

STATE OF NEVADA

BIENNIAL REPORT

OF THE

STATE ENGINEER

For the Period  
July 1, 1938, to June 30, 1940

ALFRED MERRITT SMITH  
State Engineer of Nevada



CARSON CITY, NEVADA  
STATE PRINTING OFFICE - - JOE FARNSWORTH, SUPERINTENDENT  
1940

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1940

STATE OF WYOMING  
GENERAL REPORT

STATE ENGINEER



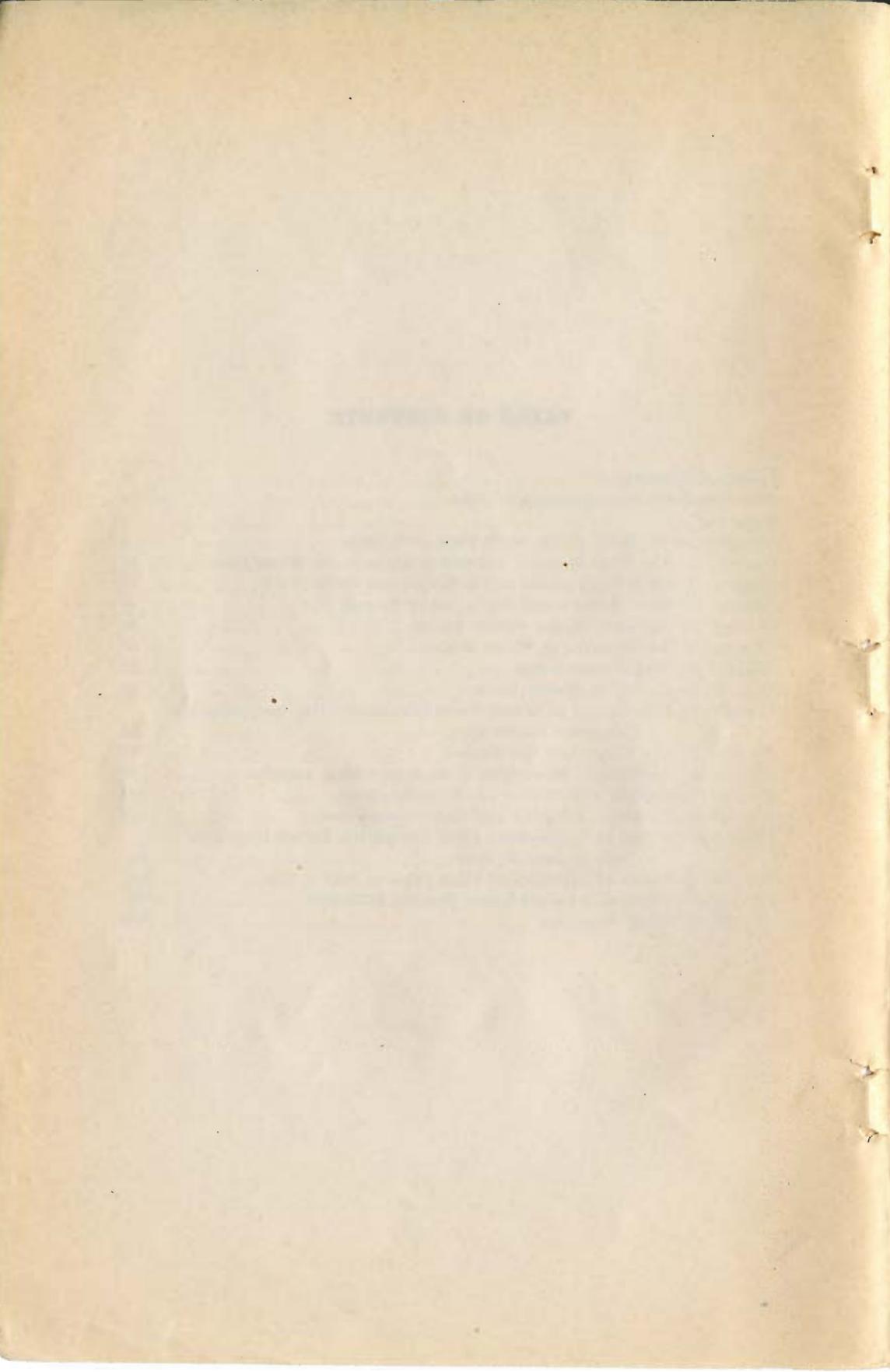
STATE ENGINEER



STATE ENGINEER

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**LETTER OF TRANSMITTAL**

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STATE OF NEVADA,  
OFFICE OF STATE ENGINEER,  
CARSON CITY, July 31, 1940.

*To His Excellency, HONORABLE E. P. CARVILLE, Governor of Nevada,  
Carson City, Nevada.*

SIR: In compliance with the provisions of section 14, chapter 140, Nevada Statutes 1913, and section 1, chapter 171, Nevada Statutes 1931, I have the honor to transmit herewith the Biennial Report of the State Engineer for the period ending June 30, 1940.

Respectfully submitted,  
ALFRED MERRITT SMITH,  
*State Engineer.*

### STATE ENGINEERS SINCE CREATION OF OFFICE

---

A. E. CHANDLER.....	May 29, 1903, to May 1, 1905
HENRY THURTELL.....	May 1, 1905, to May 1, 1907
FRANK R. NICHOLAS.....	May 1, 1907, to March 3, 1910
EMMET D. BOYLE.....	March 8, 1910, to March 21, 1911
W. M. KEARNEY.....	March 21, 1911, to May 15, 1917
J. G. SCRUGHAM.....	May 16, 1917, to January 10, 1918
SEYMOUR CASE.....	January 25, 1918, to March 28, 1919
J. G. SCRUGHAM.....	March 28, 1919, to October 7, 1922
ROBERT A. ALLEN.....	October 7, 1922, to March 28, 1927
GEO. W. MALONE.....	March 29, 1927, to May 28, 1935
ALFRED MERRITT SMITH.....	May 28, 1935—

# OFFICIAL ROSTER DEPARTMENT OF STATE ENGINEER

## OFFICE PERSONNEL

Carson City, Nevada

July 1, 1938, to June 30, 1940

ALFRED MERRITT SMITH.....	State Engineer
H. W. REPPERT.....	Assistant State Engineer
HUGH A. SHAMBERGER.....	Deputy State Engineer
F. N. DONDERO.....	Office Engineer
C. E. THIEX.....	Chief Clerk
MARIE GRAHAM.....	Stenographer
RETA S. ARKELL.....	Secretary

## WATER DISTRIBUTION PERSONNEL

### Humboldt River, 1938

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
D. E. WINCHELL, Water Commissioner.....	Lovelock District
F. E. BACKUS, Water Commissioner.....	Winnemucca District
JOHN ROBERTSON, Water Commissioner.....	North Fork District
MYRON CLARK, Water Commissioner.....	Battle Mountain District
G. R. TRES CARTES, Water Commissioner.....	Lamoille District
ORVIS STOCK, Water Commissioner.....	Wells District
JACK ST. CLAIR, Hydrographer.....	Elko
DONALD ODELL, Hydrographer.....	Willow Creek

### Humboldt River, 1939

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
D. E. WINCHELL, Water Commissioner.....	Lovelock District
F. E. BACKUS, Water Commissioner.....	Winnemucca District
MYRON CLARK, Water Commissioner.....	Battle Mountain District
G. R. TRES CARTES, Water Commissioner.....	Starr Valley and North Fork Districts
ORVIS STOCK, Water Commissioner.....	Lamoille and South Fork Districts
DONALD ODELL, Water Commissioner.....	Willow Creek Reservoir
CLYDE WARNER, Hydrographer.....	Elko

### Humboldt River, 1940

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
D. E. WINCHELL, Water Commissioner.....	Lovelock District
F. E. BACKUS, Water Commissioner.....	Winnemucca District
MYRON CLARK, Water Commissioner.....	Battle Mountain District
ORVIS STOCK, Water Commissioner.....	Lamoille and South Fork Districts
ALBERT QULL, Water Commissioner.....	Starr Valley and North Fork Districts
JOE REYNOLDS, Hydrographer.....	Willow Creek Reservoir
G. R. TRES CARTES, Hydrographer.....	Elko

### Little Humboldt River, 1938

F. E. BACKUS, Water Commissioner, July 1 to September 15.....	Entire District
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### Little Humboldt River, 1939

ROLAND VAN BIBBER, Water Commissioner.....	Entire District
--	-----------------

**Little Humboldt River, 1940**

ROLAND VAN BIBBER, Water Commissioner.....Entire District  
 ALLAN FRASER,\* Hydrographer.....Entire District  
 D. K. PERRY,† Hydrographer.....Entire District

**White River, 1939**

(No Water Commissioner 1938)

NYE TOGNONI, Water Commissioner (Intermittent Service).....White River

**White River, 1940**

MILTON CAMERON, Water Commissioner.....White River

**Muddy River, 1938**

DAVE MARSHALL, Water Commissioner.....Entire District

**Muddy River, 1939**

DAVE MARSHALL, Water Commissioner.....Entire District

**Muddy River, 1940**

DAVE MARSHALL, Water Commissioner.....Entire District

**Currant Creek and Duckwater Creek, 1938**

C. H. WAINWRIGHT, Water Commissioner.....Entire District  
 (No water distribution for Currant Creek 1938)

**Currant Creek and Duckwater Creek, 1939**

NYE TOGNONI, Water Commissioner.....Entire District

**Currant Creek and Duckwater Creek, 1940**

NYE TOGNONI, Water Commissioner.....Entire District  
 (No water distribution for Currant Creek 1940)

**Pahranagat Lake, 1938**

GERALD TRECARTES, Water Commissioner, July 8 to  
 September 19.....Entire District

**Pahranagat Lake, 1939**

GERALD TRECARTES, Water Commissioner, July 5 to  
 October 3.....Entire District

**Pahranagat Lake, 1940**

GERALD TRECARTES, Water Commissioner, June 14 to—.....Entire District

\*April 17 to May 11. †May 12 to May 25.

## SUMMARY OF THE WORK OF THE STATE ENGINEER

### STATE COMMISSIONS AND BOARDS

The State Engineer upon taking office automatically becomes a member of the following Commissions:

1. The Nevada Public Service Commission.
2. The Nevada State Board of Irrigation.
3. The Nevada State Irrigation District Bond Commission.
4. The Bureau of Industry, Agriculture and Irrigation.
5. The State Range Commission.
6. The Nevada State Planning Board.

By gubernatorial appointment the present State Engineer is also a member of the following:

7. The Colorado River Commission of Nevada.
8. State Board of Registered Professional Engineers.

### RECLAMATION ORGANIZATIONS

1. The Association of Western State Engineers (seventeen western States).
2. The National Reclamation Association.
3. The "Committee of Fourteen." Two members from each of the Colorado River Basin States, appointed by respective Governors.

### STATUS OF ADJUDICATION OF STREAM SYSTEMS

The work of adjudicating the waters of the Nevada stream systems has proceeded since the inception of this office in 1903 to the present time:

1. Stream systems adjudicated, 1903 to date.....	25
2. Acres under adjudicated streams.....	384,126
3. Vested water users under adjudicated streams.....	609
4. Adjudicated stream systems supervised by this office during the past biennium.....	7
5. Adjudicated stream systems not supervised by this office during the past biennium.....	18
6. Streams in process of adjudication .....	30
7. Adjudications completed during past biennium.....	1
8. Stream systems on which decrees have been entered by civil suit not under supervision of this office.....	11
9. Stream systems adjudicated by United States District Court .....	3
10. Stream systems under process of adjudication by United States District Court .....	2

### STATUS OF WATER APPLICATIONS AND PROOFS OF APPROPRIATION

1. Water applications filed, 1903 to June 30, 1940.....	10,526
2. Water applications acted upon, 1903 to June 30, 1940.....	9,668
3. Water applications on which no action has been taken.....	858
4. Water applications acted on, July 1, 1938, to June 30, 1940..	306
5. Water applications filed, July 1, 1938, to June 30, 1940.....	272

6. Proofs of commencement of work filed, July 1, 1938, to June 30, 1940.....	183
7. Proofs of completion of work filed, July 1, 1938, to June 30, 1940 .....	149
8. Proofs of beneficial use filed, July 1, 1938, to June 30, 1940..	128
9. Protests filed against the granting of applications, July 1, 1938, to June 30, 1940.....	89
10. Certificates of appropriation issued under permitted water rights, July 1, 1938, to June 30, 1940.....	137
11. Proofs of appropriation filed, 1903 to June 30, 1940.....	2,303
12. Proofs of appropriation filed, July 1, 1938 to June 30, 1940 .....	11

#### COOPERATIVE WORK

The State Engineer also carries on cooperative work in the compilation of stream gaging and stream run-off observations through the medium of two State appropriations. The cooperating agencies are:

The Water Resources Branch of the United States Geological Survey.

The Nevada Cooperative Snow Surveys.

The activities of the State Engineer in each of the fields are briefly related under their proper headings elsewhere.

#### PUBLIC SERVICE COMMISSION

The Nevada Public Service Commission is composed of the following members:

Charles B. Sexton, Chairman, Carson City.

Hoyt R. Martin, Reno.\*

Alfred Merritt Smith, Carson City.

Lee S. Scott, Secretary, Carson City.

The work of this Commission is published by the Chairman in a biennial report. During the past biennium many hearings have been held in various parts of the State on matters concerning the rate schedules of public utilities, rail and motor vehicle carriers, complaints as to public service, and requests for certificates of convenience and necessity for the operation of public utilities.

#### THE NEVADA STATE BOARD OF IRRIGATION

The board is composed of the following members:

E. P. Carville, Governor of Nevada, Carson City.

Wayne T. McLeod, Surveyor-General, Carson City.

Gray Mashburn, Attorney-General, Carson City.

Alfred Merritt Smith, State Engineer, Carson City.

This Board was created by the provisions of section 2, chapter 59, Nevada Statutes of 1901 (Nevada Compiled Laws 1929, section 8231), for the purpose of administering an appropriation of \$4,000 made by that Legislature to carry on hydrographic work, irrigation studies, and stream measurements in cooperation with the United States Geological Survey and the United States Department of Agriculture, in association with the Nevada Agricultural Experiment Station. The State

\*Since the compilation of this report Chas. V. Williams has succeeded Hoyt R. Martin as a member of the Commission.

appropriation was contingent upon an equal amount of money being appropriated by the Government. The State Printing Office was authorized to publish additional copies of the Government reports. The Board was also authorized to have printed copies of or extracts from any United States report on irrigation or related matters which, in the opinion of the Board, would be of value to the people of Nevada.

The activities of the Board of Irrigation were continued by the last Legislature through an appropriation of \$1,500 for cooperative work with the United States Geological Survey, Water Resources Branch, and the State Engineer (section 19, chapter 199, 1939 Nevada Stats.). A report on this work prepared by Mr. A. B. Purton of the Water Resources Branch of the United States Geological Survey is printed on page 99. This work, which has been continuously carried on since 1916, is continually adding to the valuable information regarding Nevada's water resources and supply.

#### **THE STATE IRRIGATION DISTRICT BOND COMMISSION**

The State Irrigation District Bond Commission was created by an Act of the Legislature approved February 26, 1921, being sections 8217-8228 Nevada Compiled Laws 1929. The Commission consists of the following members:

E. P. Carville, Governor of Nevada.  
D. G. LaRue, Bank Examiner.  
Alfred Merritt Smith, State Engineer.

It is the duty of the Commission to pass upon the eligibility of bonds of irrigation districts as legal investments within Nevada. A résumé of the work of this Commission during the past biennium is set forth in Chapter XI.

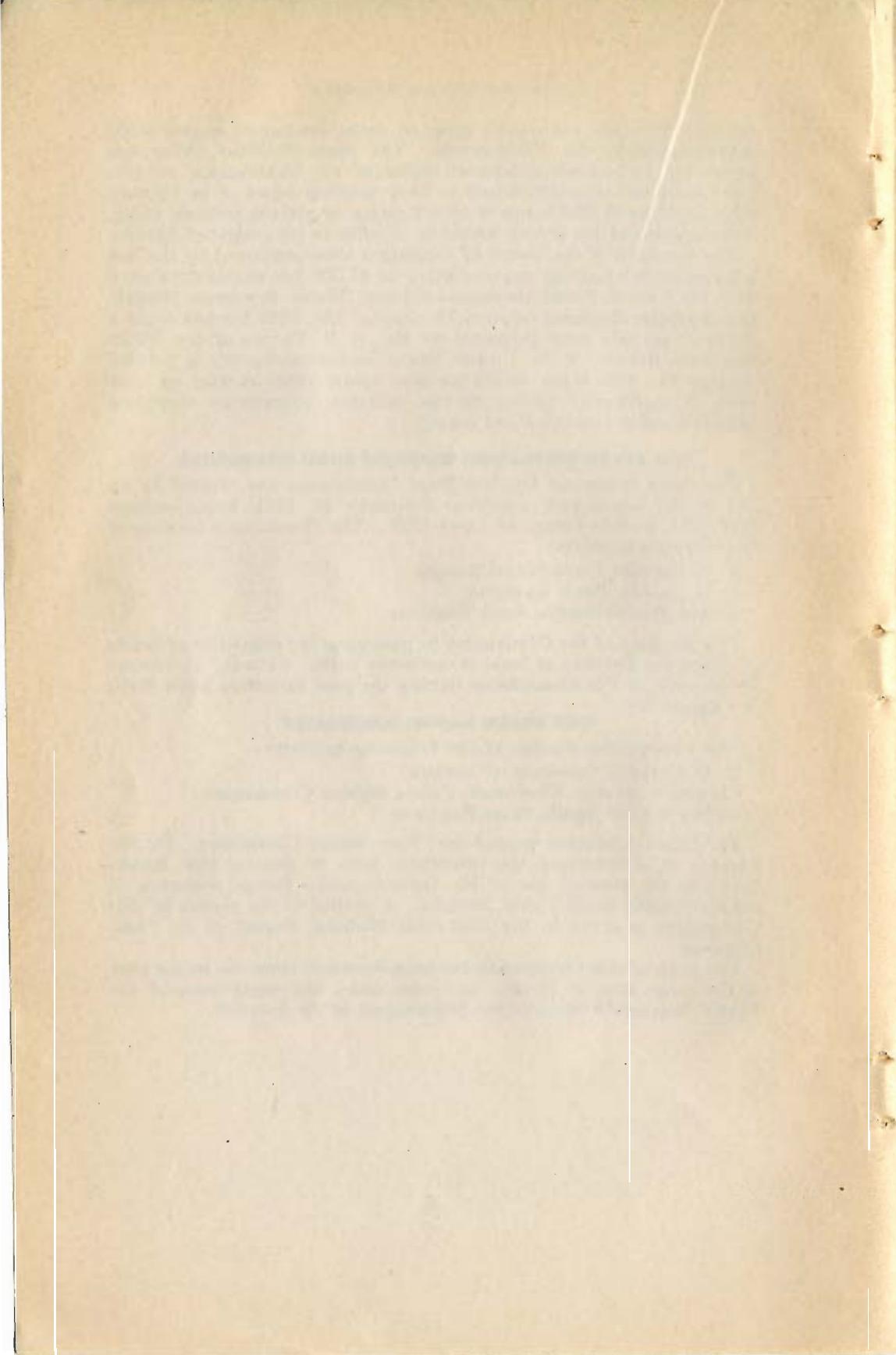
#### **THE STATE RANGE COMMISSION**

This Commission consists of the following members:

E. P. Carville, Governor of Nevada.  
Charles B. Sexton, Chairman, Public Service Commission.  
Alfred Merritt Smith, State Engineer.

The 1929 Legislature created the "State Range Commission" for the purpose of determining the principles, laws or policies that should apply to the grazing use of the natural range forage resources of publicly-owned lands within Nevada. A résumé of the report by this Commission is given in the 1931-1932 Biennial Report of the State Engineer.

The work of this Commission has been dormant, since the major part of the range area in Nevada has come under the supervision of the Taylor Grazing Division of the Department of the Interior.



# BIENNIAL REPORT OF STATE ENGINEER, 1938-1940

## CHAPTER I

### The State Engineer and His Relation to the Water User\*

To provide a basis for a better understanding of the subject "The State Engineer and his Relation to the Water User" it would seem proper to give a brief résumé of the two theories or doctrines which have had a profound effect upon the evolution and growth of our western water law, viz, the doctrine of riparian ownership and the doctrine of prior appropriation.

The doctrine of riparian ownership is a product of the English or Common Law, and means that every proprietor of land on the banks of a natural stream has an equal right to have the waters of the stream continue to flow in its natural course as it was wont to run undiminished in quantity and unimpaired in quality, except so far as either of these conditions may result from the reasonable use of water for irrigation or other lawful purposes by upper appropriators. The riparian theory is in general use in the humid areas in the middle western and eastern parts of the United States and accounts to a large extent for the sentiment so prevalent in those sections that the waters and other resources of the West are Federal property and belong to the public domain of the United States.

The doctrine of appropriation, meaning "the first in time is first in right," is the outgrowth of a custom or precedent established in the early mining days of the West. Here in the absence of established law and order, these pioneer miners by common acceptance early adopted the principle of "first come, first served" to their right of possession of mining ground on the public domain, and later recognized this same principle as applying to their diversions of water away from the streams to satisfy their mining needs. Thus a custom born of necessity of the country and its people, later sanctioned by legislative action and recognized by local court decrees, established the doctrine upon which our western water law has been founded.

Some of the western States have a hybrid system, such as California, where the riparian theory was so deep-rooted before the danger of such a system was realized it was impossible to discard it entirely.

There are seven riparian States and four with the hybrid system out of the eleven western States.

In the humid areas where it is necessary to get the water off the land and into the streams, the riparian theory serves the purpose, but in arid States where it is necessary to get the water out of the streams and onto the land, and there is more land available than the supply will properly irrigate, then the appropriation theory is particularly proper, since it means "the first in time is first in right." Without such a theory it would be impossible to finance any large irrigation improvements, since the value of such improvements is directly dependent upon the right to use the water.

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\*Presented at meeting of Institute of Irrigation Agriculture by H. W. Reppert, Assistant State Engineer, June 27, 1940, Reno, Nevada.

In the period of time allotted it would be impossible to give a digest of the water laws of the various western States and the duties and functions of the State Engineers in connection therewith. Suffice to say that the water codes of the other western States are fundamentally the same as here in Nevada, since they involve the main principles of beneficial use as the measure of the right and priority of right, including the doctrine of relation where due diligence is used, consequently I will approach the subject from the standpoint of the State Engineer of Nevada.

Nevada early adopted the appropriative theory because its supply of water, even with the highest beneficial use, is insufficient to supply its needs, but such adoption did not occur until after earlier court decisions had given recognition to the doctrine of riparian ownership. In 1872 the Supreme Court of Nevada, in the case of Van Sickle v. Haines found in favor of defendant, a riparian owner of land on the stream, as against plaintiff, a prior appropriator of water, on the ground that defendant, by virtue of patent, acquired riparian land on which plaintiff's point of diversion lay and as incident to the ownership of the soil had a right to the benefit to be derived from the flow of water therethrough. However, in 1885, the Nevada Supreme Court in the case of Jones v. Adams approved the appropriative doctrine and specifically overruled the decision previously rendered in Van Sickle v. Haines, and has on various subsequent occasions emphasized its rejection of the riparian doctrine. In other words, our courts since 1885 have ruled, and our Legislature has so declared, that there can be no ownership in the corpus of the water within the State of Nevada, but that the right to the use of water only may be acquired, and that beneficial use shall be the basis and the measure of such right.

The real incentive to the passage of the Irrigation Law of 1903, by which the office of State Engineer of Nevada was created, was the desire of the State to cooperate in every way with the Secretary of the Interior in the construction, operation, management, and maintenance of irrigation works in the State of Nevada under the National Reclamation Act as approved by Congress on June 17, 1902. Within eight months following the adoption of such legislation the construction of the Truckee-Carson Project was commenced. Thus Nevada was given the honor of being the State in which the actual building of irrigation works under the Congressional Reclamation Act was initiated.

In 1904, six of our eleven western States, viz, Colorado, Idaho, Montana, Nevada, Utah, and Wyoming, had enacted legislation creating State Irrigation Engineers.

Although the Nevada legislative Act of 1903 created the office of the State Engineer primarily for the purpose of providing a method for adjudication of water rights which had become vested, or were then in the process of initiation, it neglected to provide a specific method by which future rights could be legally acquired; hence the twenty-second session of the Legislature passed an amendatory law approved on March 1, 1905, providing the exclusive method of subsequently initiating and perfecting a water right by application to the State Engineer for permission to appropriate and apply water to a beneficial use.

Other amendments to the original Act have been made from time to time to conform with changed conditions and legal precedents so that today the Water Law of Nevada represents the outgrowth of constructive evolution in the water history of the arid West, the worth of which has been proven on numerous occasions by its triumphant emergence from repeated stubborn legal battles.

Under the Nevada Water Law there are two classes of water rights by appropriation: First, so-called vested rights, initiated in the early days of the State's development, before any very definite law concerning appropriation of water existed and before the office of the State Engineer had been created; second, application rights under which water is appropriated and beneficially used by virtue of permits granted by the State Engineer upon due application being made to him.

Rights prior to 1905 are thus classed as vested rights, the magnitude and extent of which are determined only by a process of adjudication by the State Engineer as outlined in the present Water Code, while rights initiated subsequent to 1905 are clear cut and well defined as to magnitude and extent, having been granted upon direct application to the State Engineer.

In general, then, the duties of the State Engineer under the Nevada Water Code may be summarized as follows: To make a determination of relative rights to water from streams, involving examination and filing proofs of use of water; field examinations and reports on character of soil and kinds of crops cultivated; determination of priorities and duty of water requirements; the order of determination to be filed with a court of jurisdiction where all proceedings in connection therewith, including taking of testimony, must conform as nearly as may be in accordance with the rules governing civil actions; to issue certificates to appropriators in accordance with the final court decree rendered; to supervise the distribution of water on streams where the relative rights of claimants and appropriators have been determined by statutory adjudication proceedings; to accept, file and pass upon applications for permission to appropriate the public waters of the State and issue certificates of appropriation under approved applications when perfected by beneficial use.

Time will not permit a detailed discussion of the various duties of the State Engineer as herein enumerated, or of the various legal proceedings involved. However, of outstanding importance and of particular significance to the water user is the adjudication of vested rights or rights acquired prior to the enactment of any laws governing the appropriation of water.

The work of determination of the vested rights to the water resources of the State of Nevada has been in active progress since the creation of the office in 1903. In the period the State Engineer has initiated proceedings for the determination of the relative rights of claimants and appropriators to the use of water on forty-five streams or stream systems, and on twenty-five of these stream systems the proceedings have terminated with the entry of court decrees defining the relative rights of said claimants and appropriators. Although the vested rights to the use of water on most of our major streams have been

adjudicated or are in the process of adjudication, there are still a great number of minor streams in the State where the vested right claims remain undetermined. The importance of hastening the work for the determination of the vested right claims on all unadjudicated streams cannot be over-emphasized for the reason that such determination depends upon evidence of physical facts, rather than a paper title. These physical facts include the date of initiation of the project, the construction of the ditches, conduits or storage works, followed by the application of water to beneficial use, all of such physical facts in many instances being not of record, since at the time of initiation of the right the laws of the State provided no means for evidencing of record the title of the appropriation. Many of these vested rights were initiated in the early days of State settlement, some as early as 1860, so with each succeeding year it becomes more difficult to establish by testimony of living witnesses the physical facts surrounding the appropriation. In many cases where there are only one or two vested water users on a stream, the determination of such rights is usually but a summary process with the court merely adopting the State Engineer's findings as the basis of the decree. It is commonly the case, however, for water users to pay little heed or attention to the desirability of a determination of their vested right claims until, during short water seasons, controversies invariably develop as to their priority rights and amounts of diversion, as a result of which they usually petition the State Engineer for a solution of their difficulties. Under such circumstances, due to a lack of a friendly feeling between water users, it becomes extremely difficult, on account of conflicting and unreliable testimony, to make findings as to priorities and acreage of water rights which will prove satisfactory to all the water users concerned.

One of the most difficult problems confronting the State Engineer in the preparation of his order of determination defining the relative rights of the claimants and appropriators of the waters of a stream system is that of the duty of water on the lands in question. This, of course, presents a subject too broad in scope for any detailed discussion here. Suffice to say that the procedure with respect to appropriation allowances, under either adjudicated or application rights, varies in the different western States. In some, like Colorado, the volume of the priority is only adjudicated in second feet; in others, the expression of the allowance is in terms of acre-feet, and in some a combination of the two. It is also contended by some authorities that there is no such thing as duty of water; that the courts should do nothing more than establish the priority of right, and the amount of diversion should be left to the practical distribution of water under the conditions obtained at the time of distribution. Under the Nevada statutes a cubic foot of water per second of time shall be the legal measurement of water, and the unit of volume shall be an acre-foot defined as 43,560 cubic feet. The statutes also provide that the maximum quantity of water that may be diverted under any permitted right shall not exceed one-hundredth of one cubic foot per second for each acre of land irrigated, exclusive of reasonable transportation losses, and in the case of storage, not to exceed four acre-feet for each acre of land to be supplied, with the losses of evaporation and transmission to be borne

by the appropriator. It must be kept in mind that the foregoing statutory provisions, except as to standard of measurement and the unit of volume, apply only to rights initiated by application to the State Engineer and not to adjudicated vested rights. The allowances for the latter rights are predicated more or less on the assumption that the vested rights are, and should be, entitled to the use of water in such magnitude and manner as has been customarily enjoyed since their appropriation was initiated, provided always, of course, that such use has been beneficial and attended by no flagrant waste. Here in Nevada nearly all court decrees resulting from the statutory adjudication of the rights on a stream system have fixed the length of the irrigation season and the duty of water in acre-feet, with a continuous flow allotted which, during the irrigation season as fixed by the decree, will yield the number of acre-feet per acre allowed as duty of water. Obviously such provisions, while serving the purpose on the larger streams, are hardly flexible enough in their provisions to meet conditions as prevail on the minor mountain streams. On such smaller streams the bulk of the available run-off from the watershed occurs during a relatively short period, say from a month to six weeks, during the spring season, and results in freshets sometimes approaching flood conditions in the numerous channels. After the freshets have ceased the stream discharge dwindles rapidly, sometimes ceasing entirely as early as the first of July.

In order to cope with such conditions the appropriators on such streams are of necessity forced to take the water when it comes and make use of it when they can. Long experience in such instances has proven that the only practical method of irrigation is to use all of the freshet or flood waters possible in thoroughly wetting the cultivated areas and filling the subsoil to a point approaching saturation. Thus the raised level of the ground-water table results in a condition of ground-water storage sufficient to supply plant growth by sub-irrigation for an indefinite period after the surface stream flow has diminished or ceased. In view of the foregoing, the question logically arises: How can the amount of water to which a vested user on a flash stream is entitled be determined and set forth with sufficient definition to permit of regulation under a system of distribution inaugurated as a result of adjudication? The logical answer to this question in my opinion is to allow the appropriator, in connection with a determination of his vested rights, some flexibility in the rate of diversion so that he may take advantage of the peak flow in the stream and continue the use he has customarily made and enjoyed in the past.

One of the most important duties charged to the State Engineer is the administration of the court decrees adjudicating the various rights of the claimants on a stream system. It is perhaps in the field of water distribution where the closest relationship is established between the State Engineer and the water user. In fact, in some known instances this relationship is so close that while the State Engineer was occupied in trying to land water users in jail for interference with his duties as an officer of the court, the water users at the same time were busily engaged in attempting to beat the State Engineer at his own tactics.

In some States the State Engineers are charged with the administration of all court decrees, but in Nevada it is only on those streams where there has been a statutory adjudication of the relative rights that the State Engineer has police powers over the distribution of water between the appropriators in accordance with their priority rights. Our procedure here in Nevada has one advantage very few western States have adopted, which is that after the filing of the order of determination in the District Court the distribution of the waters by the State Engineer, his assistants, or water commissioners, is at all times under the supervision and control of the District Court, and said officers are deemed to be officers of the court in distributing water under and pursuant to the order of determination or pursuant to the decree of the court. This provision of the law giving the court exclusive jurisdiction over the waters of an adjudicated stream has aided materially in the orderly distribution of waters on our streams subject to regulation, since any interference with the officers in distributing the waters is a contempt of court, punishable by fine or imprisonment.

Too much emphasis cannot be given to the advantages gained by water users owning land to which water is appurtenant to rotate in the use of the water supply to which they may be collectively entitled. This is particularly true in the short water season, as a system of rotation of the available water in periodic turn brings about an increased head so essential in the exercise of its most economical and beneficial use. As a matter of fact, during periods of acute water shortage on some streams subject to regulation by the State Engineer, water users with earlier priority rights have in a spirit of live and let live cooperation consented in a measure to the abrogation of their priority rights to the end that through a system of rotation in periodic turn of the limited supply, all users could benefit to some extent in its use. Such a friendly spirit of cooperation would be extremely difficult of accomplishment in the absence of some neutral agent, as the State Engineer, to act as an intermediary between the parties.

Although there are numerous other duties incumbent upon the State Engineer in his relation to the water user, it is believed that those as herein referred to may be considered as of paramount importance.

In conclusion it might be noted that the State Engineer serves as keeper or custodian of the records pertaining to water rights, and is at all times interested in the conservation and perpetuation of the one resource, irrigation water, upon which rests all agricultural activities in the arid West.

## CHAPTER II

### Office Engineering and Miscellaneous Office Work

Office work was carried on in the usual manner. Much of the office engineering work consisted of careful examination and checking of maps in support of applications for permission to appropriate water, proofs of appropriation of water, and in support of proofs of beneficial use of water under permits. The issuance of certificates of appropriation of water under permits requires considerable time, especially in view of the fact that the utmost care must be exercised to avoid errors.

Action on many applications has been the result of carefully prepared reports of field investigations, office records, and carefully considered transcripts of testimony taken during hearings on contested applications.

Extensive field investigations have been made on streams under which adjudication proceedings are requested. In connection with this work, maps showing the general stream system, drainage boundaries, and when possible the location of the irrigated lands, are prepared for use in the field work, from which investigations extensive detailed reports are prepared.

Affidavits, protests, deeds, contracts and other instruments in connection with the appropriations of water have been carefully examined and checked with the records before filing.

Recently large ranches have been transferred to new owners, resulting in a great deal of work in the office in connection with checking up the appurtenant water rights. In some instances days have been devoted to this work.

Numerous complex water commissioner problems arise every year relative to the distribution of water, which occupy our immediate attention and time. In certain cases charts and tables relative to the division and allotment of water have been prepared for the water commissioners to facilitate the work.

Water commissioners are given careful instructions and advice, and in some instances this work brought us out into the field to settle disputes.

Much information was made available to Federal agencies, United States Army engineers and others relative to their work in this State on the control and storage of water. A brief reference report on existing and possible reservoir sites on the Carson, Truckee, and Walker Rivers and on the Walker Lake drainage was compiled.

On request made by the State Engineer to the Director of Geological Survey, United States Department of Interior, an extensive investigation was made by Penn Livingston of the United States Geological Survey, with some assistance by this office both in the office and the field, on underground leakage from artesian wells in the Las Vegas artesian basin, resulting in an extensive and valuable report. Although the underground leakage from the wells appeared to be small, the continual loss of water from both underground leakage and uncapped wells has been found to have material effect on the flow of existing and

older wells. Recently a large map has been made in this office from field investigations and data on hand showing, in addition to pertinent information, the location and status of all of the wells in this area, to the end that proper and legal means will be forthcoming to properly conserve this water and do away with the waste thereof.

Some of the Little Humboldt River diversion works were improved by plans and specifications prepared in the office from field investigations. These installed improvements are proving of great value to both the water users and the water commissioners.

Acreages of the various classes of land embraced in the Boulder Canyon withdrawals on the Colorado River in Nevada were determined from a map submitted by the United States Geological Survey for use of the Colorado River Commission.

Assistance was given to the Water Resources Branch of the United States Geological Survey by making measurements of the flows of the Carson River at the Carson City gaging station and of the East Fork of the Carson River at the Horseshoe Bend gaging station during the high peak. Frequent checks and adjustments are made on the Carson City water stage recording gage.

The result of this work and the discharge of these and other streams appear in the United States Water Supply Paper, Part Ten, of the Great Basin.

The yearly budgets for water commissioners' services on the various streams are prepared and submitted to the County Clerk of the various counties in which the streams requiring such services are located.

The pamphlet on "Regulations Concerning Preparation of Maps for Submission to the State Engineer Under Applications to Appropriate Water and Proofs of Appropriation," which has been out of print for some months, was revised and printed.

Due to the many demands for information on water and water power equivalents and on the many methods by which water is measured, the office deemed it proper to prepare a pamphlet covering this information in such a manner as could be easily grasped and understood by the laymen, ranchers, and miners, and for the use of our water commissioners. This pamphlet, which is entitled "Common Methods of Measuring Water as Practiced in Western States," is now available for distribution.

Prompt and cordial attention has been accorded to the many visitors on matters chiefly pertaining to water engineering and to matters pertaining to this State. In many instances the entire day was devoted to these visitors. The daily routine office correspondence, official notices, and clerical work also required our attention.

Important articles, maps, and reports pertaining to water and other matters concerning this State have been given serial numbers and indexed, and many other activities relative to water rights and this office have been accomplished not here mentioned.

**CHAPTER III****State Water Right Surveyors of Nevada**

Following is a list of licensed State Water Right Surveyors authorized to practice before the office of the State Engineer during the past biennium:

**NEVADA**

- |                               |                                 |
|-------------------------------|---------------------------------|
| Alamo—W. F. Thorne.           | Manhattan—Arthur E. Smith.      |
| Boulder City—E. W. Bannister. | Mina—L. B. Spencer.             |
| Caliente—Wayne Cox.           | Minden—J. A. Millar.            |
| Carson City—H. M. Payne.      | Walter G. Reid.                 |
| R. W. Prince.                 | Mountain City—Walter S. Craven. |
| Robert A. Allen.              | Edward C. Stephens.             |
| W. T. Holcomb.                | John H. Baker.                  |
| Albert Quill.                 | Paradise Valley—F. B. Stewart.  |
| E. A. Metscher.               | Pioche—Frank Walker.            |
| Elko—W. H. Settlemyer.        | Reno—C. V. Taylor.              |
| R. A. Kinne.                  | L. H. Taylor.                   |
| W. S. Raine.                  | D. H. Updike.                   |
| Ely—F. W. Millard.            | Thos. R. King.                  |
| C. R. Townsend.               | John V. Mueller.                |
| Neil A. McGill.               | M. A. Pray.                     |
| James D. Wallace, Jr.         | Walter G. Reid.                 |
| Eureka—M. M. Harcourt.        | Carl Stoddard.                  |
| Fallon—L. W. Crehore.         | Harold L. Layman.               |
| Hugh Wilson.                  | David Mitchell.                 |
| E. P. Osgood.                 | Round Mountain—J. W. E. Taylor. |
| J. C. Coniff.                 | Sparks—C. C. Taylor.            |
| Fernley—W. A. Pray.           | Sprucemont—J. L. Vandiver.      |
| Gardnerville—O. L. Hussman.   | Tonopah—D. S. Johnson.          |
| S. Krummes.                   | C. A. Liddell.                  |
| Goldfield—Ed S. Giles.        | Frank Rapp.                     |
| Hiko—S. P. Holt.              | H. F. Bruce.                    |
| Las Vegas—J. T. McWilliams.   | Tuscarora—Chester L. Woodward.  |
| C. D. Baker.                  | John W. King.                   |
| William Clark.                | Winnemucca—F. R. O'Leary.       |
| Chas. F. DeArmond.            | H. H. Sheldon.                  |
| Lovelock—Robert S. Leighton.  | Yerington—George Parker.        |
| J. H. Causten.                |                                 |

**CALIFORNIA**

- Berkeley—R. E. Tilden, 2829 Benvenue Avenue.  
 San Francisco—J. W. Williams, 983 Mills Building.  
 Sacramento—G. F. Engle, 1857 Forty-fourth Street.  
 Benton—Joseph Markert.  
 Alturas—W. J. Archer.

**IDAHO**

- Twin Falls—Harold M. Merritt.

**OREGON**

- Burns—Mott V. Dodge.

**UTAH**

- Garrison—G. S. Quate.  
 Ogden—H. B. Way.  
 Louis H. Boukol, Care Southern Pacific Company.  
 E. B. Coulsen, 719 First Security Building.  
 K. W. Kennedy, 1544 27th Street.  
 Salt Lake City—Norman Blye, 503 Scott Building.  
 E. A. Vail, Box 895.  
 Louis Cramer, Consulting Mining Geologist.

## CHAPTER IV

## Applications for Water Rights

During the biennial period dating from July 1, 1938, to June 30, 1940, there have been 272 applications filed with this office for permission to appropriate water, as compared to 261 filed during the preceding biennium. Of this number nine applications were made to change either the point of diversion, place, or manner of use of water already appropriated under an existing permit or claim of vested right. A segregation of the applications as to the manner of use as compared with those filed during the biennial period from July 1, 1936, to June 30, 1938, is as follows:

	1938- 1940	1936- 1938
Irrigation.....	73	47
Mining and milling.....	130	110
Stockwatering.....	40	48
Domestic.....	10	9
Migratory water fowl refuge.....	...	3
To change point of diversion, manner or place of use..	9	19
Municipal.....	2	8
Bathing.....	...	2
Gravel and sand washing.....	...	2
Power.....	6	6
Recreational.....	2	6
Fish rearing.....	...	1

Definite action has been taken on 306 during this biennium, representing action on 127 applications filed during this period, and 179 applications filed prior to July 1, 1938. There have also been issued during the biennium 137 certificates of water right following the perfection of permits.

Pertinent information regarding water applications filed in this office since its creation will be found on page 9. The status of applications filed and certificates issued will be found as follows:

1. Status of applications filed during the biennium 1938-1940, Chapter XIII.

2. Status of applications filed prior to July 1, 1938, upon which action has been taken during the past biennium, Chapter XIV.

3. Certificates issued under permits during the past biennium, Chapter XV.

During the past biennium several hearings have been held on protests filed against the granting of permits. In addition, rulings were made on many other protested applications. No appeals from the findings of the State Engineer have been made during this period.

## CHAPTER V

### Adjudication of Water Rights

Section 1, chapter 4, Statutes of 1903, provided a law creating the office of State Engineer and furnished a method for the determination of the relative rights in and to waters already appropriated. Several amendments were subsequently made, with the result that our water law is now admirably adapted to conditions in Nevada, and has been declared constitutional in its entirety by decisions rendered by the Supreme Court of Nevada.

Amendatory Acts were passed during the 1907 and 1909 sessions of the Legislature. In 1913 a new water law was enacted and the old water law in its entirety was repealed. The new law was approved March 22, 1913. Under this Act the water law was greatly broadened, both as to the adjudication procedure on the determination of vested rights and the appropriation of water procedure by application to the State Engineer. Subsequent amendments to the laws relating to the adjudication procedure were enacted in the following sessions of the Legislature, viz, 1915, 1917, 1919, 1921, 1925, 1927, 1931, 1933, and 1937. A brief description of these various amendments may be found in Chapter 6 of the 1936-1938 report, wherein a summary of the laws enacted by the Nevada Legislature relating to water and the office of the State Engineer is given. A summary of the statutory procedure to determine the relative rights in and to the waters of a stream system under a claim of vested right may be found in our 1934-1936 Biennial Report, and also in the compiled edition of the water laws of this State published in 1937 by this office, both of which are available upon request.

#### PROOFS OF APPROPRIATION FILED DURING THE YEARS OF THE PRESENT BIENNIUM

During this period the following proofs of appropriation, which are claims of vested water rights, have been filed for future use in the determination of the relative rights and also to make of record such claims. A condensed statement giving the salient data is herewith given in the order of:

1. Proof serial number.
2. Date filed.
3. Name of claimant.
4. Source of water supply.
5. Location by county.
6. Use claimed.

02293.....	12-12-38.....	James Dautre; Trough Spring; White Pine; Stockwatering.
02294.....	12-12-38.....	Ellison Ranching Co.; Champion Creek; Elko; Irrigation.
02295.....	12-12-38.....	Ellison Ranching Co.; S. Fork Owyhee River; Elko; Irrigation.
02296.....	7- 1-39.....	Charles Keough; North Summit Spring; Mineral; Stockwatering.
02297.....	7- 1-39.....	Charles Keough; Dunlap Tunnel Spring; Mineral; Stockwatering.
02298.....	7- 1-39.....	Charles Keough; Warren Corral Red Spring; Mineral; Stockwatering.
02299.....	7- 1-39.....	Charles Keough; Wild Cat Spring; Mineral; Stockwatering.
02300.....	7- 1-39.....	Charles Keough; Cinnabar Spring; Mineral; Stockwatering.
02301.....	7- 1-19.....	Charles Keough; Graham Spring; Mineral; Stockwatering.
02302.....	7- 1-39.....	Charles Keough; Point of Hill Spring; Mineral; Stockwatering.
02303.....	8- 9-33.....	William M. Pettit; Twin Canon Spring and Tribs.; Humboldt; Irrigation.

A résumé is herewith given to the progress made on adjudication proceedings during this biennium.

#### MANSE SPRINGS

The location of Manse Springs and tributaries is in the southerly portion of Nye County about six miles southerly from Pahrump, Nevada, and about 28 miles northeasterly from Shoshone, California. There are two claimants to the waters from this source, one by virtue of vested rights and the other under application to the State Engineer for permission to appropriate this water.

April 14, 1937—Petition filed with State Engineer by water users to initiate proceedings to determine relative rights in and to the waters of Manse Springs and tributaries.

May 17, 1937—Field investigation completed and report filed by the State Engineer in his office.

May 18, 1937—Order filed granting petition to determine relative rights in and to the waters of Manse Springs and tributaries. Copy of order and letter advising claimants that since the claimants had all signed waiver of notices the State Engineer would proceed under section 36B.

May 24, 1937—Abstract of claims prepared by the State Engineer and filed in his office.

June 8, 1937—Order of Determination filed by State Engineer in his office.

June 12, 1937—Order of Determination, together with all original evidence and data as of record in the State Engineer's office, were filed with the Clerk of the Fifth Judicial District Court of the State of Nevada, in and for the county of Nye.

June 15, 1937—Court entered an order setting July 29, 1937, as the date for hearing exceptions. This hearing was postponed and set over from time to time, the last order setting the time for November 5, 1937.

November 5, 1937—Hearing before Hon. William D. Hatton, Judge of the Fifth Judicial District Court of the State of Nevada, in and for the county of Nye. Case submitted pending filing of briefs by respective counsel.

February 24, 1939—Decision entered by Hon. William D. Hatton, Judge of the Fifth Judicial District Court.

March 2, 1939—Motion for new trial made by claimant Eddie Barry.

October 19, 1939—Motion for new trial overruled by Hon. William D. Hatton, Judge of the Fifth Judicial District Court.

November 14, 1939—Findings of Fact and Conclusions of Law filed.

November 28, 1939—Eddie Barry appeals to the Supreme Court of the State of Nevada from the order of the District Court denying objectors motion for a new trial. September 11, 1940, was set for the arguments before the Supreme Court.

#### BASSETT CREEK

Bassett Creek is located on the easterly slope of the Shell Creek Range and drains into Spring Valley in and about T. 18 N., R. 66 E., M. D. B & M. There are two claimants to the waters of this source.

December 16, 1938—B. H. Robinson, through his attorney, Howard Gray, filed a petition in the State Engineer's office requesting a determination of the relative rights in and to the waters of Bassett Creek.

December 21, 1938—The report of the investigation of the stream system was filed in the office of the State Engineer.

December 22, 1938—The State Engineer entered an order granting petition and signifying his intention to make proper arrangements to proceed with the determination in question.

December 23, 1938—The State Engineer entered notice and order for taking proofs.

June 28, 1940—Notice sent by registered mail advising claimants that Proof of Appropriation and supporting maps must be filed on or before July 15, 1940.

#### McFAUL CREEK

McFaul Creek lies in T. 13 N., R. 18 E., M. D. B. & M., and flows westerly and drains into the southerly end of Lake Tahoe. There is only one claimant to the waters of this source, *i. e.*, Arthur K. Bourne, and the amount of land claimed to be irrigated under this vested right is approximately 34 acres.

June 19, 1939—Arthur K. Bourne, through his agent H. M. Payne, filed a petition in the State Engineer's office requesting a determination of the relative rights in and to these waters.

July 6, 1939—The report of the investigation of the stream system was filed in the office of the State Engineer.

July 11, 1939—The State Engineer entered an order granting petition and signifying his intention to make proper arrangements to proceed with the determination in question.

#### MUNCY CREEK

Muncy Creek and all of its tributaries are located in T. 20 N., R. 66 E., M. D. B. & M., approximately 30 miles distant on an airline in a northeasterly direction from Ely, Nevada, and about 70 miles distant by road. The creek heads in the Schell Creek range of mountains and runs in an easterly direction into Spring Valley.

August 27, 1938—Petition filed with the State Engineer to initiate proceedings for the determination of the relative rights in and to the waters of Muncy Creek.

September 22, 1938—Report of field investigation of the stream system was filed in the State Engineer's office.

June 14, 1940—Order filed by State Engineer granting petition to determine the relative rights in and to the waters of Muncy Creek.

#### KALAMAZOO CREEK

Kalamazoo Creek and tributaries mainly rise and flow in T. 20 N., R. 66 E., M. D. B. & M., approximately 28 miles distant on an airline in a northeasterly direction from Ely, and about 67 miles distant by road. The creek heads in the Schell Creek range of mountains and runs in an easterly direction into Spring Valley.

January 4 and 31, 1940—Petitions filed with the State Engineer to initiate proceedings for the determination of the relative rights in and to the waters of Kalamazoo Creek.

December 1, 1939—Report filed in the office of the State Engineer of field investigation of the stream system.

June 14, 1940—The State Engineer entered an order granting petition and signifying his intention to make proper arrangements to proceed with the determination in question.

#### GLENBROOK CREEK

Glenbrook Creek and its tributaries has its origin in an offshoot range of the Sierra Nevada Mountains skirting the easterly side of Lake Tahoe and forming the divide between the Tahoe drainage basin and the Carson Valley drainage, and flows in a westerly direction into Lake Tahoe. The main portion of the watershed lies within the northeast corner of T. 14 N., R. 18 E., M. D. B. & M.

September 6, 1939—The Glenbrook Company filed a petition with the State Engineer to initiate proceedings for the determination of the relative rights in and to the waters of Glenbrook Creek.

June 1, 1940—Report of field investigation of the stream system was filed in the State Engineer's office.

June 14, 1940—The State Engineer entered an order granting petition and signifying his intention to make proper arrangements to proceed with the determination in question.

#### NORTH LOGAN CREEK

North Logan Creek or Logan Shoals Creek No. 1 has its origin the same as Glenbrook Creek, in an offshoot range of the Sierra Nevada Mountains, and is the next mountain stream south of Glenbrook Creek. It flows in a westerly direction and enters Lake Tahoe near the northern boundary of section 22, T. 14 N., R. 18 E.

September 6, 1939—Petition filed by The Glenbrook Company to initiate proceedings for the determination of the relative rights in and to the waters of North Logan Creek.

June 10, 1940—Report of field investigation of the stream system filed in the State Engineer's office.

June 14, 1940—Order entered granting petition and signifying intention to make proper arrangements to proceed with the determination in question.

#### ADJUDICATIONS BY DEPARTMENT OF STATE ENGINEER

Streams on Which Decrees Have Been Entered Under Civil Suits, Statutory Court Decrees, and Streams Adjudicated by United States District Court

The following table shows the status of all the streams in the State that have been or are the subject of adjudication proceedings, given in the order of:

1. Name of stream system.
2. Location.
3. Date adjudication proceedings initiated.
4. Status toward completion, etc.

**Baker and Lehman Creeks** (White Pine County)—May 22, 1925; both streams considered as one; Findings of Fact, Conclusions of Law and Decree entered October 1, 1934. Acreage land involved 2,191.7.

**Barber Creek** (Douglas County)—September 21, 1914; Court Decree entered May 14, 1921. Land involved 235.93 acres.

- Bartlett Creek** (Humboldt County)—Petition for Determination received December 20, 1929; Proofs of Appropriation voluntarily filed. Proofs submitted for 224.9 acres.
- Battle Creek** (Humboldt County)—Petition for Determination received December 20, 1929; report on investigation made May 22, 1930; Proofs of Appropriation voluntarily filed. Land involved approximately 606.80 acres.
- Bishop Creek** (Elko County)—Included in adjudication of Humboldt River system.
- Buena Vista Creek** (Pershing County)—Petition for Determination of Relative Rights—May, 1931.
- Carrico Creek** (Lander County)—July 29, 1927; Court Decree entered November 26, 1929; Certificates issued under Court Decree July 3, 1930. Decreed rights for 351.1 acres.
- Carson River** (Douglas, Ormsby, Lyon, and Churchill Counties)—May, 1903; Order of Determination filed November 21, 1928, with ex officio Clerk of the First Judicial District Court of the State of Nevada, in and for the County of Ormsby. Court duly proceeded with the determination, setting February 4, 1929, as time for hearing exceptions to the Order of Determination. On April 6, 1929, the Supreme Court of the State of Nevada issued Alternative Writ of Prohibition in the matter of the Mexican Dam and Ditch Company et al., Petitioners, v. District Court of the First Judicial District of the State of Nevada, in and for the County of Ormsby, and Hon. G. A. Ballard, Judge thereof, Defendants, prohibiting defendants from proceeding with the determination for such time as such Writ of Prohibition is effective and until the final determination for such matter in the Supreme Court. On July 1, 1930, the writ was made permanent on the ground that certain provisions of the law were not complied with and ordered that the matter be referred back to the State Engineer for full and complete determination of the water rights on the entire Carson River stream system. The status of this matter remains unchanged. On May 11, 1925, Bill of Complaint in Equity, D-183, was filed in the District Court of the United States, for the District of Nevada in the matter of the United States of America, Plaintiff, v. Alpine Land and Reservoir Company, a Corporation, et al., Defendants. Issuance of subpoenas to all defendants began May 23, 1925. Restraining Order filed October 3, 1925, and thereafter motions to dismiss were filed by the various water users. August 17, 1926, motions to dismiss Bill of Complaint were denied, and 20 days thereafter were allowed to answer Bill of Complaint. Answers were filed November 27, 1928. Hearing on matter of setting time for trial and proposed appointment of a special master. April 16, 1929, beginning of trial before Hon. Frank H. Norcross, Judge of the United States District Court, District of Nevada. November 13, 1931, Miss Ada Torreyson was appointed special master in chancery for purpose of taking testimony, the transcript of which to be submitted to the Judge for his final action. From time of appointment of special master, hearings were held off and on in Fallon and Carson City. The taking of testimony was completed during April 1940. Litigants have been given one year within which to file final briefs.
- Chiatovich Creek** (Esmeralda County)—1914; Notice and Order for Taking Proofs, June 10, 1915.
- Clover Valley Creek** (Lincoln County)—November 4, 1919; Preliminary Order of Determination prepared prior to 1927, but not filed. Land involved approximately 467.23 acres.
- Clear Creek** (Pershing County)—June 10, 1918; Court decree rendered November 25, 1919, affirming Order of Determination; Certificates issued October 30, 1922, under Court decree. Land with decreed rights 1,933.20 acres.
- Clear Creek** (Ormsby County and Douglas County)—Decree July 22, 1872, civil suit; Notice and Order of Pendency of Proceeding, February 5, 1914.
- Crum and Wilson Creeks** (Lander County)—July 14, 1925; Court decree entered May 26, 1928; Certificates issued July 20, 1928, under Court decree. Decreed rights for 614.69 acres.
- Currant Creek** (Nye County)—1919; Notice for submission of proofs dated May 26, 1919; decree entered April 23, 1921; Certificates issued October 30, 1922, and February 13, 1923, under Court decree. Decreed rights for 600 acres.

- Deephole Springs, Clear Creek, Squaw Valley Creek, Lost Creek, Grass Valley Creek, Cottonwood Creek, Red Mountain Creek, and Hot Springs** (Washoe County)—1915; To abstract of proofs; Adjudication initiated under provision 88a, chapter 253, Statutes of 1915.
- Duck Creek** (White Pine County)—Decree entered November 24, 1886, civil suit.
- Duckwater Creek** (Nye County)—December 1, 1909; The first Court decree was rendered by Hon. M. R. Averill, adjudicating the various rights; June 20, 1910, another decree was entered by the above-mentioned Court. October 6, 1919, a stipulation was entered into by the various water users and endorsed by the Court requesting the State Engineer to make field investigation as to types of structures, etc., required for more economical and satisfactory method of distributing water; investigation completed and report filed April 13, 1921; March 27, 1930, a stipulation was entered into by the various water users which brought to a conclusion the remaining questions involved in the litigation of the waters of this stream. Decreed rights for approximately 4,000 acres.
- Eden Creek** (Humboldt County)—1915; To abstract of proofs, adjudication initiated under provision 88a, chapter 253, Statutes of 1915.
- Edgewood Creek** (Douglas County)—Petition for Determination of Relative Rights April 29, 1929. Waiver of notices filed.
- Evans Creek and Its Tributaries, Being Hufford, or Jake's Creek, and Warm Springs** (Humboldt and Elko Counties)—To abstract of proofs; Adjudication initiated under provision 88a, chapter 253, Statutes of 1915. Lands involved approximately 6,819.49 acres.
- Franklin River** (Elko County)—October 14, 1927; To investigation of facts and conditions; pending order granting petition.
- Genoa Creek** (Douglas County)—Decree entered July 23, 1881, civil suit.
- Goose Creek** (Elko County)—March 5, 1915; Decree entered March 3, 1923; land involved 995.97 acres.
- Humboldt River** (Elko, Eureka, Lander, Humboldt, and Pershing Counties)—1913; January 2, 1931; Opinion and Decision of the Court entered and filed; August 23, 1931, Proposed Findings of Fact, Conclusions of Law and Decree filed with the District Court at Winnemucca; December 14-17, 1931, motion for new trials presented and argued; March 18, 1932, decisions on motions for new trial filed; February 5-9, 1934, Hearings before the Hon. H. W. Edwards, presiding District Judge at Winnemucca, Nevada, on new trials. Amended, changed and corrected Findings of Fact, Conclusions of Law and Decree by H. W. Edwards, Judge Presiding, filed, with Clerk of Court on December 26, 1934. Proposed Findings of Fact, Conclusions of Law and Decree by H. W. Edwards, Presiding Judge, entered October 7, 1935, filed with Clerk of Court October 8, 1935. Aggregate area with decreed water rights entire stream system:
- |                          |                  |
|--------------------------|------------------|
| Harvest crop.....        | 174,708.15 acres |
| Meadow pasture.....      | 32,342.61 acres  |
| Diversified pasture..... | 78,962.76 acres  |
| Total .....              | 286,013.52 acres |
- Hall Creek** (Tributary to Carrico Creek)—See Carrico Creek.
- Iowa Creek** (Tributary to Carrico Creek)—See Carrico Creek.
- Indian or Chiatovich Creek** (Esmeralda County)—1914; Notice and order for taking proofs, June 10, 1915.
- Indian Springs Creek** (Humboldt County)—Petition for Determination of Relative Rights, December 20, 1929.
- Job's Canyon Creek** (Douglas County)—Included in Barber Creek Decree, May 27, 1921.
- K. C. Creek, Sometimes Known as Conway Creek or Renshaw Creek** (Clover Valley, Elko County)—July 1, 1927; Notice and order for taking proofs, November 27, 1928; suit filed in District Court requesting the Court to restrain State Engineer from proceeding with adjudication; Court dissolved injunction and dismissed restraining order; July 10, 1930, amended complaint filed requesting restraining order; no action to date by Court on amended restraining order.

