2,400 gallons per minute. The diversion irrigates, by border checks, 58 acres of hay and pasture land on the Melvin Hawes property. About 1 acre of berries near the pump is also irrigated. The south field containing 61.6 acres was not irrigated in 1964.

Backwater from the Sacramento River is present in Cow Creek at this diversion point during most of the irrigation season. Thus, the water available for diversion consists of a mixture of water from Cow Creek and the Sacramento River.

APPENDIX B

RECORDS OF WATER SUPPLY AND USE OF WATER

Table No.

TABLE B-1

DAILY MEAN DISCHARGE OF COW CREEK
AT U. S. GEOLOGICAL SURVEY STATION*

May 1 to September 30, 1964

(In cubic feet per second)

Day	May	June	July	August	September
1	248	116	30	11	34
2	242	114	27	7.6	45
3	277	108	28	12	38
4	304	108	31	9.8	31
5	255	112	33	9.2	27
6	233	114	30	7.0	25
7	211	154	22	7.0	19
8	211	160	19	7.6	19
9	211	261	20	12	17
10	208	322	21	12	16
11	191	224	17	7.6	18
12	183	174	17	8.2	18
13	199	150	18	7.0	19
14	202	137	16	5.3	14
15	191	122	14	3.7	11
16	191	112	15	4.8	7.6
17	191	106	15	6.5	9.8
18	183	90	14	8.7	12
19	180	89	18	6.5	16
20	174	82	17	4.4	17
21	164	78	12	6.1	12
22	157	73	12	5.7	7.0
23	150	52	9.8	7.0	4.8
24	137	46	13	5.3	4.1
25	134	26	14	2.9	5.7
26	141	37	13	2.0	9.2
27	157	34	13	2.0	16
28	188	42	9.8	2.9	17
29	160	38	13	5.3	18
30	148	33	17	8.2	19
31	128		13	11	
Mean	192	110	18.1	6.98	17.5
Runoff in acre-feet	11,806	6,545	1,113	429	1,041

Total for period - 20,934 acre-feet

*Provisional record

TABLE B-2

DAILY MEAN DISCHARGE OF GLENDENNING CREEK
BELOW CONFLUENCE WITH BEAR GULCH

May 1 to October 12, 1964

(In cubic feet per second)

Day	May	June	July	August	September	October
1	19.8	10.3	7.7	3.3*	6.7	4.7
2	16.4	10.3	6.7	3.3*	6.1	4.4
3	19.3	9.9	6.7	3.4*	5.5	4.2
4	16.4	9.9	7.1	3.5*	5.5	4.4
5	16.9	9.9	6.7	3.5*	5.3	4.2
6	15.5	11.9	6.1	3.6*	3.9	4.7
7	14.6	12.3	5.8	3.7	2.7	5.3
8	14.1	15.5	6.1	3.7	3.9	5.3
9	14.1	19.3	5.5	3.7	3.4	5.0
10	13.2	15.5	5.0	3.9	3.7	5.3
11	11.9	13.6	5.0	3.7	3.7	4.7
12	11.1	12.3	3.9	3.2	3.2	4.4
13	11.9	11.9	3.7	3.2	3.2	
14	11.9	11.1	3.9	3.2	2.5	N
15	13.6	11.5	4.2	2.5	2.7	O
16	14.1	10.3	3.9	2.3	3.2	
17	13.6	9.9	3.9	2.3	3.7	R
18	14.6	9.5	3.9	2.3	3.4	E
19	13.6	9.1	3.7	2.7	3.2	C
20	13.2	9.1	3.7	3.0	3.9	O
						R
21	14.1	8.8	3.7	3.2	4.2	D
22	13.2	8.4	3.7	3.7	4.7	
23	13.2	7.7	3.2	3.9	4.7	
24	11.9	7.7	3.4	3.2	4.7	
25	12.3	7.4	3.7	3.7	4.2	
26	14.1	6.7	3.2	3.9	4.2	
27	17.9	6.1	3.0	4.4	4.7	
28	15.5	7.1	3.1*	3.9	5.3	
29	14.1	8.1	3.2*	3.7	5.3	
30	12.3	8.1	3.2*	3.9	4.7	
31	11.1		3.2*	4.4		
Mean	14.2	10.3	4.5	3.4	4.2	4.7
Runoff in acre-feet	873	613	273	209	250	112

