SADLER SUPP_6

SADLER SUPP_6

Sadler Ranch

Shipley Hot Spring Historic and Current Discharge, and Evidence for Impact to Flow Due to Groundwater Pumping in Diamond Valley, Eureka County, Nevada

Prepared by:

Dwight L. Smith, PE, PG
Principal Hydrogeologist
Interflow Hydrology, Inc.
Truckee, CA

Exhibit 108

Prepared for:

Sadler Ranch, LLC
Eureka County, NV

September 11, 2013

Rebuttal Evidence to Protestants Eureka County and Etcheverry Family Limited Partnership Exhibit 302 prepared by D. Bugenig and M. Tumbusch, dated September 13, 2013

Prepared by:

Dwight L. Smith, PE, PG
Principal Hydrogeologist
Interflow Hydrology, Inc.
Truckee, CA

Exhibit 189

Prepared for:

Sadler Ranch, LLC
Eureka County, NV

October 23, 2013

Dwight L. Smith, P.E., P.G.
Principal Hydrogeologist

InterFlow Hydrology, Inc.
Hydrogeology and Water Resources Consulting

Exhibit 107

Education

M.S. - Hydrogeology, University of Nevada, Reno, 1996
B.S. - Geological Engineering, Colorado School of Mines, 1988

Professional Registration

P.E. - Professional Geological Engineer in Nevada, PE No. 11906
H.G. - Certified Hydrogeologist in California, HG No. 194
P.G. – Professional / Registered Geologist in California and Arizona, PG No. 5974 and 28482
W.R.S. -Water Right Surveyor in Nevada, WRS No. 1045
Formerly Registered as a C.E.M. (Certified Environmental Manager) in Nevada

Employment Summary

2002-Present:	Principal Hydrogeologist, InterFlow Hydrology, Inc., Truckee, CA
2001-2002:	Senior Associate, Kennedy/Jenks Consultants, Reno, Nevada
1998-2001:	Associate Hydrogeologist, Stantec Consulting, Inc., Reno, Nevada
1995-1998:	Senior Hydrogeologist, Stantec Consulting, Inc. (formerly SEA, Inc.)
1990-1995:	Hydrogeologist, SEA, Inc, Reno, Nevada
1988-1990:	Hydrogeologist, Ron Barto & Associates, Big Bear Lake, CA

Professional Summary

Mr. Smith has 25 years of experience as a consulting hydrogeologist, specializing in groundwater and surface water resource evaluations in the Western U.S., primarily in Nevada and California.

His professional experience includes: water resources development feasibility, water resources management, regional and watershed scale hydrogeologic assessments, groundwater recharge and sustainability evaluations, well design and aquifer pumping assessments, water rights surveying and research, design of dewatering systems, geochemical evaluations to assess sources of water, computer-aided groundwater and surface water flow modeling, stream flow gaging, stream and groundwater interaction studies, spring evaluations, water quality management plans, and environmental impact evaluations.

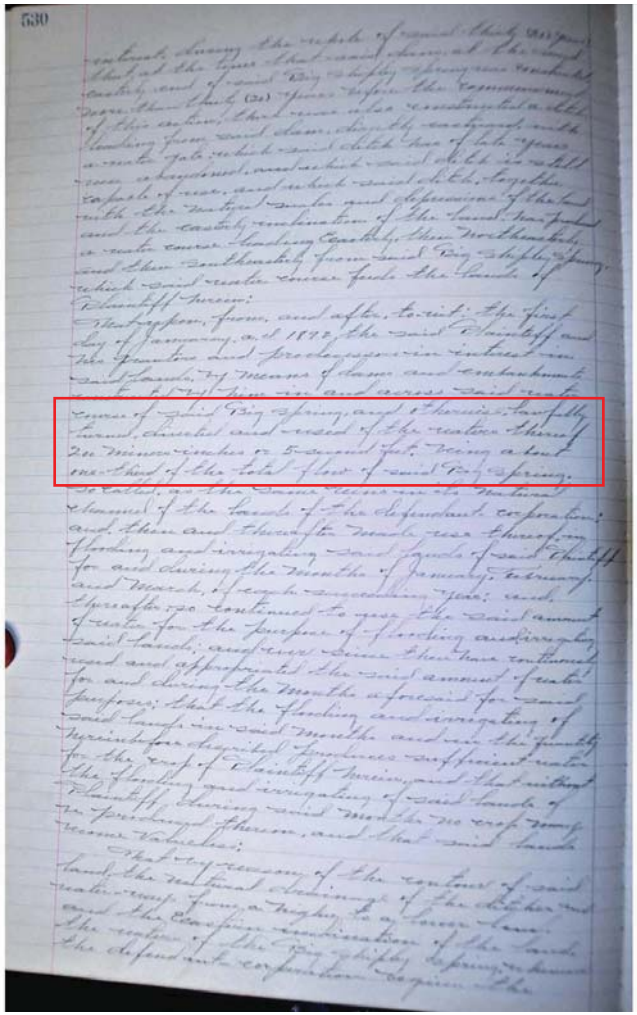
Mr. Smith has consulted to a wide range of clients, including municipalities; city, county, state and federal agencies; regional water authorities; private industries including power, mining and manufacturing; resort and recreational developments; commercial and residential establishments; private land trusts; and to other civil, geotechnical, and environmental engineering firms.

Frank Romano, Plaintiff vs. Edgar Sadler and Huntington and Diamond Valley Stock and Land Company, a Corporation, Defendant: Stipulation

Book of “Miscellaneous”transactions at the Eureka County Courthouse. Year 1913, p527-534.

- Photos of complete original document, including map
- Partial transcript

Exhibit 138



(p529) (52) East M.D.B.&M.:.....That there is situate on said land of said defendant corporation the Big Shipley Spring in the East half (E1-2).....: that the proper name of said spring is the Big Shipley Spring: that there are certain dams and ditches on said lands of said defendant-corporation which are used to divert the waters of said Big Shipley Spring by said defendant-corporation, **for the purpose of irrigating the irrigable portions of said lands, heretofore described of said defendant-corporation and that the main system of said dams and ditches, on said lands were constructed by the predecessors in interest of said defendant-corporation more than thirty (30) years before the commencement of this action: that the main dam, at the eastern end of said Big Shipley Spring was constructed by the said predecessors in interest of said defendant-corporation, more than thirty (30) years before the commencement of this action, and has been continuously maintained at the eastern end of said Big Shipley Spring, by the defendant-corporation herein, and its predecessors and grantors in** (end of page 529)

(p530) **interest during the whole of said thirty (30) years that at the time that said dam at the said easterly end of said Big Shipley Spring was constructed more than thirty (30) years before the commencement of this action**, there was also constructed a ditch leading from said dam directly eastward with a water gate, which said ditch has of late years been abandoned, and which said ditch is still capable of use and which said ditch, together with the natural swales and depressions of the land and the easterly inclination of the land, has produced a water course leading Easterly, then northeasterly and then Southeasterly from said Big Shipley Spring, which said water course feed the lands of Plaintiff herein: That upon , from, and after, to wit: the first day of January, a.d. 1892 the said Plaintiff and his grantors and predecessors in interest in said lands, by means of dams and embankments constructed by him in and **across said water course of said Big Spring, and otherwise, lawfully turned, directed and used of the waters thereof 200 miners inches or 5 second feet, being about one-third of the total flow of said Big Spring**, so called , as the same runs in its natural channel of the land of the defendant-corporation; and then and thereafter made use thereof, in flooding and irrigating said lands of said plaintiff for and during the months of January, February, and March, of each succeeding year: and, thereafter**, so continued to use the said amount of water for the purpose of flooding and irrigating said land: and ever since then have continuously used and appropriated the said amount of water for and during the months of foresaid for said purposes: that the flooding and irrigation of said lands in said months and in the quantity hereinbefore described produces sufficient water for the crop of Plaintiff herein, and that without the flooding and irrigating of said lands of Plaintiff during said months no crop may be produced thereon, and that said lands become valueless**:

1917 Application #4273 to the Nevada State Division of Water Resources by Matilda Eccles

All documents cited within this exhibit can be found in Sadler file #4273 at the Nevada State Division of Water Resources

Carson City, Nevada

Exhibit 142

A. Yes, sir.
Q. Do you know if there was an agreement between Romano and the Huntington and Diamond Valley Land and Stock Company, by H. J. Sadler as Vice-President and Edgar Sadler as the agent for the R. Sadler Estate in regard to the waters from Big Shipley Spring?
A. Yes, sir.
Q. Was that in the form of a stipulation?
A. Yes, sir.
Q. Have you a copy of that stipulation between these parties?
A. Yes, sir.
Q. I will show you a document and ask you if that is the stipulation to which you refer. Is that the stipulation?
A. Yes, this is the one.
Q. We offer this stipulation in evidence at this time as a part of the testimony and evidence offered by Mrs. Eccles.
(Offers stipulation , Exhibit "a")
Now, according to this stipulation you were entitled to five second feet of water, were you Mrs. Eccles?
A. Yes, sir.
Q. And do you know whether or not this five second feet of water has been used by yourself and by Mr. Romano for the past fifte or twenty years?
A. It has, yes sir, it has.
Q. You state that you had only 360 and title to that much?
A. Yes, and 80 more or 420 I have a title to. I bought the 360 acres from Romano and the 80 from the government.
Q. Has all of the water to which you claim title under this stipulation been used on the land owned by you?
A. Yes, sir, it has.

15 – 20 years prior to
1917 = 1887 - 1902

Notes on

HE RANCHES ON THE ROAD BETWEEN EUREKA AND
INERAL HILL, EUREKA COUNTY, NEVADA.
aken by H. M. Payne, Nov. 18, 1912.)

After leaving Eureka, the first ranch on the road to Mineral Hill is the Sulphur Ranch owned by Romano, and irrigated from springs by that name. The springs are small and all of the water from them is appropriated during the summer. The land under cultivation from this source is grain and alfalfa, and will not exceed 40 acres in area. There is some pasture in the ranch but this is probably not irrigated.

About three miles further is the home ranch of Romano, who has a small spring for irrigation, the extent of the irrigated land being 35 acres. Most of this is alfalfa and grain. Mr. Romano has some natural meadow land fenced and may cut a little hay from it, but does not irrigate it.

Three miles beyond Romano's home ranch is the ranch of Wallace Bailey, who has 100 or more acres under cultivation, and is irrigated from Bailey Spring. There is a reservoir at the spring to control the means of using the water. This is an old right and there is no other user on the source. The owners have filed proof of appropriation No. 01104 on this source and should be granted a certificate.

Two and one half miles beyond Bailey's is the Sadler Ranch, which is irrigated from a large spring known as the Big Shipley Spring. I intended to take an accurate measurement of this source, but was unable to do so on account of there being a break in the dam at the reservoir, and the water not confined to any one channel. By an estimate, I should place the flow of this spring at about 8 sec. ft. or a little more. The reservoir used in connection with this source is quite large, covering an area of about 2 acres. The acreage of land under cultivation from this source is hard to determine. Mr. Edgar Sadler informed me that there was nearly 3000 acres of land in the ranch, about 250 acres of which is alfalfa, grain and garden, the rest being meadow land, part of which is cut for hay and the remainder being used for pasture. Mr. Sadler puts up several hundred tons of hay but is unable to tell how many acres is cut. Mr. Sadler and Mr. Romano have recently had some contention regarding the use of this water. Romano has some land down in the valley below Sadler's and for some years has received the benefit of the waste water from Sadler's field when the latter is irrigating. In the winter time the water is turned down throug Sadler's ranch and finally reaches this land of Romano's. At the present time, Romano is endeavoring, through the courts, to gain a title to a portion of the water from this spring.

Four miles above Sadler's, is the ranch of John Siri, who has a spring which furnishes water for the irrigation of 50 to 100 acres of land, and like the ranches previously mentioned is an old right dating back 30 years or more.

Seven miles above Siri's, is the Scott Ranch which has recently been purchased by Joseph Flynn of Mineral Hill. There is a good spring here, but it is situated so low that water must be pumped from it to the land for irrigation. There is only about 25 acres under cultivation at present, but Mr. Flynn states that he intends breaking up a great deal more and putting in alfalfa. The right is an old one

Exhibit 145

WATER-SUPPLY CARD

No. 1.- Eureka County.

SOURCE BIG SHIPLEY SPRING.

DATE	POINT OF MEASUREMENT	GAGER'S NAME	AMOUNT	METHOD
Taken from notes that are in the back of Eureka County field book No. 8.-				

11/18/12	At spring.	H.M. Payne.	8 cfs.	

REGISTRY RETURN RECEIPT. Form 1548.

Received from the postmaster registered article, the original number of which appears on the reverse side of this card.

Date of delivery DEC 1 1913 191__
(To be filled in by person signing receipt.)

Huntington & Diamond Valley S & L C
(Signature or name of addressee.)

J L Dart
(Signature of addressee's agent.)

November 29th, 1913.

Huntington and Diamond Valley Stock and Land Company, Applicant,
Care Henderson &

and

Mrs Louisa Dacier, Protestant,
310 Mountain Avenue,
Carson City, Nevada.

Exhibit 137

You and each of you are hereby notified that I have this day denied application No. 2879, filed by the above applicant, for the waters of the above source, on the ground that the waters of Big Shipley Spring are entirely appropriated at this time, and for the further reason that the applicant failed, within the time given by the State Engineer, to comply with an order of the State Engineer to produce additional evidence in support of the application. The latter reason is not embodied in the original endorsement of denial.

Yours very truly,

State Engineer.

K/A.L.

Detach Receipt here.

INFORMATION.

To obtain a receipt showing delivery, indorse the article, across its face, "Receipt desired." A check mark (✓) or (✓) in the space after the words "Receipt desired," the letter "A" in the space after the words "Delivery restricted to addressee in person," or the letter "O" after the words "Delivery restricted to addressee or order," indicates that a return receipt is desired, or that delivery is restricted as stated. The absence of a check mark or of the letters "A" and "O" indicates that no return receipt is desired and that delivery is not restricted.

Letter / Parcel No. 2328 ~~2499~~ P. O., 2699 191 , from

Received for registration

addressed to Huntington & Diamond Valley

Receipt desired ______ Delivery restricted { To addressee in person / To addressee or order
(See printed information on this receipt.)

1st class postage prepaid. ______ Postmaster, per

SEP. 23, 1913.

Big Shipley Spring,

No. 2679,

Mr. H.J. Sadler,
Vice Prest., Huntington & Diamond Valley
Land & Stock Company,
Huntington, Elko County, Nevada,

Dear Sir:--

Referring to your application No. 2679 to appropriate forty-five cubic feet per second of water from Big Shipley Spring, situated in the NE¼ of the SE¼ of Section 23, Township 24 North, Range 52 East, M.D.B & M.

I have made an examination on the premises and estimated the amount of water available from Big Shipley Spring and the result of my investigation is such as to lead me to list your application for denial, on the ground that there is no unappropriated water in that source.

The water, amounting to approximately seven or eight cubic feet per second, is ditched to several parts of the ranch known as the "Sadler Ranch" and is used for raising crops on the sections designated in your application to be irrigated. In an indirect way I learned ~~that~~ of a conflict over the title to the lands enumerated in your application upon which the water is to be used, but this office cannot consider that phase of the question.

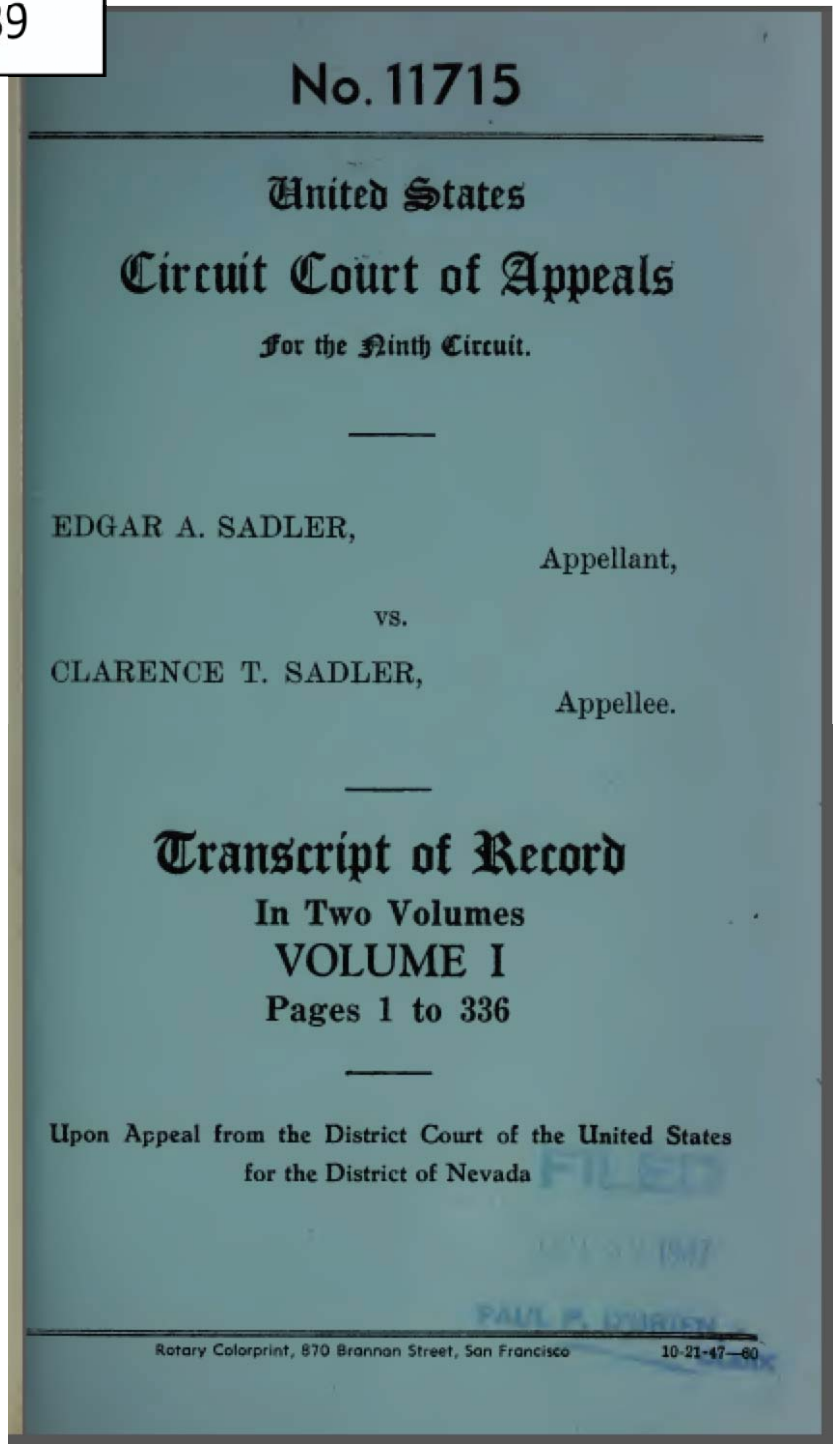
The fact that the water is used beneficially under a title dating back beyond the year 1905 is sufficient for this

Exhibit 139

Sadler vs. Sadler
1947

United States Circuit Court of Appeals for the 9th Circuit

Contents:
- Photographs of selected pages



No. 11715

United States

Circuit Court of Appeals

For the Ninth Circuit.

EDGAR A. SADLER,
Appellant,

vs.

CLARENCE T. SADLER,
Appellee.

Transcript of Record

In Two Volumes

VOLUME I

Pages 1 to 336

Upon Appeal from the District Court of the United States for the District of Nevada

FILED

PAUL P. O'BRIEN

Rotary Colorprint, 870 Brannan Street, San Francisco 10-21-47—60

(Testimony of Clarence Sadler.)

if he would pay interest and taxes on the same to the Bank as they could not run the same at a profit.

I am sending you the data that they sent down to me to send to you send their return to the ranch. They did not take any trip to California as from what Edgar said his expenses were $250 more than he received from the Legislature and that they did not have the money so much for things in general and I guess Ethel was sore because I told her that you were down in Los Angeles and they had better send the data to you if they did not want to consider the proposition. It looks to me as if they have things tied up and now worrying about cash.

No snow in the mountains and water will sure be scarce this year. Things right at present is sure dry and conditions do not look good. Mining is sure at a stand still and not much doing. Little work in the office nothing else there will close with love from us all to you, Reba and Bruce, Edward would not go along on the ranch with them. Violet did not like to come up to the house because she could not run wild so stayed down at the hotel. Ethel sure did the Society and did not look much after Violet but let her make out for herself. Hoping that you are all well and enjoying good health.

Your Brother,

/s/ ALFRED.

(Testimony of Clarence Sadler.)

Sadler Ranch in Diamond Valley, Eureka County, Nevada, known as the Diamond Valley Ranch.

Patented 3120 Acres.

160 Acres in Alfhalfa.

200 acres in tame hay.

80 acres used for garden

300 acres for pasture.

600 acres covered by spring and resvoir.

Balance in pasture and wild hay.

Springs supply 13 second feet of water which runs in the resvoir and ditches. Range land in neighborhood which belongs to Government but used to range cattle from long usuage will run about 600 hundred head of cattle which will have to feed in spring and hard winters.

Ranch could cut 1500 tons of hay but some of the fields need reseeding to bring this up to condition.

They want $65000 Cash for same.

Commission is not included.

The cattle is not included.

A mortgage of $13500 is now on the property held by Federal Land Bank. Therefore price of ranch in cash would be $65000—$13500=$51,500 cash.

[Letterhead Nevada State Legislature, Thirty-fifth Session.]

Sadler Ranch in Diamond Valley, Eureka Co. Nevada consists of 3120 acres of patented land, 200 acres of tame hay the balance in pasture and wild hay, running spring of 13 second feet.

UNITED STATES DEPARTMENT OF THE INTERIOR

THERMAL SPRINGS IN THE UNITED STATES

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 679—B

Exhibit 121

Data on thermal springs in the United States—Continued

Nevada—Continued

[See pl. 15]

Map no.	Location	Name	Geology	Temperature (° F.)	Approximate discharge (gallons a minute)	References [1]	Remarks
	Eureka County—Continued						
91	Diamond Valley, sec. 5, T. 25 N., R. 53 E.	Flynn ranch springs [2]	Alluvium, probably artesian structure.	69–78	10	174	Deep pool and minor springs; irrigation.
91a	Diamond Valley, sec. 6, T. 24 N., R. 53 E.	Siri ranch spring [2]	do	87	300	174	Irrigation.
91b	Diamond Valley, sec. 23, T. 24 N., R. 52 E.	Sadler Springs	Alluvium at base of mountains of faulted Paleozoic rocks.	106	5,000	166, p. 152; 169, p. 199; 174.	Irrigation; formerly Big Shipley Springs.
91c	Diamond Valley, sec. 36, T. 23 N., R. 52 E.	Sulphur Springs ranch springs.[2]	do	74	20	174	Irrigation.
91d	East side of Diamond Valley	Jacobson ranch springs [2]	do	71–75	900	174	Do.
92	West side of Grass Valley, sec. 15, T. 24 N., R. 47 E.		do	Hot	Small	174	Several springs; stock water.
93	East side of Grass Valley, sec. 33, T. 24 N., R. 48 E.		do	do	do	174	Several springs; not used.
93a	Antelope Valley, 35 miles southwest of Eureka, sec. 5, T. 19 N., R. 50 E.	Bartine Hot Springs [2]	Lake beds near mountains of faulted Paleozoic rocks.	105–108	10	174	2 springs on large tufa knoll; artesian well of hot water nearby.
93b	Antelope Valley, 45 miles southwest of Eureka, sec. 28, T. 18 N., R. 50 E.	Clobe Hot Spring	Alluvium near hills of faulted lava.	142	100	174	Stock water.
93c	Head of Fish Creek, sec. 7, T. 16 N., R. 53 E.	Sara ranch springs	Alluvium, probably artesian structure.	66	4,000	174	About 20 deep pools in area ½ mile in diameter; irrigation.
	White Pine County						
94	North end of Schell Creek Mountains, 15 miles southeast of Currie, sec. 27, T. 26 N., R. 65 E.	Collar and Elbow Spring	Valley alluvium	92	20	104, pp. 44*, 49	Not used; tufa deposit.
95	Near Egan Canyon 1¼ miles southwest of Cherry Creek railroad station, T. 23 N., R. 63 E.	Cherry Creek Hot Springs	Valley alluvium near Paleozoic rocks.	118–135	40	104, p. 48	3 springs; bathing.
96	1¼ miles southwest of Cherry Creek railroad station, T. 23 N., R. 63 E.	Schellbourne Hot Springs	do	124		104, pp. 43*, 48	2 springs; bathing, irrigation.
97	Steptoe Valley, 6 miles north of Melvin, sec. 16, T. 22 N., R. 63 E.	Borchert John Spring	Talus slopes of mountains	66	800	104, pp. 43*, 49	Irrigation.

“Eureka Memories”

A series of interviews with fourteen individuals and families in Eureka, Nevada
1993

Oral histories conducted and edited by Robert D. McCracken

Eureka County History Project
Eureka County, Nevada

Contents:

- Photographs of selected pages

Exhibit 132

bottom to knock the silt and the moss out, to clean them with this ditcher. As the moss and silt were loosened, they would be flushed down the ditch and out by the water.

CS: That was warm water too. That probably created more moss.

FS: Yes. They have big ditches out from this huge spring. It's a big spring — about 12 second feet of water. That's a lot of water.

CS: That was Floyd's big bathtub. He'd go up there and take a bath in the winter just the same as in the summer.

RM: Does the spring still flow?

FS: Oh, yes.

RM: The pumping hasn't stopped its flow?

FS: I don't think so — not that they know of yet. They keep a check on it.

RM: What are some more details of the work that went on there?

FS: Well, I had to work in the hayfield too, and when we put up the hay he had a small crew, but they ran a long time.

CS: What do you call a small crew?

FS: A small crew was 2 mowing machines, 2 buck rakes, one 14-foot hay rake and a stacker team — 6 men and the stacker. It takes 7 men for the crew.

RM: And quite a number of horses.

FS: Oh, yes. Each teamster changed horses at noon.

RM: Oh, you only worked a horse a half a day?

FS: That's right. It's hard work. The first 2 years I was there in the haying season, Floyd Sadler and I drove the mowing machines. One year I recall we mowed 70 days without a break. I mowed hay without a stop 7 days a week.