- King's Canyon and Gregory Canyon Creeks** (Ormsby County)—Decree November 14, 1885, civil suit.
- Lehman Creek** (White Pine County)—See Baker and Lehman Creeks.
- Little Humboldt River** (Humboldt and Elko Counties)—1910; opinion and decision entered May 4, 1934. Decreed rights for 46,275.58 acres.
- Long Spring** (White Pine County)—1915; to abstract of proofs; adjudication initiated under provision 88a, chapter 253, Statutes of 1915.
- Luther (Fairview Creek)** (Douglas County)—Decree entered May 27, 1874, civil suit.
- Muddy River** (Clark County)—1905; Decree entered March 12, 1920; certificates issued April 22, 1926, under Court decree.
- McNett or Indian Creek** (Esmeralda County)—1915; Notice and order for taking proofs, June 10, 1915; to filing of proofs.
- Nigger Creek** (White Pine County)—Civil suit.
- North and South Springs** (Nye County)—February 20, 1937; Decree entered February 21, 1938. Decreed rights for 437.9 acres.
- Overland Creek** (Elko County)—October 16, 1919; Court decree filed October 5, 1925; certificates issued December 31, 1926, under Court decree. Decreed rights for 1,718.82 acres.
- Owyhee River** (Elko County)—January 28, 1924; Order for taking proofs, January 24, 1925; June 17, 1924, suit filed in the United States District Court of Nevada by W. T. Smith as receiver for the Union Land and Cattle Company, Complainant, v. R. M. Woodward, et al., Defendants for appropriating the waters of the Owyhee River belonging to the Union Land and Cattle Company; July 5, 1930, order made by the United States District Court of Nevada making all parties of the Tuscarora branch of the Owyhee River and its tributaries in Nevada, parties defendant in the suit of Ellison Ranching Company, successors to W. T. Smith, Receiver of the Union Land and Cattle Company, Plaintiff, v. R. W. Woodward, et al., Defendants; September 18, 1931, Geo. A. Bartlett appointed special master by the United States District Court to take evidence and to submit to the Court findings and form of proposed decree. On November 21, 1939, Judge F. H. Norcross entered an order denying plaintiff's motion to set for trial and granting motion of defendants to dismiss without prejudice to the institution of a new case.
- Pahranagat Lake** (Lincoln County)—November, 1919; Court decree entered October 4, 1929; certificates issued on November 1, 1929, under Court decree. Decreed rights for 4,971.62 acres.
- Pass, Big and Boyd Basin Creeks** (Humboldt County)—Decree July 1, 1935, civil suit, United States District Court.
- Panaca Big Springs** (Lincoln County)—Petition for determination of relative rights filed July 27, 1928.
- Peavine Creek** (Nye County)—June 2, 1928; Hearing of exceptions to the order of determination by Court, May 20, 1934. Lands involved, 209.33 acres.
- Piute Creek** (Humboldt County)—December 20, 1929; To order granting petition to determine relative rights, dated May 9, 1930. Proofs submitted 541 acres.
- Quinn River** (Humboldt County)—Civil suit decree, Pacific Livestock Company v. Ellison Ranching Company and others, entered April 9, 1919; a petition for an alternative writ of mandate was filed in the Supreme Court on August 12, 1930, requesting the State Engineer to assume and take control and to regulate the waters of Quinn River; the Supreme Court on July 2, 1931, handed down a decision which failed to sustain the alternative writ and dismissed the proceedings. Decreed rights for 17,411.34 acres.
- Reese River** (Nye and Lander Counties)—1910; To notice of pendency of proceedings.
- Rice Creek** (Elko County)—1910; Court decree entered June 20, 1922; decreed rights for 833.73 acres.
- Robison Creek** (Esmeralda County)—1915; To abstract of proofs; adjudication initiated under provision 88a, chapter 253, Statutes of 1915.
- Salmon River** (Elko County)—March 5, 1915; District Court decree entered March 1, 1923; a separate decree was entered March 23, 1916, in the

- United States District Court for the District of Idaho, Southern Division, in the matter of Twin Falls Salmon River Land and Water Company v. Vineyard Land and Stock Company; land involved approximately 13,000 acres.
- Schell Creek** (White Pine County)—September 15, 1934; Decree entered June 18, 1938. Deceed rights for 109.72 acres.
- Siegel Creek** (White Pine County)—1918; To proofs taken.
- Silver Creek** (Lander County)—March 17, 1927; Decree entered on February 13, 1925.
- Silver Creek** (White Pine County)—Decree entered July 6, 1911; civil suit.
- Simpson Creek** (Eureka County)—1910; To notice of pendency of proceedings.
- Six Mile Creek** (Elko County)—July 22, 1919; Court decree filed and entered December 12, 1925; certificates issued December 31, 1926, under Court decree. Deceed rights for 417.90 acres.
- South Spring** (Nye County)—See North and South Springs.
- Spanish Creek (Perry Aiken Creek)**—1915; Court decree entered on January 22, 1916. Deceed rights for 1,431 acres.
- Steele Creek** (Elko County)—To notice and order continuing hearings.
- Steptoe Creek** (White Pine County)—January 12, 1931; Decree entered November 6, 1935. Deceed rights for 1,958.05 acres.
- Thousand Springs Creek** (Elko County)—March 24, 1928; Court decree entered December 6, 1929; certificates issued April 19, 1930, under Court decree. Deceed rights for 5,419.80 acres.
- Tony Creek** (Humboldt County)—1925; Court decree entered August 30, 1929. Deceed rights for 29.88 acres.
- Trout Creek** (Elko County)—1910; To notice pendency of proceedings; tributary to Humboldt River, adjudicated as part of Humboldt River stream system.
- Truckee River** (Washoe, Lyon, and Churchill Counties)—1913; Temporary order issued by United States Court, February 13, 1926.
- Virgin River** (Clark County)—1921; Court decree entered May 14, 1927. Deceed rights for 1,933.22 acres.
- Walker River** (Douglas, Lyon, and Mineral Counties)—1902; March 3, 1919, final decree; July 3, 1924, bill of complaint filed by the United States against Walker River Irrigation District restraining the district from obstructing or hindering, etc., the natural flow of 150 cubic feet per second of water to the Walker River Indian Reservation; March 12, 1928, B. F. Curler appointed special master by the United States District Court of Nevada; December 29, 1930, order of United States District Court made and entered accepting resignation of B. F. Curler as special master; January 6, 1931, Robert M. Price appointed special master to succeed B. F. Curler, resigned; April 1932, tentative findings made; decree entered in the District Court of the United States of America in and for the District of Nevada, April 14, 1936. Petition for allowance of appeal filed June 20, 1936, by U. S. Government. Order showing appeal granted June 22, 1936. Appeal to the U. S. Circuit Court of Appeals, 9th Circuit, San Francisco, California, filed February 24, 1938, in Circuit Court of Appeals. Mandate of the U. S. Circuit Court of Appeals filed April 25, 1940, is in part as follows: "It is now here ordered, adjudged and decreed by this Court, that the decree of the said District Court in this case be, and hereby is reversed, with the direction to enter a decree adjudging the United States to be entitled to the continuous flow of 26.25 c.f.s. of water to be diverted from Walker River upon or above the Walker River Indian Reservation during the irrigation season of 180 days for the irrigation of 2,100 acres of land on the reservation, and the flow of water reasonably necessary for domestic and stock watering purposes and for power purposes to the extent now used during the nonirrigation season, with a priority of November 29, 1859 \* \* \*"
- Weaver Creek** (White Pine County)—Decree entered May 12, 1894; civil suit.
- Weeks (Steel) Creek** (Elko County)—1915; To notice of inspection served on claimants. Refer to K. C. Creek.
- White River** (White Pine and Nye Counties)—Certificates issued by State Engineer under sections 14 to 19, inclusive, of Statutes 1907, in 1912; December 4, 1922, case reopened under Statutes 1913; order of determination

filed with Court October 7, 1922; hearing on exceptions held December 4, 1922; decree entered nunc pro tunc as of December 4, 1922, by Hon. H. W. Edwards, District Judge, Seventh Judicial District Court of Nevada, in and for the County of White Pine. Decreed rights for 3,951.10 acres.

**Woods Gulch (Elko County)**—Petition for determination of relative rights filed. Stipulation entered into December 27, 1929. Petition withdrawn January, 1930.

## CHAPTER VI

## HUMBOLDT RIVER SYSTEM—1939

By J. A. MILLAR, *Supervising Water Commissioner*

## ORGANIZATION

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
D. E. WINCHELL, Water Commissioner.....	Lovelock District
F. E. BACKUS, Water Commissioner.....	Winnemucca District
MYRON CLARK, Water Commissioner.....	Battle Mountain District
G. F. TRES CARTES, Water Commissioner.....	Starr Valley and North Fork Districts
ORVIS STOCK, Water Commissioner.....	Lamoille and South Fork Districts
DONALD ODELL, Hydrographer.....	Midas
CLAUDE WARNER, Hydrographer.....	Elko District

Due to exceptional warm weather, during the second week of March, the spring run-off of the Humboldt River Stream System began about March 20, and created the season's peak flow near the end of the month. The highest flow of 1,876 c.f.s. was observed at the Palisade gaging station on March 27, 1939. The flow gradually diminished from this date until April 29, 1939, when a flow of 651 c.f.s. was observed at the Palisade gaging station. On April 30 an increase in flow at this station was observed, and a secondary peak flow took place for about seven days. On May 7, 1939, the flow again diminished to 651 c.f.s. and fluctuated between this flow and 390 c.f.s. for the rest of the month of May. During the month of June, 1939, the flow decreased from 412 c.f.s. to 71 c.f.s. During the year 173,000 acre-feet passed Palisade.

In the Lovelock District, the Pershing County Conservation District began irrigating on March 27, 1939, and the nondistrict users or the shareholders in the H. L. I. L. & P. Co. reservoir began to use reservoir water on March 31, 1939, and continued to use stored water during the month of April, May, June, July, 24 days in August and 12 days in September. On April 17, 1939, the flow of water at the Callahan gaging station was sufficient to serve rights with a priority of 1888 or later. This condition ended on May 31, 1939, when the flow at the Callahan gaging station dropped below the requirements of 1888 priorities. On July 3 the nondistrict users again received decreed water, due to a declaration on the part of the Pershing County Conservation District that they had cumulated sufficient water for the season needs.

Irrigation started in the Winnemucca District on March 18, 1939, on the Anderson ranch, the property of Mrs. Stall. The entire continuous flow of the two Stall ranches was diverted into the Cusick ditch, and continued to flow in said ditch until April 19, 1939. The continuous flow was then transferred to the Humboldt canal, and maintained until June 20, 1939.

Throughout the rest of the Winnemucca District two rotation systems were practiced. The Bliss Brothers and the Tobin Brothers rotated their water. The second systems of rotation took place on the following ranches: Upper Reinhart, Phillip Hammond, Gartiez Brothers, Pearce, Lower Reinhart, and Hillyer ranches. Each ranch used the combined flow of all the ranches for a period of not over five days. Two complete irrigations were supplied to every ranch in the

district. During the period that the third irrigation was in progress in the month of June, the flow of the river became so low that it was impossible to complete the rotation system, and as a result the lower ranches received only partial irrigations.

The early run-off the latter part of March and the first part of April caused large amounts of water to overflow the banks of the river. On the Horse Shoe ranch in Beowawe and the Dunphy ranches in Beowawe, the overflow was exceptionally heavy for a period of three weeks. There was also a large overflow on the Russell "White House Ranch." It was not until the last of April that the Water Commissioner was able to control and regulate the water. With the exception of the Dunphy ranches, rotation was practiced throughout the district. The Dunphy ranches received their water by continuous flow.

All ranches in Elko District, except those subject to overflow, were prevented from irrigating until April 15. Very little irrigating was done on the tributary streams until after the first of May. The delivery of water was by the daily continuous flow method, and in many cases rotation between ranches on the same stream system or ditch was practiced. Willow Creek reservoir was regulated for a period of three months. The Ellison Ranching Company did no irrigating until the last week in April. During the period from March 15 to the time they started irrigation they were allowed to cumulate their decree water.

A hydrographer was employed and supervised to measure the discharge of the important tributary streams in the Elko District and the data submitted to Mr. Carl Elges, State Meteorologist.

In December the State Engineer was successful in getting the cooperation of the Division of Grazing to use their C.C.C. labor to clean the channels of tributary streams in the Elko District. Several projects were outlined and work began almost immediately. One of the Elko District Water Commissioners was employed by the State Engineer to supervise the work.

#### HUMBOLDT RIVER SYSTEM—1940

By J. A. MILLAR, *Supervising Water Commissioner*

##### ORGANIZATION

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
D. E. WINCHELL, Water Commissioner.....	Lovelock District
F. E. BACKUS, Water Commissioner.....	Winnemucca District
MYRON CLARK, Water Commissioner.....	Battle Mountain District
ORVIS STOCK, Water Commissioner.....	Lamoille and South Fork Districts
ALBERT QUILL, Water Commissioner.....	Starr Valley and North Fork Districts
JOE REYNOLDS, Hydrographer.....	Willow Creek Reservoir
G. R. TRECARTES, Hydrographer.....	Elko

The irrigation season of 1940 followed a mild winter. Most of the precipitation consisted of rain. Very little snow fell in the valleys of the Humboldt River watershed, and the snow covering on March 15 was above the 6,000 foot elevation. This condition created an average flow of 290 c.f.s. at Palisade during the month of March. During the month of April three heavy snow storms occurred in Elko County, which added at least four feet of new snow on the Ruby Mountains, but did not add to the snow covering on the northern watersheds.

The run-off of Rock Creek, North Fork and Mary's River was far below normal, and the run-off of the southern feeders was below normal until May 13. A period of very hot weather started the snow to melt and the flow at Palisade increased from 515 c.f.s. on May 12 to a maximum of 1,316 c.f.s. on May 31. This flow marked the peak of the year, and the flow gradually decreased to 515 c.f.s. on June 15. On June 30 the flow dropped to 152 c.f.s. During the last 17 days of March and up until April 20, the only irrigation taking place was in the Lovelock Valley. However, during part of this time the flow reaching the Rye Patch reservoir was cumulated. On April 20 irrigation was started in the Winnemucca and Battle Mountain Districts. Rotation systems were practiced in both districts, and each ranch received two irrigations. Very little irrigation was done in the Elko district until May 1, and it was not until May 15 that all rights up to 1905 were served.

The Willow Creek reservoir was regulated during this season, and 1,600 acre-feet of water was released for the benefit of downstream users. During the period from March 15 to April 20, the Ellison Ranching Company was allowed to cumulate their decreed water with a priority of 1880.

The Humboldt River Commissioner directed the work of a hydrographer who measured the discharge of several important tributary streams in Elko County and the acquired data compiled with a report and submitted to Mr. Carl Elges, State Meteorologist.

#### CURRENT CREEK—1939 DISTRIBUTION

By NYE TOGNONI, *Water Commissioner*

Current Creek is located approximately 43 miles southwest of Ely, Nevada, along U. S. Highway No. 6, in Nye County.

The source of water is a mountain stream from the White Pine Mountains watershed. Approximately 600 acres in a wide canyon are irrigated.

The water commissioner was called to distribute the waters of Current Creek on May 15. A preliminary examination showed the diversions and measuring devices to be in a very poor condition, due to the fact that no water commissioner had been employed on this stream system for the past two years. The water users were required to get the diversions in a usable condition as soon as possible.

Since Current Creek, like most other mountain streams, has a rather irregular flow, and through most of the irrigated section is a deep narrow gorge, a different method is used for diverting the irrigation streams than are used at Duckwater.

Dams are made in the main creek of poles, hay, etc., to raise the water high enough to force it out through ditches along the bank of the main stream. The water is not measured until it reaches the lands to be irrigated, when it is measured over two- and three-foot Cippolletti weirs. To keep the flow over these weirs at a more or less constant rate there is a headgate and an overflow into the main stream, about ten or fifteen feet above the weirs.

This is a reasonably efficient diversion system, its main weakness being that the loss of poorly constructed dams during floods and the

cutting down of the main stream banks by the overflow from the irrigation ditches caused some loss of time to several water users.

The water commissioner had no trouble distributing the waters of Currant Creek throughout the irrigation season, due to the spirit of cooperation displayed by the water users.

A table of the average daily diversions in c.f.s. for each month from May 15 to October 1 follows:

	Callaway	Ramsey	Manzonie	Rutherford	Cazier	Total daily
May.....	5.30	2.98	1.41	1.93	2.96	14.58
June.....	4.89	1.56	1.05	1.31	2.15	10.96
July.....	2.91	.88	.71	.68	1.36	6.54
August.....	2.64	.83	1.16	.87	1.35	6.79
September...3.03		.58	.52	.64	1.13	5.90

**Discharges from Humboldt River and Tributaries**

(For more complete data see 1936-1938 Biennial Report)

**HUMBOLDT RIVER AT PALISADE, NEVADA**

Gaging Station located in the SW¼ Section 36, Township 32 N., Range 51, E., M. D. B. & M. Drainage area, 5,010 square miles.

Season	DISCHARGE IN SECOND FEET—			Run-off in acre-feet
	Maximum	Minimum	Mean	
1931-1932.....	2,580	7	429	311,000
1932-1933.....	1,330	11	182	132,000
1933-1934.....	162	3	24.8	25,170
1934-1935.....	1,890	13	221	159,900
1935-1936.....	2,290	11	372	270,160
1936-1937.....	1,380	11	262	189,700
1937-1938.....	1,660	18	316	228,700
1938-1939.....	1,876	17	.....	173,400
1939-1940.....	1,316	.....	.....	161,445

<sup>1</sup>October 1939 to June 30, 1940.

**HUMBOLDT RIVER NEAR COMUS**

Gaging Station located in the NW¼ Section 14, Township 36 N., Range 41 E.

Season	DISCHARGE IN SECOND FEET—			Run-off in acre-feet
	Maximum	Minimum	Mean	
1932.....	1,142	35	.....	192,112
1933.....	350	10	.....	51,872
1934.....	64	0	.....	4,888
1935.....	586	5	.....	53,176
1936.....	1,804	107	.....	140,376
1937.....	665	115	.....	114,990
1938.....	865	101	.....	136,612
1939.....	883	10	.....	91,042

<sup>1</sup>Partial, April 1 to September 1. <sup>2</sup>March 1 to June 22. <sup>3</sup>Partial, March 18 to August 1. <sup>4</sup>March 20 to July 20. <sup>5</sup>March 15 to August 15. <sup>6</sup>March 16 to June 30.

**HUMBOLDT RIVER NEAR IMLAY, NEVADA**

The gaging recorder was moved upstream above high water line of Rye Patch reservoir to the SW¼ Section 25, Township 33 N., Range 33 E., about four miles northwest of Imlay and nine miles below H. L. I. L. & P. Company feeder canal. Drainage area, 13,500 square miles.

Season	DISCHARGE IN SECOND FEET—			Run-off in acre-feet
	Maximum	Minimum	Mean	
1935.....	329	0	78	19,210
1936.....	564	1	135	97,670
1937.....	405	7	71	51,580
1938.....	480	0	114	82,740
1939.....	497	0	.....	64,630

<sup>1</sup>River flowed at this station in June, July, August, and September.

**HUMBOLDT LOVELOCK IRRIGATION LIGHT & POWER COMPANY  
INLET AND OUTLET CANALS**

Point of diversion of inlet canal SW $\frac{1}{4}$  Section 29, Township 33 N., Range 35 E.

Point of diversion of outlet canal SE $\frac{1}{4}$  Section 30, Township 32 N., Range 33 E.

Season	—DIVERSIONS FROM RIVER—			—RELEASES FROM RESERVOIR—		
	Total diversion for period a.-f.	Maximum monthly diversion a.-f.	Maximum daily diversion a.-f.	Total releases for period a.-f.	Maximum monthly releases a.-f.	Maximum daily releases c.f.s.
1931-1932....	7,154	6,104	175	960	960	39
1932-1933....	5,236	4,912	180	9,980	3,270	100
1933-1934....	4,118	878	21	1,554	1,554	98
1935-1936....	.....	.....	.....	6,980	2,036	125
1936-1937....	40,580	14,562	254	24,090	7,196	205
1937-1938....	37,320	14,472	312	3,800	1,974	85
1938-1939....	25,910	6,044	122	16,913	5,213	295

**RYE PATCH RESERVOIR**

On January 1, 1938, the storage water in Rye Patch reservoir was 2,640 acre-feet. Water was steadily accumulated until it neared its maximum yearly capacity of 28,720 acre-feet on July 16, 1938. Thereafter releases were greater than the inflow and on September 30 the storage capacity was 13,600 acre-feet, and on January 1, 1939, the water elevation was 4,104.40 feet, indicating a storage of 13,537 acre-feet. Steady increase in storage was made, the maximum for the year occurring on May 27, when 30,396 acre-feet was accumulated, the water elevation being 3,112.12 feet. The storage gradually decreased, and on September 15, 1939, it stood at 7,905 acre-feet.

**LOVELOCK DELIVERIES IN ACRE-FEET**

Season	March	April	May	June	July	Aug.	Sept.	Total
1932.....	.....	9,574	21,168	34,168	35,598	13,330	.....	114,348
1933.....	.....	9,067	7,975	5,184	3,215	1,361	391	27,193
1934.....	768	2,359	933	.....	.....	.....	.....	4,060
1935.....	.....	.....	2,754	1,370	13,210	3,092	.....	20,462
1936.....	.....	8,613	22,808	20,443	11,202	10,409	.....	73,475
1937.....	96	5,912	26,225	10,983	13,866	12,367	2,440	71,889
1938.....	1,184	7,669	17,057	13,722	11,742	8,968	1,931	62,273
1939.....	679	15,221	18,805	11,416	16,384	6,454	1,052	70,011

<sup>1</sup>Includes deliveries from Pitt-Taylor reservoir.

**WATER IN ACRE-FEET DELIVERED TO ALL DITCHES IN  
LOVELOCK VALLEY**

Season	Rogers	Union and		Old Channel	Young	Lower Valley	Total
		Irish American	South-west				
1929.....	1,740	376	1,847	.....	.....	.....	3,963
1930.....	2,073	525	4,434	.....	.....	.....	7,032
1932.....	27,024	7,740	40,342	25,380	13,362	500	114,348
1933.....	9,488	3,171	11,250	2,008	1,276	.....	27,193
1934.....	1,112	232	2,361	218	137	.....	4,060
1936.....	17,937	4,038	30,820	14,694	5,384	603	73,475
1937.....	15,217	4,169	31,214	12,529	5,669	3,091	71,889
1938.....	13,841	3,737	23,613	12,549	5,317	3,216	62,273
1939.....	14,359	4,368	27,190	14,041	7,320	2,733	70,011

No data for 1931 and 1935.

**LAMOILLE CREEK AT POWER HOUSE.**

Season	March	April	May	June	July	Aug.	Sept.	Total
1931.....			5,064	2,528	540	254	134	18,520
1932.....	544	5,694	11,880	16,752	11,384	3,448	730	50,432
1933.....		1,426	6,648	57,960	5,314	686	360	72,394
1934.....	558	2,994	5,998	3,112	834	304	186	13,986
1935.....	304	910	5,320	15,352	5,066			26,952
1937.....		673	8,930	9,810	3,170			22,600
1938.....	337	1,590	9,530	13,300	5,480	835	447	31,700
1939.....	194	2,810	9,080	5,400	1,500	430	305	19,796

<sup>1</sup>May 7 to September 20. <sup>2</sup>To October 18. <sup>3</sup>To October 7.

**LAMOILLE CREEK NEAR HALLECK**

Season	March	April	May	June	July	Aug.	Sept.	Total
1931.....			944	296	262			1,502
1932.....		5,184	7,970	14,598	11,660	548		39,960
1933.....		1,670	2,824	7,604	1,970	114		14,182
1934.....	400	408	494	896				2,198
1935.....	683	757	2,874	16,356	2,996			23,666
1937.....		3,100	6,940	11,800	642			22,500
1938.....	1,790	3,730	8,740	15,000	7,290			36,600
1939.....	3,030	4,480	4,570	1,650	166			13,896

**STAR CREEK NEAR DEETH**

Season	March	April	May	June	July	Aug.	Sept.	Total
1932.....		1,220	3,982	12,948	3,564	774		22,488
1933.....		882	2,322	6,812	942	358		11,316
1934.....	96	396	868	922	390	288	24	2,984
1935.....	386	590	2,832	8,200	1,448			13,456
1937.....		1,490	4,590	2,740	787			9,610
1938.....	348	1,070	2,850	7,010	2,440			13,700
1939.....	628	1,310	2,280	1,180	422			5,820

**SECRET CREEK**

Bridge above 71 Ranch about Section 28, Township 35 N., Range 59. E.

Season	March	April	May	June	July	Aug.	Sept.	Total
1932.....			426	2,160	718	62		3,366
1933.....		868	2,402	1,712	146	20		5,148
1934.....		334	354	120	62	62		932
1935.....	110	1,558	2,500	1,782	122			6,072
1937.....		2,940	3,290	780	55			7,070
1938.....	358	5,810	3,890	1,340	235			11,600
1939.....	1,360	1,210	810					3,380

**Distribution Little Humboldt River and Tributaries**

For the Seasons of 1939 and 1940 to June 30, 1940

By ROLAND VAN BIBBER, *Water Commissioner*

In conformity with the report period established for the State Engineer's Biennial Report, which ends biennially with June 30, these comments in regard to distribution and other activities are made to cover that period beginning with the time the present water commissioner was placed in supervision of those activities and ending with June 30, 1940.

As a representative of the State Engineer, the water commissioner at all times endeavored to make distribution of available water in conformity with the existing court decree for this stream system: to secure and record that data required for distribution or such data as might be or become of value to either the State Engineer or the water

users; and to promote and take an active part in any improvements which would add to or increase the efficiency of distribution and water control facilities.

For the 1939 irrigation season the opening date was established as April 1; however, on account of seasonal conditions and arrangements with water users, active irrigation commenced on that date for the lower valley users only, the upper users beginning the use of measured diversions on April 10. In the spring of 1940 snow cover and stream run-off conditions were considerably different, and it was found advisable to set the opening date as March 1. As growing weather began considerably earlier this year, about 40% of the water users were prepared to beneficially irrigate on the opening date, but because there was a difference in the type of crops planted, and other conditions, some irrigators delayed their use of water until later dates. Practically all users were irrigating by April 1. It is believed that a careful selection of the opening date for any season is exceptionally important and that by varying that date in accordance with seasonal conditions a considerable benefit for all concerned will be derived.

Stream-flow records were kept for the Little Humboldt River and for the twelve streams which are considered tributaries of that river. These records were obtained by the use of established gages, supplemented by current meter ratings as required. Records were also kept of all individual diversions and these constitute permanent records of the average rate of flow, the quantity for any day, the total for the season, and some additional information, such as the periods of rotation affecting any particular individual.

From the records kept the following tabulation is submitted to present general information concerning stream discharge.

**DISCHARGE IN ACRE-FEET OF THE LITTLE HUMBOLDT AND  
TRIBUTARIES, FOR THE PERIODS INDICATED**

	1939 March 17 to November 8	1940 March 4 to June 30
Little Humboldt River.....	7,251	8,555
Martin Creek .....	10,254	20,834
Cottonwood Creek.....	2,585	4,241
Indian Creek.....	2,339	3,154
Mullinax Creek .....	2,482	2,533
Little Cottonwood Creek.....	930	719
Lamance Creek.....	372	424
Handy Creek.....	797	625
Colony Creek .....	1,747	1,700
Beef Creek.....	640	613
Stone House Creek .....	1,591	945
Wash O'Neal Creek.....	999	891
Provo Creek .....	534	564
Totals .....	32,521	45,798

For comparative data in connection with the above discharge tabulation certain information from the seasonal snow survey reports by the Federal State Cooperative Snow Survey could be given. The report for March 1, 1939, stated that the snow cover on April 1, 1939, at Buckskin Mountain was 29.6% of normal, and that the March precipitation at Paradise was 55.1% of normal. For the 1940 report, it

was stated that the snow cover at the same place on April 1 was about 65% of normal, and that the March precipitation was 211.6% of normal.

The Forest Service has reported the following water content in inches for the snow cover existing at the various places on March 1 of the respective years:

	Elevation	1939	1940
Granite Peak.....	8,600	12.8	15.4
Martin Creek.....	7,000	5.8	6.8
Lamance Creek.....	7,000	12.8	15.0
Buckskin Mountain.....	6,800	6.7	5.8
Buckskin Mountain.....	8,200	8.0	10.8

In an attempt to improve distribution conditions during both the 1939 and 1940 seasons, four concrete weirs were constructed by water users under the construction supervision of the water commissioner. All of these structures were installed on the Sam Pierce ditch for the particular purpose of providing better measuring devices. Several temporary wooden weirs were installed for the same purpose with the intention of making concrete replacements as soon as practicable. It is believed that the benefit of such improvements has been recognized and that many more structures of this and other types will be constructed in the near future.

The facilities and personnel of the C.C.C. camp maintained at Paradise Valley during the winter months have been of considerable benefit when, on numerous occasions, short emergency clearing and cleaning jobs were accomplished, and when at one time such assistance was rendered to the extent of clearing the Little Humboldt River channel for a distance of about one mile.

Previous statements have been made in regard to channel conditions, and such conditions well described. After the many repetitions of those statements it is thought that a realization of the necessity for improvements in that respect is finally beginning to be had, and it is again stated that every effort should be made to accomplish that work.

**SNOW SURVEY DATA, LITTLE HUMBOLDT BASIN**

**Average Water Content in Inches**

Year	Lamance Creek Course Elev. 7000	Martin Cr. Ranger Station Elev. 7000	Granite Peak Course Elev. 8600	Buckskin Mt. Upper Course Elev. 8200	Buckskin Mt. Upper Course Elev. 6800	Average All Courses
1931-1932.....	16.62	11.27	16.53	11.90	11.25	13.62
1932-1933.....	11.75	5.84	7.96	6.61	8.19	7.97
1933-1934.....	6.65	4.22	7.24	7.82	5.54	6.34
1934-1935.....	7.20	5.87	11.85	7.04	7.80	7.95
1935-1936.....	19.09	7.54	12.83	13.27	11.06	12.76
1936-1937.....	11.02	6.04	7.89	6.75	8.31	8.00
1937-1938.....	6.9	8.1	13.5	7.20	8.10	8.76
1938-1939.....	12.8	5.8	12.8	8.00	6.70	9.22
1939-1940.....	15.0	6.8	15.0	10.80	5.80	10.68
Average.....	11.89	6.83	11.73	8.82	8.08	

Source—Nevada Cooperative Snow Survey.

**DISCHARGE OF LITTLE HUMBOLDT RIVER AND TRIBUTARIES IN ACRE-FEET**  
**Data from Water Commissioners Report and U. S. G. S.**

Year	Little Humboldt River	Martin Creek	Cottonwood Creek	Indian Creek	Mullinax Creek	Little Cottonwood Creek	Lamance Creek	Handy Creek	Colony Creek	Beef Creek	Stonehouse Creek	Wash O'Neal Creek	Provo Creek	Total
1922	28,106	28,400												
1923	12,100	13,700												
1924	3,680	8,800												
1925	10,200	16,900	2,950											
1926	12,200	17,600	7,990											
1927	15,022	25,661	6,140											
1928	.....	20,700	2,800											
1929	.....	11,300	2,990											
1930	.....	13,500	987		130									
1931	2,770	5,910			3,887									
1932	20,942	33,200	7,180	5,168	1,906		454	1,110	2,521		2,562	1,932	826	79,782
1933	4,309	13,500	2,335	2,178	1,906	606	163	424	831	194	792	564	203	28,005
1934	3,293	8,640	1,880	912	952	451	118	278	601	87	825	356	106	18,499
1935	9,013	21,358	4,445	4,782	4,023	1,266	310	787	1,933	3,524	1,750	391	962	54,544
1936	8,954	19,910	3,463	3,804	3,701	881	625	1,335	1,890	604	2,706	1,701	662	50,236
1937	9,425	16,590	2,826	2,761	4,125	659	190	540	924	327	2,214	836	410	41,827
1938	21,237	34,240	9,278	8,836	12,340	2,084	702	1,765	2,923	1,257	4,969	2,429	1,309	102,986
1939	7,251	10,254	2,585	2,339	2,482	930	372	797	1,747	640	1,591	999	534	32,521
1940 <sup>a</sup>	8,555	20,834	4,241	3,154	2,533	719	424	625	1,700	613	945	891	564	45,798

<sup>a</sup>Martin Creek discharge taken from U. S. G. S. data for entire year. <sup>1</sup>1940 discharges are from March 4 to June 30.

**DUCKWATER CREEK—1939 DISTRIBUTION**

By NYE TOGNONI, *Water Commissioner*

Duckwater Creek is located approximately 50 miles south of Eureka, Nevada, in Nye County.

A large warm spring having a nearly constant flow of from 12 to 14 c.f.s. rises at the head of the creek. Numerous smaller warm springs feed the creek at various points for several miles south of the principal spring. Approximately 3,000 acres are irrigated along the stream for a distance of nearly 12 miles.

The water commissioner began distribution of the water on April 13, 1939, and finished October 4, 1939. A Lietz horizontal water stage recorder was installed at the Irving-Vanover weirs on April 14 and used throughout the season as a check on the water diverted to the Irwin and Irving-Vanover rights.

The headgates in the diversions of Duckwater Creek are getting old, and from time to time repairs have to be made. At many of the diversions the diverted water is measured by using the opening under the headgate in the irrigation ditch as a submerged orifice, but this does not provide a very accurate measurement. A temporary Cippoletti weir was constructed this year at the No. 3 Mendes diversion, and a cement frame is to be made for it as soon as convenient.

I would suggest that Cippoletti weirs be built at all diversions where they have not already been put in use.

Another troublemaker in Duckwater Creek is the tailings ditch which collects the tailings from the Halstead and Callaway ranches and returns them to the main creek above the Irwin and Irving-Vanover weirs. When these tailings are flowing more than 2 c.f.s. the level is washed out and the water all flows down to the Irwin irrigation ditch.

This ditch is in such poor condition in the spring that it is one of the causes of a water commissioner being called before May 1 for any irrigation season, the reason being that instead of the Irving and Vanover ranches receiving their half of the water in the creek at this point, all of it is flowing to the Irwin ranch, since the flow is through the leaking tailings ditch instead of the main channel. A strong levee should be made with large cement spillways wherever an old creek bed is crossed. During flood seasons this spillway could be opened and the levee saved from being washed out.

At some points the creek bed is so shallow that it is easily filled up with moss, grass, and other debris during the summer, causing it to overflow. The worst of these places are above the "King Spring" on the "Bank Ranch" for about one mile, and about a mile of channel through the lower end of the Rosevear ranch and the upper end of the Callaway ranch.

**DUCKWATER CREEK—1940 DISTRIBUTION**

By NYE TOGNONI, *Water Commissioner*

The water commissioner was called on April 1, 1940, to begin distribution of the waters of Duckwater Creek.

The large flow of tailings from the Callaway and Halstead ranches prevented repair of the tailings ditch above the Irwin and Irving-Vanover weirs until April 27. The Lietz horizontal water stage

recorder was installed at these weirs on April 28 and a constant record is being kept of the flow over them.

A new cement frame for a Cippoletti weir was built by C. L. Munson at the No. 3 Mendes diversion. The Indian reservation now in development at the Florio ranches will probably have a complete set of cement weirs built before the next season, according to the several officials of Indian Affairs with whom I have talked. Mr. W. F. Mundy and Mr. Ed. Halstead are also planning construction of new weirs on their respective ranches. This will leave only one or two diversions without weirs on the stream system and they are small and little used.

It has been suggested that the lower users build a new levee along the tailings ditch which takes the tailings from the Halstead and Callaway fields to the main channel above the Irwin and Irving-Vanover weirs, this levee to be paid for by the A.A.A. if it was properly constructed. Nothing has been done about it as yet.

#### WHITE RIVER—1939 DISTRIBUTION

By NYE TOGNONI, *Water Commissioner*

White River is located approximately 25 miles southwest of Ely, Nevada, along U. S. Highway No. 6, in White Pine County.

The source of water is a mountain stream from the White Pine Mountain watershed. Approximately 900 acres are irrigated.

The water commissioner was called to White River by Mr. Walter Rosevear on June 10, 1939. The diversions were in a very poor condition and it was nearly impossible to divert the water at the proper places and control it without considerable labor. Most of the headgates had been washed out, and in some places the creek was nearly filled with sand. The total diverted water on June 17 was 3.95 c.f.s.

From July 18 to the end of the season all the water was rotated between the owners of the Geo. R. Hayden and Stephen Williams ranches since there was only enough water in the stream to satisfy their rights. The rotation covered a period of thirteen days, giving Williams two days, Windous seven and one-half, and Rosevear three and one-half days.

I would suggest a different system of diverting the waters, such as the one in use at Currant Creek, with good dams to get the water out of the main channel. In the present system when a flood is causing a flow of about 75 c.f.s. the headgates are washed out.

#### WATER DISTRIBUTION ON PAHRANAGAT LAKE AND TRIBUTARIES FOR THE SEASON OF 1939

By GERALD F. TRESCARTES, *Water Commissioner*

Regulation by the commissioner began July 5, 1939. At Ash Spring considerable time was required for regulation and distribution.

The usual method of distribution was followed, whereby the land is grouped under eight flows of water, each taking care of the land or ditches designated. Continuous flows of one c.f.s. per hundred acres

AVERAGES OF TOTAL DIVERSIONS IN SECOND FEET, DUCKWATER CREEK, NYE COUNTY, NEVADA

Irrigation season	March	April	May	June	July	Aug.	Sept.	Oct.	Maximum total daily diversion		Minimum total daily diversion		Acres-feet for the season
									c.f.s.	c.f.s.	c.f.s.	c.f.s.	
1930	.....	36.44	33.51	22.68	19.60	21.68	22.75	.....	41.67	18.20	.....	9,615.51	
1931	.....	27.98	26.45	21.17	19.72	19.49	18.96	.....	38.60	16.91	.....	8,385.09	
1932	.....	32.18 <sup>2</sup>	27.76	22.95	20.74	20.43	20.85	.....	38.85	18.99	.....	8,307.55	
1933	.....	31.83 <sup>1</sup>	27.59	23.94	21.53	20.77	20.23	.....	37.56	19.09	.....	8,445.85	
1934	.....	29.81 <sup>4</sup>	27.57	23.14	20.78	20.92	21.34	22.50 <sup>3</sup>	34.56	20.24	.....	8,358.60	
1935	.....	29.09 <sup>6</sup>	26.85 <sup>5</sup>	25.01	22.39	21.02	21.01	.....	30.10	20.30	.....	7,484.40	
1936	.....	29.35 <sup>7</sup>	25.98	22.75	22.18	23.34	22.86 <sup>8</sup>	.....	31.94	20.40	.....	8,477.34	
1937	.....	.....	27.87 <sup>9</sup>	27.47	23.43	22.82	21.87	22.92	30.97	19.65	.....	8,533.80	
1938	.....	32.26 <sup>10</sup>	32.34	25.80	23.78	20.91	.....	.....	37.69	19.30	.....	7,303.00	
1939	.....	32.05 <sup>11</sup>	28.82	22.30	21.52	20.11	.....	.....	34.92	18.28	.....	8,140.00	
1940	.....	33.77 <sup>12</sup>	25.39	21.34	.....	.....	21.42	24.05 <sup>13</sup>	.....	.....	.....	.....	

<sup>1</sup>Beginning April 7. <sup>2</sup>Beginning April 8. <sup>3</sup>Beginning March 28. <sup>4</sup>April 17 to April 30, inclusive. <sup>5</sup>October 1 to October 14, inclusive. <sup>6</sup>April 22 to April 30, inclusive. <sup>7</sup>April 10 to April 30, inclusive. <sup>8</sup>Beginning May 9. <sup>9</sup>Beginning April 14. <sup>10</sup>Beginning April 14. <sup>11</sup>Beginning April 15. <sup>12</sup>To October 5, inclusive. <sup>13</sup>Beginning April 2.

as set forth in the decree were allowed. Flows as shown in the following table were allowed under Ash Spring and Ash Spring Creek.

Middle ranch.....	0.72 c.f.s.
Chism ranch.....	1.85 c.f.s.
Steele, Foremaster, Wright and Ferguson ditch..	1.24 c.f.s.
Ferguson, Shumway, Lynch and Crackus ditch..	1.49 c.f.s.
Andhers, Tigbee and Ferguson ditch.....	1.36 c.f.s.
Alamo canal.....	6.38 c.f.s.
Richard Wedge ditch.....	2.18 c.f.s.
Jennings and Lawrence Sharp ditch.....	1.50 c.f.s.

The continuous flows were kept as nearly constant as possible, but during the extremely hot weather a reduction of all flows was necessary for short periods of time. Rotation schedules were made out for each flow for the various users. The day and hour that each should take the water and later return it to the canal were marked on each schedule. On certain ditches, such as the Richard and Wedge ditch, truck gardens were irrigated from the same ditch serving field crops. It was found that the gardens could not stand the long dry interval between harvest crop irrigations. Eight hours were taken two days each week, allowing each person on the ditch half of the stream for two hours, there being eight users on the ditch. This provided proper irrigation of the produce gardens.

At the Middle ranch the continuous flow was only .72 c.f.s., and the ditch is in very sandy soil and lined with large cottonwood trees. The flow disappeared and was lost before it reached the lands to be irrigated. Owing to this condition the water was turned off and allowed to accumulate until sufficient in amount was on hand for an irrigation. Usually the crop to be irrigated was corn, and required two irrigations a season.

The Chism ranch cooperated with me very well, and when the owner was through with the water he turned it back into the main channel to augment the flow below.

The structure which controls the high-line canal at the Higbee and Andhers diversion washed out as it had done before several times in the past. Owing to the sandy nature of the soil a hole had started and the entire flow in the ditch was diverted below the foundation of the structure. A crew of about fifteen men was gathered and a dump truck and team were secured. A load of rotten wild hay used to face the bottom of the ditch and the sides of the structure to hold the gravel and clay with which we filled the hole. When the clay and gravel settled and packed it formed a perfectly hard bottom. Several truck loads of rock were hauled and a spillway was constructed to prevent future washouts.

This method of repair has been successful and stood a severe flood less than a month later. The high-line canal was cleaned once during the season to remove weeds. This cleaning should be done at least once during the summer, for the heavy water growth raises the level of the canal and causes it to overflow its banks. This overflow results in drowning out of crops growing in the old Sharp swamp and also reduced the water supply below.

An improvement was made on the Ash Springs system by the construction of a headgate at the Chism, Steele, Wright, Ferguson, and Foremaster diversion on the east side of the valley. This diversion

structure is now of a rock rubble construction and is a substantial asset to the owners of the ditch.

**THE ALAMO IRRIGATION COMPANY**  
OFFICERS

K. C. STEWART.....	President
HARVEY FREHNER.....	Vice President
DAN STEWART.....	Secretary and Treasurer
JOSEPH COX.....	Director
BYRON A. ERCANBRACK.....	Director
DAVE HARRIS.....	Ditch Master 1939
DAN STEWART.....	Ditch Master 1940

The officers remain the same for the season of 1940 excepting a change in ditch masters. Under the Alamo Irrigation Company ditch about 700 acres are irrigated. Several of the decreed rights have pooled their water and placed it in the Alamo Irrigation Company's ditch and rotate with them. They find that this method, which provides a large head for a shorter period of time, gives more satisfactory irrigation than the use of a small continuous flow.

The crops raised are hay, grain, corn, garden stuffs and some fruits. The company has no outstanding indebtedness.

The distribution system is good and the company's ditches are fairly well kept up. Under their system I would say that beneficial use is made of all of the water during the hot dry season.

**CRYSTAL SPRING**

The Crystal Spring waters irrigate the upper ranch and a part of the middle ranch of the Gardner Ranching Company. The properties of Mrs. Chas. R. Wright and George Thiriot also receive their irrigation water from this source.

Very little of the commissioner's time was necessary to administer this spring. Both summer and spring rotation schedules were used for the distribution of this water. The spring schedule is effective from March 14 to June 22, at which time the summer schedule starts and is continued until October 1. All parties have copies of schedules which designate the day and hour the water is to be used. This is taken care of by the water users concerned, and needs only occasional checks by the water commissioner.

SPRING SCHEDULE

Gardner Ranching Co.....	4.50 days
Mrs. Chas. R. Wright.....	4.00 days
George Thiriot.....	3.00 days

SUMMER SCHEDULE

Gardner Ranching Co.....	6.00 days
Mrs. Chas. R. Wright.....	3.00 days
George Thiriot.....	4.50 days

**HIKO SPRING**

Hiko Spring is in the extreme northern end of Pahranaagat Valley. Water users under the spring are as follows: Murray Whipple, Mary Castle, Mrs. Wright, John Castle property, Edgar Nesbitt, Merle Schofield, Wm. Schofield, and Albert Hansen. Rotation in use of the entire flow is the method of distribution.

The flow is divided in half at the spring. Whipple, Nesbitt, Wright, and Castle rotate one-half of the spring between them, and Schofield

and Hansen rotate the other half in proportion to their acreage. One schedule applies the entire season. Changes are taken care of by the users. The duty of the commissioner is to check and keep a record of the respective flows and to aid in eliminating local disputes when such occur.

Requests were made to the commissioner by various users on the stream for a more satisfactory method of division at the spring between the upper Hiko users and Schofield. This request brought out some other problems in regard to ditch maintenance.

During the season a plan was worked out to the satisfaction of all users on the Hiko Spring ditch. After the middle of September, when most of the distribution work had ceased, we began an improvement program.

A dump truck was secured and a dirt-loading trap was used, by means of which an earth fill was constructed across the spring which raised it .80 foot and stopped all leaks excepting small spring flows which rose below the dam. Using the spring for a weir pond, three wooden flumes were installed. Each of the flumes was the same size and set at the same elevation. Two were set on the south of the spring and one installed on the north side of the spring. Water from one of the flumes on the south was diverted back to the Schofield channel. As the upper users used water from both the south and north side of the spring, depending on who was irrigating, it was necessary that they have two flumes. The Schofield flume ran constantly, but the others had to be changed from the north to the south side of the spring. This was done by having a gate to close either flume for only two flumes were used simultaneously. As the flow in each was equal, this gave a fifty-fifty division at the spring.

The time required for making the water change is only a few minutes now, whereas by the old method the water had to be raised in the spring and a point watched about an hour each time, and the division could not be accurately made.

These flumes were each set with a level, and as extra precaution against settling, metal plates were made out of one-eighth inch strap iron and fastened with screws to make them adjustable. Any change in settling can be compensated. The plates were adjusted in position with the use of a level.

Several tons of gravel and clay were hauled to construct new ditch banks where they had washed out or been tramped down by stock. Debris and some large cottonwood trees were removed from the ditch which carries the excess winter water.

The property owners furnished the labor and prorated the cash outlay per acre. The cash expenses consisted principally of lumber and gasoline for the truck. This work should fulfill a long-felt need at this spring.

#### **WATER DISTRIBUTION ON PAHRANAGAT LAKE AND TRIBUTARIES FOR THE SEASON OF 1940**

By GERALD F. TRESKARTES, *Water Commissioner*

I arrived in Pahranaagat Valley June 16, 1940, and the time to compile data for a report has been limited. The water situation on June 16 was very good and remained so for a few days. With the

coming of extremely hot weather a noticeable drop in the flow occurred and regulation was started.

Continuous flows and rotation were used as formerly practiced. The general condition of most ditches was bad and there was a need of cleaning. No more washouts have occurred on the high-line canal where so much difficulty had been previously experienced, as the repair job had stood the winter waters in fine shape.

Crops for the season to date are good. Most of the second cutting of alfalfa has been harvested and the land is being irrigated for the third crop. The same is true of the wild hay. The first crop has been stacked and irrigation is proceeding for the second. Most of the small grains such as oats, barley, and wheat have been cut and threshed. Corn is somewhat late, caused by the cool weather of early spring, but with the present hot weather it has started to grow and as irrigation proceeds it may yield a fair crop.

The use of a surveyor's level was secured from the Division of Grazing Engineer at the Hiko C.C.C. spike camp, and the elevations of the flumes installed last fall were checked and found to be the same as set in the fall of 1939. The new structures seem to be satisfactory, and there have been no complaints from the water users.

#### RECOMMENDATIONS

From my experience and observation during the last five irrigation seasons in the valley, I believe that the following measures would be of help in the distribution and use of the water in Pahranaagat Valley:

A rotation plan including all of the owners of the old Henry Sharp swamp working as a unit or a company should be formed. Proper ditches and diversions to provide a rotation schedule could be constructed. At present the water is divided into many small heads and most of it is lost during transportation in long ditches not properly cleaned. Even where small heads are taken out adjacent to the canal it is not practical to irrigate with such small flows. Better results are available by rotation. More land could be irrigated and effective saving of the water to the stream system be accomplished.

A small drainage project extending from the lower end of B. A. Ercanbrack's property for a quarter of a mile south is advisable. A drain was dug here several years ago by the C.C.C. but they did not lower it enough. It is necessary to break through about six inches of hard pan to complete this drain. When this is done, the grade will be sufficient to wash the drain down to a level where it will be permanent. The work should be done in midsummer, for the flow then is at a minimum. This is undoubtedly why the C.C.C. could not complete the work for they were working under the full head of winter water. This should be a good summer W.P.A. project for the valley. In the years 1935 and 1936, shortly after this work was first done, good corn and hay were grown over this area, known as the Reeder Lake. Lack of maintenance of the shallow drain has caused the land to become inundate in early fall and late spring, which makes this area useless for farming.

A flood control project should be constructed for protection of the high-line canal just below the Wm. Ferguson ranch and two emergency control gates put in to take care of the water during floods. This

will save crops in the old Sharp swamp, as well as prevent much sand from entering the large high-line canal.

Central control points should be established for the Higbee and Anders west ditch, Richard and Wedge ditch and the Wm. Ferguson lower place to prevent raising the canal and holding a high level over a long span. This will reduce water loss at that point.

The general lack of good diversion controls and measuring devices is noticeable. Improvement should be made at various places.

The removal of all cottonwood trees growing along the high-line canal ditches and drains is strongly advised. Since the construction of the high-line canal and all drains and ditches, these trees have grown large. Owing to their age and size they can be quite easily handled. They have already attained large size and cause a retardation of water flow in the ditches and drains.

## CHAPTER VII

### Report on Muddy River, Clark County, Nevada

BY HUGH A. SHAMBERGER, *Deputy State Engineer*

During past years various complaints have reached the office of the Nevada State Engineer from the Muddy Valley Irrigation Company, in Clark County, Nevada, pertaining to alleged waste of water by the Indians on the Moapa Indian Reservation, and also to the manner of water use as practiced by the Indians. Such complaints motivated Alfred Merritt Smith, Nevada State Engineer, when in Washington, D. C., last July on business pertaining to the Boulder Canyon Project Adjustment Act, to call at the office of Indian Affairs and discuss the subject with the Commissioner, having in mind inaugurating a program that would tend to solve this problem and provide the establishment of proper relationship between the Indians on the Reservation and the Muddy Valley Irrigation Company, and also the establishment of equitable water rights between the U. S. Indian Service and all other users on the Muddy River stream system.

Mr. Smith discussed this matter in detail with William Zimmerman, Assistant Commissioner of Indian Affairs. Mr. Zimmerman expressed his pleasure over the idea of conducting a survey of this area and assured Mr. Smith that the Indian Service would cooperate in every possible way, and suggested that we communicate with Supervising Engineer E. C. Fortier, 647 Phelan Building, San Francisco, California, of the Irrigation Division, and with Miss Alida C. Bowler, Superintendent of the Carson Agency at Stewart, Nevada, who at that time had supervision of the Moapa Reservation.

While in Washington, D. C., Mr. Smith also discussed the matter with Congressman J. G. Scrugham, who is very familiar with this stream system and was State Engineer at the time the waters of said river were adjudicated in 1919 and 1920. Mr. Scrugham expressed his approval of such a program and promised aid in securing an appropriation to carry through the work.

Following Mr. Smith's return from Washington he communicated with Mr. Fortier and Miss Bowler, who readily approved of the State Engineer's office conducting a survey with the purpose of enabling the State Engineer to make suggestions as to possible improvements in the irrigation system and in the operation thereof.

As a result of these communications and conferences a meeting was arranged between representatives from the Indian Service and the State Engineer's office for October 5, 1939, at the Moapa Indian Reservation. Mr. Smith, who had planned to be there, was suddenly called to Washington, D. C., on urgent matters pertaining to the Boulder Canyon Project Adjustment Act and so delegated the writer to represent this office. The Indian Service was represented by Thomas C. Guyn, Irrigation Engineer; V. W. Balderson, Assistant Irrigation Engineer; F. M. Parcher, Project Manager for the C.C.C. Indian Division; Hugh Rossolo, Junior Engineer, C.C.C. Indian Division, and J. Harvey Pocock, Agent Moapa Indian Reservation.

The Muddy Valley Irrigation District was represented at the meeting by Edwin Marshall, President, Clarence Lewis, Wallace Jones, and Joseph Perkins, Directors.

Before discussing the opinions rendered at the meeting and the procedure decided upon I will give a brief description of pertinent points that enter the picture, such as the origin of waters of Muddy River, water rights of record, drainage area, and the physical characteristics of the stream.

#### PHYSICAL CONDITIONS

Muddy River is formed by a large group of springs rising mainly in portions of section 16 T. 14 S., R. 65 E., M. D. B. & M., with some contribution being from springs arising in adjoining sections. The springs rise mainly on the property known as the "Home Ranch" which formerly was owned by the Moapa & Salt Lake Produce Company, now owned by the Calvin Beach Estate. The river flows in an easterly and southeasterly direction, traversing the entire length of the Moapa Indian Reservation and crossing under the Union Pacific railroad line about a quarter of a mile southwesterly from Moapa. Near the crossing of U. S. Highway No. 91, which is about 1,000 feet southwesterly from Glendale, the Muddy River is joined by the Meadow Valley Wash, which normally at this point is a dry stream channel except at times of precipitation on its watershed, when if extensive enough causes this wash to become a river having at times a discharge of several thousand cubic feet per second. From this point the river continues a southeasterly course and near the center of section 7, T. 15 S., R. 67 E., passes through what is known as the "Narrows" where the walls of the valley converge, forming a narrow pass. At a point in the NW $\frac{1}{4}$ NE $\frac{1}{4}$ , section 21, T. 15 S., R. 67 E., the Forestry Service, through its C.C.C. Division in cooperation with the Muddy Valley Irrigation Company, constructed a diversion dam commonly known as the Wells Siding Project. The dam is 677 feet long, 140 feet wide at the bottom, 20 feet wide at the top and 30 feet high. The dam, which is earth fill, contains 36,417 cubic yards of material. The spillway has a capacity of 10,000 c.f.s. with additional 5,000 c.f.s. for emergency into the old flood channel, and will deliver 1,000 c.f.s. of water through triple gates to the Bowman reservoir. The canal leading to the Bowman reservoir is one and one-half miles long and has a maximum capacity of 1,600 c.f.s. of water.

The Bowman reservoir is located about one mile easterly from the main channel of the Muddy River, and the dam is an earth fill 620 feet long, 35 feet high, with a base width of 195 feet, a crest width of 17 feet, and contains 107,000 cubic yards of material. The discharge pipe is 12 inches in diameter, 174 feet long, with capacity of 15 c.f.s. The maximum capacity of Bowman reservoir is 1,000 acre-feet.

The main diversion for irrigation for the Muddy River Irrigation Company is at the Wells Siding dam, irrigation canals extending down the valley on both sides of the Muddy River channel.

From the Wells Siding dam the main channel continues in a southeasterly direction, running about a quarter of a mile east from Logandale and about a half mile easterly from Overton, and joins Lake Mead approximately in the SE $\frac{1}{4}$  of section 29, T. 16 S., R. 68 E.