Total for period - 2,330 acre-feet

*Estimated

TABLE B-3

DAILY MEAN DISCHARGE OF SOUTH COW CREEK
ABOVE GERMAN DITCH

June 12 to October 12, 1964

(In cubic feet per second)

Day	June	July	August	September	October
1		23	19.5	18.9	16.7
2	N	23	19.5	16.7	16.7
3	O	23	18.9	15.7	16.7
4		23	18.9	16.7	16.7
5	R	22	18.3	16.7	16.7
	E				
6	C	22	18.3	16.7	16.7
7	O	22	18.3	16.7	16.7
8	R	22	18.9	16.7	17.3
9	D	22	18.9	16.7	16.7
10		22	18.3	16.3	16.7
11		22	18.3	16.3	16.7
12	33	22	18.9	16.3	16.7
13	32	22	18.9	15.7	
14	31	22	18.9	16.3	N
15	30	22	18.9	15.7	O
16	30	21	18.3	15.7	R
17	29	21	18.3	15.7	E
18	28	21	18.3	16.3	C
19	27	20	18.3	16.7	O
20	26	20	18.3	16.7	R
					D
21	26	20	18.3	16.7	
22	26	20	18.3	17.3	
23	26	20	18.3	16.7	
24	25	20	18.3	16.7	
25	24	20	18.3	16.7	
26	24	19.5	17.8	17.3	
27	24	19.5	17.8	17.3	
28	24	19.5	17.8	17.3	
29	23	20.1	17.3	17.3	
30	23	19.5	14.8	16.7	
31		19.5	14.8		
Mean	26	21	18.2	16.6	16.8
Runoff in acre-feet	980	1,291	1,119	988	400

Total for period - 4,778 acre-feet

TABLE B-4

DAILY MEAN DISCHARGE OF ATKINS CREEK
AT BATEMAN ROAD

May 15 to October 12, 1964

(In cubic feet per second)

Day	May	June	July	August	September	October
1		13.9	4.3	2.1	3.1	2.0
2	N	13.6	4.1	2.1	3.1	2.0
3	O	13.3	3.9	2.0	3.2*	2.0
4		13.0	3.7	2.0	3.1	2.0
5	R	12.7	3.5	1.9	3.1	2.0
	E					
6	C	12.5	3.3	1.9	3.0	2.0
7	O	12.2	3.2	1.8*	2.9	2.0
8	R	11.9	3.0	1.8	2.8	2.0
9	D	11.6	2.8	1.9	2.8	2.0
10		11.3	2.6*	1.9	2.7	2.0
11		11.0*	2.7	2.0	2.6	2.0
12		10.5	2.8	2.0	2.5	2.0*
13		10.1	3.0	2.1	2.5	
14		9.6	3.1	2.1	2.4	N
15	18.9*	9.1	3.2*	2.1	2.3	O
16	18.6	8.6	3.1	2.2	2.3	R
17	18.3	8.2	3.1	2.2	2.2	E
18	18.0	7.7	3.0	2.3	2.1*	C
19	17.7	7.2*	2.9	2.3	2.1	O
20	17.4	6.9	2.9	2.4	2.1	R
						D
21	17.1	6.6	2.8	2.4*	2.1	
22	16.8	6.3	2.7	2.5	2.1	
23	16.6	6.1	2.7	2.5	2.1	
24	16.3	5.8	2.6*	2.6	2.1	
25	16.0	5.5	2.5	2.6	2.1	
26	15.7	5.2*	2.5	2.7	2.1	
27	15.4	5.0	2.4	2.8	2.1	
28	15.1	4.8	2.4	2.8	2.1	
29	14.8	4.6	2.3	2.9	2.1	
30	14.5	4.5	2.3	3.0	2.1	
31	14.2		2.2	3.0		
Mean	16.6	9.0	3.0	2.3	2.5	2.0
Runoff in acre-feet	560	536	184	141	149	48

Total for period - 1,618 acre-feet

*Staff gage read this day. Values for all other days are interpolated.