RM: That's a lot of hay.

FS: That's a lot of hay and a lot of time. The next year, I ran a buckrake in the hayfield, and the next year I stacked for him. I did all the stacking. I was trying to gain a little more experience in the various phases of ranching.

CS: And then you rode in the fall and you broke horses.

FS: Oh, I didn't break any horses for Sadlers.

CS: I thought you broke horses.

FS: One work horse is all I broke for Sadlers. I didn't break any horses there.

RM: You've broke horses though?

FS: Oh, I've broke horses.

CS: Oh, land!

RM: Tell me about breaking horses.

FS: It was a whole lot different than today because all the horses that we broke in those days were raised out on the range, and we didn't break them until they were 4 or 5 years old. So they were wild. It involved quite a little hassle to get them gentled enough that you could get on or off them or put your saddle on or whatever you needed to do. It was hard work and dangerous work. It was a different process. Now most of the horses are gentled from a baby colt so they're not afraid. Half of your problem in the early days was getting a

you're going to get that frost in June, usually. But this year we went ahead; we got with the program. We got stung, too.

FS: Yes. [Laughs]

CS: We had to replant the corn and the squash and the beans. The spuds survived somewhat, but they're pretty sorry — kind of anemic looking. But we garden. We have a big garden all over up here.

FS: In some of the more protected areas back in these canyons they don't get that much frost, and some of them grow some fruit and a few other things. But overall, it is livestock country.

RM: How many cuttings of hay do you get?

FS: We get 2 cuttings of alfalfa and one of native hay.

RM: And about how many tons of alfalfa do you get to the acre here, would you say?

FS: I don't really know.

RM: Would you get less than Diamond Valley or would it be about the same?

FS: I think a little less, because they let the hay mature a little more here and they figure on 2 crops. Over there they cut it a little early but they figure on 3 crops. They might get a little better production per crop; I don't know.

RM: I'm fascinated by the stressed plant being more nutritious than the one that isn't. Would stressed alfalfa be better?

FS: I think that's why the quality of alfalfa in Diamond Valley is as good as it is — the high elevation and the cooler temperatures add a little stress.

RM: So Diamond Valley has good quality hay?

FS: They have top quality hay there.

RM: And yours would be as good here?

FS: Oh, yes.

RM: Are most of the people here in alfalfa or grass?

FS: Well, the ranchers here mainly have grass. Although I shouldn't say native, because it's been planted in timothy and redtop and various grasses.

RM: But you only get one cutting of it?

FS: That's right.

RM: When they originally started planting hay, did they have to do a lot of working of the land to get it level and everything, or was it in pretty good shape to begin with?

FS: Years ago I'm sure that it was rough and had to be worked some. The old-timers talk about all of the wonderful rye grass that was in the bottom lands here along these creeks. And it's been written in some history how wonderful it was then and the good grass and everything. But I think they didn't take enough into consideration. I fully believe that the rye grass was that good through the bottom lands and up through here. But now they say in their writings that it has deteriorated throughout the years, and I don't believe that is true, because they've irrigated it. If you over-irrigate rye grass, it will die out. They'd give it too much water and it would die out, but they've gone in and plowed this land up and leveled it and planted timothy

Exhibit 151

9–185
(October 1950)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

check loc. in de

WELL SCHEDULE

Date Sept., 19 61 Field No. 29/52-3

Record by TEE + H. Winchester Office No.

Source of data Field

1: *Location:* State Nevada County Eureka

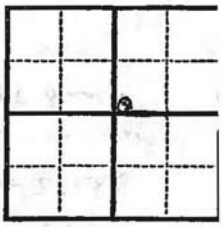
Map Diamond Valley

NE ¼ NE ¼ sec. 23 T 24 N/S R 52

2. *Owner:* Sadler Bros Address Eureka, Nev.

Tenant (Sadler Ranch Address

Driller J B Reynolds Address Fallon, Nev



3. *Topography*

4. *Elevation* ft. above / below

5. *Type:* Dug, drilled, driven, bored, jetted 19

6. *Depth:* Rept. 139 ft. Meas. ft.

7. *Casing:* Diam. in., to in., Type

Depth ft., Finish

8. *Chief Aquifer* From ft. to

Others

9. *Water level* ft. rept. / meas. 19 above / below

which is ft. above / below surf

10. *Pump:* Type Capacity G. M.

Power: Kind Horsepower

11. *Yield:* Flow 500± G. M., Pump G. M., Meas., Rept. Est.

Drawdown ft. after hours pumping G.

12. *Use:* Dom., Stock, PS., RR., Ind., Irr., Obs.

Adequacy, permanence

13. *Quality* Temp '

Taste, odor, color Sample Yes / No

Unfit for

14. *Remarks:* (Log, Analyses, etc.)

See back

U. S. GOVERNMENT PRINTING OFFICE 16—62891-1

Generalized log thick depth

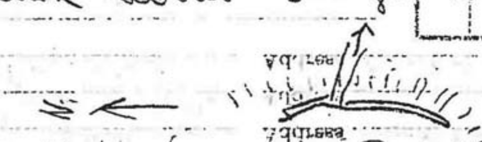
Clay blue 70 70

Boulders clay 25 95(?)

Total depth 139

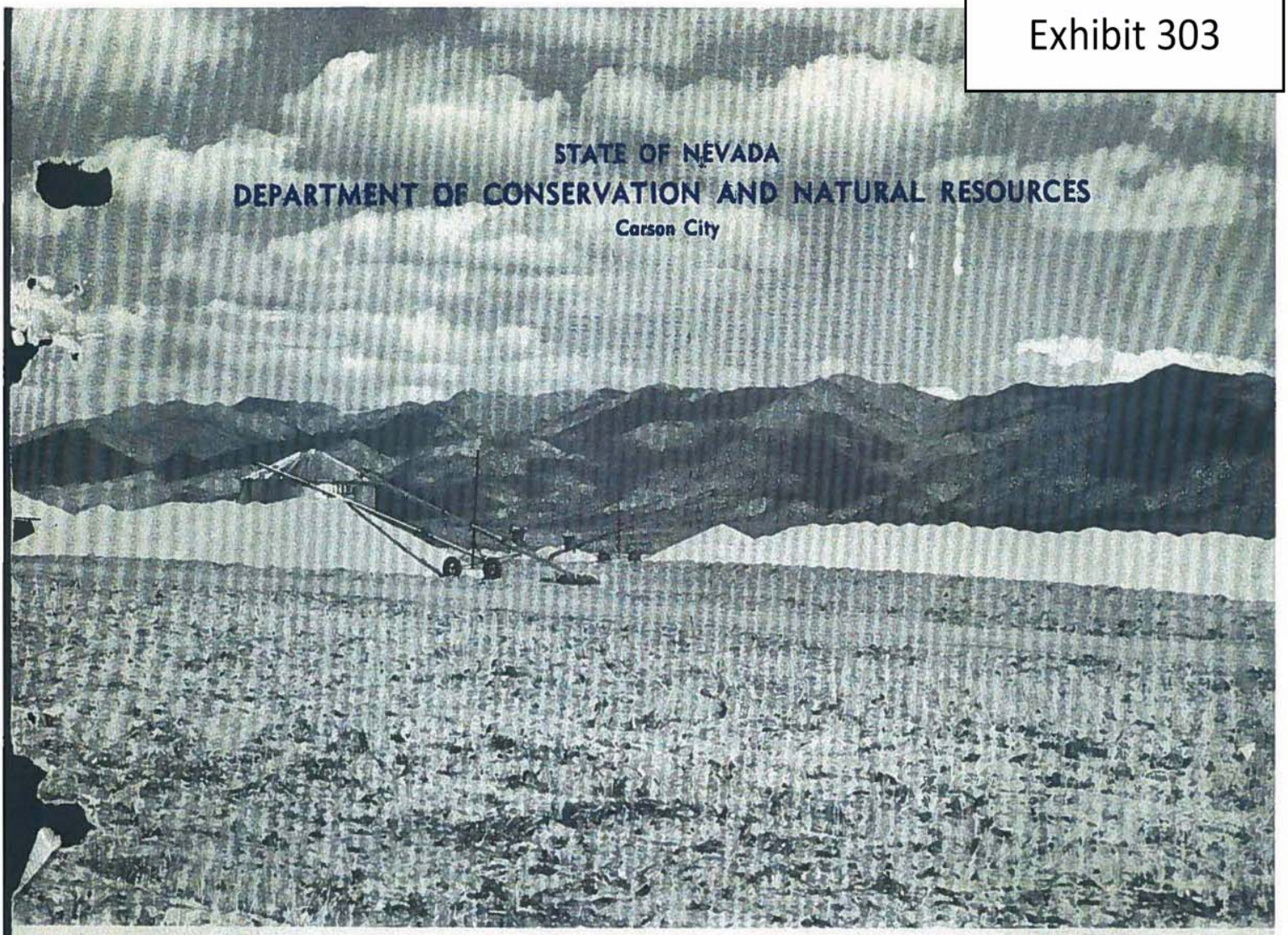
Note!

Sid law developed a spring in NE1/4 SE1/4 26-24/52 rept disch about 2 1/4 cfs present est disch 1 1/2 cfs. Consists of a/ trench cut parallel to contour at 12 ft deep and about 300 ft long



cut is in cemented (partial) sand gravel.

Rept Shipley Hot Spr. disch at 12 1/2 cfs.



STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
Carson City

Diamond Valley—View of stored grain and Diamond Mountains

GROUND-WATER RESOURCES – RECONNAISSANCE SERIES

REPORT 6

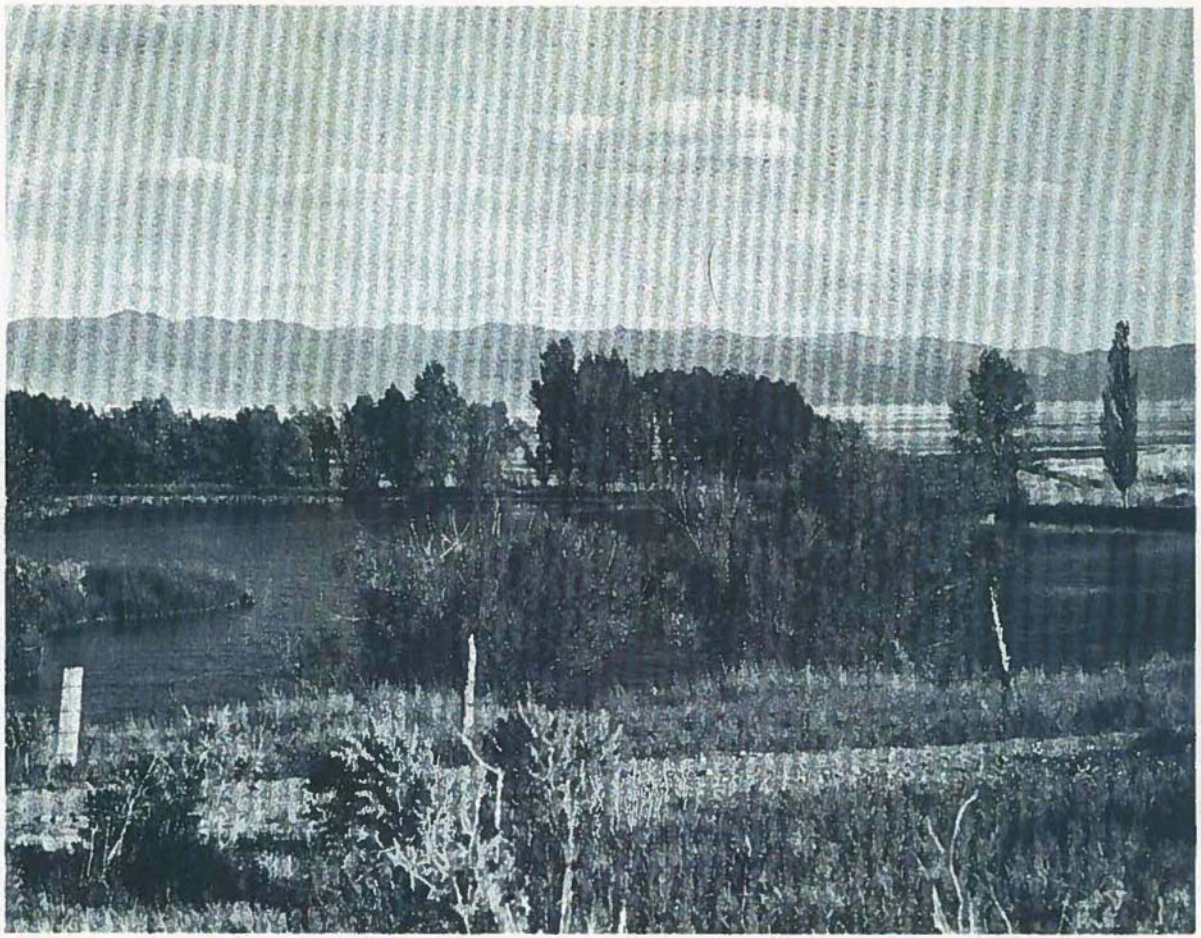
GROUND-WATER APPRAISAL OF DIAMOND VALLEY, EUREKA AND ELKO COUNTIES, NEVADA

By
THOMAS E. EAKIN
Geologist

Price $1.00

Prepared cooperatively by the
Geological Survey, U. S. Department of Interior

FEBRUARY 1962



SHIPLEY HOT SPRINGS

View east of Shipley Hot Springs pool in T. 24 N., R. 52 E. Discharge is reported to be about 15 cfs. Water is used largely for irrigated meadows. Diamond Mountains are in the background.

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND

NATURAL RESOURCES

WATER RESOURCES BULLETIN NO. 35

HYDROLOGIC RESPONSE TO IRRIGATION PUMPING IN DIAMOND VALLEY, EUREKA AND ELKO COUNTIES, NEVADA, 1950-65

By

J. R. Harrill

With section on

Surface Water

By

R. D. Lamke

Prepared in cooperation with the

United States Department of the Interior

Geological Survey

1968

Table 9.--Discharge of major springs in the North Diamond subarea

Location	Name or owner	Date	Discharge (cfs)	Discharge (acre-feet per year)
West side:				
23/52-25b	Tule Dam Spring	11-16-65	.12	90
23/52-36b	Sulphur Spring	11-18-65	.09	60
24/52-23d	Shipley Hot Spring	9-22-65	7.19	
		4- 1-66	7.01	4,900
		10-19-66	6.20	
24/52-26d	Unnamed	12- 7-65	.66	540
		4- 1-66	.82	
24/52-36c	Unnamed spring at Bailey Ranch	11-19-65	1.14	820
24/53-6cab	Siri Ranch spring	12- 7-65	.58	420
Subtotal			9.47	6,800
East side:				
23/54-3db	Thompson Ranch spring	9-21-65	2.33	
		4- 1-66	2.11	1,600
		10-19-66	2.06	
Subtotal			2.17	1,600
Total			11.64	8,400

DESERT RESEARCH INSTITUTE/UNIVERSITY OF NEVADA SYSTEM

Delineation of Ground-Water Flow Systems in Nevada

by
M. D. Mifflin

Technical Report Series H-W
Hydrology and Water Resources
Publication No. 4

Center for Water Resources Research
Desert Research Institute
University of Nevada System
Reno, July 1968

possibility constitutes the greatest weakness of the approach. This aspect seems negligible within the broad ranges considered in each classification; however, the tritium data are the only good test of important differences in rates of increase of soluble salts along flow paths.

Appendix Table 5 lists tritium determinations and concentrations of Na+K, Ca+Mg and $Cl+SO_4$ in large springs. Further, the classification as discussed is indicated, and the water temperature is listed for ease in comparison. Concentrations of Ca+Mg are given to demonstrate the limited range of variation associated with ground water from carbonate rock terrane. A few C^{14} determinations are also listed in the table.

The use of water chemistry for system classification in samples from wells or mines is not clearly reliable. Several such points are included for comparative purposes, and reasonable results are found. However, the tritium found in the Eberhardt Tunnel gouge seepage seems too high for the water chemistry, possibly because of direct communication of air and opportunity for evaporation. The Fad Shaft sample (No. 31) borders on the local-regional classification boundary, and this seems valid when compared to the lack of success of mine dewatering in this area and spring to the north (Nos. 25, 27, 28, 29 and 30) which fall into the regional classification. However, the known sulfide deposits of the area should impart high concentrations of SO_4, and this is the case.

A number of water analyses from deep carbonate rock aquifers in the Nevada Test Site area (flow system No. 122 in Plate I) display greater salt concentrations than those present in the springs at Ash Meadows. These springs constitute the majority of discharge for that flow system. Thus, it appears that the most reliable water-chemistry samples from carbonate terrane flow systems are those taken at positions of natural discharge. At positions of natural discharge the water chemistry relates directly to the entire flux reaching that point; hence, water from stagnant zones blends with water from permeable zones to give an integrated sample of the flow system. Artificial sample points may yield water chemistry relationships which grossly differ from the average character of flux in the entire flow system. For this reason samples from points other than large springs have not been used to characterize the carbonate rock flow systems.

Flow System Boundaries in Southern and Eastern Nevada

The flow system boundaries in southern and eastern Nevada have been developed on the basis of both conventional hydrologic data and system classification studies of the large springs. Even with the combined approach, delineation of flow systems in this region is believed subject to major error, and truly confident delineation awaits the proof provided by carefully collected fluid potential data from deep boreholes in key areas.

Plate II illustrates the distribution of flow system boundaries and location of the large springs associated with the carbonate rock terrane of eastern and southern Nevada. Illustrated by symbol are system classifications of each spring, and each is identified by the spring number in Appendix Tables 4 and 5. Several springs classified as regional occur in flow systems delineated as essentially confined to topographic basins. These springs are suggestive of localized interbasin flow in areas where shallow configuration of saturation indicates local flow systems.

Areas of Possible Interbasin Flow: Diamond Valley flow system No. (85 in Plate I) is a situation where considerable interbasin flow may occur but the source area for flow into the basin is uncertain. Shipley Hot Springs, with a discharge of 6,750 gpm, Siri Ranch Spring, Bailey Spring, Romano Artesian Spring, all less than 200 gpm, and Thompson Ranch Spring with 900 gpm classify as to related to regional flow systems. Further support is provided by water chemistry of Emerald Lake Cave Pool and the Fad Shaft of the Eureka Mining District. Northward, or northwesterly gradients of flow seem probable on the basis of water levels along the southern and eastern margins of the basin. Eakin, 1962, p. 21-23, has estimated 16,000 acre-ft/yr of recharge in the topographic basin, and 23,000 + acre-ft/yr discharge. Omitted from the discharge estimate is 49,000 acres of phreatic playa. This area of discharge would yield about 15,000 acre-ft/yr additional discharge if the rate of evaporation is assumed one-tenth of potential evaporation. However, it is the opinion of most hydrologists that such a rate is higher than most phreatic playas, but there is little quantitative data to support this belief. Thus, if the recharge-discharge estimates are applied, there is a minimum imbalance of discharge over recharge by 7,000 acre-ft/yr, and perhaps two or three times this value.

The water chemistry and water budget approach to delineation supports interbasin flow into Diamond Valley, yet fluid potential relationships suggest shallow ground-water divides surround the valley. Further, a source for the interbasin flow is not established.

Newark Valley flow system (No. 86 in Plate I) is also of questionable delineation. Its relationship to Long Valley flow system (No. 87 in Plate I) is uncertain, but it seems a possible position of discharge for ground water that has recharged in the Long Valley basin. The evidence for this relationship is given in the following paragraphs.

A large warm spring, Giocoechea Warm or Simonson Spring, occurs adjacent to the northeast margin of

Exhibit 119

NEVADA BUREAU OF MINES AND GEOLOGY

BULLETIN 91

THERMAL WATERS OF NEVADA

LARRY J. GARSIDE
JOHN H. SCHILLING

Descriptions of Nevada's thermal waters in springs, wells, and mine workings: locations, geology, temperatures, flow rates, water chemistry, well depths, drilling and other exploration activities, and past and present uses.

MACKAY SCHOOL OF MINES
UNIVERSITY OF NEVADA • RENO
1979

1900's (Nevada Historical Society *in* the Nevada State Journal, October 17, 1976).

Klobe (Bartholomae) Hot Springs [108]

Water temperatures at Klobe (or Clobe) Hot Springs at the Bartholomae Ranch are reported as high as 156°F in flowing springs (Fiero, 1968) and 158°F in a water well drilled in the spring (Rush and Everett, 1964). At least two springs are present and two or more wells have been drilled at the site of the springs in S28,T18N,R50E. The water is used for stock watering. Mariner and others (1974) report an estimated reservoir temperature of about 163°F from a Na-K-Ca geothermometer. This estimated reservoir temperature is near the reported surface spring temperature. Also, two wells of the Bartholomae Corp. in S18 and 30, T18N,R51E about 4 miles northeast of Klobe Hot Springs have water temperatures of 72° and 74°F. These slightly anomalous temperatures may indicate a large area of thermal ground water in this portion of Antelope Valley.

Bartine Hot Springs [107]

Bartine Hot Springs are located in Antelope Valley about 11 miles north of Klobe Hot Springs, in S5,T19N, R50E, and about 2.5 miles north of the Bartine Ranch along Highway U. S. 50. Waring (1965) reports temperatures of 105° and 108°F for two springs issuing from a "tufa" mound. A flowing well is described from near the Bartine Ranch in S17?, where a 116°F temperature was reported by Fred Bartine. Other artesian wells in the vicinity have temperatures of 58°F. These cold-water wells are probably all in the same water-bearing horizon, but the flow of the hot-water well was not affected by the drilling of the cold wells.

Horseshoe Ranch Springs [93]

Two springs having temperatures of up to 136°F are located in S32,T32N,R49E at Horseshoe Ranch about 1 mile northeast of the town of Beowawe. The flow from these springs is only about 30 gallons per minute; they are reportedly used for bathing and irrigation (Roberts and others, 1967; Stearns and others, 1937). These springs are probably on an extension of a N70°E fault which runs along the south side of Whirlwind Valley. This fault localizes the surface geothermal activity at the Beowawe Geysers 7 miles to the southwest in Eureka County near the Eureka–Lander boundary (see the section on Beowawe Geysers in this county).

Bruffey's (Mineral Hill) Hot Springs [100]

Five or six hot springs and spring systems are located along the margins of the Sulphur Spring Range in southeastern Eureka County, these springs described below are Bruffey's Hot Springs, Shipley Hot Springs, Carlotti Ranch Springs, Siri Ranch Spring, Flynn Ranch Springs, and possibly Sulfur Springs. A prominent fault bounds the Sulphur Springs Range along the west side of Diamond Valley and cuts through the range near Bruffey Canyon; it is apparently coincident with Bruffey's Hot Springs and Carlotti Ranch Springs along the east side of Pine Valley.

Bruffey's Hot Springs (formerly Mineral Hill Hot Springs) has the highest temperatures of those along the trace of the fault. Temperatures are up to 152°F, (Stearns and others, 1937), and calcareous sinter occurs as prominent terraces. Six springs occur along a north-south fault of large displacement. The old travertine deposits here contain barite and fluorite, although the travertine presently being deposited is devoid of barite and fluorite (White, 1955a).

Shipley (Big Shipley, Sadler) Hot Springs [103]

Springs in S23,T24N,R42E known as Shipley, Big Shipley, or Sadler Hot Springs have temperatures up to 106°F and issue from alluvium near the bedrock outcrops. The springs are probably supplied by water moving through secondary openings in Paleozoic rocks (Eakin, 1962a). Reported discharges range from 3,000 to 6,750 gallons per minute.

Carlotti Ranch (Sulfur) Springs [99]

Two springs a quarter of a mile apart have temperatures of 95° and 102°F (Stearns and others, 1937). The springs are used for irrigation. They are along the east side of Pine Valley 5 miles north of Bruffey's Hot Springs and are probably along the same fault reported there.

Siri Ranch Spring [104]

A warm spring and water well are found in S6,T24N, R53E at Siri Ranch along the west side of Diamond Valley north of Shipley's Hot Springs. A small pool in the alluvium is reported (Mifflin, 1968). The reported temperatures vary from 81° to 87°F for the spring, while the well is 95°F. Discharges reported are 5,800 and 300 gallons per minute (Mifflin, 1968; Stearns and others, 1937). These springs are probably associated with the range-front fault along the Sulphur Spring Range here.

