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**IN THE SUPREME COURT OF THE STATE OF NEVADA**

ADAM SULLIVAN, P.E., NEVADA STATE ENGINEER, DIVISION OF WATER RESOURCES, DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES; LAS VEGAS VALLEY WATER DISTRICT; SOUTHERN NEVADA WATER AUTHORITY; and CENTER FOR BIOLOGICAL DIVERSITY,

Appellants,

vs.

LINCOLN VALLEY WATER DISTRICT; VIDLER WATER COMPANY, INC.; COYOTE SPRINGS INVESTMENT, LLC; NEVADA COGENERATION ASSOCIATES NOS 1 AND 2; APEX HOLDING COMPANY, LLC; DRY LAKE WATER LLC; GEORGIA-PACIFIC GYPSUM, LLC; REPUBLIC ENVIRONMENTAL TECHNOLOGIES, INC.; MUDDY VALLEY IRRIGATION COMPANY; SIERRA PACIFIC POWER COMPANY, d/b/a NV ENERGY; NEVADA POWER COMPANY, d/b/a

**Supreme Court No. 84739**

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| NV ENERGY; THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS; MOAPA VALLEY WATER DISTRICT; WESTERN ELITE ENVIRONMENTAL, INC.; BEDROC LIMITED, LLC; and CITY OF NORTH LAS VEGAS,<br><br>Respondents. | |
| CENTER FOR BIOLOGICAL DIVERSITY; SOUTHERN NEVADA WATER AUTHORITY; LAS VEGAS VALLEY WATER DISTRICT; MUDDY VALLEY IRRIGATION COMPANY; COYOTE SPRINGS INVESTMENT, LLC; LINCOLN COUNTY WATER DISTRICT; APEX HOLDING COMPANY, LLC; DRY LAKE WATER, LLC; NEVADA COGENERATION ASSOCIATES NOS. 1 AND 2; GEORGIA-PACIFIC GYPSUM, LLC; REPUBLIC ENVIRONMENTAL TECHNOLOGIES, INC; and VIDLER WATER COMPANY, INC.;<br><br>Appellants,<br><br>vs.<br><br>NEVADA STATE ENGINEER; THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS; SIERRA PACIFIC POWER COMPANY d/b/a NV ENERGY AND NEVADA POWER COMPANY d/b/a NV ENERGY; MOAPA VALLEY WATER DISTRICT; CITY OF NORTH LAS VEGAS; WESTERN | **Supreme Court No. 84742** |

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| ELITE ENVIRONMENTAL, INC.; and BEDROC LIMITED, LLC,<br><br>Respondents. | |
| SOUTHERN NEVADA WATER AUTHORITY,<br><br>Appellant,<br><br>vs.<br><br>COYOTE SPRINGS INVESTMENT, LLC; APEX HOLDING COMPANY, LLC; NEVADA COGENERATION ASSOCIATES NOS. 1 AND 2; GEORGIA-PACIFIC GYPSUM, LLC; DRY LAKE WATER, LLC; REPUBLIC ENVIRONMENTAL TECHNOLOGIES, INC.; LINCOLN COUNTY WATER DISTRICT; VIDLER WATER COMPANY, INC.; MUDDY VALLEY IRRIGATION COMPANY; THE CENTER FOR BIOLOGICAL DIVERSITY; SIERRA PACIFIC POWER COMPANY d/b/a NV ENERGY AND NEVADA POWER COMPANY d/b/a NV ENERGY; MOAPA VALLEY WATER DISTRICT; THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS; CITY OF NORTH LAS VEGAS; WESTERN ELITE ENVIRONMENTAL, INC.; BEDROC LIMITED, LLC, and ADAM SULLIVAN, P.E. NEVADA STATE ENGINEER,<br><br>Respondents. | **Supreme Court No. 84741** |

MUDDY VALLEY IRRIGATION COMPANY,

Appellant,

vs.

ADAM SULLIVAN, P.E., NEVADA STATE ENGINEER, DIVISION OF WATER RESOURCES, DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES; LAS VEGAS VALLEY WATER DISTRICT; SOUTHERN NEVADA WATER AUTHORITY; COYOTE SPRINGS INVESTMENT, LLC; APEX HOLDING COMPANY, LLC; DRY LAKE WATER, LLC; CENTER FOR BIOLOGICAL DIVERSITY; NEVADA COGENERATION ASSOCIATES NOS. 1 AND 2; GEORGIA-PACIFIC GYPSUM, LLC; REPUBLIC ENVIRONMENTAL TECHNOLOGIES, INC.; LINCOLN COUNTY WATER DISTRICT; VIDLER WATER COMPANY, INC.; SIERRA PACIFIC POWER COMPANY, d/b/a NV ENERGY AND NEVADA POWER COMPANY, d/b/a NV ENERGY; MOAPA VALLEY WATER DISTRICT; THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS; CITY OF NORTH LAS VEGAS; WESTERN ELITE ENVIRONMENTAL, INC.; AND BEDROC LIMITED, LLC,

Respondents.

**Supreme Court No. 84809**

**VOLUME TWO OF EXHIBITS IN SUPPORT OF EMERGENCY MOTION FOR STAY UNDER NRAP 27(E) AND JOINDER**

Appellant, the Center for Biological Diversity, by and through counsel, submits Volume Two of its exhibits in support of its Emergency Motion for Stay Under NRAP 27(e) and Joinder pursuant to NRAP 8(a)(2).

**Affirmation:** The undersigned do hereby affirm that the preceding document and/or attachments do not contain the social security number of any person.

Dated this 2nd day of June, 2022.

*/s/ Scott Lake*

SCOTT LAKE, NV Bar No. 15765
CENTER FOR BIOLOGICAL DIVERSITY
P.O. Box 6205
Reno, NV 89513
slake@biologicaldiversity.org

## CERTIFICATE OF SERVICE

I certify that I am an employee of the Center for Biological Diversity, and that on this 2nd day of June, 2022 I served a true and correct copy of the foregoing by electronic service to the participants in this case who are registered with the Nevada Supreme Court's efiling system to this matter.

*/s/ Scott Lake*
Scott Lake

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[1] This technical report published by the Nevada Division of Water Resources and the U.S. Geological Survey was not designated by the State Engineer as part of the Record on Appeal, but was introduced in briefing by Appellant Coyote Springs Investment, LLC, and appears to have been implicitly relied upon by the District Court. *See* Order at 24-26.

# Exhibit 6

HS-14

# NEVADA

EXHIBIT NO._____

IDEN._____ ADM._____

## COPY OF DECREE

"In the Matter of the Determination of the Relative Rights in and to the Waters of the Muddy River and Its Tributaries in Clark County, State of Nevada

IN THE TENTH JUDICIAL DISTRICT COURT OF THE STATE OF NEVADA,

IN AND FOR THE COUNTY OF CLARK.

MUDDY VALLEY IRRIGATION COMPANY, a corporation, NEVADA LAND & LIVESTOCK COMPANY, a corporation, SAMUEL H. WELLS, JOHN F. PERKINS and ELLEN C. PERKINS, his wife,

Plaintiffs

Vs.

MOAPA & SALT LAKE PRODUCE COMPANY, a corporation, GEORGE BALDWIN and ALETHA L. BALDWIN, his wife, ISAIAH COX and ANNA M. COX, his wife, JOSEPH PERKINS and KATHRYN PERKINS, his wife, D. H. LIVINGSTON and RICHARD SMITH, G. S. HOLMES and JULIA MAY KNOX, W. J. POWERS and MARY A. POWERS, his wife, SADIE GEORGE, LOS ANGELES & SALT LAKE RAILROAD COMPANY, a corporation, and WALKER D. HINES, as Director General of Railroads, and JACOB BLOEDEL.

Defendants.

AND

IN THE MATTER OF THE DETERMINATION OF THE RELATIVE RIGHTS IN AND TO THE WATERS OF THE MUDDY RIVER AND ITS TRIBUTARIES IN CLARK COUNTY, STATE OF NEVADA

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JUDGMENT AND DECREE.

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The above entitled action and the above entitled matter having come on for hearing before the Court on the 10th day of March, 1920, all of the parties to said action, appearing and being represented in court by their respective attorneys, and J. G. Scrugham, the State Engineer of the State of Nevada, appearing in person, and after hearing and the taking of testimony and evidence, and the making of an order for a further determination by the State Engineer, as hereinafter set forth in the said action and

matter having been continued for further hearing and determination and have now come on for hearing this 12 th day of March, 1920, all of the parties to the above entitled action appearing and being represented in open court by their respective attorneys;

And it appearing that on the 23rd day of April, 1919, a stipulation was made and filed herein by and on behalf of all of the parties who had then appeared in said action, signed by their respective attorneys, which said stipulation, after the title of the court and cause was in words and figures following to-wit:

STIPULATION

The parties to the above entitled action, by their respective attorneys, for the purpose of settling and determining as between themselves the issues in said action, do hereby stipulate and agree as follows:

1. That the defendants in this paragraph named, their grantors and predecessors in interest, have diverted and appropriated from the Muddy River, its head waters, sources of supply and tributaries, for use upon the lands herein described or referred to, and that said defendants are respectively entitled to divert to their said lands for use thereon, the respective amounts of water herein specified.

The defendants, George Baldwin, and Aletha L. Baldwin, his wife, for use on the lands described in their Amended and Supplemental Answer, other than those described in their original answer, 16/70 of one cubic foot of water per second.

The defendant, Moapa and Salt Lake Produce Company, for use on the lands described in its separate Answer, 2 and 15/70 cubic feet of water per second.

The defendants, D. H. Livingston and Richard Smith, for use upon the said lands described in their separate Answer, 2 and 20/70 cubic feet of water per second.

The defendants, Joseph Perkins and Kathryn Perkins, his wife, for use upon the lands described in their separate Answer, 30/70 of a cubic foot of water per second.

The defendants, G. S. Holmes and Julia May Knox, for use upon the lands described in their separate Answer, 1 and 25/70 of a cubic foot of water per second.

The defendants, Isaiah Cox and Annie Cox, his wife, for use on ten acres of land described in their separate Answer, 10/70 of a cubic foot of water per second. Provided, that if the State Engineer in his adjudication shall find that because of the situation of said land, and the small stream or small head of water diverted, or other causes, said defendants need more than said amount to properly irrigate said land, the said defendants shall be entitled to divert such amount of water as the State Engineer may find necessary for said purpose.

The defendants, W. J. Powers and Mary Powers, his wife, for use on the land described in their separate Answer, and for 2 and 8/10 acres situate in the NW 1/4 of the SE 1/4 and the N. E. 1/4 of the S. W. 1/4, of Section 27, Township 14 South, Range 65 East, 29/70 of a cubic foot of water per second. Provided, however, that if the State Engineer in his adjudication shall find that because of the situation and character of said lands, the length of the ditch, or other causes, said defendants need more than said amount to properly irrigate, twenty-nine acres of said lands, being the lands heretofore irrigated, said defendants shall be entitled to divert such amount of water as the State Engineer may find necessary for said purposes.