TABLE B-5

DAILY MEAN DISCHARGE OF MILL CREEK
AT MILL CREEK ROAD

May 14 to October 1, 1964

(In cubic feet per second)

Day	May	June	July	August	September	October
1		6.4	5.9	5.7	5.7	6.1*
2	N	6.3	5.9	5.7	5.7	N
3	O	6.3	5.9	5.7*	5.7*	O
4		6.3*	5.8	5.7	5.7	
5	R	6.3	5.8	5.7	5.7	R
	E					E
6	C	6.3	5.8	5.7	5.8	C
7	O	6.3	5.8	5.7*	5.8	O
8	R	6.2	5.8	5.7	5.8	R
9	D	6.2	5.8	5.7	5.8	D
10		6.2	5.8*	5.7	5.9	
11		6.2*	5.8	5.7	5.9	
12		6.1*	5.7	5.7	5.9	
13		6.1	5.7*	5.7	6.0	
14	6.8*	6.0	5.6	5.7	6.0	
15	6.8	6.0*	5.6	5.7	6.0	
16	6.8	6.1*	5.6	5.7	6.0	
17	6.7	6.0	5.6	5.7	6.1	
18	6.7	5.9	5.6	5.7	6.1*	
19	6.7	5.8*	5.6	5.7	6.1	
20	6.7	5.8	5.7	5.7	6.1	
21	6.6	5.8	5.7	5.7*	6.1	
22	6.6	5.8	5.7	5.7	6.1	
23	6.6	5.9	5.7	5.7	6.1	
24	6.6	5.9	5.7*	5.7	6.1	
25	6.5	5.9	5.7	5.7	6.1	
26	6.5	5.9*	5.7	5.7	6.1	
27	6.5	5.9	5.7	5.7	6.1	
28	6.5	5.9	5.7	5.7	6.1	
29	6.4	5.9	5.7	5.7	6.1	
30	6.4	5.9	5.7	5.7	6.1	
31	6.4		5.7*	5.7		
Mean	6.6	6.1	5.7	5.7	6.0	6.1
Runoff in acre-feet	236	363	350	350	357	12

Total for period - 1,668 acre-feet

*Staff gage read this day. Values for all other days are interpolated.

TABLE B-6

DAILY MEAN DISCHARGE OF SOUTH COW CREEK
AT U. S. GEOLOGICAL SURVEY STATION*

May 1 to September 30, 1964

(In cubic feet per second)

Day	May	June	July	August	September
1	82	39	18	10	18
2	70	36	19	13	18
3	73	32	17	11	16
4	70	33	18	12	16
5	66	34	18	11	14
6	64	37	17	12	14
7	62	43	16	11	13
8	62	44	15	12	12
9	59	65	14	13	9.5
10	60	68	14	12	10
11	58	52	16	12	11
12	56	44	16	10	12
13	62	39	14	8.6	12
14	64	38	12	8.2	5.9
15	64	32	14	10	8.2
16	62	33	14	10	11
17	64	32	12	11	11
18	60	30	12	10	12
19	58	30	12	12	12
20	54	30	14	12	10
21	48	26	15	12	9.0
22	48	20	14	12	9.0
23	46	20	16	12	8.2
24	45	18	14	10	8.6
25	44	20	15	10	10
26	48	19	15	10	10
27	52	20	14	8.6	11
28	58	20	14	10	13
29	48	19	14	8.6	13
30	44	19	9.5	9.5	12
31	40		6.8	13	
Mean	57.8	33.1	14.5	10.9	11.6
Runoff in acre-feet	3,554	1,970	891	667	693

Total for period - 7,775 acre-feet

*Provisional record

TABLE B-7

DAILY MEAN DISCHARGE OF COW CREEK BELOW
CONFLUENCE OF OLD COW AND SOUTH COW CREEKS

April 30 to October 12, 1964

(In cubic feet per second)

Day	April	May	June	July	August	September	October
1		206	112	44	16.3	51	28
2		188	109	45	17.5	51	23
3		206	101	44	17.5	47	15.0
4		182	101	44	20	32	14.0
5		175	106	42	15.0	27	15.0
6		172	109	38	16.3	24	18.8
7		170	136	33	11.6	27	24
8		172	141	30	11.6	24	27
9		177	216	35	15.0	16.3	27
10	N	180	201	32	16.3	21	24
	O						
11		172	165	27	20	23	25
12	R	172	146	32	17.5	24	24
13	E	180	133	35	12.7	18.7	
14	C	175	125	30	11.6	20	
15	O	172	109	28	11.6	16.3	N
	R						O
16	D	172	109	32	11.6	17.5	
17		175	106	32	15.0	20	R
18		172	96	28	16.3	24	E
19		170	91	27	15.0	20	C
20		159	91	27	15.0	20	O
							R
21		152	83	27	15.0	17.5	D
22		146	71	20	16.3	16.3	
23		139	64	24	11.6	11.6	
24		131	60	21	12.7	17.5	
25		131	57	20	9.5	21	
26		133	55	24	10.5	20	
27		159	49	20	16.3	27	
28		170	57	26	15.0	32	
29		141	55	30	11.6	28	
30	183	125	47	23	13.8	27	
31		117		11.6	23		
Mean	183	164	103	30	14.8	25	22
Runoff in acre-feet	363	10,084	6,129	1,845	910	1,488	524