Identification number, name, location	Temp. (°F)	Discharge (gpm)	Date	SiO_2 (ppm)	Fe (ppm)	Ca (ppm)	Mg (ppm)	Na (ppm)	K (ppm)	HCO_3 (ppm)	CO_3 (ppm)	SO_4 (ppm)	Cl (ppm)	F (ppm)	NO_3 (ppm)	B (ppm)	TDS (ppm)	SC (μmhos/cm)	pH	Reference
EUREKA COUNTY (continued)																				
spring NW¼S11,T29N,R48E	129	33	1973	67	–	53	35	230	58	913	<1	7	1	6.6	–	2.1	–	1730	6.6	Mariner & others, 1974
	Remarks: Li = 1.1.																			
spring NE¼S11,T29N,R48E	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Mariner & others, 1975
	Remarks: Al = 0.008, N = 3.2, P = 0.01, Br = 0.2, I = 0.02, Rb = 0.29, Ce = 0.1, Sr = 1.3, Cu = 0.04, Hg = <0.0001, δD(‰) = –125.8, δO^{18} = –13.21; gas (volume %): O_2 + Ar = 9, N_2 = 31, CH_4 <1, CO_2 = 60.																			
springs SE¼SE¼S2 & NE¼NE¼ S11,T29N,R48E	122	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Waring, 1965, No. 88A
Magma Power Co. Hot Springs Point No. 1 well S1,2 or 11, T29N,R48E	166	–	1965	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Koenig, 1970
	Remarks: Depth – 410 ft.																			
[97] spring NW¼NW¼NE¼S10,T28N,R49E	186	2.5	1960	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Wilson, 1960a
[98] Hot Creek Springs																				
spring NW¼S12,T28N,R52E	79	1585	1973	20	–	46	23.5	10	2.1	226	1	27	4.6	<0.1	–	0.03	–	408	7.3	Mariner & others, 1974
	Remarks: Li = 0.02.																			
springs SW¼NW¼S12,T28N,R52E	84	5900	27Sep65	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Mifflin, 1968; Waring, 1965, No. 89
	Remarks: (epm) Na + K = 0.53; Ca + Mg = 3.77, Cl + SO_4 = 0.74.																			
springs SE¼NW¼S12,T28N,R52E	–	1800-2250	1960	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Eakin, 1961b
[99] Carlotti Ranch (Sulfur) Springs																				
springs SE¼S24,T28N,R52E	95-102	100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Waring, 1965, No. 90
[100] Bruffey's (Mineral Hill) Hot Springs																				
spring S14,T27N,R52E	150	50	–	.58	–	52	16	39	8.7	2.87	0	27	14	0.7	0.1	0.25	–	–	7.0	Roberts, Montgomery & Lehner, 1967
	Remarks: Mn = 0; Ba = 0; Li = 0.2.																			
springs S14,T27N,R52E	108-152	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Waring, 1965, No. 90A
[101] Flynn Ranch Springs																				
springs S5,T25N,R53E	69-78	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Waring, 1965, No. 91
[102] Walti Hot Springs																				
spring W½S33,T24N,R48E	163	–	–	75	0.02	60	13	48	15	282	0	62	13	2.4	0.1	0.17	–	–	6.9	Roberts, Montgomery & Lehner, 1967
	Remarks: Mn = 0; Li = 0; PO_4 = 0.1.																			
spring S33,T24N,R48E	160	–	17Jun65	–	–	57	12		70	315	0	65	14	–	–	–	–	–	7.1	Everett & Rush, 1966
spring SW¼S33,T24N,R48E	162	79	1973	68	–	56	12	44	14	264	<1	64	12	2.5	–	0.12	–	592	6.5	Mariner & others, 1974
	Remarks: Li = 0.3.																			
spring W½S33,T24N,R48E	160	897	17Jun65	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Mifflin, 1968
	Remarks: (epm) Na + K = 3.04; Ca + Mg = 3.82; Cl + SO_4 = 1.75.																			
springs S33,T24N,R48E	hot	small	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Waring, 1965, No. 93
[103] Shipley (Big Shipley, Sadler) Hot Springs																				
springs NE¼SE¼S23,T24N,R52E	103-106	5000	1960	40	0.01	57	21	29	5.9	279	0	35	21	0.2	0	0.26	346	540	7.2	Eakin, 1962a; Waring, 1965, No. 91B
	Remarks: Mn = 0; Li = 0; PO_4 = 0.1.																			
springs NE¼SE¼S23,T24N,R52E	94	3000	16Apr63	30	0	55	21	30	6	288	0	33	17	0.5	0.6	0.1	330	529	7.6	Harrill, 1968
springs NE¼SE¼S23,T24N,R52E	106	6750	18Sep52	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Mifflin, 1968
	Remarks: (epm) Na + K = 1.52; Ca + Mg = 4.57; Cl + SO_4 = 1.29.																			
[104] Siri Ranch Spring																				
spring NW¼SW¼S6,T24N,R53E	81	5800	11Jul66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Mifflin, 1968
	Remarks: (epm) Na +K = 0.76; Ca + Mg = 4.00; Cl + SO_4 = 0.89.																			
spring NW¼SW¼S6,T24N,R53E	87	300	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Waring, 1965, No. 91A

From Terry Kater
August 2013

Mount Hope Water Resources
Shipley Hot Springs

Location — Latitude 39 degrees 54.683 minutes
Longitude 116 degrees 04.383 minutes
Elevation 5800 feet

Period of Record
Gage — Tru-Track presure/temperature recorder
Remarks

Meas #	Date	Staff Feet	Discharge CFS	Hydrologist	Remarks	Meas Rating	
1	5/7/2008		3.56	TK DS			
2	1/6/2009		3.00	TKCD			
3	2/25/2009		3.11	TK BS			
4	3/31/2009		2.08	TK			
5	5/9/2009		2.90	BS			
6	5/29/2009		3.10	JBR			
7	6/25/2009		2.88	TKBS			
8	7/23/2009		2.36	TKBS			
9	7/28/2009		2.02	TKBS			
10	8/23/2009		3.06	BS	2 Channels		
11	9/26/2009		2.23	BS TK	2 Channels		
12	10/5/2009		2.06	JBR			
13	111/19/2009		3.49	BS	2 Channels		
14	12/15/2009		2.70	TK	2 Channels		
15	1/19/2010		3.51	BS TK	3 Channels		
16	2/16/2010		2.94	BS TK	3 Channels		
17	3/16/2010		3.39	BS TK	3 Channels		
18	4/21/2010		3.32	BS TK	3 Channels		
19	5/20/2010		2.41	BS TK	3 Channels		
20	6/15/2010		2.85	BS TK	2 Channels		
21	7/15/2010		2.35	BS TK	2 Channels		
22	8/19/2010		2.40				
23	9/15/2010		2.87	BS	2 Channels		
24	10/15/2010		2.62	BS	3 Channels		
25	11/18/2010		2.39	BS TK	3 Channels		
26	12/14/2010		2.84	BS	2 Channels		
27	1/14/2011		2.84	BS TK	2 Channels		
28	2/15/2011		3.15	BS	2 Channels		
29	3/15/2011		3.10	BS TK	2 Channels		
30	4/27/2011	1.00	2.74	BS TK	2 Channels		Installed Outside Staff
31	6/15/2011	1.02	3.05	B Squires	1 Channel	G	and recorder
32	7/14/2011	1.03	2.00	B Squires	1 Channel	G	
33	8/16/2011	1.05	2.17	B Squires	3 Channels	F	
34	9/29/2011	1.04	2.16	B Squires	2 Channels	F	
35	11/10/2011	1.00	2.14	BS TK EB	2 Channels	F	
36	1/12/2012	0.88	1.92	BS	3 Channels	F	
37	4/5/2012	0.97	2.32	BS	1 Channel	F	
38	6/7/2012	0.92	2.01	BS TK	1 Channel	F	
39	7/11/2012	0.92	2.42	BS TK	1 Channel	F	
40	9/5/2012		1.80	BMO			
41	9/17/2012		0.00	GMO			Well on
42	9/27/2012		0.54	DS			Well om
43	10/9/2012		0.00	GMO			Well on
44	11/13/2012		1.82	GMO			
45	12/20/2012	0.74	2.15	BS TK	2 Channels	F	
46	3/12/2013	0.84	2.43	BS BH	2 Channels	F	
47	6/12/2013	0.86	1.64	BS BH	1 Channel	F	

Exhibit 108, p. 3

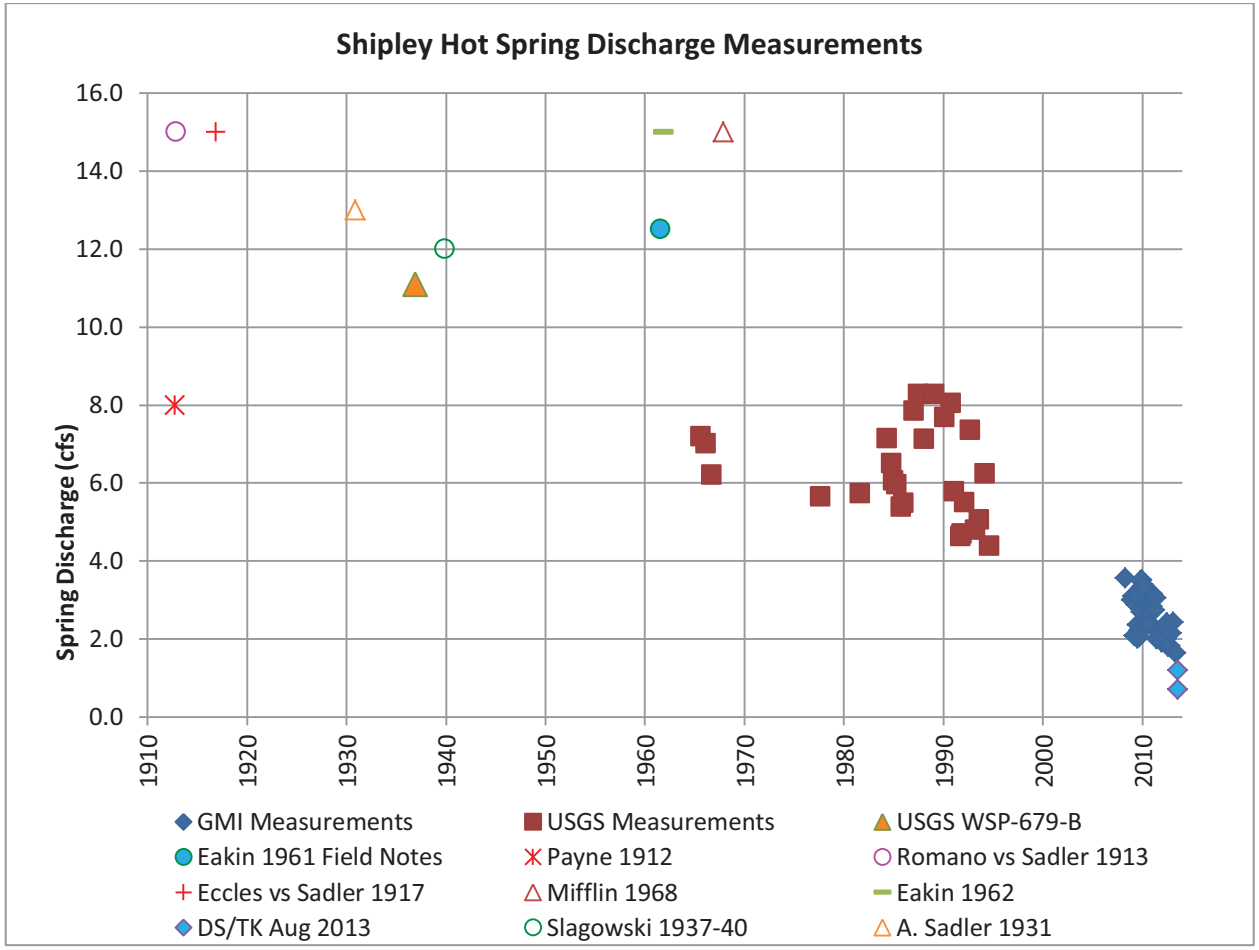


Figure 1 – Shipley Hot Spring Discharge Measurements and Reported Discharge, 1912 to 2013

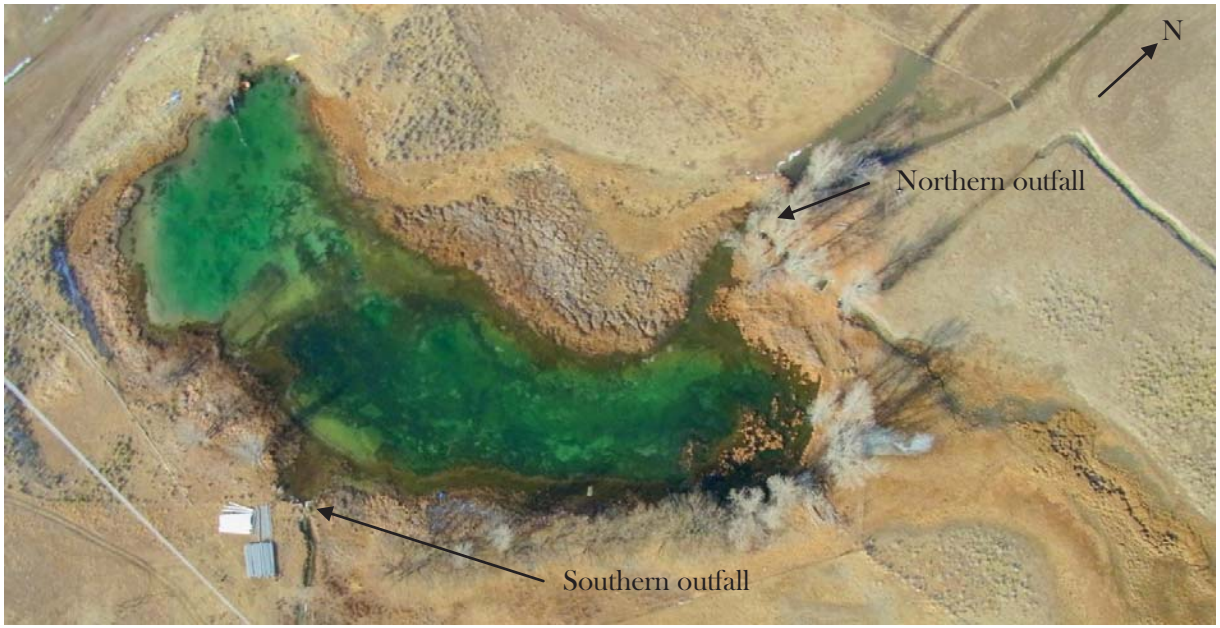


Figure 1: Low altitude aerial photograph of Shipley Hot Spring.

Exhibit 109, p. 2

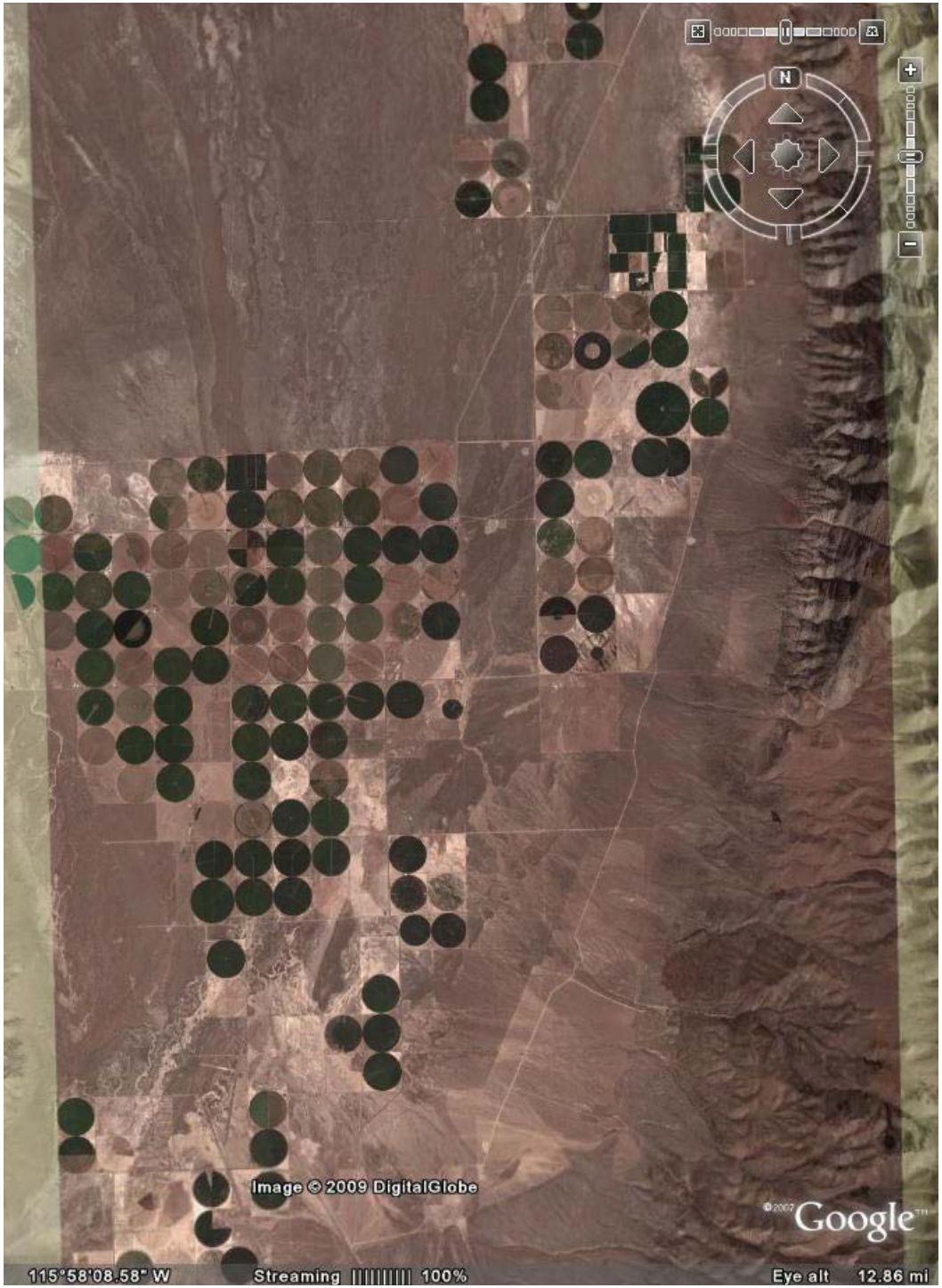


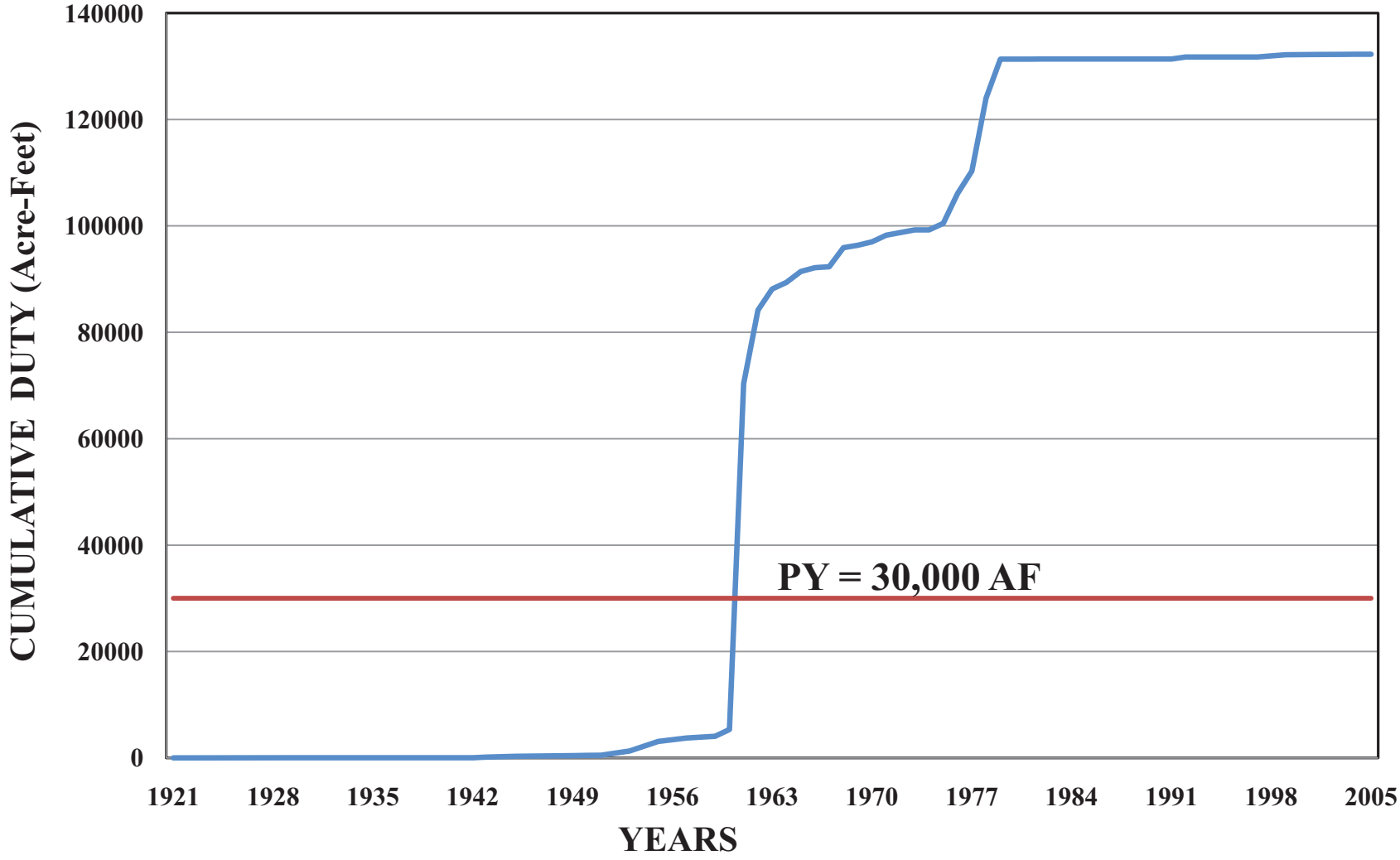
Exhibit 287

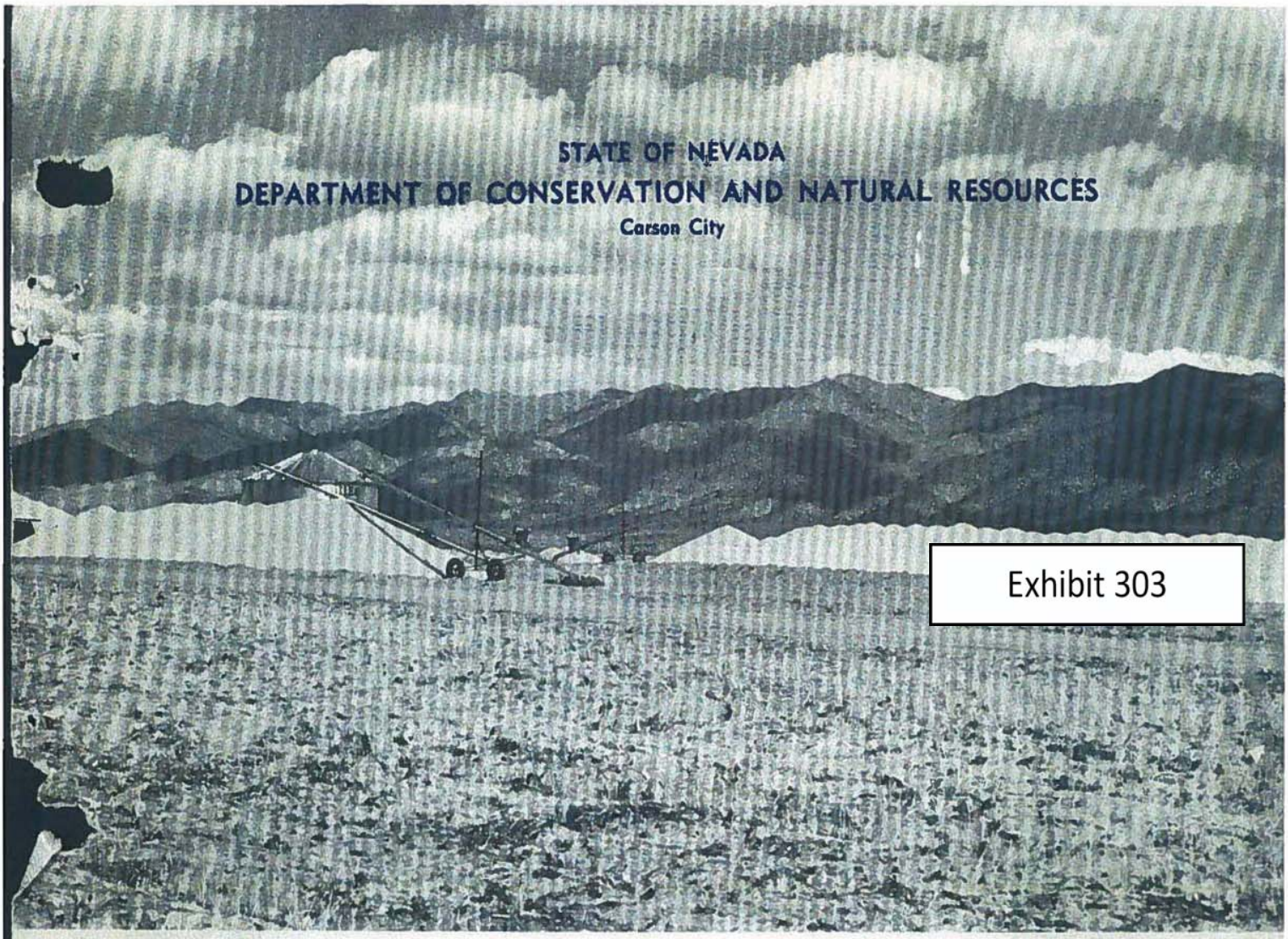
Diamond Valley Water Resource Management

March 19, 2009

Eureka, Nevada

WATER RIGHTS IN DIAMOND VALLEY 1921 - 2005





STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
Carson City

Diamond Valley—View of stored grain and Diamond Mountains

GROUND-WATER RESOURCES – RECONNAISSANCE SERIES

REPORT 6

GROUND-WATER APPRAISAL OF DIAMOND VALLEY, EUREKA AND ELKO COUNTIES, NEVADA

By
THOMAS E. EAKIN
Geologist

Price $1.00

Prepared cooperatively by the
Geological Survey, U. S. Department of Interior

FEBRUARY 1962

GROUND-WATER APPRAISAL OF DIAMOND VALLEY

EUREKA AND ELKO COUNTIES, NEVADA

by

Thomas E. Eakin

SUMMARY

The results of this reconnaissance indicate that the average annual ground-water discharge by natural processes is on the order of 23,000 acre-feet. This estimate is believed to be reasonable and compatible with information developed for other valleys of Nevada where more extensive studies have been made. The estimate of natural discharge provides an initial guide for the amount of ground water that may be withdrawn annually on the basis of permanent development. The estimate can be re-evaluated at such time as a great many more data can be obtained and economic or other conditions warrant.

The estimate of average annual ground-water recharge, based on precipitation and altitude zones, is about 70 percent of the estimate of discharge. It has been found that the estimates of recharge may vary widely from the estimates of discharge for a specific valley although the estimates in general are in reasonable agreement. To the extent that the estimate of recharge for Diamond Valley is correct, the estimate of perennial yield, based on the estimate of discharge, is optimistic. However, available information suggests that the estimate of discharge probably is more reliable and therefore it is given the principal weight in this reconnaissance.

The amount of ground water in storage has been estimated to be on the order of 15,000 acre-feet per foot of saturated thickness in the valley fill within a 100,000-acre area south of the playa. On the same basis, the upper 100 feet of saturated valley fill would contain about 1,500,000 acre-feet in storage. This latter amount, which is equivalent to 65 times the estimated average annual discharge, is indicative of the very large amount of ground water in reserve for maintaining pumping withdrawals during protracted periods of drought.