Before the forming of Lake Mead by the building of Boulder Dam the Muddy River channel continued in the same direction and confluenced with the Virgin River approximately in section 13, T. 17 S., R. 68 E., about two miles below the now submerged town of St. Thomas, the combined streams confluencing with the Colorado River near section 32, T. 20 S., R. 68 E., at Rioville, the old Bonelli Ferry Station.

The present length of Muddy River from its source to where it enters Lake Mead is approximately 26 miles. From Warm Springs near the center of the NE $\frac{1}{4}$ , section 16, T. 14 S., R. 65 E., which is near the head of the Muddy River, downstream to the White Narrows dam site near the upper end of the Indian Reservation, is a distance of about 3 $\frac{1}{2}$  miles; from Warm Springs to the Narrows in section 7, T. 15 S., R. 67 E., is a distance of about 12 $\frac{1}{2}$  miles. "The Narrows" is the dividing line between the upper and lower water users, which will be further explained later.

Above Warm Springs the Muddy Canyon extends in a northwesterly and westerly direction for more than ten miles, and is dry except during heavy rains on its watershed, at which times a river volume of water comes down this canyon. Four miles above Warm Springs the canyon walls converge closely, forming a very narrow gorge with almost vertical walls for a distance of about four miles. This is Arrowhead Canyon, the floor of which is only 19 to 35 feet wide, while the depth averages from 80 to 100 feet.

At the upper end of Arrowhead Canyon and approximately located in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ , section 3, T. 14 S., R. 64 E., a rubble masonry arch dam known as the Arrowhead Dam, has been constructed by the C.C.C. under supervision of the Forestry Service. The dam was completed in 1934 and has a base width of 26 feet, crest width of 10 feet, crest length of 45 feet, and is 35 feet high above flow line. A 24-inch outlet pipe having no regulating valve was placed 15 feet above the toe of the dam. The drainage area above the dam is mainly from the northerly and easterly slopes of Sheep Mountains, the Pahrnagat Valley, the Arrow Canyon Mountains, and the westerly slopes of the Meadow Valley Mountains. The drainage area above the Arrowhead Dam, which has been conservatively estimated to be about 1,000 square miles, rises to elevations of over 8,000 feet in the Sheep Mountains. The purpose of this dam was apparently flood and silt control. At the present elevation there is a storage capacity of slightly in excess of 300 acre-feet and this amount has been reduced somewhat due to silt deposit. An increase of 10 feet in height of the dam would add about 400 additional acre-feet capacity.

The canyon extends onward in a northwesterly direction and about six miles above Arrowhead Canyon its walls come together, forming Double Canyon. Beyond Double Canyon the canyon divides into two canyons, one known as Elgin Wash, which continues northerly and drains that part of Pahrnagat Valley below Maynard Lake. The other branch turns westerly and catches the Sheep Mountains run-off.

#### HISTORICAL

The first settlement in the Muddy Valley was in the year 1865 when Mormon colonists from Utah settled at St. Thomas. Population in the valley increased until in 1871 when there were about 600 people living

there. Shortly after coming to the valley the Mormons began tilling the land and dug canals to divert the waters of the Muddy River for irrigation. No data is available as to the acreage under cultivation during this time.

At the time the Mormons first settled here the valley was in Pah-ute County, Territory of Arizona. An Act of Congress passed in 1886 added a strip of land lying between 115° and 114° west longitude, and north of the Colorado River, which placed the settlements in Nevada. In 1870 certain disagreements arose between these settlers and the county officials of Lincoln County which resulted in all the Mormons leaving the valley and going to Utah, with one exception, that being Daniel Bonelli, who remained and operated the Bonelli Ferry at Rioville on the Colorado River.

In 1881 Mormon settlers returned to Moapa Valley and from that date to the present they have made steady strides in the development of the natural resources of the valley, and today it is one of the most highly developed agricultural valleys in this State. In 1938 about 2,126 acres were in summer cultivation within the confines of the Muddy Valley Irrigation Company, producing 4,014 tons of alfalfa, 2,437 crates of asparagus, 411 tons of barley, 148,308 pounds beet seed, 20,216 crates of cantaloupes, 883 tons of corn, 1,687 crates of green onions, 675 crates of lettuce, 90 tons of milo, 31,255 dozen radishes, 124 tons of wheat, and 9,039,700 tomato plants.

#### MUDDY VALLEY IRRIGATION COMPANY

The Muddy Valley Irrigation Company was incorporated in August 1895. The capital stock of the company was \$15,000, divided into 15,000 shares of stock of par value of one dollar. On April 21, 1906, the stockholders met for the purpose of amending the articles of incorporation, the amendments being adopted August 25, 1906. The amendments were briefly as follows: The amount of capital stock (in lieu of the \$15,000 of the former issue, at the par value of one dollar per share, as provided in the original articles of incorporation) was increased to \$130,000 divided as follows: 5,000 shares of preferred stock of par value of \$20, and 10,000 shares of common stock of par value of \$3.

The original shares of the company were issued upon the basis of one share of stock for each acre of land admitted to voting power and susceptible of irrigation from the Muddy River. The irrigation company received quit-claim deeds from its subscribers to all their right, title, and interest in and to the waters of Muddy River and its tributaries. Under the 1906 amended articles of incorporation preferred stock was issued only to holders of the original stock who had placed water to beneficial use prior to June 2, 1900, upon the basis of one share of preferred stock in exchange for one share of the original stock, and one share of common stock was issued to holders of the original stock who owned the land that was not irrigated in 1901, in exchange for one share of the original stock. In the adjudication proceedings which were conducted in 1919 and 1920, the Muddy Valley Irrigation Company was awarded a water right of 36.2588 c.f.s. for summer use and 45.3945 for winter use. Later the company acquired

the rights decreed to John Perkins in the amount of .0286 c.f.s. for summer use and .02 c.f.s. for winter use, giving the Muddy Valley Irrigation Company a summer right of 36.2874 c.f.s and a winter right of 45.4145 c.f.s. These rights were predicated upon a duty of 1 c.f.s. of water for 70 acres of land from May 1 to October 1, and for winter use from October 1 to May 1 of the following year a duty of 1 c.f.s. for each 100 acres of land. The preferred stock was issued on a basis of 70 shares for each 1 c.f.s. of water. On this basis the company was entitled to issue 2,540 shares of preferred stock. These shares of preferred stock under this preference right over the common stock during the winter season are entitled to 25.40 c.f.s. of water. The balance of the water allowed to the company for winter use amounting to approximately 20 c.f.s. is divided pro rata upon the company's total of 6,195.12 outstanding shares of common stock as of 1932.

The decree in the matter of the Determination of the Relative Rights in and to the Waters of the Muddy River and its Tributaries allocates water to 5,555.86 acres of land, of which 4,541.56 acres lie in the Lower Moapa Valley, the water rights of which are owned by the Muddy Valley Irrigation Company. The right of the individual land owners to use this water is, as heretofore stated, evidenced by shares of stock. All of this land in the lower Moapa Valley was decreed a winter use of water. However, only 2,670 acres was given a summer use of water.

Shortly after construction work began on Boulder Dam it became necessary for the Government to purchase considerable land in the vicinity of St. Thomas, land which would be affected by the creation of Lake Mead. A great deal of this land had decreed water rights from the Muddy River which were evidenced by shares in the Muddy Valley Irrigation Company and which were appurtenant to the land purchase. Subsequent thereto the Muddy Valley Irrigation Company repurchased the shares of stock from the Government for a reputed sum of \$20,000. These shares were then prorated among the remaining holders of preferred stock apparently in proportion to the amount they already held.

According to records in the State Engineer's office the Government purchased all privately owned lands having a decreed water right in Townships 16 and 17 S., Range 68 E., which contained 1,089.20 acres having a decreed summer use of water, and 1,199.81 acres having a decreed winter use, which includes 425.20 acres having a summer right, or a total of 1,863.81 acres of land purchased by the Government which had decreed water rights.

Decreed water rights on certain portions of the land purchased by the Government were initiated by means of applications to appropriate water, but were given a priority as of January 1, 1905, by the court, and were included in the said decree. On such lands the duty was based on 1 c.f.s. for one hundred acres of land for both summer and winter use. Included in the lands purchased by the Government having a summer use of water was 425.20 acres which were decreed 4.252 c.f.s. of water. The remaining 664 acres with a duty of 1 c.f.s. for each 70 acres of land was allowed 9.48 c.f.s., or a total of 13.732 c.f.s. allocated to summer use on lands purchased by the Government. On the basis of 70 shares of preferred stock for each 1 c.f.s. of water

the Government came into possession of 961 shares of such stock, which represented about 38% of the total outstanding issue, and which were later repurchased by the Muddy Valley Irrigation Company.

The 6,195.12 shares of common stock was apparently sold to owners of lands having a winter right under the permitted rights as evidenced by Certificates of Appropriation Nos. 58A, 59AA, 60A, and 1199, as shown on page 56, and which were included in the decree. The 1,199.81 acres of land purchased by the Government having only a winter water right carried with it about 3,240 shares of the common stock, or about 53% of the total outstanding shares.

The manner of use of the water amounting to 13.732 c.f.s. for summer use and about 10.6 c.f.s. for winter use that is represented by the purchased stock from the Government and which was moved upstream is not completely known. Some of the water as evidenced by the preferred stock has been placed on new land, some has been placed on land having a winter use under the common stock, and some has been used to supplement lands already having summer irrigation rights where more water is required for higher class of culture. The legality of the changing of place of use of this water in this instance without making application to the State Engineer as set forth in section 59, chapter 59, Stats. of 1919, is not known, and will not be discussed in this report except to state that at the time of such change there was no appropriator of water below the Muddy Valley Irrigation Company; that the land to which the water was changed is within the confines of the area that is dependent upon the distribution of water by the Muddy Valley Irrigation Company, and that the point of diversion remains the same.

#### MOAPA INDIAN RESERVATION

In about the year 1873 the Moapa Indian Reservation was created. By an Act of Congress on March 3, 1875, the reservation was reduced to about 1,000 acres, of which some 625 acres are irrigable. Correspondence of record with the U. S. Department of the Interior, Indian Service, indicate that in 1873 some 130 acres were under irrigation, chiefly in barley, wheat, corn, beans, and melons. In 1874 there were 370 acres under cultivation. A map prepared by Henry W. Dietz, Supervising Engineer, U. S. Indian Irrigation Service, made in May and June 1919, shows 351.58 acres of irrigated lands. In 1915 the irrigable lands were allotted in severalty to 117 members of the tribe; twenty-five year trust patents were issued. Some 604.52 acres were allotted in this fashion, the heads of families receiving 7½ acres, married women 5 acres, single adults 5 acres, orphans under 18 years of age 5 acres, and all other minor children 2½ acres. A few acres of irrigable land were reserved for school and agency purposes.

From 1873 when the Moapa Indian Reservation was formed, and from 1881 when the Mormon people again settled along the Muddy River and up until shortly after the turn of the century the settlers were busy building canals, ditches, and breaking up new land. There being sufficient water for all at that time no water troubles appear to have entered into the picture until about the year 1906 when certain arguments were raised between the water users.

### WATER RIGHTS

The State Engineer's office having been created just three years prior to 1906, the then State Engineer Henry Thurtell was called upon by the water users of the Muddy River to settle the controversies. During 1906 Mr. Thurtell caused a hydrographic survey of Muddy River to be made, and collected a list of the various appropriations of water rights with the priority. About March 1, 1907, the State Engineer's office issued 121 certificates setting forth therein the name and post office address of its appropriators, the priority number, the number of acres for which water is appropriated and a description of the land to which the water was appurtenant. These certificates adjudicated water to approximately 2,800 acres of land along the course of the Muddy River.

The 1903 and 1905 Acts relating to adjudication procedure were very simple. The Act vested in the State Engineer the authority to collect and prepare for each stream in the State a list of the appropriations of water according to priority, based on a hydrographic survey of such streams and a cultural survey of lands irrigated therefrom, and upon the sworn statement of each appropriator of the facts upon which the claim was based. Following the preparation of such a list, it became the duty of the State Engineer to issue certificates of water rights. The Acts of 1903 and 1905 were repealed in 1907 and replaced by a new Act. In 1909 and 1911 certain amendments were added, but in 1913 the Act was repealed and replaced by a new Act. In 1921 the Supreme Court ruled that certain sections in the 1913 Act relating to the adjudication procedure were unconstitutional, as they gave the State Engineer certain judicial powers. The result of this ruling was that although it was applied to the 1913 Act it annulled all adjudication proceedings under the older Acts insofar as these earlier Acts particularly gave the State Engineer complete judicial powers in determining the magnitude and extent of vested water rights. Due to this and other circumstances that occurred prior to 1921, the Thurtell certificates of 1907 were not accepted by the water users, and serious litigation ensued between the upper and lower appropriators. In the spring of 1919 a stipulation was entered into between the upper and lower users and filed with the District Court of Clark County, Nevada, on April 23, 1919. The stipulation set forth the several amounts of water the defendants were entitled to divert, which included all the users other than the plaintiffs, Muddy Valley Irrigation Company and John F. and Ellen C. Perkins, and the Indian Reservation which did not enter into the stipulation. The stipulation also set forth the amounts of water the plaintiff Perkins and the Indian Reservation were entitled to divert and reserved to the Muddy Valley Irrigation Company all the remaining water of said river.

Besides other matters the stipulation provided that the court could refer this matter to the State Engineer for an adjudication of the water rights of the Muddy River in accordance with the provisions of Chapter 140, Statutes of 1913.

On April 23, 1919, the District Court referred this matter to James G. Scrugham, then State Engineer of Nevada, with instructions to prepare and file a Final Order of Determination under the provisions

of the statutes of the State, making said order conform to the terms of the stipulation. On January 21, 1920, the State Engineer made his Order of Determination and filed same with the court on January 26, 1920. This Order of Determination did not fully conform to the conditions of the stipulation and was remanded back to the State Engineer for correction. On March 11, 1920, the State Engineer made and filed his Supplemental Order of Determination. On March 12, 1920, the Order of Determination as amended and modified by the Supplemental Order of Determination was affirmed by the court, and judgment and decree entered.

A summation of the decreed rights is as follows:

Claimant	Acreage	Summer	Winter
Jacob Bloedel	2.0	0.0286	
Moapa & Salt Lake Produce Co. <sup>1</sup>	155.0	2.215	1.55
Isaiah Cox and wife <sup>2</sup>	10.0	0.143	0.10
Isaiah Cox and wife <sup>2</sup>	3.0	0.043	0.03
George and Aletha Baldwin <sup>3</sup>	16.0	0.2286	0.16
George and Aletha Baldwin <sup>3</sup>		0.8298	0.8298
Sadie George	2.10	0.03	0.021
Los Angeles & Salt Lake R. R. (transportation)		0.04646	0.04646
Livingston & Smith	160.0	2.286	1.60
Holmes & Knox <sup>4</sup>	95.0	1.357	0.95
W. J. and Mary Powers	29.0	0.4143	0.29
Joe Perkins	30.0	0.428	0.30
Moapa Indian Reservation	87.0	1.242	0.87
John Perkins <sup>5</sup>	2.0	0.0286	0.02
Muddy Valley Irrigation Co.	2244.80	32.0068	22.448
Muddy Valley Irrigation Co. (Cert. 59AA)	425.20	4.2520	
Muddy Valley Irrigation Co. (Cert. 59AA)	846.65		8.4665
Muddy Valley Irrigation Co. (Cert. 58A)	398.11		3.98
Muddy Valley Irrigation Co. (Cert. 60A)	80.0		0.80
Muddy Valley Irrigation Co. (Cert. 1199)	970.0		9.70

The decree establishes the irrigation seasons and divides same into two seasons, the summer season being from May 1 to October 1 and the winter season from October 1 to May 1 of the following year, with the exception of the Moapa Indian Reservation where the summer irrigation season was set as being from April 1 to October 1 and the winter season from October 1 to April 1. As heretofore stated, the duty of water was set for the summer irrigation period at 1.0 c.f.s. to each 70 acres of land, and for the winter period 1.0 c.f.s. of water to each 100 acres of land.

The decree divides the Moapa Valley into two parts, the "Upper Valley" and the "Lower Valley," the Upper Valley being that portion above the "Narrows" and the Lower Valley being below the "Narrows." The Narrows is situated immediately below the old Wiser Ranch designated in the decree as the Knox & Holmes Ranch, now belonging to Pete West, and being as heretofore described in Section 7, T. 15 S., R. 67 E.

By virtue of the transfer of the John Perkin's right to the Muddy Valley Irrigation Company, this company is at present the only owner of legal water rights in the Lower Valley. The company's summer right amounts to 36.2874 c.f.s. for the irrigation of 2,670 acres of land.

<sup>1</sup>Known as the Home Ranch, now owned by Mrs. Ray Weber and sister.

<sup>2</sup>Owned by Arthur Doty.

<sup>3</sup>Location of the 16 acres is just east of Indian Reservation in secs. 25 and 36, T. 14 S., R. 65 E. Permit No. 6419 filed 1921 by Baldwin changes place of use of 0.2 c.f.s. on 14 acres to portions of secs. 14, 15, and 16, T. 14 S., R. 65E. Transferred to Calvin Beach in 1924. Remaining 0.0286 c.f.s. remains as decreed place of use.

<sup>4</sup>Considered as newly developed water.

<sup>5</sup>Now Pete West.

<sup>6</sup>Transferred to Muddy Valley Irrigation Co.

The decree awards the company a winter irrigation right of 45.4145 c.f.s. on 4,541.56 acres of land.

The total rights decreed to the Upper Valley, excepting the amount awarded the Moapa Indian Agency of 1.242 c.f.s., and the Baldwin Spring flow of 0.8298, amounts to 7.21996 c.f.s. for summer use on 502.1 acres of land and 5.04746 c.f.s. for winter use on 500.1 acres of land, the Bloedel 2.0 acres of land not being included for winter use.

The decree allowed a duty of water on the Indian Reservation during the summer season of 183 days of 5.18 acre-feet per acre or a continuous flow of 0.01428 c.f.s. per acre, and for the winter season of 182 days a duty of 3.61 acre feet per acre was granted, or a continuous flow of 0.01 c.f.s. per acre. The amount of water allocated per acre for the entire year was 8.79 acre-feet. The decree allowed a duty for all other users for the summer season of 4.33 acre-feet during 153 days and for the 212-day winter season a duty of 4.20 c.f.s., or a year-round duty of 8.53 acre-feet per acre, the continuous flow per acre being the same as allowed the Indian Reservation.

Although the Moapa Indian Reservation was duly notified of the pendency of these proceedings in the statutory manner, the United States Indian Service authorities did not file a claim and stated that they refused to recognize the authority of the State of Nevada to determine the water rights of the reservation. In the absence of any showing on the part of the Indian Service, the State Engineer based his allotment on the official investigations and reports, that have been previously referred to herein, made in the year 1906 by Henry Thurtell, State Engineer of Nevada. These reports gave the Moapa Indian Reservation an allotment of water sufficient to properly irrigate an area of 87 acres.

Immediately following the issuance of the decree in 1920 the State Engineer through his water commissioner on the Muddy River made several attempts to distribute the waters of the Muddy River within the Indian Reservation and in the amounts allotted therein, but in all such instances was denied permission to do so by the agent in charge of the Reservation. Considerable correspondence was carried on by the State Engineer, the U. S. Attorney-General's office and the Commissioner of Indian Affairs in Washington, D. C., the State Engineer maintaining the State's sovereignty over all waters within the State, and the U. S. Indian Service maintaining that the State of Nevada has no jurisdiction upon the Reservation for the purpose of distributing water; that when the Reservation was created in 1873 sufficient water was reserved to irrigate the 600 acres of irrigable lands therein, and such are immune from State control.

At one time in these proceedings it was suggested that litigation be instigated in order to settle questions of jurisdiction and determine the Government water rights. No litigation, however, was started, and at the present time the status remains the same. The present complaints on the part of the Muddy Valley Irrigation Company are not based so much on the quantity of water the Indians use but on the manner under which they use it. It appears from information furnished us that during the various harvest periods in the Lower Valley many of the Indians are employed there to help harvest the crops. When they

return to the Reservation they immediately begin irrigating their lands and divert from the Muddy River all the waters their diversions will afford. This is allegedly kept up until the next harvest season in the Lower Valley. The result is that there is a great fluctuation in the flow to the Lower Valley, and due to the method of use in the Lower Valley works a hardship on the particular users during the low water period. In the Lower Valley water rotation is used whereby an appropriator is allowed for a certain number of hours a month a much larger head of water than he would be entitled to under his decreed continuous flow. Naturally then, when the Indians are diverting a large amount of water upstream there is not enough water left in the stream to satisfy whoever has the rotation period below.

Under the statutory laws relating to the appropriation of water by filing application to so appropriate with the State Engineer there have been several applications filed to make new applications of water and to change the place of use of waters already appropriated. These applications are briefly as follows:

Application No. 4852 filed in January 1918 by the Muddy Valley Irrigation Company to appropriate 86.95 c.f.s. of the underflow or subsurface waters of the Muddy River at the so-called Narrows in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ , Sec. 7, T. 15 S., R. 67 E. The water was to be applied to 8,695 acres of land. No action has been taken on this application.

Application No. 6169 filed June 14, 1920, by the Moapa & Salt Lake Products Co., to change point of diversion and place of use of one (1) c.f.s. of the waters of the Muddy River as represented by 100 shares of common stock of the Muddy Valley Irrigation Co. for use during the winter season for the irrigation of 100 acres of land in portions of Sections 14 and 15, T. 14 S., R. 65 E. This application was protested August 30, 1920, by the Muddy Valley Irrigation Co. on the grounds that 100 shares of common stock was not entitled to draw a constant flow of one c.f.s. during the winter season, and that a change in the point of diversion and place of use of one c.f.s. would do material damage to the protestant. No action has been taken on this application, which we understand now belongs to the Calvin Beach Estate.

Application No. 6419 filed March 9, 1921, by George Baldwin to change the point of diversion and place of use of  $1\frac{1}{70}$  c.f.s. of the waters of Muddy River heretofore decreed to George Baldwin. The water was to be placed to beneficial use in portions of Sections 14 and 15, T. 14 S., R. 65 E. Said application was granted and proof of beneficial use was filed August 18, 1924, setting forth that 0.2 c.f.s. was beneficially used during the summer season and 0.14 c.f.s. during the winter season on 14 acres of land in the W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ , Sec. 15, T. 14 S., R. 65 E. No certificate was ever issued under this permit due no doubt to the fact that no cultural map was ever filed.

Application No. 7855 filed August 21, 1926, by the Muddy Valley Irrigation Co. to store 10,000 acre-feet of the flood and unappropriated waters of the Muddy River. Point of diversion was in the NW $\frac{1}{4}$ NE $\frac{1}{4}$ , Sec. 21, T. 15 S., R. 67 E., and was to be used for domestic, power, and irrigation purposes on 6,500 acres of land in portions of T. 15 S., R. 67 E.; T. 16 S., R. 67 and 68 E.; T. 17 S., R. 68 E. Said application was approved December 15, 1939.

Application No. 7856 filed August 21, 1926, by the Muddy Valley Irrigation Co. to store 34,000 acre-feet of the flood waters of Meadow

Valley Wash at a point in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ , Sec. 1, T. 13 S., R. 65 E. Water to be used to irrigate 9,000 acres of land in portions of T. 14 S., R. 66 E.; T. 15 S., R. 67 E.; T. 16 S., R. 67 and 68 E., and T. 17 S., R. 68 E. No action has been taken on this application.

Application No. 8818 filed in January 1929 by Clarence A. Lewis to store 10,000 acre-feet of the waters of Muddy River and tributaries for the irrigation of 8,000 acres of land in portions of T. 15 S., R. 66 and 67 E.; T. 16 S. R. 67 and 68; T. 17 S., R. 68 E., and T. 18 S., R. 68 E., M. D. B. & M. The dam to be located in the SW $\frac{1}{4}$ SE $\frac{1}{4}$ , Sec. 26, T. 14 S., R. 65 E. It is our understanding that Mr. Lewis filed this application in behalf of the Muddy Valley Irrigation Co. No action taken on this application. This storage reservoir to be at the White Narrows reservoir site.

Application No. 9461 filed May 1931 by Calvin B. Beach to appropriate 0.0286 c.f.s. of the waters of Muddy River at a point in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ , Sec. 21, T. 14 S., R. 65 E. Mr. Beach stated in said application that he is applying for the water right that was allotted to Jacob Bloedel by the Order of Determination in the Matter of the Determination of the Relative Rights in and to the Waters of Muddy River, on the grounds that Jacob Bloedel and his successors in interest had abandoned said right by nonuser thereof for a continuous period of five years. No action taken by the State Engineer's office.

Application No. 9985 filed August 20, 1936, by Muddy Valley Irrigation Co. to store 700 acre-feet of flood and unappropriated waters at Arrowhead Canyon in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ , Sec. 3, T. 14 S., R. 64 E., to irrigate 6,500 acres of land in portions of T. 16 S., R. 67 and 68 E.; T. 15 S., R. 67 E. and T. 17 S., R. 67 E. Permit issued May 24, 1937.

Application No. 10034 filed October 8, 1936, by D. H. Livingstone for 50 c.f.s. of the waters of Muddy River for power purposes. Point of diversion is to be in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ , Sec. 4, T. 15 S., R. 66 E. No action has been taken although applicant has indicated that he will withdraw said application since Boulder Dam power has been furnished to Logandale.

Application No. 1018 filed December 1, 1937, by the U. S. Department of Agriculture, Bureau of Biological Survey, to appropriate 25 c.f.s. of the waters of Muddy River for irrigation and propagation of migratory waterfowl on 2,520 acres of land in portions of Sections 19, 20, 28, 29, 30, 31, 32, and 33, T. 16 S., R. 68 E. The point of diversion is in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ , Sec. 19, T. 16 S., R. 68 E. On March 9, 1938, a protest was filed by the Muddy Valley Irrigation Co. praying that said application be denied. The protest was based mainly on the grounds that all of the waters of the Muddy River are now appropriated. On November 22, 1938, a hearing was held at Overton, Nevada, before the State Engineer, Alfred Merritt Smith, and his Deputy Hugh A. Shamberger. No ruling has been made to date by the State Engineer. The point of diversion under said application is below Overton and also below all points of diversion of the Muddy Valley Irrigation Company.

Application No. 10302 filed October 13, 1938, by the Muddy Valley Irrigation Co. to store 3,000 acre-feet of water in the Bowman Reservoir, located in the NE $\frac{1}{4}$ , Sec. 22, T. 15 S., R. 67 E. This application was withdrawn June 1, 1939.

## WATER SUPPLY

As has been previously noted herein, the source of the waters of Muddy River is a series of large springs mainly rising in portions of sections 15 and 16, T. 14 S., R. 65 E., M. D. B. & M. The combined flow from the springs has been rather uniform. From the meager discharge records that are available it appears that there has been a gradual decrease in the average flow of the stream. The cause of such decrease is of course not definitely known, but it would be reasonable to assume that the decrease was caused by the drought cycle of 1924 to 1934. The average normal flow in 1939 has been estimated to have been 41.1 c.f.s., whereas in 1931 it was 44.1 c.f.s., and in 1918 was 47.0 c.f.s. During the period from 1910 to 1918 the average flow remained almost constant at 47.0 c.f.s. The following table gives the existing yearly run-off measurements that are of record:

Year	Maximum	Minimum	Mean	Run-off in acre-feet	
1910 .....	122	33	61	23,200	April 22 to October 31, above Narrows
1913-1914 .....	205	39.7	47.2	34,200	October 1 to September 30, at Home Ranch
1914-1915 .....	83	37	47.6	34,400	October 1 to September 30, at Home Ranch
1915-1916 .....	59	38	47.3	34,300	October 1 to September 30, at Indian Reservation
1916-1917 .....	54	37	46.7	33,800	October 1 to September 30, at Home Ranch
1917-1918 .....	.....	.....	47.0	34,100 <sup>1</sup>	October 1 to September 30, at Home Ranch
1927-1928 .....	.....	.....	42.8	10,852 <sup>2</sup>	June 1 to September 30, at Home Ranch
1928-1929 .....	.....	.....	45.0	32,046 <sup>3</sup>	October 1 to September 30, at Home Ranch
1929-1930 .....	.....	.....	43.5	31,505 <sup>4</sup>	October 1 to September 30, at Home Ranch
1930-1931 .....	.....	.....	44.1	31,786 <sup>5</sup>	October 1 to September 30, at Home Ranch
1935 .....	44.3	35.7	39.7	16,821 <sup>6</sup>	May 1 to December 1, at Home Ranch
1936 .....	46.5	35.7	41.1	27,537 <sup>6</sup>	January 1 to December 1, at Home Ranch
1938 .....	41.0	37.8	39.2	11,995 <sup>6</sup>	June 1 to November 1, at Home Ranch
1939 .....	44.2	37.8	41.1	24,820 <sup>6</sup>	January 1 to November 1, at Home Ranch

## FLOOD DATA

Since 1905 there have been several major floods on the Muddy River and its tributaries. Little is known as to the duration and intensity of these floods and our only record in many cases has been furnished by old-time residents from memory. However, there seems to have been major floods in the following eight years: 1905, 1906, 1909, 1910, 1913,

<sup>1</sup>1917-1918, record incomplete, partly estimated.

<sup>2</sup>1927-1928, August 4-5, estimated.

<sup>3</sup>1928-1929, March 18-24, estimated.

<sup>4</sup>1929-1930, October 22-28, July 20-23, 26-27, 29-30, August 2-3, 5-17, estimated.

<sup>5</sup>1930-1931, February 16-28, March 1-25, estimated.

<sup>6</sup>Measurements taken once or twice each month—flood flow measurements not taken—average therefore is too low.

1914, 1917, 1922, 1925, 1937, and 1938. The major portion of the run-off during these floods was contributed by the Meadow Valley Wash, which joins the Muddy River at Glendale. While the purpose in mind in this report is to suggest and recommend corrective measures to be taken on the Muddy River above the Indian Reservation diversion, it is probably essential for the study as a whole to include the floods contributed by the Meadow Valley Wash.

In 1925 and 1926 the then State Engineer, Robert A. Allen, made a preliminary study of the Muddy River and its Tributaries for the purpose of obtaining data relative to flood waters. Unfortunately the report was never completed, but the data obtained at that time, although not too authentic, due to the fact that same was gained mainly through hearsay evidence, is of great importance as it is the only data available relating to the various floods that have occurred since 1905 on the Muddy River and its tributaries.

The drainage area of the Muddy River at the gage above the Indian Reservation and just below the Home Ranch has been estimated by the U. S. G. S. as being 1,080 square miles (Water Supply Paper No. 359, page 206). The drainage area of the Muddy River and tributaries at a point  $2\frac{1}{2}$  miles above Logandale has been estimated by the U. S. G. S. to be 3,740 square miles, which includes in addition to the Muddy River proper the drainage of the Meadow Valley Wash. The drainage area between the point above Logandale and the gage station above the Indian Reservation and not including the Meadow Valley Wash is estimated as being 360 square miles, which includes the California Wash area of over 100 square miles. This leaves the drainage area of the Meadow Valley Wash at its confluence with the Muddy River at Glendale as being about 2,660 square miles.

Practically all of the major floods that have caused damages in the Lower Moapa Valley have originated on the Meadow Valley Wash watershed and mainly within the Mathews and Pine Canyon watersheds that contribute to Clover Valley Creek which confluences with the Meadow Valley Wash at Caliente. The Delmues drainage area is also a large contributor of flood waters to the Meadow Valley Wash. This drainage area lies northerly and easterly from Panaca. The property losses resulting from floods down the Meadow Valley Wash have been enormous. The resulting damage to the Los Angeles and Salt Lake Railroad line between Glendale and Caliente has amounted to more than seven million dollars since 1905. The damage resulting from floods in the Lower Moapa Valley since 1910 has amounted to \$481,340, according to information furnished by John H. Wittwer, Clark County Extension Agent, and segregated by flood periods is as follows:

1910 .....	\$117,200
1911 to 1913 .....	55,400
1914 .....	101,800
1915 to 1921 .....	82,400
1922 .....	33,300
1923 to 1924 .....	13,800
1925 .....	29,800
1926 to 1936 .....	3,000
1937 .....	12,050
1938 .....	31,950
Total .....	\$481,340

As heretofore stated there is little authentic information available as to the magnitude and intensity of the various floods. However, measurements were made of the discharge of the flood of March 1938, by the Soil Conservation Service at Caliente, where it was estimated that the peak flow was approximately 20,000 c.f.s. At Wells Siding in the Lower Moapa Valley the peak flow for the same flood was estimated as being 10,000 c.f.s. flooding 1,612 acres of crop land and 928 acres of bench land below Wells Siding. Although the 1938 flood was one of the greatest in recent history in this area, the resulting damage was greatly minimized due to the flood control works on the Meadow Valley Wash a few miles northerly from Glendale; to the construction of the diversion dam at Wells Siding, and Bowman reservoir, which filled to its capacity of 1,000 acre-feet, and also due to the enlarged flood channel in the Lower Moapa Valley.

Calculations made in 1926 by the State Engineer's office from data not too reliable indicates the run-off in acre-feet from the major floods between 1905 and 1926, and are as follows:

<i>Year</i>	<i>Acre-feet</i>
1905 .....	3,458
1909 .....	4,322
1910 .....	31,471
1913 .....	11,527
1922 .....	12,038
1925 .....	17,290

It was estimated that the peak flow in 1910 was 7,064 c.f.s. at Wells Siding. In 1922 the peak flow at the same point was 8,106 c.f.s. Of the 1925 flood the run-off of 17,290 acre-feet was divided as follows: Arrowhead Canyon, 2,114 acre-feet with a peak flow of 1,485 c.f.s.; Meadow Valley Wash, 14,523 acre-feet, with a peak flow of 10,205 c.f.s., and California Wash 654 acre-feet, with a peak flow of 850 c.f.s. It is not known as to the amount of water contributed by the Muddy River drainage area above the Indian Reservation in other of these major floods. However, since the drainage areas are so widely separated, it is quite possible that no water was being contributed except during the 1925 flood. The floods that have occurred from the drainage area above the Indian Reservation have been minor in character compared to the Meadow Valley Wash floods, but nevertheless quite destructive to the Upper Moapa Valley.

In the flood of September 1939, which originated in the Upper Muddy River watershed, it is estimated that during the peak flow between 1,400 and 1,800 c.f.s. of water was discharging through Arrowhead Canyon and down through the Indian Reservation. According to J. H. Wittwer, Clark County Extension Agent, who visited the Arrowhead Dam near the time of peak run-off, the water was running over the dam with a head in excess of six feet. No doubt the extreme peak flow was reduced from an approximate 6,000 c.f.s. due to the Arrowhead dam and reservoir, which lessened the damage in Upper Moapa Valley.

The writer visited this area on October 5, 1939, and was informed by Mr. J. Harvey Pocock, Agent at the Moapa Valley Indian Reservation, that the flood waters covered practically the entire reservation that was in cultural crops, and he estimated the damages at being about \$1,000. At the Home Ranch above the Reservation the flood

water covered an area several hundred feet wide and came within a few feet of covering the swimming pool which is formed by the Warm Springs, one of the major contributing springs to the Muddy River flow.

The floods originated in the watershed of the Upper Muddy River in the area above the Indian Reservation average about three in number per annum, and vary from 100 acre-feet to 3,000 acre-feet per season. The flood of 1939 was the largest in peak volume since the 1925 flood, which was estimated to have flowed at a rate of 1,485 c.f.s. Usually once a year a flood occurs which causes damage on the Indian Reservation.

No damage is done in the Lower Moapa Valley from floods originating in the watershed of the Upper Muddy due to an enlarged flood channel which has been constructed below Wells Siding, having a capacity of approximately 3,000 c.f.s., unless floods from the Meadow Valley Wash watershed occur at the same time, as happened in 1925.

Very thorough studies have been made by the Soil Conservation Service as to the feasibility of flood control in the upper drainage area of the Meadow Valley Wash, and also on flood control and drainage in the Lower Moapa Valley. Two preliminary reports have been made of these studies. One of these deals with flood control to determine the advisability of constructing flood control dams in the Mathews Canyon, Pine Canyon, and Delmues watersheds. The report dealing with the Lower Moapa Valley gives the results of their studies pertaining to the construction of flood channels with capacities of 15,000, 10,000, and 5,000 c.f.s, and also the economic phases of the proposed drainage system.

#### FLOOD CONTROL PROJECTS

Certain flood control projects of benefit to the property owners along the Muddy River have been completed, namely:

The construction of the Arrowhead Dam in the NE $\frac{1}{4}$ SE $\frac{1}{4}$  of Section 3, Township 14 S., Range 64 E., to a height of 35 feet above the flow line, with reservoir capacity of approximately 300 acre-feet. This dam was completed in 1934 and was constructed with C.C.C. labor under Forestry Service supervision.

The construction of the Meadow Valley Wash flood control works a few miles above Glendale. The work consists of a main dam containing 40,000 cubic yards of material with 8,155 square yards of riprap on the upstream face; a series of levees containing 159,212 cubic yards of earth and eight checks, each 525 feet in length. According to Edwin Marshall, President of the Moapa Valley Soil Conservation District, these spreading areas have a capacity of 12,000 acre-feet. The purpose of this work was to force the water to spread out and cause a temporary partial storage, and which would also cause deposit of silt in suspension.

The construction of the Wells Siding Diversion Dam to a height of 26 $\frac{1}{2}$  feet, length of 677 feet and containing 36,417 cubic yards of material. The construction of a one and one-half mile canal of 1,000 c.f.s. capacity leading to the Bowman reservoir, and the construction of Bowman Dam to a height of 35 feet, length of 620 feet and containing 107,000 cubic yards of material. The Bowman reservoir has

a capacity of 1,000 acre-feet of water. This reservoir serves as a flood control measure as well as for temporary storage.

The construction of White Narrows Dam No. 2. This dam which is 416 feet long, 18 feet high, with 10 feet crest width, is an earth and rock fill structure, with upstream face riprapped. The outlet pipe is a 21-inch corrugated iron pipe controlled with a gate valve. The spillway which is 45 feet wide and 10 feet lower than the crest of the dam empties into the Muddy River channel at White Narrows. The drainage area is small, being approximately 13 square miles.

The construction of Hogans Wash Dam. This a long and low earth fill, being about 700 feet long, 15 feet high, with a crest width of 10 feet. The outlet pipe is an 8-inch corrugated iron pipe with no control valve. This wash has a small drainage area and is tributary to the Muddy River in the lower end of the reservation.

All of the above work, except that of White Narrows No. 2 built by the Indian Service, was done with C.C.C. labor, some of the projects being done under supervision of the U. S. Forest Service, and others under the Soil Conservation Service and U. S. Indian Service.

The purpose of this report is to suggest and recommend corrective measures which should be taken on the Muddy River above the Indian Reservation to remedy the following conditions:

1. To alleviate future misunderstanding between the Muddy Valley Irrigation Company and the Indian Service over the use of water.

2. To prevent destructive flooding in the Upper Moapa Valley, mainly over the cultural lands on the Indian Reservation and the cultural areas above and below the Reservation.

3. To enable the Indians to use a specified amount of water for irrigation over the cultural lands on the Indian Reservation and the cultural areas above and below the Reservation.

4. To store flood waters.

5. To store surplus winter flow waters.

It was the concensus of opinion at the conference at the Moapa Indian Reservation on October 5, 1939, which was attended by representatives of the Indian Service, the Muddy Valley Irrigation Company, and the State Engineer's Office, that the construction of a dam at the White Narrows dam site, accompanied by the necessary understanding between the Indian Service and the lower users would tend to solve the present difficulties.

#### WHITE NARROWS DAM SITE

The White Narrows dam site is located in the SE $\frac{1}{4}$  of Section 26, Township 14 S., Range 65 E., M. D. B. & M., and is within the Moapa Indian Reservation, being about three hundred feet from the boundary line. Consequently, a very small portion of the reservoir formed by such a dam would lie within the Reservation, the major portion lying on unimproved land owned, we understand, by the Beach Estate.

In 1927 the Muddy Valley Irrigation Company obtained the services of the engineering firm of King & Malone, of Reno, Nevada, to make an engineering report on the Moapa Valley area. This report was

submitted in April 1928, and covered various phases of storage and flood control possibilities, farming and irrigation methods, soils and economics, and plans for the development of the full utilization of water and soil resources. The report was quite comprehensive and covered the portion of the Meadow Valley Wash in Clark County, and the Muddy River. Recommendations were made for the construction of White Narrows Dam No. 1, Wells Siding Diversion Dam and the Bowman Dam and the Meadow Valley Wash flood control dam. As previously stated, the Wells Siding Diversion Dam and the Bowman Dam and reservoir of capacity of 1,000 acre-feet have been constructed. In January 1929 Clarence Lewis, acting for the Muddy Valley Irrigation Company, filed Application No. 8818 to store 10,000 acre-feet of water in a proposed reservoir at White Narrows.

In the King & Malone report studies were made of the White Narrows dam site which is referred to in their report as the White Narrows Dam Site No. 1. The White Narrows Dam Site No. 2 referred to in their report lies about one-half mile directly west from No. 1 dam site on the Muddy River and would act, if constructed at this No. 2 site, merely as a flood control measure on the 13 square miles of drainage area appurtenant thereto. The construction of a dam at the No. 2 site to act as a supplemental storage for the reservoir created by the construction of a dam at the No. 1 site was not recommended at that time.

The studies made by King & Malone at the White Narrows Dam Site No. 1 indicate that the construction of a 35-foot dam would give a reservoir capacity of five thousand eight hundred (5,800) acre-feet, with a freeboard of five feet and maximum water depth of thirty feet.

As to the type of dam, foundation, etc., King & Malone report as follows:

For purpose of cost estimation and as our opinion of the type of dam most feasible for site No. 1 a combination rock and earth-fill type has been selected and is recommended. Suitable materials are available at the dam site for the rock and earth fill, and very excellent clay deposits are located within one-quarter mile of the dam site for building the impervious facing.

The dam site is peculiar in that the dam abutments are a sedimentary rock largely limestone and somewhat fractured, and a few hundred feet from the abutment faces the rock forms a capping over sedimentary earth deposits high in gypsum. A thorough investigation of abutment conditions and of the banks immediately adjacent should be made prior to construction. Final selection of dam type and design will be necessarily based on such investigations if a stable and satisfactory structure is to result.

No foundation investigations have been made, and prior to design or construction, borings should be made at the dam site and in the reservoir bottom with a view of limiting seepage and preventing water logging of lands just below the dam.

Cost estimates were given for the construction of White Narrows Dam No. 1 as follows:

Preparation and foundations .....	\$5,000.00
Rock fill 40,000 c.y. at \$1.50.....	60,000.00
Earthfill 20,00 c.y. at 30¢.....	6,000.00
Gates and outlet works.....	2,000.00
Facing, clay and rip-rap.....	6,000.00
Spillway .....	2,000.00
Miscellaneous and contingencies and engineering....	10,000.00
<b>Total .....</b>	<b>\$91,000.00</b>

This cost estimate is of course approximate at the time it was made (1928), and may be too low under present conditions.

The construction of a dam at the White Narrows site would be of multiple use. It would be a reservoir to store waters; it would impound accumulated decreed water during the portions of the season when the water is not placed to beneficial use; it would be a flood control measure, mainly for the protection of the Indian Reservation, and finally it would serve as a medium whereby regulatory flows could be attained. Other measures will be recommended in this report but the construction of such a dam is the major item.

The benefits accruing from the construction of this dam would be as follows:

#### STORAGE OF FLOOD WATERS

Floods originating in the Upper Muddy River drainage area average about three in number per year, varying from 100 acre-feet to about 3,000 acre-feet per year. Floods exceeding 1,000 acre-feet occur rarely, perhaps only once in every five years. It would be reasonable to assume that there would be an annual storage from such waters of 1,000 acre-feet. The Arrowhead Canyon reservoir located  $7\frac{1}{2}$  miles upstream from the White Narrows dam site has a present capacity of about 300 acre-feet and serves as flood protection, in some measure, on the cultural lands above the Indian Reservation. As a storage reservoir it has no apparent value due to the long porous stream channel below the dam which consumes all the water, mainly by percolation. Such underground percolation might have the value of supplementing the flow from the springs below which are the sources of the Muddy River flow.

#### FLOOD CONTROL

Almost every year flood waters do destructive damage on the cultural acres of the Indian Reservation. In the flood of September 1939 damages exceeding \$1,000 were said to have been done. Although, as stated herein, floods of over 1,000 acre-feet occur about once in every five years, it is almost a yearly occurrence to have floods of 1,000 c.f.s. for short durations. The fact that practically every year damaging floods occur on the Indian Reservation is no doubt the reason why not more of the irrigable land has been cultivated. The channel of the Muddy River through the Reservation is small and any flow of major proportions causes flood conditions. Such flooding also has the effect of water logging the land.

At the present time there is a drainage project under way on the Indian Reservation which will drain about 300 acres.

It can reasonably be assumed that with proper flood protection and assured water supply, at least 400 acres of land will eventually be under cultivation on the Indian Reservation.

The value of such a dam for flood control to the Lower Moapa Valley is small insofar as there has never been, at least in recent years, floods of 2,500 c.f.s., and the flood channel in the Lower Valley is adequate to handle this amount of water. It would, however, have a decided advantage if flood waters were reaching the Lower Moapa Valley from both the Meadow Valley Wash and the Muddy River simultaneously.

#### STORAGE OF DECREEED WATER

From the meager stream flow records available it appears that there is an average flow of about 38 c.f.s. at the gaging station below the Home ranch from about May 1 to October 1. The average flow during the winter months is somewhat greater, due to cessation of use on the ranches above as well as reduction in transportation losses and amounts to about 43 c.f.s.

The decree allowed 42.11976 c.f.s. of water for summer use on lands below the gaging station, which is located below the Home ranch. This amount does not include the Home ranch, Bloedel, Isaiah Cox, and the Baldwin rights, amounting to 3.4595 c.f.s. which are above the gage. Of this amount, 42.11976 c.f.s., the Lower Moapa Valley was decreed 36.2874 c.f.s. and the area above the Narrows and below the Home ranch was decreed 5.83236 c.f.s., which does not include 0.2 c.f.s. of the Baldwin right that was transferred above the gaging station under Permit 6419.

Insofar as the average summer flow has been assumed to be about 38 c.f.s. and if the appropriators above the Narrows and below the Home ranch used their entire allotment of 5.832 c.f.s., there would then remain about 32 c.f.s. from which an estimated deduction of 3 c.f.s. could be made for transportation and percolation losses, leaving at the point of diversion at Wells Siding about 29 c.f.s. to supply the Muddy Valley Irrigation Company, which has a decreed summer right of 36.2874 c.f.s. This amount of 29 c.f.s. may be still further reduced if, as alleged, the Indians should use water in excess of their decreed amount. In 1939 some 2,336 acres were irrigated in the Lower Valley, and with a flow of 29 c.f.s. for the summer season, would indicate a duty, at diversion, of 3.76 acre-feet per acre.

Of the 6,290 acres of land in the Lower Moapa Valley there are 3,700 acres available for farm purposes. At the present time, according to the 1939 report of the Soil Conservation Service, this is divided as follows: 2,336 acres of crop land, 169 acres of pasture, and 1,195 acres of privately owned brush lands.

The soils of the valley have been divided into five classes according to alkali concentration and inadequate drainage. Of the 2,336 acres of crop land, 82.1% was made up from lands of classes 1 and 2 which represent well-drained lands. According to the figures compiled by the Soil Conservation Service there are 351 acres of classes 1, 2, and 3 soils that are now in pasture and brush. With additional water this land could be put on a productive basis. A proposed tile drainage system between Logandale and Overton would affect 1,067 acres of land of classes 2, 3, 4, and 5.

It would be reasonable to assume that at least 500 acres of new land could be placed under cultivation and several hundred acres of crop land could be improved so as to give higher production, providing sufficient water is made available for irrigation purposes.

It is therefore evident that there is much need for storage water.

During the months of November, December, January, and February in the Lower Moapa Valley irrigation is greatly curtailed, alfalfa and grain lands being given one irrigation in each of these months. Such crops as radishes, tomato plants, and lettuce are irrigated during the winter months. During these months a flow of 15 c.f.s. may be adequate for the needs in the Lower Valley. Upstream use would also be greatly decreased through these winter months. Of the 43 c.f.s. average flow at the gaging station below the Home ranch it could reasonably be assumed that 20 c.f.s. could be stored at the proposed White Narrows dam site. This would be equivalent to 4,800 acre-feet of water for the four winter months.

The decree allowed a total of 52.16 c.f.s. for winter use, 2.65 c.f.s. being appurtenant to lands above the present gaging station which is above the proposed White Narrows reservoir site, and 49.51 c.f.s. is appurtenant to the lands below the gaging station. Of this amount, 45.41 c.f.s. was decreed to lands in the Lower Moapa Valley for distribution by the Muddy Valley Irrigation Company.

Adding to the estimated 4,800 acre-feet of stored water from the natural winter flow of the stream the 1,000 acre-feet that can reasonably be assumed available for storage from floods, would indicate a total of 5,800 acre-feet annual storage, inclusive of seepage and evaporation losses.

King & Malone estimated that a 35-foot dam at White Narrows would give a reservoir capacity of 5,800 acre-feet. On the basis that there would be available 5,800 acre-feet of storage water, mainly during the four winter months, it is apparent that a reservoir of this capacity is not of sufficient size to allow sufficient leeway in the event that large floods occur during the time of winter storage, if it is desired to impound all available water. Storage in Bowman reservoir from waters of the Upper Muddy River would not be practical, as this reservoir should be available for storage of flood waters from the Meadow Valley Wash to afford flood protection to the Lower Valley.

There are two alternative methods that would afford additional storage space, viz:

1. Increasing the height of the proposed dam at White Narrows. An increase in height of 10 feet would probably give about 5,000 acre-feet additional storage. The practicability of such increase in height would depend upon the result of foundation studies and also whether the increased cost would be justified.

2. The use of the White Narrows Reservoir Site No. 2 for additional storage. King & Malone estimated that a dam 31 feet high would give a reservoir capacity of 1,250 acre-feet, with a freeboard of 5 feet. They gave an estimated cost of an earth and rock-fill dam as being \$24,600 and did not recommend the construction of the White Narrows Dam No. 2 at that time due to the lack of definite information

as to sufficiency of water supply, and also due to the fact that Bowman Dam when constructed would afford 1,000 acre-feet additional capacity. As previously stated, the storage capacity afforded by the construction of Bowman Dam, now completed, should be used as a flood control measure for waters from Meadow Valley Wash.

However, some additional storage would be available with little additional cost insofar as there is already constructed an 18-foot dam at the White Narrows Site No. 2. The present spillway for Reservoir No. 2 empties into the Muddy River at the White Narrows, above dam site No. 1, the spillway elevation being 10 feet lower than the crest of the dam at site No. 2, and 23 feet lower than the crest of the proposed 35-foot dam at White Narrows No. 1 site. It would be necessary to build a narrow dam at the present spillway section in order to separate the two reservoirs. Such a dam could be built to an elevation of the maximum high water line in the proposed White Narrows Reservoir No. 1, having control gates so that water could be diverted to Reservoir No. 2, which at present has a capacity of about 480 acre-feet with a freeboard of 2 feet.

#### MANNER OF USE OF WATER

There is considerable difference in the method of irrigation by users in the Upper Moapa Valley and that of the Muddy Valley Irrigation Company. The crops raised on lands of the Upper Valley are mainly alfalfa and grain, which require but little irrigation during the winter months. On the Indian Reservation, according to Mr. Poocek, there is an attempted rotation between the various allotments, but elsewhere in the Upper Valley no rotation is carried on. As previously stated in this report, many of the Indians find employment in the Lower Valley during the harvest periods of crops such as asparagus, beets, cantaloupes, onions, lettuce, radishes, and tomato plants. The harvest season for the different crops comes at different times during the spring and summer months. The harvest season for one crop may last two weeks, following which the Indians return to the Reservation and carry on intensive irrigation there for an interim period between another harvest season. When they return to the Lower Valley for work in connection with another crop, irrigation comes to practically a standstill on the Reservation. Such irrigation practice has been injurious to the farmers in the Lower Valley, for when the Indians are irrigating they usually use at least one-third of the stream flow which is much in excess of their allotted rights to 1.242 c.f.s. continuous flow for 87 acres. Rotation methods are used in the Lower Valley, and when the Indians are at work there, plenty of water is available for whoever is using water in the rotation periods. When the Indians return to the Reservation and start irrigating their lands there is then a great scarcity in the Lower Valley which is extremely harmful to the perishable crops.

The construction of a dam at the White Narrows site would correct this situation, providing agreements were made between the Indians and the Muddy Valley Irrigation Company as to the amount of water in acre-feet per season the Indians would be entitled to use.

There is at present about 300 acres of land being irrigated on the Reservation, and it is possible that within a few years four or five hundred acres will be under crops providing water is available. The State Engineer feels that the Muddy Valley Irrigation Company could well afford to come to some stipulated agreement whereby the Indians would be allowed sufficient water to properly irrigate four or five hundred acres of land for their participation in the construction of a dam at White Narrows.

About 4,800 acre-feet during the winter months could be stored in such a reservoir, which would be available for use in the Lower Valley and on the Reservation during the summer irrigation season.

For instance, assuming that an agreement be made between the Indians and the Muddy Valley Irrigation Company whereby the Indians would be allowed water for 400 acres at a duty of 4 acre-feet per acre per season (a total amount of 1,600 acre-feet), this amount could be taken out of storage for their use when needed in such quantities as they desire. By such use no interruption would be made in the continuous flow to the Muddy Valley Irrigation Company.

Deducting 1,600 acre-feet from the winter storage of 4,800 acre-feet would leave 3,200 acre-feet available for use on the lands within the Muddy Valley Irrigation Company. This is equivalent to a continuous flow of 8.7 c.f.s. for a one hundred and eighty-four day period.

As set forth on page 60 the present average summer flow at the gaging station is about 38 c.f.s. Deducting 4.59 c.f.s., which is the decreed rights below the gaging station and above the Narrows, exclusive of the Indian allotment of 1.242 c.f.s., would leave 33.41 c.f.s. Further reducing this an estimated amount of 3 c.f.s. for losses would leave 30.4 c.f.s. at the point of diversion below the Narrows for use by the Muddy Valley Irrigation Company. Adding to this the continuous flow of 8.7 c.f.s. from storage water would result in an available continuous flow of 39 c.f.s. for six months during the summer irrigation season, and a flow of 30.4 c.f.s. during the balance of two months of the summer season. This flow would amount to 17,851 acre-feet for eight months during the intensive irrigation season. On the basis of a duty 5 acre-feet per acre for the class of culture raised there, this water would irrigate 3,611 acres, which is 1,275 acres in excess of the 1939 cultivated acreage.

The above figures do not take into account the possible 1,000 acre-foot storage in the proposed White Narrows reservoir from flood waters, nor do they take into consideration storage of flood waters from the Meadow Valley Wash in the Bowman reservoir which would benefit the Muddy Valley Irrigation Company.

On October 16, 1939, this office was in receipt of the following petition:

LOGANDALE, NEVADA, October 12, 1939.

HONORABLE ALFRED MERRITT SMITH, *State Engineer, Carson City, Nevada.*

DEAR MR. SMITH: Following a discussion regarding merits of a water storage project at the White Narrows No. 1 site at or near the head of the Moapa Indian Reservation on the Muddy River in cooperation with the U. S. Indian Service, the

Directors of the Muddy Valley Irrigation Company in session this date, unanimously petition for your cooperation toward securing an appropriation of \$10,000 for the purpose of determining foundation and such other needs of the area pertaining to construction, maintenance, and protection of such a project from seepage losses and undue siltation.

The Directors of said Muddy Valley Irrigation Company also desire your cooperation and direction in the establishment of proper relationships with the U. S. Indian Service regarding matters pertaining to the establishment of equitable water rights as between users on the U. S. Indian Reservation and all other users as represented by established rights that are to be maintained on said Muddy Creek and its tributaries.

Respectfully submitted,

MUDDY VALLEY IRRIGATION COMPANY,  
EDWIN MARSHALL, *President*,  
THOMAS ANDERSON, *Secretary*.

#### RECOMMENDATIONS

The State Engineer recommends the construction of a dam on the Muddy River at the White Narrows site, providing foundation investigations prove the engineering feasibility of such a dam.

We recommend a congressional appropriation of \$10,000 to be made available to the Department of Indian Affairs to be used on an engineering study of the Upper Muddy River, Clark County, Nevada, these studies to include the following:

1. Foundation studies at the White Narrows dam site which would include core drillings to bedrock.
2. Investigation of the proposed White Narrows reservoir site.
3. Investigation of the advisability of raising the present dam at Arrowhead Canyon to make available additional flood control for the ranches above the White Narrows site and also as a silt depository.
4. Studies as to the advisability of clearing the Muddy River channel below Warm Springs for further flood protection and also to save the present heavy transportation losses.

It is recommended that gaging stations be installed at two or more additional points, one near the Narrows and above the Wells Diversion dam, and another near the lower end of the Moapa Indian Reservation. It is recommended that Parshall flumes with automatic recorders be installed at these gaging locations. An automatic recorder should be installed at the measuring weir below the Home ranch.

The State Engineer feels that the difficulties and misunderstandings that have existed for the past 25 years or more between the Department of Indian Affairs, the Indians on the Reservation and the Muddy Valley Irrigation Company can be easily disposed of by each party assuming a cooperative attitude regarding the matters outlined in this report.