The defendant, Sadie George, for use on 2.1 acres of land situate in the West side of the S. E. 1/4 of the N. E. 1/4, of Section 1, Township 15, South, Range 65 East, 21/700 of a cubic foot of water per second.

The defendants, Los Angeles and Salt Lake Railway and Walker D. Hines, as Director General of Railroads, are entitled

to take from the Muddy River, by the pumping plant of said Railroad at Moapa, such amount of water as the State Engineer may find has by said Railroad been lawfully appropriated for any beneficial use at Moapa. Subject, however, to contest by any party hereto and to an appeal from such finding and review thereof by the Court.

The above volumes or amounts of water to which it is agreed the respective parties are entitled shall be understood to include and define the amount of all the waters now or heretobefore rightfully used on said lands, whether diverted directly from said Muddy River, or from its tributaries, springs, head waters or other sources of supply, including the waters claimed to have been developed heretofore by any of the said parties. All measurements of amounts diverted are to be made at the places of diversion, or as near thereto as practicable or convenient, as the State Engineer or Water Commissioner may select or approve.

2. That the waters now and heretofore used by defendants, George Baldwin and Aletha L. Baldwin, his wife, upon the lands described in their original separate Answer, are waters which have been developed and appropriated by said defendants in the manner and by the means alleged in their said Answer, and that such development and use has not and does not diminish the flow or volume of the Muddy River, or interfere with the rights of any of the other parties to this action.

The said defendants Baldwin shall during the present 1919 irrigating season permit the plaintiffs, or any agent or agents of plaintiffs, to enter upon the said lands of said defendants and make measurements of the cultivated areas and of the waters now developed or used thereon. The said defendants Baldwin shall not make any attempt to develop any additional water upon said land before October 1, 1919, and thereafter no further development of water, or additional use of water, shall be made on or for said lands which in any way diminishes the flow of the waters of the Muddy River, or impairs the rights therein or thereto of the other

parties to this action.

3. The Indian Reservation, situated above Moapa, and the inhabitants thereof, are entitled to divert from the waters of said Muddy River, and to use upon lands on said reservation, 1.25 of a cubic foot of water per second, and no more, measured at place of diversion or such place as the State Engineer or Water Commissioner may select.

4. That the Plaintiff, Muddy Valley Irrigation Company, and the Plaintiffs John F. Perkins, and Ellen C. Perkins, his wife and their grantors and predecessors in interest, have diverted and appropriated from the Muddy River, its head waters, sources of supply and tributaries, for use on the lands hereinafter described or referred to, all of the waters flowing therein or therefrom, save and except the several amounts specified in paragraph 1 and 3 hereof. The said plaintiffs Perkins are entitled to water for the irrigation of two acres of ground at or near St. Thomas, in the N. E 1/4 of the S. E. 1/4, of Section 10, Township 17 South, Range 68 East, which water is diverted from the River and conveyed to their land by said Muddy Valley Irrigation Company.

The said Muddy Valley Irrigation Company is and at the time of the commencement of this action was the legal owner of the rights to divert, convey and use all of said waters of said River, its head waters, sources of supply and tributaries, save and except the rights hereinbefore specified and described, and to divert said waters, convey and distribute the same to its present stockholders, and future stockholders, and other persons who may have acquired or who may acquire temporary or permanent rights through said Company, for the various purposes described in the Complaint, and upon the land situated as stated in the Complaint; and that its stockholders are the equitable owners of rights to use said waters in accordance with its articles and amended Articles of Incorporation, and its By Laws, and the accepted uses and practices of said corporation.

5. That the parties named in paragraphs 1 and 3 of this Stipulation shall not be required to take or use the waters of said River in continuous flow, but may cumulate the same or any part thereof in rotation and in turn periods, with the approval of the Water Commissioner, and subject to his control and direction, and under such rules and regulations as may be prescribed by the State Engineer and the statutes of the State of Nevada. The whole amount of water diverted from the River at any one time by all of the parties named in paragraph 1 shall not exceed in the aggregate the total of the amounts of water awarded to the several parties named in said paragraph 1. Below the lowest diversion of the defendants Holmes and Knox the flow in the stream shall be maintained substantially constant, subject to seasonal variations, but only in so far as the parties named in paragraph 1 can be held to be responsible for the fluctuations of said stream. The whole of said River system shall be under the supervision, rules and regulations of the State Engineer, and the direction and control of the Water Commissioner, to be appointed as hereafter provided or as provided by law, as a fully adjudicated stream; but it is the intention hereof that so far as practicable the stream shall be treated as divided into two parts, that above and that below the lowest diversion of the ranch now belonging to the defendants Holmes and Knox; and the Muddy Valley Irrigation Company, although under the supervision and control of the State Engineer and Water Commissioner, will, subject to said supervision and general control, distribute and control the distribution of the waters diverted and conveyed by its works to its stockholders and other persons obtaining water by means thereof. Such head gates, measuring devices, etc., as the State Engineer or Water Commissioner may order shall be installed by all who divert or use the waters of said stream system.

6. The owners of land on the upper part of said River, as in the last paragraph defined, shall keep the channels through their respective lands clear of all ordinary obstructions, but

in case of of extraordinary obstruction, such as the formation of lime beds or deposits, in the channel of the stream, the same shall be removed under the direction of the Water Commissioner, and the expense thereof paid as he or the State Engineer may assess the same.

7. All the water rights hereinbefore specified shall be deemed and held to be vested rights, acquired by valid appropriation and beneficial use prior to March 1, 1905, and by continued, uninterrupted use since said date, and shall be considered as equal in rank, without one having any priority over any other. This stipulation shall apply to and include whatever rights are held or possessed by the Muddy Valley Irrigation Company under the certificates of appropriation issued to the plaintiff, Nevada Land and Live Stock Company, as set forth in paragraph twelve of the Complaint herein.

8. All abnormal losses from the flow of said stream shall be pro rated and shared among the parties hereto. Abnormal losses shall include such as any substantial loss from the permanent flow of the stream, caused by some cataclysm of nature, as a cloudburst, destroying or obstructing the channel thereof, or as the opening up of a fissure in the bed of the stream, or in one of the courses of supply, and the disappearance therein of a substantial amount of the waters, thereby causing a substantial diminution in the flow available for appropriation by any of the parties. Any diversion of water by the Indian Reservation, or the inhabitants thereof, in excess of the 1.25 cubic foot per second, specified in paragraph 3, or any award by the State Engineer to or for the lands of the Indian Reservation in excess of said 1.25 cubic foot per second, and any water in excess of such amount, which in any suit or action may be awarded or decreed to or for the lands on said Indian Reservation, or any water which in the final adjudication of this action or any other may be awarded or decreed to any party not a party to this action, shall also be deemed an abnormal loss from the stream.

If any such abnormal loss occur at any time the pro-rata share of such loss to be borne by each party shall be as follows:

The defendants Baldwin and wife shall bear 16/3169 of such loss.

The defendant, Moapa and Salt Lake Produce Company, 155/3169 thereof.

The defendants, Livingston and Smith, 160/3169 thereof.

The defendants, Perkins and wife, 30/3169 thereof.

The defendants Holmes and Knox 95/3169 thereof.

The defendants, Cox and wife, 10/3169 thereof.

The defendants, Powers and wife, 29/3169 thereof.

The defendant, Sadie George, 2/3169 thereof.

And the Plaintiff, Muddy Valley Irrigation Company 2672/3169 of such loss.

9. An order may be entered by the Court referring this suit to the State Engineer for an adjudication of the water rights on the Muddy River, in accordance with the provision of Chapter 140 of the Statutes of Nevada, of 1913, approved March 22, 1913, and all acts amendatory thereof. The order shall direct that said State Engineer in making such adjudication shall as between the parties to this Stipulation, and in determining their relative rights as between themselves, be bound by and give effect to the terms and conditions of this Stipulation, and the division of the waters which said parties have made between themselves.

And the parties further stipulate and agree that any final Decree entered herein shall, in determining the relative rights of the parties hereto, follow and give effect to the terms and conditions of this Stipulation.

10. Pending the final adjudication of said River, and final Decree in this action, and the legal organization of a Water District embracing the Muddy River Valley, and the legal appointment of a Water Commissioner, therefor, the parties themselves shall select and employ a Water Commissioner to act under the terms of this

Stipulation, subject to the supervision of the State Engineer, and such rules and regulations as he may prescribe not inconsistent with this Stipulation. Said Water Commissioner shall be selected by a representative of the Muddy Valley Irrigation Company and a representative chosen by a majority in interest of the defendants, and if such representatives cannot agree then the State Engineer shall have the selection and appointment of the Water Commissioner. The salary and expenses of such Water Commissioner shall be borne by the parties hereto in the same proportion as fixed in paragraph eight hereof for the sharing of losses. The representatives of the respective parties who are to select the Water Commissioner shall agree on the time and manner and person through whom each party shall pay his share of such salary and expenses, and such agreement shall be binding on each party and become a legal obligation.

11. An Order shall also be entered, binding on all of the parties hereto, modifying the terms of the temporary injunction heretofore made and granted, in accordance with the terms of this Stipulation, so that during the pendency of this action and until the final adjudication and final Decree each party shall be injoined from interfering with or impairing any right given by this Stipulation to any other party and from violating any of the terms and conditions and agreements of this Stipulation, or any part thereof.

12. Each party shall pay its or his own costs in this action, but the costs and expenses of the adjudication of the State Engineer, including any surveys or maps made by him, shall be borne by the respective parties, in accordance with the Statutes of this State. But in determining the Water Right and acreage against which such expense shall be assessed the numerators in the fractions in paragraph eight shall as between these parties be deemed to be the number of acres to be irrigated by the respective parties.

Dated this 23rd day of April, A. D., 1919.

A. S. Henderson,
Brown & Belford
Attorneys for Plaintiffs.

F. R. McNamee and
Leo A. McNamee
Attorneys for all defendants,
except W. J. Powers and Mary
Powers.

C. D. Breeze
Attorney for Defendants,
W. J. Powers and Mary Powers.

That on the said 23rd day of April, 1919, an order was made and entered by the Court in the above entitled action referring to the State Engineer of the State of Nevada the said action for an adjudication of the water rights of the Muddy River, its head waters and tributaries and providing that the said State Engineer in making such adjudication should, as between the parties to said Stipulation, in determining their relative rights, as between themselves, be bound by, and give affect to, the terms and conditions of said stipulation and the division of the waters which said parties have made between themselves. That a copy of said Order of reference, duly certified, was delivered to said State Engineer and thereupon the said State Engineer proceeded in accordance with said order and with the provisions of the Statutes of the State of Nevada to make an adjudication of said Muddy River; that the various notices as required by Statute were given by said State Engineer and that claims were filed by various claimants for the use of water on said river and proofs taken and used by said State Engineer in accordance with the provisions of said Statute. That thereafter and on the 21st day of January 1920, said State Engineer made his order of determination entitled "In the matter of the determination of the relative rights in and to the waters of the Muddy River and its tributaries in Clark County, State of Nevada."