The few chemical analyses of ground water that are available suggest that the ground water in the newly developed area generally is of a calcium-bicarbonate type and suitable for irrigation. However, additional analyses are needed to identify local differences in quality. This information probably is needed even more in Diamond Valley than in some other areas because a wide variety of crops are being used to test the capabilities of the valley.

The development of new lands by means of pumped irrigation wells began in 1949 in Diamond Valley. A small acreage was irrigated for several years. In

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND

NATURAL RESOURCES

WATER RESOURCES BULLETIN NO. 35

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Geological Survey

1968

CONCLUSIONS

This second appraisal of the water resources of Diamond Valley has led to the following conclusions regarding the adequacy of supply, effects of development, and types of data needed to refine the flow system and response characteristics of the valley-fill reservoir:

1. All development to date and all applications for future development are in the South Diamond subarea--total permits to pump about 150,000 acre-feet per year have been granted. This is considerably in excess of the estimated perennial yield of 30,000 acre-feet for Diamond Valley.

2. The estimated net pumpage in 1965 was 12,000 acre-feet, or less than half the estimated yield. Virtually all net pumpage of record (1950-65), which totals an estimated 50,000 acre-feet, has been supplied from ground water in storage in the South Diamond subarea.

3. Because the area of pumping is remote from areas of natural discharge, storage depletion will continue for many years in the future. An example demonstrated that if net pumpage were held to only 12,000 acre-feet per year, about 3 million acre-feet of storage depletion would be required before 12,000 acre-feet per year of natural discharge could be salvaged. Water levels in the area of concentrated pumpage (T. 21 N., R. 53 E.) would be drawn down as much as 200 feet below 1965 levels. The time required to reach the new equilibrium would be from 300 to 400 years.

4. The rate of increase in estimated net pumpage from 1,800 acre-feet in 1960 to 12,000 acre-feet in 1965 suggests that net pumpage may equal the perennial yield by 1975. Even if the perennial yield is not exceeded, local overdraft is likely to occur in the South Diamond subarea and water levels locally may be drawn down below economic pumping lifts.

5. Pumping in the South Diamond subarea eventually should decrease the natural discharge from springs in the North Diamond subarea, which during the summer 1965 was largely being used beneficially. In time, the discharge from springs may have to be supplemented or replaced by pumping from wells. Although more costly, this procedure would salvage the large amount of water (about 6,000 acre-feet per year) now running to waste during the nongrowing season.

6. The cost of pumping will increase in about direct proportion to the increase in pumping lift, provided that other fixed

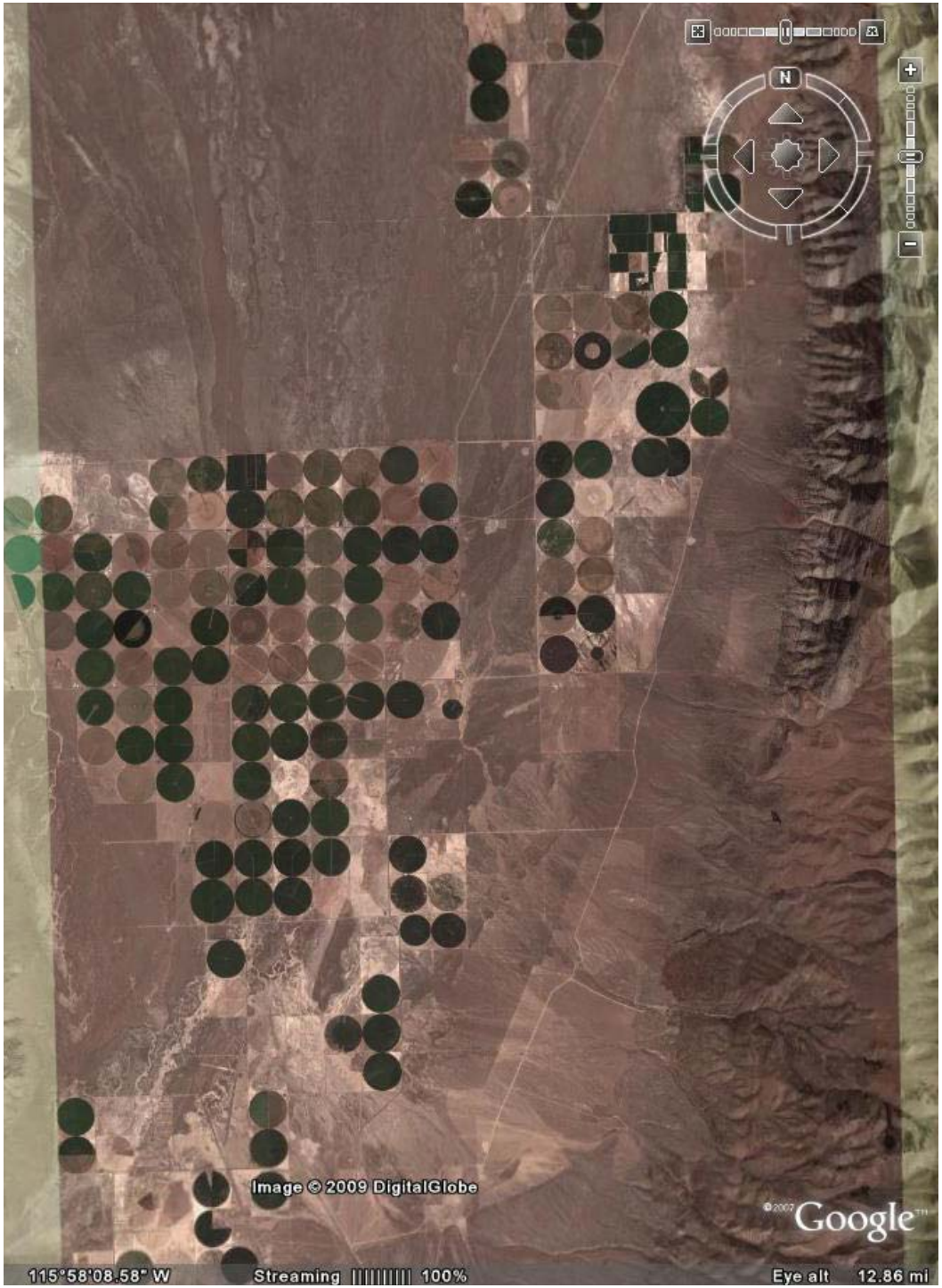

Exhibit 287

Diamond Valley Water Resource Management

March 19, 2009

Eureka, Nevada

Diamond Valley Hydrographic Area Summary

•Hydrographic Area Number	10-153
•Designated	Yes
•State Engineer Orders	
•277 – Designation	August 5, 1964
•280 – Amended Designation	August 28, 1964
•541 – Notification of Curtailment	December 22, 1975
•717 - Notification of Curtailment	July 10, 1978
•815 – Amended Designation	April 4, 1983
•Committed Ground-water Resources	133,248 Acre-Feet
•Perennial Yield	30,000 Acre-Feet
•Reference	USGS Bulletin 35
•Consumptive Use (Alfalfa)	2.3 Acre-feet

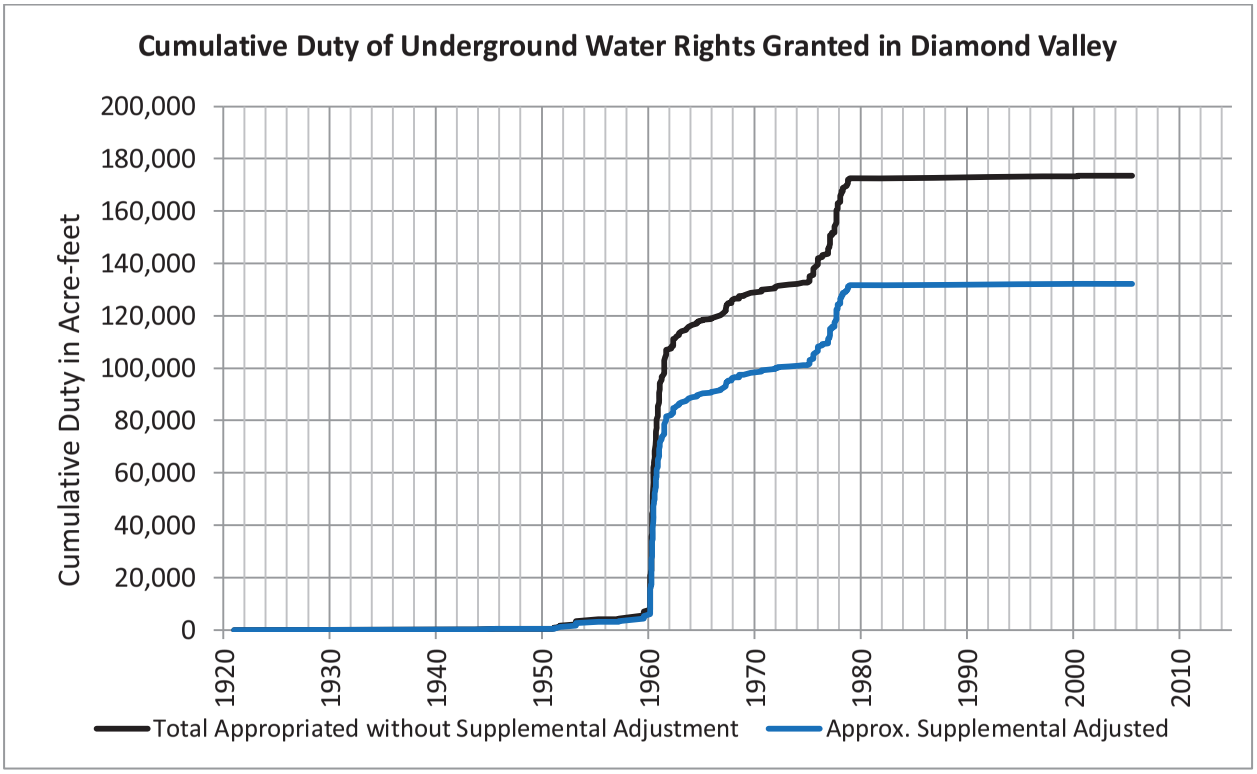

Figure 4 – Underground Water Rights Issued (permitted – active) in Diamond Valley (NDWR records), Scaled for Supplemental Duties

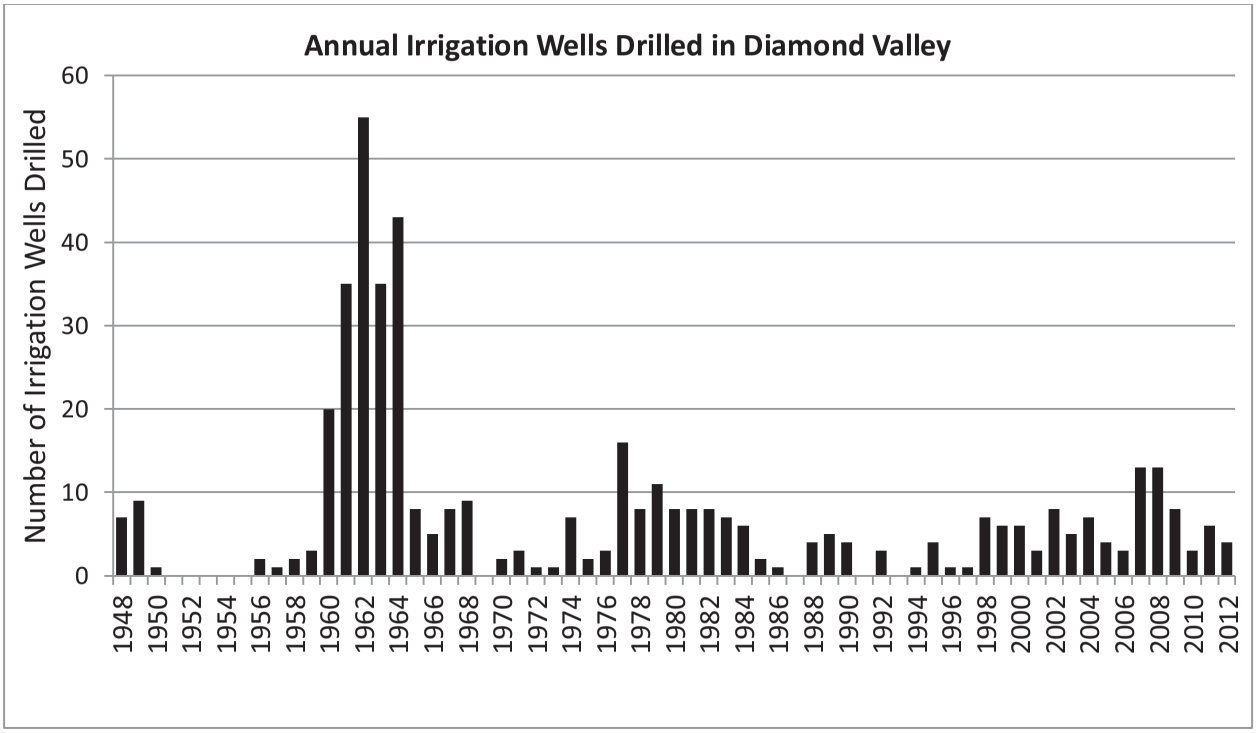

Figure 5 – Irrigation Wells Drilled in Diamond Valley (NDWR records)

Hugh A. Shamberger: Memoirs of a Nevada Engineer and Conservationist

Interviewee: Hugh A. Shamberger
Interviewed: 1965-1966
Published: 1967
Interviewer: Mary Ellen Glass
UNOHP Catalog #019

Description

Hugh A. Shamberger was born in Idaho in 1900. He attended schools in the Payette region and graduated from Stanford University with an engineering degree. He worked at surveying and engineering jobs in California, and when Hoover Dam was in the planning stages, he decided to make a home in Nevada. Arriving in Las Vegas early in 1929, Shamberger began a new phase of his career, working at mining and engineering in the developing community.

One of Shamberger's new friends in Las Vegas was Alfred Merritt Smith, who became the state engineer of Nevada. Under Smith's sponsorship, Shamberger also entered the state service, first in the State Highway Department, and then in the office of the state engineer. While in this office Shamberger pioneered several techniques of studying the water resources of his adopted state, and wrote of his researches in several monographs that are widely used. As state engineer, he was instrumental in aiding Nevada's cause in the Colorado River litigation, Arizona v. California, in the 1950s.

As the duties of the state engineer's office became more complex, Shamberger designed and pressed to completion a reordering of several state offices concerned with state resources, and the Nevada Department of Conservation and Natural Resources was created. This office contained the office of the state engineer, the Division of Water Resources, the Division of Forestry, the Division of Oil and Gas, and the Division of State Land. Hugh Shamberger became the first director of the new office.

He was the head of the state's Civilian Defense organization during World War II, and he served two terms as a county commissioner of Ormsby County (Carson City). During his term as county commissioner, Shamberger organized, and became the first president of, the State Association of County Commissioners.

After his retirement, Shamberger became director of the Center for Water Resources Research, a division of the Desert Research Institute at the University of Nevada. Under his leadership, it has become nationally known and respected for pioneering studies of water problems.

The memoir includes reminiscences of early days in Idaho and California, an account of Shamberger's work in the Las Vegas Valley in the early 1930s, a discussion of water and land problems in Nevada, impressions of the Colorado River adjudication, information about the Department of Conservation and Natural Resources, and discussions of political and civic affairs.

meant that before any drilling could be done a permit would have to be issued.

In a valley that had not been designated by the State Engineer under the '39 Ground Water Act, a person could first drill a well and develop his water, and then make application. Of course, he had no assurance that his application would be approved. Once a man spent $15,000 or $20,000 putting a well in, though, the tendency of the State Engineer would be to give him a permit. In a designated area, this couldn't be done, so much more control is now being made on ground water development in these valleys than in the early years.

I would like to emphasize this matter of the difficulties faced by the typical Desert Land entryman. In practically every case of a Desert Land applicant obtaining a permit from the Bureau of Land Management for the land, and a permit from the State Engineer to develop ground water, where the person involved was not an experienced farmer he went broke— and probably lost everything he had—in trying to do something he had no business to start in on.

I have seen so many of these people try to develop land. Apparently they were reading some western magazines or something, and thought there was a lot of romance attached. But after the first few months out with the jackrabbits and the desert winds and the dust, they gave up the idea very rapidly. In most cases, they had built a small shack and they had probably fenced around the house and had a well drilled. On many occasions they would try to raise a crop of grain on unfenced land. Then when the grain would get about two or three inches above ground, the rabbits would come in and overnight destroy the crop. This is a pretty hard thing for a person to take, and certainly if they were not properly financed to try again, they would move out very rapidly, having lost everything they had saved. This is the reason that I, on so many occasions, tried to talk these people out of coming into the state. Most of them were out-of-state people and spent their life savings in trying to reclaim desert land, when they had had no experience whatsoever on farming of any kind.

This was not only limited to elderly people who had retired, but on many occasions young people would come in with a little money and try to do the same thing. I know of no case where a success was made by anyone but a person who had previous experience with irrigation, knew how to develop land and apply the water, and knew what it took in the way of living conditions that they were faced with. Sometimes when a person came in with knowledge of how to farm and experience behind him, and with some money, he was able to stick it out for quite awhile.

I would say that nine out of ten people who obtained a Desert Land entry failed in trying to develop these desert lands. Not only did they have the difficulties of drilling for water, the difficulties of developing land in the desert, but they had—especially in the northern part of the state— the matter of a short irrigation season, so they were limited to only very few types of crops such as grain and hay. Usually these were low-priced crops, and unless they had stock to utilize the feed, they found it very difficult to get by. In general, it can be said that most of them failed. Evidence of what is left can be seen on many of these isolated tracts. The little shack has fallen down, the wind has built sand dunes up around the house and the few pieces of barbed wire strung around. This is what remains of the great expectations of some of these people who apparently were thrilled by the romance of the desert, and tried to overcome the hazards they were facing.

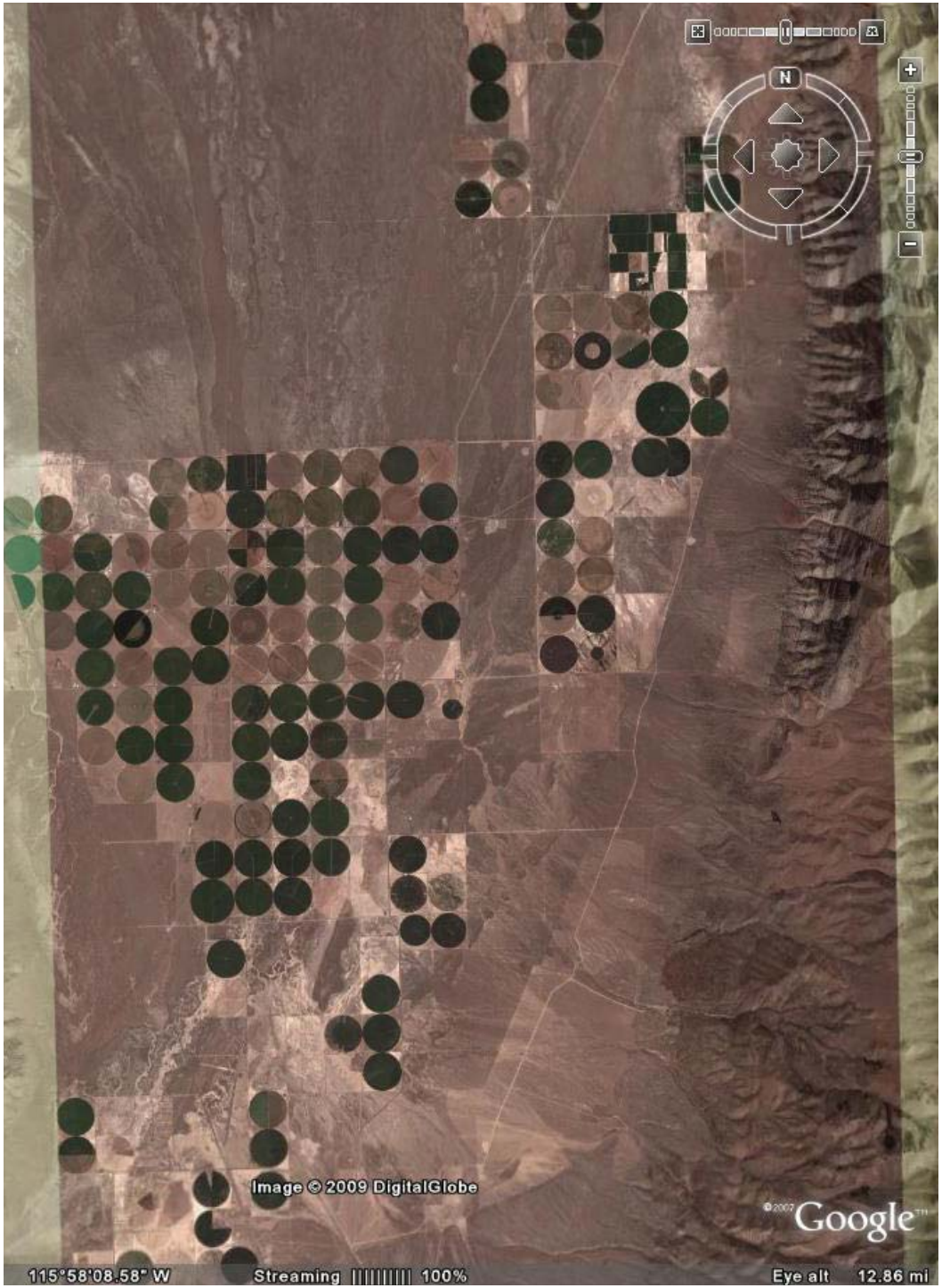

Exhibit 287

Diamond Valley Water Resource Management

March 19, 2009

Eureka, Nevada

Estimating Pumpage in Diamond Valley

- The pumpage estimate reported by the USGS (Arteaga, et al., 1995, p.5) for the year 1990, confirming Landsat imagery with field checking, was 64,400 acre-feet on 22,200 acres for an overall duty of 2.90 acre-feet per acre.

Average Pumpage in Diamond Valley

- 72,568 acre-feet / 24,220 acres = 3.00 acre-feet per acre
- Even if we use 772 acre-feet per day * 100 pumping days maximum = 77,200 acre-feet per season
- 77,200 acre-feet / 24,220 acres = 3.19 acre-feet per acre

Exhibit 290

Irrigated Croplands, Estimated Pumpage, and Water-Level Changes in Diamond Valley, Eureka and Elko Counties, Nevada, through 1990

By FREDDY E. ARTEAGA, J. LARUE SMITH, and JAMES R. HARRILL

U.S. GEOLOGICAL SURVEY

Open-File Report 95-107

Prepared in cooperation with the
NEVADA DIVISION OF WATER RESOURCES

Carson City, Nevada
1995

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

O R D E R

SUSPENDING COMPLIANCE DATE OF STATE ENGINEER'S ORDER NO. 809 RELATING TO INSTALLATION OF TOTALIZING METERS ON ALL PERMITTEES' IRRIGATION WELLS WITHIN THE DIAMOND VALLEY GROUND WATER BASIN

WHEREAS, the State Engineer issued Order No. 809 on December 1, 1982, requiring installation of totalizing meters on all permitted irrigation wells within the Diamond Valley Designated Ground Water Basin.

Various well owners and/or their representatives have requested permission to substitute other recording devices for said totalizing meters.

It will be necessary to study and consider the substitute proposals to determine whether or not the data required in Order No. 809 can be supplied thereby.

This study and determination cannot be made by May 1, 1983.

All those well owners that have already installed or that wish to install totalizing meters may proceed with such installation.

NOW THEREFORE, it is hereby ordered that the compliance date of State Engineer's Order No. 809 is suspended for one year, until May 1, 1984, at which time either a totalizing meter or an effective and authorized substitute measuring device must be installed on all permitted irrigation wells in the Diamond Valley Designated Ground Water Basin.

Peter G. Morros
State Engineer

Dated at Carson City, Nevada,
this 7th day of February, 1983.

PUMPAGE AND WELL-EFFICIENCY TESTS

Pumpage prior to 1966 was estimated by Harrill (1968, p. 49). Pumpage from 1966 to 1969 and from 1975 to 1989 was estimated by the Nevada Division of Water Resources, primarily on the basis of inventories of irrigated land and water duties (estimates are not available for 1970-74). These estimates are listed in table 1 and shown in figure 3, along with the estimates of acreage of irrigated croplands.

The University of Nevada Cooperative Extension Service office in Eureka, Nev., provided reports of 418 well-efficiency tests for Diamond Valley spanning 1972-89. The test reports contain information on approximate well location, type of pump and motor, water level, pumping level, friction head, pressure head, discharge rate, date and method of measurement, and overall efficiency. Complete information is available for 285 of the tests, and for these tests, additional computations were made to determine the power, in kilowatthours, needed to pump 1 acre-ft of water. A second variable was computed by dividing the kilowatthours per acre-foot by the total head (the sum of depth to pumping level, friction head, and pressure head) to determine the power consumed to lift 1 acre-ft of water 1 ft. Of the 285 tests with complete data, about 17 percent were in T. 20 N.; about 71 percent were in T. 21 N.; about 11 percent were in T. 22 N.; and about 1 percent were in T. 23 N. Most of the tests were made from the mid-1970's to the early 1980's; testing continued at a reduced rate through 1989. Graphs known as boxplots (Tukey, 1977) are used to display information on the statistical distribution of discharge, pumping level, total head, power consumed pumping each acre-foot of water, and power consumed lifting each acre-foot of water by 1 ft (fig. 4) for three areas in the valley:

- Area 1 includes 49 tests from T. 20 N., R. 53 and 54 E.;
- Area 2 includes 201 tests from T. 21 N., R. 53 and 54 E.; and
- Area 3 includes 32 tests from T. 22 N., R. 53 and 54 E.