#### APPROPRIATION OBTAINED FOR MOAPA SURVEY

Copies of the foregoing report were delivered to agencies interested in the Muddy River situation. Secretary of the Interior Harold Ickes,

Congressman J. G. Scrugham of Nevada, and Mr. William Zimmerman, Assistant Commissioner of Indian Affairs, were each sent a copy of the report, with a letter from the State Engineer suggesting that an appropriation of \$10,000 be requested of the Government to cover costs of an investigation of the White Narrows dam site. All of the officials expressed interest in the problems. Congressman Scrugham, who had been a former State Engineer for Nevada and was thoroughly familiar with Moapa Valley problems, and is acting chairman of the House Appropriations Committee, inserted a provision in the Interior Department Appropriation Bill for 1940, which provided funds for the proposed surveys and investigations in the Moapa Indian Reservation. The provision reads:

Funds are provided in the item\* for administrative expenses for surveys and investigations in connection with the Moapa Indian Reservation, including foundation studies at the White Narrows dam site, investigation of proposed White Narrows reservoir site, and advisability of raising present dam at Arrowhead Canyon so as to make additional flood control, and the advisability of clearing the Muddy River channel below Warm Springs for further flood protection and to save heavy transportation loss.

The Bureau of Indian Affairs was later advised that up to \$10,000 out of the total appropriation of \$3,329,850 for U. S. Indian Irrigation would be made available for the Moapa work, and the State Engineer was advised, under date of August 2, 1940, by E. C. Fortier, District Engineer, Office of Indian Affairs at San Francisco, that Mr. Fortier's office had been authorized to expend \$10,000 for this work.

A conference was held with Mr. Fortier and other engineers in the Indian Service, at the State Engineer's office, Carson City, on August 5, 1940, and as a result it was decided to start surveys sometime during September 1940, when the torrid summer heat of that vicinity will have abated and the work can be carried on more efficiently. A topographical survey crew which is now on another detail in Nevada will then be available, and the Department of the Interior will transfer an assistant engineer to the area to take charge of the investigation. The program calls for cooperation and consultation with the Department of the State Engineer, which initiated the project for the purpose of conserving water for the benefit of Moapa Valley farms, and the prevention of floods that in the past have been greatly injurious to both the Moapa Indian Reservation and the Moapa Valley below.

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\*Appropriations for Bureau of Indian Affairs, under head of Irrigation.

**CHAPTER VIII****Distribution of Water from Humboldt River and Litigation  
Connected Therewith**

In the Biennial Report of the State Engineer for the period from July 1, 1936, to June 30, 1938, was an article covering litigation initiated during the irrigation season of 1937 and subsequent thereto and affecting the manner of distribution of the waters of the Humboldt River in the Lovelock Valley. The purpose of this article is to complete the history of such litigation by a summary of events leading up to its final disposition.

The following represents a continuance of the chronological history of this litigation during the present biennium:

Suit of Humboldt Lovelock Irrigation Light & Power Company v. State Engineer, et al.

Filed April 27, 1927, in the Sixth Judicial District Court of the State of Nevada, in and for the County of Pershing, No. 1006. Stipulation for Dismissal signed June 20, 1940, Order for Dismissal entered by B. F. Curler, Presiding Judge, on June 24, 1940.

Suit of Old Channel Ditch Company, a corporation, v. Pershing County Water Conservation District, a corporation, Alfred Merritt Smith, State Engineer, et al.

Filed May 18, 1937, in the Sixth Judicial District Court of the State of Nevada, in and for the County of Pershing, No. 1008.

Suit of the United States of America, Plaintiff, v. Humboldt Lovelock Irrigation, Light & Power Company, a corporation, Defendant.

Filed May 27, 1937, in the District Court of the United States of America in and for the District of Nevada, in Equity, H-190.

On November 14, 1938, Hon. Frank Norcross, District Judge of the above-entitled Court, signed Order Pursuant to Writ of Mandate reading in part as follows:

Now, therefore, upon motion of plaintiff and pursuant to the mandate order and decree of the United States Circuit Court of Appeals for the Ninth Circuit, issued in the above-entitled cause on October 18, 1938, it is ordered that the clerk of this Court be, and he is hereby directed to file in the above-entitled cause, the mandate, order and decree of said Appellate Court; and

It is ordered that the "findings, conclusions and order" heretofore made and entered in the above cause on June 22, 1937, be and the same is hereby vacated, annulled, and set aside; and

It is ordered that the order of this Court heretofore made and entered on or about June 10, 1937, be, and the same is hereby vacated, annulled and set aside; and

It is further ordered that the defendants' motion to dismiss plaintiff's bill of complaint be and the same is hereby denied; and

It is further ordered that plaintiff's motion for a preliminary injunction be, and the same is hereby granted; and

It is further ordered that plaintiff have to and including November 28, 1938, within which to reply or otherwise plead to the counter-claim set forth in defendants' answer on file therein.

On the same date the court in the above-entitled action entered the following Injunction Pendente Lite:

Wherefore, it is now ordered, adjudged and decreed that pending the further order of this Court you, the Humboldt Lovelock Irrigation, Light & Power Company, the above-named defendant, and your officers, agents, servants, and attorneys or anyone acting by, through or for you be, and each of you are, hereby enjoined and restrained from in any way or in any manner interfering with the transportation, conveyance, diversion, storage or use of the waters of the Humboldt River Stream System, or any portion thereof, owned by and belonging to the United States of America, or being diverted, transported or conveyed by the United States of America, or anyone acting by, through or for it, for use upon the lands of the Pershing County Water Conservation District of Nevada in Lovelock Valley, Pershing County, Nevada, or being diverted, conveyed and transported by the United States of America or anyone acting by, through or for it, for storage in Rye Patch Reservoir; and

It is further ordered that said defendant, its officers, agents, servants, attorneys and employees, and each of them, are hereby enjoined and restrained from in any manner storing, taking or diverting from the Humboldt River any of the aforesaid waters being so diverted, conveyed, or transported either for storage in Rye Patch Reservoir or for use upon the lands situate within the boundaries of said Pershing County Water Conservation District of Nevada.

On June 24, 1940, by stipulation of the respective counsel for plaintiff, defendant and intervenors in the above-entitled matter, the Court entered the following order modifying Injunction Pendente Lite:

The stipulation of the attorneys for the above-named parties having been filed herein on the 24th day of June 1940, and upon that date presented to the Court and good cause appearing therefor, it is ordered:

That the Injunction Pendente Lite heretofore issued by this Court and filed herein on the 14th day of November 1938, be and the same is hereby modified to the end that defendant may release for use by its stockholders or others, as it may direct, approximately 7,000 acre-feet of water now held in storage in its reservoirs, right to use of which is involved in the issues of the above case; and

It is further ordered that said Injunction Pendente Lite shall, except as herein modified, remain in full force and effect until the further order of this Court.

Dated June 24, 1940.

FRANK H. NORCROSS,  
*District Judge.*

Petition of State Engineer et al. to the Supreme Court of Nevada to set aside and vacate Order and Notice of Injunction to State Engineer of Sixth Judicial District Court of the State of Nevada, in and for the County of Humboldt, Case No. 2804. The writ issued and a final opinion was rendered and filed with the Clerk of the Supreme Court on November 18, 1937. (73 P. 2d. 499.)

In the District Court of the United States, in and for the District of Nevada. Equity No. H-194. Statutory Three Judge Court.

On December 12, 1938, the three Federal Judges entered their decision (25 F. Supp. 57) holding the State Water Code of Nevada, and particularly section 75 thereof, constitutional, saying:

The State Water Law, and particularly Section 75 thereof,\* does not deprive plaintiff of any constitutional rights. The complaint does not set out a substantial federal question, and, consequently, this Court lacks jurisdiction to dispose of the case upon its merits. The application for interlocutory injunction is denied, the restraining order is dissolved, and the case is dismissed.

Suit of Young Ditch Company, a corporation, Plaintiff, v. State Engineer, et al., Defendants.

No hearings during present biennium.

#### CONDEMNATION SUITS

Pershing County Water Conservation District, a corporation, v. Old Channel Ditch Company, No. 1071, and Young Ditch Company, No. 1072.

Foregoing suits filed May 27, 1938, in the Sixth Judicial District Court of the State of Nevada, in and for the County of Pershing.

On August 24, 1938, Hon. James Dysart, District Judge Presiding, approved bonds in the sum of \$10,000 under each of the above-entitled actions, and said bonds to defendant on order permitting plaintiff, pendente lite, to occupy premises sought to be condemned were filed with the Clerk of the Court on August 26, 1938.

The foregoing represents all of the litigation referred to in the previous biennial report of this office. However, another action initiated subsequent thereto and which was of paramount importance in the negotiation of a stipulated agreement for the dismissal of all pending litigation as hereinafter set forth, was the case filed in the Sixth Judicial District Court of the State of Nevada, in and for the County of Pershing, on October 10, 1938, entitled:

Carlo and Luigi Arobio, Plaintiffs, v. Old Channel Ditch Company, a Corporation, Geo. C. Stoker, H. W. Robinson, Emil Holmstrom, Eric Hostman, Anthony Ducini and Manuel Moreira, Defendants. Case No. 1104.

In this action the Arobios brought suit against the Old Channel Ditch Company and its directors individually for actual damages in the sum of \$2,180 and punitive damages in the sum of \$1,000 for the alleged refusal of the corporation and its individual directors to permit the Arobios to transport Rye Patch storage or United States purchased water through the Old Channel Ditch.

\*Compiled Laws of Nevada, section 7961.

Plaintiffs as stockholders of the Old Channel Ditch Company claimed that their stockholdings represented a proportionate part of space in the ditch and that they had the right, to the extent of such proportionate space in the ditch, to transport therein any class of water, storage or otherwise, that they were entitled to divert and use.

Defendants took the opposite view. Defendants' demurrer and motion to strike were argued and the motion to strike denied and the demurrer overruled. The case was ready to go on the calendar for trial on the merits when negotiations were commenced by the defendants and others for an amicable disposition of all the pending suits that involved the Rye Patch Reservoir, the Pitt-Taylor Reservoir, and the ditch companies.

On June 13, 1940, the following agreement was signed by the United States of America, the Pershing County Water Conservation District of Nevada, Union Canal Ditch Company, W. W. Carpenter, Humboldt Lovelock Irrigation Light & Power Company, Old Channel Ditch Company, Young Ditch Company, and Alfred Merritt Smith, individually and as State Engineer.

**RENO DRAFT—APRIL 18, 1940**

THIS AGREEMENT made this 13th day of June 1940, by the UNITED STATES OF AMERICA, acting by W. C. MENDENHALL, Acting Under Secretary of the Interior, in pursuance of the Reclamation Act of June 17, 1902, 32 Stat. 388, and amendatory or supplementary laws, THE PERSHING COUNTY WATER CONSERVATION DISTRICT OF NEVADA, a corporation organized under the laws of Nevada (hereinafter referred to as the District), UNION CANAL DITCH COMPANY, a Nevada corporation, W. W. CARPENTER, HUMBOLDT LOVELOCK IRRIGATION LIGHT & POWER COMPANY, a Nevada corporation (hereinafter referred to as the Reservoir Company), the OLD CHANNEL DITCH COMPANY, a Nevada corporation, and YOUNG DITCH COMPANY, a Nevada corporation, and ALFRED MERRITT SMITH, individually and as State Engineer of the State of Nevada:

WITNESSETH: That whereas there are now, and for sometime last past have been, pending actions at law or in equity, seven in number, entitled as follows:

No. 1006

IN THE SIXTH JUDICIAL DISTRICT COURT OF THE STATE OF  
NEVADA, IN AND FOR THE COUNTY OF PERSHING

HUMBOLDT LOVELOCK IRRIGATION, LIGHT & POWER COMPANY, a corporation,  
Plaintiff,

v.

ALFRED MERRITT SMITH, as State Engineer of the State of Nevada and individually, H. W. REPERT, as Assistant State Engineer of the State of Nevada, and individually, J. A. MILLAR, as Supervising Water Commissioner of the Humboldt River, and individually, PERSHING COUNTY WATER CONSERVATION DISTRICT, a corporation, A. JAHN, as President of said defendant corporation, and individually, C. H. JONES, as Secretary of said defendant corporation, and individually, L. J. FOSTER, and STANLEY MAREAN, Defendants.

No. 1008

IN THE SIXTH JUDICIAL DISTRICT COURT OF THE STATE OF  
NEVADA, IN AND FOR THE COUNTY OF PERSHING

OLD CHANNEL DITCH COMPANY, a corporation, Plaintiff,

v.

PERSHING COUNTY WATER CONSERVATION DISTRICT, a corporation, ALFRED MERRITT SMITH, as State Engineer of the State of Nevada, H. W. REPERT, as Assistant State Engineer of the State of Nevada, J. A. MILLAR, as Supervising Water Commissioner of the Humboldt River, including the Lovelock District, in Pershing County, State of Nevada, Defendants.

No. 1050

IN THE SIXTH JUDICIAL DISTRICT COURT OF THE STATE OF  
NEVADA, IN AND FOR THE COUNTY OF PERSHING  
YOUNG DITCH COMPANY, a corporation, Plaintiff,

v.

PERSHING COUNTY WATER CONSERVATION DISTRICT, a corporation, ALFRED MERRITT SMITH, as State Engineer of the State of Nevada, H. W. REPERT, as Assistant State Engineer of the State of Nevada, J. A. MILLAR, as Supervising Water Commissioner of the Humboldt River, including the Lovelock District, in Pershing County, State of Nevada, Defendants.

IN EQUITY—No. H-190

IN THE DISTRICT COURT OF THE UNITED STATES OF AMERICA,  
IN AND FOR THE DISTRICT OF NEVADA

UNITED STATES OF AMERICA, Plaintiff,

v.

HUMBOLDT LOVELOCK IRRIGATION, LIGHT & POWER COMPANY, a corporation, Defendant.

PERSHING COUNTY WATER CONSERVATION DISTRICT OF NEVADA, an Irrigation District formed, organized and existing under "The Nevada Irrigation Act," Intervener,

UNION CANAL DITCH COMPANY, a corporation, and W. W. CARPENTER, on behalf of water users on lands within the Pershing County Water Conservation District of Nevada, Interveners.

No. 1071

IN THE SIXTH JUDICIAL DISTRICT COURT OF THE STATE OF  
NEVADA, IN AND FOR THE COUNTY OF PERSHING

PERSHING COUNTY WATER CONSERVATION DISTRICT OF NEVADA, a corporation, Plaintiff,

v.

OLD CHANNEL DITCH COMPANY, a corporation, UNION DITCH COMPANY, a corporation, SOUTHWEST DITCH COMPANY, an association conducting business under said name, JOHN DOE and JOHN DOE Nos. 1 to 5, both inclusive, Defendants.

No. 1072

IN THE SIXTH JUDICIAL DISTRICT COURT OF THE STATE OF  
NEVADA, IN AND FOR THE COUNTY OF PERSHING

PERSHING COUNTY WATER CONSERVATION DISTRICT OF NEVADA, a corporation, Plaintiff,

v.

YOUNG DITCH COMPANY, a corporation, S. R. YOUNG, JOHN DOE and RICHARD ROE, Defendants.

No. 1104

IN THE SIXTH JUDICIAL DISTRICT COURT OF THE STATE OF  
NEVADA, IN AND FOR THE COUNTY OF PERSHING

CARLO AROBIO and LUIGI AROBIO, Plaintiffs,

v.

OLD CHANNEL DITCH COMPANY, a corporation, GEO. C. STOKER, H. W. ROBINSON, EMIL HOLMSTROM, ERIC HOSTMAN, ANTHONY DUCINI and MANUEL MOREIRA, Defendants.

and that in said actions and suits the said United States, corporations and persons above named, and the persons whom they represent, are interested as parties or otherwise; and

WHEREAS, The pendency of said actions or suits has resulted in a lack of harmony and good feeling among the parties hereto; and said suits tend to interfere with the full development and use of land and waters in the Lovelock Valley, Pershing County, Nevada; and tend to interfere with desirable certainty of rights to use the waters in said Valley; and tend to create strife

between water users under the reclamation project of the United States there situate and other water users; and result in interference with, and uncertainty with respect to rights of users of waters in Lovelock Valley; and

WHEREAS, The issues of fact and of law involved in said actions and suits can be settled and finally determined by the courts only upon and after long and expensive litigation; and

WHEREAS, It is the desire of each of the parties hereto that a practical and feasible basis for the operation of the respective rights of the parties hereto may be reached and arranged and that further continuation of said uncertainties and litigation be avoided and mitigated; and

WHEREAS, It is recognized that the existing conflicts impede and hinder distribution of waters, and that the State Engineer of the State of Nevada, in his statutory supervision and distribution of water, should be aided and assisted insofar as may be without surrender by any party hereto, of substantial rights;

NOW, THEREFORE, In order to aid said State Engineer, and to terminate said litigation, and to provide, for a period of time, a reasonably acceptable method and plan of operation of the various reservoirs, dams, ditches, canals, and water rights in said Lovelock Valley, it is mutually agreed as follows, That

#### ARTICLE I

(a) The United States of America, by and through the Secretary of the Interior, having heretofore withdrawn from entry the following described land for reclamation purposes in connection with the Humboldt Federal Reclamation Project—Nevada, and now finding it expedient and desirable in connection with the construction and operation and maintenance of said Project and for the best interests of the United States, does hereby grant to the Reservoir Company a perpetual easement to occupy and use the SW $\frac{1}{4}$  of SE $\frac{1}{4}$  of Sec. 30, T. 32 N., R. 33 E., M. D. B. & M., for reservoir purposes subject to the perpetual right of the United States and the District to fill, operate and maintain Rye Patch Reservoir up to a maximum water surface elevation of 4,133 feet above sea level.

(b) The Reservoir Company, for itself, its successors and assigns, does hereby perpetually release the United States and the District, their successors and assigns, from any claims for damages to the Reservoir Company's Lower or No. 2 Reservoir (hereinafter called No. 2 Reservoir), dams or outlet works which damages are the result of, occasioned by, or contributed to by, the storage of water in Rye Patch Reservoir, a feature of the Humboldt Federal Reclamation project. This release shall be deemed a covenant running with the lands and works of the Reservoir Company, for the benefit of the United States and the District and the lands and works comprising said Humboldt Project. The District, for itself, its successors and assigns, hereby perpetually releases the Reservoir Company from any claims for damages, incurred by or occasioned to said District, its successors and assigns by the breaking or undermining of said No. 2 Reservoir, dams or outlet works, to the extent said breaking or undermining is the result of, occasioned by, or contributed to, by storage or accumulation of waters in Rye Patch Reservoir. This release shall be deemed a covenant running with the lands and works of the Humboldt Project for the benefit of the Reservoir Company, its No. 2 Reservoir, dams and outlet works.

(c) In the event waters at any time overflow from Rye Patch Reservoir into said No. 2 Reservoir of the Reservoir Company the said waters are to become and be considered and used and distributed as storage waters belonging to the Reservoir Company.

(d) In the event any waters of the Reservoir Company by reason of breakage or partial breakage of the dam or embankment or outlet works of said No. 2 Reservoir escape therefrom and are recaptured in said Rye Patch Reservoir, said waters so escaping and recaptured are to remain the property of the Reservoir Company, and are to be so recognized, considered, distributed and administered; and the then operator of said Rye Patch Reservoir shall and will, insofar as it reasonably can, cooperate in preventing the loss of such escaping waters by the recapture thereof in Rye Patch Reservoir: Provided, That any such recaptured water in Rye Patch Reservoir at a time when the Reservoir Company is exercising storage rights under subsection (f) of this Article I shall be included in determining the Reservoir Company's maximum

storage rights under said subsection (f), and water in excess of the combined total of 19,500 acre-feet, being the Reservoir Company's then storage rights in Rye Patch Reservoir and in its No. 2 Reservoir, shall become the property of the United States.

(e) At any and all times, should the Reservoir Company by reason of the surface elevation of waters contained in said Rye Patch Reservoir, be unable to make delivery of water from its own reservoirs to persons entitled thereto and in need thereof, then such needed water shall be released from said Rye Patch Reservoir without charge to the Reservoir Company in such rates of flow as the Reservoir Company may from time to time direct. Thereafter and when reasonably able to do so, said Reservoir Company shall release into said Rye Patch Reservoir an equal amount of water to replace the water theretofore delivered for the Reservoir Company from Rye Patch Reservoir.

(f) If at any time the dam or embankments or outlet works of said Reservoir No. 2 of the Reservoir Company should break, wash out, or become unsafe or not usable, then the Reservoir Company may at its option make its lawful storage, to the extent of a maximum of 16,000 acre-feet at any one time in said Rye Patch Reservoir; provided, that in the event the Reservoir Company determines to, and does finally, abandon its No. 2 Reservoir, then said storage right in Rye Patch Reservoir shall be and become a perpetual right of storage to the extent of a maximum of 16,000 acre-feet at any one time; and provided further that the Reservoir Company's storage of water in Rye Patch Reservoir and in its Reservoir No. 2 shall not exceed at any one time during a period it elects to use any part of the maximum space of 16,000 acre-feet in Rye Patch Reservoir a combined total of 19,500 acre-feet. The Reservoir Company's water going into Rye Patch Reservoir under the provisions of this subparagraph (f) shall be measured at or near its point of delivery into said Reservoir.

(g) Neither the United States, the District, Union Canal Ditch Company, Old Channel Ditch Company, Young Ditch Company, nor W. W. Carpenter may or shall at any time or place contend or claim that any use of Rye Patch Reservoir for storage of water by the Reservoir Company in any wise does or shall affect the substantial rights or present priority of the Reservoir Company to store water.

(h) The Reservoir Company shall be entitled to have released from Rye Patch Reservoir at any reasonable time at rates of flow not exceeding 400 c.f.s., any quantity of water so stored less storage losses, occurring while same is so impounded in Rye Patch Reservoir.

(i) A standard United States Weather Bureau evaporation pan shall be installed at Rye Patch Dam and daily records of evaporation therefrom made by the United States or the District. Such records shall be available to the Reservoir Company at all reasonable times. The evaporation loss in the Reservoir will be determined from such evaporation pan records, and prorated between the Company's storage and the District's storage in Rye Patch Reservoir, in proportion to their then\* respective amounts of stored water in the reservoir. In case of dispute as to the amount of the evaporation losses, or as to the proper division of same between the Company and the District, the matter will be determined by the State Engineer.

(j) If the Reservoir Company should at any time, exercise the option provided in subparagraph (f) of this Article, to abandon its said No. 2 Reservoir and store water in the Rye Patch Reservoir, then it shall and will pay annually (on or before March 1st of the year following that in which the expenses were incurred) to the United States, or to the District, whichever is then operating said Rye Patch Reservoir, for the use and occupancy thereof and for storage space therein, while said Rye Patch Reservoir is so used by and for the Reservoir Company, a sum equal to eight per cent of the annual cost of maintenance and operation (exclusive of any and all construction or reconstruction cost) of said Rye Patch Reservoir; provided, however, that this obligation and liability of the Reservoir Company shall not exceed and said Reservoir Company be called on to pay more than the sum of \$300.00 in or for any one year.

\*The word "them" changed to "then" by the Commissioner, Bureau of Reclamation, as authorized by the respective presidents and secretaries of the corporate parties hereto and by the other parties hereto, prior to the execution in behalf of the United States by the Acting Under Secretary of the Interior,

JOHN C. PAGE,  
Commissioner Bureau of Reclamation.

## ARTICLE II

The Reservoir Company and its stockholder users are and shall be entitled to the free and prompt passage through Rye Patch Reservoir and dam of any and all water released into the Humboldt River from the reservoirs owned by said Reservoir Company, at rates of flow not exceeding 400 c.f.s. less a reasonable and fair transportation loss occurring between the outlet of the Reservoir Company's reservoirs and the outlet of Rye Patch Reservoir, said loss to be determined by the State Engineer.

## ARTICLE III

(a) The Reservoir Company agrees that during the existence of this Agreement, United States purchased water and water decreed to individual District landowners and permit rights now belonging to such landowners, may be cumulated between March 15 and September 15 of each year in Rye Patch Reservoir for use during the same irrigation season, and used in collective rotation by users entitled thereto, all under the supervision and control of the State Engineer of Nevada. It is further agreed by all parties hereto, that none of the waters so cumulated may or shall be carried as cumulated water, over from one irrigation season to another, but it is agreed and understood that all said waters so cumulated and being in said Rye Patch Reservoir on September 15, in any such year, shall, as between the United States and the District on the one hand and the Reservoir Company on the other, and subject to all existing rights pass to, become, and be deemed to be storage water belonging to the Reservoir Company (subject to Article I (f) fixing the Company's maximum storage in Rye Patch Reservoir), and be and is covered by the same rights as though actually stored in reservoirs of said Reservoir Company and in all respects subject to its use and lawful control, and that there shall be and is no storage charge or expense as to said waters against said Reservoir Company or its stockholders.

(b) By "United States purchased water," as used in this Article, is meant any water or water rights in the Battle Mountain or Imlay areas purchased by the United States and, under permit issued by the State Engineer, transferred for use upon the lands in the District, all as referred to and described in the Complaint on file in a certain suit entitled United States v. Humboldt Lovelock Irrigation Light & Power Company No. H-190, In Equity, pending in United States District Court for the District of Nevada. By "water decreed to individual District Landowners," is meant, waters decreed in the general adjudication Decree filed October 20, 1931, in the Sixth Judicial District Court of Nevada in and for the County of Humboldt to be appurtenant to therein specifically described lands situate within the District. By permit rights is meant water rights now in good standing acquired by application on the State Engineer pursuant to the Water Code of the State of Nevada.

(c) All parties hereto further agree that classification as cumulated water may be made only by the State Engineer, Assistant State Engineer or Deputy State Engineer, subject to all existing rights, and that once so classified, said water shall remain in said classification until beneficially used, as in this Agreement provided, prior to September 15, or until on said date it passes to and becomes storage water belonging to said Reservoir Company to the extent provided in Article III (a) of this Agreement. The United States or the District, whichever may be operating the Humboldt Project, agrees to keep a continuous record of the flow of water coming into Rye Patch Reservoir, from which a daily record of the classes flowing therein may be computed; and a record of the classes and quantity of water released therefrom; and further agrees that such records will be available at any reasonable time to the State Engineer, his deputy, the Water Commissioner or Deputy Water Commissioner, and to the officials or agents of the Reservoir Company.

(d) Water so cumulated in Rye Patch Reservoir should not at any time, within any irrigation season, exceed in quantity the amount properly to be calculated as United States purchased water (elsewhere in this Article defined), and that amount properly to be calculated as belonging to owners of Decreed rights and said permit rights (elsewhere in this Article defined) who are members of said District and who have annually requested such cumulation; and, as to each class of waters, less the amount of such water and rights used prior to the date of classification as cumulated water.

(e) However, should such cumulation, within any irrigation season, for any

reason, exceed in quantity the limitations fixed in subparagraph (d) above, or when calculated in connection with such water actually used prior to classification, exceed the limit of lawful use in any season as fixed by Statute and Decree, then in either event, such excess cumulated water shall immediately become available for beneficial use within such irrigation season, by and for Lovelock Valley holders of decreed rights or said permit rights for the irrigation of land not within the District in the order of their respective priorities and needs. Provided, however, that at all times all said cumulated water remaining and being in said Rye Patch Reservoir on September 15, or any year shall, subject to the provisions of subparagraph (a) of Article III be, become and be recognized as the property of the Reservoir Company and subject to its control and lawful disposition.

(f) Cumulated water at all times subsequent to classification as such, shall bear its proportional part of storage losses, as defined in subparagraph (i) of Article I.

#### ARTICLE IV

(a) The Old Channel Ditch Company and the Young Ditch Company, each, as to its respective ditch, canal and diversion works, agrees that a reasonable amount of project water (that is, either United States purchased water, Rye Patch storage water or cumulated water in and coming from said Rye Patch Reservoir) may be passed or transported through its respective diversion works, ditch, or canal, but only for the irrigation of lands now receiving any water through said ditch and within or hereafter annexed to, said District and belonging to persons who are stockholders in said respective Ditch Companies; provided, however, that said works, ditches or canals shall at no time, by reason of this Agreement be used by, or for the benefit of, any person not a stockholder in the Ditch Company involved.

(b) For many years waters, in said respective ditches, have been used under a reasonably satisfactory system of cumulation and rotation, based upon mutual recognition of present difficulties and practical necessities. It is, however, recognized that the total demands of water users for immediate service, may at times exceed said respective ditches' capacity safely to carry water for immediate service to the respective stockholders. In said situation, and from time to time, the Ditch Company involved, will determine the safe capacity of its ditch and distribute and allocate to the individual stockholders the same proportion of the said safe capacity of said ditch that the Ditch Company capital stock, owned by the individual stockholder, bears to the entire issued capital stock of the Company involved. At all times the Ditch Company involved shall be the sole judge, but in no sense a guarantor, of the safe capacity of its ditches; and the exclusion of water therefrom, because of lack of safe capacity, shall not be or become the basis of any legal action.

(c) From time to time, and when reasonably necessary or proper, to clean said ditches or any portion thereof, said District shall and will on request of either of said Ditch Companies, furnish for said work such reasonably useful, adaptable and practical machinery and equipment as it may at said times have; provided, however, that for such aid so given said respective Ditch Companies so aided shall and will pay to the District reasonable compensation therefor.

(d) No party hereto, nor any person, association or corporation in privity to any such party, shall ever at any time or place claim or contend that by reason of this agreement, or any part thereof, either said Ditch Company became, or is, a common carrier or subject to rules or regulations applicable to common carriers. Each of said Ditch Companies specifically rejects and disclaims present classification as and the present status of a common carrier, and reserves in said respect all and any right now or hereafter provided by the laws of the State of Nevada.

#### ARTICLE V

The Reservoir Company hereby releases and waives its claim and demand against the United States, Alfred Merritt Smith as State Engineer of the State of Nevada and individually, H. W. Reppert as Assistant State Engineer of the State of Nevada and individually, J. A. Millar as Supervising Water Commissioner of the Humboldt River and individually, the District, A. Jahn as President of the District and individually, C. H. Jones as Secretary of the District and individually, L. J. Foster and Stanley Marean for the reasonable value of approximately 17,500 acre-feet of water, by it claimed to have been wrongfully

taken from it in the year 1937, and the United States, the District, the Union Canal Ditch Company and W. W. Carpenter for themselves and those represented by them, hereby release and waive the claims and demands heretofore made by them to a release, from the reservoirs of the Reservoir Company of approximately 7,000 acre-feet of water claimed to have been illegally stored therein during the irrigation season of 1937.

#### ARTICLE VI

(a) All pending actions at law and suits in equity, including all interventions, being seven in number, and more particularly described on pages 1-4 of this Agreement, shall be dismissed forthwith (subject to the provisions of subparagraph (e) of this Article) with prejudice and all relief heretofore sought or obtained therein released, waived or abandoned; and each party thereto shall pay his or its own costs and attorney fees.

(b) This Article shall be understood to cover and include, among others, that certain action pending in the Sixth Judicial District Court of the State of Nevada, in and for the County of Pershing, entitled Carlo Arobio and Luigi Arobio, Plaintiffs v. Old Channel Ditch Company et als., Defendants, No. 1104.

(c) Ten executed copies of this Agreement shall be placed in escrow (with appropriate escrow instructions) at the Main Office, First National Bank of Nevada, at Reno, and this Agreement shall become operative upon dismissal of said referred to Action No. 1104. The District will use its best efforts to secure dismissal of said Action No. 1104, with all reasonable diligence.

(d) Upon the dismissal of said action No. 1104, the District will procure a certified copy of the order of Dismissal or equivalent evidence thereof, and deliver same to said Bank and thereupon said Bank shall make proper distribution and delivery of the several papers in said escrow and close said escrow.

(e) The parties hereto agree that all pending litigation above referred to, is to be held in status quo, for a maximum period of ninety days from the escrowing of this instrument, awaiting said dismissal of said action No. 1104.

(f) The reasonable bank fees, if any, of said escrow will be paid one-half by the District and one-half by the Reservoir Company.

#### ARTICLE VII

(a) From and after its effective and operative date, arrived at under Article VI above, this Agreement shall be in full force and effect to and inclusive of September 30, 1944; and, shall after said September 30, 1944, remain and be of full force and effect for an additional term of five (5) years and to and inclusive of September 30, 1949, unless prior to March 30, 1944, the United States, the District, the Old Channel Ditch Company, the Young Ditch Company or the Reservoir Company or any of their successors in interest, shall renounce this Agreement in form and manner provided as follows, to-wit:

(b) Such renouncement shall be brought about by such signatory or successor, prior to March 30, 1944, mailing to each other signer hereof or to his or its respective successor in interest, where generally known, addressed to Lovelock, Nevada, a written notice of his or its desire to be no longer (after September 30, 1944) bound by the terms and conditions hereof, and in addition said renouncing signatory shall publish and cause to be published before said March 30, 1944, in at least three consecutive issues of a newspaper of general circulation published at Lovelock, Nevada, a copy of said Notice. As to the United States, said Notice shall be mailed to the Secretary of the Interior, at Washington, D. C.

(c) In the event Notice of renouncement is not given and this Agreement, therefore, remains in force and effect for said above second period or term of five years, then likewise, this Agreement, within said second period or term and at least six months prior to the expiration thereof, may be renounced by and in the same form and manner as hereinabove provided.

(d) In the absence of such a renouncement, this Agreement shall be and remain in full force and effect for successive and continuing five year period or terms, until it neither be in said manner and form renounced or be terminated by mutual agreement.

#### ARTICLE VIII

(a) This Agreement in part, being intended to provide a period during which there may be found a final and practical solution of the problems and conflicts

which beset the parties hereto and the Lovelock community, is not to be considered or construed as a final settlement thereof; and, therefore, except as provided in Article I(a), Article I(b), Article I(f), Article V and Article VI above, and otherwise in this Agreement specifically provided is not, at any time or place, to be considered or used as a release, waiver, or abandonment of any substantial right of any of the parties hereto, or to create any estoppel, or to be used in evidence as an admission against claimed interest or right, or to be used at any place, or for any purpose, except for the purposes herein expressed and in pursuance of the terms in this Agreement stated. At no time or place may any party hereto, his or its successor, or any corporation or association or any person in privity with any of the parties hereto claim that the time during which this Agreement may be in force, is a part of or is usable in support of, any claim or defense based upon any Statutes of Limitations or in support of any claim of laches.

(b) It is understood by all parties hereto that this Agreement in no manner is to enlarge, diminish, or affect (except as in this agreement stated and only so long as this Agreement remain in force) (a) the present lawful rights of the United States or the District to divert, store and use the waters of the Humboldt River or (b) the present lawful and prior right of the Reservoir Company (as against the storage rights of the United States) to divert and store water, in any and all years.

#### ARTICLE IX

This Agreement does not, and shall not be construed to deny to any party hereto, or to any stockholder of a corporate party hereto, or to any landowner of the District its, or his right to seek to acquire additional or other water rights and to change the place of use thereof; and all said parties or persons, shall and do remain free at any and all time and times, either singly or in groups, to seek to acquire additional or other water rights and, as to said acquisitions, and any and all thereof, to seek to change the point or points of diversion and place or places of use of any or all thereof, pursuant to the Laws of the State of Nevada now, or hereafter, in such cases made and provided.

#### ARTICLE X

(a) The State Engineer by his signature and approval hereto, agrees and promises, for himself and his lawful successors, that, insofar as the laws of Nevada and the decisions of Courts of competent jurisdiction are not, or may not become, in conflict with this Agreement, he will accept and faithfully pursue the same so long as it remains operative and that at all convenient times and upon request therefor, he will meet in friendly discussion any of the signatories hereto concerning any of the matters covered and referred to herein.

(b) Each of the signatories hereto promises to said State Engineer fair and reasonable cooperation in his operations hereunder.

#### ARTICLE XI

Either or any party hereto may make formal acknowledgment hereof and cause this document to be recorded in Pershing County, Nevada.

#### ARTICLE XII

Where the operations of this contract extend beyond the current fiscal year, the contract, so far as the liability of the United States to make such expenditures is concerned, is made contingent upon Congress making the necessary appropriation for expenditure by the United States hereunder after such current year shall have expired. In case such appropriations as may be necessary to enable the United States to carry out this contract are not made, the other parties hereto hereby release the United States from all liability due to the failure of Congress to make such appropriations.

#### ARTICLE XIII

No member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

In Witness Whereof the signers hereunto have affixed their hands and seals to ten original copies hereof, or caused same to be done by officers or agents lawfully authorized thereunto.

UNITED STATES OF AMERICA,

By W. C. MENDENHALL, *Acting Under Secretary of the Interior.*

THE PERSHING COUNTY WATER CONSERVATION

DISTRICT OF NEVADA,

By A. JAHN, *President.*

By C. H. JONES, *Secretary.*

UNION CANAL DITCH COMPANY,

By C. C. CARPENTER, *President,*

By A. JAHN, *Secretary.*

HUMBOLDT LOVELOCK IRRIGATION LIGHT &

POWER COMPANY,

By JOHN HOLMSTROM, *President,*

By EMIL HOLMSTROM, *Secretary.*

OLD CHANNEL DITCH COMPANY,

By EMIL HOLMSTROM, *President,*

By ERIK HOSTMAN, *Secretary.*

YOUNG DITCH COMPANY,

By MATT SMITH, *President,*

By VIK SEBBAS, *Secretary.*

ALFRED MERRITT SMITH,

*Individually and as State Engineer of the State of Nevada.*

W. W. CARPENTER.

Following the execution and delivery of the foregoing agreement, all pending suits were dismissed.

## CHAPTER IX

### Las Vegas Artesian Basin, Clark County, Nevada

The Las Vegas artesian basin is located in and around the city of Las Vegas in Southern Nevada and by legal subdivisions can be described as being within Townships 20, 21, and 22 South, Ranges 60, 61, and 62 East, M. D. B. & M., covering approximately 75,000 acres.

The Las Vegas Valley, within which this artesian basin is located, occupies a structural trough surrounded on practically all sides by mountains. On the west lies the Spring Mountain Range, which is the highest mountain range system in southern Nevada, an elevation of 11,910 feet being attained at Charleston Peak, which is approximately 35 miles in a westerly direction from Las Vegas. This mountain range is composed mostly of carboniferous limestones which have been greatly folded. On the south and east the valley is bounded by low unnamed ranges rising to a height of from 3,000 to 4,000 feet above sea level. On the north the Las Vegas, Sheep, Desert and Pint-water Ranges form a continuous mountain boundary.

The only outlet for surplus water in the Las Vegas Valley is the Las Vegas Wash, which runs in an easterly direction about three miles south of Las Vegas and empties into Lake Mead. This wash is dry most of the year, but following cloudbursts which usually occur once or twice a year, the wash carries considerable water into Lake Mead.

The sediments that fill the valley were no doubt derived mainly from the surrounding mountains. The large alluvial cones west of Las Vegas were formed by sediments being carried by surface streams from the Spring Mountain range. As these early streams, formed by precipitation in the mountains, debouched from the mouths of the canyons, due to the decrease of slope, the swift current slackened and the coarser materials were deposited first, and as the streams continued on towards the center of the valley the slopes became less and the finer materials were deposited. As the coarser materials were deposited first, the areas surrounding the mouths of the canyons were built up more rapidly than the other parts of the valley, forming the alluvial cones or fans that are now so evident there.

As the deposition of sands and gravels filled the channels their capacity decreased and succeeding floods overtopped the banks, depositing heterogeneous layers of material on each side of the channels. Flood waters broke out at low points in the banks, especially near the apex of the cone, cutting new channels toward the valley, the old channels thus being abandoned.

Near the foot of the slope of the cone the grades became less and the channels usually subdivided in several fingers, so-called, due to the decreasing slope which accelerated the deposition of the sediments in the channel, the capacity of which was thereby reduced, causing the stream to separate into diverging forks.

After a channel filled with pervious material was abandoned it was

covered with material deposited by subsidiary flood waters, by mud-flows generated by torrential downpour and by the wind. These covered channels are known as "aquifers," the definition being "a geologic formation or structure that transmits water in sufficient quantity to supply pumping wells or springs."

It is thus seen that the combined action of flood water flow and subsequent low water flow resulted in the building up of diversion aquifers separated by coarse pervious material in the upper part of the cone and by fine material of decreasing permeability down the slope of the cone. The relative permeability, or water-bearing capacity, encasing the buried stream channels determines the degree of confinement of the water in the aquifers. If the encasing material is impervious, such as clay, a confined water course is formed; if impervious it forms a free water (ground water) aquifer.

This briefly is probably the general manner in which the aquifers in the Las Vegas artesian basin were formed. As rain water falls on the mountains such as those of the Spring Mountain Range, surface streams of short duration are formed, the water being very quickly absorbed by the limestones. As the water percolates through the limestones it enters the various underground watercourses, heretofore described as aquifers, and if the aquifer is encased by impervious material it becomes confined water and is subject to pressure due to difference in head between intake and discharge areas of the confined water.

When a well is drilled into a confined aquifer the water in the aquifer, due to the pressure caused by the difference in elevation of the aquifer where it is tapped and the intake (fountain head) is forced above the encased aquifer and becomes an artesian well. When the static level is above the ground elevation the well becomes a flowing artesian well.

From the above brief description of the possible manner in which the Las Vegas basin was formed it can readily be realized that by this process many different aquifers were formed, varying greatly in elevation, permeability, lateral continuity and confinement, and consequently wells sunk not far apart may have entirely different sections.

Many of the wells sunk in this basin encountered several aquifers, some being within 75 feet of the ground surface and others 900 feet below the surface. Different pressures are found in the aquifers, usually increasing with depth. There is also a marked difference in the temperature of the water flowing from the wells in different parts of the valley. These temperatures range from 69° at the Van Raines well five miles north of Las Vegas to 90° at the McGriff well several miles south of Las Vegas. The average temperature of the artesian water south of Las Vegas is probably between 78° and 80°. In other parts of the valley the average is about 72°.

According to Floyd Francis, well driller, the first flowing artesian well in the Las Vegas Valley was drilled in the NW $\frac{1}{4}$ NE $\frac{1}{4}$  of Section 21, Township 20 S., Range 61 E., during the year 1907 by the "Vegas Artesian Water Syndicate." This property was later subdivided and called the "Vegas Heights," and the well is now owned by C. Gratz. Following the discovery of artesian water in the Las Vegas Valley

many wells were drilled in different parts of the valley, and by 1912 at least a hundred wells had been drilled. Of this number about 75 were flowing wells and 25 nonflowing artesian wells. Drilling of wells continued, and at the present time there are over 350 wells, 340 of which have been definitely tabulated and located.

### INVESTIGATIONS

In 1912 an underground water investigation in this valley was made by Everett Carpenter, Engineer, with the United States Geological Survey, and the report published in Water Supply Paper No. 365, in 1915. Between 1921 and 1936 investigations were carried on by George Hardman of the Nevada Agricultural Experiment Station and several reports written. In 1938, realizing the seriousness of the water situation there, the State Engineer engineered a cooperative program between the United States Geological Survey, the city of Las Vegas, County of Clark, and the Las Vegas Land and Water Company, which resulted in obtaining the services of Penn Livingston, Engineer with the United States Geological Survey, to carry on a short study of underground leakage from wells. The field work was carried on from August 11 to September 13, 1938, and Mr. Livingston was assisted in the field by Harry Jameson of Las Vegas, Nevada. Several trips were made from the State Engineer's office to Las Vegas to assist in this work. During this period studies were made on 42 wells and the underground leakage determined by means of a special current meter designed for this purpose. A summary of the Livingston report is as follows:

#### **SUMMARY OF THE LEAKAGE TESTS AND SUGGESTIONS FOR REPAIRING THE LEAKY WELLS**

Of the 42 wells listed in this report, 34 were tested to a satisfactory depth. The eight wells not tested were caved or obstructed or for some other reason could not be tested to a depth where leakage might be expected. The estimated total amount of underground leakage in the 34 wells tested was about 375 gallons a minute, of which about 300 gallons a minute came to the surface as springs in the vicinity of the wells. Most of the flow of 375 gallons a minute was lost from wells 7, 24, and 25. The leaks from the other wells tested are small and need not be considered further.

Well 7 leaks about 35 gallons a minute at a depth of about 41 to 43 feet, and the water lost from the well evidently does not come to the surface near the well. It could be repaired by pumping the well full of clay through a small pipe to the bottom of the well and then removing the casing and setting a new string of casing to a much greater depth, and then cementing on the outside through a small pipe extending to the bottom of the casing.

Well 24 leaks about 10 gallons a minute at a depth of 470 to 495 feet, 11 gallons a minute at 402 feet, and 26 to 28 gallons a minute at 64 feet. The movement of water below 400 feet probably represents water flowing into upper sands that are under lower artesian pressure. In view of the fact that about 30 gallons a minute comes to the surface by means of a spring close to the well, probably most of the underground leakage goes to supply this spring. It seems inadvisable to attempt to repair this well until after a rigid conservation program covering the whole artesian basin is in force.

The springs surrounding well 25 flow about 230 gallons a minute. Since this is a large percentage of the total flow from the well it shows that either the passageway on the outside of the casing is open and offers little friction to the movement of water or that the casing is obstructed and offers nearly an equal amount of friction. It is unfortunate that the well is obstructed at 230 feet and that the meter could not be lowered below that depth. It is believed, however, that most of the underground leakage comes to the surface and that

there is no necessity for repairing this well until a serious effort is made to reduce the waste due to flowing wells from the whole artesian basin. When it becomes necessary to repair this well it could be brought under control by pumping it full of clay through a pipe, 1½ or 2 inches in diameter, leading to the bottom of the well. It might then be possible to pull out all of the casing, ream the hole larger to a depth of about 200 feet, set a new casing, and cement on the outside of it. If difficulty were experienced in getting a tight seal at the bottom of the casing for cementing purposes, the mud from the bottom of the well up to a depth of about 200 feet could be replaced with sand through a pipe to the bottom of the well. Later the mud or sand could be removed from the well by circulating water or by means of an air lift pump. Probably it would be cheaper, however, to seal the well with clay and a cement plug and to drill a new well than to try to repair the well.

It is believed that the water-logging of the ground east of the group of wells Nos. 19 to 23 is caused by irrigation from these wells and is not due to underground leakage from them. The surface flow from this group of wells amounts to at least 450 gallons a minute continuously.

Only a small percentage of the total number of artesian wells in the valley were tested with the current meter. It is believed, however, that the underground leakage from wells is very small, except from a few wells that are poorly constructed or improperly cased.

#### WASTE OF ARTESIAN WATER

It has been reported by Floyd Francis, well driller, that the first flowing artesian well, in the Las Vegas basin was drilled in the NW¼ of the NE¼ of Section 21, T. 20 S., R. 61 E., during the year 1907. Since that time wells have been drilled from time to time until in 1938 there were probably between 200 and 300 artesian wells. For the most part, if water from a well has not caused any local inconvenience it has been allowed to flow full force year after year. Many wells have flowed unchecked since the day they were drilled. As the artesian water pressure was lowered, the flow from some of the wells has decreased considerably while others have ceased to flow. As the pressure in the upper artesian sands had declined, new wells have been drilled to the deeper artesian sands, and these wells too are allowed to flow uncontrolled. The flow from some of the wells irrigates only a few cottonwood trees surrounding abandoned homes. The flow from wells 24 and 25, amounting to a measured total of over 1,100 gallons a minute during September 1938, waters a few head of stock and the surplus goes to form a wild duck pond. Plate 5, A and B, shows views of the two fish ponds belonging to the United States Fish Hatchery that are supplied from flowing artesian wells. The seepage from these earthen embanked ponds has spread out down the slope and can be seen nearly to the Las Vegas-Tonopah highway a mile away. Attempts are being made in some cases to combine the flow of several wells and to carry the water in open earthen ditches for several miles to the places where the water is used for irrigation. The soil absorbs water readily, and only a small part of the flow at the wells reaches the land to be irrigated. In these cases the water from the artesian wells is generally allowed to flow in the ditches all winter in order that the soil along the ditches will be wet when spring comes. It is believed that if the soil were allowed to dry out during the winter, the water from the wells would probably not reach the fields during the summer. There are no water meters in the waterworks that supply the city of Las Vegas. The Las Vegas Land and Water Company, which owns and operates the water works, reports that with the advent of air conditioning, water consumption has increased, until in 1938, the city, with a population of about 8,000, is consuming about 5,000,000 gallons a day. This water is obtained by the water company from the original spring and from two flowing wells that discharge into the main reservoir. The wells are allowed to flow wide open continuously, and any excess water that the city does not use overflows into the creek and runs to a ranch northeast of the city.

#### CONCLUSIONS

The results of the tests with the deep-well current meter in 34 artesian wells in the Las Vegas area show that the underground leakage from these wells is small. A few wells that are poorly constructed or improperly cased leak an appreciable amount of water, but the aggregate leakage is small.

It is believed that the wells tested are fairly representative of the wells in the area, and that the loss of artesian water by underground leakage is not great. The material of the valley fill varies widely from place to place, but it is generally coarser near the mountains and finer toward the valley, and therefore wells are less likely to leak through the fine overlying material in the valley than through the coarser material toward the mountain. The material varies so widely from place to place that it is only by knowing the permeability of the overlying material at each well that it is possible to judge the amount of water that may waste from the well below the ground and the care that is necessary in placing and cementing the casing. New wells should be tightly cased and the casing cemented to a depth of at least 200 feet.

Much artesian water that is discharged by wells is wasted or put to low use. The area a short distance east of wells 19 to 23 is probably waterlogged by artesian water used in surface irrigation rather than from underground leakage from the artesian wells. The ground near the United States Fish Hatchery is being waterlogged mainly from seepage from the lakes that are maintained by the flow from artesian wells and not from underground leakage. The people in the Las Vegas area should understand that the artesian water supply is not unlimited and that conservation of the supply is necessary. It is believed that if the draft upon the artesian basin were reduced and strict measures of conservation were applied, the pressure, in the shallower sands, especially, would increase noticeably.

The water that flows from the wells is clear and does not carry much sediment, and therefore there is little danger of affecting the potential capacity of the wells by closing the valves when the water is not needed. However, the flowing wells should be opened or closed slowly in order to avoid shock from water-hammer that may dislodge any loose material from the walls of the hole.

Since 1938 investigation work has been carried on by this office as time would allow, and all of the wells were located and as much of the history as possible was obtained about each one of them. A cooperative program was entered into between the city of Las Vegas, Clark County, and the Las Vegas Land and Water Company, which provides sufficient money to pay the services of a man five days each month in this basin under the supervision of the State Engineer's office. Harry Jameson, who has assisted in such work for many years, first with George Hardman and then with Penn Livingston, was selected for this work. As a result due to his efforts in closing wells that were wasting water we believe that a saving of at least 750,000 gallons a day has been achieved.

#### NEVADA UNDERGROUND WATER LAW

No mention was made of underground water in our water laws until 1913 when the Legislature repealed the water law of 1907 and provided a new water law, chapter 140, sections 1 to 87. Section 1 of the 1913 Act provides that the water of all sources within the boundaries of the State, whether above or below the surface of the ground, belongs to the public.

Also, during the 1913 session of the Legislature an Act was passed providing for the casing and capping of artesian wells, and providing a penalty for the violation of the provisions of such Act (chapter 54, Statutes of 1913). This Act applied only to artesian wells and was not tied into the general water law.

In 1915 an Act was passed providing a law for the conservation of underground water (chapter 210, Stats. 1915). Section 1 of said Act reads: "All underground water, save and except percolating water, the course and boundaries of which are incapable of determination, are hereby declared to be subject to appropriation under the laws of

the State relating to the appropriation and use of water." Other sections in the Act had to do with the sinking or boring of artesian wells, the proper casing, etc. This Act was amended in 1935 and in 1937.

Under the general water law of 1913 "the waters of all sources \* \* \* whether above or beneath the surface of the ground belongs to the public (sec. 1) and may be appropriated for beneficial use as provided in this Act and not otherwise (sec. 2). The 1915 underground water Act heretofore referred to seemed to be somewhat in conflict with the 1913 general water law insofar as it apparently eliminates percolating water, the course and boundaries of which are incapable of determination.

This office has been of the opinion that not only can the course and boundaries of practically all of the major underground percolating waters in this State be reasonably ascertained, but also the quantity of water percolating can be approximated, providing sufficient tests and observations could be made, and were therefore public waters subject to appropriation under the general water laws of this State.

However, in 1939 the 1915 and amendatory Acts were repealed and a new underground water law was enacted. In this new Act it provides that all underground waters within the boundaries of the State belong to the public, and subject to all existing rights to the use thereof, and are subject to appropriation for beneficial use only under the laws of the State relating to the appropriation and use of water, and not otherwise.

The 1939 Act provided methods for the designation of underground water basins, the employment of an artesian well supervisor, and raising the necessary money to pay for such services. It provides that anyone desiring to appropriate water in a basin designated by the State Engineer must, before performing any work in connection therewith, make application in the statutory manner to appropriate such water. Under this Act the State Engineer is given the necessary authority to close any wells from which water is being wasted or being used without legal authority.

#### WATERSHED

It is the general opinion of engineers who have studied the underground drainage, that the Las Vegas Valley receives underground drainage from Indian Springs Valley, Owens Dry Lake, and Mormon Gulch to the north, and the Ivanpah Valley to the southwest. The watershed area, according to an unpublished report by George Hardman, contributing directly to the Las Vegas Valley, totals about 632 square miles in the Las Vegas, Sheep, and Spring Mountain Ranges. The total watershed area contributing to the Las Vegas, Indian Springs, Owens Dry Lake, Mormon Gulch, and Ivanpah Valleys comprise about 1,876 square miles. Of this area only about 104 square miles lie above the 7,500-foot elevation, where the precipitation is sufficient to contribute underground water in any appreciable quantity. Over the balance of the 1,772 square miles the rainfall is so slight that transpiration and evaporation consume practically all of the falling water.

A tabulation of the approximate areas in square miles contributing

water to the Las Vegas Valley as determined by George Hardman, Land Planning Specialist for Nevada in 1936, is as follows:

Location	BETWEEN			Total square miles
	3,500-7,500 feet elevation	7,500-9,500 feet elevation	9,500-11,910 feet elevation	
Charleston Range .....	304	40	9	353
Sheep Range .....	244	36	---	280
Owens Dry Lake .....	50	---	---	50
Mormon Gulch .....	268	---	---	268
Ivanpah Dry Lake .....	416	---	---	416
Jean Dry Lake .....	29	---	---	29
Indian Springs Valley—				
Spotted Range .....	261	---	---	261
Spring Mountains .....	200	17	2	219
Totals .....	1,772	93	11	1,876

Very little data has been kept on the annual rainfall on the Spring Mountains or Sheep Ranges but it can be conservatively estimated that between the 7,500 feet and 8,500 feet elevation it varies between 14 and 20 inches, and above 8,500 feet probably averages about 25 inches. The winter of 1939 and 1940 was, according to old timers, the driest in that area for over 30 years. In that portion of the Spring Mountain Range contributing to the Charleston Park area it is believed that the precipitation did not exceed six inches during the season, which will probably be noticeable first by the drying up of some of the springs in this range of mountains and later by the decreased hydrostatic pressure in the Las Vegas artesian basin.

The following list of 340 wells have all been located accurately and date as to depth, year drilled, and flow is partially shown. As time goes on more information will be obtained, and the office hopes to complete the list within the next few months. It is believed that there are probably 25 more wells that have not been located.

During the past few months a map of the Las Vegas artesian basin showing all the wells located to date has been prepared in the State Engineer's office.

The State Engineer's office firmly believes that for the perpetuation of the flowing artesian wells in this basin a program of conservation should be carried on with increasing enforcement. We believe that a cooperative program entered into with the United States Geological Survey for a further and complete study of this area would be of great benefit. We also recommend the establishment of a snow survey course in the Charleston Park area of the Spring Mountain Range.