Total for period - 21,343 acre-feet

TABLE B-8

MISCELLANEOUS MEASUREMENTS OF STREAM FLOW

1964

Stream	Location of measurement	Date	Discharge in cubic feet per second
West Hunt Creek*	At One Road	Oct. 13	1*
Old Cow Creek	At Ponderosa Way	June 25	2.6
		July 10	1.4
		July 14	1.3
		July 24	0.9
		Aug. 7	1.4
		Aug. 21	0.6
		Sept. 1	6.5
		Sept 18	1.5
		Oct. 1	1.6
Old Cow Creek	Below Kilarc Power-house	June 25	44 **
		July 10	36 **
		July 14	35 **
		July 24	31 **
		Aug. 7	29 **
		Aug. 21	27 **
		Sept. 1	32 **
		Sept. 18	26 **
		Oct. 1	26 **
Dailey Creek	At Tamarack Road	June 16	2.04
		June 17	2.04
		June 26	1.00
		July 10	0.5
		July 14	0.95
		July 24	0.95
		Aug. 7	1.2
		Aug. 21	1.2
		Sept. 1	1.52
		Sept. 18	1.93
		Oct. 1	1.8
Bear Gulch	At Tamarack Road	June 6	1.53
		June 26	1.3
		July 10	0.20
		July 14	0.13
		July 24	0.3
		Aug. 7	0.3
		Aug. 21	0.5
		Sept. 1	2.37
		Sept. 18	0.6
		Oct. 1	0.8

* Estimated

** Computed

TABLE B-8 (contd.)

Stream	Location of measurement	Date	Discharge in cubic feet per second
Fern Spring Channel	Above confluence with Old Cow Creek	Apr. 22	0.1 *
		June 4	0.01*
		July 10	0.01*
Beal Creek	Above Beal Creek Ditch	Aug. 26	6*
Hagaman Gulch	At Ponderosa Way	Apr. 22	0
		June 15	0
Hamp Creek	Above confluence with South Cow Creek	June 16	0.05*
Covey Creek	At confluence with Mill Creek	June 4	1*
South Cow Creek	At Ponderosa Way	May 13	72
		Sept. 23	10*
South Cow Creek	Above Wagoner Ditch	June 25	5.7*
		July 14	4.5*
		Sept. 23	5*
		Sept. 30	5.1
Basin Hollow	At confluence with Cow Creek	May 14	0.2*
		May 29	0.6*
		July 13	0.17
		Aug. 21	0
		Aug. 31	0
		Sept. 4	0
		Sept. 18	0.02*
		Oct. 12	0.1*
Cow Creek	Below confluence with Clover Creek	Aug. 27	17.6
		Oct. 14	28.8

* Estimated

TABLE B-8 (contd.)

Stream	Location of measurement	Date	Discharge in cubic feet per second
Cow Creek	Below Silverbridge Road	Aug. 27	8.8
		Oct. 14	21.7
Clover Creek	At old Highway 44	Apr. 1	15*
		Apr. 21	10*
		June 11	20*
		July 1	0.1*
		Aug. 10	0.1*
		Aug. 27	0
		Sept. 17	0.1*
		Sept. 30	0.2*
		Oct. 12	0.2*
Oak Run Creek	At old Highway 44	Apr. 1	8*
		Apr. 21	4*
		June 4	3*
		June 11	10*
		June 15	0
		Aug. 10	0
		Aug. 27	0
		Sept. 30	0
		Oct. 12	0
North Cow Creek	At old Highway 44	Apr. 1	10*
		Apr. 21	10*
		June 11	20*
		July 1	0
		Aug. 10	0
		Aug. 27	0
		Sept. 30	0
		Oct. 12	0