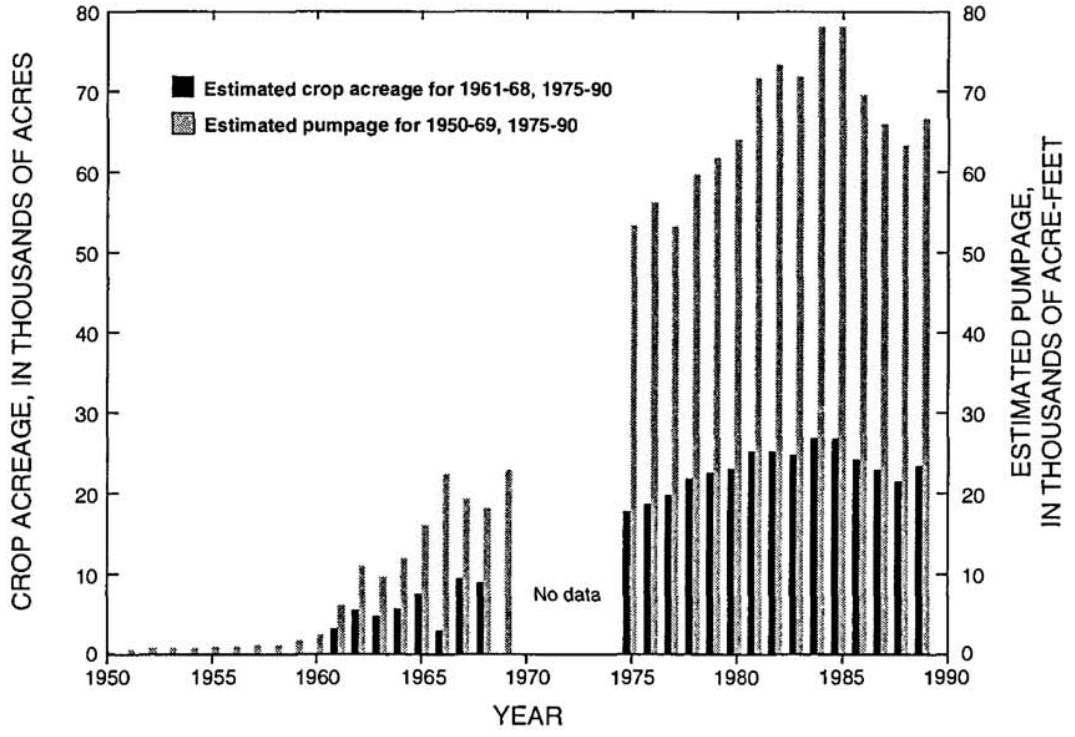

Figure 3. Estimated crop acreage and estimated pumpage in Diamond Valley, Nev., 1950-90.

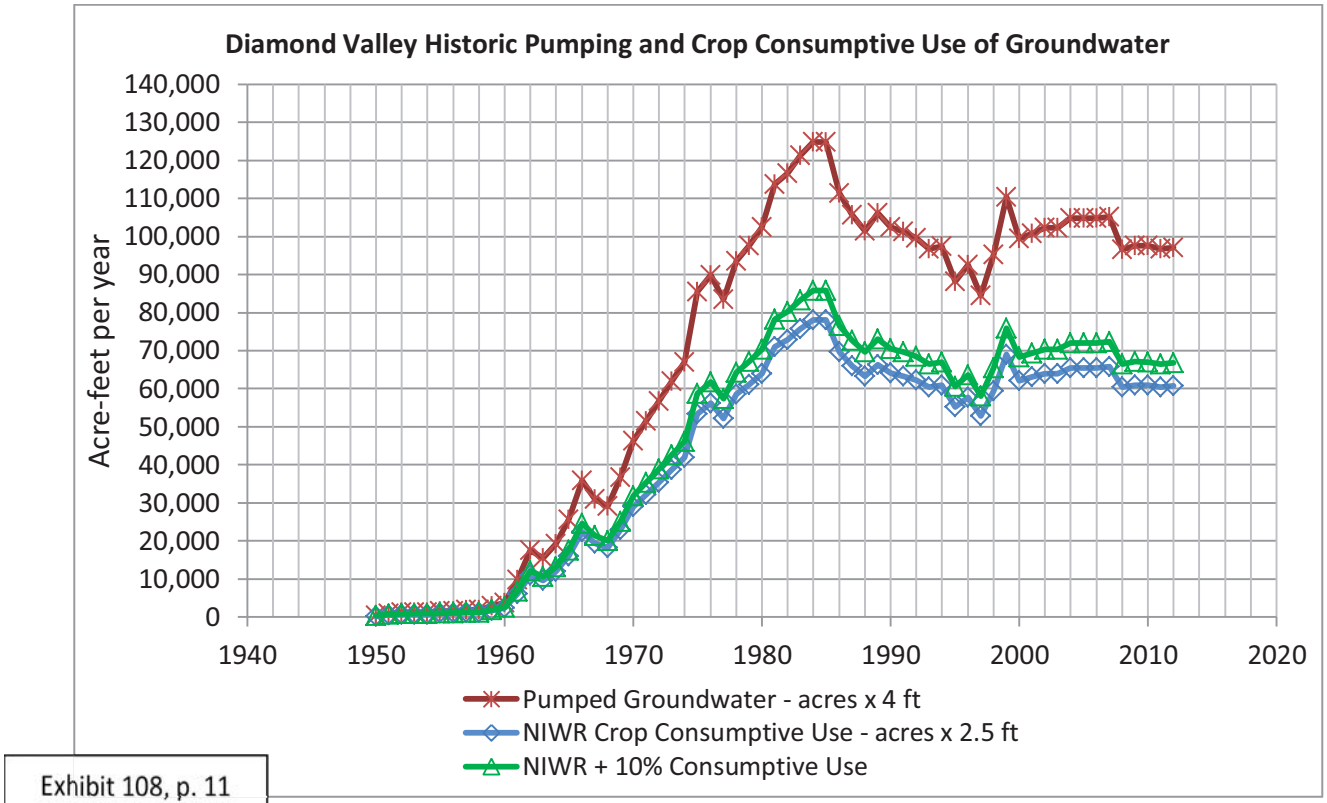

Exhibit 108, p. 11

Figure 6 – Estimated Total Irrigation Pumping in Diamond Valley and Crop Consumptive Use of Groundwater (Based on NDWR Crop Inventory Data and NDWR Net Irrigation Water Requirement)

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

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O R D E R

DESIGNATING AND DESCRIBING
THE DIAMOND BASIN

Pursuant to a petition signed by twenty (20) legal appropriators of underground water in Diamond Valley, Eureka County, Nevada, an Order is hereby made by the State Engineer and entered on the records of the State Engineer, at Carson City, Nevada, designating the following described area of land as an underground water baain coming under the provisions of Chapter 534 NRS (Conservation and Distribution of Underground Waters). The land included within said basin is described as follows:

Sections 22 through 28, 32 through 36, all in T. 26 N., R. 53 E.; Sections 19 through 23, 26 through 34, all in T. 26 N., R. 54 E.; all of T. 25 N., R. 53 E.; the West Half (W½) of T. 25 N., R. 54 E.; Sections 1, 12, 13, 24, 25, 35, 36, all in T. 24 N., R. 52 E.; all of T. 24 N., 53 E.; Sections 4 through 9, 15 through 22, 27 through 34, all in T. 24 N., R. 54 E.; Sections 1, 12, 13, 24, 25, 36, all in T. 23 N., R. 52 E.; all of T. 23 N., R. 53 E.; Sections 3 through 10, 15 through 22, 27 through 33, all in T. 23 N., R. 54 E.; Sections 1, 11 through 14, 22 through 26, 35, 36, all in T. 22 N., R. 52 E.; all of T. 22 N., R. 53 E.; all of T. 22 N., R. 54 E.; all of T. 21½ N., R. 53 E.; all of T. 21½ N., R. 54 E.; Sections 1, 12, 13, 24, 25, 36, all in T. 21 N., R. 52 E.; all of T. 21 N., R. 53 E.; Sections 3 through 10, 15 through 22, 27 through 34, all in T. 21 N., R. 54 E.; Section 24 in T. 20 N., R. 52 E.; all of T. 20 N., R. 53 E.; the West Half (W½) of T. 20 N., R. 54 E.; Sections 1 through 29, 32 through 36 all in T. 19 N., R. 53 E.; Sections 4 through 9, all in T. 19 N., R. 54 E.; M. D. B. & M.

Dated this 5th day of August, 1964, at Carson City, Nevada

Elmo J. DeRicco

ELMO J. DeRICCO
State Engineer

Exhibit 279

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

. . . . . .

O R D E R

AMENDING THE DESIGNATED AREA OF THE DIAMOND BASIN

On August 5, 1964, the State Engineer by an official order and pursuant to a petition signed by twenty (20) legal appropriators of underground water in Diamond Valley, Eureka County, Nevada, designated and described an area of land as an underground water basin coming under the provisions of Chapter 534 NRS (Conservation and Distribution of Underground Waters).

Under the provisions of Chapter 534 NRS an Order is hereby made by the State Engineer and entered on the records of the Division of Water Resources, Carson City, Nevada amending the description of the designated area of the Diamond Basin.

The area included within the basin as amended is described as follows: All of the area within the Diamond Basin officially designated August 5, 1964, except that portion described as Sections 1 through 29, 32 through 36 all in T. 19 N., R. 53 E., M.D.B. & M. which is deleted from the designated area.

Dated this 28th day of August, 1964, at Carson City, Nevada

Elmo J. DeRicco

ELMO J. DeRICCO
State Engineer

Exhibit 280

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

ORDER

* * * * *

NOTICE OF CURTAILMENT OF WATER APPROPRIATION

WITHIN THE DIAMOND VALLEY GROUND WATER BASIN

WHEREAS, the State Engineer has designated the Diamond Valley Ground Water Basin as provided under NRS 534.010 to 534.190, inclusive, by the following Orders:

1. Order No. 277, dated August 5, 1964.
2. Order No. 280, dated August 28, 1964.

WHEREAS, NRS 534.120 provides that within an area that has been designated by the State Engineer where, in his judgment, the ground water basin is being depleted, the State Engineer in his administrative capacity is empowered to make such rules, regulations and orders as are deemed essential for the welfare of the area involved.

WHEREAS, the U. S. Geological Survey estimates that 30,000 acre-feet of water annually are available as a perennial yield from the Diamond Valley Ground Water Basin. Existing ground water rights of record in the State Engineer's office total 127,526 acre-feet per year for the irrigation of 32,650 acres. Approximately 17,000 acres were irrigated during the 1975 irrigation season.

WHEREAS, the State Engineer has found that the ground water is being depleted in portions of the basin, particularly in the agricultural areas south of the South Boundary Line of Township 22 North, M.D.B.& M.

Exhibit 281

NOW THEREFORE, it is ordered that:

1. All applications filed to appropriate water from the Diamond Valley Ground Water Basin north of the South Boundary Line of Township 22 North, M.D.B.& M. will be considered for approval on an individual basis and on their own merits.
2. All applications filed to appropriate water for irrigation of additional lands within that portion of the designated area of Diamond Valley south of the South Boundary Line of Township 22 North, M.D.B.& M. that have not had a previous water right lost through forfeiture will be denied.
3. All applications filed to appropriate water for irrigation purposes on lands in Diamond Valley that had a previous water right lost through forfeiture will be considered for approval on an individual basis and on their own merits.

Respectfully submitted,

Roland D. Westergard
State Engineer

Dated this 22nd
day of December, 1975.

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

ORDER

NOTICE OF CURTAILMENT OF WATER APPROPRIATION

WITHIN THE DIAMOND VALLEY GROUND WATER BASIN

WHEREAS, the State Engineer has designated the Diamond Valley Ground Water Basin as provided under NRS 534.010 to 534.190, inclusive, by the following Orders·

1. Order No. 277, dated August 5, 1964.
2. Order No. 280, dated August 28, 1964.

WHEREAS, NRS 534.120 provides that within an area that has been designated by the State Engineer where, in his judgment, the ground water basin is being depleted, the State Engineer in his administrative capacity is empowered to make such rules, regulations and orders as are deemed essential for the welfare of the area involved.

WHEREAS, the State Engineer issued Order No. 541 on December 22, 1975 giving notice of curtailment of water appropriation within the Diamond Valley Ground Water Basin.

WHEREAS, lands that have not been cultivated for several years are being put back into production and a total of approximately 20,000 acres were irrigated in 1977 compared to 17,000 acres in 1975.

WHEREAS, the State Engineer has found a continued depletion of the ground water supplies in portions of the basin.

NOW THEREFORE, it is ordered that:

1. All applications filed after the date of this order to appropriate ground water for irrigation of lands within the Diamond Valley Ground Water Basin that have not had a previous water right lost through forfeiture will be denied
2. All applications filed on or before December 31, 1978 to appropriate ground water for irrigation purposes on lands in Diamond Valley that had a previous water right lost through forfeiture will be considered for approval on an individual basis and on their own merits

Exhibit 282

3. All applications filed after December 31, 1978 to appropriate ground water for irrigation purposes on any land within the Diamond Valley Ground Water Basin will be denied.

Roland D. Westergard
State Engineer

Dated at Carson City, Nevada,
this 10th day of July, 1978.

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

O R D E R

REQUIRING INSTALLATION OF TOTALIZING METERS ON ALL PERMITTED IRRIGATION WELLS WITHIN THE DIAMOND VALLEY GROUND WATER BASIN

WHEREAS, the State Engineer has designated the Diamond Valley Ground Water Basin as provided under NRS 534.010 to 534.190, inclusive, by the following Orders:

1. Order No. 277, dated August 5, 1964
2. Order No. 280, dated August 28, 1964

NRS 534.120 provides that within an area that has been designated by the State Engineer where, in his judgment, the ground water basin is being depleted, the State Engineer in his administrative capacity is empowered to make such rules, regulations and orders as are deemed essential for the welfare of the area involved.

The State Engineer issued Order No. 541 on December 22, 1975 and Order No. 717 on July 10, 1979, giving notice of curtailment of water appropriation within the Diamond Valley Ground Water Basin.

The State Engineer held public hearings in Eureka, Nevada on May 24, 1982 and August 9, 1982 to receive evidence and testimony on possible curtailment of pumping from under ground sources in the Diamond Valley Designated Ground Water Basin.

The U.S. Geological Survey estimates that 30,000 acre-feet of water annually are available as perennial yield from the Diamond Valley Ground Water Basin. Existing ground water rights of record in the State Engineer's office total 139,249.54 acre-feet per year. Approximately 25,279 acres were irrigated by 183 wells in 1981 with an approximate consumptive use of 71,744 acre-feet.

The State Engineer has found that the ground water is being depleted in portions of the basin, particularly in the agricultural areas.

Exhibit 283

The State Engineer has the authority under NRS 534.110, section 6, to conduct investigations in any basin or portion thereof where it appears that the average annual replenishment to the ground water supply may not be adequate for the needs of all permitees and all vested right claimants, and if his findings so indicate the State Engineer may order that withdrawals be restricted to conform to priority rights.

NOW THEREFORE, for the purpose of obtaining more accurate measurements of water placed to beneficial use and for the purpose of obtaining more accurate information concerning the effects of pumping on the average annual replenishment to the ground water supply, it is hereby ordered that totalizing meters be installed on all permitted and certificated wells within the Diamond Valley Ground Water Basin. The totalizing meters must be installed and maintained in the discharge pipeline near the point of diversion. The totalizing meters must be installed before May 1, 1983.

Peter G. Morros
State Engineer

Dated at Carson City, Nevada, this

1st day of DECEMBER, 1982

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

O R D E R

SUSPENDING COMPLIANCE DATE OF STATE ENGINEER'S ORDER NO. 809 RELATING TO INSTALLATION OF TOTALIZING METERS ON ALL PERMITTEES' IRRIGATION WELLS WITHIN THE DIAMOND VALLEY GROUND WATER BASIN

WHEREAS, the State Engineer issued Order No. 809 on December 1, 1982, requiring installation of totalizing meters on all permitted irrigation wells within the Diamond Valley Designated Ground Water Basin.

Various well owners and/or their representatives have requested permission to substitute other recording devices for said totalizing meters.

It will be necessary to study and consider the substitute proposals to determine whether or not the data required in Order No. 809 can be supplied thereby.

This study and determination cannot be made by May 1, 1983.

All those well owners that have already installed or that wish to install totalizing meters may proceed with such installation.

NOW THEREFORE, it is hereby ordered that the compliance date of State Engineer's Order No. 809 is suspended for one year, until May 1, 1984, at which time either a totalizing meter or an effective and authorized substitute measuring device must be installed on all permitted irrigation wells in the Diamond Valley Designated Ground Water Basin.

Peter G. Morros
State Engineer

Dated at Carson City, Nevada,
this 7th day of February, 1983.

Exhibit 284

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

1226

ORDER

WHEREAS, Nevada Revised Statute (NRS) § 534.120 provides that within an area that has been designated by the State Engineer where, in his judgment, the groundwater basin is being depleted, the State Engineer in his administrative capacity is empowered to make such rules, regulations and orders as are deemed essential for the welfare of the area involved.

WHEREAS, the State Engineer designated the Diamond Valley Hydrographic Basin as provided under the provisions of NRS § 534.030, by the following Orders:

1. Order No. 277, dated August 5, 1964.
2. Order No. 280, dated August 28, 1964.
3. Order No. 541, dated December 22, 1975.
4. Order No. 717, dated July 10, 1978.
5. Order No. 809, dated December 1, 1982.
6. Order No. 813, dated February 7, 1983.
7. Order No. 815, dated April 4, 1983.

WHEREAS, by Order No. 541 and Order No. 717, the State Engineer declared, that within the Diamond Valley Hydrographic Basin the groundwater supply is being depleted in portions of the basin. Further, Order No. 717 specified that all applications filed after December 31, 1978, to appropriate groundwater for irrigation purposes will be denied.

WHEREAS, by Order No. 815, the area previously designated under Order Nos. 277 and 280 was amended to describe and encompass the entire Diamond Valley Hydrographic Basin.

WHEREAS, the Nevada Division of Water Resources estimates the perennial yield of the Diamond Valley Hydrographic Basin at 30,000 acre-feet annually.

WHEREAS, committed groundwater rights of record in the Office of the State Engineer greatly exceed the perennial yield.

WHEREAS, the Diamond Valley Crop Inventory consistently shows the pumpage of groundwater within the Diamond Valley Hydrographic Basin is in excess of the perennial yield.

WHEREAS, the State Engineer finds that conditions warrant the curtailment of new appropriations of groundwater within the Diamond Valley Hydrographic Basin.

NOW THEREFORE, it is ordered that, with the following exceptions, any application to appropriate groundwater within the designated Diamond Valley Hydrographic Basin will be denied. Applications filed under the exceptions below must also satisfy the criteria found in NRS Chapters 533 and 534.

EXCEPTIONS:

1. Those applications filed for environmental permits filed pursuant to NRS 533.437 to 533.4377, inclusive.
2. Those applications filed for diversion rate only with no corresponding increase in duty of water.
3. Those applications filed for non-consumptive uses.
4. Those applications filed to mitigate senior surface water rights that have been impacted by groundwater pumping under junior water rights.

JASON KING, P.E.
State Engineer

Dated at Carson City, Nevada this

26th day of March, 2013.

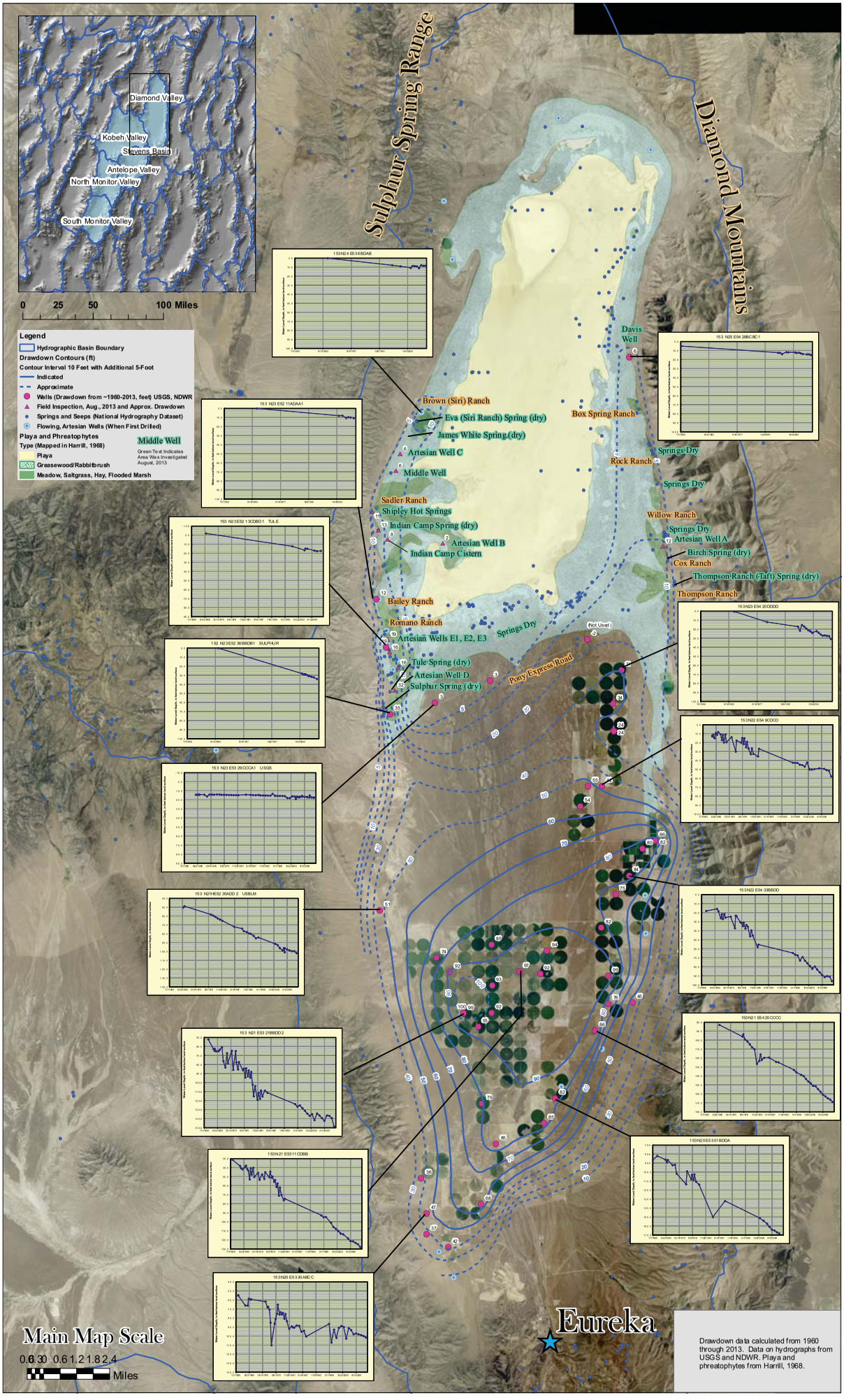

Plate 1: Drawdown in the Basin-Fill Aquifer, Diamond Valley 1960-2013

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND

NATURAL RESOURCES

WATER RESOURCES BULLETIN NO. 35

HYDROLOGIC RESPONSE TO IRRIGATION PUMPING IN DIAMOND VALLEY, EUREKA AND ELKO COUNTIES, NEVADA, 1950-65

By

J. R. Harrill

With section on

Surface Water

By

R. D. Lamke

Prepared in cooperation with the

United States Department of the Interior

Geological Survey

1968

of the area.

Spring Discharge

In South Diamond subarea small springs occur along the east side of the valley mostly as seepage areas near the bases of alluvial fans. The discharge in these areas is about 180 acre-feet per year, and most of the water is consumed by vegetation.

In the North Diamond subarea there is one fairly large spring on the east side of the valley at Thompson Ranch, sec. 3, T. 23 N., R. 54 E. There, water flows from bedrock outcrops mapped as klippe of western facies rocks of Ordovician(?) age by Larsen and Riva (1963). The water is warm, and the spring is considered to be in a fault-controlled area of discharge of moderately deeply circulating ground water. Other small seepage areas are common along the east side of the subarea. The western margin of the subarea is characterized by a number of pond springs at altitudes of approximately 5,800 feet. All the springs discharge warm water and all are in alluvial material near the bases of alluvial fans or pediments.

Drillers' logs of wells and field observations indicate that the alluvial fill in the vicinity of the springs along the west side of the North Diamond subarea is composed predominantly of interbedded sand, gravel, and clay, and is capable of transmitting appreciable quantities of water. This coarse-grained valley fill is underlain by bedrock at shallow depth. Logs of wells drilled nearer the center of the valley indicate that there the valley fill is predominantly silt, clay, and fine sand, and is less capable of transmitting water. These springs probably are fault controlled and supplied principally by deeply circulating ground water that passes from bedrock into a narrow band of coarser material and then is discharged at the surface.

Table 9 lists the locations, names, discharges, and dates of measurements of the major springs. Slight decreases in discharge have occurred in both Shipley Hot Spring and Thompson Ranch spring. These changes are interpreted as adjustments to local development or as natural fluctuations, which may represent below-average precipitation in the 1950's, as indicated by Eakin and Lamke (1966, p. 19) for stations in the adjacent Humboldt River basin, rather than to pumping in the South Diamond subarea. Eventually, a gradual decrease of spring discharge in the North Diamond subarea should occur in response to pumping in the South Diamond subarea as sufficient water is removed from storage to induce subsurface flow from the spring areas toward the well field.

of the area.

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CONCLUSIONS

This second appraisal of the water resources of Diamond Valley has led to the following conclusions regarding the adequacy of supply, effects of development, and types of data needed to refine the flow system and response characteristics of the valley-fill reservoir:

1. All development to date and all applications for future development are in the South Diamond subarea--total permits to pump about 150,000 acre-feet per year have been granted. This is considerably in excess of the estimated perennial yield of 30,000 acre-feet for Diamond Valley.

2. The estimated net pumpage in 1965 was 12,000 acre-feet, or less than half the estimated yield. Virtually all net pumpage of record (1950-65), which totals an estimated 50,000 acre-feet, has been supplied from ground water in storage in the South Diamond subarea.

3. Because the area of pumping is remote from areas of natural discharge, storage depletion will continue for many years in the future. An example demonstrated that if net pumpage were held to only 12,000 acre-feet per year, about 3 million acre-feet of storage depletion would be required before 12,000 acre-feet per year of natural discharge could be salvaged. Water levels in the area of concentrated pumpage (T. 21 N., R. 53 E.) would be drawn down as much as 200 feet below 1965 levels. The time required to reach the new equilibrium would be from 300 to 400 years.