### WELLS IN THE LAS VEGAS ARTESIAN BASIN

#### And Data Pertaining Thereto

Well No.	Name of Well	Subdi- vision	LOCATION			Permit No.	Year drilled	Depth	Dis-charge G.P.M.
			Sec.	T. S.	R. E.				
1	Taylor, H. ....	SW $\frac{1}{4}$ SE $\frac{1}{4}$	24	20	60	.....	1913	315	N.F.
2	Egglington, L. C. ....	SE $\frac{1}{4}$ NE $\frac{1}{4}$	24	20	60	.....	1910	270+	N.F.
3	Syndicate No. 2 .....	SW $\frac{1}{4}$ NW $\frac{1}{4}$	19	20	61	.....	1914	234+	27
4	Syndicate No. 1 .....	NW $\frac{1}{4}$ SW $\frac{1}{4}$	19	20	61	.....	1914	.....	20
5	Syndicate No. 5 .....	NW $\frac{1}{4}$ NE $\frac{1}{4}$	19	20	61	.....	1914	260+	67
6	Anderson, Geo. ....	NW $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	.....	.....	268+	67
7	Oppedyk, R. J. ....	NW $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	9389	1930	278	238
8	Frewalt, John .....	NE $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	.....	1938	300	9

WELLS IN THE LAS VEGAS ARTESIAN BASIN—Continued

Well No.	Name of Well	LOCATION			Permit No.	Year drilled	Depth	Discharge G.P.M.
		Sub-division	Sec.	T. S. R. E.				
9	Las Vegas Building & Land Co.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	21	20	61	1913	.....	N.F.
10	North Las Vegas.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	9992	1936	600
11	North Las Vegas.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	9651	1933	250
12	Thebo, T. J.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	28	20	61	10293	1938	630
13	Beam, Frank.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	33	20	61	.....	1938	600
14	Blackman, A. W.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	10035	1936	400
15	Tate, Myrtle.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	.....	425
16	Nagle, Helen.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	32	20	61	.....	.....	363
17	Filby, James.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	32	20	61	.....	.....	616
18	Kidder, M. D.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	36	20	60	.....	1925	385
19	Hinson, W. N.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	.....	.....	326
20	Pinjuv, L. M.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	.....	1938	292
21	Umbaugh, J. H.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	10409	1937	394
22	Umbaugh, J. H.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	10409	.....	224+
23	Gobeli, Fred.	SE $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	.....	1928	229
24	Lindsay	SE $\frac{1}{4}$ NW $\frac{1}{4}$	5	21	61	.....	.....	555
25	Sund.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	5	21	61	.....	1914	585
26	Syndicate No. 6	SW $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	1914	354
27	South, J.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	61	.....	1936	341
28	Sweet, W. M.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	7	21	61	.....	.....	360
29	Deadrich, Henry.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	18	21	61	.....	1912	292
30	Bryant, C. A.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	18	21	61	.....	1925	225
31	City of Las Vegas.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	17	21	61	10183	1928	400
32	State Highway	SW $\frac{1}{4}$ NW $\frac{1}{4}$	16	21	61	9832	1935	900
33	Rockwell, L. H.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	15	21	61	.....	.....	386
34	Cornish, E. M.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	22	21	61	.....	.....	690
35	Armstrong, F. E.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	27	21	61	.....	1912	400
36	Armstrong, F. E.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	27	21	61	.....	1912	346
37	Tallackson, G. T.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	34	21	61	.....	.....	246
38	Gambill, C. L.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	34	21	61	.....	.....	263
39	Mildren, F. R.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	33	21	61	.....	.....	222
40	Ferron, W. E.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	28	21	61	.....	.....	103
41	Fitzpatrick.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	4	22	61	.....	.....	355
42	Bell, Daisy.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	9	22	61	.....	.....	127
43	Oppedyk, R. J.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	9389	1930	318
44	Syndicate No. 3	SW $\frac{1}{4}$ NW $\frac{1}{4}$	19	20	61	.....	1913	300
45	Syndicate No. 4	SE $\frac{1}{4}$ NW $\frac{1}{4}$	19	20	61	.....	1914	.....
46	North Las Vegas.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	10181	1936	740
47	Craner, S. W.	SE $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	.....	1913	354
48	Ellis, William.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	1911	381
49	Ellis, William.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	61	.....	1910	403
50	Duncan, W. E.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	35	20	61	10152	1937	350
51	Hunt, et al.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	2	21	61	.....	1926	1,120
52	Russell, Julia.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	29	20	61	10434	1938	.....
53	Minnette, A. M.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	28	21	61	.....	.....	.....
54	Dutton.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	3	21	61	.....	1907	442
55	Ronnow, Alice.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	11	22	61	.....	1909	208
56	Ronnow, Alice.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	11	22	61	.....	1909	410
57	Tomiyasu, Y.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	1	22	61	2303	1911	203
58	Tomiyasu, Y.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	1	22	61	2303	.....	.....
59	Von Tobel, Edward.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	1	22	61	.....	1910	505
60	Von Tobel, Edward.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	1	22	61	.....	1912	230
61	Von Tobel, Edward.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	1	22	61	.....	1912	335
62	Miller, John F.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	1	22	61	.....	1912	.....
63	Miller, John F.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	1	22	61	.....	1912	.....
64	So. Nev. L. & D. Co.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	1911	378
65	So. Nev. L. & D. Co.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	1913	430
66	So. Nev. L. & D. Co.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	1911	372
67	Paps, Michael.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	61	10392	1912	725
68	So. Nev. L. & D. Co.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	11	20	60	.....	1911	628
69	Gladstone Corp.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	10	22	61	4374	1909	325
70	Gladstone Corp.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	10	22	61	4374	1912	349
71	McCarter, A. F.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	36	21	61	.....	1911	500
72	Nagamatsu, Fred.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	34	21	61	.....	1912	.....
73	Nagamatsu, Fred.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	34	21	61	.....	1912	.....
74	Nagamatsu, Fred.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	34	21	61	.....	1912	.....
75	Harris, Art.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	61	.....	1910	480
76	Harris, Art.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	1911	750
77	L. A. & S. L. R. R.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	29	20	61	7201	1924	.....
78	Beam, F.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	35	20	61	.....	.....	475
79	Wengert, A. F.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	3	22	61	7593	1925	374
80	Wickman, E.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	19	20	61	7930	1926	275
81	Lorenzi, J.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	29	20	61	.....	.....	375
82	Lorenzi, J.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	29	20	61	.....	.....	600
83	Lorenzi, J.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	29	20	61	.....	.....	.....
84	Whitehead, S.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	1	21	61	.....	.....	.....
85	Murphy, Roy.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	26	21	61	9239	.....	610
86	Eastland, Van.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	26	21	61	9239	.....	500
87	Bell Telephone.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	27	21	61	9243	1930	625
88	Boulder Dam Town-site Co.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	4	21	61	9323	.....	400

WELLS IN THE LAS VEGAS ARTESIAN BASIN—Continued

Well No.	Name of Well	LOCATION			Permit No.	Year drilled	Depth	Dis-charge G.P.M.
		Subdi- vision	Sec.	T. S.				
89	Las Vegas Home Blds. Inv.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	14	20	61	.....	402	N.F.
90	Beverly Hills Dev.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	2	21	61	.....	398	F.
91	Boulder Dam Town- site Co.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	33	20	61	.....	1925 520	F.
92	Linn, Francis.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	35	21	61	9498	1931 300	F.
93	Ferguson, F. M.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	29	21	61	9516	1931 260	S.F.
94	Ferguson, F. M.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	29	21	61	9516	1931 280	N.F.
95	Clark, E. A.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	35	20	61	9520	1925 290	F.
96	Humphrey, Guy.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	9522	.....	310
97	Humphrey, Guy.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	9522	.....	265
98	Humphrey, Guy.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	9522	.....	417
99	Russell, Julia.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	29	20	61	9525	1915 800	310
100	City of Las Vegas.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	26	20	61	9601	1932 352	F.
101	City of Las Vegas.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	27	20	61	9602	1932 626	F.
102	City of Las Vegas.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	26	20	61	9614	.....	347
103	City of Las Vegas.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	26	20	61	9614	.....	490
104	Clark, E. A.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	36	20	61	9652	1932 465	F.
105	Wilson & Mikkelsen.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	9653	1928 900	F.
106	Dennison, Blanche.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	2	21	61	9885	.....	500
107	Baxter, Elmer.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	9914	1932 320	S.F.
108	City of Las Vegas.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	27	20	61	9939	1936 925	F.
109	City of Las Vegas.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	30	20	61	8173	1927 322	F.
110	City of Las Vegas.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	30	20	61	9940	1937 830	225
111	Stafford, John.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	16	21	61	10013	1936 559	96
112	Weller, Burton.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	16	21	61	10019	1929 560	50
113	Smith, Wm. R.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	10066	1926 300	50
114	Las Vegas Land & Water Co.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	31	20	61	10127	1936 802	554
115	City of Las Vegas.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	30	20	61	10182	1937 680	P. 500
116	Murray, W. D.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	10241	.....	386
117	Baker, Alpha P.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	22	21	61	10243	1933 500	65
118	Honrath, Earl.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	28	20	61	10245	1940 650	67
119	Moon, William.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	10260	1938 200	21
120	Gerken, H. D.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	32	20	61	10301	1939 407	F.
121	Nickerson, H.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	3	22	61	10321	1924 395	176
122	Nickerson, H.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	3	22	61	10321	1912	.....
123	Jamenson, Slim.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	21	21	61	.....	.....	25
124	Byler, M.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	21	21	61	.....	.....	F.
125	Pittman, Vail.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	35	21	61	.....	1925 465	F.
126	Wollman, Agnes.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	23	21	61	.....	1929	.....
127	Mayfair Garden.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	31	21	62	.....	1931	.....
128	Campbell, U. G.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	30	21	62	.....	1912 390	150
129	Campbell, U. G.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	30	21	62	.....	1912 405	20
130	Parks, Anna.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	19	21	62	.....	1934	.....
131	Sheppard, J.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	31	21	62	.....	1911 250	F.
132	Sheppard, J.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	31	21	62	.....	.....	F.
133	Matzdorf, Martha.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	29	21	62	.....	1912 1,165	3
134	Matzdorf, Martha.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	29	21	62	.....	1912 404	3
135	Bailey.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	36	21	61	.....	.....	5
136	Heaton, C. A.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	6	22	62	.....	.....	3
137	Heaton, C. A.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	6	22	62	.....	1912	.....
138	County Golf Course.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	9	21	61	.....	.....	530
139	Reed, Harry F.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	2	22	61	.....	.....	600
140	Smoke.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	13	20	60	.....	1915	.....
141	Taylor, H.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	24	20	60	.....	1924 315	N.F.
142	McIntyre.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	33	21	61	.....	1931 351	P.
143	Beam, F.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	8	22	61	.....	1931 115	S.W.
144	Engler.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	35	19	60	.....	.....	.....
145	Williams, D.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	3	22	61	.....	1935 575	N.F.
146	McWilliams.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	1	21	60	.....	1930 508	N.F.
147	Stocker, C.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	169
148	Umbaugh, Mrs. J. H.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	10409	.....	274
149	Beckwith, Clarence.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	25	21	61	.....	.....	.....
150	Leavitt, L. P.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	2	22	61	10367	1940	.....
151	Higgins, Earl.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	6	21	61	.....	.....	259
152	Woodward, J. W.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	F.
153	Youngquist.	.....	.....	.....	.....	.....	.....	425
154	Rose Garden Add.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	1931 415	F.
155	Kimball & Williams.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	7	21	61	.....	.....	375
156	Buol, Frank.	SW $\frac{1}{4}$ NE $\frac{1}{4}$	22	20	61	.....	1932 265	100
157	Stewart, Mina.	SE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	.....	265
158	State Highway.	SE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	.....	270
159	L. A. & S. L. R. R.	SW $\frac{1}{4}$ NW $\frac{1}{4}$	34	20	61	.....	.....	F.
160	Rose, Morris.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	21	21	61	.....	.....	520
161	Clancy.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	369
162	Maracci, C.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	415
163	Bryant, C. A.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	.....	1925	.....
164	Paris Auto Court.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	.....	.....	180
165	Dimmick.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	210
166	Gynn.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	20	20	61	.....	1932 347	F.
167	Five Point Serv. Sta.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	165

## WELLS IN THE LAS VEGAS ARTESIAN BASIN—Continued

Well No.	Name of Well	LOCATION			Permit No.	Year drilled	Depth	Dis-charge G.P.M.	
		Subdi- vision	Sec.	T. S. R. E.					
168	Von Tobel	SE $\frac{1}{4}$ SW $\frac{1}{4}$	1	22	61	.....	1936	.....	25
169	Indian Reservation	NW $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	.....	375	F.
170	Owen, Charles	SE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	.....	N.F.
171	Masik & Hennon	NE $\frac{1}{4}$ SE $\frac{1}{4}$	29	20	61	.....	.....	.....	F.
172	Paps, Michael	SW $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	61	10392	.....	810	P.
173	Case, Harold	SE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	.....	280	31.5
174	Clough, Richard	SW $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	10391	1940	570	31
175	Leavitt, L. P.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	2	22	61	.....	1912	290	.....
176	Kisiwor, Martin	SW $\frac{1}{4}$ NE $\frac{1}{4}$	27	21	61	.....	1912	230	S. F.
177	Las Vegas Irr. F. L. Co.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	21	61	.....	1912	550	N.F.
178	Mendelsohn, Wm.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	3	21	61	10419	1939	512	S.F.
179	Las Vegas Land & Water Co.	SE $\frac{1}{4}$ SE $\frac{1}{4}$	30	20	61	10458	1940	.....	958
180	Las Vegas Land & Water Co.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	27	20	61	10439	1939	323	45
181	Saunders, R. B.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	10465	1940	200	16
182	Goumond, P. J.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	34	20	61	10466	1940	638	66
183	Woodland Park	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	1912	360	F.
184	Gratz, C.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	21	20	61	.....	1912	301	S. F.
185	Oppedyk	SE $\frac{1}{4}$ SE $\frac{1}{4}$	21	20	61	.....	1912	490	N.F.
186	Oppedyk	SE $\frac{1}{4}$ SE $\frac{1}{4}$	21	20	61	.....	1912	410	N.F.
187	Russell, Doc	NE $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	1931	.....	P.
188	Cox, W.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	23	20	61	.....	1934	185	S. F.
189	Coleman, J.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	.....	1937	400	P.
190	Eruno, Tony	NW $\frac{1}{4}$ SW $\frac{1}{4}$	23	20	61	.....	1936	210	P.
191	Sakai, H.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	.....	.....	P.
192	Stevens, Mrs.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	22	20	61	.....	1938	812	P.
193	North Las Vegas	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	1939	.....	F.
194	North Las Vegas	SW $\frac{1}{4}$ SE $\frac{1}{4}$	22	20	61	.....	1939	.....	F.
195	Bunker, Robert	NE $\frac{1}{4}$ SW $\frac{1}{4}$	28	20	61	10474	1932	820	F.
196	Hermenget, A.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	28	20	61	.....	.....	390	F.
197	Hutchinson, A.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	28	20	61	.....	.....	.....	F.
198	Sternner & Allen	NW $\frac{1}{4}$ SE $\frac{1}{4}$	28	20	61	.....	1920	420	F.
199	Haggard, J. A.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	28	20	61	.....	1916	805	100
200	Haggard, J. A.	NE $\frac{1}{4}$ SE $\frac{1}{4}$	28	20	61	.....	1928	320	100
201	Pico & Perry	SE $\frac{1}{4}$ SE $\frac{1}{4}$	32	20	61	.....	1932	.....	50
202	County Hospital	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	.....	.....	N.F.
203	Filby, James	NW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	1913	400	87
204	Filby, James	NW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	1912	426	60
205	Allen, E. H.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	10471	1938	400	F.
206	Strong, Ed.	SW $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	1938	226	F.
207	Ullom	SE $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	1912	401	S.F.
208	Parks, E.	SE $\frac{1}{4}$ NW $\frac{1}{4}$	16	20	61	.....	1930	.....	S. F.
209	Oppedyk Dairy	SW $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	1934	.....	F.
210	Pat's Patio	SW $\frac{1}{4}$ SE $\frac{1}{4}$	35	20	61	.....	1931	412	F.
211	Richardson, Vance	SE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	.....	.....	F.
212	Mankiewicz, M.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	22	20	61	.....	.....	.....	P.
213	State Highway	SE $\frac{1}{4}$ NE $\frac{1}{4}$	27	20	61	.....	1912	.....	N.F.
214	McLallen, W.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	4	21	61	.....	1912	382	20
215	Blanding	NW $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	61	.....	1913	750	F.
216	Blanding	NW $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	61	.....	.....	.....	N.F.
217	Hefner, G.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	.....	.....	135
218	Hefner, G.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	4	21	61	.....	.....	710	S. F.
219	Fisher, J. C.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	1	21	61	.....	.....	.....	30
220	City of Las Vegas	NW $\frac{1}{4}$ SE $\frac{1}{4}$	17	21	61	.....	.....	.....	125
221	Bryant, C. A.	NW $\frac{1}{4}$ SE $\frac{1}{4}$	18	21	61	.....	.....	.....	N.F.
222	Woodward	NE $\frac{1}{4}$ SE $\frac{1}{4}$	17	21	61	.....	.....	.....	25
223	Gould, C.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	27	21	61	.....	1931	360	17
224	Bell, P. W.	SW $\frac{1}{4}$ SE $\frac{1}{4}$	27	21	61	.....	.....	.....	F.
225	Griffith, Edna	NW $\frac{1}{4}$ NE $\frac{1}{4}$	2	22	61	.....	.....	200	S. F.
226	Lightfoot, L.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	2	22	61	.....	1924	200	F.
227	Sweeney, M. M.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	2	22	61	.....	.....	.....	20
228	Smythe	NW $\frac{1}{4}$ NW $\frac{1}{4}$	2	22	61	.....	1910	.....	1
229	Mundy	SE $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	.....	1913	.....	F.
230	Keeler, Tom	NE $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	.....	1926	600	F.
231	Garehime, Jake	SW $\frac{1}{4}$ NW $\frac{1}{4}$	35	20	61	.....	.....	.....	F.
232	Ladd, James	SE $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	.....	1912	370	F.
233	Ladd, James	NW $\frac{1}{4}$ SW $\frac{1}{4}$	35	20	61	.....	1912	373	F.
234	Meadows Add.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	1	21	62	.....	.....	.....	P.
235	Home Auto Court	NE $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	61	.....	1926	407	F.
236	Fulcher, James	NE $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	61	.....	1927	400	P.
237	Larson, Sam	NE $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	61	.....	1925	403	F.
238	Park, Dr.	NW $\frac{1}{4}$ NE $\frac{1}{4}$	3	21	61	.....	1912	807	F.
239	Dutton	NW $\frac{1}{4}$ NE $\frac{1}{4}$	3	21	61	.....	.....	.....	F.
240	Stevenson, Dr. Gladys	SE $\frac{1}{4}$ SE $\frac{1}{4}$	4	21	61	.....	1939	350	S. F.
241	Tower Auto Court	SE $\frac{1}{4}$ SE $\frac{1}{4}$	4	21	61	.....	1934	600	F.
242	91-Club	NE $\frac{1}{4}$ NW $\frac{1}{4}$	16	21	61	10497	1930	600	80
243	Miller & Smith	NW $\frac{1}{4}$ SW $\frac{1}{4}$	16	21	61	.....	.....	700	F.
244	Wells, T. A.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	16	21	61	.....	.....	.....	N.F.
245	Wells, T. A.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	16	21	61	.....	.....	700	F.
246	Weisberger, Jack	NW $\frac{1}{4}$ SW $\frac{1}{4}$	16	21	61	.....	1936	700	F.

WELLS IN THE LAS VEGAS ARTESIAN BASIN—Continued

Well No.	Name of Well	LOCATION			Permit No.	Year drilled	Depth	Dis-charge G.P.M.	
		Subdi- vision	Sec.	T.S.					R.E.
247	Munson, F.	SW <sub>4</sub> SE <sub>4</sub>	17	21	61	1938	540	95	
248	Pickwick Oil Co.	NE <sub>4</sub> NE <sub>4</sub>	17	20	61	1931	500	Dry	
249	Mildren, Dr.	SW <sub>4</sub> NW <sub>4</sub>	33	21	61			S.F.	
250	Gallagher, J.	SE <sub>4</sub> NE <sub>4</sub>	3	22	61			33.5	
251	Johnson, Rufus.	SW <sub>4</sub> SE <sub>4</sub>	3	22	61			S.F.	
252	Fox, J.	NE <sub>4</sub> NE <sub>4</sub>	10	22	61	1912		25	
253	Fox, J.	NE <sub>4</sub> NE <sub>4</sub>	10	22	61	1912		N.F.	
254	Zaugg, A.	SE <sub>4</sub> NE <sub>4</sub>	10	22	61			N.F.	
255	Zaugg, A.	SE <sub>4</sub> NE <sub>4</sub>	10	22	61			N.F.	
256	Zaugg, A.	SE <sub>4</sub> NE <sub>4</sub>	10	22	61			F.	
257	Whitney, R. E.	NE <sub>4</sub> SE <sub>4</sub>	10	22	61			13.5	
258	Whitney, R. E.	NE <sub>4</sub> SE <sub>4</sub>	10	22	61			F.	
259	Whitney, R. E.	NE <sub>4</sub> SE <sub>4</sub>	10	22	61			F.	
260	Clark-Ronnow.	SE <sub>4</sub> SW <sub>4</sub>	2	22	61	1912		S.F.	
261	Clark-Ronnow.	NE <sub>4</sub> NW <sub>4</sub>	11	22	61	1912		N.F.	
262	Clark-Ronnow.	SE <sub>4</sub> NW <sub>4</sub>	11	22	61	1912		25	
263	Clark-Ronnow.	SE <sub>4</sub> NW <sub>4</sub>	11	22	61	1912		50	
264	Clark-Ronnow.	SE <sub>4</sub> NW <sub>4</sub>	11	22	61	1912		N.F.	
265	McNamee, Frank.	SE <sub>4</sub> SE <sub>4</sub>	2	22	61			S.F.	
266	Sakai, T.	NW <sub>4</sub> NW <sub>4</sub>	12	22	61			20	
267	Von Tobel & Beckley	SE <sub>4</sub> SW <sub>4</sub>	1	22	61	1914	536	S.F.	
268	Von Tobel & Beckley	SW <sub>4</sub> SE <sub>4</sub>	1	22	61	1911	503	60	
269	Miller, John F.	SW <sub>4</sub> NW <sub>4</sub>	1	22	61	1938	225	20	
270	Miller, John F.	SW <sub>4</sub> NW <sub>4</sub>	1	22	61	1912	455	F.	
271	Miller, John F.	SW <sub>4</sub> NW <sub>4</sub>	1	22	61	1912	455	N.F.	
272	Miller, John F.	SW <sub>4</sub> NW <sub>4</sub>	1	22	61	1912		F.	
273	Miller, John F.	NW <sub>4</sub> SW <sub>4</sub>	1	22	61	1912	1,050	F.	
274	Miller, John F.	NW <sub>4</sub> SW <sub>4</sub>	1	22	61	1912	340	N.F.	
275	Miller, John F.	NW <sub>4</sub> SW <sub>4</sub>	1	22	61	1912		F.	
276	Goodwin, Wm.	SE <sub>4</sub> SW <sub>4</sub>	27	20	61	1924	357	S.F.	
277	Las Vegas Land & Water Co.	SE <sub>4</sub> NE <sub>4</sub>	31	20	61	10508	1940	801	603
278	Hampton, R.	SW <sub>4</sub> SW <sub>4</sub>	25	20	61	1932	530	30	
279	Hampton, Davis & Dial	SW <sub>4</sub> SW <sub>4</sub>	25	20	61	1940	330	15	
280	Haller, Chas.	NW <sub>4</sub> NW <sub>4</sub>	36	20	61	1934	320	40	
281	Parks, Eugenc.	SE <sub>4</sub> NW <sub>4</sub>	36	20	61			S.F.	
282	Polman, W.	SE <sub>4</sub> NW <sub>4</sub>	36	20	61			3	
283	Barbee, S.	NE <sub>4</sub> NW <sub>4</sub>	7	21	62	1929	425	N.F.	
284	Murphy, G. H.	NE <sub>4</sub> NW <sub>4</sub>	7	21	62		180	N.F.	
285	Mather, R. L.	NE <sub>4</sub> NW <sub>4</sub>	7	21	62		700	N.F.	
286	McLaurine, Iva.	NE <sub>4</sub> NW <sub>4</sub>	7	21	62	1929	225	S.F.	
287	Finlayson, M.	NE <sub>4</sub> NW <sub>4</sub>	7	21	62	1926		S.F.	
288	Sears, Buck.	NE <sub>4</sub> NW <sub>4</sub>	7	21	62		325	S.F.	
289	Lisle, Jack.	NE <sub>4</sub> SE <sub>4</sub>	12	21	61	1939	310	25	
290	Maas, Elsie.	SW <sub>4</sub> SE <sub>4</sub>	12	21	61	1937	284	25	
291	Creighton, F. C.	SW <sub>4</sub> SE <sub>4</sub>	12	21	61	1937	284	50	
292	Lisle, John.	SE <sub>4</sub> NW <sub>4</sub>	13	21	61	1939	260	75	
293	Gribble, C.	NE <sub>4</sub> NE <sub>4</sub>	28	21	62		420	S.F.	
294	Bunch, J. H.	SE <sub>4</sub> NE <sub>4</sub>	28	21	62	1931	570	N.F.	
295	Dolan, Geo.	SE <sub>4</sub> SE <sub>4</sub>	21	21	62			S.F.	
296	Snider, R. M.	NW <sub>4</sub> SW <sub>4</sub>	27	21	62		400	P.	
297	Clark & Ronnow.	SW <sub>4</sub> NE <sub>4</sub>	28	21	62			S.F.	
298	Campbell, U. G.	NW <sub>4</sub> SE <sub>4</sub>	30	21	62			S.F.	
299	Campbell, U. G.	NW <sub>4</sub> SE <sub>4</sub>	30	21	62			S.F.	
300	Campbell, U. G.	NW <sub>4</sub> SE <sub>4</sub>	30	21	62			4	
301	Matzdorf, M.	SW <sub>4</sub> NW <sub>4</sub>	29	21	62	1935		F.	
302	Stevens, Una.	SW <sub>4</sub> SE <sub>4</sub>	30	21	62	1910	415	S.F.	
303	Jefferson, R. B.	NW <sub>4</sub> NW <sub>4</sub>	28	20	61	1912	690	60	
304	Jefferson, R. B.	SW <sub>4</sub> NW <sub>4</sub>	28	20	61			N.F.	
305	Owens, B.	SE <sub>4</sub> NW <sub>4</sub>	21	20	61	1925	525	43	
306	Francis, Floyd.	SE <sub>4</sub> NW <sub>4</sub>	21	20	61	1925	500	N.F.	
307	Hizar, A. E.	SE <sub>4</sub> SW <sub>4</sub>	17	20	61			F.	
308	Hizar, A. E.	SE <sub>4</sub> SW <sub>4</sub>	17	20	61			F.	
309	Taylor Est. Co.	NE <sub>4</sub> NE <sub>4</sub>	22	20	61	1912	418	N.F.	
310	Taylor Est. Co.	SW <sub>4</sub> SE <sub>4</sub>	15	20	61	1925	500	N.F.	
311	Taylor Est. Co.	SW <sub>4</sub> SE <sub>4</sub>	15	20	61	1925	805	F.	
312	Taylor Est. Co.	SW <sub>4</sub> SE <sub>4</sub>	15	20	61			F.	
313	Taylor Est. Co.	SW <sub>4</sub> SE <sub>4</sub>	15	20	61	1925	935	N.F.	
314	Rains, Van.	NE <sub>4</sub> SE <sub>4</sub>	3	20	61	1933	242	450	
315	Simpson, A. L.	SE <sub>4</sub> NE <sub>4</sub>	3	20	61	1938	340	5	
316	Stewart, Sumner V.	SW <sub>4</sub> NE <sub>4</sub>	3	20	61	1934	300	S.F.	
317	Stewart, Sumner V.	SW <sub>4</sub> NE <sub>4</sub>	3	20	61	1934		N.F.	
318	Craig, Geo.	SE <sub>4</sub> NE <sub>4</sub>	4	20	61	1912	900	P.	
319	Simons, P. A.	NW <sub>4</sub> NE <sub>4</sub>	27	20	61	1931	310	N.F.	
320	Young, P. P.	SW <sub>4</sub> NE <sub>4</sub>	27	20	61		320	N.F.	
321	Remick, Fred.	NE <sub>4</sub> NE <sub>4</sub>	27	20	61			F.	
322	Kelly, M.	NE <sub>4</sub> SW <sub>4</sub>	27	20	61	1924	283	S.F.	
323	Masik, J.	NW <sub>4</sub> SE <sub>4</sub>	20	20	61	1936	325	15	
324	Masik, J.	NW <sub>4</sub> SE <sub>4</sub>	20	20	61			N.F.	
325	Clark, E. A.	SW <sub>4</sub> SW <sub>4</sub>	36	20	61	10503	1940	637	45
326	Craner, S. W.	SE <sub>4</sub> NE <sub>4</sub>	34	20	61			F.	

## WELLS IN THE LAS VEGAS ARTESIAN BASIN--Continued

Well No.	Name of Well	LOCATION			Permit No.	Year drilled	Depth	Discharge G.P.M.
		Subdi- vision	Sec.	T. S.				
327	Craner, S. W.	SE $\frac{1}{4}$ NE $\frac{1}{4}$	34	20	61	.....	.....	F.
328	Jones & Blaine	SE $\frac{1}{4}$ SW $\frac{1}{4}$	33	20	61	.....	1940	F.
329	Ridgeview Est. Co.	SE $\frac{1}{4}$ SW $\frac{1}{4}$	10	21	61	.....	1912	2
330	Nevada Hotel Co.	NW $\frac{1}{4}$ NW $\frac{1}{4}$	11	21	61	10520	1940	650
331	Boulder Dam Hotel Corp.	NE $\frac{1}{4}$ NW $\frac{1}{4}$	17	21	62	.....	.....	400
332	Bauer, A.	NE $\frac{1}{4}$ NE $\frac{1}{4}$	29	20	61	.....	.....	.....
333	Morgan, R. L.	NE $\frac{1}{4}$ SW $\frac{1}{4}$	27	20	61	.....	1924	472
334	Reeder	NE $\frac{1}{4}$ SW $\frac{1}{4}$	27	20	61	.....	1922	385
335	Baldwin, Mrs.	NW $\frac{1}{4}$ SW $\frac{1}{4}$	27	20	61	.....	.....	.....
336	Caskey, Clyde	NW $\frac{1}{4}$ SW $\frac{1}{4}$	27	20	61	.....	.....	.....
337	Winterwood Ranch	NE $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	62	.....	1912	.....
338	Winterwood Ranch	NE $\frac{1}{4}$ NE $\frac{1}{4}$	4	21	62	.....	1912	.....
339	Winterwood Ranch	NE $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	62	.....	1912	.....
340	Winterwood Ranch	NE $\frac{1}{4}$ NW $\frac{1}{4}$	3	21	62	.....	1912	.....

N.F.—Nonflowing; no discharge under artesian pressure.

F.—Flowing but no measurement.

S.F.—Small flow.

P.—Pumping.

S.W.—Surface water.

**CHAPTER X****Cooperative Work With Federal and State Agencies****SNOW SURVEYS**

By H. P. BOARDMAN, *Chairman Forecast Committee,  
Nevada Cooperative Snow Surveys*

**I. CENTRAL SIERRA**

As stated in the last biennial report, the 1938 run-off of the Truckee, Carson, and East Walker Rivers far exceeded the predictions based on the snow surveys.

Probably the main reason for such discrepancy was the fact that no other year of such heavy precipitation and run-off had occurred since snow surveying was started, and so lack of similar years for comparison caused too conservative an estimate to be made.

**1939**

The agencies cooperating in our Sierra snow survey work for 1939 were the Nevada Cooperative Snow Surveys, including the State of Nevada through the State Engineer's office, the Truckee-Carson Irrigation District, the Washoe County Water Conservation District, and the Sierra Pacific Power Company; the California Cooperative Snow Surveys headed by the Division of Water Resources of the Department of Public Works at Sacramento, and including the Pacific Gas & Electric Co. and the Nevada Irrigation District of Nevada County, California; the Division of Irrigation of the Bureau of Agriculture, which was the Federal organization engaged in developing and coordinating the snow surveys throughout the western States. All of these organizations contributed financially to the work.

The U. S. Weather Bureau and the University of Nevada Agricultural Experiment Station also cooperate in various ways.

The year 1939 was very low in stream flow. The April 1 snow survey results showed a water content averaging less than 30% for normal for the low-level courses and about 50% for the high-level courses. The forecasts for run-off varied from 23.9% of normal for the Carson River at Fort Churchill to 44.5% of normal for the West Walker near Chris Flat.

The actual resulting run-off checked very close to the prediction, the greatest discrepancy being with the Truckee River which fell 6.7% of normal below the forecast. The rise of Tahoe came within one-half inch of the forecast, and the differences for the Carson and both forks of the Walker were less than 2% of normal.

In spite of the very low precipitation year, those districts provided with storage fared pretty well because of carry-over from the previous excessively high year.

**1940**

The agencies cooperating in our Sierra snow survey for this year 1940 were the same as listed for 1939 except that the Federal agency cooperating financially is now the Division of Irrigation of the Soil Conservation Service, U. S. Department of Agriculture, the personnel being the same as that of the former Division of Irrigation of the

Bureau of Agricultural Engineering. The Forest Service also cooperated to some extent this year.

The precipitation for last November and December was very low, but January, February, and March largely made up for this deficiency in quantity.

However, much of the January and the late March precipitation was rain below 7,000 feet altitude, and this combined with early melting, due to high March temperatures, caused a deficiency in water content of low-level snow courses at April 1 snow survey.

Partly because of these winter rains, Lake Tahoe rose 2.31 feet during the three months of January, February, and March, which was very unusual, as the rise during this period seldom reaches 1.5 feet.

In the Truckee and Tahoe basins the high level snow courses averaged about 102% of normal in water content and the low level only 56%, while in the Carson and Walker basins the high level average was 77% and the low level 59% of normal.

The heavy winter run-off was caught and saved in reservoirs wherever available, so several such reservoirs contained good storage on April 1, the beginning of the regular spring melting season.

The Truckee River natural discharge at Farad for April-July, inclusive, corrected for Boca reservoir and not including draft from Tahoe, was about 306,000 acre-feet, or 94% of normal, as compared with the forecast of 245,000 or 75.2% of normal.

The rise of Lake Tahoe April 1 to maximum height, assuming gates kept closed, was 1.60 feet to elevation 6,228.32; practically stationary June 27 to July 3, while the forecast was for elevation 6,228.10 about June 25. The actual rise was 95.2% of normal, and the forecast 82.2%.

The Carson River April-July discharge at Fort Churchill was about 184,000 acre-feet, very close to the forecast which was for 185,000 acre-feet.

The West Walker April-July forecast was for 153,000 acre-feet at Chris Flat, while the actual was about 151,500, a difference of .8% of normal.

The East Walker discharge below Bridgeport dam corrected for change in storage in the reservoir will be about 57,000 acre-feet for April-August, which is 78.1% of normal, while the forecast was for 52,000 acre-feet, or 71.2% of normal.

## II. HUMBOLDT BASIN

As in the past, the snow survey activity has been carried out under the direction of Carl Elges of the Nevada Agricultural Experiment Station and State representative for the Soil Conservation Service, Division of Irrigation, the Federal agency charged with coordinating snow surveys. For the past two years the Humboldt surveys have been financed by the Humboldt water users through the distribution fund, the Nevada Agricultural Experiment Station, the Owyhee Project of the Bureau of Reclamation, and by the Division of Irrigation, Soil Conservation Service. No funds were received from the State appropriation for snow surveys, since it is even inadequate for the surveys in the Sierras. As in the past, the U. S. Forest Service has given valuable assistance, without which the cost of the surveys would have more than doubled.

During the past biennium a new snow course was laid out at Midas,

and two new courses were laid out for the U. S. Biological Survey near Cave Creek in Ruby Valley. The U. S. Weather Bureau installed a battery of storage precipitation gages in Lamoille Canyon at the Terraces, and a short snow course was laid out there to offer a means of checking the relative catch of the gages.

Through cooperation with the State Engineer, measurements have been made of the run-off of the larger tributaries of the Humboldt River in Elko County. Although only three years of reliable record were available, a forecast was included this year for the South Fork at the Bolton ranch. It is planned to make additional forecasts as data are accumulated.

The forecast results for the Humboldt for 1939 and 1940 were the best so far made for that stream. The forecast for the March-July period in 1939 was 140,000 acre-feet, or 56% of normal at Palisade. The actual flow received for the period was 151,610 acre-feet, or 60.6% of normal. For 1940 the forecasted flow for the same period was 140,000 acre-feet, or 56% of normal. Preliminary figures give the actual flow received as 140,600, or 56.2% of normal. Better forecasts than were made for the past two years can hardly be expected.

#### STREAM MEASUREMENT WORK

(In cooperation with United States Geological Survey)

By A. B. PURTON, *District Engineer, Water Resources Branch,  
United States Geological Survey*

General stream gaging work on the principal streams of the State has been continued during the biennium under the usual form of cooperative agreement between the State Engineer and the United States Geological Survey.

On June 30, 1938, records were being obtained at 18 stations of which four were on reservoirs or lakes. On June 30, 1940, the number of stations had been increased to 24 of which six are on reservoirs or lakes.

The construction work and new equipment involved at two new river gaging stations was made possible by the allocation of Public Works Administration funds which also provided for the reconstruction of two stations destroyed by the 1937 floods and the replacement of antiquated equipment at several other stations. However, the problem of adequate operation and maintenance has been made more acute. Funds for the operation of one new river station are being provided by the United States Office of Indian Affairs, and it is hoped that the State Legislature will take into consideration the importance and value of the somewhat expanded work in making the biennial appropriations so that it will be possible to obtain adequate records without abandoning any stations now being operated.

The flood control investigations and the general planning for utilization of the water resources of the State have emphasized the lack of records and should support the plea for more adequate funds to carry on stream gaging work. Without such it is impossible properly to anticipate the needs and have records available for use when needed.

The data obtained as a result of these cooperative investigations are published in the annual water supply papers of the Geological Survey. The United States has been divided into twelve primary drainage

basins, and for convenience the annual progress reports on stream measurements are published in fourteen water supply papers. Each of these papers contain the data for one primary drainage basin, with the exception of the Columbia River basin, for which data is published in three water supply papers. Stream systems in Nevada are included in the Great Basin, Colorado River, and Columbia River primary drainage basins. The stream flow data for this State appear in the water supply papers for these basins. A set of these publications is available for consultation at the State Engineer's office, Carson City, Nevada, and at the district office of the Geological Survey, 303 Federal Building, Salt Lake City, Utah. Data in advance of publication and that for previous years at individual stations can be furnished in blue print form upon application to the District Engineer.

Acknowledgments are due to the water users, particularly in the Walker and Humboldt River basins, for invaluable assistance in maintaining stations in those basins, and to the United States Indian Irrigation Service for financial support and other cooperation. Records for the Carson River station at Fort Churchill have been furnished by the Newlands Project, and those for the Humboldt River near Imlay and near Oreana by the United States Bureau of Reclamation. Elevations of Walker Lake near Hawthorne have been furnished by the Navy Department.

On June 30, 1940, records were being obtained at the stations shown in the following list:

**COLORADO RIVER BASIN**

Virgin River at Littlefield, Arizona, 1929-.

**SNAKE RIVER BASIN**

Salmon Falls Creek near San Jacinto, Nevada, 1906-1916; 1919-.

Owyhee River at Mountain City, Nevada, 1927-.

Wild Horse Reservoir, 1939-.

Owyhee River below Wild Horse Dam, 1937-.

Owyhee River at Owyhee, 1939-.

**GREAT BASIN AND MINOR BASINS IN NEVADA**

Walker Lake Basin—

Bridgeport Reservoir near Bridgeport, California, 1931-.

East Walker River near Bridgeport, California, 1911-1914;  
1922-.

Walker Lake near Hawthorne, Nevada, 1928-.

West Walker River near Coleville, California, 1902-1910; 1915-.

Topaz Reservoir near Topaz, California, 1931-.

Pyramid Lake Basin—

Pyramid Lake at Nixon, Nevada, 1867-.

Carson-Humboldt Sink—

Carson River near Carson City, 1939-.

Carson River near Fort Churchill, Nevada, 1911-.

East Fork of Carson River at Horseshoe Bend, 1890-1893;  
1900-1906; 1908-1910; 1924-1929; 1935-1937; 1939-.

West Fork of Carson River at Woodfords, California, 1890-  
1892; 1900-1920; 1939-.

Humboldt River at Palisade, Nevada, 1902-1906; 1911-.

- Humboldt River near Imlay, Nevada, 1935-.
- Rye Patch Reservoir, 1939-.
- Humboldt River near Oreana, Nevada, 1896-1922; 1924-.
- South Fork of Humboldt River near Elko, Nevada, 1896-1909;  
1910-.
- Martin Creek near Paradise Valley, Nevada, 1925-.
- H. L. I. L. & P. Co.'s Feeder Canal near Mill City, Nevada,  
1914-1931; 1936-.
- H. L. I. L. & P. Co.'s Outlet Canal near Humboldt, Nevada,  
1914-.

## CHAPTER XI

**Related Activities of the State Engineer  
COLORADO RIVER COMMISSION OF NEVADA**

GOVERNOR E. P. CARVILLE.....	Chairman
ALFRED MERRITT SMITH.....	Secretary
A. J. CATON.....	Member
ED W. CLARK.....	Member
C. F. DEARMOND.....	Member

**BOULDER CANYON PROJECT ADJUSTMENT ACT**

BY ALFRED MERRITT SMITH

*Explanatory Statement.* On September 13, 1939, Governor Carville renewed the appointment of the State Engineer to be a member of the Colorado River Commission, and he was thereafter reelected by the Commission to be its Secretary, an office which had been held by him during the previous four years.

It is not required by law that the State Engineer be a member of the Colorado River Commission, but his familiarity with water use and power affairs as State Engineer and as a member of the Public Service Commission qualify him for the work, much of which can most conveniently and economically be carried on in his office at Carson City. The service is performed without additional salary and at no cost to the State excepting for traveling, living, and incidental expenses while actively engaged in the work. Stenographic service and office space are also provided by the office of the State Engineer.

During the past three years much of the State Engineer's time has been taken up by the proposed Boulder Canyon Project adjustment legislation which has now culminated in the passage of the Boulder Canyon Project Adjustment Act, which became law on July 19, 1940, when it was signed by the President. The effect of this Act on the State will be far reaching and greatly beneficial. A brief outline of the development of the Act and its passage through Congress is thought necessary here as a related activity of the State Engineer, and in order to have a permanent and readily accessible record of these important proceedings for future public reference. In the preparation of this statement no attempt has been made to detail the proceedings of a great many meetings and conferences that were held at different times and in various cities of the Colorado River Basin States and also at Washington, D. C. Such detail would require volumes. Many of the transactions and reports made by special groups of engineers and by committees appointed for special work are now on file in the office of the State Engineer at Carson City, where they are available for future reference.

*Organization.* The first meetings were attended by Governors, Senators, Congressmen, Federal irrigation and power officials, and many others interested in the development of the Colorado River Basin. There was no fixed organization with which to transact business. At these earlier meetings a chairman and secretary were elected for the

occasion, and the chairman appointed suitable committees to carry on the work. Later on the necessity of an official organization representing the interested States was seen, which resulted in the formation of the Committee of Sixteen to officially represent all seven of the Colorado River Basin States and also the Boulder power contractors. This body consisted of two delegates or committeemen from each of the seven States, who were appointed by the respective State Governors, or, with one or two States, were elected by the official State water commission. It consisted of sixteen members and was therefore called "The Committee of Sixteen," there being fourteen members from the seven States, and by unanimous consent also contained two members elected by the municipalities and power companies which had underwritten the construction of Boulder Dam by contracting with the Government in advance for the use of all of the energy to be generated.

Following is the personnel of the Committee of Sixteen:

*Arizona—*

Alma M. Davis, Secretary Colorado River Commission of Arizona, Capitol Building, Phoenix, Arizona.

Donald C. Scott, Member Colorado River Commission of Arizona, 333 N. 3d Avenue, Phoenix, Arizona.

*California—*

Evan T. Hewes, Imperial Irrigation District, El Centro, California.

Lewis A. Hauser, 554 Roosevelt Building, Los Angeles, California.

*Colorado—*

Clifford H. Stone, 212 State Office Building, Denver, Colorado.

Byron G. Rogers, Attorney General, Capitol Bldg., Denver, Colorado.

*Nevada—*

Alfred Merritt Smith, State Engineer, Carson City, Nevada.

C. F. DeArmond, Colorado River Commission, Las Vegas, Nevada.

*New Mexico—*

A. T. Hannett, First National Bank, Albuquerque, New Mexico.

Thomas M. McClure, State Engineer, Santa Fe, New Mexico.

*Utah—*

William R. Wallace, Utah Water Storage Commission, Salt Lake City, Utah.

Grover A. Giles, Attorney General, Salt Lake City, Utah.

*Wyoming—*

Ewing T. Kerr, Attorney General, Cheyenne, Wyoming.

L. C. Bishop, State Engineer, Cheyenne, Wyoming.

*Power Interests—*

E. F. Scattergood, Bureau of Power and Light, 207 S. Broadway, Los Angeles, Calif.

J. M. Gaylord, Metropolitan Water District, Los Angeles, Calif.

Subsequently at Denver, Colorado, where a conference was held in March 1939 for the purpose of considering the form of legislation which was to be based on agreements that had been reached, a Committee of Three was elected by the Committee of Sixteen for the purpose of actively aiding in the promotion of the proposed legislation. This committee was composed of the following:

Judge Clifford H. Stone of Denver, Colorado, representing the four upstream Colorado River Basin States of Colorado, New Mexico, Utah, and Wyoming.

Alfred Merritt Smith, State Engineer of Nevada, Carson City, Nevada, representing the three downstream Colorado River Basin States of Arizona, California, and Nevada.

S. B. Robinson, Chief Assistant City Attorney for Water and Power of the City of Los Angeles, representing the Boulder Dam power contractors.

The Committee of Three was instructed to proceed to Washington, D. C., and actively assist the Department of the Interior and the Bureau of the Budget in preparing a suitable and acceptable draft of the proposed legislation for Congress.

*Historical.* The original Boulder Canyon Project Act was passed by the 70th Congress, December 21, 1928. The original Act contained many provisions. One of them was that Arizona and Nevada together have a privilege of withdrawing and using at cost 36 percent of the total firm power to be generated at Boulder Dam plant, being 18 percent of the total firm power for each State. This quantity of energy will amount to approximately 120,000 continuous horsepower for each State upon the full completion of the project.

In the original Act it was required that all of the power that could be generated at Boulder Dam must be contracted for before the Government would appropriate money to build the dam. Nevada was not in a financial position to contract for any part of the said energy, but after much negotiation and many debates in the U. S. Senate, the State was granted a power withdrawal privilege, whereby, by giving advance notice of from six months to two years time, depending on the amount of energy required, the State could withdraw energy even if such energy had already been withdrawn and put to use by the California contracting interests. The same applied to Arizona. By giving similar time notices the two States, when they had no further use for it, could also turn energy back to California contractors. This process could be repeated as often as necessary. It seemed at the time that the provision was excellent for the two States. Under conditions which existed the agreement was apparently a satisfactory arrangement, and the legislators and State officials who secured it in the face of strong opposition are to be congratulated for their work. Since the passage of the original bill, both world and national conditions have changed to an extent which greatly reduces the value of the power withdrawal privilege for Nevada. The catch to the program which has developed is that the long period of advance notice to the generating lessees, which had to be given by Nevada in order to withdraw power, and the similar notice which had to be given before the power could be returned or relinquished if necessary, made the situation so difficult that the power privilege was of little use unless taken advantage of immediately upon the completion of the project and before all of the power had been absorbed by California.

Under the original Boulder Project Act of 1928 we had obtained another important concession which had nothing whatever to do with our right to withdraw and use power. This second right in the original

Act provides that the two States, Arizona and Nevada, in which States the project is located, be repaid or reimbursed for taxes and natural resources, which had been lost to them as a result of giving up the valuable dam site to the Government. It was shown at the original congressional hearings in 1928, and also more recently in 1937, very forcefully, at a conference called by the Secretary of the Interior at Washington, that if Boulder Dam had been built by private capital and been subject to taxation by the two States, Nevada alone might have received in excess of \$700,000 per year in various benefits, including taxes, which are now lost as a result of the Government having taken possession. The right of these States to compensation "in lieu of taxes" was recognized in Senate debates, and was also inferentially recognized by the Congress of 1928, through provision in the Act that Nevada and Arizona should together receive  $37\frac{1}{2}$  percent of all surplus revenue from the project. A sum equal to  $18\frac{3}{4}$  percent of all surplus earnings from the project was to be payable to each State. Tentative studies prepared by the U. S. Bureau of Reclamation at the direction of Dr. Elwood Mead indicated that with a rate of 1.63 mills set up for firm energy and .5 mill for secondary energy, the amount of surplus created, after all other obligations were paid, would bring in about \$620,000 per year to each of the two States. This estimate was an assumption based on the power rates then existing, the estimated expenses, and the amount of power to be generated.

Provision was made that these payments to the two States were to be allowed only out of "surplus" earnings. Under the Act the rates were fixed as above, but are subject to change, first in the year 1945 and every ten years thereafter, when energy rate changes are to be made based on existing competitive power rates. The Act originated and was passed by a Republican administration. Some time later the Democratic administration came into power, and promoted, and has now under construction, a number of large hydroelectric projects comparable to Boulder Dam. Among these are Grand Coulee, Tennessee Valley Authority and Bonneville projects, each of which will produce vast amounts of electric energy to be sold at very low rates under Government control. When this large amount of power is thrust on the markets of the country it will be necessary to greatly lower the present Boulder Dam power rates in order for the contractors to successfully enter the competitive field.

The present Colorado River Commission was created by Nevada legislative Act in 1935. Immediately after its appointment the commission began a study of the Boulder Dam situation. It was at once apparent to the commission that when the power rates would be first subject to change in 1945, they probably would be made so low that no surplus revenue would be earned thereafter from which Arizona and Nevada could be paid. An extremely small reduction in the rate as initially fixed would completely prevent any accumulation of surplus earnings. It was also apparent that prior to 1945 it was within the power of the Congress, with the assistance of the Department of the Interior, to reduce the present rate with the consent of the contractors and thereby wipe out any surplus and any payments that might be made to the States prior to 1945.

The California power contractors were already active in 1937 and

were preparing legislation looking to a reduction in the interest rate upon the project of from 4 percent to 3 percent, and deferment of an item of \$25,000,000 in the project loan which had been allocated to flood control on the Colorado River, but charged to the project. These changes in the Act would permit a reduction in the rate which they hoped to make low enough to bring the power into the competitive field, but no provisions whatever were made by the contractors at that time to insure any positive revenue to Nevada and Arizona, or to the four upstream States of Colorado, New Mexico, Utah, and Wyoming. The contractors, quite naturally, having underwritten and guaranteed the big project, were concerned only with their own very serious problems.

As the legislation then stood, Nevada simply had a power allotment written into the power contracts, but so fenced in by time and use conditions that its value was greatly reduced; and Nevada also had a revenue provision "in lieu of taxes," payable out of surplus or excess earnings, which would undoubtedly vanish in 1945, or perhaps earlier, for it had been held by the Attorney-General of the United States that the Government was under no obligation to pay revenue to either Nevada or Arizona, under the terms of the Act, if the Government saw fit to divert such surplus to more rapid amortization of the project. Furthermore, there was no doubt held by anyone familiar with the conditions and facts but what the surplus would completely disappear when the energy rates were to be first revised in 1945.

After a careful review of the entire situation the Nevada commission asked its secretary to go to Washington and check upon proposed legislation being prepared at that time by the Metropolitan Water District, and to secure all information possible as to the activity of the other power contractors, and if possible see that Nevada was properly provided for in any new programs. With the commission's permission the secretary was accompanied to Washington by Deputy Attorney-General Howard Gray and Professor Jay A. Carpenter of the University of Nevada. This committee was instructed to negotiate for a fixed annual revenue to be substituted in place of participation in elusive and uncertain surplus earnings. The committee was also instructed to insist upon a revision of the power contracts so that Nevada's allotment of energy would have more elastic withdrawal conditions and be of more use to the State.

Shortly after arriving in Washington the committee reached a tentative agreement with Los Angeles and the Metropolitan Water District on power contract changes. At that time Governor Kirman requested the other three members of the Colorado Commission to proceed to Washington for general conferences and to aid the committee. With them also went the Attorney-General of Nevada. The committee's new program for State power withdrawal and return was there ratified by the full commission, and after numerous conferences was agreed to by the power contractors. The revenue program was also the subject of additional study, and many discussions concerning it were had by the commission while in Washington. In the end, final negotiations on the matter of revenue in lieu of taxes were left to be continued by the secretary in Washington, and the other members of the commission, the Attorney-General and Professor Carpenter, returned to Nevada.

With the able help of Senators Pittman and McCarran and Congressman Scrugham as consultants, the commission's secretary soon thereafter secured a statement from the power interests that they would agree to a payment of \$350,000 annually to Nevada, providing Nevada would waive all right to tax the contracting municipalities' transmission lines within the State of Nevada. It was impossible for anyone to make such an arrangement or to recommend it, for the power of taxation in Nevada is definitely fixed by the constitution and law. This resulted in a temporary stalemate, and Mr. Smith returned to Nevada. The discussion was continued from Carson City between the commission and the Attorney-General and the Los Angeles power contractors. Finally these municipalities and power companies agreed to a payment of \$300,000 annually to Nevada without any reference to the tax situation.

While in Washington, and at the insistence of the Nevada delegation, discussions were had as to the position of the upstream States in the newly proposed legislation. The first proposed legislative drafts contained no change in the original Act so far as the upstream States were concerned. In the original Act the four upstream States were to receive money from surplus project earnings for development and irrigation, but only after the fifty-year period of amortization had passed. The upper State representatives promptly stated that if new legislation was to be enacted greatly to the benefit of both the California contractors and the States of Arizona and Nevada, they too should also receive some benefits, and they asked for \$1,000,000 per year fixed cash payment to be allocated to the so-called "Separate Fund" for their own use, to be given to them from the proceeds of power sales. The power contractors immediately replied that this request could not be considered, and that if the upstream States insisted upon loading this increased cost upon them they would have to fall back upon the terms of the original Act. However, there was no definite break between the upstream States and the Los Angeles power interests. The Los Angeles people insisted that not more than \$400,000 per year could possibly be paid annually into the separate fund for the upstream States, and \$600,000 per year to Nevada and Arizona, and at the same time maintain reasonable power rates. The proposed legislation was then written, and as it was late in the session was introduced as an amendment to the pending Bonneville Act in the hope that it would be passed at that session of Congress. The Bonneville Act was in the Committee of Rivers and Harbors of the House. After much debate and argument in committee, in which Nevada was ably represented by Senator Pittman, Congressman Scrugham, Attorney-General Mashburn and others, the proposed Boulder legislation, as an amendment to the Bonneville Act, was reported out favorably. When it was brought out in the House for vote it was opposed by several Congressmen from the upstream States on the ground that the upper States had not properly been provided for. The Bonneville Bill was therefore referred back to the House committee which then struck all of the Boulder amendments contained in it as being controversial matter jeopardizing the passage of the Bonneville Act. So, when the 75th session of Congress closed, the proposed Boulder project legislation was exactly where it had started from.

Thereafter followed a series of conferences which were initiated by the Governors of the several Colorado River Basin States. In the beginning, these conferences were rather unsatisfactory, and the differences between the upstream States, the power interests, and Arizona and Nevada seemed so great that it would be impossible to compose them. The first conference which gave definite hope of an agreement was held in March 1938, and was attended by a number of State Governors. At this time two official representatives were appointed from each of the States with the exception of two States in which the delegates were selected by water conservation boards or planning boards which had official recognition by their State governments. This is known as "The Committee of Sixteen," the personnel of which has been given under "Organization," and the conference was held in Santa Fe, New Mexico. The next conference was held in Yellowstone National Park in August 1938, where engineering reports that had been submitted by the upstream States and by the power interests in regard to possible earnings from the Boulder Project were extensively studied. Approaching State elections prevented definite action on Boulder problems then, for the reason that a number of Congressmen and Governors present did not care to make commitments in this matter prior to the elections. Subsequently a conference was held at Phoenix in December 1938, at which an agreement was reached by all parties concerned in the proposed legislation. The negotiations at Phoenix were carried on by the Committee of Sixteen, which by that time had become a fully authoritative body. A tentative draft of the proposed legislation was prepared and submitted to the delegates for further study, and a final conference was held in Denver in March 1939. At the Denver conference, which was attended by many irrigation and reclamation experts, Governors, Congressmen, representatives of the National Resources Committee, and the Department of the Interior, the proposed legislation was reviewed and finally approved. A resolution was adopted calling for the election of a committee of three members to go to Washington and confer with the Department of the Interior and make such minor changes as might be necessary and required to secure the approval of the Secretary of the Interior. The Committee of Three, however, had no power to make changes in the substance of the proposed legislation without again referring it to the Committee of Sixteen. The Committee of Three proceeded to Washington where, after a series of meetings and discussions with Senators and Congressmen of interested States, and with the offices of the Solicitor of the Interior Department, the Bureau of Reclamation, and the Bureau of the Budget, it prepared an amended draft of the legislation, which was presented in pamphlet form and distributed to the Committee of Sixteen, to Congressmen and Senators and other persons interested in the program. The Committee of Three also prepared and submitted a pamphlet to accompany the draft, which gave an analysis of each of the provisions thereof. The Committee of Three was then informed by the Solicitor's office that as soon as the Bureau of the Budget had submitted a favorable report on the bill it would be submitted to Secretary Ickes for his approval.

Considerable time elapsed before all of the foregoing steps had been

completed, but it was indicated by the office of the Solicitor that the Secretary's approval would be forthcoming very shortly and in time for the bill to be introduced and passed before Congress adjourned. However, a long delay ensued which has not yet been satisfactorily explained. The Bureau of the Budget delayed in getting a report out for the Secretary of the Interior, and the Secretary in turn declined to study the legislation until he had the Budget Bureau's report. Fearing that the bill would not be introduced in time to be considered during the session, the Committee held consultations with Governor Carville, Senators Pittman and McCarran and Congressman Scrugham, and with Congressmen and Senators from the upper Colorado River Basin States, as to the advisability of presenting the bill to Congress without the approval of the Secretary of the Interior. In the end these officials unanimously agreed that Congressman Scrugham, who had been of much help in framing the actual legislation, and had taken an active part in the many discussions, should submit the bill to the Committee on Irrigation and Reclamation of the House, for hearing, without further delay. Prior to doing this, Secretary Ickes was consulted and in a letter to Congressman Scrugham he stated: "If you desire to introduce the bill before the views of the Bureau of the Budget and this Department are made known, I would have no objection."

On July 6, 1939, Congressman Scrugham introduced his bill (H.R. 6629) and hearings were begun. Those who spoke in behalf of the bill were Congressman Scrugham, Judge Clifford H. Stone of Colorado, S. B. Robinson, of the Los Angeles Department of Water and Power, James Howard for the Metropolitan Water District, Professor Jay A. Carpenter for Arizona and Nevada, Alfred Merritt Smith for Arizona, California, and Nevada, E. F. Scattergood for the power interests, and C. F. DeArmond, for Nevada. Able presentations in behalf of the legislation were made by these men, and many questions were asked by members of the committee. On July 14, 1939, the hearings were discontinued by Chairman Compton I. White, pending receipt of the report from Secretary Ickes. This action was taken in response to a direct request by Secretary Ickes that the matter be recessed until the Bureau of the Budget, Federal Power Commission, and the Interior Department had time to give it further consideration. They desired to introduce an amendment providing for generation of the power by the Government or by an agency of the Government instead of through the present contractors, by which power is generated for the municipalities by the City of Los Angeles and by Southern California Edison Company for the power companies. It was indicated that some further changes in the proposed legislation might be requested from these agencies.