That on the 26th day of January, 1920, a copy of the said Order of Determination, duly certified by the State Engineer

was filed with the Clerk of the above entitled court and an order made and entered by the Judge of said Court appointing the 10th day of March, 1920, 10 o'clock A. M. of said day, as the time for hearing the matter of said determination and that a certified copy of such order and a notice of such hearing was duly published and served as required by law and that thereafter, and within the time provided by law, various parties to the above entitled action, claimants of water rights in said Muddy River, duly filed with the clerk of said court and served upon the State Engineer their exceptions to the said order of determination.

That on the 10th day of March, 1920, the defendant Jacob Bloedel, a claimant of a water right on said river who had not theretobefore been a party to said action, was by stipulation made a party defendant thereto and duly appeared by his attorneys and it was stipulated that he should be deemed to have made a claim for water right in said Muddy River without further pleading; and also on said date it was stipulated that the defendants Isaiah Cox and Anna Cox his wife, who appeared to the satisfaction of the court to have become the owners of and entitled to land and water rights of J. H. Mitchell, should be deemed to have made a claim in said action for the water rights for said land so acquired by them without further pleading. That on the said 10th day of March, 1920 there was made and filed in said action a stipulation supplemental to said stipulation of April 23rd, 1919 which said stipulation after the entitlement of the court and cause is in words and figures following, to-wit:

STIPULATION SUPPLEMENTAL TO STIPULATION OF APRIL 23, 1919.

WHEREAS, since the making and filing of a stipulation by all of the parties to the above entitled action, who has then appeared therein under date of April 23rd, 1919, Jacob Bloedel has been made a party defendant to said action and has duly appeared therein by F. R. McNamee and Leo A. McNamee, his attorneys;

AND, WHEREAS, since the making of said stipulation the rights of J. H. Mitchell, and the lands belonging to him have been sold and conveyed to Isaiah Cox and Annie M. Cox, his wife, two of said defendants, and whereas a stipulation has been filed herein providing and allowing water rights in behalf of the land so sold by Mitchell to Cox and wife, and providing that the same may be considered as having been made in this action without further pleading,

AND WHEREAS, in view of the foregoing premises it is deemed desirable to supplement and amend the said stipulation of April 23rd, 1919.

The parties to the above entitled action by their respective attorneys do hereby agree and stipulate as follows:

1. The said defendant, Jacob Bloedel, and the said defendants, Isaiah Cox and Anna M. Cox, his wife, in behalf of the land and water rights so acquired from Mitchell, do hereby assent to and make themselves parties in all respects to the said stipulation of April 23rd, 1919, except as the same is changed and amended hereinafter.

2. The said defendant, Jacob Bloedel, his grantors and predecessors in interest have diverted and appropriated from the Muddy River, its headwaters, sources of supply and tributaries, and the said defendant, Bloedel, is entitled to divert from said river 2/70 of one cubic foot of water per second, for use upon the NE 1/4 of the NE 1/4 of Sec. 21, T. 14 S. R. 65 E. M. D. B. & M.

The defendants, Isaiah Cox and Anna M. Cox, his wife, their grantors and predecessors in interest have diverted and appropriated from the said Muddy River, its headwaters, tributaries and sources of supply and are entitled to divert, in addition to the quantity of water described in the said original stipulation of April 23rd, 1919, 3/70 of one cubic foot of water per second for use upon said land in the NW1/4 of the NE 1/4 of the N. E. 1/4 of Section 16 T. 14 S. R. 65 E. M. D. B. & M., the same being

the land acquired by said defendants Cox and wife from J. H. Mitchell.

3. Paragraph 3 of said stipulation of April 23rd, 1919, is amended to read as follows:

""the Indian Reservation, situate above Moapa, and the inhabitants thereof, are entitled to divert from the waters of said Muddy River, and to use upon said land on said Reservation 1.242 of a cubic foot of water per second, and no more, measured at the place of diversion, or such place as the State Engineer or Water Commissioner, may select."

4. That portion of Paragraph 8 of said stipulation of April 23rd, 1919, fixing the pro rata share of any abnormal loss to be borne by each party, is amended to read as follows:

"If any such abnormal loss occurs at any time the pro-rata share of such loss to be borne by each party shall be as follows:

The defendants, Baldwin and Wife, shall bear 16/3169 of such loss;

The defendant Moapa and Salt Lake Produce Company 155/3169 thereof;

The defendants Livingston & Smith 160/3169 thereof;

The defendants Perkins and wife 30/3169 thereof;

The defendants Knox and Holmes 95/3169 thereof;

The defendants Cox and wife 13/3169 thereof;

The defendants Powers and wife 29/3169 thereof;

The defendant Sadie George 2/3169 thereof;

The defendant Jacob Bloedel 2/3169 thereof; and

The Plaintiff Muddy Valley Irrigation Company 2667/3169 thereof."

5. In Paragraph 8 of said stipulation of April 23rd, 1919, is amended, so that the definition of abnormal losses from the flow of said stream wherever the figures 1.25 occur, the same shall be struck out and the figures 1.242 substituted therefor. The parties hereto do not admit or recognize any rights to the use of the

Muddy River by or for the Indian Reservation and the inhabitants thereof, except the amount awarded and found to belong to such reservation by the State Engineer. The parties have included in their definition of abnormal losses a possible diversion of a greater amount by said reservation or possible acquisition of an increase right, only as a measure of security against a possible contingency which might arise through the uncertainty of litigation.

6. Paragraph 7 of said stipulation of April 23rd, 1919, is amended to read as follows:

"All of the water rights hereinbefore specified shall be deemed and held to be vested rights acquired by valid appropriation and beneficial use prior to March 1, 1905, and by continued and uninterrupted use since said date, and shall be considered as equal in right, without one having any priority over any other. This stipulation shall apply to and include whatever rights are held or possessed by the Muddy Valley Irrigation Company under the certificates of appropriation issued to the plaintiff Nevada Land & Live Stock Company as set forth in paragraph twelve of the amended complaint herein and under any certificate of appropriation which may be issued to the Muddy Valley Irrigation Company under its application to the State Engineer numbered 1611.

7. The amount of water awarded in the said stipulation of April 23rd, 1919, and in this stipulation to the respective parties shall be deemed a continuous right during the entire year, it being understood that the minimum duty of water during the summer season shall be one cubic foot per second for 70 acres of land; during the winter season, one cubic foot per second for 100 acres of land, and that by the summer season is meant the period between and including the first day of May of each year up to and including the 30th day of September of each year, and by the winter season is meant the period from and including the 1st day of October to and including the following 30th day of April.

8. It is understood and agreed that the amounts of water awarded by this stipulation to the respective parties and to the Indian Reservation absorbs and exhausts all of the flow of the said stream, its sources of supply, headwaters and tributaries during the entire year.

9. The order of determination of the State Engineer and any further or supplemental order of determination made by him under order of the court shall give effect to the terms and conditions of said stipulation of April 23rd, 1919 and of this supplemental stipulation as said order of determination may define or effect the rights of the parties to the above entitled action and any final decree entered herein shall, in determining the relative rights of the parties hereto follow and give effect to the terms of the said new stipulation.

DATED this 10th day of March, 1920.

A. S. Henderson
Brown & Belford
Attorneys for Plaintiff

F. R. McNamee &
Leo A. McNamee
Attorneys for Defendants other than W. J. and Mary Powers.

C. D. Breeze
Attorney for W. J. and Mary Powers.

That the said exceptions of the respective parties to the order of determination came regularly on for hearing on said 10th day of March, 1920 and witnesses were sworn and testified for and on behalf of the said excepting parties and documentary and other evidence was introduced in support of said exceptions and thereupon the court made and entered an order requiring the State Engineer to make a further determination of the waters of the said Muddy River and its tributaries, subject to instructions of the court which were embodied in such order; and thereafter, to-wit, on the 11th day of March, 1920 said State Engineer did make and file in his office a further and supplemental order of determination and has filed a duly certified

copy thereof with the Clerk of this Court.

And the above entitled action and the above entitled matter and the said original and said further and supplemental order of determination of the State Engineer in said matter having now come on for hearing and the Court having considered the pleadings of the parties, the oral and documentay evidence heretofore taken herein, and the stipulations of the parties filed herein, and written findings having been waived by attorneys for the respective parties, thereupon, upon motion of the attorneys for plaintiffs and defendants,

It is by the Court ORDERED, ADJUDGED AND DECREED as follows:

First: That the said order of determination of the State Engineer in the matter of the determination of the relative rights in and to the waters of the Muddy River and tributaries in Clark County, State of Nevada, as amended and modified by the said further and supplemental order of determination, and the said further and supplemental order of determination be and the same hereby are affirmed and confirmed. Wherever the said further and supplemental order of determination differs from, changes, modifies, or is in conflict with the original order of determination, the said original order of determination is and shall be deemed to be modified by the said further and supplemental order of determination and by the order and decree of this court and the same as so modified is hereby affirmed. A copy of said original order of determination marked "Exhibit "A" and a copy of said further and supplemental order of determination marked "Exhibit 'B" are annexed to this decree and are made parts hereof as if set forth at length herein. Hereinafter in this decree whenever the order of determination is referred to it shall, unless otherwise specified, be understood to include both the original order of determination and the further and supplemental order of determination and the former as amended, changed and modified by the latter. Said

order of determination shall and does define the rights of the parties named therein except as hereinafter in this decree provided.

Second: That the parties to the above entitled action, their grantors and predecessors in interest have diverted and appropriated from the Muddy River, its headwaters, sources of supply and tributaries for use upon the lands described in their several answers and specifically described in the order of determination and the said parties are respectively entitled to divert to said lands for use in the irrigation thereof, the respective amounts of water herein setforth:

The defendants George Baldwin and Aletha Baldwin his wife, .2286 of one cubic foot of water per second.

The defendant Moapa and Salt Lake Produce Company 2.215 cubic feet per second.

The defendants D. H. Livingston and Richard Smith, 2.286 cubic feet per second.

The defendants Joseph Perkins and Kathyrn Perkins, his wife, .428 cubic feet per second.

The defendants G. S. Holmes and Julia May Knox, 1.357 cubic feet per second.

The defendants Isaiah Cox and Anna Cox his wife for use on 10 acres of land described in their separate answer .143 of a cubic foot per second.

The defendants Isaiah Cox and Anna Cox his wife for use upon the lands formerly belonging to J. H. Mitchell, described in the order of determination .043 of a cubic foot per second.

The defendants, W. J. Powers and Mary Powers his wife, .4143 of a cubic foot per second.

The defendant, Sadie George for use on the land described in the order of determination, .03 of a cubic foot per second.

The defendant, Los Angeles & Salt Lake Railroad Company for the use specified in the order of determination, .04646 of a cubic foot per second.

The defendant, Jacob Bloedel for use upon the land described in the order of determination, .0286 of a cubic foot per second.

The plaintiff, John F. Perkins, .0286 of a cubic foot per second.

The plaintiff, Muddy Valley Irrigation Company, for use during the summer season, as hereinafter defined and as defined in said order of determination, upon the lands described in said order of determination, 36.2588 cubic feet per second, which said amount includes the amount of water for summer use allowed by State Engineer's certificate No. 59. Said company is also the owner of the right to and entitled to divert during the winter season for use upon the lands described in said order of determination and in State Engineer's Certificate Nos. 58, 59 and 60, and also upon the lands described in any certificate or permit granted or issued by said State Engineer upon said Company's application No. 1611 - the several amounts of water allowed by said certificate or permits for winter use.