4. The rate of increase in estimated net pumpage from 1,800 acre-feet in 1960 to 12,000 acre-feet in 1965 suggests that net pumpage may equal the perennial yield by 1975. Even if the perennial yield is not exceeded, local overdraft is likely to occur in the South Diamond subarea and water levels locally may be drawn down below economic pumping lifts.

5. Pumping in the South Diamond subarea eventually should decrease the natural discharge from springs in the North Diamond subarea, which during the summer 1965 was largely being used beneficially. In time, the discharge from springs may have to be supplemented or replaced by pumping from wells. Although more costly, this procedure would salvage the large amount of water (about 6,000 acre-feet per year) now running to waste during the nongrowing season.

6. The cost of pumping will increase in about direct proportion to the increase in pumping lift, provided that other fixed

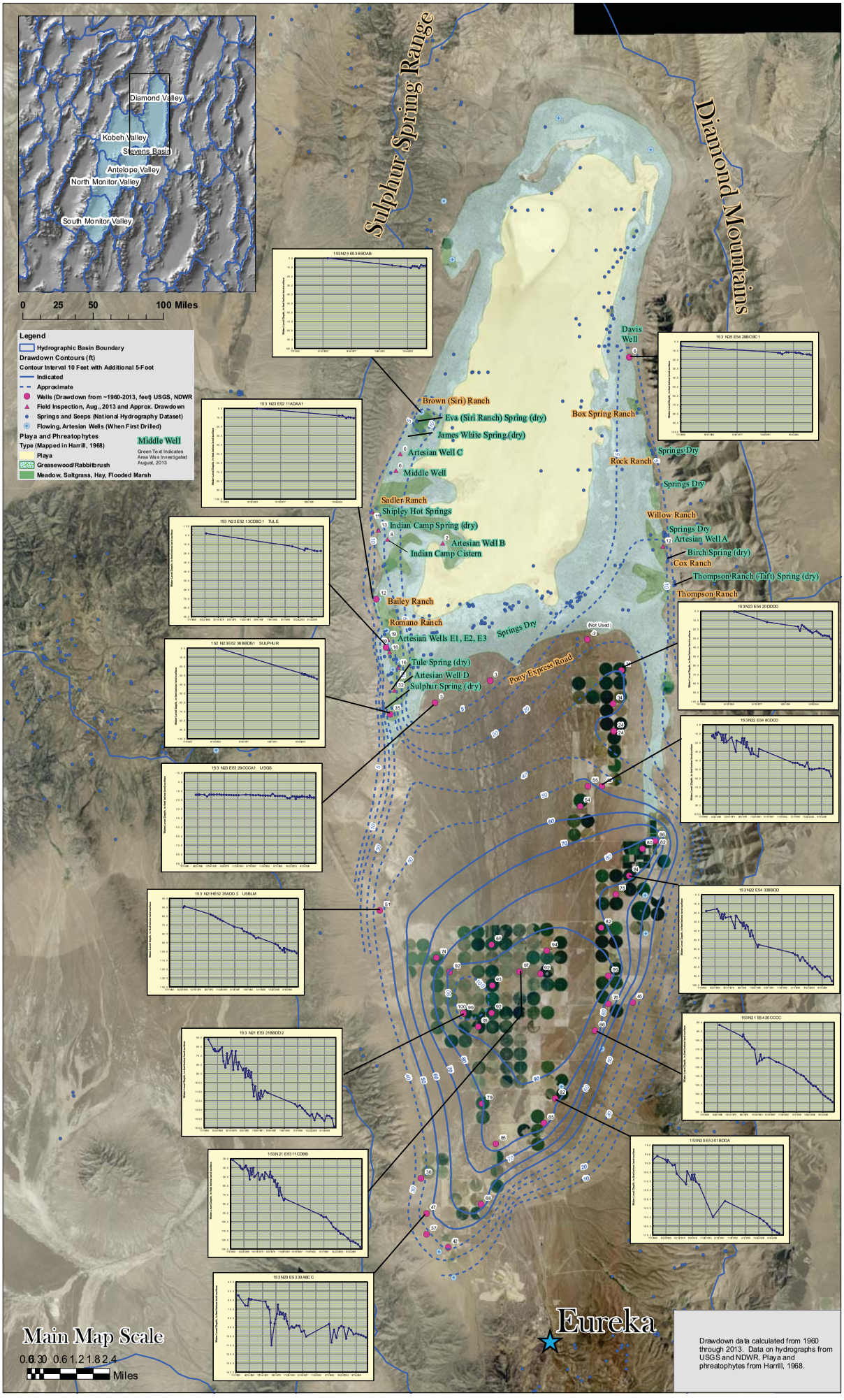

Plate 1: Drawdown in the Basin-Fill Aquifer, Diamond Valley 1960-2013

WELL LOG AND REPORT TO THE STATE ENGINEER OF NEVADA

Log No. 509
Rec. 6/4 1948
Well No.
Permit No.
Do not fill in Blank 153

Owner A.C. Florio
Driller Henry L Nelson
Address Eureka Nev.
Address Lovelock
Lic. No. 18

Location of well: NW¼NW¼ Sec. 13, T. 23 N/S, R 52 E, in Eureka County
or O I D Romano Ranch N39.977624 W116.066107 NAD27

Water will be used for Irrigation
Total depth of well 140'
Size of drilled hole 6½"
Weight of casing per linear foot 16#
Thickness of casing ¼"
Temp. of water 40°
Diameter and length of casing 6" X 140'
(Casing 12" in diameter and under give inside diameter; casing 12" in diameter give outside diameter.)

If flowing well give flow in c.f.s. or g.p.m. and pressure 20 miners inches (Weir) 0.5 cfs
If nonflowing well give depth of standing water from surface
If flowing well describe control works None at Specific instructions of owner
(Type and size of valve, etc.)

Date of commencement of well May 1 1948 Date of completion of well May 31 1948
Type of well rig Churn Drill

LOG OF FORMATIONS

From feet	To feet	Thickness feet	Type of material
0	23	23	Silt - Clay (Blue)
23	29	6	Sand - pea Gravel - water (not Flowing)
29	50	21	- Sandy Clay
50	71	21	Sand - Coarser Gravel 9 M.I. artesian Flow
71	93	22	Red Sandy Clay & Gravel
93	111	18	Sand Gravel 12 M.I. artesian Flow at 111'
111	140	29	Sand Gravel Increasing Flow unable to Go Deeper Due to Sand & Gravel Resistance to Drilling

(OVER)

Water-bearing Formation, Casing Perforations, Etc.

Chief aquifer (water-bearing formation)
from 111 to 140 ft.
Other aquifers 23-29
50-71
71-93

First water at 23 feet.

Casing perforated
from 0 to 140' ft.

Size of perforations
⅛" X 5"

Exhibit 154

SUPP000775

LOG OF FORMATIONS—*Continued*

From feet	To feet	Thickness	Type of material

CASING RECORD

Diam. casing	From feet	To feet	Length	"Remarks"—Seals, Grouting, Etc.

GENERAL INFORMATION—Pumping Test, Quality of Water, Etc.

water cold, clear & good tasting but with a metallic smell — unvarying artesian flow about 20 m.i.

WELL DRILLERS STATEMENT

This well was drilled under my jurisdiction and the above information is true to my best information and belief.

Signed Henry L. Nelson
Well Driller

By .....

License No. 18

Dated June 2, 1948

OFFICE STATE ENGINEER
JUN 4 '48
RECEIVED
ANS.

(Not to be filled in by Driller)

of the area.

Spring Discharge

In South Diamond subarea small springs occur along the east side of the valley mostly as seepage areas near the bases of alluvial fans. The discharge in these areas is about 180 acre-feet per year, and most of the water is consumed by vegetation.

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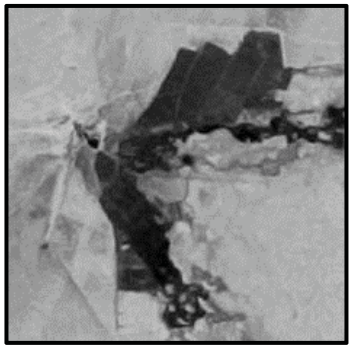
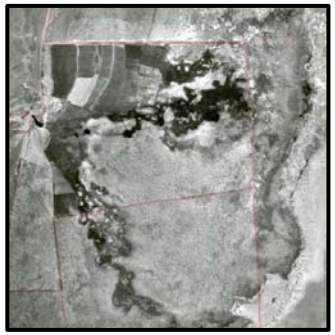
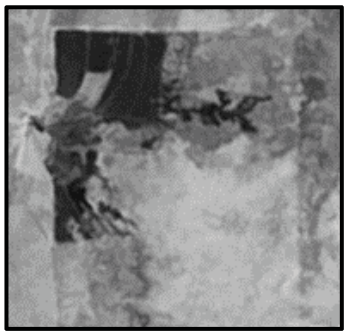
Aerial Photos of Brown Ranch—Irrigated Acres



1954

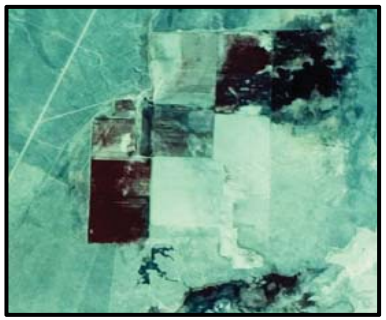


1967

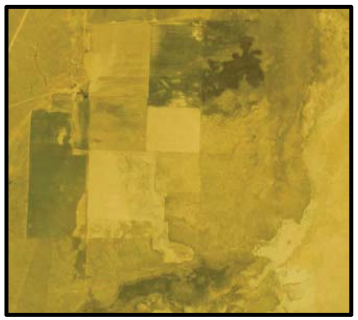


1968

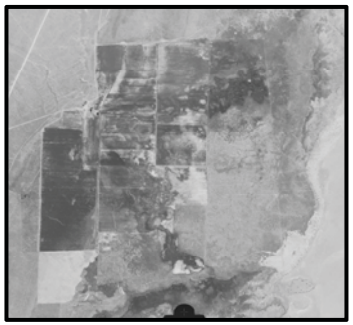
1975



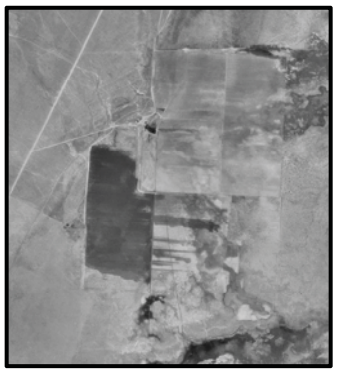
1981



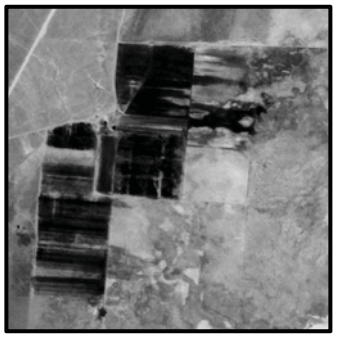
1982



1984



1994



1999

2006

Brown Ranch

Date	Estimate of irrigated acreage	Rounded Estimate
1954	81	80
1967	161	160
1968	243	240
1975	169	160
1981	243	240
1982	212	200
1984	529	520
1994	96	100
2006	257	260

< 1999 about 260 acres

Table from Exhibit 601
Aerials from Exhibit 200

EXHIBIT 36
FOR:
☑ STATE OF NEVADA
☐ PROTESTANT
☐ APPLICANT
☐ OTHER
8-9-82

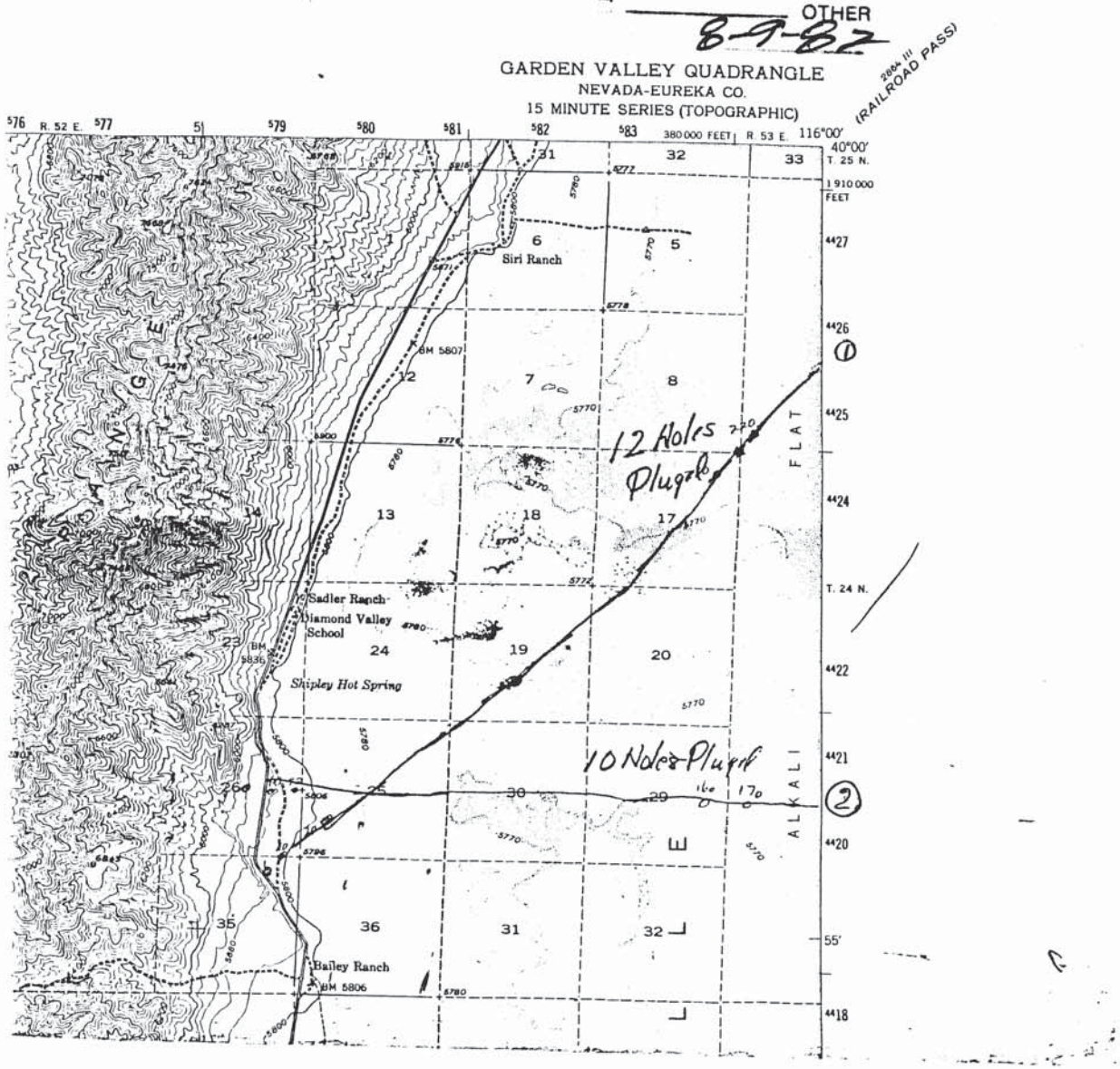


Exhibit 333

DEFENDANT'S EXHIBIT

ard Place 6
East Maplewood Ave.
333 Englewood 80111

Northwest Domolition

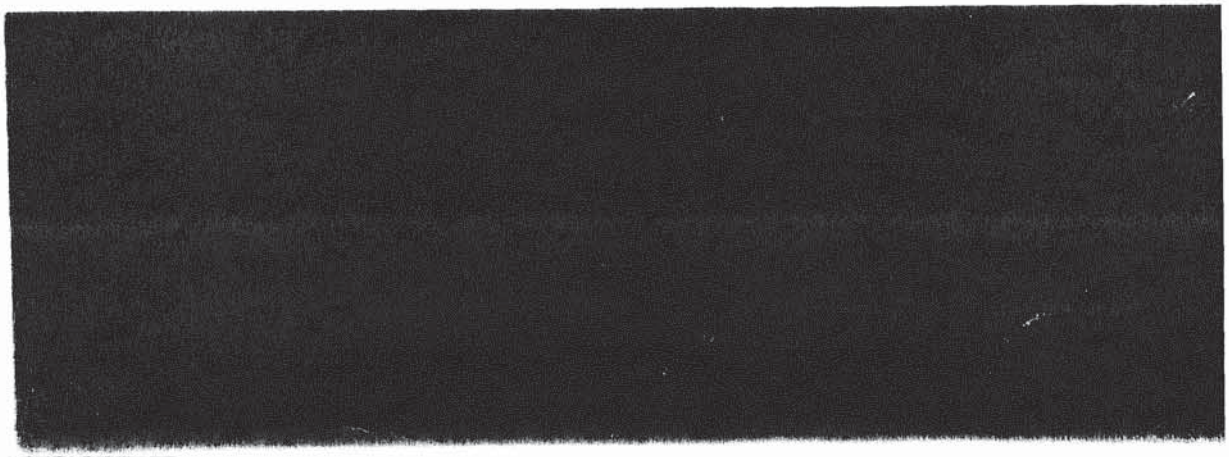
Plug East To West
Line #2
Location Sec 29 R53E T24N
Diamond Valley Nev.
Eureka

Date Completed June 82

Drill 1 Hole No.	Stand Pipe	G.P.M. Flowing	PSI & Temperature	Cement LBS	Aquifer Level	Explosive Recovered	Cement TD	Photo
1	0	3	.03 40	400	7	0	20	L
2	0	2	.03 40	400	7	0	20	L
3	0	2	.03 40	400	6	0	20	L
4	0	3	.02 40	400	7	0	20	L
5	0	3	.02 40	400	7	0	20	L
6	0	4	.02 41	600	8	0	20	L
7	6	12	741	800	12	0	30	L
8	0	6	.03 41	800	14	0	30	L
9	0	4	.0541	700	6	0	20	L
10	0	2	.0240	600	7	0	20	L
		41						

Signature Ray Wagner
1332

41 G.P.M 24 Hours After Shot Hole was Redrilled



[illegible] U.S.A. INC.
Anvil Place 6
East Maple wood Ave.
To 333 Englewood 80,11
lo.

Northwest Domolition

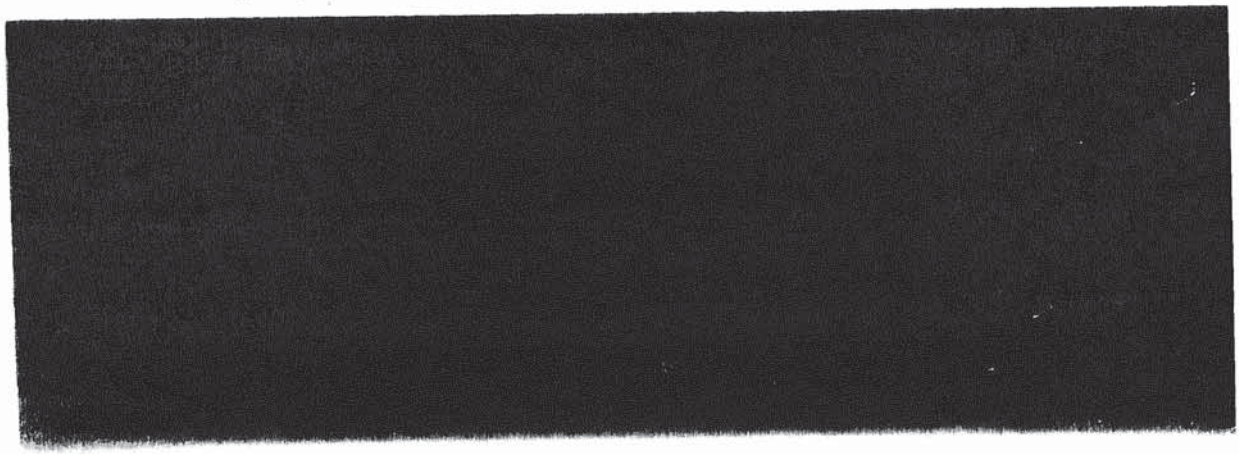
Location Line No 1 East To West Sec 19 R53E T24N
Diamond Valley Nev.
Eureka

Date Completed June 82

Drill 1 Hole No.	Stand Pipe	G.P.M. Flowing	PSI & Temperature	Cement LBS	Aquifer Level	Explosive Recovered	Cement TD	Photo
1	0	½	05 40	400	7	0	20	L
2	0	½	05 40	400	7	0	20	L
3	0	½	04 40	400	7	0	20	L
4	0	1	05 40	400	7	0	20	L
5	0	1	04 40	400	7	0	20	L
6	6	4	2 40	400	7	0	20	L
7	0	2	03 40	400	7	0	20	L
8	0	2	03 40	400	7	0	20	L
9	0	1	02 40	400	8	0	20	L
10	0	2	02 40	500	8	0	20	L
11	0	6	3 40	500	9	0	20	L
12	0	2	1 40	600	12	0	30	L
		22½						

Signature Ray Wagner
1339

22½ G.P.M 24 Hours After Shot Hole was Redrilled



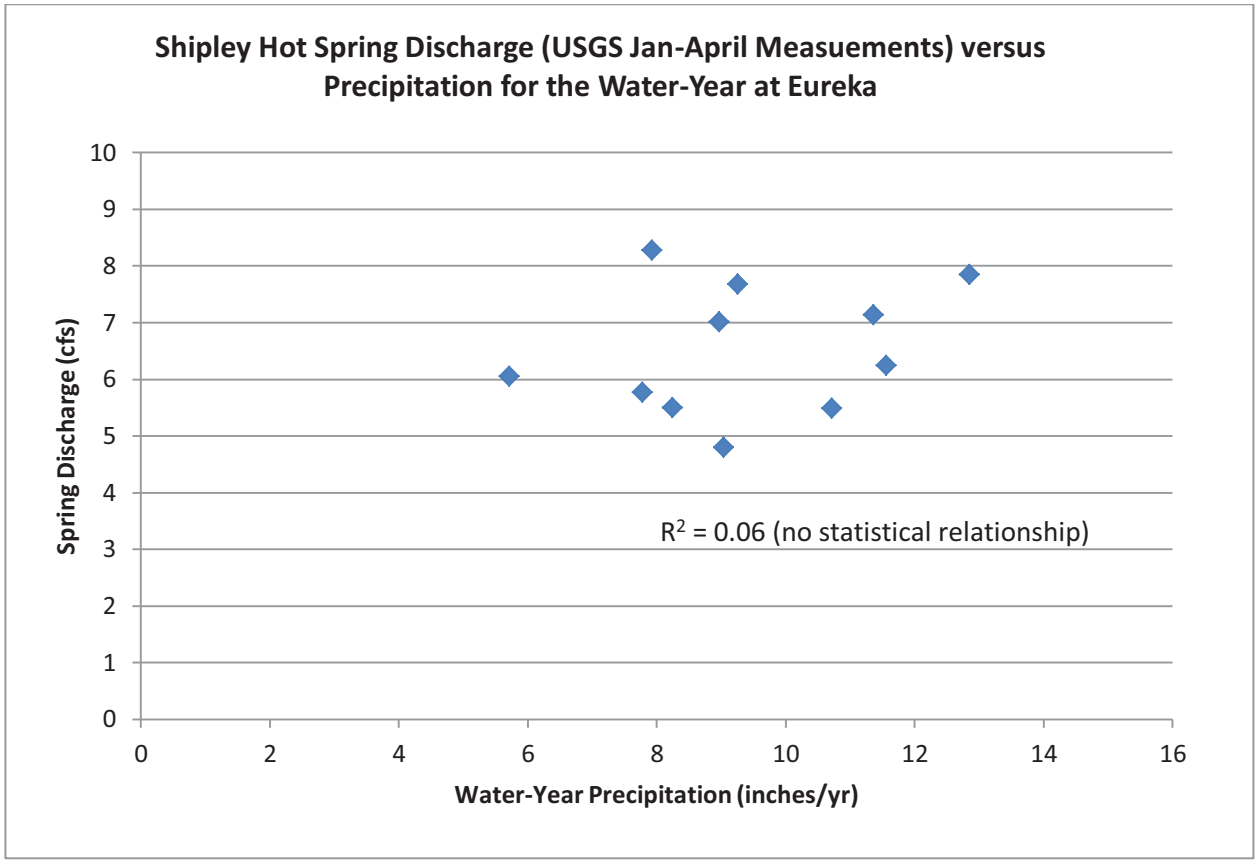


Figure 2 – Water-year Precipitation Recorded at the Eureka vs. Shipley Hot Spring Discharge Measurements (USGS data, 1965-1994 January to April measurements)