The Committee of Three thereafter prepared for the Committee of Sixteen a report of their work up to that time, and the members left Washington for their respective States. The representatives of the power contractors submitted a revised copy of the legislation to Solicitor Margold as a suggested basis of what they would be willing to agree to in the way of changes that had been tentatively suggested by the Interior Department up to that time. They were assured by

the Solicitor that a form of the bill satisfactory to the several Federal agencies would be ready before the second session of the Congress convened in January 1940.

In September 1939 the Committee of Three resumed active discussion of the several questions arising from the proposal of the Secretary of the Interior, which as stated by the Secretary in his report to the House Committee was:

\* \* \* that the legislation authorizing a revision of the Boulder power contracts be redrafted to provide for the unified operation of all the generating facilities at the dam by the United States or an agency designated by the United States,

In the discussions it was learned that certain questions of policy must be passed upon by the Secretary in person, and these questions were submitted by Solicitor Margold in a memorandum. At the same time the Los Angeles Department of Water and Power submitted a memorandum detailing their position with regard to operation of the power plant by the Government. Judge Clifford H. Stone and Mr. Alfred Merritt Smith sent a memorandum to the Secretary clearly defining the position of all the Colorado River Basin States. This memo was not signed by Mr. S. B. Robinson, the third member of the Committee of Three, although he was in perfect accord with its contents, for the reason that the committee was of the opinion the States should present a statement apart from that of the power contractors.

The statement of Messrs. Stone and Smith to the Secretary is here given in full:

October 4, 1939.

#### MEMORANDUM

Submitted to the Secretary of the Interior by Alfred Merritt Smith and Clifford H. Stone, representing the States of the Colorado River Basin, in the matter of the proposed Boulder Canyon Project Adjustment Act.

There is no disposition on the part of the States of the Colorado River Basin to question the general policy of the Government with respect to provisions in the proposed Boulder Canyon Project Adjustment Act, designed to insure operation of the Boulder power plant through an agent. However, the effect of such a provision on the eventual realization of the benefits of other major provisions of the bill should be seriously considered.

This matter of plant operation was injected into the bill by the Interior Department this summer, several weeks after the representatives of the States and power contractors had agreed upon what appeared to be all of the controlling questions of policy, subject to submission to and final approval by the appropriate governmental authorities. During the negotiations which resulted in the drafting and approval of this legislation by interests within the Colorado River Basin, we have kept in touch, and, during much of the time, met in conference, with the officials of the Department of the Interior.

The necessity of composing differences between the States

and allottees of power under the project at all times has been strongly emphasized and urged by representatives of the Government, as stated in your telegram of December 10, 1938, and letter of about the same date to Clifford H. Stone, Chairman of the Colorado River Basin Committee of Sixteen. These differences were of long standing. After about two years of effort and expenditure of considerable sums of money, they have been resolved. This solution, if effectuated by appropriate legislation, will accrue to the public good and future development of the entire basin.

Under such circumstances, we feel the success of this legislation should not depend on the question of whether operation through an agent can be immediately effectuated.

There are reasonable grounds to doubt the legal authority of the Department of Water and Power to act as generating agent for the Government at Boulder. This can be tested by proper legal action or an attempt made to obtain the necessary legal authority. This will require time. In view of the possibility that such authority may not be sustained through court or otherwise, we submit that the provisions as to operation of the power plant should be so worded that the far reaching benefits of this legislation are not jeopardized by that hazard.

We further submit that this provision as to operation should not have the effect of enabling private power allottees, holding contracts for a comparatively small amount of electrical energy, to defeat the legislation by withholding their consent to the agency plan.

The allowance of time through the proposed legislation to work out these legal difficulties, with reservation of certain discretionary powers in the Secretary in the determination of the effective date, are undoubtedly necessary; and we respectfully ask, in the interests of the preservation of the agreement between the States and power contractors, that such possibilities be given full consideration.

Respectfully submitted,

CLIFFORD H. STONE,

ALFRED MERRITT SMITH.

The three memoranda were handed to Secretary Ickes on October 6, 1939, and he announced that it would be several weeks before he could again consider the matter of Government generation. Several weeks later he fixed the week beginning December 4, 1939, for a conference with the Committee of Three and others. This was further postponed until December 20, 1939. Alfred Merritt Smith and Judge Clifford H. Stone, through pressure of other matters, were unable to attend this conference, but each presented a letter reiterating their views.

At this conference, the Secretary's suggestion that the legislation be redrafted to provide for the unified operation of all the generating facilities at the dam by the United States, either directly or by an agency, was discussed. The representative of the Los Angeles Department of Water and Power clearly presented practical reasons why its

generating lease could not be abruptly terminated by consent to the operation directly by the United States, for the operation of that portion is integrated with other large plants on the system of the City.

An alternative plan of operation by the Los Angeles Department of Water and Power as an agent of the United States was presented, but the Secretary did not at this time commit himself to this alternative.

The City represented that its charter inhibited execution of a contract until it had been approved as to form in advance by the City Attorney, which would require a favorable decision in a test suit, for two reasons; First, section 219 of the charter forbids the sale, lease, or other disposition of "electric energy" or the right to develop electric or other power by means of any water or water right now or hereafter owned or controlled by the City, without the assent of a two-thirds vote of the electors; and a later proviso negatives any suggestion that an exchange of power or rights is free of the prohibition. Second, operation by the City of generating units for the benefit and use of private corporations (as for example the Edison Company), per se, would be *ultra vires*, and it is doubtful whether that lack of authority could be supplied by coupling the new duty with benefits received under the proposed Act. If court decisions on these two points should unexpectedly prove adverse, the first could be cured by an election, but the second would require not only an election to amend the charter but approval by the Legislature, which does not meet until 1941. The necessity for reaching a solution of these problems was recognized by Solicitor Margold in his memorandum to the Secretary.

As a solution it was suggested by the City that the bill provide authority for the Secretary to promulgate new energy rates at once upon the passage of the bill, and that an agency plan setting up the City as agent for the United States become effective as soon as the legal obstacles could be removed and when allottees now obligated by contract to pay for 90 percent of the power shall have signed new supplemental contracts accepting all provisions of the proposed Act. Six or seven other points relating to the financial operation were cleared up at this time with the help of Solicitor Margold, Mr. Leland Olds, and Mr. Ben Cohen. These proceedings were all had with the idea of speeding up the passage of the Act so that the much desired economic adjustment affecting the seven States and the power contractors could go into effect. In the end, with minor changes, all of this suggested procedure was followed out.

Discussions followed with the Bureau of the Budget which subjected the bill to numerous amendments, mainly technical, and not affecting its substance. One amendment suggested, designated "Title II," proposed creating a "Boulder Canyon Project Finance Corporation" with power to issue bonds in anticipation of revenues, in order to aid the Federal Treasury. This provision, said to have been advanced by the President, was not incorporated in the bill for it was learned by the Committee that it would be opposed by many members of Congress and its inclusion might defeat the whole of the proposed legislation. There was no other objection to the proposal

by legislators favoring the Boulder Adjustment Act, and they agreed to give "Title II" their support if introduced as a separate Act. The suggestion met with the approval of the Budget Bureau.

On March 26, 1940, the bill, containing technical changes in the original draft which had up to that time resulted from the discussions with various governmental agencies, was introduced in the House of Representatives as H.R. 9093.

Under date of April 20 the Secretary of the Interior made a report to the Committee on Irrigation and Reclamation of the House of Representatives, to which the bill had been referred, recommending the enactment of H.R. 9093, and transmitting the amendments proposed by the Bureau of the Budget.

Numerous hearings were had before the House committee, at which Congressman Scrugham and others made addresses and were questioned. During the hearings a new amendment was proposed providing that the payments to the Colorado River Development Fund be made for the amortization period of fifty years beginning in 1938, the same as payments to Arizona and Nevada, instead of for 48 years beginning in 1940, as written in the bill, according to the final agreement at Denver in March 1939. This amendment was consented to by the lower basin States and the power contractors.

On May 23, 1940, the bill was reintroduced as H.R. 9877, including all amendments. Additional hearings were held during which, at the request of the American Federation of Labor, the House committee offered a further amendment, inserting the "prevailing wage" clause. Senator McCarran was active in behalf of this amendment, and insisted that the laborers at the dam be fully protected under the proposed plan of operation by the Government or its agency.

On May 28, 1940, the House Committee recommended passage of the bill, and on June 17, 1940, the bill was passed in the House with the "prevailing wage" clause changed to conform with the corresponding clause as worded in the Senate bill. Meantime, on May 24, 1940, the bill had been introduced in the Senate as S. 4039, in the same form as H.R. 9877 introduced in the House May 23, 1940.

Hearings were had before the Senate Committee on Irrigation and Reclamation, at which representatives of New Mexico proposed amendments radically changing the agreements that had been entered into between the States. The first related to the provisions that receipts of the Development Fund for the 14 years ending in 1955 be available for projects "equitably distributed among the four States of the Upper Division," and that for the years between 1956 and 1987, inclusive, such receipts be used for similar work on projects "equitably distributed among the states of the Upper Division and the States of the Lower Division." Two amendments proposed striking the word "equitably" at both places and the substitution of the word "equally." The third proposed amendment would have inserted in the same section authority for the State of New Mexico to use the money made available to it by the Act for the completion of a survey by the Bureau of Reclamation of the transmountain diversion project on the San Juan River in New Mexico, and for the construction of such a project, which was to be designed so as to protect users of water in Colorado and New

Mexico, including the Navajo tribe of Indians, after which any remaining water available from the project shall be used as New Mexico determines.

The Senate Committee approved the New Mexico amendments and the Senate passed the bill June 21, 1940. The bill had then been passed by the two Houses in identical form with the exception that the Senate Bill contained the three additional New Mexico amendments. The House refused to concur in the Senate amendments, and the bill went to conference.

On June 22, 1940, a conference report was made, attempting a compromise, but opposition developed, and after recess of Congress to attend the Republican convention, the amendments were again referred to the conference committee, which met on July 10 and then recommended that the Senate strike the New Mexico amendments. Both Houses approved this report, which completed final passage by both Houses.

On July 19, 1940, the bill was approved by the President.

Final adoption of the Act was accomplished by the constant and unstinted work of various Senators, Congressmen, members of the Committee of Sixteen, and others too numerous to mention. It has involved "give and take" by many interests. It is a source of gratification to know that the divergent interests succeeded in arriving at a solution of the problems involved.

The passage of the Boulder Canyon Adjustment Act does not in itself supply the solution of the many problems involved. The Act provides that it is not effective until new or supplemental power contracts in conformity therewith have been executed by the present contractors for 90 percent of the firm energy generated. Neither is the Act effective until the present lease of the Boulder power plant has been terminated, and new contracts have been entered into for the operation of the plant by the present lessees acting as agents of the United States instead of as lessees.

Hearings and conferences are now being conducted by the Interior Department to work out the financial, legal, and technical points raised by the proposed new contracts. It is confidently expected that such contracts will be executed, and thus render the Act effective.

A letter dated July 27, 1940, by the Secretary of the Interior, designates Mr. R. V. L. Wright as his special representative to prepare such findings of fact and drafts of regulations and contracts as are necessary, and therein the Secretary expresses his desire that "all things of an immediate nature provided for in the Act be done as expeditiously as possible to the end that they may be finished business during the next six months."

At the time this is being written, a hearing on the matter has been called by Mr. Wright to be held in Los Angeles on August 12, 1940, to consider and draft the proposed new contracts, and all power allottees have been so notified. Meanwhile representatives of the power contractors are in Washington, D. C., conferring with the Bureau of the Budget, the Federal Power Commission and other agencies in order to complete details for the execution of new contracts with the least possible delay. The power contractors will benefit greatly by the new

lower power rates being promulgated, and therefore desire no delay in rendering the Act effective.

The diverse, and in some instances the conflicting desires of the many interests that were engaged in preparing the bill made it impossible for any one group to succeed in the inclusion of everything it desired. With respect to Nevada the benefits to the State are now definite and certain and are entirely removed from their former nebulous and evasive class. Such compromises as had to be made in order to secure this result were amply justified in the opinion of all those who participated in the work.

Volumes could be written upon the transactions of the numerous meetings and conferences held during the last four years, by which agreement was finally reached by the many diverse interests. Speaking for Nevada, I wish that I had the time and the eloquence to adequately describe and praise the work that has been done in this matter by Senators Key Pittman and Pat McCarran, Congressman Scrugham, Governors Kirman and Carville, Attorney-General Mashburn, Deputy Attorney-General Howard Gray, Professor Jay A. Carpenter, and Commission members Ed Clark, A. J. Caton, and C. F. DeArmond. No more able or willing group of men could, in the opinion of the writer, have been found to defend the rights of Nevada in the solution of this difficult series of problems.

#### **EFFECTS OF THE BOULDER CANYON PROJECT ADJUSTMENT ACT**

The Committee of Three had prepared this brief analysis for distribution to busy Senators and Congressmen, who had little time for detailed study.

*Background.* This bill represents an agreement between the seven States of the Colorado River Basin, the Interior Department, and the nine power contractors.

*Basic purposes.* The bill changes three features of the Boulder Canyon Project Act (Act of December 21, 1928, 45 Stat. 1057), under which Boulder Dam was built: It (I) reduces the fixed charges which must be met out of power revenues, (II) sets up a new basis of rate determination to provide those revenues, and (III) changes the method of operating the power plant. It does not affect the Colorado River Company, the All-American Canal, or other features of the Project Act. It does not change the primary conception that power is being sold to pay for the dam, rather than the dam being built to sell power. Power at this project was and is subordinate to navigation, flood control, and irrigation.

I. *Change in fixed charges are made in four respects, as follows:*

1. *Interest is reduced from 4% to 3%.* Four percent is excessive. The actual cost of Federal borrowings outstanding during construction of the dam was slightly less than 2.8%. The present long-term Federal interest cost, as determined by R.E.A., is 2.66%. A rate of three percent is authorized for power development by the Reclamation Repayment Act of 1939, the most recent expression of Congressional policy on this point. Three and one-half percent is charged at Bonneville, but only on 32% of the investment, the rest being written

off, with no firm power contracts made in advance, and the Government taking the risk of finding a market after completion. Boulder was secured (in advance of construction) by firm contracts for 100% of the firm power for 50 years, and the contractors have invested over \$40,000,000 of their own money in transmission lines to bring the market to the switchboard. A lower rate of interest, commensurate with the better risk, is justified. Three percent is in excess of the cost of recent private utility financing. Four percent is charged on P.W.A. loans, but 45% of the project cost is written off. There was no "grant" here; all money advanced is repayable. Three percent is the rate fixed for power development on the Colorado-Big Thompson project in this watershed during the past year. If Congress chooses here to fix the interest rate at the actual cost of money, determined by a 50-year refunding bond issue, instead of 3%, the power users are agreeable.

2. *Twenty-five million dollars was allocated by the Project Act to flood control, to be repaid, if at all, out of "excess" revenues, if any. If surplus was inadequate, repayment of the flood control allocation was to be deferred until after the rest of the investment was repaid. The bill does not change this amount, but makes it definitely repayable after the balance of the investment is retired, and waives interest on it, whereas the Project Act charged 4% interest. Forty million dollars was estimated as the cost of a flood control dam without irrigation or power storage when the Project Act was enacted. The Project Act subordinates power to flood control, navigation, and irrigation, but power pays all the cost. This bill leaves the Colorado River as the only watershed on which the principal of the flood control cost is completely reimbursable, but it does waive interest on that item. The flood protection is not for the power users, but for the farming communities in the Imperial Valley, the Yuma area, and other areas two or three hundred miles away from the center of the use of the power.*

3. *Twenty-five million dollars, not required by the Project Act, must be paid the Treasury under the bill for use in the development of the Colorado River Basin, at the rate of \$500,000 per year, providing revenues to that extent for such purpose in lieu of Federal tax money.*

4. *Three hundred thousand dollars each year will be paid to each of the States of Arizona and Nevada in commutation of the 18¾% of "excess" revenues given each State by the Project Act. This is in lieu of taxes described in the bill.*

II. *The bill stabilizes the rate base. The Project Act provided:*

1. *The rate initially fixed in the contracts (in 1930) which became effective on completion of the dam (in 1937) was required to be high enough to repay the investment (minus \$25,000,000 for flood control) in 50 years with 4% interest. The rate actually fixed was over 50% higher than even that requirement, because only 64% of the contract revenues were taken into account, the Metropolitan Water District's contract being ignored because it had not voted bonds. It has since done so and built a \$200,000 aqueduct, lifting Colorado River water 1,600 feet and moving it 240 miles with Boulder power for municipal and domestic purposes. Thus the initial rate, during the early years, is very high; but—*

2. *The Project Act required a rate revision in 1945, and each ten years afterward, upward or downward, as competitive prices (costs of fuel-generated power) at "distributing points and competitive centers" might require. Los Angeles, the principal distributing point, is located over large oil and gas fields. Under the conditions then existing, it was believed by all concerned that rates based upon competitive conditions would assure amortization in 50 years. In 1930 it was generally believed that the sources of supply of fuel oil were nearing depletion, and that fuel prices would advance very substantially. Instead, in the Los Angeles area, new sources of supply have been developed, and fuel oil prices have materially decreased. The original Act, therefore, does not assure amortization within 50 years, because the present rate is subject to an early downward revision, which would probably eliminate all "excess" revenues, and hence any further payments on the flood-control item or to Arizona and Nevada, which are payable only from such excess.*

*The bill provides, instead of a fluctuating rate, a substantially constant rate for 50 years, computed on a base materially higher than at T.V.A., Bonneville, or Fort Peck, adequate to meet operation and maintenance, replacements, and all fixed charges enumerated above. Complete amortization of the investment is assured for the first time. The total revenues realized by the Government are more than it would receive on a "competitive rate" basis even if fuel-generated power were to cost 50% more, throughout the 50 years, than it does now.*

### III. *Changes in operation of the plant.*

At the behest of the Interior Department the bill is wholly contingent on substitution of Government operation, directly or through agents, for the present lease. But Secretary Ickes has agreed that the plant will be operated by the present lessees as Government agents. They are The City of Los Angeles and the Southern California Edison Co., Ltd. The terms of the proposed agency are acceptable to all of the power contractors.

### SUMMARY OF RESULTS OF THE BILL

*The Government is assured:*

(1) The receipt of all money necessary for operation and maintenance of the dam and power plant and for the ordinary replacements required to keep them in good operating condition.

(2) The return of its entire investment within the 50-year period, with interest, except the \$25,000,000 flood-control item, which will be repayable after the 50-year period, without interest. Ordinarily flood-control advances are not repayable at all.

(3) Twenty-four million for development in the river basin.

(4) The ownership of the dam and power plant. During the 50-year period they will be operated and through maintenance and replacements, kept in good operating condition, at the expense of the power contractors, and at the end of the period, although full paid for by them, owned by the Government.

These results may be contrasted with the results under P.W.A. power projects, constructed during the same period, where the Government loaned 55% of the cost at 4% interest and made an outright

grant of 45%. Under the P.W.A. plan after the borrower had repaid slightly more than *half* the cost, with interest, *it*, and not the Government, *owned* the project. Here the Government gets *all* its money back *and* owns the plant forever.

*The power users* receive a rate assured against major fluctuations for 50 years. Although the rate will be lower than the rate fixed until 1945, it will be higher than the present cost of steam power. The benefit of the change is uniformly shared by all private and public utilities in the area; all are contractors for Boulder Dam power on uniform terms, and the power is distributed by the existing utilities, both public and private, through their own systems. No Government competition is involved.

*Arizona and Nevada* receive fixed amounts in lieu of taxes, which can be budgeted like taxes, instead of a speculative share of profits, if any, thus, through the payment of an amount fixed by compromise, carrying out the intent of the original Act.

*All the Colorado River Basin* shares not only in the benefits of the Government's Development Fund, but also in the elimination of features of the existing law which in the past have resulted in discord.

#### THE BOULDER CANYON PROJECT ADJUSTMENT ACT

Following is the complete text of the Act as it was passed by Congress:

[PUBLIC—No. 756—76TH CONGRESS]

[CHAPTER 643—3D SESSION]

[H. R. 9877]

#### AN ACT

Authorizing the Secretary of the Interior to promulgate and to put into effect charges for electrical energy generated at Boulder Dam, providing for the application of revenues from said project, authorizing the operation of the Boulder Power Plant by the United States directly or through agents, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Interior is hereby authorized and directed to, and he shall, promulgate charges, or the basis of computation thereof, for electrical energy generated at Boulder Dam during the period beginning June 1, 1937, and ending May 31, 1987, computed to be sufficient, together with other net revenues from the project, to accomplish the following purposes:

(a) To meet the cost of operation and maintenance, and to provide for replacements, of the project during the period beginning June 1, 1937, and ending May 31, 1987;

(b) To repay to the Treasury, with interest, the advances to the Colorado River Dam Fund for the project made prior to June 1, 1937, within fifty years from that date (excluding advances allocated to flood control by section 2 (b) of the Project Act, which shall be repayable as provided in section 7 hereof), and such portion of such advances made on and after June 1, 1937, as (on the basis of repayment thereof within such fifty-year period or periods as the Secretary may determine) will be repayable prior to June 1, 1987;

(c) To provide \$600,000 for each of the years and for the purposes specified in section 2 (c) hereof; and

(d) To provide \$500,000 for each of the years and for the purposes specified in section 2 (d) hereof.

Such charges may be made subject to revisions and adjustments at such times, to such extent, and in such manner, as by the terms of their promulgation the Secretary shall prescribe.

SEC. 2. All receipts from the project shall be paid into the Colorado River Dam Fund and shall be available for:

(a) Annual appropriation for the operation, maintenance, and replacements of the project, including emergency replacements necessary to insure continuous operations;

(b) Repayment to the Treasury, with interest (after making provision for the payments and transfers provided in subdivisions (c) and (d) hereof), of advances to the Colorado River Dam Fund for the construction of the project (excluding the amount allocated to flood control by section 2 (b) of the Project Act), and any readvances made to said fund under section 5 hereof; and

(c) Payment subject to the provisions of section 3 hereof, in commutation of the payments now provided for the States of Arizona and Nevada in section 4 (b) of the Project Act, to each of said States of the sum of \$300,000 for each year of operation, beginning with the year of operation ending May 31, 1938, and continuing annually thereafter until and including the year of operation ending May 31, 1987, and such payments for any year of operation which shall have expired at the time when this subdivision (c) shall become effective shall be due immediately, and be paid, without interest, as expeditiously as administration of this Act will permit, and each such payment for subsequent years of operation shall be made on or before July 31, following the close of the year of operation for which it is made. All such payments shall be made from revenues hereafter received in the Colorado River Dam Fund.

Notwithstanding the foregoing provisions of this subsection, in the event that there are levied and collected by or under authority of Arizona or Nevada or by any lawful taxing political subdivision thereof, taxes upon—

(i) the project as herein defined;

(ii) the electrical energy generated at Boulder Dam by means of facilities, machinery, or equipment both owned and operated by the United States, or owned by the United States and operated under contract with the United States;

(iii) the privilege of generating or transforming such electrical energy or of use of such facilities, machinery, or equipment or of falling water for such generation or transforming; or

(iv) the transmission or control of such electrical energy so generated or transformed (as distinguished from the transmission lines and other physical properties used for such transmission or control) or the use of such transmission lines or other physical properties for such transmission or control,

payments made hereunder to the State by or under the authority of which such taxes are collected shall be reduced by an amount equivalent to such taxes. Nothing herein shall in anywise impair the right of either the State of Arizona or the State of Nevada, or any lawful taxing political subdivision of either of them, to collect nondiscriminatory taxes upon that portion of the transmission lines and all other physical properties, situated within such State and such political subdivision, respectively, and belonging to any of the lessees and/or allottees under the Project Act and/or under this Act, and nothing herein shall exempt or be construed so as to exempt any such property from nondiscriminatory taxation, all in the manner provided by the constitution and laws of such State. Sums, if any, received by each State under the provisions of the Project Act shall be deducted from the first payment or payments to said State authorized by this Act. Payments under this section 2 (c) shall be deemed contractual obligations of the United States, subject to the provisions of section 3 of this Act.

(d) Transfer, subject to the provisions of section 3 hereof, from the Colorado River Dam Fund to a special fund in the Treasury, hereby established and designated the "Colorado River Development Fund," of the sum of \$500,000 for the year of operation ending May 31, 1938, and the like sum of \$500,000 for each year of operation thereafter, until and including the year of operation ending May 31, 1987. The transfer of the said sum of \$500,000 for each year of operation shall be made on or before July 31 next following the close of the year of operation for which it is made: *Provided*, That any such transfer for any year of operation which shall have ended at the time this section 2 (d)

shall become effective, shall be made, without interest, from revenues received in the Colorado River Dam Fund, as expeditiously as administration of this Act will permit, and without readvances from the general funds of the Treasury. Receipts of the Colorado River Development Fund for the years of operation ending in 1938, 1939, and 1940 (or in the event of reduced receipts during any of said years, due to adjustments under section 3 hereof, then the first receipts of said fund up to \$1,500,000), are authorized to be appropriated only for the continuation and extension, under the direction of the Secretary, of studies and investigations by the Bureau of Reclamation for the formulation of a comprehensive plan for the utilization of waters of the Colorado River system for irrigation, electrical power, and other purposes, in the States of the upper division and the States of the lower division, including studies of quantity and quality of water and all other relevant factors. The next such receipts up to and including the receipts for the year of operation ending in 1955 are authorized to be appropriated only for the investigation and construction of projects for such utilization in and equitably distributed among the four States of the upper division. Such receipts for the years of operation ending in 1956 to 1987, inclusive, are authorized to be appropriated for the investigation and construction of projects for such utilization in and equitably distributed among the States of the upper division and the States of the lower division. The terms "Colorado River system," "States of the upper division," and "States of the lower division" as so used shall have the respective meanings defined in the Colorado River compact mentioned in the Project Act. Such projects shall be only such as are found by the Secretary to be physically feasible, economically justified, and consistent with such formulation of a comprehensive plan. Nothing in this Act shall be construed so as to prevent the authorization and construction of any such projects prior to the completion of said plan of comprehensive development; nor shall this Act be construed as affecting the right of any State to proceed independently of this Act or its provisions with the investigation or construction of any project or projects. Transfers under this section 2 (d) shall be deemed contractual obligations of the United States, subject to the provisions of section 3 of this Act.

Sec. 3. If, by reason of any act of God, or of the public enemy, or any major catastrophe, or any other unforeseen and unavoidable cause, the revenues, for any year of operation, after making provision for costs of operation, maintenance, and the amount to be set aside for said year for replacements, should be insufficient to make the payments to the States of Arizona and Nevada and the transfers to the Colorado River Development Fund herein provided for, such payments and transfers shall be proportionately reduced, as the Secretary may find to be necessary by reason thereof.

Sec. 4. (a) Upon the taking effect of this Act, pursuant of section 10 hereof, the charges, or the basis of computation thereof, promulgated hereunder, shall be applicable as from June 1, 1937, and adjustments of accounts by reason thereof, including charges by and against the United States, shall be made so that the United States and all parties that have contracted for energy, or for the privilege of generating energy, at the project, shall be placed in the same position, as nearly as may be, as determined by the Secretary, that they would have occupied had such charges, or the basis of computation thereof, and the method of operation which may be provided for under section 9 hereof, been effective on June 1, 1937: *Provided*, That such adjustments with contractors shall not be made in cash, but shall be made by means of credits extended over such period as the Secretary may determine.

(b) In the event payments to the States of Arizona and Nevada, or either of them, under section 2 (c) hereof, shall be reduced by reason of the collection of taxes mentioned in said section, adjustments shall be made, from time to time, with each allottee which shall have paid any such taxes, by credits or otherwise, for that proportion of the amount of such reductions which the amount of the payments of such taxes by such allottee bears to the total amount of such taxes collected.

Sec. 5. If at any time there shall be insufficient sums in the Colorado River Dam Fund to meet the cost of replacements, however necessitated, in addition to meeting the other requirements of this Act, or of regulations authorized hereby and promulgated by the Secretary, the Secretary of the Treasury,

upon request of the Secretary of the Interior, shall readvance to the said fund, in amounts not exceeding, in the aggregate, moneys repaid to the Treasury pursuant to section 2 (b) hereof, the amount required for replacements, however necessitated, in excess of the amount currently available therefor in said Colorado River Dam Fund. There is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, such sums, not exceeding said aggregate amount, as may be necessary to permit the Secretary of the Treasury to make such readvances. All such readvances shall bear interest.

SEC. 6. Whenever by the terms of the Project Act or this Act payment of interest is provided for, and whenever interest shall enter into any computation thereunder, such interest shall be computed at the rate of 3 per centum per annum, compounded annually.

SEC. 7. The first \$25,000,000 of advances made to the Colorado River Dam Fund for the project shall be deemed to be the sum allocated to flood control by section 2 (b) of the Project Act and repayment thereof shall be deferred without interest until June 1, 1987, after which time such advances so allocated to flood control shall be repayable to the Treasury as the Congress shall determine.

SEC. 8. The Secretary is hereby authorized from time to time to promulgate such regulations and enter into such contracts as he may find necessary or appropriate for carrying out the purposes of this Act and the Project Act, as modified hereby, and, by mutual consent, to terminate or modify any such contract: *Provided, however,* That no allotment of energy to any allottee made by any rule or regulation heretofore promulgated shall be modified or changed without the consent of such allottee.

SEC. 9. The Secretary is hereby authorized to negotiate for and enter into a contract for the termination of the existing lease of the Boulder Power Plant made pursuant to the Project Act, and in the event of such termination the operation and maintenance, and the making of replacements, however necessitated, of the Boulder Power Plant by the United States, directly or through such agent or agents as the Secretary may designate, is hereby authorized. The powers, duties, and rights of such agent or agents shall be provided by contract, which may include provision that questions relating to the interpretation or performance thereof may be determined, to the extent provided therein, by arbitration or court proceedings. The Secretary in consideration of such termination of such existing lease is authorized to agree (a) that the lessees therein named shall be designated as the agents of the United States for the operation of said power plant; (b) that (except by mutual consent or in accordance with such provisions for termination for default as may be specified therein) such agency contract shall not be revocable or terminable; and (c) that suits or proceedings to restrain the termination of any such agency contract, otherwise than as therein provided, or for other appropriate equitable relief or remedies, may be maintained against the Secretary. Suits or other court proceedings pursuant to the foregoing provisions may be maintained in, and jurisdiction to hear and determine such suits or proceedings and to grant such relief or remedies is hereby conferred upon the District Court of the United States for the District of Columbia, with the like right of appeal or review as in other like suits or proceedings in said court. The Secretary is hereby authorized to act for the United States in such arbitration proceedings.

SEC. 10. This Act shall be effective immediately for the purpose of the promulgation of charges, or the basis of computation thereof, and the execution of contracts authorized by the terms of this Act, but neither such charges, nor the basis of computation thereof, nor any such contract, shall be effective unless and until this Act shall be effective for all purposes. This Act shall take effect for all purposes when, but not before, the Secretary shall have found that provision has been made for the termination of the existing lease of the Boulder Power Plant and for the operation thereof as authorized by section 9 hereof, and that allottees obligated under contracts in force on the date of enactment of this Act to pay for at least 90 per centum of the firm energy shall have entered into contracts (1) consenting to such operation, and (2) containing such other provisions as the Secretary may deem necessary or proper for carrying out the purposes of this Act. For purposes of this section

such 90 per centum shall be computed as of the end of the absorption periods provided for in regulations heretofore promulgated by the Secretary and in effect at the time of the enactment of this Act.

If contracts in accordance with the requirements of this section shall not have been entered into prior to June 1, 1941, this Act shall cease to be operative and shall be of no further force or effect.

SEC. 11. Any contractor for energy from the project failing or refusing to execute a contract modifying its existing contract to conform to this Act shall continue to pay the rates and charges provided for in its existing contract, subject to such periodic readjustments as are therein provided, in all respects as if this Act had not been passed, and so far as necessary to support such existing contract all of the provisions of the Project Act shall remain in effect, anything in this Act inconsistent therewith notwithstanding.

SEC. 12. The following terms wherever used in this Act shall have the following respective meanings:

"Project Act" shall mean the Boulder Canyon Project Act;

"Project" shall mean the works authorized by the Project Act to be constructed and owned by the United States, exclusive of the main canal and appurtenances mentioned therein, now known as the All-American Canal;

"Secretary" shall mean the Secretary of the Interior of the United States;

"Firm energy" and "allottees" shall have the meaning assigned to such terms in regulations heretofore promulgated by the Secretary and in effect at the time of the enactment of this Act:

"Replacements" shall mean such replacements as may be necessary to keep the project in good operating condition during the period from June 1, 1937, to May 31, 1987, inclusive, but shall not include (except where used in conjunction with the word "emergency" or the words "however necessitated") replacements made necessary by any act of God, or of the public enemy, or by any major catastrophe; and

"Year of operation" shall mean the period from and including June 1 of any calendar year to and including May 31 of the following calendar year.

SEC. 13. The Secretary of the Interior shall, in January of each year, submit to the Congress a financial statement and a complete report of operations under this Act during the preceding year of operation as herein defined.

SEC. 14. Nothing herein shall be construed as interfering with such rights as the States now have either to the waters within their borders or to adopt such policies and enact such laws as they may deem necessary with respect to the appropriation, control, and use of waters within their borders, except as modified by the Colorado River compact or other interstate agreement. Neither the promulgation of charges, or the basis of charges, nor anything contained in this Act, or done thereunder, shall in anywise affect, limit, or prejudice any right of any State in or to the waters of the Colorado River system under the Colorado River compact. Sections 13 (b), 13 (c), and 13 (d) of the Project Act and all other provisions of said Project Act not inconsistent with the terms of this Act shall remain in full force and effect.

SEC. 15. All laborers and mechanics employed in the construction of any part of the project, or in the operation, maintenance, or replacement of any part of the Boulder Dam, shall be paid not less than the prevailing rate of wages or compensation for work of a similar nature prevailing in the locality of the project. In the event any dispute arises as to what are the prevailing rates, the determination thereof shall be made by the Secretary of the Interior, and his decision, subject to the concurrence of the Secretary of Labor, shall be final.

SEC. 16. This Act may be cited as "Boulder Canyon Project Adjustment Act." Approved, July 19, 1940.

#### REPORT OF LAS VEGAS OFFICE

By C. F. DEARMOND, *Resident Engineer*

On January 1, 1938, the Commission established an office in Las Vegas and placed C. F. DeArmond, a member of the Commission, in charge as Resident Engineer. Following is a brief statement of the purpose of the office and an outline of work performed up to August 1, 1940.

Through this office the Commission maintains a close contact with its contractors, the Bureau of Reclamation, and the generating agency. Through this office the Commission obtains information as to the estimated cost of power on which to base charges to contractors until such time as the actual costs are definitely fixed, and as to the manner in which these costs should be allocated to its contractors. It keeps in touch with the future requirements of its contractors so as to aid in securing the necessary generating and transforming capacity at the dam to meet those requirements. Billings for power are made here and a general supervision of accounts and of contracts is maintained. The Resident Engineer also collects data pertaining to the operation of the dam and power plant and of uses of energy by other allottees, and all other facts relating to costs which must be paid to the United States or to the operating agent through the United States. The manner of allocating certain of these costs is controversial and is to be determined through hearings held under direction of the Secretary of the Interior beginning on August 12, 1940.

The office also is maintained to promote the use of power under present contracts, to promote the development of natural resources and to aid and assist industries which may contemplate the use of power allocated to the State. Since the delivered cost of energy will vary with the distance from the dam, the number of kilowatts of demand and the load and power factors, each contemplated use requires an estimate of costs to meet its requirements. Through cooperation of members of the Las Vegas Chamber of Commerce suitable factory sites have been acquired.

A study has been made of the project for bringing water from Lake Mead to the Las Vegas area at such time as developments in that area make an additional water supply necessary. In contemplation of that event the Commission is cooperating with the office of the State Engineer in keeping a monthly record of water pressure and measurements on a series of wells throughout the Las Vegas artesian belt so that it can anticipate the beginning of depletion of that present sole source of water supply.

Studies and estimates have also been made for a domestic water supply system for the Moapa and Overton areas, and the Commission has cooperated in securing flood control projects in the Virgin and Muddy Valleys.

In addition to the work of more or less local application, the Resident Engineer has devoted fully one-half his time away from Las Vegas on other work of the Commission such as meetings of the Commission, the Boulder Dam Project Adjustment Legislation, the Seven States Committee on Colorado River water problems and meetings of the Committee working for a compact between Arizona, California, and Nevada.

**CONSUMPTION OF ELECTRIC ENERGY FROM BOULDER DAM PLANT  
BY THE STATE OF NEVADA**

June 1, 1937, to May 31, 1938.....	11,423,170 KWH
June 1, 1938, to May 31, 1939.....	34,447,641 KWH
June 1, 1939, to May 31, 1940.....	38,035,930 KWH
Total to May 31, 1940.....	83,906,741 KWH

The forecast for 1940-1941 is about 40,000,000 KWH, and for 1941-1942 about 48,000,000 KWH, both estimates excluding any new industries.

The use of State power in 1939-1940 was five percent of the 760,000,000 KWH allocated to the State of Nevada for that contract year.

**AN OUTLINE OF THE WORK OF THE STATE IRRIGATION DISTRICT  
BOND COMMISSION DURING THE BIENNIUM OF 1938-1940**

**AUGUST 31, 1938**

Special meeting held at Carson City attended by all members of the Commission, consisting of Governor Richard Kirman, Chairman, D. G. LaRue, and Alfred Merritt Smith, Members, with Elda M. Fricke, as Secretary.

The Walker River Irrigation District, acting as the Board of Directors of Local Improvement District No. 2 of the Walker River Irrigation District, was authorized to incur an indebtedness of \$8,000, and given the authority to issue warrants bearing interest of 6%. The resolution authorizing such indebtedness is herewith given in synopsis only:

WHEREAS, Local Improvement District No. 2 of Walker River Irrigation District, a corporation, has applied to the State Board of Irrigation District Bond Commissioners for its approval and authority to incur an indebtedness in behalf of Local Improvement District No. 2 of Walker River Irrigation District, not exceeding in the aggregate the sum of \$8,000, with authority to issue warrants of said Local Improvement District No. 2 of Walker River Irrigation District therefor, bearing interest at the rate of six percent (6%) per annum, payable semiannually, the proceeds of which warrants are to be used for the purpose authorized by the Nevada Irrigation District Act and its amendments, and particularly for the expense incurred and to be incurred for drainage of lands within Local Improvement District No. 2; and

WHEREAS, The said Board of Directors of Local Improvement District No. 2 of Walker River Irrigation District did on the 5th day of August 1938, adopt a resolution for the purpose of creating said debt and providing for the said drainage work, a copy of which is as follows:

*Resolved*, That Local Improvement District No. 2 of Walker River Irrigation District, by and through the Board of Directors of Walker River Irrigation District, a corporation, acting in its ex officio capacity as a Board of Directors of Local Improvement District No. 2 of Walker River Irrigation District, be and it is hereby empowered to incur an indebtedness in the aggregate sum of eight thousand dollars (\$8,000) for the payment of expenses incurred pursuant to the provisions of the Irrigation District Act and its amendments thereto, and particularly for the purpose of the payment of the expenses and costs in the construction of a drainage canal in Local Improvement District No. 2 in accordance with surveys, plans and specifications now on file in the office of Walker River Irrigation District at Yerington, Lyon County, Nevada.

**MAY 26, 1939**

Meeting at Carson City attended by Governor E. P. Carville, Chairman, Alfred Merritt Smith, Member, and Alice C. Maher, Acting Secretary. This meeting was held for the purpose of taking action on a resolution passed by the Walker River Irrigation District acting as a Board of Directors for Local Improvement District No. 3 of Walker River Irrigation District, to sell fifteen additional bonds. The resolution is briefly set forth in a letter written by W. M. Kearney, Attorney for Walker River Irrigation District, addressed to the Commission, which reads as follows:

WILLIAM M. KEARNEY  
ATTORNEY AT LAW  
RENO, NEVADA

May 10, 1939.

*State Irrigation District Bond Commission, Carson City, Nevada.*

GENTLEMEN: Enclosed herewith is resolution of the Board of Directors of Walker River Irrigation District acting as a Board of Directors for Local Improvement District No. 3 of Walker River Irrigation District requesting your approval of the sale of fifteen additional bonds of said Local Improvement District No. 3. Heretofore the State Irrigation District Bond Commission authorized an issue of \$90,000 of bonds for completing drains and laterals within Local Improvement District No. 3 under a general plan of drainage. A portion of the work has been completed. Sixty-one thousand dollars of bonds were heretofore issued and \$37,000 thereof have been redeemed and retired, leaving outstanding only \$24,000. Additional work under the general plan, including improvements of the existing drains is necessary, and the Board of Directors of the District have adopted a resolution authorizing the sale of the additional bonds and request your approval of said sale before offering the same for sale in the manner provided by law.

Yours very truly,

W. M. KEARNEY,

*Attorney for Walker River Irrigation District.*

By unanimous vote of the Commission the resolution was approved.

#### FLOOD CONTROL SURVEYS

Under the provisions of the Flood Control Act of 1936, as modified in 1938 (Public No. 761, 75th Congress, approved June 28, 1938), the Engineering Division of the U. S. Army was authorized to make investigations and hold hearings in each State that requested investigation of specified streams.

The State Planning Board, the Department of the State Engineer and the Department of Highways arranged to present data and information as to the necessity of flood control surveys upon the East and West Carson, the East and West Walker, the Truckee, and Humboldt Rivers. Hearings regarding these streams were held by the Army engineers at suitable times in Carson City, Reno, and Winnemucca. Reports were presented and read and statements made by local engineers from each of the State Departments, who were then questioned by the engineers of the Army Board.

Subsequently flood control surveys were authorized by the Army on the Carson, Walker, and Truckee Rivers, as a result of these preliminary investigations, but the requested survey on the Humboldt River was not recommended. (Letter, Col. Warren T. Hannum, Division Engineer, February 21, 1939.)

On March 3, 1939, the Governor of Nevada, the Chairman of the Nevada State Planning Board, and the State Engineer of Nevada entered a protest to the Army's adverse decision on the Humboldt. Thereafter a letter from R. A. Wheeler, Colonel, Corps of Engineers, dated March 4, 1940, advised that a hearing would be held on this protest before the Army Engineering Board in Washington, D. C., on March 27, 1940. As the State Engineer was in Washington at that time on work connected with the Boulder Dam Project Adjustment Act, Senator Pat McCarran and Governor Carville asked him to appear

at the hearing and submit additional data in support of the proposed Humboldt Survey. Accordingly the State Engineer appeared before the Army Board, read the following report, and was interrogated by the engineers:

WASHINGTON, D. C., March 25, 1940.

War Department, Board of Engineers for Rivers and Harbors, 2848 Munitions Building, Washington, D. C.

#### NECESSITY FOR SURVEY OF HUMBOLDT RIVER, NEVADA

##### GENERAL INFORMATION

All of the irrigated and cultivated lands of Humboldt, Eureka, Lander, Elko, and Pershing Counties in the State of Nevada receive their water from the Humboldt River, which has a drainage basin of 9,000,000 acres in northern Nevada. About 3,950,000 acres of this basin is privately owned, of which more than 2,000,000 acres is termed "railroad land," being grant lands owned by the Southern Pacific Railroad Company through its subsidiary, the Central Pacific Land Co. There are also 1,294,000 acres of lands in the Humboldt National Forest. A report on this area by the University of Nevada Agricultural Experiment Station in 1939<sup>1</sup> gives the total irrigated area as 286,548 acres, of which 123,115 are third-class or pasture lands, the remainder being first- and second-class cultivated lands.

The river follows a tortuous meandered course about 800 miles long, although the actual distance traveled would be, if shown in broad curves, only about 300 miles. Between the points of Beowawe and Humboldt the actual length is 380 miles, but the straight channel distance is only 130 miles.

The total fall of the river between Deeth and the Humboldt Sink is about 1,400 feet; between Deeth and Palisade about 500 feet; Palisade to Lovelock about 840 feet; Beowawe and Humboldt House about 567 feet. The channel has an average width of 70 feet. Between Beowawe and Humboldt the actual grade is 1.6 feet per mile. About 300,000 acres of land have decreed water rights of 643,000 acre-feet of water distributed among 600 water users who are served by as much water as may be available from this system.

Profitable crops cannot be produced anywhere in the area without irrigation. Native grasses can be grown adjacent to the river and on its tributaries, but even this crop would be scanty and uncertain without the use of water diverted from the main stream or its tributaries. Alfalfa and grains, and during the last two or three years a small acreage of sugar beets, are grown at the southwestern end of the river in the Lovelock Valley. These crops depend entirely upon irrigation, and have frequently failed because of water shortage. Recent construction of the Rye Patch reservoir just above Lovelock Valley by the Bureau of Reclamation has been of substantial aid to some 30,000 acres of cultivated land in that valley.

The flow at Palisade, a point about midway from the beginning and the end of this stream, varies from 10 or 15 second-feet at extreme low water to 2,000 second-feet maximum. The average yearly run-off for 34 years is 258,000 acre-feet. The grade of the stream, eliminating curves, from Deeth to Palisade is 10 feet per mile; from Palisade to Lovelock only 4.8 feet per mile. Even at flood stages the volume of water is small and destructive erosion is negligible.

The population of the Humboldt Basin is about 20,000, or about one-quarter of the entire State of Nevada. The principal towns are as follows, from the Census of 1930:

Elko .....	3,511
Winnemucca .....	1,989
Lovelock .....	1,263
Battle Mountain .....	1,020
Carlin .....	895
Wells .....	792
	9,770

<sup>1</sup>"Irrigated Lands of the Humboldt River Area" by George Hardman, Cruz Venstrom, and Howard G. Mason, May 1939.

Increases of population that have probably occurred will be shown by the 1940 census now in progress.

The area is well served in the matter of transportation. The paved highway (US 40) and the Southern Pacific Railroad follow the valleys traversed by the river all through the area, across the State from east to west. The Western Pacific Railway traverses the area from the east boundary of the State westerly as far as Winnemucca, about two-thirds of the river's course. Good dirt roads both north and south enter the river valleys.

The main water contributing area lies in the eastern part of the State, where the neighboring mountains are highest. The cultivated lands in the several connected valleys vary from 3,900 feet elevation at Lovelock to above 6,000 feet at Wells. The winters are longer and colder on the east than on the west. Rainfall on the whole in all of the area is rather scanty, and the total stream flow depends largely upon snowfall during the winter months, supplemented by the early spring rains.

Practically all of the agricultural area may be said to be devoted to the production of livestock. Although there is much mining in adjacent mountains, that has but little connection with this report. The native grasses are grown for hay and used as winter feed.

The surrounding territory for many miles is grazing land, over which the sheep and cattle wander during the open weather months. In general, the soil of cultivated land is good, and contains considerable organic matter, yet scattered areas are alkaline because of inadequate drainage.

A denser farming population has in general been prohibited by lack of water, and this condition, together with the availability of good range land has led to almost exclusive livestock ranching. This type of industry may always remain best for the district, but can be greatly aided by the conservation of flood waters, river channel improvement, and river control, which will lead to the prevention of waste of water. Some reports have been given out stating that the adjacent ranges have deteriorated from overgrazing. Although portions of the ranges are in poorer condition than they were a few years ago, this is due to the long drought throughout the area during recent years, and, generally speaking, the ranges will now carry more cattle than for some years past. Conservation of flood run-off on the river, and the production of more grass hay for longer winter feeding, is necessary. The ranges are not in bad condition.

Erosion is distinctly a minor problem. Early spring floods cover large areas of the valley lands in eastern Nevada, but do not wash away the soil. Their chief damage upstream in Elko County is in killing good grasses, and in promoting a growth of water grasses of low food value; also causing short crops. Much greater damage results from such flooding in the loss of water to users downstream, which is occasioned by the uncontrolled use of flood waters upon lands which have no legal water rights, and also an excess of water unavoidably used upon lands entitled to a lesser amount. These uncontrolled and unregulated floods cause an annual loss to the entire area upstream and downstream, probably in excess of \$150,000 per year.

#### **FLOOD CONTROL AND WATER CONSERVATION**

I submit primarily that flood control on streams in the western United States cannot be logically separated from the related matter of water storage for power development, irrigation and soil and water conservation. They go hand in hand and are inseparable, each assuming different importance as location and topography may determine. On the Humboldt River the floods do not result in destruction of life or obvious loss of physical property, yet one-third of the population of Nevada depends upon the use of this stream for its existence. Proper regulation and control of the annual run-off is imperative to proper economic use and the welfare of the people living along it for, without conservation, the stream can only supply two-thirds of the ranchers with enough water to irrigate the present cultivated land. This deficiency leads to controversies between both individuals and districts with respect to priority of use of available water, and engenders much useless and expensive litigation. The proper conservation of available supply would save large sums of money wasted in such hopeless controversies. Although a legal order of determination setting out priorities was decreed by the District Court in the year 1931,

only the earlier rights are benefited thereby, while settlers since 1890 or thereabouts, who may have invested their all in the land and who would have sufficient water if less were wasted upstream, often see much of their life work fade away.

Control of the river is further necessary because the time of flood run-off as well as intermittent increases of flow vary excessively due to the low grade, long length, and consequent sluggish flow of the river. The flow of the stream could be speeded up between various points by straightening and improving the channel and this work, if laid out by such engineers as the Army affords, will not in the least degree cause destructive erosion. The contrary will be true. Excessive silting now causes constant changes in the river bed with resultant loss of meadow land through swamps and willow growth. Straightening of the channel over long distances will prevent much of this, and will hasten the transportation of water downstream where, because of an earlier and longer irrigation season, it is first needed. That such work can be of the highest value has been proven by the U. S. Reclamation Service in its development on the river above Lovelock Valley.

It is sometimes productive of error to be guided by general rule in making statements, as appears to have been the case with those who prepared the E. V. Debler report on the Humboldt River in 1931.\* I quote from the report:

Below Elko the Humboldt River meanders through the valleys in a shallow, narrow channel, with a capacity seldom exceeding a few hundred feet. Ordinary spring floods cause minor overflow, while unusual floods from rapidly melting snows or heavy rains often completely cover the valley floor as the flood moves down stream. Confinement of such flows to a flood channel of moderate width by means of levees would result in a depth and velocity of channel flows requiring exorbitant expense for initial construction and for maintenance of the levees.

Channel straightening holds no better hope. With a valley slope of about five feet to the mile, resulting velocities would produce destructive erosion followed by meandering. Nature has provided for this by means of a winding channel of moderate grade wherein velocities are comparatively safe, together with a side valley area to carry the balance of the water at shallow depths with nonerosive velocity. Floods now move forward slowly, losing volume and peak as they proceed, but with confinement they would quickly pass through the valley, gathering velocity as they progress.

There may be a few sections of this long river to which the above statement would appropriately apply. On the other hand, there are much longer stretches of which it cannot be true; and the reverse not only obtains, but has been proven by the efficient engineers in Mr. Debler's own department, the U. S. Bureau of Reclamation. I take the liberty of repeating a paragraph from my own report to this Board of Army Engineers, dated November 17, 1938:

The drought period (1928 to 1935) during which time the Rye Patch reservoir was conceived and built, emphasized the need of more water for Lovelock Valley. In order to increase the supply Lovelock District purchased 35,000 acres of farm lands in the vicinity of Battle Mountain, including the large Argenta Swamp. Irrigation diversion to the purchased lands was stopped and the swamp drained by dredging two canals through it. This resulted in some 50,000 acre-feet annually of additional water being made available to Lovelock Valley of most benefit to the junior rights, which includes all of the lands under the Pitt-Taylor Reservoir. The river channel improvement advanced the arrival of run-off to Lovelock Valley by a week or more. For a distance of about 10 miles in a straight line the capacity of the river channel has been doubled by widening and straightening, elimination of sharp bends, removal of obstructions and damming off sloughs which filled and diverted water. This work materially increased the grade of the stream through that area. Drainage canals were also excavated to protect properties and return water to the river. Levees were built to prevent overflow to adjacent

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\*Humboldt River Investigation, U. S. Bureau of Reclamation, 1931.

properties, thereby preventing improper use of water. Several non-regulatory dams have been removed from the land purchased. Other obstructions which choked the flow to an undesirable extent were removed. The beneficial result of this work is apparent in increased water available to Lovelock Valley.

I would like to add that in years of normal run-off, the drained Argenta Swamp area has, without irrigation, produced good hay crops.

There are two upstream reservoir sites on a tributary named the North Fork which can be made to store about 95,000 acre-feet each. On the South Fork is a site upon which a dam can be built that will result in the storage of 139,000 acre-feet. Storage and river control can also be considered at points on the main river, notably at Palisade, a good site at a midway point. There are a large number of smaller upstream reservoir sites on various upstream tributaries in northeastern Nevada which should be surveyed and studied.

It can hardly be debatable that man cannot leave nature to provide the regulation of streams at her own sweet will. Control and regulation are increasingly necessary to prevent loss of land and life on most rivers of the world, and this has been true from the most remote times. On the Humboldt River, the comparatively low floods, the long stretches having a very low gradient, the large areas of willow and swamp land, result in lamentable loss of water which is the most valuable possession of a desert State. This can be corrected to a great extent by stream channel improvement and the conservation of flood run-off, and no better work than a complete report on the situation could, in my opinion, be undertaken by the able Army Engineers, for the benefit of so large a portion of the population of the State of Nevada.

Most respectfully yours,

ALFRED MERRITT SMITH,

*Nevada State Engineer, Carson City, Nevada.*

At the time this report was submitted the State Engineer had not studied a report on the Humboldt River and Tributaries which had been submitted to the Army Board by Col. L. B. Chambers, and asked for time to do so before the Army Board made a final decision. After going over the report of Col. Chambers (which because of its length and our limited space is not reproduced here), the State Engineer submitted the following supplemental report:

WASHINGTON, D. C., April 3, 1940.

*War Department, Rivers and Harbors Board of Engineers, 2848 Munitions Building, Washington, D. C.*

NECESSITY FOR ARMY SURVEY OF HUMBOLDT RIVER, NEVADA. STATEMENT OF ALFRED MERRITT SMITH, NEVADA STATE ENGINEER, SUPPLEMENTAL TO HIS REPORT DATED MARCH 25, 1940.

#### PRELIMINARY

This statement is confined to comments upon portions of the report entitled: "Preliminary Examination Report on Flood Control, Humboldt River and Tributaries in Nevada," which was submitted by Warren T. Hannum, Colonel, Corps of Engineers, Division Engineer, under date of March 3, 1939. This statement is supplemental to reports made by Alfred Merritt Smith on November 17, 1938, and March 25, 1940.

#### COMMENTS

The examining engineer, in an able report, found that combined flood control and water conservation features on the Humboldt River and certain tributaries was feasible, but doubted whether the anticipated benefits therefrom would equal the estimated costs, and therefore, from an economic viewpoint, did not recommend the survey.

His report contains a number of excellent tables based upon conditions prior to 1938. The use of these as a base for the river area income, may, however, lead to error in conclusions. For example, table 2, on page 4, which gives the total income of the Humboldt Basin as \$10,513,000 for the year 1936, is undoubtedly a low figure, obtained near the end of a long period of extreme drought, and is probably much below the average income for the district.

**LOCAL COOPERATION**

Local interests made no definite statements at a hearing on this subject which was held at Winnemucca, Nevada, on September 26, 1938, at which hearing some 40 persons were present. This lack of discussion or statement at that time was due to the fact that not many people on the stream system are familiar with the great benefits which would derive from combined flood control and water conservation. They have not studied the matter. The considerable number present, some of whom came many miles, were there to learn about what might be done and what it would cost, and then to think it over. It was not a matter of immediate urgency, as in the case of such rivers as the Carson and Walker and Truckee in Nevada, which cause property damage by wild floods. But the Humboldt floods are, as a large number of the citizens of Nevada know, a cause of great damage and annual loss to many people, although lacking in dramatic property destruction. None of the local citizens were prepared to make statements or to submit plans, and some of them fearful of the unfamiliar, fear that a program of Federal control and conservation might endanger their water rights under existing Nevada law, and these water rights are the most valuable thing they possess.

**WATER RIGHTS**

We know that all of these problems can be worked out, and that no water right would be extinguished or damaged to any degree by any program the Army board would either recommend or undertake. These things must be made clear to the ranchers, and that can only come through the medium of a thorough survey and report, which will include a consideration of local water law and property rights. Such a study will also be of great value to local engineers and State officials as an aid in working out local problems, even if the construction of a recommended project should be deferred for a time.

To the general desires of local interests (p. 8, par. 16) for whose benefit the proposed work is designed, as these desires were originally expressed by the State Engineer, who is charged with the distribution of water and the general care of the river, may we suggest another item, viz:

(f) That the effect which such a combined flood and storage program will have upon existing private Nevada State water rights on the Humboldt River be studied, and in the working out of plans their preservation and continuance be provided for.

**FLOOD CONTROL BENEFITS (Page 22, Par. 12)**

I do not presume to take direct issue with the statements made in this section for most of them are, in my opinion, generally correct. At the same time I submit that, in my opinion, substantially 80% of flood damage in the upstream area could be prevented by work upon the main stream channel, of which the greater part would consist in removing the present nonregulatory brush and rock dams in the main river channel and replacing as many of them as would be necessary with full regulatory concrete structures. There are more than fifty such dams, each contributing at times to a retardation of flood waters. This work, together with a straightening of the channel in the places of lowest grade, can be accomplished without great expense. Such work would permit the early spring floods, whose present effect is to inundate the upper valley, before it is required there for proper irrigation, to be swiftly by-passed for use in the lower western valleys which have an earlier irrigation season and need the water. Such a program, if aided by upstream storage at the best reservoir sites, whereby later season water could be conserved for use in the upper valleys, would, in my opinion, effect a proper flood control and conservation program for the Humboldt River as a whole.