Third: That the Moapa Indian Reservation has diverted and appropriated from the said Muddy River for use upon the lands of said reservation and is entitled to divert upon said lands for use thereon 1.242 cubic feet per second during the summer season and .87 of a cubic foot per second during the winter season.

Fourth: That all of the defendants to the above entitled action and the plaintiff John F. Perkins are and shall be entitled to use the several amounts of water which they have appropriated as aforesaid during both the summer and winter seasons.

Fifth: That the duty of water allowed for all land in the Muddy Valley except on the Moapa Indian Reservation shall be one cubic foot per second of flow to 70 acres for the summer irrigation season which is defined as extending from May 1st to October 1st, and one cubic foot per second flow to 100 acres for the winter irrigation season which is defined as extending from October 1st to May 1st. On said Indian Reservation the duty of

water allowed is 1 cubic foot per second flow to 70 acres for the summer irrigation season which is defined as from April 1st to October 1st, and one cubic foot per second flow to 100 acres for the winter irrigation season which is defined as from October 1st to April 1st.

The volumes or amounts of water awarded and allotted by this decree to the parties hereinbefore named and to which they are entitled shall be understood to include and define the amount of all the waters now or heretofore rightfully used on the lands given in the tabulation in the original order of determination whether diverted directly from said Muddy River or from its tributaries, springs, head waters or other sources of supply, including waters claimed to have been developed heretofore by any of the said parties. All measurements of amounts to which the said several parties are entitled except that awarded to the Moapa Indian Reservation shall be made at the places of diversion or as near thereto as practicable or convenient, as the State Engineer or Water Commissinner may select or approve. On said Indian Reservation all measurements of amounts diverted are to be made at the point where the main ditch enters or becomes adjacent to the land irrigated or as near thereto as practicable as the State Engineer or Water Commissioner may select or approve.

Sixth: That the waters now and heretofore used by the defendants George Baldwin and Aletha Baldwin his wife, upon the lands described in their original separate answer, and which are the waters of what is known as the George Baldwin Spring, the maximum flow of which is found to be .8298 of a cubic foot per second of water are waters which have been developed and appropriated by said defendants in the manner and by the means alleged in their said answer; and that such development and use has not and does not diminish the flow or volume of the Muddy River or interfere with the rights of any of the other parties to the above entitled action or the Moapa Indian Reservation.

Seventh: That, as between the parties to the above entitled action, the Muddy Valley Irrigation Company is declared and decreed to have acquired by valid appropriations and beneficial use and to be entitled to divert and use upon the lands described in the amended complaint and more particularly described in the order of determination, all the waters of said Muddy River, its head waters, sources of supply and tributaries, save and except the several amounts and rights hereinbefore specified and described as awarded and decreed to the other parties to this action and to the Moapa Indian Reservation, and said Company is to divert said waters, convey and distribute the same to its present stockholders and to its future stockholders and to other persons who have acquired or who may hereafter acquire temporary or permanent rights from said Company, for the various purposes described in the complaint and upon the lands situated as stated in the complaint and specifically designated in the order of determination and that the stock holders of said Company are the equitable owners of rights to use said waters in this decree and by the order of determination allotted and decreed to said Company, in accordance with its articles and amended articles of incorporation, or its by-laws or the accepted uses and practices of said corporation.

Eighth: As between the parties to this action and except against the rights awarded the Indian Reservation and the Inhabitants thereof, all of the water rights enumerated as belonging to the parties to the action shall be deemed and held to be and are hereby decreed to be vested rights acquired by valid appropriation and beneficial use prior to March 1st, 1905, and by continued uninterrupted use since said date and shall be considered as equal in rank without anyone having any priority over another and that this shall apply to and include the rights held by the Muddy Valley Irrigation Company as grantee or assignee of Nevada Land & Live Stock Company under the State Engineer's certificates, 58, 59 and 60, and under such permit or certificate as may hereafter be

granted by the State Engineer to the Muddy Valley Irrigation Company under its application No. 1611. That, as against the water right granted and allotted to the said Indian Reservation, the water rights held by the Muddy Valley Irrigation Company under said certificates or permits shall be deemed to be subsequent to the water rights allotted and decreed the said Indian Reservation. The water right allotted and decreed the Indian Reservation shall be deemed and held to be vested rights acquired by valid appropriation prior to March 1st, 1905 and by uninterrupted use thereafter and shall, to the extent decreed and allotted, rank, as equal in priority with all the other rights, allotted, awarded and decreed to the said several parties, except those granted by the said certificates or permits.

Ninth: That the defendants in said action shall not be required to take or use the waters in said river in continuous flow, but may cumulate the same or any part thereof in rotation and turn periods, with the approval of the Water Commissioner, and subject to his control and direction and under such rules and regulations as may be prescribed by the State Engineer and the statutes of the State of Nevada. That the whole amount of water diverted from said river at any one time by all of the defendants shall not exceed in the aggregate the total of the amounts of water awarded to the said defendants. Below the lowest diversion of the defendants Holmes and Knox, the flow in the stream shall be maintained substantially constant, subject to seasonal variations, only, however, in so far as the defendants can be held to be responsible for the fluctuations of the stream. The whole of said river system shall be under the supervision, rules and regulations of the State Engineer, and the direction and control of the water commissioner to be appointed as provided by law, as a fully adjudicated stream; but it is the intention hereof, and it is hereby decreed that, so far as practicable, the stream shall be treated as divided into two parts, that above and that below the lowest diversion on the ranch now belonging to Knox and Holmes. The Muddy Valley Irrigation Company, although under the supervision

and control of the state engineer and water commissioner, shall, subject to said supervision and general control, distribute and control the distribution of the waters diverted and conveyed by its works to its stockholders and other persons obtaining water by means thereof. Substantial headgates, weirs or other measuring devices and sand boxes, as the State Engineer, through the water commissioner may direct or require, shall be installed and maintained in good order by all who divert or use the waters of said stream system.

Tenth: That the owners of land on the upper part of said river as in the last paragraph defined, and defined in the said order of determination, as that part of said river above the "narrows", shall keep the channel through their respective lands cleared, of all ordinary obstructions, but in case of extraordinary obstructions, such as the formation of lime beds or deposits in the channel of the stream, the same shall be removed under the direction of the water commissioner and the expenses thereof paid pro rata by all parties to the determination in proportion to the acreage owned or controlled by them as defined in said order of determination.

Eleventh: That all abnormal losses from the flow of the stream shall be pro rated and shared among the parties holding water rights on the stream, but as between the parties to the above entitled action, abnormal losses shall be defined as in paragraph 8 of said stipulation of April 23rd, 1919, as amended by paragraph 5 of the stipulation supplemental thereto, and, as between the parties to said action, such abnormal losses shall be borne by the parties to said action, pro rata in the proportions named and set forth in paragraph 4 of said supplemental stipulation.

Twelfth: That the aggregate volume of the several amounts and quantities of water awarded and allotted to the parties named in said order of determination, which include all of the parties to said action and the said Moapa Indian Reservation, is the total available flow of the said Muddy River and consumes and

exhausts all of the available flow of the said Muddy River, its head waters, sources of supply and tributaries.

Thirteenth: That the salary and the expenses of any water commissioner, who may be appointed to supervise, control and regulate the distribution of the waters of said Muddy River in accordance with the provisions of said order of determination and this decree, shall be paid pro-rata by the parties to the said stipulation supplemental to the stipulation of April 23rd, 1919, in the same proportion as for the sharing of abnormal losses set forth in paragraph 4 of said supplemental stipulation. If in the opinion of the State Engineer a suitable and competent water commissioner cannot be employed at the salary fixed by statute, the State Engineer is authorized to fix the salary of the Water Commissioner in such amount as he may determine to be reasonable, subject, in case of objection by any of the water users, to the approval of the Judge of the above entitled Court. The State Engineer may also allow such expenses of such water commissioner as he may deem necessary or proper to be incurred in the performance of the duties of such water commissioner, subject, also, in case of objection, to the approval of the Judge of said Court.

That any money due or which may hereafter become due from any party for his, her or its pro rata share of such salary or such expenses of the water commissioner shall be paid by the party at the times and in the manner provided by law for the payment of the salary of the water commissioner, and any neglect or failure of any party to make any such payment shall be deemed a violation of this decree and a contempt of Court, and shall be punished accordingly, or the same may be deemed a debt and collected by civil process.

Fourteenth: That each of the parties to this action his, her or its grantees and successors in interest and every person acting under his, her or its direction or control be and hereby is perpetually restrained and enjoined from in any way interfering with or in any way impairing any right given or awarded or

decreed by this decree to any other party and from violating any of the provisions of this decree, and is also perpetually restrained and enjoined from opening, closing, changing or interfering with any headgate or water box established by or under the order of the State Engineer or Water Commissioner without the authority of said State Engineer or Water Commissioner, and also from using water or conducting water into or through his, her or its ditch which has not been awarded to such party by this decree.

Fifteenth: Each party shall pay his or its own costs in this action, but the costs and expenses of the adjudication by the State Engineer, including any surveys or maps made by him, shall be borne by the respective parties in accordance with the Statutes of this State. But in determining the water right and acreage, against which said expense shall be assessed the numerators in the fractions in said paragraph 4 of said supplemental stipulation, shall, as between said parties, be deemed to be the number of acres to be irrigated by the said respective parties.

Done in open Court this 12th day of March, A. D. 1920.

/s/ Wm. E. Orr
District Judge.

EXHIBIT "A"

# STATE OF NEVADA

## ORDER OF DETERMINATION OF RELATIVE RIGHTS

TO THE

# Waters of the Muddy River and Its Tributaries

J. G. SCRUGHAM, State Engineer

CARSON CITY, NEVADA
STATE PRINTING OFFICE : : : JOE FARNSWORTH, SUPERINTENDENT
1920
1[60]

## ORDER OF DETERMINATION

**In the Matter of the Determination of the Relative Rights in and to the Waters of the Muddy River and its Tributaries in Clark County, State of Nevada.**

In accordance with stipulated agreement entered into by the Muddy Valley Irrigation Company, et al., v. Moapa and Salt Lake Produce Company, et al., on the 23d day of April, 1919, an order was entered in the Tenth Judicial District Court of the State of Nevada referring the above-entitled action to the State Engineer for an adjudication of the water rights on the Muddy River stream-system as provided for in Chapter 140, Statutes of 1913, and all Acts amendatory thereof.

The tabulation of the allotments of the waters of the Muddy River stream-system, as attached hereto, covers all claims filed in the office of the State Engineer as provided for by law, and also an allotment to the Moapa Indian Reservation. Although duly notified of the pending adjudication proceedings in the statutory manner, the United States Indian Service authorities did not file a claim and state that they refuse to recognize the authority of the State of Nevada to determine the water rights of the Moapa Indian Reservation. In the absence of any showing on part of the United States Indian Service, the State Engineer has based the Moapa Indian Reservation allotment on the official investigations and reports made in the year 1906 by Henry Thurtell, at that time State Engineer of Nevada. These reports gave the Moapa Indian Reservation an allotment of water sufficient to properly irrigate an area of 87 acres, which was found to be the full area on the Reservation entitled to a vested water right under the law of the State.