Exhibit 108, p. 4

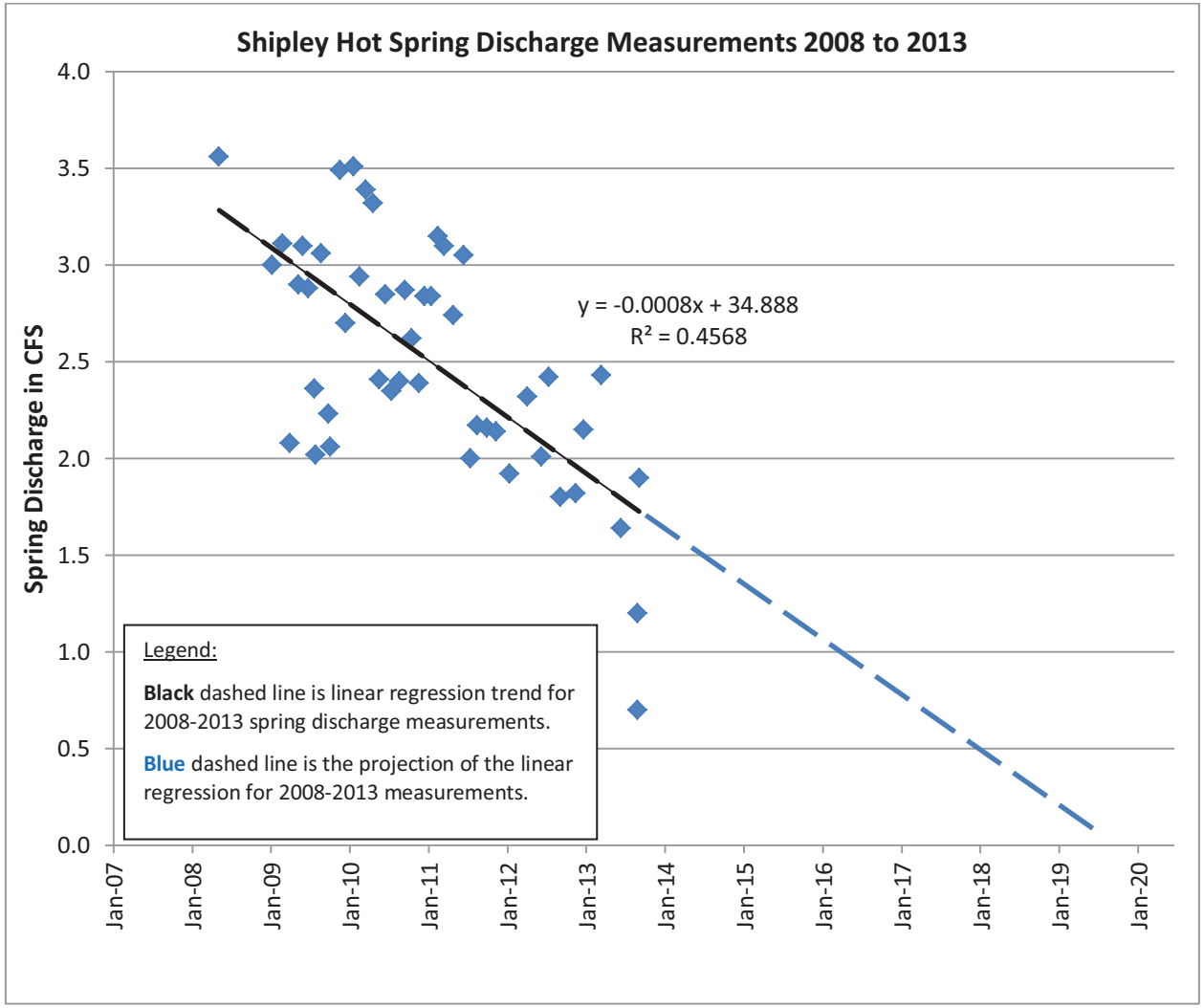
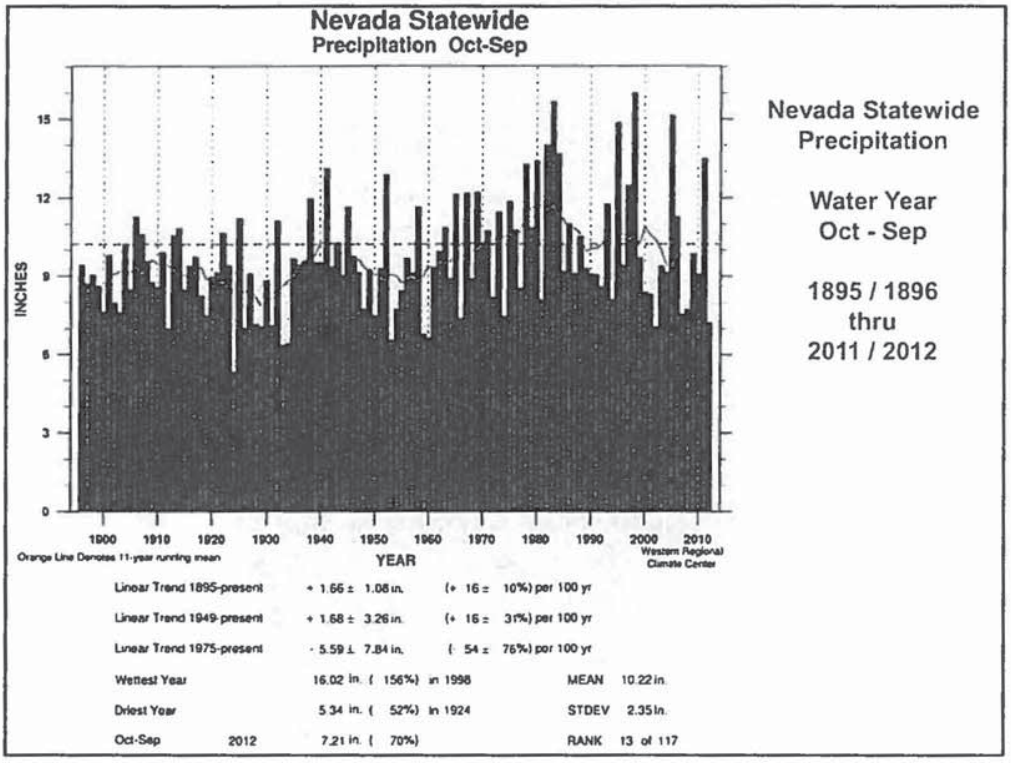
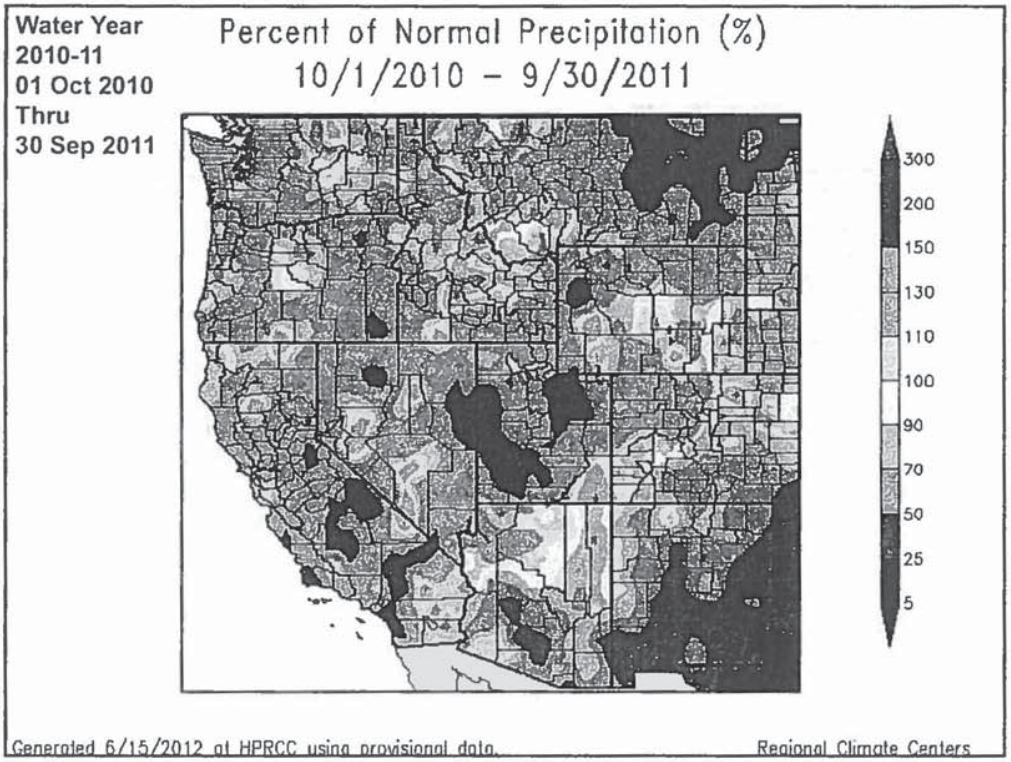
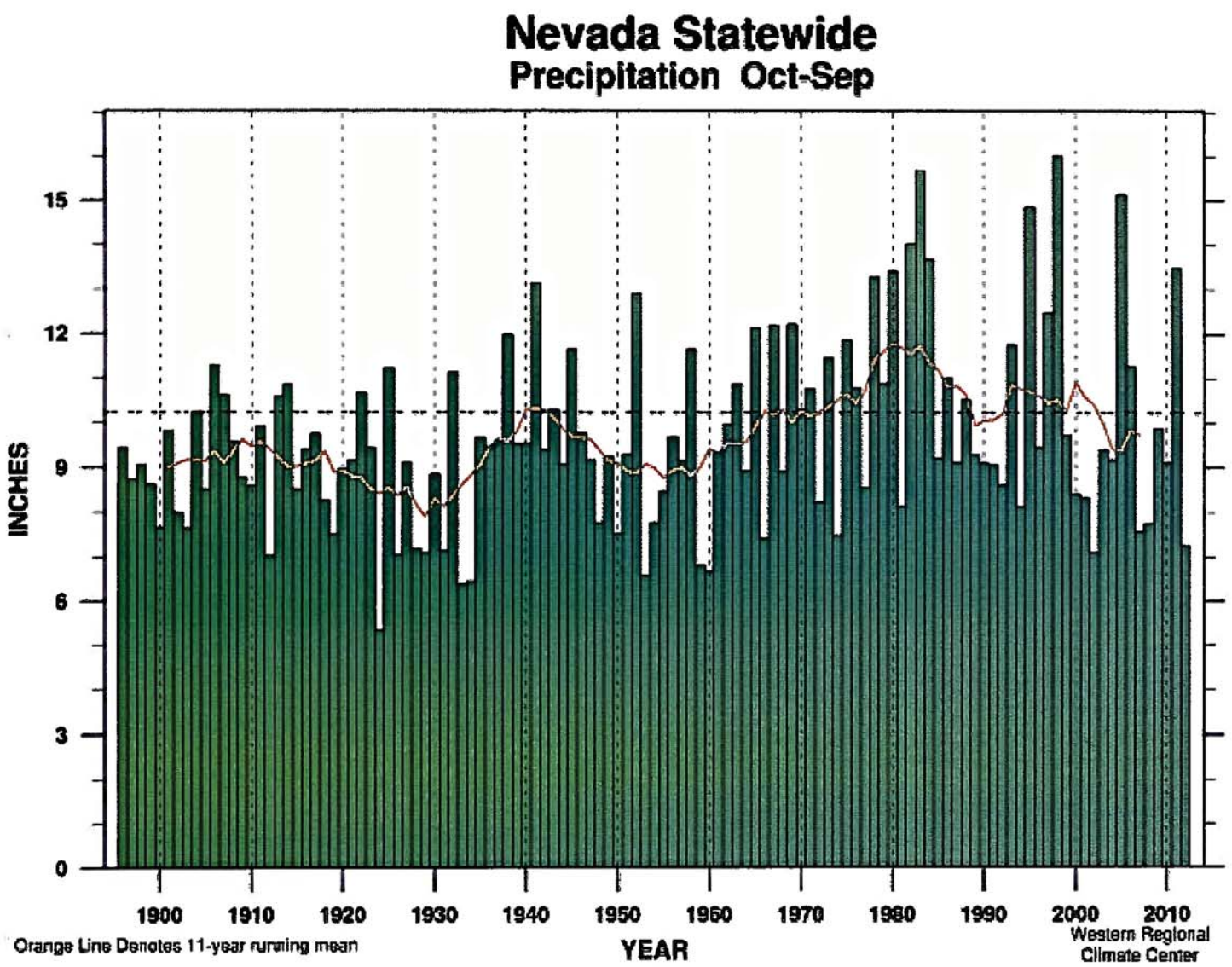


Figure 3 – Shipley Hot Spring Discharge Measurements, 2008 to 2013

Exhibit 108, p. 5


Nevada Statewide
Precipitation Oct-Sep
INCHES
YEAR
Orange Line Denotes 11-year running mean
Western Regional Climate Center
Linear Trend 1895-present + 1.66 ± 1.08 in. (+ 16 ± 10%) per 100 yr
Linear Trend 1949-present + 1.68 ± 3.26 in. (+ 16 ± 31%) per 100 yr
Linear Trend 1975-present - 5.59 ± 7.84 in. (- 54 ± 76%) per 100 yr
Wettest Year 16.02 in. (156%) in 1998 MEAN 10.22 in.
Driest Year 5.34 in. (52%) in 1924 STDEV 2.35 in.
Oct-Sep 2012 7.21 in. (70%) RANK 13 of 117
Nevada Statewide Precipitation
Water Year Oct - Sep
1895 / 1896 thru 2011 / 2012


Water Year 2010-11
01 Oct 2010 Thru 30 Sep 2011
Percent of Normal Precipitation (%)
10/1/2010 – 9/30/2011
300
200
150
130
110
100
90
70
50
25
5
Generated 6/15/2012 at HPRCC using provisional data.
Regional Climate Centers



Linear Trend 1895-present	+ 1.66 ± 1.08 in.	(+ 16 ± 10%) per 100 yr	
Linear Trend 1949-present	+ 1.68 ± 3.25 in.	(+ 16 ± 31%) per 100 yr	
Linear Trend 1975-present	- 5.57 ± 7.84 in.	(- 54 ± 76%) per 100 yr	
Wettest Year	16.02 in. (156%) in 1998	MEAN	10.22 in.
Driest Year	5.34 in. (52%) in 1924	STDEV	2.35 in.
Oct-Sep 2012	7.24 in. (70%)	RANK	13 of 117

Nevada Statewide Precipitation

Water Year Oct-Sep

1895-96 thru 2011-12

Exhibit 310, p. 33

EUREKA, NEVADA

Monthly Total Precipitation (inches)

(262708)

File last updated on Apr 4, 2013
*** Note *** Provisional Data *** After Year/Month 201304
a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,
z = 26 or more days missing, A = Accumulations present
Long-term means based on columns; thus, the monthly row may not
sum (or average) to the long-term annual value.
MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5
Individual Months not used for annual or monthly statistics if more than 5 days are missing.
Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1888	0.00z	0.00z	0.00z	0.00z	1.77	0.28	0.76	0.06	0.57	1.03	0.56	0.60	5.63
1889	0.86z	0.03	1.46	0.23	1.58	0.53	0.01	0.54	0.00z	1.47	0.19	2.36o	6.04
1890	2.87	1.10	3.21u	1.08	1.72	0.00	0.25	0.00z	0.01z	0.39z	0.04	9.75y	7.06
1891	0.60z	0.00z	2.81r	1.24t	2.48	2.47	1.66z	0.84z	0.49y	0.20	0.00z	0.00z	5.15
1892	0.00z	0.50	1.82t	0.25	0.00z	0.00z	0.02z	0.03	0.00z	6.00z	0.00z	0.00z	0.78
1893	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.60	0.60
1894	1.39	2.14	1.62	0.37	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	5.52
1895	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1896	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1897	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1898	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1899	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1900	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1901	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1902	0.00z	0.00z	5.40	1.55	0.90	0.30	0.50	0.00	1.00	0.40	1.10	0.30	11.45
1903	1.00	1.20	0.35	1.10	1.10	0.10	0.00	0.00	0.00	0.00	0.00	0.20	5.05
1904	0.45	1.80	1.00	0.59	0.00	0.00	1.50	3.40	0.11	0.71	0.00	0.25	9.81
1905	2.60	2.60	1.10	2.23	1.10	0.07	0.00	0.95	0.50	0.00	1.40	1.60	14.15
1906	0.00z	0.00z	0.01u	1.26	2.59	1.21	1.27	0.65	0.53	0.66	1.24	2.49	11.90
1907	4.70	0.78	2.18	1.04	2.62	3.86	0.19	0.63	0.64	0.85	0.70	2.45	20.64
1908	2.15	2.55	1.95	0.30	2.13	0.44	1.28	0.57	1.70	0.53	0.15	0.25	14.00
1909	1.58	0.78	1.28	0.50	0.09	0.00	0.38	1.64	0.68	1.29	3.53	0.71	12.46
1910	0.71	0.52	0.81	0.53	0.65	0.02	2.62	0.54	1.15	0.70	0.58	0.63	9.46
1911	1.49	1.30	1.27	1.35	1.01	1.63	0.50	0.00	1.20	0.65	0.18	0.77z	10.58
1912	0.72	0.13	4.05	2.33	0.80	0.79y	3.38	0.53	0.65	4.08x	0.87	0.69	14.15

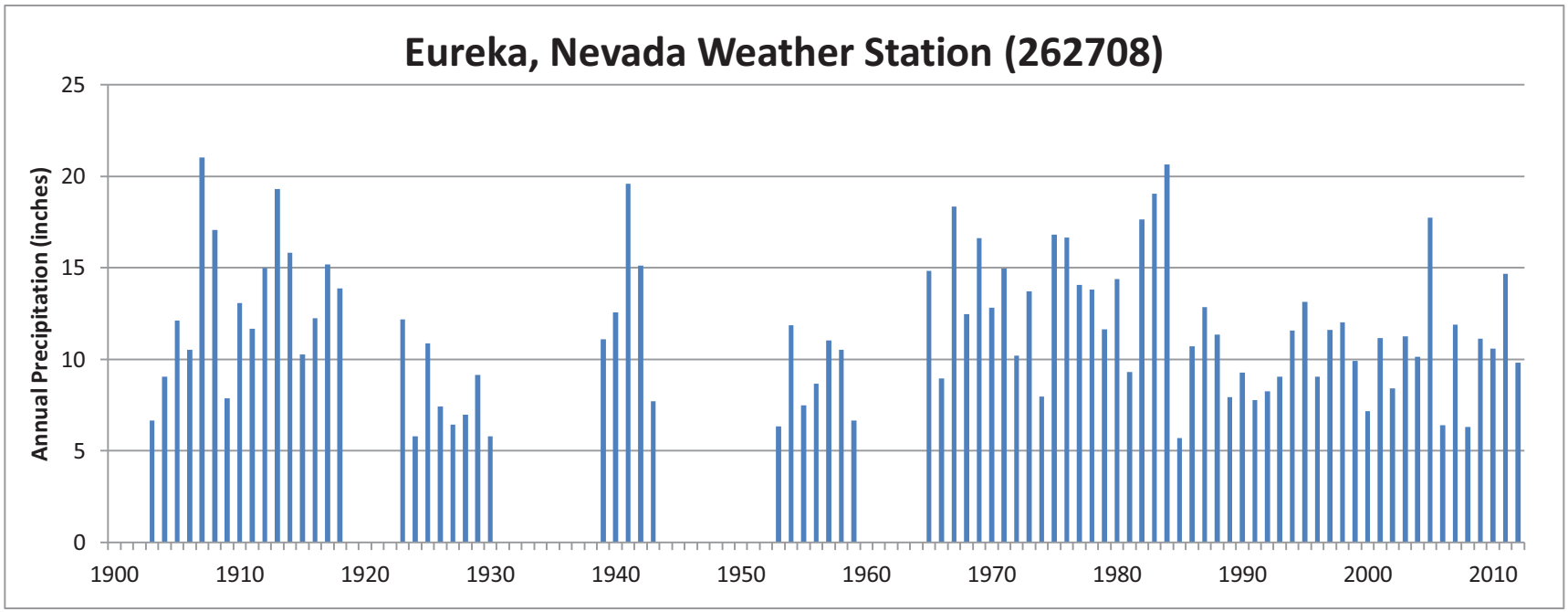

Eureka, Nevada Weather Station (262708)
Annual Precipitation (inches)
25
20
15
10
5
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

Table 1.

Springs in Eureka County Showing Decreased Spring Flow

Spring Name	Certificate	Historical Discharge [a]	Recent Discharge
Hash	1439	0.059 cfs (26.5 gpm)	Water present, no measureable flow [b]
			0 cfs [c]
Railroad	1440	0.059 cfs (26.5 gpm)	Water present, no measureable flow [b]
			0 cfs [c]
Trap Corral	1441	0.05 cfs (22.4 gpm)	Water present, no measureable flow [b]
			0 cfs [c]
Mud (located in the alluvium)	5880	0.015 cfs (6.7 gpm)	Water present, no measureable flow [b]
Unnamed Spring No.3 (Diamond Springs Ranch)	14026	0.0.713 cfs (320.0 gpm)	0.529 cfs (237.4 gpm) [b]

Notes
a. Discharge documented on the Certificate of Appropriation approved by the NSE or webmap.water.nv.gov/data/permit
b. SRK, 2007
c. http://water.nv.gov/data/streamflow, 2013 measurement.

Exhibit 302, p. 7

Exhibit 199

Under Permit No. 8183

FILED
June 16, 1928
STATE ENGINEER'S OFFICE

PROOF OF APPLICATION OF WATER TO BENEFICIAL USE

DEPOSITION OF PERMITTEE

NOTE—Questions 1 to 12 inclusive must be answered regardless of the purpose for which your permit for water has been granted. If this proof is made for irrigation purposes, a cultural map showing actual boundaries of land irrigated, together with classes of culture, etc., must accompany same, unless such map has already been filed. (See Sec. 69, Chapter 140, Statutes 1913.)

Question 1. What is your name, occupation, and post-office address?

Answer: A. C. Florio, Stockman, Eureka, Nevada

Question 2. Are you acting in behalf of a corporation? If so, state its name, place of business, and your authority for acting in its behalf.

Answer: No

Question 3. What is the number of the permit under which this proof is made? Answer: 8183

Question 4. From what source do you obtain your water supply?

Answer: Hash Spring

Question 5. What is the name of the canal, conduit, or other works by which water is conducted to its place of use?

Answer: pipe line and trough

Question 6. Are you the person to whom the permit was issued? If not, state how you obtained it, giving the succession of title.

Answer: Yes

(If assignments of title are not on file in the office of the State Engineer, the certificate will issue to the original applicant.)

Question 7. For what purpose are you using the water for which you are now making proof?

Answer: Stock watering and domestic purposes

Question 8. How many cubic feet per second of water, or fraction thereof, have you actually diverted and beneficially used for the purpose for which this proof is made?

(Actual measurement of water shall be given. 40 miners' inches equals 1 cubic foot per second. 1 miners' inch equals 11.21 gallons per minute. 448.83 gallons per minute equals 1 cubic foot per second.)

Answer: 0.2

Question 9. State the period during the year when water has been beneficially used.

Answer: January 1st to December 31st

Question 10. Do you divert and use more water at periods than granted in the permit for which proof is made? If so, make proper explanation.

Answer: No

Question 11. Give date when water measurements were taken, the point at which such measurements were taken and the name and address of person who made the measurements.

Answer: ----------

Under Permit No. 8184

FILED
June 14, 1927
STATE ENGINEER'S OFFICE

PROOF OF APPLICATION OF WATER TO BENEFICIAL USE

DEPOSITION OF PERMITTEE

NOTE—Questions 1 to 12 inclusive must be answered regardless of the purpose for which your permit for water has been granted. If this proof is made for irrigation purposes, a cultural map showing actual boundaries of land irrigated, together with classes of culture, etc., must accompany same, unless such map has already been filed. (See Sec. 69, Chapter 140, Statutes 1913.)

Question 1. What is your name, occupation, and post-office address?

Answer: A. C. Florio, Stockman, Eureka, Nevada

Question 2. Are you acting in behalf of a corporation? If so, state its name, place of business, and your authority for acting in its behalf.

Answer: No

Question 3. What is the number of the permit under which this proof is made? Answer: 8184

Question 4. From what source do you obtain your water supply?

Answer: Railroad Spring

Question 5. What is the name of the canal, conduit, or other works by which water is conducted to its place of use?

Answer: Pipe line and reservoir

Question 6. Are you the person to whom the permit was issued? If not, state how you obtained it, giving the succession of title.

Answer: Yes

(If assignments of title are not on file in the office of the State Engineer, the certificate will issue to the original applicant.)

Question 7. For what purpose are you using the water for which you are now making proof?

Answer: Stock watering and domestic purposes

Question 8. How many cubic feet per second of water, or fraction thereof, have you actually diverted and beneficially used for the purpose for which this proof is made?

(Actual measurement of water shall be given. 40 miners' inches equals 1 cubic foot per second. 1 miners' inch equals 11.21 gallons per minute. 448.83 gallons per minute equals 1 cubic foot per second.)

Answer: 0.2

Question 9. State the period during the year when water has been beneficially used.

Answer: January 1st to December 31st

Question 10. Do you divert and use more water at periods than granted in the permit for which proof is made? If so, make proper explanation.

Answer: No

Question 11. Give date when water measurements were taken, the point at which such measurements were taken and the name and address of person who made the measurements.

Answer: ---------

Question 21. What are the dimensions of the cross-section of the pipe, flume, ditch or other conduit

Under Permit No. 8185

FILED
June 16, 1928
STATE ENGINEER'S OFFICE

PROOF OF APPLICATION OF WATER TO BENEFICIAL USE

DEPOSITION OF PERMITTEE

NOTE—Questions 1 to 12 inclusive must be answered regardless of the purpose for which your permit for water has been granted. If this proof is made for irrigation purposes, a cultural map showing actual boundaries of land irrigated, together with all classes of culture, etc., must accompany same, unless such map has already been filed. (See Sec. 69, Chapter 140, Statutes 1913.)

Question 1. What is your name, occupation, and post-office address?

Answer: A. C. Florio, Stockman, Eureka, Nevada

Question 2. Are you acting in behalf of a corporation? If so, state its name, place of business, and your authority for acting in its behalf.

Answer: No

Question 3. What is the number of the permit under which this proof is made? Answer: 8185

Question 4. From what source do you obtain your water supply?

Answer: Trap Corral Spring

Question 5. What is the name of the canal, conduit, or other works by which water is conducted to its place of use?

Answer: Dam and reservoir

Question 6. Are you the person to whom the permit was issued? If not, state how you obtained it, giving the succession of title.

Answer: Yes

(If assignments of title are not on file in the office of the State Engineer, the certificate will issue to the original applicant.)

Question 7. For what purpose are you using the water for which you are now making proof?

Answer: Stock watering and domestic purposes

Question 8. How many cubic feet per second of water, or fraction thereof, have you actually diverted and beneficially used for the purpose for which this proof is made?

(Actual measurement of water shall be given. 40 miners' inches equals 1 cubic foot per second. 1 miners' inch equals 11.21 gallons per minute. 448.83 gallons per minute equals 1 cubic foot per second.)

Answer: 0.2

Question 9. State the period during the year when water has been beneficially used.

Answer: January 1st to December 31st

Question 10. Do you divert and use more water at periods than granted in the permit for which proof is made? If so, make proper explanation.

Answer: No

Question 11. Give date when water measurements were taken, the point at which such measurements were taken and the name and address of person who made the measurements.

Answer: ----------

REPORT OF FIELD INVESTIGATION

IN THE MATTER OF APPLICATION)
NOS. 12747 AND 12748 FILED)
BY THE EUREKA LIVESTOCK CO.)

DESCRIPTION OF APPLICATIONS

Application No. 12747 was filed by the Eureka Livestock Co. to appropriate 1.0 c.f.s. of the waters of Lone Mountain Spring for stockwatering purposes. The point of diversion and place of use are described as being in the NE¼ SW¼ Sec. 12, T. 20 N., R. 50 E., M.D.M.