The decree of 1931, which established the many water rights upon the Humboldt by law, after prolonged hearings, has diminished the water controversies and the distribution of available water is in the hands of the State Engineer. The law, however, cannot increase available water, and as stated in my report of November 17, 1938, some 300,000 acres of land have decreed water rights to 643,000 acre-feet distributed among 600 water users, while the average yearly run-off (at Palisade) is only 258,000 acre-feet. Although this flow is increased somewhat by downstream contributions and return flow from ranches helps out, the stream is very much over appropriated and only in exceptionally wet years is there sufficient water to fulfill all of the established

rights. Before the decree was entered there was endless litigation and bickering along the river. There is less litigation now than formerly, but there would be practically none if the water could be conserved, for it then would be adequate to serve all of the present irrigated land entitled to it.

#### MAXIMUM FLOOD CONTROL

As stated on page 14, par. 26, of the Army's report, maximum flood control and conservation can be provided by combined channel improvement and storage on tributaries and headwaters. I am of the belief that such a program, if properly presented with plans and careful cost estimates, would be favored by both upstream and downstream farmers. Three questions are uppermost in the minds of each of the farmers, viz: (1) To what extent will it disturb my present water rights. (2) What benefit will I derive? (3) What will it cost me, and how are payments to be made? A survey is necessary to answer these questions, after which the energetic and progressive people of this area will promptly decide whether or not they wish to proceed at this time, or whether they will proceed if certain modifications or changes may be made in the comprehensive plan.

#### PAGE 14, PAR. 27

The economic consideration of sale of stored water does not seem to me to be the controlling factor in this problem. I am sure that the examining engineer will agree with me that his Tables Nos. 7 and 8 are computed upon data open to question so far as the Humboldt River is concerned, and that the primary considerations, such as the storage capacity and the cost of reservoir construction must, at this time, be largely matters of assumption. I submit that the problem is one of keeping the several hundred water users in sound financial condition by a well designated water control program.

Most respectfully yours,

ALFRED MERRITT SMITH,

*Nevada State Engineer, Carson City, Nevada.*

During this exchange, Senator McCarran actively supported the position of the State by letters to the Army board and personal conversation with the engineers.

On May 1, 1940, Major General Julian Schley, Chief of U. S. Army Engineers, reversed the former decision of the board and ordered a field investigation and report on the Humboldt River system, and assigned Col. L. B. Chambers, Sacramento District Engineer, to the task.

At the time this is written Col. Chambers has informed the State Engineer that for some time the work would be limited to preliminary field investigations and study of existing records. Flood control work is not being actively pursued on any stream now because of additional demands upon the Army Engineering Board in the National Defense Program.

## CHAPTER XII

### Irrigation Districts and Canal Companies

The information herewith presented has been gathered by the office of the State Engineer through the medium of questionnaires that have been mailed to the various districts in the State.

No new districts have been organized in Nevada during the past biennial period, and no material change in the status of the existing irrigation districts has occurred.

#### PERSHING COUNTY WATER CONSERVATION DISTRICT

Officers—Andrew Jahn, President; W. W. Carpenter, Vice President; C. H. Jones, Secretary and Treasurer; C. Arobio, C. C. Carpenter, Frank Jones, Directors; John A. Jurgenson, Attorney, and Roy F. Meffley, District Superintendent.

Office at Lovelock, Nevada.

Organized February 1926.

This district has about 30,000 acres of irrigable lands within its boundaries. Of this amount, 21,096 acres have decreed water rights. In the Lovelock Valley only about 11,600 acres of lands having decreed rights are not included in the district. During the latter part of 1936 the Rye Patch dam was completed on the Humboldt River. This structure is located about 23 miles northeast of Lovelock, and was built by the Bureau of Reclamation under a repayment contract dated October 1, 1934, with the Pershing County Water Conservation District. The history and description of this project was fully described by L. J. Foster, Construction Engineer, in an article appearing in the 1934-1936 Biennial Report.

The repayment contract mentioned above between the Bureau and the District provides that the total cost of the project shall be returned to the United States in forty annual payments over a period of forty years without interest charges. If the annual payments are not made when due, such payments carry a six percent interest charge.

The project consists of two salient features, namely, the construction of Rye Patch dam and the purchase of water rights and the making of river channel improvements in the Battle Mountain area. These features are discussed in the 1936-1938 Biennial Report.

#### LUND IRRIGATION COMPANY

Officers—G. W. Faucett, Jr., President; Lafe Carter, Vice President; A. B. Gubler, Secretary; A. N. Carter and Fernley Sinfield, Directors.

Office at Lund, Nevada.

Organized 1907.

This company delivers irrigation water to 1,500 acres of land in White Pine County through a gravity canal eight miles long. The source of the water is Preston Big Springs, Lund, Cold, Nicholas, and Horsley Springs.

The annual cost of operating averages \$1,000, and the annual expenditures for repairs and replacements averages \$200.

The company has no long-term indebtedness. Taxes amount to about \$100 per year.

#### PRESTON IRRIGATION COMPANY

Officers—Carl Madsen, President; R. A. Reid, Vice President; Pharo Arnoldsen, Secretary and Treasurer; Lowell Petersen and Christian Hermansen, Directors.

Office at Preston, Nevada.

Organized 1911.

This company delivers irrigation water to 1,100 acres of land lying adjacent to Preston. The source of the water is Preston big spring and Arnoldsen spring.

#### ALAMO IRRIGATION COMPANY

Officers—Karl C. Stewart, President; Harvey Frehner, Vice President; Dan Stewart, Secretary and Treasurer; Joseph Cox and Byron A. Ercanbrack, Directors.

Office at Alamo, Nevada.

Organized 1922.

In the decree in the Matter of the Determination of the Relative Rights in and to the Waters of Pahrnagat Lake and its Tributaries, signed by Judge William E. Orr on October 14, 1929, the Alamo Irrigation Company was given decreed water rights on 501.1 acres of land. Of this amount 435.1 acres were harvest crop lands, the balance being diversified pasture. The source of the water is Ash Springs Creek.

The annual cost of operation is about \$1,100. The costs of repairs and replacements are approximately \$640 per year. Taxes amount to about \$77 per year.

Water is furnished by this company for domestic and garden pumping to 30 families in the town of Alamo and to 21 farms at an annual fee of about \$1.25 per acre. The company has no indebtedness.

#### WASHOE COUNTY CONSERVATION DISTRICT

Officers—L. M. Christensen, President; Silvo Questa, Vice President; George L. Ferris, Secretary; Ernest Capurro, Treasurer; Edward Peckham, Howard Doyle, E. J. Kleppe, and all officers, Directors; Charles M. Merrill, Attorney; Thos. R. King, Engineer.

Office at Reno, Nevada.

Organized June 1929.

The district embraces 32,840 acres within the boundaries of which approximately 26,000 acres are irrigated each year.

The source of water supply is the Truckee River. The distribution is through a system of 33 canals, varying in capacity from five to 100 cubic feet per second, and from one to 37 miles in length.

The lands irrigated lie in close proximity to Reno and Sparks in Washoe County, in the territory generally known as Truckee Meadows.

Representatives of Washoe County Conservation District, the Sierra Pacific Power Company and the Truckee-Carson Irrigation District operating the Newlands Project began in 1929 an exhaustive study of water supply as a basis for storage developments. This resulted in the execution of a repayment contract under which the United States Bureau of Reclamation was to undertake construction of a reservoir

dam on the Little Truckee River, using funds made available to the Bureau of Reclamation through the Public Works Administration. The 1934-1936 Biennial Report of the State Engineer contains a very complete article written by S. R. Marean of the Bureau of Reclamation on the Truckee River Agreement. The progress that has been made to date on the construction of the Boca Dam on Little Truckee River is described in an article written by F. M. Spencer, Associate Engineer, U. S. Bureau of Reclamation, given in Chapter XI of the 1936-1938 Biennial Report of the State Engineer.

#### **BUNKERVILLE IRRIGATION COMPANY**

Officers—Merl Wittwer, President; Hector Bunker, Vice President; W. C. Bowman, Secretary and Treasurer.

Office at Bunkerville, Nevada.

Organized June 25, 1925.

In the decree entered in the Matter of the Determination of the Relative Rights of Claimants and Appropriators in and to the Waters of the Virgin River, in Clark County, State of Nevada, dated May 14, 1927, the Bunkerville Irrigation Company was decreed 12.37 c.f.s. continual flow of water from the Virgin River from March 1 to October 1, and a continuous flow of 8.66 c.f.s. from October 1 to March 1 of the following year, for the irrigation of 865.85 acres of land with a priority of prior to 1905.

Water is diverted from the Virgin River by means of a brush and rock dam and conveyed through a canal having an approximate capacity of 26 c.f.s. to the lands irrigated. At the present time 62 water users are being served on about 900 acres of land.

#### **THE MESQUITE IRRIGATION COMPANY**

Officers—J. Lewis Pulsipher, President; Maxwell Hafen, Vice President; John A. Tobler, Secretary and Treasurer, and Leo Hardy, Directors.

Office at Mesquite, Nevada.

Organized June 8, 1925.

In the decree entered in the Matter of the Determination of the Relative Rights of Claimants and Appropriators in and to the Waters of the Virgin River, in Clark County, State of Nevada, dated May 14, 1927, the Mesquite Irrigation Company was decreed 15.25 c.f.s. continuous flow of water from Virgin River from March 1 to October 1 and a continuous flow of 10.67 c.f.s. from October 1 to March 1 of the following year for the irrigation of 1,067.37 acres with a priority of prior to 1905.

Water is diverted from the Virgin River by means of a brush and rock dam in Arizona, and located in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ , Sec. 3, T. 39 N., R. 16 W., S. L. & G. M., being about two and one-half miles easterly from the Nevada and Arizona State line, into a canal having a capacity of about 30 c.f.s. Some water is diverted from the canal to irrigate lands in Arizona.

The company also has a permitted right to appropriate 8 c.f.s. for the irrigation of 800 acres in Nevada. The total acreage irrigated in Nevada approximates 1,747 acres.

**IRRIGATION DISTRICT NO. 1, CARSON VALLEY UNIT,  
TRUCKEE-CARSON PROJECT**

Officers—H. F. Dangberg, President; W. F. Dressler, Vice President; Louis Stodieck, Treasurer; L. A. McInnis, Secretary.

Office at Minden, Nevada.

This district was organized on August 17, 1914, primarily for the purpose of creating a legal organization to be in a position to deal with the Government on matters pertaining to storage on the Carson River. The district has never initiated work on any project, nor has it controlled distribution of water; therefore, no detailed records are available. The boundaries of the district include practically all of the irrigable land in Carson Valley in Douglas County, Nevada, the total area of which is 53,773 acres.

**NEWLANDS RECLAMATION PROJECT, NEVADA**

(Truckee-Carson Irrigation District)

Officers—Geo. G. Miller, President; R. J. Swope, Vice President; W. H. Wallace, Project Manager; H. W. Emery, Secretary and Treasurer; F. C. Erb, W. A. Harmon, John C. Mall, and J. R. McCulloch, Directors.

Office at Fallon, Nevada.

Organized November 25, 1918.

The Newlands Project, located in Western Nevada, embraces lands mainly in Churchill and Lyon Counties. This project was the first of the numerous Federal projects to be investigated, and upon which construction work was commenced by the United States Reclamation Service under the Act of Congress approved June 17, 1902, commonly known as the Reclamation Act. Actual construction work was commenced during September 1903, and water was delivered to project lands from the new system of works during 1905. The project was operated and maintained by the United States Bureau of Reclamation until December 31, 1926, on which date control was transferred to the Truckee-Carson Irrigation District under a contract dated December 18, 1926. The irrigation district was organized on November 25, 1918, under the laws of the State of Nevada.

**THE MUDDY RIVER IRRIGATION DISTRICT**

Officers—Edwin Marshall, President; Clarence A. Lewis, Vice President; Thomas Anderson, Secretary and Treasurer; E. S. Bowman, E. V. Gubler, and Joseph Perkins, Directors.

Office at Overton, Nevada.

For information concerning this company see report on Muddy River, Chapter 7, this report.

**WALKER RIVER IRRIGATION DISTRICT**

Officers—George Parker, President; C. E. Kingsley, Vice President; Jas. H. Day, Treasurer; C. O. Gelmstedt, Secretary; Fred Settlemeyer, John H. Wichman, Directors.

Office at Yerington, Nevada.

Organized April 14, 1919.

Walker River Irrigation District comprises all the irrigable lands

of the East, West, and Main Walker Rivers and tributaries, in the State of Nevada, with the exception of the Walker River Indian Reservation. These rivers have their source in the eastern slopes of the Sierra Nevada Mountains, drawing from a water shed of some 3,000 square miles. The total area of the district is 260,000 acres, of which 160,000 acres are irrigable. At present 91,360 acres are held under private ownership. The irrigated area is approximately 82,000 acres.

A complete description of the operation and status of this district may be found in the 1934-1936 Biennial Report of the State Engineer.

Since June 1938 eight miles of new drain canals have been constructed in central Mason Valley. The work was done by Local Improvement District No. 3 of Walker River Irrigation District at its own expense.

The Bureau of Reclamation C.C.C. Camp formerly stationed in this District was moved to Fallon in the spring of 1938.

The emergency spillway at the Bridgeport dam is being altered at the present time at a cost of about \$2,500. This work will further insure the safety of the dam in case of extremely high flood stage that the regular siphon spillway could not handle.

#### **LOCAL IMPROVEMENT DISTRICT NO. 4 OF THE WALKER IRRIGATION DISTRICT**

##### **Saroni Canal**

Officers—George Parker, President; C. E. Kingsley, Vice President; C. O. Gelmstedt, Secretary; Jas. H. Day, Treasurer; John Wichman and Fred W. Settlemyer, Directors.

Office at Yerington, Nevada.

The Saroni Canal is operated under the Improvement District and serves 24 farms having an acreage of 3,822 acres. The canal, having a capacity of 105 c.f.s., takes water from the West Walker River.

This improvement district has an outstanding bonded indebtedness of \$22,000 carrying an interest rate of 4%. All of these bonds are held by the Reconstruction Finance Corporation.

## CHAPTER XIII

Status of Applications Filed During the Period from July 1,  
1938, to June 30, 1940

Following is a condensed statement giving the salient data in connection with applications filed during the period from July 1, 1938, to June 30, 1940, in the order of:

1. Application serial number.
2. Date of filing.
3. Name of applicant.
4. Source of water supply.
5. Purpose of appropriation.
6. Action on application.
7. Status of permits as of June 30, 1940.

10255....	7- 1-38....	United States Forest Service; Dishrag Spring; Domestic and public; Approved November 7, 1938. G. S.
10256....	7- 2-38....	Pacific Butte Mines Company, a Corporation; Mining, milling, and domestic; Canceled November 22, 1938.
10257....	7- 2-38....	Pacific Butte Mines Company, a Corporation; Mining, milling, and domestic; Canceled November 22, 1938.
10258....	7- 2-38....	Pacific Butte Mines Company, a Corporation; Mining, milling, and domestic; Canceled November 22, 1938.
10259....	7- 6-38....	Rosemary de Longchamps; Starrett Spring; Mining, milling, and domestic;* No action.
10260....	7-11-38....	William F. Moon; Las Vegas Valley Artesian Basin; Domestic and irrigation; Approved November 7, 1938. G. S.
10261....	7-11-38....	Trayco Placer, Inc.; Sheehan 1 Springs and Tributaries No. 1 and No. 2 Springs; Placer mining and domestic;* Approved November 6, 1939.
10262....	7-12-38....	John B. Lamb; Summit Creek; Placer mining;* No action.
10263....	7-13-38....	United States Forest Service; Rainbow Creek; Public camp-grounds and domestic;* No action.
10264....	7-13-38....	United States Forest Service; Snow Slide Spring; Public and domestic; No action.
10265....	7-13-38....	United States Forest Service; Twin Falls Springs; Domestic and public; Withdrawn August 17, 1938.
10266....	7-14-38....	Mrs. Frances B. Moore; Colorado River; Mining, milling, and domestic; Approved December 12, 1938. G. S.
10267....	7-14-38....	Lois Kellogg II; Six Mile Manse Spring; Stockwatering and domestic; No action.
10268....	7-18-38....	Spring Valley Milling Company; Unnamed Spring; Mining, milling, and domestic; Withdrawn August 31, 1938.
10269....	7-18-38....	Spring Valley Milling Company; South American Canyon Spring; Mining, milling, and domestic; Withdrawn August 31, 1938.
10270....	7-22-38....	Lime Mountain Consolidated; A stream issuing from the mouth of the 700-foot level tunnel of the Lime Mountain Consolidated Mine; Mining;* Approved January 9, 1939. G. S.
10271....	7-22-38....	Lime Mountain Consolidated; Lime Mountain Spring; Domestic and mining;* Approved January 9, 1939. G. S.
10272....	7-23-38....	George Whittell; Fifth Creek; Irrigation and domestic; Canceled December 26, 1938.
10273....	7-23-38....	George Whittell; Fourth Creek; Irrigation and domestic; canceled December 26, 1938.
10274....	7-23-38....	George Whittell; Sixth Creek; Irrigation and domestic; Canceled December 26, 1938.
10275....	7-23-38....	George Whittell; Third Creek; Irrigation and domestic; Canceled December 26, 1938.
10276....	7-23-38....	George Whittell; Second Creek; Irrigation and domestic; Canceled December 26, 1938.
10277....	7-23-38....	George Whittell; First Creek; Irrigation and domestic; Canceled December 26, 1938.
10278....	7-25-38....	Nevada Gold Production Company; Strawberry Creek; Placer mining;* No action.
10279....	8- 3-38....	Sue Magee Gamble; Black Canyon Creek; Mining and domestic; Withdrawn November 23, 1938.
10280....	8- 9-38....	Lloyd W. Martin; Surplus and unappropriated waters of Desert Creek; Irrigation; Canceled July 10, 1939.
10281....	8-11-38....	John B. Lamb; Summit Creek; Mining;* No action.

\*Protested application. G. S. Good standing.

- 10282.... 8-12-38....Joe Ferraris; Barrel Spring and Underground source through a well; Placer mining, milling, and domestic; Canceled December 30, 1938.
- 10283.... 8-13-38....United States of America, acting by S. R. Marean, Superintendent of the Humboldt Project, Bureau of Reclamation, Department of the Interior; Humboldt River; Irrigation and domestic;\* No action.
- 10284.... 8-15-38....A. R. Weeter; Underground source (Sulphur Wells); Mining and domestic; Approved June 27, 1939. G. S.
- 10285.... 8-16-38....Mrs. Richard F. McGuire; Becky Spring; Irrigation and domestic; Withdrawn November 23, 1938.
- 10286.... 8-16-38....A. Pincolini and O. M. Todd; Tunnel Spring No. 1; Mining, milling, and domestic; No action.
- 10287.... 8-16-38....A. Pincolini and O. M. Todd; Tunnel Spring No. 2; Mining, milling, and domestic; No action.
- 10288.... 8-20-38....Pershing County Water Conservation District; Humboldt River; Irrigation and domestic;\* No action.
- 10289.... 8-29-38....W. M. Pettit; Twin Canyon Creek; Irrigation; Approved March 20, 1940. G. S.
- 10290.... 8-31-38....Spring Valley Milling Company; Tamarac Spring; Mining, milling, and domestic; Canceled July 9, 1939.
- 10291.... 8-31-38....John Turner; Outlaw Springs; Mining; Canceled July 10, 1939.
- 10292.... 9- 1-38....Tsutae Tanabe WeHara; Golden Fleece Springs, both surface and underground flow; Mining, milling, and domestic; Withdrawn December 30, 1938.
- 10293.... 9- 2-38....T. J. Thebo; Las Vegas Valley Artesian Basin or Subterranean Channel; Irrigation and domestic; Approved July 24, 1939. G. S.
- 10294.... 9-12-38....A. M. Thompson and Roy Waite; Juanetta Spring; Irrigation and domestic; Approved July 8, 1939.
- 10295.... 9-12-38....Spring Valley Milling Company; Brewery Springs; Mining and milling; Approved November 27, 1939.
- 10296.... 9-16-38....J. W. R. Hilliard; Underground water of Amargosa River; Mining, milling, and domestic; Approved July 26, 1939. G. S.
- 10297.... 9-20-38....Pacific Placers, Inc.; Duck Creek in Galena Canyon and springs in said canyon, including subterranean flow; Mining; No action.
- 10298.... 9-28-38....E. B. Salinas; Sacramento Creek; Irrigation and domestic;\* No action.
- 10299.... 9-20-38....Rip Van Winkle Mining Company; Rip Van Winkle Spring; Milling, mining, and domestic;\* No action.
- 10300....10- 1-38....J. W. R. Hilliard; Amargosa River (surface and subsurface); Irrigation and domestic;\* No action.
- 10301....10- 3-38....H. D. Gerken; Las Vegas Artesian Basin; Domestic and irrigation; Approved March 25, 1939. G. S.
- 10302....10-13-38....Muddy Valley Irrigation Company; Bowman Reservoir; Irrigation; Withdrawn June 1, 1939.
- 10303....10-14-38....Lois Kellogg II; Unnamed Spring (Kellogg Spring); Stockwatering and domestic; No action.
- 10304....10-24-38....Albert E. Woods; Becky Spring; Stockwatering;\* No action.
- 10305....11-14-38....Robert B. Griffith; Mazey Spring; Domestic and recreational; Approved September 15, 1939.
- 10306....11-14-38....Robert B. Griffith; Rainbow Creek; Domestic and recreational; Approved September 15, 1939.
- 10307....11-15-38....L. L. Doty and C. H. Fink; Storey Spring; Mining, milling, and domestic; Canceled July 10, 1939.
- 10308....11-30-38....J. N. Bryan; Lodi Tunnel Spring; Stockwatering;\* No action.
- 10309....12- 6-38....Pierre Nouque; St. Martin Creek; Irrigation and domestic; Approved August 29, 1939. G. S.
- 10310....12- 8-38....Nevada Gold Dome Mining Company; Gilman Spring; Mining, milling, and domestic;\* Approved June 7, 1940. G. S.
- 10311....12- 8-38....Nevada Gold Dome Mining Company; McCoy Springs; Mining, milling, and domestic;\* Approved June 7, 1940. G. S.
- 10312....12-12-38....William Rabe and Elizabeth Rabe, his wife; Folsom Springs; Domestic and recreational; Approved April 13, 1940. G. S.
- 10313....12-15-38....Guy Saval; Underground water; Placer mining and domestic; Approved September 29, 1939. G. S.
- 10314....12-15-38....J. N. Bryan; Jack Springs; Stockwatering;\* No action.
- 10315....12-15-38....J. N. Bryan; Marble Falls Springs Creek; Stockwatering;\* No action.
- 10316....12-15-38....J. N. Bryan; Ottaway Spring; Stockwatering; No action.
- 10317....12-15-38....J. N. Bryan; Green Springs; Stockwatering;\* No action.
- 10318....12-16-38....Afterthought Mines Corporation; Unnamed Spring; Mining and domestic;\* No action.
- 10319....12-16-38....Afterthought Mines Corporation; Unnamed Spring; Mining and domestic;\* No action.
- 10320....12-16-38....M. E. Wilson; Surface and subflow of Timber Hill Wash and Tributaries; Mining and domestic; Canceled July 17, 1939.
- 10321....12-20-38....Henry C. and Hazel H. Nickerson, husband and wife; Underground waters in Las Vegas Valley; Irrigation and domestic; Approved April 14, 1939. G. S.
- 10322....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering; Approved August 29, 1939. G. S.

\*Protested application. G. S. Good standing.

- 10323....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10324....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10325....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10326....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10327....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10328....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10329....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10330....12-30-38....The Utah Construction Company; Unnamed Spring; Stockwatering;\* Approved August 29, 1939. G. S.
- 10331.... 1- 3-39....Getchell Mines, Inc.; Getchell Well; Mining and milling; approved August 29, 1939. G. S.
- 10332.... 1- 3-39....Henry J. Grohs; Garfield Springs (surplus and unappropriated water); Mining, milling, and domestic; No action.
- 10333.... 1- 7-39....Oscar G. Diessner; Willow Creek, with tributary snow and flood waters; Irrigation and domestic;\* Approved November 29, 1939. G. S.
- 10334.... 1-20-39....Preston Irrigation Company; Preston Big Spring; Irrigation; Canceled October 27, 1939.
- 10335.... 2- 3-39....Joe Ferraris; Barrell Spring, both underground and surface flow; Placer mining, milling and domestic;\* Approved September 11, 1939. G. S.
- 10336.... 2-11-39....Juan Eyheralde; Pollard Creek; Irrigation; No action.
- 10337.... 2-11-39....Juan Eyheralde; Mud Springs; Irrigation and domestic; No action.
- 10338.... 2-11-39....Murray Wollman and Hayward Milligan; Ash Creek Springs; Irrigation and domestic; Approved August 29, 1939. G. S.
- 10339.... 2-15-39....H. D. Cornell; Intermittent Spring; Irrigation; Approved January 10, 1940. G. S.
- 10340.... 2-15-39....William Beverly Moore; Underground waters; Milling and domestic; Canceled July 13, 1939.
- 10341.... 2-16-39....M. E. Wilson; Underground waters; Mining and domestic; Approved September 15, 1939. G. S.
- 10342.... 2-25-39....Frederick Steigmeyer; Underground waters of Jefferson Creek Basin and/or surface flow of Jefferson Creek when and if at point of diversion there is a surface flow; Mining and domestic; Approved December 27, 1939. G. S.
- 10343.... 3-10-39....United States of America, acting by and through Superintendent Alida C. Bowler, Carson Indian Agency, Bureau of Indian Affairs, Department of the Interior; Quinn River and Tributaries; Irrigation, stockwatering, and domestic; Approved August 10, 1939. G. S.
- 10344.... 3-11-39....J. A. Millar; Alder Creek; Placer mining;\* No action.
- 10345.... 3-11-39....Mrs. Effie M. Fisk; No Name Springs; Mining and domestic;\* No action.
- 10346.... 3-20-39....R. J. Bradshaw; Rock Seeps; Stockwatering and domestic; Approved November 6, 1939. G. S.
- 10347.... 3-24-39....The Utah Construction Company; Underground waters; Stockwatering; No action.
- 10348.... 3-24-39....The Utah Construction Company; Underground waters; Stockwatering; No action.
- 10349.... 3-25-39....George Whittell; First Creek; Irrigation and domestic; Canceled October 25, 1939.
- 10350.... 3-25-39....George Whittell; Second Creek; Irrigation and domestic; Canceled October 25, 1939.
- 10351.... 3-25-39....George Whittell; Third Creek; Irrigation and domestic; Canceled October 25, 1939.
- 10352.... 3-25-39....George Whittell; Fourth Creek; Irrigation and domestic; Canceled October 25, 1939.
- 10353.... 3-25-39....George Whittell; Fifth Creek; Irrigation and domestic; Canceled October 25, 1939.
- 10354.... 3-25-39....George Whittell; Sixth Creek; Irrigation and domestic; Canceled October 25, 1939.
- 10355.... 4- 3-39....Preston Light and Power Company, Inc.; Preston Big Spring and Cold Spring Channel; Power;\* Approved January 25, 1940. G. S.
- 10356.... 4-14-39....J. C. Horton; Willow Spring; Mining, milling, and domestic; Approved December 27, 1939. G. S.
- 10357.... 4-15-39....Carson Indian Agency; Milton Canyon Springs and Creek; Stockwatering and domestic; Canceled October 27, 1939.
- 10358.... 4-18-39....Ira B. Joralemon; Dan Tucker Spring; Mining and domestic;\* No action.
- 10359.... 4-19-39....Charles B. Griffith; Underground water from Mandalay Mine Shaft; Mining, milling, and domestic; Approved January 12, 1940. G. S.
- 10360.... 4-19-39....Charles H. Griffith; Underground water from Aqua Claim Shaft and drilled wells; Mining, milling and domestic; Approved January 12, 1940. G. S.

\*Protested application. G. S. Good standing.

- 10361.... 4-19-39....J. G. Huntington; Underground water from Loveletter Well; Mining, milling, and domestic; Approved January 4, 1940. G. S.
- 10362.... 4-26-39....P. W. Winslett; Topopah Spring; Stockwatering and domestic; Canceled October 24, 1939.
- 10363.... 4-27-39....John Q. Lisle; Las Vegas Valley Underground Basin or Subterranean Channel; Irrigation and domestic; Canceled October 27, 1939.
- 10364.... 5-4-39....T. M. Page and Norman Holt; Cave Spring; Mining and milling; Withdrawn September 18, 1939.
- 10365.... 5- 5-39....James Scossa; Water Canyon Spring; Mining and domestic; Approved June 3, 1940. G. S.
- 10366.... 5- 6-39....L. J. Nickerson; Underground waters; Mining, milling, and domestic; Approved January 10, 1940. G. S.
- 10367.... 5- 8-39....L. P. Leavitt; Artesian Well; Irrigation for domestic use; Approved December 27, 1939. G. S.
- 10368.... 5-10-39....Frank E. Bell and J. C. Stephenson; Meadow Canyon Creek overflow and underground water; Mining and domestic; Canceled October 27, 1939.
- 10369.... 5-11-39....Getchell Mine, Inc.; S-524 Vertical Shaft Spring; Mining, milling and domestic; Approved January 4, 1940. G. S.
- 10370.... 5-11-39....Getchell Mine, Inc.; Tunnel No. 4 Spring; Mining, milling, and domestic; Approved January 4, 1940. G. S.
- 10371.... 5-15-39....Lee Lakin; Corral Canyon Creek; Mining;\* Approved April 24, 1940. G. S.
- 10372.... 5-29-39....Little Gem Mining Company; Indian Creek; Mining, milling, and domestic;\* No action.
- 10373.... 5-29-39....Trayco Placer, Inc.; Unnamed Spring; Placer mining and domestic;\* No action.
- 10374.... 5-29-39....Trayco Placer, Inc.; Unnamed Spring; Placer mining and domestic; Withdrawn October 13, 1939.
- 10375.... 5-31-39....George Gergen; Underground waters; Mining and milling; No action.
- 10376.... 6- 3-39....Lucille M. Jones (Successor to Rogers Estate); Humboldt River; Irrigation and stockwatering; No action.
- 10377.... 6- 5-39....Harry Gething, M. T. Keaton and C. M. Reynolds; Evening Star Spring in Cherry Gulch; Mining and domestic;\* No action.
- 10378.... 6- 5-39....Crater Range Mines, Inc.; Jarbidge River; Power; Canceled December 8, 1939.
- 10379.... 6- 7-39....William M. Donovan; American Flat Creek; Milling; Approved December 15, 1939. G. S.
- 10380.... 6- 9-39....Arthur K. Bourne; McFaul Creek and Springs and Tributaries; General domestic and fire protection; Approved June 1, 1940. G. S.
- 10381.... 6- 9-39....Arthur K. Bourne; McFaul Creek Springs and Tributaries; General domestic, fire protection and irrigation; Approved June 1, 1940. G. S.
- 10382.... 6-12-39....Lake Shore Gold Mining Company; Lake Mead (Colorado River); Mining, milling, and domestic; Approved July 5, 1940. G. S.
- 10383.... 6-14-39....The Red Top Mining Company; Buena Vista Spring; Mining, milling and domestic; Canceled December 7, 1939.
- 10384.... 6-16-39....Walter Haggerty; Unnamed Developed Water; Mining, milling, and domestic; Canceled December 7, 1939.
- 10385.... 6-19-39....Edward R. Wagner; Underground waters of Callahan Placer No. 3; Placer mining and domestic; Approved December 22, 1939. G. S.
- 10386.... 6-21-39....George Leonard, Trustee; Franktown Creek and its Tributaries, including snow and flood waters; Irrigation and domestic;\* No action.
- 10387.... 6-23-39....Gray Eagle Mining Company; Unnamed seepage springs and underground waters; Mining, milling, and domestic;\* No action.
- 10388.... 6-30-39....Crater Range Mines, Inc.; Unnamed Spring; Power and domestic; Canceled December 8, 1939.
- 10389.... 6-30-39....Crater Range Mines, Inc.; Unnamed Spring; Mining, milling, and domestic; Canceled December 8, 1939.
- 10390.... 7- 5-39....Floyd C. Odekirk and Walter Johnson; Underground source (Betty Well); Mining and domestic; No action.
- 10391.... 7- 5-39....Richard H. Clough; Underground waters of Las Vegas Valley Artesian Basin; Irrigation and domestic; Approved October 18, 1939. G. S.
- 10392.... 7- 5-39....Michael Paps; Las Vegas Valley Underground Basin or Subterranean Channel; Irrigation and domestic; Approved January 4, 1940. G. S.
- 10393.... 7- 5-39....Adriatic Mines, Inc.; Tacchino Springs; Mining, milling, and domestic; No action.
- 10394.... 7- 7-39....Alice E. Paddison; Underground water (a mine tunnel); Mining, milling, power, and domestic;\* No action.
- 10395.... 7- 7-39....J. R. Schulz; Clear Creek; Irrigation and domestic; Approved December 22, 1939. G. S.

\*Protested application. G. S. Good standing.

- 10396.... 7-10-39....George I. Fenton; Upper Long Creek Springs; Placer mining;\* No action.
- 10397.... 7-14-39....Copper Canyon Mining Company; Underground water; Mining, milling, and domestic; Approved November 20, 1939. G. S.
- 10398.... 7-17-39....J. N. Bryan; Stookey Spring; Stockwatering;\* No action.
- 10399.... 7-17-39....J. N. Bryan; Overland Spring; Stockwatering;\* No action.
- 10400.... 7-17-39....J. N. Bryan; Gabbs Valley Well; Stockwatering;\* No action.
- 10401.... 7-18-39....Lois Kellogg I; Underground water; Irrigation; Canceled December 7, 1939.
- 10402.... 7-18-39....Lois Kellogg II; Lee Spring and Tributaries; Irrigation; Canceled December 7, 1939.
- 10403.... 7-18-39....Lois Kellogg II; Underground water; Irrigation; Canceled December 7, 1939.
- 10404.... 7-18-39....Standard Cyaniding Company; Antelope Creek; Mining and domestic;\* Approved December 22, 1939. G. S.
- 10405.... 7-19-39....Hay Ranches, Inc.; Adriance Valley Lake and Stream; Irrigation and domestic; Canceled January 4, 1940.
- 10406.... 7-19-39....Henry Seeman; Underground waters; Irrigation and domestic;\* No action.
- 10407.... 7-21-39....H. Alex Johnson; Eagle Creek; Mining and domestic; No action.
- 10408.... 7-24-39....Standard Cyaniding Company; Spring Gulch Creek; Milling and domestic; Approved December 22, 1939. G. S.
- 10409.... 7-26-39....Edna L. Umbaugh; Underground waters; Irrigation and domestic; Approved May 24, 1940. G. S.
- 10410.... 7-26-39....Charles B. Archer; Underground source through a well; Mining and milling; Approved January 10, 1940. G. S.
- 10411.... 7-27-39....William Geraghty; Spring on Devonion Mining Claim located in Ivanhoe Mining District in Elko County, Nevada, about 25 miles Southeast of Midas, Nevada; Mining; Withdrawn August 16, 1939.
- 10412.... 8-17-39....N. W. Parker; Unnamed Springs and Underground Channels; Placer mining; Withdrawn May 27, 1940.
- 10413.... 8-21-39....Adriatic Mines, Inc.; Upper Tacchino Springs; Mining, milling, and domestic;\* No action.
- 10414.... 8-24-39....Incline Lake Corporation; an unnamed creek channel and tributary springs in the East Half of Section 35, T. 17 N., R. 18 E., M. D. B. & M.; Recreation and fish propagation; Approved December 22, 1939. G. S.
- 10415.... 8-24-39....Nupaz Mining Company; Underground waters; Mining, milling, and domestic; Approved April 25, 1940. G. S.
- 10416.... 8-28-39....Earnest L. Quist; Meadow Valley Wash; Mining, milling, and domestic; Approved March 20, 1940. G. S.
- 10417.... 8-29-39....W. J. Wadhams; Denio Creek, Massacre, Middle and West Lakes and Tributaries; Irrigation and domestic; No action.
- 10418.... 8-30-39....Nevada State Gold Mines Company; Underground waters (Badger Shaft); Mining, milling and domestic;\* No action.
- 10419.... 9- 1-39....William Mendelsohn; Las Vegas Valley Artesian Basin and Subterranean Channel; Irrigation and domestic; No action.
- 10420.... 9- 5-39....June Cheetham; Spring Branch, a tributary of Summit Creek; Mining and domestic; No action.
- 10421.... 9- 5-39....Nelson, Mullen & Webster, Inc.; Janke Springs; Mining and domestic; No action.
- 10422.... 9- 8-39....Max Hafen, John Jensen and Leo M. Hardy; Indian Spring; Stockwatering and domestic; Approved January 17, 1940. G. S.
- 10423.... 9-10-39....L. R. Jones; West Queen Canyon; Irrigation and domestic; Approved May 24, 1940. G. S.
- 10424.... 9-15-39....C. G. Sevier; Holy Lake Creek and its Tributaries; Irrigation and domestic;\* No action.
- 10425.... 9-20-39....Henry E. Heidenreich; South Fork of Jumbo Canyon (surface and underground water); Irrigation and domestic; No action.
- 10426.... 9-28-39....Josie Alma Woods; Underground source through a well; Irrigation and domestic; No action.
- 10427.... 10- 2-39....Westgate Mining and Milling Corporation; Eastgate Water Channel commonly known as Eastgate Creek in Buffalo Canyon, Churchill County, Nevada; Ore milling and domestic; No action.
- 10428.... 10-10-39....J. F. Featherstone; Water Creek, East side of Jersey Valley in Lander County, Nevada; Mining and milling;\* No action.
- 10429.... 10-10-39....Summit King Mines, Ltd.; Underground source through a well; Mining and domestic; Approved April 22, 1940. G. S.
- 10430.... 10-13-39....W. W. Hartman; Surface and subsurface water from an Unnamed Wash; Mining and domestic; Approved February 8, 1940. G. S.
- 10431.... 10-17-39....Archie Daniels; Cartier Spring; Irrigation; No action.
- 10432.... 10-24-39....R. B. Stewart; Greggs Canyon; Irrigation;\* Approved May 7, 1940. G. S.
- 10433.... 10-25-39....Abel & Curtner Livestock Company; Antelope Spring; Stockwatering; Approved June 3, 1940. G. S.

\*Protested application. G. S. Good standing.

- 10434.....11- 6-39.....Julia Russell; Underground source through a well; Irrigation and domestic; Approved May 13, 1940. G. S.
- 10435.....11- 6-39.....George W. Hennen; A well or wells located below Warm Springs from an underground source; Mining, milling and domestic; No action.
- 10436.....11- 7-39.....Charles L. Richards; O'Hara Spring; Mining, milling and domestic; No action.
- 10437.....11- 8-39.....R. A. Yelland; Nigger Creek; Irrigation;\* No action.
- 10438.....11- 8-39.....John Uhalde; Modes Holes Springs and Tributaries; Stockwatering;\* No action.
- 10439.....11- 9-39.....Las Vegas Land and Water Company; Las Vegas Valley Artesian Basin or Subterranean Channel; Stockwatering and domestic; No action.
- 10440.....11-15-39.....John H. Conaway; Flood waters of Gregerson Basin; Stockwatering; Approved June 11, 1940. G. S.
- 10441.....11-15-39.....William C. Browning; Underground and surface water of and under the watershed of Bodie Creek, Mineral County, Nevada; Mining, milling, and domestic; No action.
- 10442.....11-16-39.....Joaquin Arbonies; Gregg's Canyon; Irrigation; No action.
- 10443.....11-16-39.....Roy A. Judd; Unappropriated and flood waters of Jumbo Creek; Irrigation and domestic; No action.
- 10444.....11-21-39.....Frank Childress and Stuart Welter; Horseshoe Spring; Mining, milling and domestic; No action.
- 10445.....11-22-39.....El Dorado Rover Mining Company; Surface and subsurface water from an unnamed wash; Milling and domestic; Approved March 20, 1940. G. S.
- 10446.....11-28-39.....Nevada United Gold Mining Company; Gilman Springs Addition; Mining, milling, and domestic;\* Approved June 7, 1940. G. S.
- 10447.....11-28-39.....Nevada United Gold Mining Company; Nevada United Springs; Mining, milling, and domestic;\* No action.
- 10448.....11-29-39.....Dennis Smith; Coyote Springs; Mining and milling; Withdrawn May 7, 1940.
- 10449.....12- 4-39.....Dave Stewart and John Conaway; Pony Reservoir situated in South Summit drainage of Gregory Basin and Tributaries; Stockwatering and domestic; Approved June 11, 1940. G. S.
- 10450.....12- 4-39.....Otto Waddell and Chris Jensen; Cow Springs; Mining and milling (gold dredging); No action.
- 10451.....12- 7-39.....John Crosby, Jr.; Unnamed Spring; Mining, milling, and domestic; No action.
- 10452.....12- 8-39.....Albert Welch; Carpenter Spring; Stockwatering; No action.
- 10453.....12- 8-39.....Crater Range Mines, Inc.; Unnamed Spring; Power and domestic; No action.
- 10454.....12- 8-39.....Crater Range Mines, Inc.; Unnamed Spring; Mining, milling, and domestic; No action.
- 10455.....12- 8-39.....Crater Range Mines, Inc.; Jarbidge River (East Fork); Power; No action.
- 10456.....12- 8-39.....Crater Range Mines, Inc.; Pine Creek, tributary of Jarbidge River; Power and domestic; No action.
- 10457.....12-11-39.....L. E. Roberts; Deerlodge Creek; Mining and milling; No action.
- 10458.....12-15-39.....Las Vegas Land Water Company; Las Vegas Valley Artesian Basin and Subterranean Channel; Municipal supply and domestic; No action.
- 10459.....12-21-39.....Thos. Griffin and T. D. Griffin Estates; Humboldt River; Irrigation and domestic; No action.
- 10460.....12-21-39.....E. H. Burdick; Underground percolating water, not in any defined channel; Mining and milling; No action.
- 10461.....12-22-39.....Ellen McGuire and H. V. Mathews; Little Red Wash; Irrigation and domestic; No action.
- 10462..... 1- 2-40.....The Technical Operators, Inc.; Underground source through a well; Mining and milling; No action.
- 10463..... 1- 4-40.....Lawrence Sharp, E. P. Higbee and Paul Stewart; Sheep Mt. Dry Lake (flood water) and Crescent Valley Dry Channels; Stockwatering and domestic; No action.
- 10464..... 1-10-40.....C. L. Stuart; Spalding Canyon Spring; Mining and domestic; No action.
- 10465..... 1-15-40.....Robert B. Saunders; Underground water of the Las Vegas Valley Artesian Belt through a well; Irrigation and domestic; No action.
- 10466..... 1-24-40.....P. J. Goumond; Las Vegas Valley Underground Artesian Basin through a well; Domestic and swimming pool use; Approved June 25, 1940. G. S.
- 10467..... 1-29-40.....Albert Welch; Carpenter Spring; Stockwatering;\* No action.
- 10468..... 2-13-40.....Krsto P. Stanisich; Unnamed Spring; Mining and milling; No action.
- 10469..... 2-19-40.....J. O. Greenan; Baldwin Spring; Mining and domestic; No action.
- 10470..... 2-21-40.....Mildred L. Smith; Hunt's Canyon Creek; Stockwatering; No action.
- 10471..... 2-26-40.....E. H. Allen; Underground Waters of Las Vegas Artesian Basin or Subterranean Channel; Irrigation and domestic; No action.
- 10472..... 3- 1-40.....Lois Kellogg II; Underground source through a well; Irrigation; No action.

\*Protested application. G. S. Good standing.

- 10473.... 3-1-40....Lois Kellogg II; Underground source through a well; Irrigation; No action.
- 10474.... 3-11-40....Robert E. Bunker; Underground waters of the artesian basin in Las Vegas City, Nevada, through a well; Irrigation and domestic; No action.
- 10475.... 3-12-40....Leroy Smallwood; Willow Creek; Placer mining; Withdrawn May 27, 1940.
- 10476.... 3-13-40....Dr. Walter C. McAdoo; McAdoo Spring; Mining and domestic; No action.
- 10477.... 3-13-40....J. W. Richard; Flow water from Evergreen Channel and Tributaries; Stockwatering and domestic; No action.
- 10478.... 3-18-40....Buck Horn Cattle Company; Evergreen Channel and Tributaries; Stockwatering and domestic; No action.
- 10479.... 3-20-40....Carl F. Muir; Underground source through wells to be drilled; Irrigation, stock watering and domestic; No action.
- 10480.... 3-20-40....Walter Haggerty; Underground flow; Mining and milling; No action.
- 10481.... 3-21-40....Frank W. Hinckley; Upper Spring; Power, mining, and domestic; No action.
- 10482.... 3-21-40....Frank W. Hinckley; Lower Spring; Power, mining, and domestic; No action.
- 10483.... 3-23-40....United States of America. Forest Service; Secret Spring; Stockwatering; No action.
- 10484.... 3-27-40....R. G. Heckman and O. D. Gable; Rabbit Hole Spring; Mining and domestic; No action.
- 10485.... 4- 4-40....Ed. Filippini; Underground source through a well; Stockwatering; No action.
- 10486.... 4- 4-40....Copper Canyon Mining Company; Blossom Spring; Mining and milling;\* No action.
- 10487.... 4- 8-40....J. M. Collins; Nigger Creek and Tributaries; Irrigation, stockwatering and domestic; No action.
- 10488.... 4- 8-40....J. F. Featherstone; Trenton Creek in Lander County, Nevada; Milling and mining; No action.
- 10489.... 4-10-40....Paul Shoup, Frank Karr and Isidore B. Dockweiler; Underground source through Artesian Well No. 6; Irrigation; No action.
- 10490.... 4-10-40....Paul Shoup, Frank Karr, and Isidore B. Dockweiler; Bennett's Springs, Nos. 1 and 2; Irrigation; No action.
- 10491.... 4-10-40....Paul Shoup, Frank Karr and Isidore B. Dockweiler; Underground source through Artesian Well No. 5; Irrigation; No action.
- 10492.... 4-10-40....Paul Shoup, Frank Karr and Isidore B. Dockweiler; Underground source through Artesian Well No. 4; Irrigation; No action.
- 10493.... 4-10-40....Victor Lambertucci; Underground source through a well; Irrigation and domestic; No action.
- 10494.... 4-17-40....E. Evans; Underground flow of unnamed canyon and wash; Placer mining and domestic; No action.
- 10495.... 4-18-40....Ray W. West and Grace M. West; West Springs; Mining and domestic; No action.
- 10496.... 4-25-40....Currant Creek Mining Company; Twin Springs; Mining, milling and domestic;\* No action.
- 10497.... 4-29-40....91-Club (Incorporated); Las Vegas Valley Artesian Basin; Irrigation and domestic; No action.
- 10498.... 5- 1-40....Chas. F. Lee; Wilson Creek; Irrigation and domestic; No action.
- 10499.... 5- 2-40....United States of America. Forest Service; Unnamed spring on Currant Creek; Domestic and recreational;\* No action.
- 10500.... 5- 8-40....W. W. Hartman; Surface and subsurface water from an unnamed wash; Mining and domestic; No action.
- 10501.... 5- 9-40....Victor Lambertucci; Underground source (Bottle Gulch underflow); Irrigation and domestic; No action.
- 10502.... 5- 9-40....Victor Lambertucci; Underground source (Bottle Gulch underflow); Irrigation and domestic; No action.
- 10503.... 5-13-40....E. A. Clark; Artesian well in Las Vegas Valley Artesian Basin; Irrigation and domestic; No action.
- 10504.... 5-15-40....St. Elmo Mining Company, Inc.; North Fork Cornwall Creek; Mining, milling, and domestic; No action.
- 10505.... 5-17-40....Richard L. Wood; Wood Spring; Stockwatering; No action.
- 10506.... 5-17-40....P. M. Anderson; Northeast Fork of Canyon Creek; Mining and domestic; No action.
- 10507.... 5-18-40....Emery Garrett; Big Creek's; Irrigation and domestic; No action.
- 10508.... 5-20-40....Las Vegas Land and Water Company; Las Vegas Valley Artesian Basin or Subterranean Channel; No action.
- 10509.... 5-20-40....John Dunsmore, E. S. Gillette and George W. Dunsmore; Underground source through Whitney Well (a driven well); Mining, milling, and domestic; No action.
- 10510.... 5-20-40....Frank Walker and David Francis; Bradshaw Spring; Stockwatering; No action.
- 10511.... 5-25-40....Don Maestretti; Ox Corral Creek; Placer mining and domestic; No action.
- 10512.... 6- 5-40....B & M Mining Company; Liberty well; Mining placer gravel; No action.

\*Protested application. G. S. Good standing.

- 10513.... 6- 5-40....Cathrine E. Woods; Kate Seep; Domestic and irrigation; No action.
- 10514.... 6- 5-40....Lois Kellogg II; Underground source through a well; Irrigation; No action.
- 10515.... 6- 7-40....C. H. Jackson, Jr.; An unnamed spring; Irrigation and domestic; No action.
- 10516.... 6- 7-40....Frank W. Hinkley; Middle Springs; Power, mining, and domestic; No action.
- 10517.... 6- 8- 40....O. D. Iveson; Nigger Creek (flood waters); Irrigation and domestic; No action.
- 10518.... 6-11-40....Mary E. Tobin; Crystal Springs; Mining and milling; No action.
- 10519.... 6-14-40....Mr. and Mrs. G. W. Bettles; A spring a mile and a half west of Highway; Domestic and Auto Campsite; No action.
- 10520.... 6-19-40....Nevada Hotel Company; Las Vegas Valley Artesian Basin or Subterranean Channel; Irrigation and domestic; No action.
- 10521.... 6-20-40....H. W. Parker and J. K. Luther; Underground source through a well; Mining, milling, and domestic; No action.
- 10522.... 6-20-40....H. W. Parker and J. K. Luther; Sharpel Spring; Mining, milling, and domestic; No action.
- 10523.... 6-20-40....H. W. Parker and J. K. Luther; Wolframite Spring; Milling and domestic; No action.
- 10524.... 6-21-40....Walter Haggerty; Underground flow in Northumberland Canyon; Mining and milling; No action.
- 10525.... 6-27-40....N. E. Hanson; Underground source through a well; Mining, milling, and domestic; No action.
- 10526.... 6-28-40....C. A. Liddell; Indian Springs; Mining, milling, and domestic; No action.

## CHAPTER XIV

## Status of Applications Filed Prior to July 1, 1938

Status of applications filed prior to July 1, 1938, upon which action has been taken during the present biennium.

Following is a condensed statement giving the salient data in connection with applications filed prior to July 1, 1938, upon which action has been taken during the years of the present biennium, in the order of:

1. Application serial number.
2. Date of filing.
3. Name of applicant.
4. Source of water supply.
5. Purpose of appropriation.
6. Action on application.
7. Status of permits as of June 30, 1940.

2030....	5- 2-11....	Herbert Badt; Town Creek; Irrigation; Canceled August 9, 1938.
2620....	1-27-13....	Frank W. Simpson; West Walker River (flood waters); Irrigation and domestic; Canceled October 6, 1938.
2685....	4-14-13....	John H. Hillsbery; Sheep Creek; Irrigation and domestic; Canceled October 6, 1938.
3655....	10-26-15....	Golconda Cattle Company; Fish Creek, Lander County, Nevada; Irrigation and domestic; Canceled October 6, 1938.
4093....	8-10-16....	Oklahoma Gold Mining Company; Oklahoma Gulch; Mining and domestic; Canceled October 6, 1938.
4196....	8-14-16....	Margaret Hyer; Bull Run Creek; Irrigation and stockwatering; Canceled November 1, 1939.
4118....	8-24-16....	Peter Anker; Humboldt River; Irrigation and domestic; Canceled October 6, 1938.
4159....	9-21-16....	Louis Ruhenstroth; East Fork of Carson River; Irrigation, stockwatering and domestic; Approved March 1, 1939. G. S.
4244....	12- 9-16....	Charles Stanley Powell; Tuledad Creek, Tributaries Express Creek; Irrigation; Withdrawn July 23, 1938.
4541....	8-16-17....	Christian P. Ronnow and Philip Mathews; Hamlite Canyon Creek (flood and unappropriated waters); Irrigation and domestic; Canceled October 6, 1938.
4627....	10-10-17....	Glenn Moore; An unnamed creek from north group of what are known as Quaker Springs; Irrigation and domestic; Canceled October 6, 1938.
5105....	6-14-18....	Mary E. Winter; Forest Creek; Irrigation and stockwatering; Withdrawn February 20, 1939.
5164....	7-22-18....	Lorenzo D. Creel; Lime Kiln Canon (flood and unappropriated waters); Irrigation and domestic; Canceled October 6, 1938.
5183....	7-29-18....	John Folwick; Buser Creek and Springs (flood and unappropriated waters); Irrigation and domestic; Canceled October 6, 1938.
5186....	8- 1-18....	Mary Larson; Springs in SW $\frac{1}{4}$ SW $\frac{1}{4}$ , Section 12, T. 34 N., R. 54 E., M. D. B. & M.; Irrigation, mining, stockwatering and domestic; Canceled October 6, 1938.
5419....	3-13-19....	John G. McGowen and George W. Wilson; Wilson Spring; Irrigation and domestic; Canceled October 6, 1938.
5824....	10-29-19....	Martin Oyarcabal and Pete Bertranhandy; Big Creek; Irrigation and stockwatering; Canceled February 13, 1940.
5825....	10-29-19....	Martin Oyarcabal and Pete Bertranhandy; Pole Creek; Irrigation, stockwatering and domestic; Canceled February 13, 1940.
5826....	10-29-19....	Martin Oyarcabal; Buckaroo Creek; Irrigation and stockwatering; Canceled February 13, 1940.
5889....	12- 3-19....	Arthur W. Guthrie, Administrator of Estate of Harriet Guthrie, deceased; Sonoma Creek; Irrigation and stockwatering; Canceled October 6, 1938.
6028....	3-23-20....	Pyramid Land & Stock Company; Dry Valley Creek; Irrigation; Denied February 14, 1939.
6079....	4-30-20....	Christian August Koyen and John W. Richard; Point of Rock Spring; Irrigation; Approved April 12, 1940. G. S.
6430....	3-31-21....	H. Van den Heuvel; Willow Creek; Power and Irrigation; Withdrawn October 3, 1938.
6656....	3-27-22....	H. H. Schrader; Clover Slough; Irrigation; Canceled October 6, 1938.

\*Protested application. G. S. Good standing.

- 6734.... 8-10-22....Carson and Tahoe Lumber and Fluming Company, a Corporation; Secret Harbor Creek; Irrigation, stockwatering and domestic; Withdrawn November 8, 1939.
- 6752.... 9-25-22....Pacific Portland Cement Company Consolidated; Baker Spring No. 5; Mining and domestic; Withdrawn December 2, 1939.
- 6937.... 7-12-23....Gentile Georgetown; Spring Creek (during winter months); Irrigation and domestic; Canceled October 11, 1938.
- 6957.... 8-14-23....Bank of Nevada Savings & Trust Company; Dry Valley Creek; Irrigation and domestic; Denied February 14, 1939.
- 6959.... 8-14-23....Bank of Nevada Savings & Trust Company; Dry Valley Creek; Irrigation and domestic; Denied February 14, 1939.
- 6960.... 8-14-23....Bank of Nevada Savings & Trust Company; Dry Valley Creek; Irrigation and domestic; Denied February 14, 1939.
- 7194.... 8-13-24....John Urrizaga; Cattle Camp Creek; Irrigation and domestic; Canceled April 20, 1939.
- 7409.... 6-26-25....Carson and Tahoe Lumber and Fluming Company, a Corporation; Bliss Creek; Irrigation and domestic; Withdrawn November 8, 1939.
- 7410.... 6-26-25....Carson and Tahoe Lumber and Fluming Company, a Corporation; Secret Harbor Creek; Irrigation and domestic; Withdrawn November 8, 1939.
- 7649.... 2-26-26....Aldrich Silver Lead Mines Company; Cherry Spring and Creek; Mining, milling, and domestic; Canceled January 14, 1939.
- 7659.... 3- 8-26....Geneva Herren; Mud Spring; Irrigation and domestic; Denied November 1, 1938.
- 7762.... 5-24-26....H. O. Comstock; First Creek; Power and domestic; Canceled November 7, 1939.
- 7846.... 8- 9-26....Donald J. Wallace; Surface and underflow of Buckeye Creek and Tributary Springs in Section 27, T. 13 N., R. 22 E., M. D. B. & M.; Placer mining and domestic; Canceled January 25, 1939.
- 7855.... 8-21-26....Muddy Valley Irrigation Company; Muddy River and Tributaries (flood and unappropriated summer and winter flow); Irrigation, domestic and power; Approved December 15, 1939. G. S.
- 7903....10-15-26....Mrs. Lena Harkey Scott; Unnamed Spring now known as Scott Spring; Stockwatering; Approved November 21, 1938.
- 7904....10-15-26....Mrs. Lena Harkey Scott; Unnamed Spring now known as Scott Spring No. 2; Stockwatering and irrigation; Approved November 21, 1938.
- 7904....10-15-26....Mrs. Lena Harkey Scott; Unnamed Spring now known as Scott Spring No. 2; Stockwatering and irrigation; Approved November 21, 1938.
- 7905....10-15-26....Mrs. Lena Harkey Scott; Rock Spring; Stockwatering; Approved November 21, 1938.
- 7908....10-15-26....Mrs. Lena Harkey Scott; Section 5 Spring; Stockwatering; Approved November 21, 1938.
- 7932....11-16-26....Licking Land and Livestock Company, a Corporation; Humboldt River; Irrigation and stockwatering; Approved November 28, 1938.
- 7951....12-14-26....Lena Harkey Scott; Grassy Spring; Stockwatering; Approved November 21, 1938.
- 7958....12-30-26....Pete Saffores; A small spring near the Southwest Corner of the SW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 24, T. 40 N., R. 22 $\frac{1}{2}$  E., M. D. B. & M.; Stockwatering and domestic; Withdrawn October 27, 1938.
- 7977.... 1-10-27....Williams Estate Company, a Corporation; Cherry Spring No. 2; Stockwatering and domestic; Approved December 27, 1939. G. S.
- 8013.... 2-22-27....J. P. Saffores; Basko Spring; Stockwatering; Withdrawn October 27, 1938.
- 8197.... 6-24-27....The Glenbrook Company, a Corporation; Glenbrook Creek and its Tributaries; Irrigation and domestic; Approved June 27, 1939. G. S.
- 8213.... 7- 7-27....Marius Allard and Joseph Hermelin; Stone House Spring; Stockwatering; Denied June 7, 1939.
- 8214.... 7- 7-27....Marius Allard and Joseph Hermelin; Jersey Creek Spring; Stockwatering; Denied June 7, 1939.
- 8215.... 7- 7-27....Marius Allard and Joseph Hermelin; Cherry Creek Spring; Stockwatering; Denied June 7, 1939.
- 8216.... 7- 7-27....Marius Allard and Joseph Hermelin; Wild Creek; Stockwatering; Denied June 7, 1939.
- 8217.... 7- 7-27....Marius Allard and Joseph Hermelin; White Rock Spring; Stockwatering; Denied June 7, 1939.
- 8318.... 9- 9-27....Williams Estate Company, a Corporation; Bernice Spring; Stockwatering; Approved December 27, 1939. G. S.
- 8384....11-13-27....American Beauty Mining and Milling Company; Long Canyon Creek on South Fork of the Humboldt River; Power; Denied June 12, 1939.
- 8385....11-13-27....American Beauty Mining and Milling Company; East Fork of Long Canyon on South Fork of Humboldt River; Milling; Denied June 12, 1939.
- 8386....11-13-27....American Beauty Mining and Milling Company; American Beauty Spring; Domestic; Denied June 12, 1939.