(a) *Duty and point of diversion defined.*

The duty of water allowed for all land in the Muddy River Valley shall be 1 c.f.s. flow to 70 acres for the summer irrigation season from April 1 to October 1 and 1 c.f.s. flow to 100 acres for the winter irrigation season from October 1 to April 1.

The volumes or amounts of water allotted and to which it is agreed the respective parties are entitled shall be understood to include and define the amount of all the waters now or heretofore rightfully used on the lands given in the tabulation whether diverted directly from said Muddy River or from its tributaries, springs, headwaters or other sources of supply, including water claimed to have been developed heretofore by any of the said parties. All measurements of amounts diverted are to be made at the point where the main ditch enters or becomes adjacent to the land to be irrigated or as near thereto as practicable, as the State Engineer or water commissioner may select or approve.

(b) *Baldwin Spring flow defined.*

The maximum flow of .8298 c.f.s. of water of the George Baldwin Spring now and heretofore used by George Baldwin and Aletha L. Baldwin, his wife, is water which has been developed by said parties.

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c.f.s. signifies cubic foot per second.

Such development and use of this amount of water has not and does not diminish the flow or volume of the Muddy River, or interfere with the rights of any other water users on the stream-system. No further development of water on the head of the Muddy River stream-system shall be made which in any way diminishes the flow of the waters of the Muddy River or impairs rights defined and referred to in this order.

(c) *Method of use.*

The parties named in this order shall not be required to take or use the water of said river in continuous flow, but may cumulate same or any part thereof in rotation and in periodic turn, with the approval of the water commissioner, subject to his control and direction and under such rules and regulations as are prescribed by the State Engineer and the statutes of the State of Nevada.

The whole amount of water diverted from the river at any one time by all the parties allotted water for use above the "narrows" is not to exceed in the aggregate the total amount of water allotted to the several parties resident in the Upper Muddy Valley. Below the lowest diversion of Knox and Holmes the flow in the stream shall be maintained substantially constant subject to seasonal variation. The whole of said river system shall be under supervision of the rules and regulations of the State Engineer and the direction and control of the water commissioner, to be appointed as provided by law. Substantial headgates, weirs, and sand-boxes, as the State Engineer through the water commissioner may order, shall be installed and maintained in good order by all who divert or use the waters of said stream-system.

(d) *Channel upkeep, responsibility for.*

The owners of land on that part of said river above the "narrows" shall keep the channel through their respective lands cleared of all ordinary obstructions, but in case of extraordinary obstruction, such as the formation of lime deposits in the channel of the stream, the same shall be removed under the direction of the water commissioner and the expenses thereof paid pro rata by all parties to this determination in proportion to the acreage owned or controlled by them as defined in this order.

(e) *Priority—Vested and granted rights.*

All the water rights enumerated in this order of determination, except those held under permit from the State Engineer's office, shall be deemed and held to be vested rights acquired by valid appropriation and beneficial use prior to March 1, 1905, and by continued uninterrupted use since said date and shall be considered as equal in rank without having any priority over one another.

Permits Nos. 31 and 1372, which are the basis for certificates Nos. 58, 59, and 60, granted by the State Engineer, cover certain water rights which are enumerated in the appended tabulation of allotments. These granted rights are next in priority to the vested rights on the Muddy River stream-system.

(f) *Losses, apportionment of.*

All abnormal losses from the flow of said stream shall be pro-rated and shared among the parties holding water rights on the stream. Abnormal losses shall include any substantial loss from the permanent

flow of the stream, such as a cloudburst destroying or obstructing the channel thereof or an opening up of a fissure in the bed of the stream or in one of the sources of supply and the disappearance therein of a substantial amount of the waters, thereby causing a diminution in the available flow.

If any such abnormal loss occurs at any time, the pro-rata share of such loss to be borne by each party to this order shall be as follows:

George Baldwin and Aletha Baldwin, his wife....16/2839
Moapa & Salt Lake Produce Co....155/2839
Livingston & Smith....160/2839
Joseph Perkins and wife....30/2839
Knox and Holmes....95/2839
Isaiah Cox and wife....10/2839
W. J. Powers and wife....29/2839
Sadie George....2.1/2839
Jacob Bloedel....2/2839
J. H. Mitchell....3/2839
U. S. Indian Service, Moapa Reservation....87/2839
John F. Perkins....2/2839
Muddy Valley Irrigation Co....2244.80/2839

(g) *Expense of commissioner.*

The salary and expenses of the water commissioner shall be paid pro rata by all parties to this adjudication in the proportion of acreage owned and controlled by them as defined in this order.

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**SUMMARY OF ALLOTMENTS AND CERTIFICATES**

| *Claimant* | *Acreage* | *C.F.S. flow* *Summer* | *Winter* |
|---|---|---|---|
| Jacob Bloedel | 2 | .0286 | .02 |
| Moapa & Salt Lake Produce Co. | 155 | 2.215 | 0 |
| Isaiah Cox and wife | 10 | .143 | 0 |
| J. H. Mitchell | 3 | .043 | 0 |
| George Baldwin | 16 | .2286 | 0 |
| Sadie George | 2.1 | .0300 | 0 |
| John F. Perkins | 2 | .0286 | .02 |
| Los Angeles & Salt Lake Ry. | | .04646 | .04646 |
| Livingston and Smith | 160 | 2.286 | 0 |
| Knox and Holmes | 95 | 1.357 | 0 |
| W. J. Powers | 29 | .4143 | .29 |
| Muddy Valley Irr. Co. | 2244.80 | 32.0068 | 22.448 |
| Muddy Valley Irr. Co. (Cert. 58) | 398.11 | ..... | 3.98 |
| Muddy Valley Irr. Co. (Cert. 59) | 425.2 | 4.252 | ..... |
| | 846.6 | ..... | 8.466 |
| Muddy Valley Irr. Co. (Cert. 60) | 80 | ..... | .8 |
| Joseph Perkins | 30 | .428 | 0 |
| Moapa Indian Reservation | 87 | 1.242 | .87 |

Appropriator—Jacob Bloedel.

Source—Muddy River Tributary (Bloedel Spring).

| Ditch Title | Date when construction commenced | Date when land first irrigated | Number of acres irrigated | Sec. | Subdivision | Tp.S. | R.E. |
|---|---|---|---|---|---|---|---|
| Morris & Jones Ditches | 1896 | | 2.00 | 21 | NE¼NE¼ | 14 | 65 |

Domestic use allowed.

2/70 c.f.s. allowed for irrigation.

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Appropriator—Moapa and Salt Lake Produce Co.

Source—Muddy River and Tributaries.

| | | | | | |
|---|---|---|---|---|---|
| Big Spring, Jones Spring, High Springs, and Rock Cabin Spring Ditches. | 14 | W½SW¼ | 14 | 65 |
| | 15 | S½ | 14 | 65 |
| | 15 | S½N½NW¼ | 14 | 65 |
| | 15 | S½N½ | 14 | 65 |
| | 16 | NE¼ | 14 | 65 |
| | 16 | E½SE¼ | 14 | 65 |
| Excepting and excluding from the above description the | 16 | NE¼ NW¼NE¼ | 14 | 65 |
| | 16 | NW¼ NE¼NE¼ | 14 | 65 |

Domestic use allowed.

Total acreage allotted water, 155 acres.

2 and 15/70 c.f.s. allowed for irrigation.

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Appropriator—Isaiah Cox and Anna Cox, His Wife.

Source—Muddy River and Tributaries.

| | | | | | | |
|---|---|---|---|---|---|---|
| Cox Ditch and Cox Spring Ditch | 10.00 | 16 | NE¼ NW¼NE¼ | 14 | 65 |

Domestic use allowed.

10/70 c.f.s. allowed for irrigation.

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Appropriator—J. H. Mitchell.

Source—Muddy River.

| | | | | | | |
|---|---|---|---|---|---|---|
| Mowry & Mitchell or Cox Ditch | 3.00 | 16 | NW¼ NE¼NE¼ | 14 | 65 |

Domestic use allowed.

3/70 c.f.s. allowed for irrigation.

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Appropriator—U. S. Indian Service (Moapa Indian Reservation).

Source—Muddy River.

| | | | | | |
|---|---|---|---|---|---|
| Indian Ditches | 87.00 | 36 | | 14 | 65 |
| | | 35 | | 14 | 65 |
| | | 31 | | 14 | 66 |
| | | 1 | | 15 | 65 |
| | | 6 | | 15 | 66 |
| Total | 87.00 | | | | |

This allotment is based on the Thurtell findings as covered in Certificate No. 479, issued by Henry Thurtell on March 30, 1907.

Domestic use allowed.

87/70 c.f.s. allowed for irrigation.

Appropriator—**George Baldwin.**

Source—**Muddy River and Tributaries.**

| *Ditch Title* | *Date when construction commenced* | *Date when land first irrigated* | *Number of acres irrigated* | *Sec.* | *Subdivision* | *Tp.S.* | *R.E.* |
|---|---|---|---|---|---|---|---|
| George A. Davis and Dry Ditch.... | | | 16.00 | 25 | SE¼SW¼ | 14 | 65 |
| | | | | 25 | SW¼SE¼ | 14 | 65 |
| | | | | 36 | Lots 2 and 3 NE¼ | 14 | 65 |

Domestic use allowed.
16/70 c.f.s. allowed for irrigation.

---

Appropriator—**Sadie George.**

Source—**Muddy River and Tributaries.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Indian Ditch..... | | | 2.10 | 1 | SE¼NE¼ | 15 | 65 |

Domestic use allowed.
21/700 c.f.s. allowed fpr irrigation.

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Appropriator—**Joseph Perkins.**

Source—**Muddy River and Tributaries.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Barnes & Harris Ditch and Bradfute Ditch. | | | 30.00 | 6 | Lots 4 and 5 NW¼ | 15 | 66 |
| | | | | 6 | Lot 6 SW¼ | 15 | 66 |
| | | | | 6 | SE¼NE¼ | 15 | 66 |
| | | | | 6 | SW¼NE¼ | 15 | 66 |
| | | | | 6 | Lots 2 and 3 | 15 | 66 |

Domestic use allowed.
30/70 c.f.s. allowed for irrigation.

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Appropriator—**Los Angeles and Salt Lake Ry. Co.**

Source—**Muddy River.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pipe Line..... | | | equiv. to .0322 | 32 | NE¼ | 14 | 66 |

NOTE—Water used for locomotives, cars, depot, stock yards, and town supply.
.04646 c.f.s. allowed.