* Estimated

TABLE B-9

DAILY MEAN DISCHARGE OF KILARC POWERHOUSE DITCH
ABOVE SIPHON

May 1 to September 30, 1964

(In cubic feet per second)

Day	May	June	July	August	September
1	15.3	44	34	28	23
2	43	43	34	28	24
3	43	43	34	25	24
4	43	43	34	25	23
5	51	43	34	25	23
6	55	46	33	25	23
7	55	46	32	25	23
8	51	46	32	25	23
9	46	46	32	25	23
10	46	45	31	25	23
11	44	44	31	25	23
12	44	43	31	24	23
13	46	43	31	24	23
14	45	43	31	24	23
15	43	43	30	24	23
16	43	43	30	24	23
17	43	43	30	24	23
18	43	43	29	24	22
19	43	43	29	24	22
20	43	42	29	24	22
21	43	40	29	24	22
22	43	39	28	24	22
23	43	39	28	24	22
24	43	38	27	24	22
25	43	37	27	24	22
26	43	37	27	24	22
27	45	37	27	24	22
28	45	36	28	24	22
29	44	36	28	24	22
30	44	35	28	24	22
31	44		28	23	
Mean	44.0	41.6	30.2	24.5	22.6
Discharge in acre-feet	2,705	2,475	1,857	1,506	1,345

Total for period - 9,888 acre-feet

TABLE B-10

DAILY MEAN DISCHARGE OF
SOUTH COW CREEK POWERHOUSE DITCH

May 1 to September 30, 1964

(In cubic feet per second)

Day	May	June	July	August	September
1	60	42	21	16.0	20
2	58	38	22	13.0	17.2
3	59	39	23	14.5	17.0
4	0	39	25	14.5	16.5
5	0	39	24	15.0	15.2
6	0	42	22	14.7	14.7
7	0	46	21	14.5	14.5
8	22	49	21	15.2	13.7
9	56	56	21	14.0	14.0
10	56	55	19.4	14.7	14.2
11	55	51	21	14.2	14.7
12	56	48	19.6	12.8	13.3
13	56	43	16.5	12.1	12.3
14	56	40	15.2	12.1	12.1
15	56	38	16.0	13.5	12.3
16	56	39	16.2	14.2	12.3
17	56	38	16.5	13.5	12.6
18	55	37	16.7	12.8	13.3
19	54	36	17.5	15.2	13.0
20	54	34	17.0	14.0	11.9
21	52	31	16.5	14.0	11.9
22	51	28	15.7	13.0	11.9
23	49	27	16.2	12.3	11.4
24	48	27	16.0	11.2	12.1
25	48	25	14.7	12.3	12.1
26	50	23	12.3	13.3	11.4
27	54	23	13.5	11.9	12.3
28	53	23	16.0	13.0	13.5
29	48	21	17.8	12.3	13.0
30	45	22	15.2	12.3	13.3
31	43		14.7	13.0	
Mean	45.4	36.6	18.1	13.5	13.6
Discharge in acre-feet	2,792	2,178	1,113	830	809

Total for period - 7,722 acre-feet

TABLE B-11

DAILY MEAN DISCHARGE OF BASSETT DITCH
ABOVE ALL LATERALS

May 1 to October 27, 1964

(In cubic feet per second)

Day	May	June	July	August	September	October
1	25	28	27	23*	29	24
2	25	28	26	23*	26	24
3	27	28	29	23*	25	24
4	26	29	30	23*	24	24
5	26	29	29	22*	24	25
6	25	29	28	22*	23	26
7	25	29	29	22	22	25
8	26	31	28	22	22	25
9	27	30	29	23	21	24
10	26	24	29	25	22	24
11	25	23	30	24	22	24
12	25	23	29	23	21	25
13	25	24	30	23	20	26
14	23	24	28	22	21	26
15	22	23	28	22	20	26
16	22	24	29	22	21	26
17	22	23	28	22	22	20
18	23	21	28	23	22	21
19	23	21	28	22	22	21
20	23	21	27	19.6	23	21
21	23	21	26	18.5	23	21
22	26	25	25	18.5	23	21
23	29	29	25	20	23	21
24	28	29	24	19.6	23	22
25	28	28	24	19.3	23	22
26	30	28	24	22	23	22
27	29	27	24	22	23	22
28	24	27	24	21	24	
29	23	27	24	21	22	NO
30	25	27	23	22	23	
31	29		23*	23		RECORD
Mean	25.6	26.1	26.9	21.8	22.7	23.4
Discharge in acre-feet	1,574	1,553	1,654	1,340	1,350	1,253