\*Protested application. G. S. Good standing.

- 8417.... 1- 4-28....Mrs. Lena Harkey Scott; High Rock Creek; Stockwatering and domestic; Approved November 21, 1938.
- 8418.... 1- 4-28....Mrs. Lena Harkey Scott; Upper Grassy Spring; Stockwatering; Approved November 21, 1938.
- 8419.... 1- 4-28....Mrs. Lena Harkey Scott; Lake or Pot Hole; Stockwatering; Approved November 21, 1938.
- 8420.... 1- 4-28....Mrs. Lena Harkey Scott; Head of High Rock Spring; Stockwatering; Approved November 21, 1938.
- 8490.... 3-28-28....Wm. Ferguson; Ferguson Well; Stockwatering and domestic; Approved August 21, 1939. G. S.
- 8519.... 4-23-28....Grace A. Street; Cherry Creek and Springs; Stockwatering and domestic; Approved November 7, 1938.
- 8521.... 4-23-28....Grace A. Street; Wild Horse Spring; Stockwatering and domestic; Approved November 7, 1938.
- 8522.... 4-23-28....Grace A. Street; Rimrock Spring; Stockwatering and domestic; Approved November 7, 1938. G. S.
- 8532.... 5-12-28....L. E. McCulley; Post Spring; Stockwatering and domestic; Withdrawn October 27, 1938.
- 8533.... 5-12-28....L. E. McCulley; Indian Spring; Stockwatering and domestic; Withdrawn October 27, 1938.
- 8568.... 6-13-28....Chester L. Woodward; Columbia Creek; Irrigation; Approved May 21, 1940. G. S.
- 8721....10-13-28....Marion Yelland; South Millick Spring; Stockwatering; Approved June 29, 1939. G. S.
- 8812.... 1-14-29....W. C. Bradley; Amargosa River; Irrigation; Denied October 17, 1938.
- 8817.... 1-22-29....George E. Turpin; McCoy Spring No. 3; Mining and domestic; Canceled December 9, 1939.
- 8865.... 4-12-29....J. M. Jensen; Underground waters of Dunlap Canyon, Mineral County, Nevada; Irrigation and domestic; Denied June 7, 1939.
- 8888.... 5- 1-29....Robert Griffith; Rainbow Falls Spring; Irrigation and domestic; Withdrawn August 3, 1938.
- 8902.... 5-13-29....Frank Childress; Childress Spring; Mining, milling, and domestic; Approved December 15, 1939. G. S.
- 8994.... 7-19-29....W. J. West and B. V. Smith; South Fork of Deer Creek; Domestic; Canceled April 20, 1939.
- 8997.... 7-21-29....F. C. Vanover; Little Ike Springs (Upper); Stockwatering; Withdrawn January 25, 1939.
- 9056.... 9-18-29....Abel & Curtner Livestock Company; Mahogany Spring; Stockwatering; Canceled August 8, 1938.
- 9293.... 7-10-30....Consolidated Copper Mines Corporation; Steptoe Creek and Tributaries; Mining, milling, concentrating ores, general metallurgical operations and domestic; Withdrawn June 27, 1940.
- 9409.... 2- 5-31....Pete Laca; Antelope Spring; Stockwatering; Denied May 6, 1940.
- 9540....10-13-31....C. H. Taylor; Taylor Spring No. 1; Stockwatering and domestic; Approved April 22, 1940. G. S.
- 9572.... 2- 3-32....Charles Labbe; Unnamed Spring; Mining, milling, and domestic; Withdrawn April 20, 1939.
- 9613.... 7-21-32....W. R. McCrea; Amargosa River; Irrigation and domestic; Canceled November 14, 1939.
- 9652.... 3-12-33....E. A. Clark; Artesian well in Las Vegas Valley Artesian Basin; Municipal and domestic; Approved April 24, 1940. G. S.
- 9673.... 7-12-33....Ambassador Gold Mines, Ltd.; Underground source through Well No. 1; Mining; Denied March 7, 1939.
- 9674.... 7-12-33....Ambassador Gold Mines, Ltd.; Underground source through Well No. 2; Mining; Denied March 7, 1939.
- 9706....10-17-33....Irvin E. Bauer; Beaver Dam Wash; Irrigation and domestic; Withdrawn June 25, 1940.
- 9743.... 4-27-34....A. G. Wells and W. G. Shearer; Cedar Hill Canyon Springs; Mining, milling, and domestic; Canceled February 21, 1939.
- 9746.... 5- 2-34....Buena Gold Mines, Inc.; Summit Creek; Mining, milling, and domestic; Canceled October 6, 1938.
- 9748.... 5-10-34....E. G. Frawley; Underground water; Mining, milling, and domestic; Canceled August 24, 1939.
- 9773.... 7-13-34....Hammond Gold Mines, Inc.; Underground water; Mining, milling and domestic; Canceled July 11, 1939.
- 9781.... 7-24-34....Howard B. Dennis; Dry Gulch; Mining and domestic; Canceled March 1, 1939.
- 9786.... 8- 6-34....Lyle C. McDermott; Cowden Creek; Mining, milling, and domestic; Canceled October 6, 1938.
- 9828.... 1- 9-35....Wagner Gold Placer Company, Inc.; Jacks Spring; Placer mining and domestic; Denied January 20, 1939.
- 9834.... 1-28-35....Caliente Cyaniding Company; Underground water in Cedar Wash (Stuart Well); Milling; Withdrawn December 23, 1939.
- 9862.... 5-27-35....Leo F. Schmitt, Receiver; Chiatovich Creek and all of its tributaries; Irrigation and domestic; Approved March 21, 1939.
- 9878.... 7-12-35....Walter Haggerty; Underground waters through a well; Mining and milling; Withdrawn June 25, 1940.
- 9894.... 8-27-35....C. Shockley; Barrel or Mustang Spring; Mining, milling, and domestic; Canceled January 25, 1939.

\*Protested application. G. S. Good standing.

- 9899.... 9-16-35....John Valente; Stark Spring in Deer Lodge Wash; Mining and milling; Canceled October 6, 1938.
- 9918....12-16-35....Persistent Mining Company; Squab Seep; Mining and milling; Canceled June 10, 1940.
- 9919....12-16-35....Persistent Mining Company; Stockade Seep; Mining and milling; Canceled June 10, 1940.
- 9920....12-16-35....Persistent Mining Company; Chimney Seep; Mining and milling; Canceled June 10, 1940.
- 9989.... 5-28-36....Alpha Gold Mines, Inc.; Bourne Creek; Mining, milling, and domestic; Withdrawn September 7, 1939.
- 10014.... 8-15-36....Geo. L. McCracken; Underground source; Mining, milling, and domestic; Approved July 18, 1939. G. S.
- 10037....10-13-36....John Van Daam; The Colorado River; Milling of ore; Canceled August 28, 1939.
- 10041....10-16-36....Department of Highways, State of Nevada; Surplus and unappropriated waters of Ferguson Spring; Highway and domestic; Approved January 12, 1940. G. S.
- 10062....12- 9-36....R. J. Bradshaw; Mud Springs; Stockwatering; Approved March 1, 1939. G. S.
- 10069.... 1- 7-37....James Ryan, Erastus L. Jones and William Jones; Flood waters of Pahrock Watershed stored in Ryan Jones Reservoir No. 2; Stockwatering; Denied November 27, 1939.
- 10070.... 1- 7-37....James Ryan, Erastus L. Jones and William Jones; Flood waters of Pahrock Watershed stored in Ryan Jones Reservoir No. 1; Stockwatering; Denied November 27, 1939.
- 10077.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10078.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10079.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10080.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10081.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10085.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10086.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10087.... 2- 6-37....The Utah Construction Company; Underground source; Stockwatering; Approved September 8, 1938. G. S.
- 10088— 2-10-37....Karl C. Stewart; Eight Mile Spring; Stockwatering; Approved April 7, 1939. G. S.
- 10093.... 2-24-37....Ora Tahoma Mining Company; Birch Springs; Milling and domestic; Approved August 6, 1938. G. S.
- 10097.... 3-10-37....Fred Vollmar; Unnamed Spring; Mining, milling, and domestic; Approved May 11, 1939. G. S.
- 10102.... 3-24-37....Fred Vollmar; Unnamed Spring; Mining, milling, and domestic; Approved May 11, 1939. G. S.
- 10124.... 6-1-37....The Technical Operators, Inc.; Underground source; Mining and milling; Approved December 21, 1938. G. S.
- 10125.... 6- 9-37....B. F. Baker and August Galvin; Creek and Springs and Tributaries in what is locally known as Brewery Canyon; Stockwatering and domestic; Approved March 20, 1940. G. S.
- 10126.... 6- 9-37....B. F. Baker and August Galvin; Milk Ranch Springs and Creek and Tributaries; Stockwatering and domestic; Approved March 20, 1940. G. S.
- 10135.... 7- 2-37....Mono Land and Livestock Company, a Corporation; Unnamed Spring; Stockwatering and domestic; Approved September 14, 1939. G. S.
- 10139.... 7-10-37....Frank Trammel, W. V. Turner and Leon L. Peck; Unnamed Hot Spring; Bathing and domestic; Denied August 14, 1939.
- 10150.... 8-10-37....The Citizens' Committee of Goldfield; Well No. 1; Municipal; Approved October 15, 1938.
- 10152.... 8-12-37....W. Ed. Duncan; Underground waters of Las Vegas Valley Underground Basin; Irrigation and domestic; Approved August 26, 1938. G. S.
- 10161.... 9- 7-37....Clark C. Johnson; Johnson Spring; Irrigation and domestic; Approved July 25, 1938. G. S.
- 10167.... 9-13-37....Mrs. Floyd Walch; Cottonwood Creek; Irrigation and domestic; Approved November 7, 1938. G. S.
- 10171.... 9-28-37....Frank H., Ida M., Franklin H., and Florence M. Baker, and Helen M. Currie; Aspen Springs; Domestic; Approved May 25, 1939. G. S.
- 10179....10-21-37....Mackelprang Brothers; Gray Shale Spring; Stockwatering; Denied February 8, 1940.
- 10180....10-21-37....Mackelprang Brothers; Chokecherry Spring; Stockwatering; Denied February 8, 1940.
- 10187....11- 6-37....Chris Dahlstrom; West Spring; Stockwatering; Approved February 27, 1939. G. S.
- 10197.... 1-10-38....L. N. Massey; Underground waters (a well); Irrigation; Canceled August 10, 1938.
- 10201.... 1-26-38....Joe Alzugaray; Needle Well; Stockwatering; Canceled August 10, 1938.

\*Protested application. G. S. Good standing.

- 10202.... 2- 2-38....United States Department of Agriculture; Las Vegas Wash; Migratory Waterfowl Refuge; Approved September 2, 1938, G. S.
- 10203.... 2- 4-38....Mountain City Copper Company; Owyhee River (East Fork); Milling and domestic; Approved August 6, 1938. G. S.
- 10209.... 2-10-38....Julia A. Russell; Underground water, Las Vegas Valley Artesian Belt; Irrigation and domestic; Canceled August 10, 1938.
- 10211.... 3- 3-38....The Utah Construction Company; Unnamed Spring; Stockwatering; Approved August 16, 1938. G. S.
- 10212.... 3- 3-38....The Utah Construction Company; Unnamed Spring; Stockwatering; Approved August 16, 1938. G. S.
- 10214.... 3- 3-38....Billie Lamb; Badger Spring; Stockwatering; Approved December 21, 1938. G. S.
- 10215.... 3-16-38....Perry White; Pearl Springs; Mining and milling; Canceled October 26, 1938.
- 10216.... 3-21-38....A. M. Thompson and Roy Waite; Juanetta Spring; Irrigation and domestic; Canceled August 10, 1938.
- 10217.... 3-22-38....Nevada Porphyry Gold Mines, Inc.; Jett Creek; Mining and milling; Approved October 4, 1938. G. S.
- 10219.... 4- 4-38....United States Forest Service; Easter Spring; Domestic; Approved July 2, 1938. G. S.
- 10220.... 4- 4-38....United States Forest Service; Scout Spring; Public campground; Approved July 2, 1938. G. S.
- 10221.... 4- 4-38....United States Forest Service; Clark Canyon Spring; Public campground; Approved July 2, 1938. G. S.
- 10222.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10223.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10224.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10225.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10226.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10227.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10228.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10229.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10230.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10231.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10232.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10233.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10234.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10235.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10236.... 4- 5-38....Morgan Whitaker and Raymond I. Smith; Underground water; Placer mining and milling; Approved October 4, 1938. G. S.
- 10237.... 4- 7-38....Mark Bradshaw; Driven well at Salt Lake R. R. Yards; Mining and milling; Approved September 14, 1938. G. S.
- 10239.... 4- 8-38....Zenas Walmsley; Gold Canyon Creek; Tailings disposal; Approved August 14, 1938. G. S.
- 10240.... 4-14-38....Anna Saverey; Springs and Creek; Irrigation and domestic; Approved September 26, 1938. G. S.
- 10241.... 4-20-38....W. D. Murray; Underground waters of Las Vegas Valley Artesian Basin or Subterranean Channel; Irrigation and domestic; Approved August 26, 1938. G. S.
- 10242.... 4-25-38....Lode Development Company; Underground source; Mining and domestic; Canceled October 26, 1938.
- 10243.... 4-26-38....Alpha Pearl Baker; Underground waters of Las Vegas Valley Artesian Basin or Subterranean Channel; Irrigation and domestic; Approved November 7, 1938. G. S.
- 10244.... 5- 5-38....Placer Properties Company, Inc.; South American Canyon; Placer mining and domestic; Withdrawn August 16, 1938.
- 10245.... 5-16-38....Earl A. Honrath; Underground waters of Las Vegas Valley Artesian Basin or Subterranean Channel; Irrigation and domestic; Approved December 21, 1938. G. S.
- 10246.... 5-21-38....Ben Fabian; Tiger Creek Springs; Mining, milling, and domestic; Approved January 20, 1939. G. S.
- 10247.... 6- 2-38....Joe Steele; White Rock Spring; Stockwatering and domestic; Denied February 8, 1940.
- 10248.... 6-15-38....Albert Zimmerman and Drew Wilson; Deadwood Springs No. 1; Mining, milling, and domestic; Approved August 31, 1939. G. S.
- 10249.... 6-15-38....Albert Zimmerman and Drew Wilson; Deadwood Springs No. 2; Mining and milling; Approved August 31, 1939. G. S.

\*Protested application. G. S. Good standing.

- 10250.... 6-17-38....Charles McKellar; Erickson Well; Stockwatering and domestic; Approved September 11, 1939. G. S.
- 10251.... 6-17-38....Charles McKellar; Tommy Johns Spring; Stockwatering and domestic; Approved September 11, 1939. G. S.
- 10252.... 6-17-38....Charles McKellar; Tunnel Well; Stockwatering and domestic; Approved September 11, 1939. G. S.
- 10253.... 6-25-38....Jose Castillo; Shell Creek; Irrigation and domestic; Approved April 28, 1939. G. S.
- 10254.... 6-27-38....Combined Metals Reduction Company, a Corporation; Underground water (Caselton Shaft); Mining and domestic; Approved September 13, 1939. G. S.

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\*Protested application. G. S. Good standing.

## CHAPTER XV

## Certificates Issued Under Permits, 1938-1940

Following is a condensed statement giving the salient data in connection with Certificates Issued Under Permits during the biennium for the period July 1, 1938, to June 30, 1940, in the order of:

1. Certificate number.
2. Book number.
3. Permit number.
4. Name of appropriator.
5. Source of water supply.
6. Purpose of appropriation.
7. Amount of water in cubic feet per second, unless otherwise noted.
8. Date of certificate issued.

2400	8	9609	Mountain City Copper Company; Unnamed Spring; Mining and domestic	0.02	7- 7-38
2401	8	9988	Caliente Cyaniding Company; Willow Creek; Milling	0.04456	7-22-38
2402	8	3205	John W. Cogswell; Texas Creek and Tributaries, including Clover Creek; Irrigation and domestic	0.278	7-25-38
2403	8	10189	James Ryan and John Conaway; Grassy Spring; Stockwatering and domestic	0.025	9-14-38
2404	8	9656	R. H. Gordon; Valcalda Springs; Mining and milling	0.034	9-20-38
2405	8	9979	H. F. Dangberg Land & Live Stock Company; Underground water (well); Stockwatering	0.013	10-10-38
2406	8	9655	G. W. Warmoth and S. W. Hill; Underground water (well); Milling and domestic	0.05	10-20-38
2407	8	7631	George R. Parman; Parman Spring; Stockwatering	0.011	10-26-38
2408	8	8298	Home Camp Land and Livestock Company; Canon Spring; Stockwatering	0.0031	10-26-38
2409	8	8525	George N. Swallow and Richard M. Swallow; Pipe Spring; Stockwatering	0.1025	10-28-38
2410	8	8713	George N. Swallow and Richard M. Swallow; Underground Source (South Well); Stockwatering	0.013	10-28-38
2411	8	8573	W. T. Jenkins Company; Clark's Springs; Stockwatering	0.067	11- 7-38
2412	8	8575	W. E. Hill; Little Slough; Stockwatering	0.0094	11- 7-38
2413	8	8576	W. E. Hill; Little Basin Creek; Stockwatering	0.0094	11- 7-38
2414	8	9653	J. W. Wilson and Elmer Mikkelsen; Underground water through Artesian well; Irrigation and domestic	0.05	11-23-38
2415	8	10130	Matthew Hickson; Sheep Springs; Irrigation	0.323	11-23-38
2416	8	4374	Gladstone Corporation; Underground Source, Paradise Valley Artesian Belt; Irrigation and domestic	0.705	11-28-38
2417	8	6646	George Martin; Walker River; Irrigation and domestic	0.1664	11-28-38
2418	8	7987	C. B. Oliver and Edith P. Oliver; Ben Spring; Irrigation and domestic	0.026	12-29-38
2419	8	6029	The Marigold Mines, Inc.; South Fork of Buena Vista Creek; Milling	0.067	1- 6-39
2420	8	9621	Steve Collins; Collins Artesian Springs Nos. 1 and 2; Irrigation and domestic	0.028	1-10-39
2421	8	4006	Ray S. Frazer; Jack Creek; Irrigation	0.967	1-13-39
2422	8	9805	D. C. Gardner; Blind Spring; Stockwatering	0.005	1-16-39
2423	8	9713	Mrs. C. A. Horn; Three Tunnels Springs; Mining, milling, and domestic	0.05	1-31-39
2424	8	8623	R. H. Cowles; Juniper Spring; Stockwatering	0.0125	2- 2-39
2425	8	8625	R. H. Cowles; North Juniper Spring; Stockwatering	0.01	2- 2-39
2426	8	8626	R. H. Cowles; Tunnel Spring; Stockwatering	0.01	2- 2-39
2427	8	8627	R. H. Cowles; Upper Stone House Spring; Stockwatering	0.01	2- 2-39
2428	8	5996	Fred T. Hoelzle; Middle Fork Creek; Irrigation and domestic	0.2549	2-18-39
2429	8	3705	W. B. Griffith; Jerrett Creek; Irrigation	0.2304	2-23-39

2430	8	9316	Willard H. George; Unnamed Wash; Stockwatering	0.0019	2-27-39
2431	8	9317	Willard H. George; Unnamed Wash; Stockwatering	0.0019	2-27-39
2432	8	8389	Wayne Wightman; Underground Source through an Artesian Well; Stockwatering	0.011	2-28-39
2433	8	9357	Western Pacific Railroad Company; Underground water (well); Locomotive and domestic	0.09	3- 1-39
2434	8	9766	Frederick Steigmeyer; Underground flow, Jefferson Creek Basin; Milling and domestic	0.5	3- 2-39
2435	8	4159	Ida Ruhenstroth; East Fork Carson River; Irrigation	0.966	3- 3-39
2436	8	9464	John Canson; Underground Water through Artesian Wells; Domestic and bathing	0.78	3- 7-39
2437	8	8091	Charles H. Nash and J. F. Butler; Underground Water (well); Mining and domestic	0.028	3-10-39
2438	8	7915	Joe Ferguson; Keno Spring; Stockwatering	0.001	3-14-39
2439	8	9700	Charles Cecchini; Underground water (well); Stockwatering	0.0013	3-14-39
2440	8	8849	T. T. Fairchild; Packer Creek; Stockwatering and domestic	0.009	3-15-39
2441	8	9866	Allen Nay; Lime Spring; Stockwatering	0.003	3-15-39
2442	8	10124	The Technical Operators, Inc.; Underground Source; Milling	0.046	3-15-39
2443	8	10237	Mark Bradshaw; Underground Water (well); milling	0.046	3-15-39
2444	8	10049	Mark G. Bradshaw; Underground Source; milling	0.077	3-15-39
2445	8	3369	Oliver A. Perry; East Walker River; Irrigation and domestic	0.638	3-22-39
2446	8	3370	Charles C. Perry; East Fork Walker River; Irrigation and domestic	1.375	3-22-39
2447	8	9663	The Nevada Company; Union Canyon Springs (Lower); Mining, milling and domestic	0.0401	3-25-39
2448	8	9483	Leon Acorda; Underground Source (Acorda Well No. 1); Stockwatering	0.013	3-25-39
2450	8	5395	Ed. W. Clark; Duck Creek; Irrigation and domestic	0.6564	3-28-39
2451	8	9516	Ferdinand M. Ferguson; Underground Water; Irrigation	0.208	3-28-39
2452	8	9622	California Lands Inc.; Shanghai Spring; Stockwatering	0.007	3-31-39
2453	8	9623	California Lands Inc.; Mill Spring; Stockwatering	0.0035	3-31-39
2454	8	1946	Mrs. Marie Anderson; Carson River; Irrigation	0.331	4- 7-39
2455	8	9804	Fondaway Gold Mining Company; Fondaway Canyon Spring (North Branch); Domestic	0.026	5-22-39
2456	8	10054	W. C. Morgan; Point Spring; Stockwatering	0.0013	5-22-39
2457	8	5027	Hannorah Seyler and Rolland Tidwell; Peavine Creek; Irrigation	0.25	5-23-39
2458	8	3021	Fred S. Talcott and Fern L. Talcott; Buena Vista or Unionville Creek; Irrigation	1.00	5-23-39
2459	8	7964	W. Whitaker; Edwards Spring No. 1; Stockwatering and domestic	0.08	6- 7-39
2460	8	7965	W. Whitaker; Edwards Spring No. 2; Stockwatering and domestic	0.08	6- 7-39
2461	8	7966	W. Whitaker; Cedar Spring No. 1; Stockwatering and domestic	0.08	6- 7-39
2462	8	7967	W. Whitaker; Cedar Spring No. 2; Stockwatering and domestic	0.08	6- 7-39
2463	8	7968	W. Whitaker; Cedar Spring No. 3; Stockwatering and domestic	0.08	6- 7-39
2464	8	7969	W. Whitaker; Cedar Spring No. 4; Stockwatering and domestic	0.08	6- 7-39
2465	8	7971	W. Whitaker; Aspen Spring; Stockwatering and domestic	0.08	6- 7-39
2466	8	7972	W. Whitaker; Topia Spring No. 3; Stockwatering and domestic	0.08	6- 7-39
2467	8	7974	W. Whitaker; Lower Cedar Spring; Stockwatering and domestic	0.08	6- 7-39
2468	8	9543	Bentura Bengocheas; Old Corral Spring; Stockwatering	0.025	6- 7-39
2469	8	9544	Bentura Bengocheas; Little Creek Spring; Stockwatering	0.025	6- 7-39
2470	8	8715	William G. Lamb; Big Springs; Irrigation and domestic	1.10	6-14-39
2471	8	9561	Bertrand Paris; Underground Source (well); Stockwatering	0.016	6-21-39
2472	8	9562	Bertrand Paris; Underground Source (well); Stockwatering	0.016	6-21-39
2473	8	9435	George Eldridge; Underground Source through Eldridge Well No. 2; Stockwatering	0.0187	6-22-39

2474	8	8188	Herman Deitlaff; Deitlaff Springs; Irrigation and domestic	0.0585	7-10-39
2475	8	7586	Edna J. Carver; Spring and Underground Water through a Well; Domestic, sanitarium and resort	0.22	7-24-39
2476	8	7587	Edna J. Carver; Unnamed Spring (Chicken Soup Spring); Drinking and sanitarium	0.00074	7-24-39
2477	8	7588	Edna J. Carver; Unnamed Spring; Domestic, sanitarium and resort	0.018	7-24-39
2478	8	7589	Edna J. Carver; Spring and Underground Water through a Well; Domestic, sanitarium and health resort	0.025	7-24-39
2479	8	6853	Dan Filippini; Sod House Creek (Spring); Irrigation and Culinary	0.0035	8-25-39
2480	8	7502	Dan Filippini; Hand Me Down Spring No. 1; Stockwatering	0.019	8-25-39
2481	8	7438	Dan Filippini; 24 Spring; Stockwatering	0.019	8-25-39
2482	8	7440	Dan Filippini; 27 Spring; Stockwatering	0.019	8-25-39
2483	8	9935	John H. Conaway; Meadow Valley Wash; Irrigation	0.167	11- 6-39
2484	8	9272	George W. Friefhoff; Walker River-East Fork; Irrigation and domestic	0.50	12-19-39
2485	8	9444	George W. Friefhoff; Walker River-East Fork; Irrigation and domestic	0.86	12-19-39
2486	8	9908	V. E. Greenwald; Corral Spring; Irrigation and domestic	0.0245	12-28-39
2487	8	3225	John A. Mollini; Robinson Creek; Irrigation	0.12	1- 9-40
2488	8	10041	Department of Highways, State of Nevada; Ferguson Springs; Domestic	0.01	1-15-40
2489	8	8330	Alma Woods; Clover Spring; Stockwatering	0.006	1-19-40
2490	8	8331	Alma Woods; Shamrock Spring; Stockwatering	0.01	1-19-40
2491	8	9833	State of Nevada, Department of Highways; Twin Creek; Domestic use for Traveling Public	0.07	1-22-40
2492	8	8961	Ned M. Fothergill; Underground Source; Irrigation and domestic	0.108	1-25-40
2493	8	9898	Nevada-Massachusetts Company, Inc.; Spear-mint Canyon Spring; Mining, milling, and domestic	1.0	1-29-40
2494	8	9446	City of Elko; Underground Source; Domestic and fire protection	1.27	1-39-40
2495	8	9239	Ray and Eunice C. Murphy; Underground Water through Artesian Well; Domestic	0.033	2- 2-40
2496	8	8280	Oren F. Boies; Stag Spring; Stockwatering and domestic	0.035	2- 6-40
2497	8	8534	L. E. McCulley; Sagehen Spring; Stockwatering and domestic	0.0125	2- 8-40
2498	8	8535	L. E. McCulley; Beebe Spring; Stockwatering and domestic	0.0125	2- 8-40
2499	8	5257	Blanche Siard; Siard Tunnel; Stockwatering	0.033	2-10-40
2500	8	9601	City of Las Vegas; Underground Source through an Artesian Well; Municipal Sewage Treatment Plant and domestic	0.05	2-10-40
2501	8	9602	City of Las Vegas; Underground Source through Artesian Well; Irrigation and domestic	0.20	2-10-40
2502	8	9939	City of Las Vegas; Underground Source through Artesian Well; Municipal	0.23	2-10-40
2503	8	8173	City of Las Vegas; Underground Source through Artesian Well; Irrigation and domestic	0.15	2-13-40
2504	8	9940	City of Las Vegas; Underground Source through Artesian Wells; Fish Hatchery and domestic	1.25	2-13-40
2505	8	10422	Max Hafen, John Jensen and Leo M. Hardy; Indian Spring; Stockwatering	0.005	2-28-40
2506	8	9913	Nevada Gold, Inc.; Squaw Springs; Mining milling, and domestic	0.0123	3- 1-40
2507	8	9923	Nevada Gold, Inc.; Natural Spring; Mining, milling, and domestic	0.0123	3- 1-40
2508	8	9924	James Ryan; Live Oak Spring; Stockwatering	0.005	3- 9-40
2509	8	8721	Marion Yelland; South Millick Spring; Stockwatering	0.02	3- 9-40
2510	8	8769	Ely Water Company; Underground Source; Irrigation	0.223	3- 9-40
2511	8	7650	Ely Water Company; Murry Creek; Irrigation	2.0	3- 9-40
2512	8	8641	Ely Water Company; Underground Source; Municipal	0.67	3- 9-40
2513	8	8874	Town of Gardnerville; Underground Source through Wells; Municipal	3.5	3-11-40
2514	8	9936	The Glenbrook Company; Unnamed Creek; General domestic	1.01	3-11-40

2515	8	9937	The Glenbrook Company; Bliss Spring; Quasi-Municipal and General domestic	0.25	3-14-40
2516	8	8197	The Glenbrook Company; Glenbrook Creek and its Tributaries; Irrigation and domestic	0.20	3-14-40
2517	8	7657	H. E. Lewis; Unnamed Spring; Domestic and Tourist Camp	0.006	3-15-40
2518	8	8005	Pacific States Savings and Loan Company; Clear Creek; Irrigation	1.022	3-18-40
2519	8	9681	Charles Cecchini; Ramsey Well; Stockwatering	0.0031	3-28-40
2520	8	9864	Charles Cecchini; Unnamed Spring; Stockwatering	0.0035	3-28-40
2521	8	9838	Gold, Silver & Tungsten, Inc., Imigrant Springs; Mining, milling, and domestic	0.25	3-28-40
2522	8	10391	Richard H. Clough; Underground Source (well); Domestic	0.025	3-28-40
2523	8	9812	N. H. Getchell; Chase Spring; Mining, milling, and domestic	0.045	3-29-40
2524	8	9907	J. N. Bryan; Underground Source (well); Stockwatering	0.017	3-30-40
2525	8	9832	State of Nevada, Department of Highways; Underground Source through Artesian Well; Irrigation and domestic	0.50	4-19-40
2526	8	7470	Leo F. Schmitt; Dalton Spring; Stockwatering	0.016	4-23-40
2527	8	7471	Leo F. Schmitt; White Rock Spring; Stockwatering	0.016	4-23-40
2528	8	9593	Clifford Johnson; Easterly Silver Hill Spring; Stockwatering	0.009	4-30-40
2529	8	9594	Clifford Johnson; Westerly Fondaway Canyon Spring; Stockwatering	0.009	4-30-40
2530	8	5895	Charles, Leo J. and John V. Damele; Pine Creek; Irrigation and domestic	1.4739	5- 4-40
2531	8	9259	Charles F. Lee; Wilson Creek; Irrigation and domestic	0.172	5- 7-40
2532	8	9856	Russell Land & Cattle Company; Humboldt River; Irrigation, stockwatering and domestic	5.50	5- 7-40
2533	8	9465	United Cattle and Packing Company; Little Meadows Creek; Stockwatering and domestic	0.0625	5- 7-40
2534	8	9636	Nevada Consolidated Copper Company; Bird Creek; Power	6.5	5- 7-40
2535	8	10404	Standard Cyaniding Company; Antelope Creek; Mining and domestic	0.60	5- 7-40
2536	8	9929	George Parker; Underground Source (a well); Stockwatering and domestic	0.006	5-21-40

**CHAPTER XVI****Office Finances**

Statements showing receipts and disbursements of State Engineer's office accounts, and other accounts controlled by this office, for the period July 1, 1938, to June 30, 1940.

REPORT OF STATE ENGINEER

STATEMENT OF EXPENDITURES FROM APPROPRIATION FOR SUPPORT OF STATE ENGINEER'S OFFICE DURING THE PERIOD JULY 1, 1938, TO JUNE 30, 1940

Month and Year	Appropriation by Legislature	Salaries	Travel expense	Office expense	Equipment	Total
<b>1938</b>						
Balance July 1, 1938.....						\$13,158.43
July.....		\$675.00	\$120.21	\$71.65	\$66.80	\$933.66
August.....		675.00	176.95	88.04	278.60	1,218.59
September.....		675.00	266.17	65.73		1,006.90
October.....		675.00	228.43	126.02		1,029.45
November.....		675.00	165.19	100.75		940.94
December.....		675.00	507.84	255.04	305.80	1,743.68
Totals.....		\$4,050.00	\$1,464.79	\$707.23	\$651.20	\$6,873.22
Balance January 1, 1939.....						\$6,285.21
<b>1939</b>						
January.....		\$675.00	\$172.29	\$173.72		\$1,021.01
February.....		675.00	70.57	110.43		766.00
March.....		675.00	46.35	27.65		730.00
April.....		675.00	6.31	36.94	\$758.00	1,586.95
May.....		675.00	167.91	148.04	66.00	1,056.95
June.....		675.00	358.37	423.84	305.20	1,762.41
Totals.....		\$4,050.00	\$832.00	\$920.62	\$371.20	\$6,173.82
Reverted, June 30, 1939.....						\$111.39
<b>1940</b>						
July.....	\$25,500.00	\$675.00	\$48.83			\$723.83
August.....		675.00	139.92	\$187.61		1,002.53
September.....		675.00	159.35	120.75		955.10
October.....		675.00	79.01	80.07		834.08
November.....		675.00	61.92	64.74		801.66
December.....		675.00	243.27	81.46		999.73
Totals.....		\$4,050.00	\$732.30	\$534.63		\$5,316.93
Balance January 1, 1940.....						\$20,183.07
<b>1940</b>						
January.....		\$675.00	\$167.39	\$39.61	\$72.50	\$955.50
February.....		675.00	191.76	116.65	147.00	1,130.41
March.....		675.00	50.94	48.14	82.90	856.98

April.....	675.00	88.91	116.93	.....	880.84
May.....	675.00	108.90	80.26	.....	864.16
June.....	700.00	186.42	42.62	7.00	936.04
Totals.....	<u>\$4,075.00</u>	<u>\$794.32</u>	<u>\$444.21</u>	<u>\$310.40</u>	<u>\$5,623.93</u>

Balance June 30, 1940..... \$14,559.14

†Appropriation for support of State Engineer's Office not including statutory salary appropriation.

STATEMENT OF FEES COLLECTED BY STATE ENGINEER FROM JULY 1, 1938, TO JUNE 30, 1940

Month and year	Total fees received	Proofs of appropriation	Publications	Applications	Recording permits	Proof of work	Proof of completion of work	Proof of benefitual use	Protests	Clerical	Blue prints	Excess collections	Advance for certificates
<b>1938</b>													
July	\$560.00	.....	\$300.00	\$180.00	\$40.00	\$4.00	\$4.00	\$4.00	\$2.00	\$19.00	9.00	\$3.00	\$3.00
August	390.00	.....	137.50	82.50	100.00	5.00	5.00	6.00	3.00	21.00	8.00	39.00	1.00
September	302.00	.....	100.00	60.00	90.00	5.00	4.00	6.00	6.00	26.00	2.00	39.00	6.00
October	608.00	.....	37.50	57.50	375.00	.....	6.00	2.00	.....	21.00	5.00	.....	5.00
November	244.00	.....	37.50	22.50	140.00	5.00	6.00	2.00	.....	21.00	5.00	1.00	3.00
December	398.00	.....	175.00	110.00	40.00	9.00	3.00	1.00	5.00	34.00	7.00	1.00	3.00
Totals.....	\$2,502.00	\$10.00	\$837.50	\$512.50	\$785.00	\$28.00	\$22.00	\$19.00	\$21.00	\$141.00	\$32.00	\$76.00	\$18.00
<b>1939</b>													
January	\$363.50	.....	\$162.50	\$95.50	\$30.00	\$10.00	\$14.00	\$2.00	\$6.00	\$28.00	\$7.50	\$1.00	\$5.00
February	\$29.00	.....	87.50	52.50	20.00	16.00	23.00	19.00	1.00	48.00	7.00	24.00	11.00
March	468.00	.....	162.50	102.50	90.00	27.00	12.00	9.00	8.00	38.00	.....	.....	19.00
April	295.50	.....	112.50	67.50	50.00	6.00	3.00	5.00	2.00	25.50	14.00	.....	10.00
May	228.00	.....	100.00	60.00	10.00	5.00	12.00	21.00	2.00	13.00	1.00	.....	3.00
June	493.20	.....	225.00	140.00	53.00	2.00	3.00	.....	4.00	39.00	9.20	1.00	15.00
July	590.00	70.00	275.00	170.00	53.00	.....	3.00	1.00	2.00	11.00	2.00	1.00	5.00
August	212.50	.....	75.00	45.00	132.50	7.00	7.00	7.00	9.00	15.00	9.00	6.00	.....
September	575.00	10.00	100.00	60.00	230.00	6.00	6.00	3.00	3.00	25.00	4.00	132.00	.....
October	237.00	.....	137.50	97.50	10.00	3.00	3.00	4.00	3.00	34.00	4.00	7.00	1.00
November	87.50	.....	137.50	87.50	30.00	3.00	2.00	3.00	4.00	15.00	.....	.....	.....
December	629.10	.....	212.50	132.50	185.00	1.00	4.00	3.00	3.00	33.00	47.10	7.00	1.00
Totals.....	\$4,804.80	\$100.00	\$1,750.00	\$1,075.00	\$895.50	\$86.00	\$89.00	\$77.00	\$49.00	\$325.50	\$108.80	\$179.00	\$70.00
<b>1940</b>													
January	\$376.00	.....	\$75.00	\$45.00	\$147.00	\$2.00	\$3.00	\$11.00	\$3.00	\$44.00	\$23.00	\$15.00	\$8.00
February	186.00	.....	50.00	30.00	55.00	5.00	3.00	3.00	7.00	16.00	1.00	5.00	11.00
March	346.10	.....	150.00	90.00	10.00	23.00	13.00	5.00	1.00	34.10	3.00	.....	19.00
April	455.10	.....	175.00	105.00	70.00	11.00	8.00	7.00	3.00	25.00	43.10	.....	8.00
May	537.00	.....	187.50	122.50	138.00	21.00	5.00	5.00	3.00	46.00	5.00	.....	4.00
June	472.40	.....	175.00	105.00	120.00	7.00	6.00	1.00	2.00	49.40	7.00	.....	.....
Totals.....	\$2,372.60	.....	\$812.50	\$497.50	\$540.00	\$69.00	\$38.00	\$32.00	\$19.00	\$214.50	\$80.10	\$20.00	\$50.00

STATEMENT OF DISBURSEMENTS FROM STATE ENGINEER'S FUND FOR THE PERIOD JULY 1, 1938, TO JUNE 30, 1940

Month and year	Total disbursements	Deposited with State Treasurer	Paid for publications	Refunds	Recording certificates	Blue prints
<b>1938</b>						
July.....	\$349.43	\$253.50	\$75.00	\$3.00	\$3.00	\$14.93
August.....	572.00	215.00	262.50	84.50	6.00	
September.....	424.54	137.00	37.50	138.04	2.00	
October.....	607.00	474.50	62.50	64.00	6.00	
November.....	256.00	199.00	25.00	25.00	7.00	
December.....	395.00	205.50	112.50	76.00	1.00	
Totals.....	\$2,603.97	\$1,544.50	\$625.00	\$400.54	\$19.00	\$14.93
<b>1939</b>						
January.....	\$272.25	\$191.25	\$75.00	\$1.00	\$5.00	
February.....	328.31	183.00	87.50	24.00	6.00	\$27.81
March.....	373.00	286.50	62.50	.....	24.00	
April.....	354.50	166.00	112.50	75.00	1.00	
May.....	216.00	124.50	87.50	.....	4.00	
June.....	264.60	247.60	.....	2.00	15.00	
July.....	395.00	238.00	62.50	89.50	5.00	
August.....	486.00	297.00	237.50	17.50	4.00	
September.....	579.50	325.00	112.50	132.00	.....	
October.....	353.00	121.00	150.00	82.00	.....	
November.....	285.00	196.50	87.50	.....	1.00	18.91
December.....	594.96	385.05	75.00	113.00	3.00	
Totals.....	\$4,502.12	\$2,701.40	\$1,150.00	\$536.00	\$68.00	\$46.72
<b>1940</b>						
January.....	\$396.00	\$254.00	\$112.50	\$91.50	\$8.00	
February.....	343.10	192.50	212.50	30.00	11.00	\$20.10
March.....	541.18	316.95	100.00	1.00	16.00	17.58
April.....	295.55	250.55	.....	.....	.....	
May.....	512.50	343.00	162.50	.....	7.00	
June.....	456.40	293.90	162.50	.....	.....	
Totals.....	\$2,377.73	\$1,437.55	\$750.00	\$102.50	\$50.00	\$37.68

**STATEMENT OF RECEIPTS AND DISBURSEMENTS, JULY 1, 1938, TO  
JUNE 30, 1940**

Balance July 1, 1938.....	\$9,917.18	Disbursements July 1, 1938,	
Receipts July 1, 1938, to		to June 30, 1940.....	\$9,483.82
June 30, 1940.....	9,679.40	Balance June 30, 1940.....	10,112.76
	<u>\$19,596.58</u>		<u>\$19,596.58</u>

**CASH RECONCILEMENT**

Balance Carson Branch, First National Bank of Nevada,			
June 30, 1940.....	\$4,001.68		
Less outstanding checks.....	353.90		
	<u>\$3,647.78</u>	\$3,647.78	
Advances, Humboldt River Adjudication, outstanding.....		\$5,214.98	
Revolving Fund .....		1,250.00	
Balance June 30, 1940.....		<u>\$10,112.76</u>	

COLORADO RIVER COMMISSION, STATEMENT OF EXPENDITURES FROM APPROPRIATION,  
JULY 1, 1938, TO AUGUST 4, 1939

Month and year	Total disbursements	Compen-sations	Travel expense	Telephone and telegraph	Supplies and equipment	Publications and printing	Miscel-laneous		
Balance July 1, 1938.....								\$9,714.20	
July.....	\$184.81		\$87.99	\$19.42	\$66.80	\$10.60			
August.....	555.92	\$80.00	351.01	16.81	34.50	11.10	\$62.50		
September.....	659.80	605.00	6.60	2.89	4.51	40.80			
October.....	117.87		69.52	3.35		45.00			
November.....	335.81	30.00	255.14	2.00	3.67	45.00		*68.89	
December.....	143.26		130.89	2.52	9.85				
Totals.....	\$1,997.47	\$715.00	\$901.15	\$46.99	\$119.33	\$152.50	\$62.50	\$9,783.09	
Balance December 31, 1938.....								\$7,785.62	
1939									
Balance January 1, 1939.....								\$7,785.62	
January.....	\$359.94	\$80.00	\$242.77		\$37.17				
February.....	1,074.84	30.00	950.84	\$28.56	13.17	\$50.35	\$1.92		
March.....	38.45			23.55	2.11	12.79			
April.....	452.30	70.00	305.58	14.22			62.50		
May.....	1,296.33	485.00	768.97	42.35					
June.....	2,546.73	405.00	2,090.48	35.65	18.66				
July.....	1,332.66	655.00	457.74	169.92			40.00		
August.....	1,635.19	375.00	1,256.91	1.28					
Totals.....	\$8,537.50	\$1,910.00	\$6,073.29	\$315.54	\$71.11	\$63.14	\$104.42	\$751.88	
					Transfer from Power Fund...			\$751.88	
								\$0.00	

\*Receipts. †Overdrawn.

**HUMBOLDT RIVER DISTRIBUTION, STATEMENT OF EXPENSES FROM  
JULY 1, 1939, TO JUNE 30, 1940**

Month and year	Salaries	Travel expense	Miscellaneous expense	Total
<i>1938</i>				
July .....	\$2,345.00	\$535.65	\$56.76	\$2,937.41
August .....	1,065.00	556.18	39.39	1,660.57
September .....	816.60	469.82	62.01	1,348.43
October .....	637.25	233.37	27.10	897.72
November .....	483.00	56.50	35.87	575.37
December .....	615.00	346.33	22.99	984.32
Totals .....	\$5,961.85	\$2,197.85	\$244.12	\$8,403.82
<i>1939</i>				
January .....	\$310.00	\$16.00	\$6.98	\$332.98
February .....	304.00	9.58	8.01	321.59
March .....	360.00	4.48	37.93	402.41
April .....	918.70	35.85	187.90	1,142.45
May .....	1,637.00	98.09	89.55	1,824.64
June .....	1,924.00	783.51	105.25	2,812.76
July .....	1,695.00	472.27	110.79	2,278.06
August .....	1,158.95	504.40	65.71	1,729.06
September .....	851.90	716.54	48.36	1,616.80
October .....	755.00	61.27	32.47	848.74
November .....	553.00	305.99	94.99	953.98
December .....	315.00	53.25	7.13	375.38
Totals .....	\$10,782.55	\$3,061.23	\$795.07	\$14,638.85
<i>1940</i>				
January .....	\$310.00	\$150.75	\$34.62	\$495.37
February .....	365.00	61.75	6.68	433.43
March .....	430.00	23.12	9.62	462.74
April .....	833.00	36.44	171.16	1,040.60
May .....	1,597.00	416.97	62.54	2,076.51
June .....	1,989.00	325.61	109.62	2,424.23
Totals .....	\$5,524.00	\$1,014.64	\$394.24	\$6,932.88

**LITTLE HUMBOLDT RIVER DISTRIBUTION, STATEMENT OF  
EXPENDITURES FROM JULY 1, 1938, TO JUNE 30, 1940**

Month and year	Salaries	Travel expense	Miscellaneous expense	Total
<i>1938</i>				
July .....	\$240.00	\$61.46	\$6.10	\$307.56
August .....	248.00	45.22	5.58	298.80
September .....	248.00	73.71	5.58	327.29
October .....	160.00	51.45	55.60	267.05
November .....	7.50	.....	.....	7.50
December .....	5.00	.....	.....	5.00
Totals .....	\$908.50	\$231.84	\$72.86	\$1,213.20
<i>1939</i>				
January .....	\$5.00	.....	.....	\$5.00
February .....	5.00	.....	.....	5.00
April .....	120.00	\$52.00	\$2.53	174.53
May .....	210.00	63.07	4.72	277.79
June .....	488.00	136.76	22.58	647.34
August .....	248.00	59.43	9.08	316.51
September .....	248.00	44.21	5.58	297.79
October .....	240.00	24.85	5.40	270.25
November .....	248.00	67.95	5.58	321.53
December .....	125.00	35.69	2.70	163.39
Total .....	\$1,937.00	\$483.96	\$58.17	\$2,479.13
<i>1940</i>				
February .....	\$10.00	.....	.....	\$10.00
March .....	\$37.00	\$16.80	.....	53.80
April .....	248.00	106.20	\$14.58	368.78
May .....	324.00	110.72	82.19	516.91
June .....	414.00	148.51	6.93	569.44
Totals .....	\$1,033.00	\$382.23	\$103.70	\$1,518.93

**CURRENT AND DUCKWATER CREEKS, STATEMENT OF EXPENDITURES FROM JULY 1, 1938, TO JUNE 30, 1940**

Month and year	Salaries	Miscellaneous expense	Total
<i>1938</i>			
July .....	\$195.00	\$4.39	\$199.39
August .....	198.25	4.46	202.71
September .....	195.00	4.39	199.39
October .....	195.00	4.39	199.39
Totals .....	\$783.25	\$17.63	\$800.88
<i>1939</i>			
May .....	\$99.00	\$2.25	\$101.25
June .....	202.00	11.96	213.96
July .....	240.00	10.90	250.90
August .....	248.00	5.58	253.58
September .....	248.00	5.58	253.58
October .....	267.50	5.38	272.88
Totals .....	\$1,304.50	\$41.65	\$1,346.15
<i>1940</i>			
May .....	\$165.00	\$3.71	\$168.71
June .....	165.00	3.71	168.71
Totals .....	\$330.00	\$7.42	\$337.42

**PAHRANAGAT LAKE DISTRIBUTION, STATEMENT OF EXPENDITURES FROM JULY 1, 1938, TO JUNE 30, 1940**

Month and year	Salaries	Travel expense	Miscellaneous expense	Total
<i>1938</i>				
July .....		\$14.80		\$14.80
August .....	\$168.00		\$26.33	194.33
September .....	168.00	76.47	4.88	249.35
October .....	133.00	54.63	2.99	190.62
Totals .....	\$469.00	\$145.90	\$34.20	\$649.10
<i>1939</i>				
March .....	\$42.00	\$23.56	\$0.95	\$66.51
August .....	189.00	31.80	4.25	225.05
September .....	217.00	27.76	4.88	249.64
October .....	210.00	70.57	4.25	284.82
Totals .....	\$658.00	\$153.69	\$14.33	\$826.02

**MUDDY RIVER DISTRIBUTION, STATEMENT OF EXPENDITURES  
FROM JULY 1, 1938, TO JUNE 30, 1940**

Month and year		Salaries	Miscellaneous expense	Total
<i>1938</i>				
July .....		\$45.00	\$1.01	\$46.01
August .....		118.50	2.67	121.17
September .....		46.50	1.04	47.54
October .....		45.00	1.01	46.01
November .....		15.50	.35	15.85
December .....		15.00	.34	15.34
Totals .....		\$285.50	\$6.42	\$291.92
<i>1939</i>				
January .....		\$15.50	\$5.35	\$20.85
February .....		15.50	.35	15.35
March .....		14.00	.31	14.31
April .....		15.50	.35	15.85
May .....		15.00	.34	15.34
June .....		46.50	1.05	47.55
July .....		45.00	1.01	46.01
August .....		46.50	1.05	47.55
September .....		46.50	1.05	47.55
October .....		45.00	1.01	46.01
November .....		15.50	.....	15.50
December .....		15.00	.....	15.00
Totals .....		\$335.50	\$11.87	\$347.37
<i>1940</i>				
January .....		\$15.50	.....	\$15.50
February .....		15.50	.....	15.50
March .....		14.50	.....	14.50
April .....		15.50	.....	15.50
May .....		15.00	.....	15.00
June .....		46.50	\$1.05	47.55
Totals .....		\$122.50	\$1.05	\$123.55

**WHITE RIVER DISTRIBUTION, STATEMENT OF EXPENDITURES  
FROM JULY 1, 1938, TO JUNE 30, 1940**

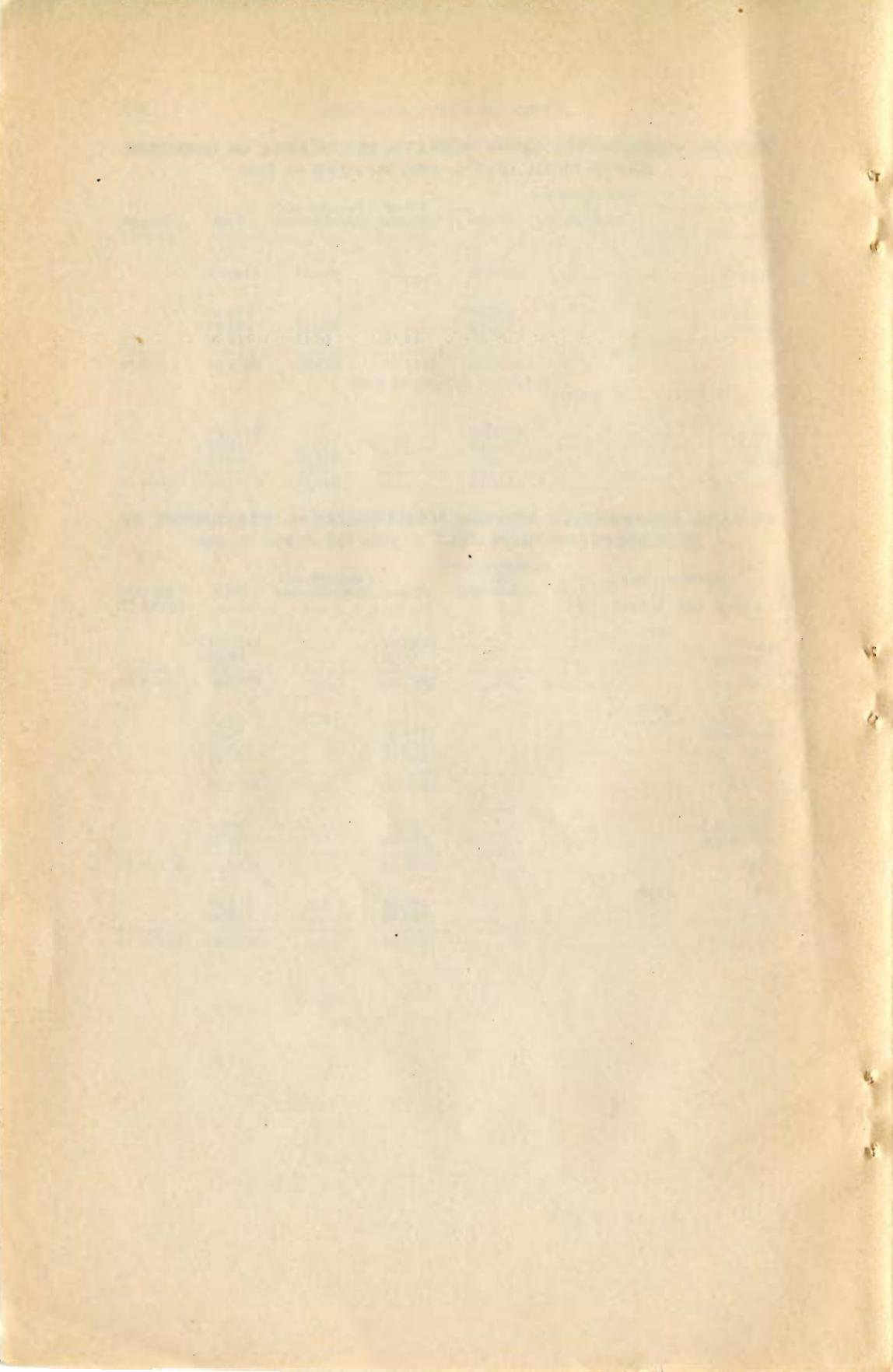
Month and year		Salaries	Travel expense	Miscellaneous expense	Total
<i>1938</i>					
August .....		\$3.50	\$3.92	.....	\$7.42
September .....		7.00	7.10	.....	14.10
Total .....		\$10.50	\$11.02	.....	\$21.52
<i>1939</i>					
October .....		\$30.00	.....	.....	\$30.00
<i>1940</i>					
May .....		\$60.00	.....	\$1.35	\$61.35
June .....		60.00	.....	1.35	61.35
Totals .....		\$120.00	.....	\$2.70	\$122.70

**NEVADA COOPERATIVE SNOW SURVEYS, STATEMENT OF DISBURSEMENTS FROM JULY 1, 1938, TO JUNE 30, 1940**

Month and year	Appropriation by Legislature	Wages	Travel expense	Supplies and miscellaneous	Total	Balance
Bal. July 1, 1938.....						\$524.15
<i>1938</i>						
October .....		\$54.00		\$95.13	\$149.13	
<i>1939</i>						
January .....		\$28.00			\$28.00	
March .....		165.00	\$56.87	\$10.43	232.30	
May .....		57.50	46.19	10.21	113.90	
Totals .....		\$250.50	\$103.06	\$20.64	\$374.20	*\$0.82
*Reverted to General Fund.						
July 1, 1939.....	\$1,000.00					
<i>1940</i>						
March .....		\$220.00			\$220.00	
April .....		216.25			216.25	
June .....				\$54.68	54.68	
Totals .....		\$436.25		\$54.68	\$490.93	\$509.07

**NEVADA COOPERATIVE STREAM MEASUREMENTS, STATEMENT OF EXPENDITURES FROM JULY 1, 1938, TO JUNE 30, 1940**

Month and year	Appropriation by Legislature	Wages	Supplies and miscellaneous	Total	Balance
Balance July 1, 1938.....					\$1,109.77
<i>1938</i>					
August .....		\$127.44		\$127.44	
December .....		66.00		66.00	
Totals .....		\$193.44		\$193.44	\$768.28
<i>1939</i>					
January .....			\$7.50	\$7.50	
February .....		\$75.30		75.30	
May .....		271.00		271.00	
June .....		562.53		562.53	
Totals .....		\$908.83	\$7.50	\$916.33	
July 1, 1939.....	\$1,500.00				
September .....		\$7.50		\$7.50	
November .....		175.00		175.00	
Totals .....		\$182.50		\$182.50	\$1,317.50
<i>1940</i>					
February .....		\$29.00		\$29.00	
May .....		190.00		190.00	
Totals.....		\$219.00		\$219.00	\$1,098.50



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