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Appropriator—**D. H. Livingston and Richard Smith.**

Source—**Muddy River and Tributaries.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| White, Livingston, and Crosby Ditches. | | | | 5 | S½SE¼ | 15 | 66 |
| | | | | 8 | N½NE¼ | 15 | 66 |
| | | | | 9 | N½NW¼ | 15 | 66 |
| | | | | 9 | NW¼NE¼ | 15 | 66 |
| | | | | 4 | SW¼SE¼ | 15 | 66 |
| | | | | 4 | SE¼SW¼ | 15 | 66 |
| | | | 20.00 | 4 | N½SE¼ | 15 | 66 |
| | | | | 9 | NE¼NE¼ | 15 | 66 |
| | | | | 4 | SE¼SE¼ | 15 | 66 |
| | | | | 3 | W½SW¼ | 15 | 66 |
| | | | | 8 | N½NW¼ | 15 | 66 |
| | | | | 5 | S½SW¼ | 15 | 66 |
| All that portion of..... | | | | 6 | S½SE¼ situated east of the R. R. track | | |
| Total..... | | | 160.00 | | | | |

Domestic use allowed.
2 and 20/70 c.f.s. allowed for irrigation.

Appropriator—G. S. Holmes and Julia May Knox.
Source—Muddy River and Tributaries.

| Ditch Title | Date when construction commenced | Date when land first irrigated | Number of acres irrigated | Sec. | Subdivision | Tp.S. | R.E. |
|---|---|---|---|---|---|---|---|
| Weiser Ditch | | | 95.00 | 1 | S½NW¼SW¼ | 15 | 66 |
| | | | | 1 | S½SW¼ | 15 | 66 |
| | | | | 1 | S½SE¼ | 15 | 66 |
| | | | | 12 | NE¼ | 15 | 66 |
| | | | | 12 | NE¼SE¼ | 15 | 66 |
| | | | | 7 | SW¼NW¼ | 15 | 67 |
| | | | | 7 | NE¼SW¼ | 15 | 67 |
| | | | | 7 | Frac. ½SW¼ | 15 | 67 |

Domestic use allowed.
1 and 25/70 c.f.s. allowed for irrigation.

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Appropriator—W. J. Powers.
Source—Muddy River.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cook Ditch | | | 29.00 | 4 | NW¼SE¼ | 15 | 66 |
| | | | | 4 | NE¼SE¼ | 15 | 66 |
| | | | | 4 | NW¼SE¼& NE¼SW¼ | 15 | 66 |
| | | | | 4 | NE¼SE¼ | 15 | 66 |
| | | | | 4 | SE¼NE¼ | 15 | 66 |
| | | | | 3 | NW¼SW¼ | 15 | 66 |

Domestic use allowed.
29/70 c.f.s. allowed for irrigation.

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Appropriator—Muddy Valley Irrigation Co.
Source—Muddy River.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| St. Joe Ditch | | | 20.00 | 15 | SE¼SW¼ | | |
| | | | 14.00 | 15 | SW¼SW¼ | | |
| | | | 34.00 | 15 | | 15 | 67 |
| | | | 20.00 | 21 | SE¼NE¼ | | |
| | | | 7.25 | 21 | NE¼NE¼ | | |
| | | | 27.25 | 21 | | 15 | 67 |
| | | | 20.00 | 22 | NE¼NW¼ | | |
| | | | 24.00 | 22 | SE¼NW¼ | | |
| | | | 14.00 | 22 | NW¼NW¼ | | |
| | | | 14.00 | 22 | SW¼NW¼ | | |
| | | | 14.00 | 22 | NW¼SW¼ | | |
| | | | 14.00 | 22 | NE¼SW¼ | | |
| | | | 15.00 | 22 | SW¼SW¼ | | |
| | | | 20.00 | 22 | NW¼NE¼ | | |
| | | | 20.00 | 22 | SW¼NE¼ | | |
| | | | 15.00 | 22 | NW¼SE¼ | | |
| | | | 14.00 | 22 | SE¼SW¼ | | |
| | | | 184.00 | 22 | | 15 | 67 |
| | | | 14.00 | 27 | NE¼NW¼ | | |
| | | | 14.00 | 27 | NW¼NE¼ | | |
| | | | 16.50 | 27 | SW¼NE¼ | | |
| | | | 30.00 | 27 | SE¼NE¼ | | |
| | | | 26.00 | 27 | NE¼SE¼ | | |
| | | | 10.00 | 27 | SE¼SE¼ | | |
| | | | 110.50 | 27 | | 15 | 67 |
| | | | 2.60 | 26 | SW¼NW¼ | | |
| | | | 24.40 | 26 | NW¼SW¼ | | |
| | | | 3.00 | 26 | SW¼SW¼ | | |
| | | | 30.00 | 26 | | 15 | 67 |
| | | | 17.50 | 35 | SE¼NW¼ | | |
| | | | 40.00 | 35 | NW¼NW¼ | | |
| | | | 20.00 | 35 | NE¼NW¼ | | |
| | | | 77.50 | 35 | | 15 | 67 |
| Total | | | 463.25 | | | | |

46325/7000 c.f.s. allowed for irrigation.

Appropriator—**Muddy Valley Irrigation Co.**

Source—**Muddy River.**

| *Ditch Title* | *Date when construction commenced* | *Date when land first irrigated* | *Number of acres irrigated* | *Sec.* | *Subdivision* | *Tp.S.* | *R.E.* |
|---|---|---|---|---|---|---|---|
| Sprole-Averitt | | | 22.25 | 27 | NW¼NW¼ | | |
| | | | 25.00 | 27 | SW¼NW¼ | | |
| | | | 10.00 | 27 | SE¼NW¼ | | |
| | | | 35.50 | 27 | NE¼SW¼ | | |
| | | | 22.50 | 27 | SE¼SW¼ | | |
| | | | 28.00 | 27 | SW¼SE¼ | | |
| | | | 143.25 | 27 | | 15 | 67 |
| | | | 6.00 | 34 | NE¼NW¼ | | |
| | | | 15.00 | 34 | SE¼NW¼ | | |
| | | | 17.75 | 34 | NE¼NE¼ | | |
| | | | 40.00 | 34 | NE¼NE¼ | | |
| | | | 13.75 | 34 | SW¼NE¼ | | |
| | | | 6.50 | 34 | SE¼SE¼ | | |
| | | | 99.00 | 34 | | 15 | 67 |
| Total | | | 242.25 | | | | |

24225/7000 c.f.s. allowed for irrigation.

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Appropriator—**Muddy Valley Irrigation Co.**

Source—**Muddy River.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Kapalapa Ditch | | | 10.00 | 2 | NW¼NW¼ | | |
| | | | 20.00 | 2 | NE¼NW¼ | | |
| | | | 20.00 | 2 | SE¼NW¼ | | |
| | | | 20.00 | 2 | NW¼NE¼ | | |
| | | | 7.50 | 2 | NE¼NE¼ | | |
| | | | 20.00 | 2 | SE¼NE¼ | | |
| | | | 20.00 | 2 | SW¼NE¼ | | |
| | | | 20.00 | 2 | NW¼SE¼ | | |
| | | | 20.00 | 2 | NE¼SW¼ | | |
| Total | | | 157.50 | 2 | | 16 | 67 |

15750/7000 c.f.s. allowed for irrigation.

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Appropriator—**Muddy Valley Irrigation Co.**

Source—**Muddy River.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Stringtown Ditch | | | 17.80 | 12 | NE¼NW¼ | | |
| | | | 12.50 | 12 | SW¼NW¼ | | |
| | | | 12.50 | 12 | SE¼NW¼ | | |
| | | | 7.50 | 12 | SW¼NE¼ | | |
| | | | 12.00 | 12 | NE¼SE¼ | | |
| | | | 30.00 | 12 | NW¼SE¼ | | |
| | | | 36.20 | 12 | SW¼SE¼ | | |
| | | | 24.10 | 12 | SE¼SE¼ | | |
| | | | 7.00 | 12 | NE¼SW¼ | | |
| | | | 15.00 | 12 | SE¼SW¼ | | |
| | | | 8.00 | 12 | SW¼SW¼ | | |
| | | | 182.60 | 12 | | 16 | 67 |
| | | | 21.40 | 13 | NW¼NE¼ | | |
| | | | 25.80 | 13 | NE¼NE¼ | | |
| | | | 47.20 | 13 | | 16 | 67 |
| | | | 5.00 | 18 | SW¼NW¼ | | |
| | | | 5.00 | 18 | NW¼NW¼ | | |
| | | | 10.00 | 18 | | 16 | 68 |
| Total | | | 239.80 | | | | |

23980/7000 c.f.s. allowed for irrigation.

Appropriator—Muddy Valley Irrigation Co.

Source—Muddy River.

| Ditch Title | Date when construction commenced | Date when land first irrigated | Number of acres irrigated | Sec. | Subdivision | Tp. | S. R. | E. |
|---|---|---|---|---|---|---|---|---|
| Sparks Canal | | | 13.00 | 1 | SE¼SW¼ | 16 | 67 | |
| | | | 21.80 | 7 | SW¼SW¼ | | | |
| | | | 1.20 | 7 | NW¼SW¼ | | | |
| | | | 23.00 | 7 | | 16 | 68 | |
| | | | 1.80 | 12 | NE¼SE¼ | | | |
| | | | 8.20 | 12 | SE¼SE¼ | | | |
| | | | 10.00 | 12 | | 16 | 67 | |
| Total | | | 46.00 | | | | | |

46/70 c.f.s. allowed for irrigation.

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Appropriator—Muddy Valley Irrigation Co.

Source—Muddy River.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Overton Canal | | | 18.00 | 2 | SW¼SE¼ | | | |
| | | | 20.00 | 2 | SE¼SW¼ | | | |
| | | | 12.00 | 2 | SW¼SW¼ | | | |
| | | | 50.00 | 2 | | 16 | 67 | |
| | | | 7.00 | 3 | SE¼SE¼ | 16 | 67 | |
| | | | 5.00 | 10 | NE¼NE¼ | 16 | 67 | |
| | | | 10.00 | 11 | NW¼NW¼ | | | |
| | | | 20.00 | 11 | NE¼NW¼ | | | |
| | | | 20.00 | 11 | NW¼NE¼ | | | |
| | | | 13.475 | 11 | NE¼NE¼ | | | |
| | | | 7.50 | 11 | SE¼NE¼ | | | |
| | | | 7.50 | 11 | SW¼NE¼ | | | |
| | | | 10.00 | 11 | NE¼SE¼ | | | |
| | | | 10.00 | 11 | NW¼SE¼ | | | |
| | | | 27.525 | 11 | SE¼SE¼ | | | |
| | | | 126.00 | 11 | | 16 | 67 | |
| | | | 13.00 | 13 | NW¼NW¼ | | | |
| | | | 5.00 | 13 | NE¼NW¼ | | | |
| | | | 20.00 | 13 | SW¼NW¼ | | | |
| | | | 15.00 | 13 | SE¼NW¼ | | | |
| | | | 4.50 | 13 | SW¼NE¼ | | | |
| | | | 7.50 | 13 | SE¼NE¼ | | | |
| | | | 24.50 | 13 | NW¼SE¼ | | | |
| | | | 32.75 | 13 | NE¼SE¼ | | | |
| | | | 26.40 | 13 | SE¼SE¼ | | | |
| | | | 31.35 | 13 | SW¼SE¼ | | | |
| | | | 24.50 | 13 | NE¼SW¼ | | | |
| | | | 12.00 | 13 | SE¼SW¼ | | | |
| | | | 216.50 | 13 | | 16 | 67 | |
| | | | 7.50 | 14 | NE¼NE¼ | 16 | 67 | |
| | | | 5.00 | 18 | SW¼SW¼ | 16 | 68 | |
| | | | 3.00 | 19 | SW¼SE¼ | | | |
| | | | 6.00 | 19 | NE¼SW¼ | | | |
| | | | 5.00 | 19 | SE¼SW¼ | | | |
| | | | 14.00 | 19 | | 16 | 68 | |
| | | | 3.00 | 24 | NW¼NE¼ | | | |
| | | | 20.00 | 24 | NE¼NE¼ | | | |
| | | | 5.00 | 24 | SW¼NE¼ | | | |
| | | | 4.00 | 24 | SE¼NE¼ | | | |
| | | | 32.00 | 24 | | 16 | 67 | |
| | | | 3.00 | 30 | NW¼NE¼ | 16 | 68 | |
| Total | | | 466.00 | | | | | |

466/70 c.f.s. allowed for irrigation.