Total for period - 8,724 acre-feet

*Estimated

TABLE B-12

DAILY MEAN DISCHARGE OF GERMAN DITCH
ABOVE ALL LATERALS

May 7 to October 28, 1964

(In cubic feet per second)

Day	May	June	July	August	September	October
1		11.1	10.5	10.7	11.1	10.8
2		10.9	10.4	10.7	10.8	10.8
3	NO	10.7	10.4	10.8	10.7	10.8
4		10.7	10.3	10.8	10.4	10.8
5	RECORD	10.7	10.1	10.8	10.4	10.7
6		10.8	10.1	10.7	10.4	10.7
7	12.4	11.1	10.0	10.7	10.4	10.7
8	12.4	11.4	10.0	10.5	10.4*	10.9
9	12.4	11.8	9.9	10.4	10.4*	10.8
10	12.7	11.5	9.9	10.4	10.4*	10.9
11	12.8	11.4	9.6	10.7	10.4*	10.8
12	13.3	10.8	9.9	10.9	10.4*	10.8
13	13.5	10.7	10.5	10.9	10.4*	10.9
14	13.4	10.4	10.7	11.1	10.4*	10.9
15	13.5	10.3	10.7	11.1	10.4*	11.1
16	13.7	10.4	10.7	11.1	10.4*	11.1
17	13.5	10.1	10.4	11.1	10.4*	11.1
18	13.5	10.0	10.0	11.2	10.4	11.1
19	13.4	10.7	10.0	11.2	10.5	11.1
20	13.3	11.1	10.0	11.2	10.7	11.1
21	13.1	11.1	10.0	11.2	10.9	11.1
22	12.8	10.9	10.0	11.2	10.8	11.1
23	12.7	10.8	10.1	11.1	10.7	11.1
24	12.4	10.8	10.1	11.1	10.8	10.9
25	12.1	10.7	10.1	10.9	10.7	11.1
26	12.2	10.8	10.3	10.7	10.7	11.1
27	12.5	10.7	10.3	10.5	10.8	11.4
28	12.2	10.7	10.4	10.5	10.8	11.7
29	11.8	10.5	10.3	10.4	10.8	NO
30	11.4	10.4	10.4	9.9	10.8	
31	11.2		10.7	9.9		RECORD
Mean	12.7	10.8	10.2	10.8	10.6	11.0
Discharge in acre-feet	630	643	627	664	631	611

Total for period - 3,806 acre-feet

*Estimated

TABLE B-13

DUTY OF WATER MEASUREMENTS
PUMP DIVERSIONS

1964

Pump	Duty of water (acres irrigated by 1 cubic foot per second)	
	Entire season**	Maximum month
Sprinkler pumps		
Hall North Pump	146	99
Blomquist Pump	107	75
Junkans North Pump	114	94
Otten Pump	78	71
Pearson Pump*	67	50
Average	102	78
Border-check pumps		
Pearson Pump*	67	50
Hunt Pump	80	70
Junkans South Pump	116	77
Tuttle Pump	78	61
Maynard Pump	86	56
Stone-Fitzpatrick Pump	62	42
M. Hawes Pump	85	58
Average	82	59

* The place of use under this pump is partly irrigated by sprinkler and partly by border-checks.

** Season used was approximately April 10 to October 27.

APPENDIX C

APPLICATIONS BEFORE THE STATE WATER RIGHTS BOARD

Since the Water Commission Act of 1913 went into effect, a new appropriative water right may be initiated only by filing an application with the State. If the application is approved, a permit is issued allowing the project to proceed. After use of water has been completed under the terms of the permit, a license is issued confirming the appropriation. Nine such appropriative water rights from the stream system are currently on file in the records of the State Water Rights Board. They are listed and described below in order of priority. Details of the diversion systems named in the applications are contained in the various tables of Appendix A.