Application No. 12748 was filed by the Eureka Livestock Co. to appropriate 1.0 c.f.s. of the waters of Mud Spring for stockwatering purposes. The point of diversion and the place of use are described as being in the NE¼ NE¼ Sec. 1, T. 20 N., R. 50 E., M.D.M.

Both of the above described applications were protested by A. C. Florio on the following grounds: "Subject to subsisting rights".

FIELD INVESTIGATION

On Tuesday, October 16, 1951, I arranged for the interested parties to meet at the Hay Ranch for a field investigation in the matter of the above described applications. On Wednesday, October 17th, the following parties were present at the Hay Ranch for this investigation:

A. C. Florio	-	Protestant under Applications Nos. 12747 and 12748.
Phil Etcheverry	-	Representing the Eureka Livestock Co. as a partner in business.
Isadore Sala	-	Foreman for the Eureka Livestock Co.
Orville R. Wilson	-	Attorney for the Eureka Livestock Co.
E. J. DeRicco	-	Field Engineer representing the Office of the State Engineer.

The party proceeded by automobile to Mud Spring, which is located in an area about 2 miles north of the west side of Lone Mountain in Kobeh Valley. The spring consisted of a circular hole about 3 feet deep and 75 feet in diameter. Most of the water in it was muddy and stagnant. From this point, Isadore Sala pointed out Lone Mountain Spring, applied for under Application No. 12747. This spring is located at the base of

Lone Mountain about two miles in a southerly direction from Mud Spring. The party did not attempt to go to Lone Mountain Spring because of the condition of the road leading to it, and because it was visible to the party from Mud Spring. Isadore Sala described it as being similar to Mud Spring except that it is smaller and at the present time does not have much water in it.

A. C. Florio made the following statements concerning the use of the range and water in the vicinity of Mud and Lone Mountain Springs: He said that he realizes that the Eureka Livestock Co. has a grazing right in this vicinity but that they do not have an exclusive right. He further stated that the Hay Ranch has used this area for grazing purposes for years and that they have the oldest priority in the valley.

Phil Etcheverry stated that he realizes that there is a joint grazing use in this area as far as cattle are concerned, however, he said the Eureka Livestock Co. has an exclusive right for the grazing of sheep in the area.

Mr. Florio stated that he has no objection to the sheep operation but that he wants to protect his grazing right for cattle in Kobeh Valley.

In view of the circumstances, I suggested that the parties make an agreement to the joint use of this area, and that the Eureka Livestock Co. either assign a portion of the cattle right under Applications Nos. 12747 and 12748 to Mr. Florio, or that Mr. Florio file for stockwatering purposes on his own on these springs. Both parties found this agreeable and Orville R. Wilson, attorney for the applicants, stated that they would contact Mr. Florio at a later date so that the agreement could be made. He further stated that a copy of the agreement would be sent to this office when it has been completed.

Respectfully submitted,

E. J. DeRicco

E. J. DeRicco
Field Engineer

October 23, 1951.

Question 21. What are the dimensions of the cross-section of the pipe, flume, ditch or other conduit at each change in cross-section, and the length of each portion of the same size?

FILED
FEB -3 1965
STATE ENGINEER'S OFFICE

Permit No. 12743

PROOF OF APPLICATION OF WATER TO BENEFICIAL USE

DEPOSITION OF PERMITTEE

NOTE—Questions 1 to 12, inclusive, must be answered regardless of the purpose for which your permit for water has been granted. If this proof is made for irrigation purposes, a cultural map showing actual boundaries of land irrigated, together with classes of culture, etc., must accompany same, unless such map has already been filed. (See NRS 533.400, NRS 533.405 and NRS 533.410.)

Question 1. What is your name, occupation, and post-office address?

Answer: Eureka Livestock Company, Stockmen, Eureka, Nevada

Answer: Mud Spring

Question 5. What is the name of the canal, conduit, or other works by which water is conducted to its place of use?

Answer: Water is used at source

Question 6. Are you the person to whom the permit was issued? If not, state how you obtained it, giving the succession of title.

Answer: Permit issued to Eureka Livestock Company

(If assignments of title are not on file in the office of the State Engineer, the certificate will issue to the original applicant.)

Question 7. For what purpose are you using the water for which you are now making proof?

Answer: Stockwatering purposes

Question 8. How many cubic feet per second of water, or fraction thereof, have you actually diverted and beneficially used for the purpose for which this proof is made?

(Actual measurement of water shall be given. 40 miners' inches equals 1 cubic foot per second. 1 miners' inch equals 11.21 gallons per minute. 448.83 gallons per minute equals 1 cubic foot per second.)

Answer: 0.015 cubic foot per second

Question 9. State the period during the year when water has been beneficially used.

Answer: January 1st to December 31st

Question 10. Do you divert and use more water at periods than granted in the permit for which proof is made? If so, make proper explanation.

Answer: No

Question 11. Give date when water measurements were taken, the point at which such measurements were taken and the name and address of persons who made the measurements.

Answer: Water measured by Filbert Etcheverry at source at the time of development.

O.K. R.H.M.

PROOF OF COMPLETION OF WORK

Permit No. 12743

STATE OF NEVADA
} ss.
County of White Pine

FILED
JAN 20 1964
STATE ENGINEER'S OFFICE

BEFORE ME, Personally appeared ROBERT W. MILLARD, Agent for the subscribed, who being duly sworn saith that at least one hundred dollars ($100.00) has been expended in work or improvements performed or made under the conditions provided in Permit No. 12748, in the completion of said works, and at the expense of the applicant.

Said improvements consisted of clearing spring flow and providing unrestricted access to a natural shallow basin used for stockwatering.

and being work essential to the actual diversion of the water applied for and in the completion of the work required under said permit.

Robert W. Millard
Applicant

EUREKA LIVESTOCK CO.
Robert W. Millard, Agent

Subscribed and sworn to before me this 17th day of January, 1964

Albert D. Grindle

Notary Public in and for the County of White Pine, State of Nevada.

My Commission expires

260

[One dollar filing fee must accompany this proof]

SUPP000795

Permit No. 50076

PROOF OF APPLICATION OF WATER TO BENEFICIAL USE

DEPOSITION OF PERMITTEE

NOTE—Questions 1 to 11, inclusive, must be answered regardless of the purpose for which your permit for water has been granted. If this proof is made for irrigation purposes, a cultural map showing actual boundaries of land irrigated, together with classes of culture, etc., must accompany same, unless such map has already been filed. (See NRS 533.400, NRS 533.405 and NRS 533.410.)

QUESTION 1. What is your name, occupation, and post office address?

Answer. Duane V. Merrill, Nevada State Water Right Surveyor, 515 South Fifth Street, Elko, NV 89801

QUESTION 2. Are you acting in behalf of the permittee? If so, state his name, address, and your authority for acting in his behalf.

Answer. Yes, Denny S. and Della C. Mulford, Diamond Valley Route, Box 53, Eureka, Nevada 89316, Acting as Agent

QUESTION 3. What is the number of the permit under which this proof is made? Answer 50076

QUESTION 4. From what source do you obtain your water supply?

Answer. Spring No. 3

Underground, stream, spring, etc.

QUESTION 5. What is the name of the canal, conduit, or other works by which water is conducted to its place of use?

Answer. No Name Pipelines

QUESTION 6. To whom was the permit issued? If current owner is not the original permittee, give the succession of title.

Answer. Denny S. and Della C. Mulford

If assignments of title are not on file in the office of the State Engineer, the certificate will issue to the original applicant.

QUESTION 7. For what purpose are you using the water for which you are now making proof?

Answer. Irrigation

Irrigation, municipal, quasi-municipal, mining, etc.

QUESTION 8. How many cubic feet per second of water, or fraction thereof, have you actually diverted and beneficially used for the purpose for which this proof is made?

(Actual measurement of water shall be given. 448.83 gallons per minute equals 1 cubic foot per second.)

Answer. 0.713 cfs

QUESTION 9. Give date when water measurements were taken, the point at which such measurements were taken and the name and address of persons who made the measurements. Measurements must be made by a licensed State Water Right Surveyor.

Answer. August 27, 1991 at the Point of Diversion by Duane V. Merrill, 515 South Fifth Street, Elko, NV 89801

QUESTION 10. State the period during the year when water has been beneficially used.

Answer. January 1 - December 31

PROOF OF COMPLETION OF WORK

FILED
AUG 11 1988
STATE ENGINEER'S OFFICE

Permit No. 50076

STATE OF Nevada
COUNTY OF Elko } ss.

Comes now Boyack Surveying, the Agent
Permittee or Agent

who after being first sworn, deposes and says that at least Three Thousand dollars ($3000.00) has been expended in work or improvements performed or made under the conditions provided in Permit No. 50076, pertaining to the completion of said works, and at the expense of the permittee.

Said improvements consisted of Cleaned and improved spring, installed sprinkler system, ±2000 feet of 4 inch pipeline with gravity system for sprinklers.
If an underground source, state size and depth of well with casing and make and type of pump and motor.

said work being essential to the actual diversion of the water applied for and in the completion of the work required under said permit. Said work completed prior to July 1, 1988

Point of diversion located within the NE ¼ SE ¼ Sec. 31, T. 26 N., R. 53 E., M. D. B. & M.

WELL DRILLER
Name and Address

WELL LOG FILED Yes ☐ No ☐

Subscribed and sworn to before me this 10th day of August, 19 88.

Linda L. Reynolds

Notary Public in and for the County of Elko,

State of Nevada.

My commission expires May 5, 19 89.

BOYACK SURVEYING, AGENT

Signed Duane V. Merrill
Permittee or Agent

By: Duane V. Merrill

Address 515 South Fifth Street
Street No. or P.O. Box No.

Elko, Nevada 89801
City, State, Zip Code No.

LINDA L. REYNOLDS
Notary Public - State of Nevada
Elko County, Nevada
My appointment expires May 5, 1989

(Ten dollar filing fee must accompany this proof)

(Revised 11-86)

(O)-4430

A central issue regarding the applications is that information available from published scientific sources suggests that the Venturacci and Sadler Ranch LLC applications overstate the historical irrigation of land from spring sources. Quite simply, the goal of this report is to help prevent the NSE from making further assumptions that will exacerbate an already egregious water problem in the basin at the expense of the vibrant agricultural economy. At the request of the State Engineer, the water rights holders in the basin and Eureka County are presently actively working toward a strategy to effectively manage the water resources in the basin. For example, the County sponsored a study of the feasibility a General Improvement District to retire water rights. The County is also exploring alternative land uses that might reduce groundwater consumption while maintaining the agricultural economy and keeping the community largely intact.

2.2.1 Likely Causes of the Decline in the Flow of Springs

There are likely several causes for discharge decline in Shipley Hot Springs and Indian Camp Springs:

> *"Throughout Nevada and the Great Basin, there are occurrences of long-term water level trends, both declining and increasing, some of which can be explained by natural and human created changes, and some of which are anomalous and difficult to understand. Some possible explanations for long-term water level trends include:*
>
> - *Long-term climate change and variability, including lag and response time effects,*
> - *Watershed and land use changes, for example pinion – juniper vegetation changes . . .*
> - *Changes in aquifer permeability due to compaction, mineral precipitation or solution, or sediment movement/accumulation into open fracture spaces."* (Interflow Hydrology, 2012)

The NSE must consider these factors when evaluating any applications for new groundwater appropriations in Diamond Valley, under Order 1226 with the purpose of mitigating the impacts from junior appropriators.

2.2.1.a Irrigation Pumping in Diamond Valley

Agricultural pumping in Diamond Valley has resulted in a decline in water levels in the basin and likely captured a portion of the natural groundwater discharge in the basin, including spring discharge, consistent with Nevada's Beneficial Use Doctrine. This capture of groundwater discharge would ultimately occur even if the basin was not over appropriated. Because the response of the basin to pumping is well documented, no further discussion of the pumping in the southern portion of the basin is provided.

2.2.1.b Climate Change

While the cause of climate change is a matter of debate, it is difficult to dispute that the Great Basin is undergoing changes in the climate. One clear indicator is illustrated in Figure 3, which documents the change in the freezing level elevations in the Ruby Mountains. What effect this

InterFlow Hydrology, Inc.
Hydrogeology and Water Resources Consulting

MEMORANDUM

Date: April 24, 2012

To: Mr. Patrick Rogers, Ms. Elise Brachtl, Eureka Moly, Inc.

Regarding: Mt Hope Project DEIS - Nichols Spring Flow Baseline Data Environmental Impact Study

From: Dwight L. Smith, P.E., P.G., Jack M. Childress, P.G.

This memorandum has been prepared to provide additional data regarding historic Nichols Spring flows and to counter the implication that there has been impacts to flows resulting from pumping test of the 206T test well conducted in 2008. In summary, baseline spring flow measurements at Nichols Spring have been obtained since 2006, and we find no evidence of impact to spring flows resulting from the 32 day pumping test of the 206T well.

Historic Nichols Spring Flow Measurements

Nichols Spring is located on the lower southern flank of the Roberts Mountains, and has been assigned Spring ID number 630 in the Montgomery et al (2010) hydrogeology and modeling report, and is spring site OT-8 in the Mt Hope baseline monitoring network.

Nichols spring has been part of the Mount Hope Project baseline monitoring program since its inception in 2006. Table 1 presents the measurements made to date as part of the baseline monitoring program, as reported in JBR 2011a and b, and the measurements are plotted in Figure 1. The highest observed flow has been in the spring of 2006, at 13.6 gallons per minute (gpm), and the lowest observed flow was in the winter of 2007 at 0.45 gpm. The period of record average flow is 4.3 gpm, and the median flow is 2.9 gpm. Variability in spring flow is loosely associated with season of the year, but there is no clear or consistent variation, and anomalies are present. The greatest seasonal variability in spring flow has been observed in 2006 and 2011. 2006 was not a particularly wet year, but was proceeded by two wet years, and 2006 was an above average water year for the Eureka area.

Exhibit 305

Testing of the 206T well, and additional test wells completed in the limestone rocks in the vicinity, defined a compartmentalized condition, whereby long-term pumping withdrawals of water from the limestone in the vicinity of 206T would be limited by constraints on groundwater inflow. One line of evidence for this interpretation was that static water levels in the 206T well had not completely recovered to starting static water level one month after pumping ceased (residual drawdown was 4.5 ft at one month post pumping). However, continued water level monitoring indicates that static water levels have been declining throughout the life of the well, both prior to the pumping test and continuing to present (Figure 3). The apparent linear declining water level trend is not interpreted to be a pumping response. The persistence and linear nature of the declining trend indicates that it is a background phenomena, not a time dependant pumping response, which would approach a re-established static water level in a log-time relationship. Throughout Nevada and the Great Basin, there are occurrences of long-term water level trends both declining and increasing, some of which can be explained by natural and human created changes, and some of which are anomalous and difficult to understand. Some possible explanations for long-term water level trends include:

- changes in aquifer matrix stress in tectonically active areas,
- long-term climate change and variability, including lag and response time effects,
- watershed and land use changes (for example pinion - juniper vegetation changes, or mining within the Roberts Mountains - Gold Bar / Gold Canyon),
- changes in aquifer permeability due to compaction, mineral precipitation or solution, or sediment movement/accumulation into open fracture spaces,
- regional pumping (such as Diamond Valley),
- recharge water diversions (such as Roberts Creek), and/or
- long-term potentiometric head equilibration between multiple screened zones penetrated by the well.

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND

NATURAL RESOURCES

WATER RESOURCES BULLETIN NO. 35

HYDROLOGIC RESPONSE TO IRRIGATION PUMPING IN DIAMOND VALLEY, EUREKA AND ELKO COUNTIES, NEVADA, 1950-65

By

J. R. Harrill

With section on

Surface Water

By

R. D. Lamke

Prepared in cooperation with the

United States Department of the Interior

Geological Survey

1968

CONCLUSIONS

This second appraisal of the water resources of Diamond Valley has led to the following conclusions regarding the adequacy of supply, effects of development, and types of data needed to refine the flow system and response characteristics of the valley-fill reservoir:

1. All development to date and all applications for future development are in the South Diamond subarea--total permits to pump about 150,000 acre-feet per year have been granted. This is considerably in excess of the estimated perennial yield of 30,000 acre-feet for Diamond Valley.

2. The estimated net pumpage in 1965 was 12,000 acre-feet, or less than half the estimated yield. Virtually all net pumpage of record (1950-65), which totals an estimated 50,000 acre-feet, has been supplied from ground water in storage in the South Diamond subarea.

3. Because the area of pumping is remote from areas of natural discharge, storage depletion will continue for many years in the future. An example demonstrated that if net pumpage were held to only 12,000 acre-feet per year, about 3 million acre-feet of storage depletion would be required before 12,000 acre-feet per year of natural discharge could be salvaged. Water levels in the area of concentrated pumpage (T. 21 N., R. 53 E.) would be drawn down as much as 200 feet below 1965 levels. The time required to reach the new equilibrium would be from 300 to 400 years.

4. The rate of increase in estimated net pumpage from 1,800 acre-feet in 1960 to 12,000 acre-feet in 1965 suggests that net pumpage may equal the perennial yield by 1975. Even if the perennial yield is not exceeded, local overdraft is likely to occur in the South Diamond subarea and water levels locally may be drawn down below economic pumping lifts.

5. Pumping in the South Diamond subarea eventually should decrease the natural discharge from springs in the North Diamond subarea, which during the summer 1965 was largely being used beneficially. In time, the discharge from springs may have to be supplemented or replaced by pumping from wells. Although more costly, this procedure would salvage the large amount of water (about 6,000 acre-feet per year) now running to waste during the nongrowing season.

6. The cost of pumping will increase in about direct proportion to the increase in pumping lift, provided that other fixed

Exhibit 108, p. 3

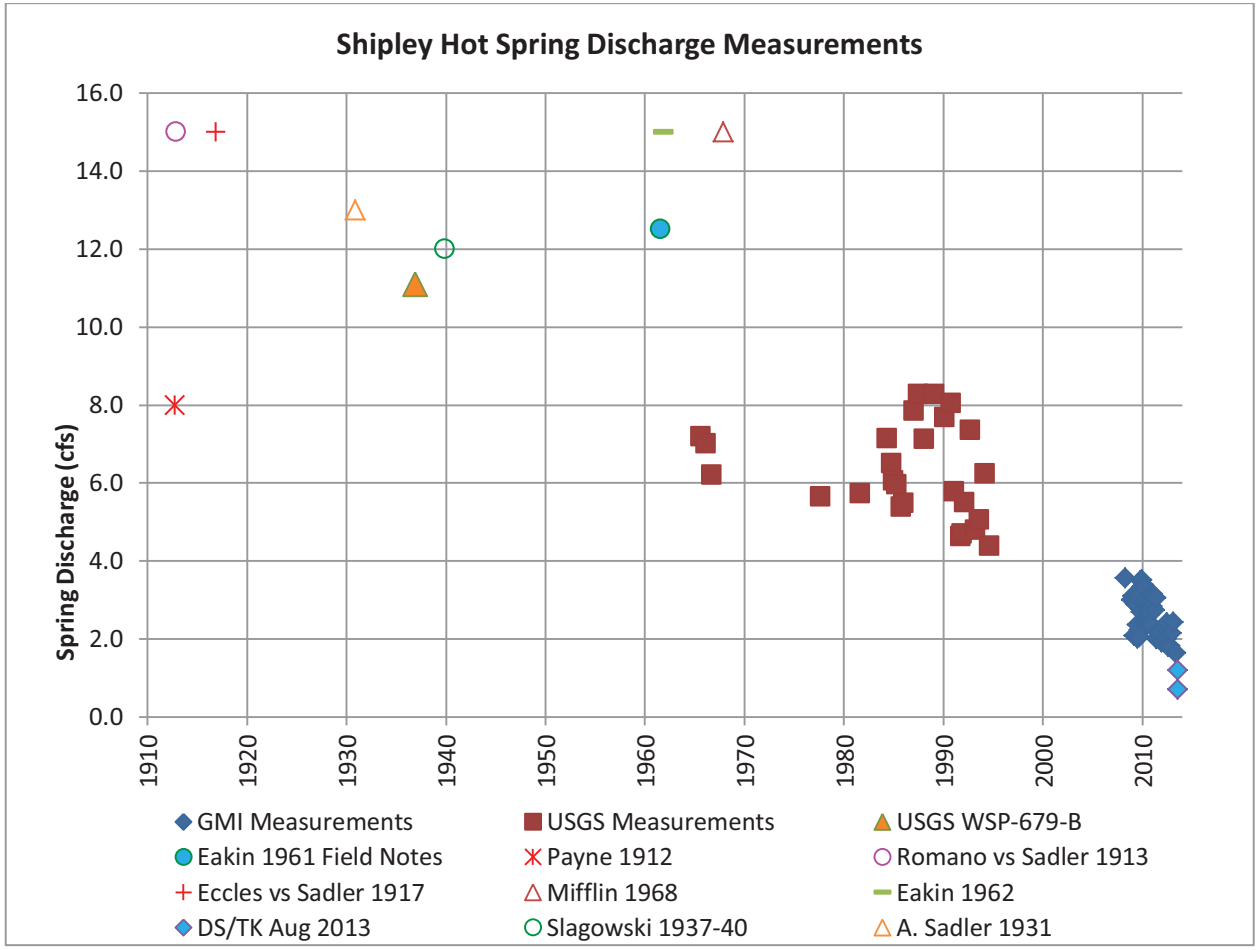


Figure 1 – Shipley Hot Spring Discharge Measurements and Reported Discharge, 1912 to 2013

Exhibit 109, p. 6

Shallow Geothermal Test Hole Program

Thirteen shallow test holes were drilled to the water table around Shipley Hot Spring to gain an understanding of the spatial distribution of heat at the water table. Hole depth was generally between 15 and 30 feet. Temperature was recorded, and water level measurements were made and compared to the elevation of the spring pool at Shipley Hot Spring using a laser level. The temperature and head measurements are the highest just west of Shipley Hot Spring. Temperature highs are roughly aligned in a north south orientation, and the highest head measurements were measured at the boreholes closest to the discharging spring heads along the west side of the spring pool (Figure 4). The elevation of the water table was measured relative to pond stage, and indicates a relatively isolated high along the western edge of the spring pond (Figure 5). The area with the highest temperatures and highest head elevation was eventually chosen as the production well location. All shallow boreholes were drilled by a licensed Nevada well driller, and were properly abandoned after measurements were made.

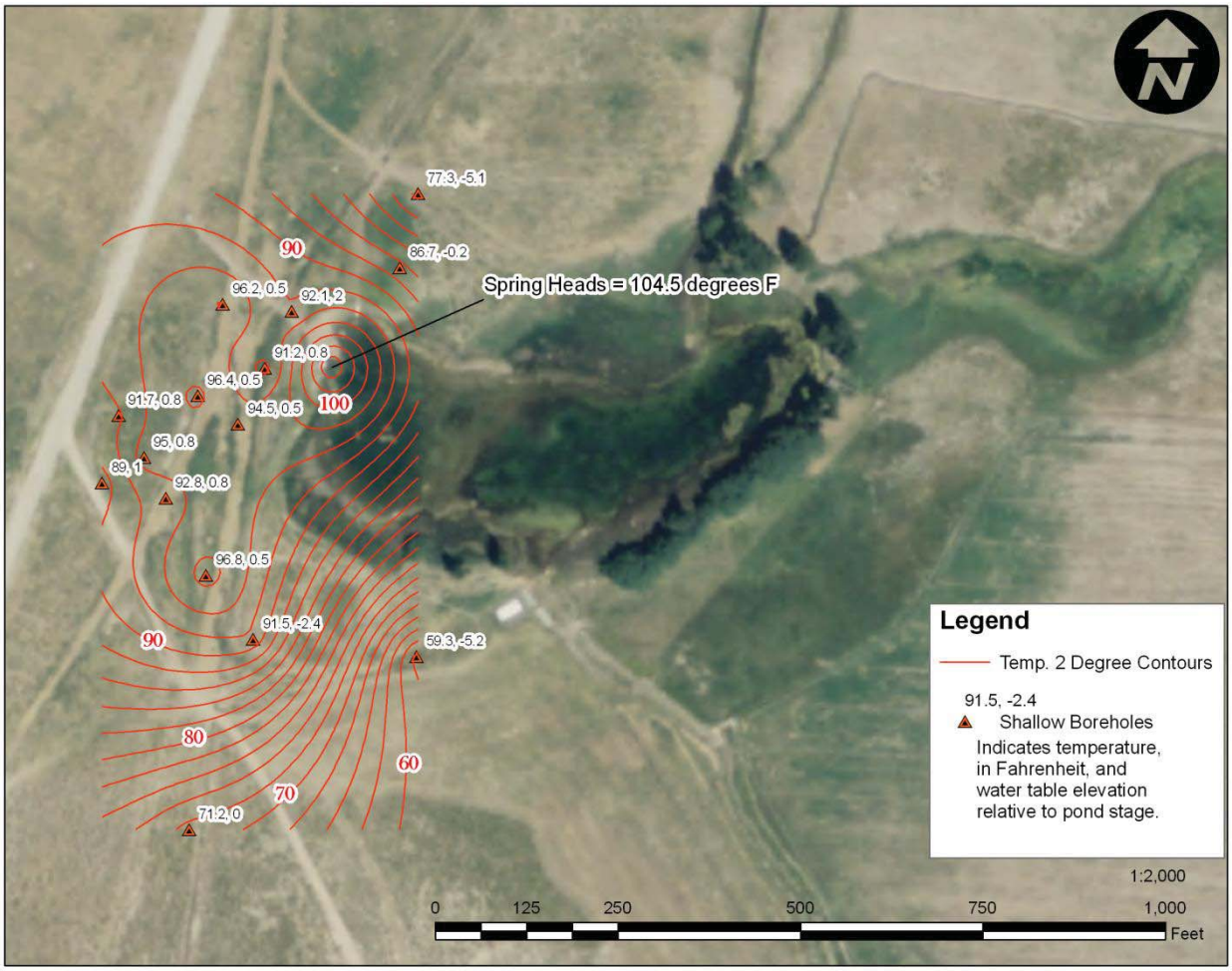


Figure 4: Temperature and water table measurements relative to the stage of the spring pond as obtained from shallow boreholes, Shipley Hot Springs.