Appropriator—**Muddy Valley Irrigation Co.**

Source—**Muddy River.**

| *Ditch Title* | *Date when construction commenced* | *Date when land first irrigated* | *Number of acres irrigated* | *Sec.* | *Subdivision* | *Tp.S* | *R.E.* |
|---|---|---|---|---|---|---|---|
| Kaolin Ditch | | | 28.00 | 19 | SE¼SE¼ | 16 | 68 |
| | | | 20.00 | 30 | SW¼NE¼ | | |
| | | | 20.00 | 30 | NW¼SE¼ | | |
| | | | 7.00 | 30 | NE¼NE¼ | | |
| | | | 47.00 | 30 | | 16 | 68 |
| | | | 20.00 | 32 | NE¼SE¼ | | |
| | | | 20.00 | 32 | NW¼SE¼ | | |
| | | | 40.00 | 32 | | 16 | 68 |
| | | | 4.00 | 29 | NE¼NW¼ | 16 | 68 |
| Total | | | 119.00 | | | | |

119/70 c.f.s. allowed for irrigation.

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Appropriator—**Muddy Valley Irrigation Co.**

Source—**Muddy River.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| St. Thomas Ditch | | | 15.00 | 10 | SE¼NW¼ | | |
| | | | 20.05 | 10 | NW¼NE¼ | | |
| | | | 19.00 | 10 | NE¼NE¼ | | |
| | | | 23.00 | 10 | SW¼NE¼ | | |
| | | | 13.50 | 10 | SE¼NE¼ | | |
| | | | 17.25 | 10 | NE¼SE¼ | | |
| | | | 2.50 | 10 | SE¼SE¼ | | |
| | | | 110.30 | 10 | | 17 | 68 |
| | | | 5.00 | 11 | NW¼NW¼ | | |
| | | | 28.00 | 11 | SW¼NW¼ | | |
| | | | 30.25 | 11 | NW¼SW¼ | | |
| | | | 20.25 | 11 | NE¼SW¼ | | |
| | | | 34.00 | 11 | SW¼SW¼ | | |
| | | | 37.75 | 11 | SE¼SW¼ | | |
| | | | 20.80 | 11 | SW¼SE¼ | | |
| | | | 176.05 | 11 | | 17 | 68 |
| | | | 17.80 | 14 | NW¼NW¼ | | |
| | | | 37.00 | 14 | NE¼NW¼ | | |
| | | | 25.20 | 14 | NW¼NE¼ | | |
| | | | 24.20 | 14 | NE¼NE¼ | | |
| | | | 10.50 | 14 | SW¼NE¼ | | |
| | | | 19.40 | 14 | SE¼NE¼ | | |
| | | | 134.10 | 14 | | 17 | 68 |
| Total | | | 420.45 | | | | |

42045/7000 c.f.s. allowed for irrigation.

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Appropriator—**Muddy Valley Irrigation Co.**

Source—**Muddy River.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| East St. Thomas Ditch | | | 4.00 | 2 | SW¼SW¼ | 17 | 68 |
| | | | 17.00 | 3 | SE¼SE¼ | | |
| | | | 7.00 | 3 | NE¼SE¼ | | |
| | | | 24.00 | 3 | | 17 | 68 |
| | | | 15.85 | 11 | NW¼NW¼ | | |
| | | | 16.10 | 11 | NE¼NW¼ | | |
| | | | 8.00 | 11 | SW¼NW¼ | | |
| | | | 12.00 | 11 | SE¼NW¼ | | |
| | | | 10.60 | 11 | NW¼SE¼ | | |
| | | | 62.55 | 11 | | 17 | 68 |
| Total | | | 90.55 | | | | |

Domestic use allowed from all Muddy Valley Irrigation Company Ditches.

9055/7000 c.f.s. allowed for irrigation.

**Appropriator—John F. Perkins.**

**Source—Muddy River.**

| Ditch Title | Date when construction commenced | Date when land first irrigated | Number of acres irrigated | Sec. | Subdivision | Tp. | S.R. | E. |
|---|---|---|---|---|---|---|---|---|
| St. Thomas Ditch | | | 2.00 | 10 | E part of NE¼SE¼ | | | |
| | | | | 11 | W part of NW¼SW¼ | 17 | 68 | |

Domestic use allowed.

2/70 c.f.s. allowed for irrigation.

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**Appropriator—Muddy Valley Irrigation Co., Assignee of Nevada Land and Livestock Co., Under Certificate No. 58.**

**Source—Muddy River.**

| | | | | | |
|---|---|---|---|---|---|
| Overton Canal | 20.00 | 2 | W½NW¼NW¼ | | |
| | 5.00 | 2 | SW¼SE¼ and SE¼SE¼ | | |
| | 115.00 | 11 | NE¼NE¼ and SE¼ | | |
| | 40.00 | 12 | W½SW¼ | | |
| | 25.00 | 12 | E½SW¼ | | |
| | 40.00 | 13 | NW¼NW¼ | | |
| | 6.50 | 13 | NW¼SW¼ | | |
| | 25.36 | 13 | NW¼ | | |
| | 7.09 | 13 | NW¼SE¼ | | |
| | 16.00 | 14 | NE¼NE¼ | 16 | 67 |
| | 27.36 | 19 | SW¼ | | |
| | 24.00 | 30 | SW¼NE¼ | | |
| | 20.00 | 30 | N½SE¼ | | |
| | 16.80 | 30 | SE¼SE¼ | 16 | 68 |
| Total | 398.11 | | | | |

2.98 c.f.s. allowed for irrigation.

The use of this water is determined as a winter use; diversion to commence October 1 of each year and to extend to April 1 of the year following. The use is limited to irrigation, stockwatering, and domestic purposes.

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**Appropriator—Muddy Valley Irrigation Co., Assignee of Nevada Land and Livestock Co., Under Certificate No. 59.**

**Source—Muddy River.**

| | | | | | |
|---|---|---|---|---|---|
| Kaolin Ditch — Winter Use | 40.00 | 20 | SW¼SW¼ | 16 | 68 |
| | 150.00 | 29 | SW¼ | 16 | 68 |
| | 310.00 | 32 | N½ | 16 | 68 |
| | 35.20 | 32 | N½SW¼ | 16 | 68 |
| | 111.61 | 32 | SE¼ | 16 | 68 |
| | 70.00 | 33 | S½SW¼ | 16 | 68 |
| | 26.36 | 33 | NW¼SW¼ | 16 | 68 |
| | 24.43 | 31 | E½NE¼ | 16 | 68 |
| | 52.70 | 3 | W½SW¼& SE¼ | 17 | 68 |
| | 16.35 | 4 | NE¼NW¼ | 17 | 68 |
| Summer Use | 140.00 | 29 | SW¼ | 16 | 68 |
| | 250.00 | 32 | N½ | 16 | 68 |
| | 35.20 | 32 | N½SW¼ | 16 | 68 |
| Total summer use | 425.20 | | | | |
| Total winter use | 846.65 | | | | |

Summer use—4.252 c.f.s.

Winter use—8.466 c.f.s.

The use is limited to irrigation, stockwatering, and domestic purposes.

Appropriator—**Muddy Valley Irrigation Co., Assignee of Nevada Land and Livestock Co., Under Certificate No. 60.**

Source—**Muddy River.**

| *Ditch Title* | *Date when construction commenced* | *Date when land first irrigated* | *Number of acres irrigated* | *Sec.* | *Subdivision* | *Tp.S.* | *R.E.* |
|---|---|---|---|---|---|---|---|
| St. Joe or Logan Ditch | | | 20.00 | 26 | SE¼SW¼ | | |
| | | | 20.00 | 35 | E½NE¼ | | |
| | | | 40.00 | 35 | SE¼NW¼ | 15 | 67 |
| Total | | | 80.00 | | | | |

The use of this water is determined as a winter use; diversion to commence October 1 of each year, and to extend to April 1 of the year following. Use limited to irrigation, stock-watering and domestic purposes.

0.8 c.f.s. allowed for irrigation.

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## STATE OF NEVADA
## STATE ENGINEER'S OFFICE

I, J. G. Scrugham, State Engineer of the State of Nevada, duly appointed and qualified, having charge of the records and files of the office of the State Engineer, do hereby certify that the foregoing is a full, complete and true copy of the Order of Determination of the Relative Rights in and to the Waters of Muddy River and its Tributaries in Clark County, Nevada, prepared and filed in said office on the 21st day of January, 1920, as appears by the records and files of the office of the State Engineer of Nevada, and nothing more or less.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at the City of Carson, State of Nevada, this 21st day of January, A. D. 1920.

J. G. SCRUGHAM,
*State Engineer.*

[SEAL]

EXHIBIT "B"

IN THE MATTER OF THE DETERMINATION OF THE RELATIVE RIGHTS IN AND TO THE WATERS OF THE MUDDY RIVER AND ITS TRIBUTARIES IN CLARK COUNTY, STATE OF NEVADA.

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FURTHER AND SUPPLEMENTAL ORDER OF DETERMINATION.

In accordance with a stipulated agreement entered into by the parties in the suit of Muddy Valley Irrigation Company, et al, Vs. Moapa and Salt Lake Produce Company, et al, on the 23rd day of April, 1919, an order was entered in the Tenth Judicial District Court of the State of Nevada, in and for the County of Clark referring the above entitled action to the State Engineer for an adjudication of the water rights on the Muddy River stream system as provided for in Chapter 140, Statutes of 1913, and all Acts amendatory thereof.

On the 10th day of March, 1920, the matter having come on for hearing before the Court upon exceptions duly filed with the Clerk of the Court and served as required by law on the State Engineer, said exceptions having been filed by various parties to the said suit of Muddy Valley Irrigation Company et al. Vs. Moapa and Salt Lake Produce Company, et al., and the Court having heard said exceptions and proofs adduced by and on behalf of the excepting parties, the Court made and entered an order requiring the State Engineer to make a further determination of the waters of the said Muddy River and its tributaries subject to the Court's instructions which were set forth in said order, the said order being made by said District Court and entered in said suit.

In accordance with the said order of said Court and the said instructions the State Engineer makes the following:

FURTHER AND SUPPLEMENTAL ORDER OF DETERMINATION.