Application 237 was filed on January 25, 1916, by the Big Cow Creek Ditch Company to appropriate water from Cow Creek for irrigation purposes. The application was approved on August 30, 1919, allowing diversion of 11 cubic feet per second. License 1857 was issued on June 1, 1938, confirming the appropriation of 11 cubic feet per second from April 1 to December 1 of each year for irrigation use on 854 acres on both sides of Cow Creek and on both sides of Deschutes Road within Sections 4, 7, 8, 9, 17, 18, 19, and 29, T31N, R3W. The diversion point was within NE¼ of NE¼ of Section 5, T31N, R3W, on the south bank of Cow Creek a short distance above its confluence with Clover Creek. On April 29, 1960, a

hearing was held by the State Water Rights Board to decide what disposition should be made of the appropriation after it was learned that the diversion works had been washed out and abandoned, and that Big Cow Creek Ditch Company was defunct. The hearing revealed that the only use then being made under the license was diversion of two cubic feet per second from Cow Creek by Howard M. and Gladys Leggett from about April 1 to about December 1 of each year for irrigation of 80 acres comprising the $W\frac{1}{2}$ of $SE\frac{1}{4}$ of Section 8, T31N, R3W. The Board ordered the license amended accordingly and ownership now rests with the Leggetts. The point of diversion authorized is in the $NW\frac{1}{4}$ of $SE\frac{1}{4}$ of Section 8, T31N, R3W, about 1/4 mile downstream from the existing Leggett Pump (Diversion 95).

Application 3256 was filed on February 15, 1923, by Fred H. Rengstorf to appropriate water from an unnamed stream tributary to Ash Creek for irrigation purposes. The application was approved on June 18, 1923, allowing diversion of 1.0 cubic foot per second. License 969 was issued on January 10, 1931, confirming the appropriation of 1.0 cubic foot per second from April 1 to November 1 of each season for irrigation of 80 acres within the $NW\frac{1}{4}$ of Section 8, T32N, R1E. The present owner is June M. Owbridge. The point of diversion is within the $SE\frac{1}{4}$ of $NW\frac{1}{4}$ of Section 8, T32N, R1E, and is the same point named in Application 8522. It is designated as Diversion 18 on the State Water Rights Board map and in this report.

Application 8522 was filed on December 17, 1935, by Henry S. Lace to appropriate water from an unnamed stream tributary to Ash Creek for irrigation purposes. The application was approved on May 12, 1936, allowing diversion of 3.0 cubic feet per second. License 2350 was issued confirming the appropriation of 0.61 cubic foot per second from April 1 to November 1 of each year for irrigation of 20 acres within the NW¼ of Section 8, T32N, R1E. The license was assigned to June M. Owbridge on December 21, 1958. The point of diversion is identical with that under Application 3256 and is within the SE¼ of NW¼ of Section 8, T32N, R1E. It is designated as Diversion 18 on the State Water Rights Board map and in this report.

Application 11528 was filed on August 26, 1946, by A. F. Hufford to appropriate water from Cow Creek for irrigation purposes. The application was approved on February 20, 1947, allowing diversion of 3.0 cubic feet per second. License 3974 was issued on July 15, 1954, confirming the appropriation of 1.5 cubic feet per second to be diverted from May 1 to November 1 of each year for irrigation of 100 acres within Sections 29 and 32, T31N, R3W. The license was assigned to Glenn Pearson on April 12, 1961. The point of diversion is within the SW¼ of SE¼ of Section 29, T31N, R3W, and is designated as Diversion 110 on the State Water Rights Board map and in this report.

Application 11695 was filed on January 15, 1947, by Mrs. O. G. Brown to appropriate water from Cow Creek for irrigation purposes. The application was approved on May 29, 1947, allowing

diversion of 1.0 cubic foot per second. License 5909 was issued on December 7, 1959, confirming the appropriation of 0.3 cubic foot per second to be diverted from April 15 to October 15 of each year for irrigation of 24 acres within the $SE\frac{1}{4}$ of $NW\frac{1}{4}$ of Section 29, T31N, R3W. The license was assigned to John F. and Lucille Swoboda on February 8, 1962. The point of diversion is within the $NW\frac{1}{4}$ of $NE\frac{1}{4}$ of Section 29, and is designated as Diversion 109 on the State Water Rights Board map and in this report.

Application 12138 was filed on October 29, 1947, by A. F. Hufford to appropriate water from Cow Creek for irrigation purposes. The application was approved on July 15, 1948, allowing diversion of 0.5 cubic foot per second. License 3975 was issued on July 15, 1954, confirming the appropriation of 0.5 cubic foot per second from May 1 to November 1 of each year for irrigation of 40 acres within the $W\frac{1}{2}$ of $NE\frac{1}{4}$ of Section 29, T31N, R3W. The point of diversion is within the $NE\frac{1}{4}$ of $NW\frac{1}{4}$ of Section 29, and is designated as Diversion 107 on the State Water Rights Board map and in this report.

Application 14586 was filed on November 23, 1951, by R. M. and Jeanne Reid to appropriate water from Cow Creek for irrigation purposes. The application was approved on March 24, 1952, allowing diversion of 2.0 cubic feet per second. License 6515 was issued on March 21, 1962, confirming the appropriation of 2.0 cubic feet per second from April 1 to November 15 of each year for irrigation of 140 acres within the $E\frac{1}{2}$ of Section 8, T31N, R3W. The appropriation was assigned to Howard M. and Gladys A. Leggett on

May 19, 1952. The point of diversion is within the SW¼ of NE¼ of Section 8, T31N, R3W, and is designated as Diversion 95 on the State Water Rights Board map and in this report.

Application 17636 was filed on June 3, 1957, by Earle H. and Geneva Warner, Sr. and Earle H. and Noel Warner, Jr. to appropriate water from Cow Creek for irrigation, domestic, and stockwatering purposes. Permit 11340 was issued on April 23, 1958, allowing diversion of 1.51 cubic foot per second from April 1 to November 1 of each year for domestic and stockwatering purposes and irrigation of 120 acres within Section 20, T31N, R3W. The ownership of the permit is now as follows:

F. C. Stone, Geneva Stone, Charles W. Stone and Clara Stone	1/5 interest
David P. Fitzpatrick and Mildred M. Fitzpatrick	4/5 interest

The point of diversion under the application is within the SE¼ of SW¼ of Section 20, T31N, R3W, and is designated as Diversion 105 on the State Water Rights Board map and in this report.

Application 19280 was filed on March 4, 1960, by John K. and Evonne F. Watkins to appropriate water from an unnamed stream tributary to Cow Creek for irrigation and stockwatering purposes. Permit 12547 was issued on November 29, 1960, allowing 36 acre-feet per annum to be collected to storage between November 1 and May 30 of each season. The land to be irrigated consists of 7 acres within the SW¼ of NE¼ of Section 18, T31N, R3W. The point of diversion is an earthfill dam west of Deschutes Road within the

SE¼ of NW¼ of Section 18, T31N, R3W, and is designated as Diversion 97 on the State Water Rights Board map and in this report. The permit is now owned by C. M. Dicker, Inc.

APPENDIX D

STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

IN THE MATTER OF THE DETERMINATION OF THE RIGHTS OF THE VARIOUS CLAIMANTS TO THE WATERS OF COW CREEK STREAM SYSTEM, EXCEPTING CLOVER CREEK, OAK RUN CREEK, AND NORTH COW CREEK, IN SHASTA COUNTY, CALIFORNIA	ORDER GRANTING PETITION FOR DETERMINATION OF WATER RIGHTS

John Crowe, W. J. Bryant, Elmer Junkans, B. C. Bingham, Carl F. Tuttle, Jr., E. D. Maynard, R. Maynard, E. C. Frisbie, Alex J. Otten, Dennis S. Welch, Ernest Bargsten, Jesse D. Hufford, Jr., Glenn Pearson, and Albert F. Hufford having on the 12th day of August, 1963, filed with the State Water Rights Board a petition requesting a determination of the rights of the various claimants to the waters of Cow Creek Stream System excepting Clover Creek, Oak Run Creek, and North Cow Creek, in Shasta County, California, and the Board having made an investigation of the facts and conditions in said matter, finds that the facts and conditions are such that the public interest and necessity will be served by a determination of all rights in and to the waters of said stream system (save and except the right to take water from an underground supply other than a subterranean stream flowing through known and definite channels).

NOW THEREFORE, IT IS ORDERED that said petiton be, and it is hereby granted, and it is further ordered that the examination of said stream system shall begin on December 2, 1963.

Adopted as the order of the State Water Rights Board at a meeting duly called and held at Sacramento, California, on the 18th day of October, 1963.

/s/ Kent Silverthorne

Kent Silverthorne, Chairman

/s/ Ralph J. McGill

Ralph J. McGill, Member

/s/ W. A. Alexander

W. A. Alexander, Member