The tabulation of the allotments of the waters of the Muddy River stream system as set forth in the original order of determination with the changes herein made in this order, cover all claims filed in the office of the State Engineer as provided by law, and also an allotment to the Moapa Indian Reservation. Although duly notified of the pending adjudication proceedings in the statutory manner, the United States Indian Service authorities, did not file a claim and state that they refuse to recognize the authority of the State of Nevada to determine the water rights of the Moapa Indian Reservation. In the absence of any showing on the part of the United States Indian Service, the State Engineer has based the Moapa Indian Reservation allotment on the official investigations and reports made in the year 1906 by Henry Thurtell, at that time State Engineer of Nevada. These reports gave the Moapa Indian Reservation an allotment of water sufficient to properly irrigate an area of 87 acres, which was found to be the full area on the Reservation entitled to a vested water right under the law of this State.

(a) DUTY AND POINT OF DIVERSION DEFINED.

The duty of water allowed for all lands in the Muddy Valley, except on the Indian Reservation, shall be 1 c.f.s. flow to 70 acres for the summer irrigation season from May 1st to October 1st, and 1 c.f.s. flow to 100 acres for the winter irrigation season from October 1st to May 1st. On the Reservation, the duty of water allowed shall be 1 c.f.s. flow to 70 acres for the summer irrigation season from April 1st to October 1st, and 1 c.f.s. flow to 100 acres for the winter irrigation season from October 1st to April 1st.

The volumes or amounts of water alloted and to which it is agreed the respective parties are entitled shall be understood to include and define the amount of all the waters now or heretofore

rightfully used on the lands given in the tabulation in the original order of determination whether diverted directly from said Muddy River or from its tributaries, springs, head-waters or other sources of supply, including waters claimed to have been developed heretofore by any of the said parties. All measurements of amounts except that awarded to the Indian Reservation shall be made at the places of diversion or as near thereto as practicable or convenient as the State Engineer or Water Commissioner may select or approve. On the Indian Reservation, all measurements of amounts diverted are to be made at the point where the main ditch enters or becomes adjacent to the land irrigated or as near thereto as practicable, as the State Engineer or Water Commissioner may select or approve.

(b) BALDWIN SPRING FLOW DEFINED.

The maximum flow of .8298 c. f. s. of water of the George Baldwin Spring now and heretofore used by George Baldwin and Aletha L. Baldwin, his wife, is water which has been developed by said parties. Such development and use of this amount of water has not and does not diminish the flow or volume of the Muddy River, or interfere with the rights of any other water users on the stream system. No further development of water on the head of the Muddy River stream system shall be made which in any way diminishes the flow of waters of the Muddy River or impairs rights defined and referred to in this order.

(c) METHOD OF USE.

The Muddy Valley Irrigation Company, subject to the supervision and general control of the State Engineer or Water Commissioner, shall distribute and control the distribution of the water alloted to it, and diverted and conveyed by its work to its stockholders and other persons obtaining water by means thereof.

All other parties named in this order shall not be required to take or use the water of said River in continuous flow but may cumulate the same or any part thereof in rotation and in periodic turn, with the approval of the water commissioner, subject to his

control and direction and under such rules and regulations as are prescribed by the State Engineer and the statutes of the State of Nevada.

The whole amount of water diverted from the river at any one time by all the parties alloted water for use above the "narrows" is not to exceed in the aggregate the total amount of water alloted to the several parties resident in the Upper Muddy Valley. Below the lowest diversion of Knox and Holmes the flow in the stream shall be maintained substantially constant subject to seasonal variation. The whole of said river system shall be under the supervision and the rules and regulations of the State Engineer and the direction and control of the Water Commissioner, to be appointed as provided by law, except as hereinbefore specified as to the Muddy Valley Irrigation Company. Substantial headgates, weirs and sand-boxes, as the State Engineer through the Water Commissioner may order, shall be installed and maintained in good order by all who divert or use the waters of said stream system.

(d) Channel upkeep, responsibility for.

The owners of land on that part of said river above the "narrows" shall keep the channel through their respective lands cleared of all ordinary obstructions, but in case of extraordinary obstruction, such as the formation of lime deposits in the channel of the stream, the same shall be removed under the direction of the water commissioner and the expenses thereof paid pro rata by all parties to this determination in proportion to the acreage owned or controlled by them as defined in this order.

(e) Priority, vested and granted rights.

As between the parties to the above entitled suit and except against the rights awarded the Indian Reservation and the inhabitants thereof, all of the water rights enumerated as belonging to the parties to the suit shall be deemed and held to be vested rights acquired by valid appropriation and beneficial use prior to March 1, 1905, and by continued uninterrupted use since said date

and shall be considered as equal in rank without anyone having any priority over another; this shall apply to and include the rights held by the Muddy Valley Irrigation Company as grantee or assignee of Nevada Land & Live Stock Company under certificates Nos. 58, 59 and 60 and to such permit or certificate as may be granted by the State Engineer to the Muddy Valley Irrigation Company under its application No. 1611. Against the right granted and alloted to the Indian Reservation, the rights held by the Muddy Valley Irrigation Company, under said certificates or permits, shall be deemed to be subsequent to the right by this order alloted to said Indian Reservation. The right allowed the Indian Reservation shall be deemed and held to be a vested right acquired by valid appropriation prior to March 1st, 1905, and uninterrupted use thereafter and shall to the extent allowed rank as of equal priority with all the other rights alloted and awarded to the various parties except those granted by the said certificates or permits.

(f) Losses, apportionments of.

All abnormal losses from the flow of said stream shall be pro-rated and shared among the parties holding water rights on the stream. Abnormal losses shall include any substantial loss from the permanent flow of the stream, such as a cloudburst destroying or obstructing the channel thereof or an opening up of a fissure in the bed of the stream or in one of the sources of supply and the disappearance therein of a substantial amount of the waters, thereby causing a diminution in the available flow.

If and such abnormal loss occurs at any time, the pro-rata share of such loss to be borne by each party to this order shall be as follows:

| | |
|---|---|
| George Baldwin and Aletha L. Baldwin, his wife | 16/2839 |
| Moapa & Salt Lake Produce Co. | 155/2839 |
| Livingston and Smith | 160/2839 |
| Joseph Perkins and wife | 30/2839 |
| Knox and Holmes | 95/2839 |
| Issiah Cox and wife | 10/2839 |
| W. J. Powers and wife | 29/2839 |
| Sadie George | 2.1/2839 |
| Jacob Bloedel | 2/2839 |

| | |
|---|---|
| J. H. Mitchell | 3/2839 |
| U. S. Indian Service, Moapa Reservation | 87/2839 |
| John F. Perkins | 2/2839 |
| Muddy Valley Irrigation Company | 2244.80/2839 |

As between the parties to the said suit the definition of abnormal losses shall be as contained in paragraph 8 of a stipulation filed in said court and suit on April 23rd, 1919, and the stipulation supplemental thereto filed in said court and suit and dated March 10th, 1920; and as between the parties to said suit the pro rata share of such abnormal losses shall be as set forth in paragraph 4 of the said stipulation supplemental to the stipulation of April 23rd, 1919.

(g) Expense of Commissioner.

The salary and expenses of the Water Commissioner shall be paid pro rata by the parties to the stipulation supplemented to the stipulation of April 23rd, 1919, made and filed in said suit March 10th, 1920, in the same proportion as for the sharing of abnormal losses set forth in paragraph 4 of said supplemental stipulation.

(h) All the waters of the stream system appropriated and alloted.

The aggregate volume of the several amounts and quantities of water awarded and alloted to the parties named in this order of determination which includes all the parties to said suit and the Indian Reservation is the total available flow of the said Muddy River and consumes and exhausts all of the available flow of the said Muddy River, its headwaters, sources of supply and tributaries.

(i) Water alloted to Muddy Valley Irrigation Company.

In accordance with the said stipulation and supplemental stipulation filed in said suit and the instructions of the Court requiring a further order of determination, as between the parties of the suit, the Muddy Valley Irrigation Company is hereby declared to be entitled to divert and use upon its lands all the waters of the

said stream except the amounts specifically awarded and alloted to the other parties to said suit and to the Indian Reservation. In addition to the certificate rights belonging to the Muddy Valley Irrigation Company set forth in the original order of determination the Muddy Valley Irrigation Company is entitled to such rights as have accrued to it under its water application No. 1611 and which will be specifically defined in the certificate or permit to be issued by the State Engineer upon said application No. 1611, which said permit will be for approximately 10 C. F. S. of water (more or less) for use upon approximately 1000 acres of land (more or less) during the winter season.

The summary of allotments and certificates, contained in the original order of determination is amended so as to allow winter use of water to the parties hereinafter named and for the amounts hereinafter specified:

| To | c.f.s. flow. |
|---|---|
| Moapa & Salt Lake Produce Company | 2.215 |
| Isaiah Cox and wife | .143 |
| Isaiah Cox and wife (as grantees of J. H. Mitchell) | .043 |
| George Baldwin | .2286 |
| Sadie George | .03 |
| John F. Perkins | .0286 |
| Livingston and Smith | 2.286 |
| Knox and Holmes | 1.357 |
| Joseph Perkins | .428 |
| W. J. Powers and wife | .4143 |

The amount allowed for winter use is allowed under a duty of water of 1 c. f. s. for 100 acres.

There is also the additional allotment to the Muddy Valley Irrigation Company for winter use under its application No. 1611. Except as hereinbefore changed the summary of allotments and certificates shall be as stated in the original order of determination.

The names of the respective appropriators, the sources of their appropriation, the titles of the ditches, the number of acres irrigated and the description of the land to which the water

is appurtenant, the uses allowed and the amounts of water allowed for irrigation shall be as set forth in the original order of determination, except that it is understood that the rights of J. H. Mitchell have been acquired by and conveyed to Isaiah Cox and Anna M. Cox, his wife, and except that the periods of winter and summer use, as between the parties to said suit, shall be as hereinbefore defined in this further and supplemental order of determination.

/s/ J. G. Scrugham
State Engineer.

STATE OF NEVADA

STATE ENGINEER'S OFFICE.

I, J. G. SCRUGHAM, State Engineer of the State of Nevada, duly appointed and qualified, having charge of the records and files of the office of the State Engineer, do hereby certify that the foregoing is a full, complete and true copy of the further and supplemental order of determination of the relative rights in and to the waters of Muddy River and its tributaries in Clark County, Nevada, made under order of the Tenth Judicial District Court of the State of Nevada in and for the County of Clark, and in accordance with the instructions of said Court and filed in said office on the 11th day of March, 1920, as appears by the records and files of the office of the State Engineer of Nevada, and nothing more or less.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal of office this 11th day of March, A. D. 1920.

/s/ J. G. Scrugham
State Engineer.

SEAL

# CERTIFICATION OF COPY

STATE OF NEVADA, )
) SS.
COUNTY OF CLARK, )

I, HARLEY A. HARMON, the duly elected, qualified and acting Clerk of Clark County, in the State of Nevada, and Ex-Officio Clerk of the District Court, do hereby certify that the foregoing is a true, full and correct copy of the original

JUDGMENT AND DECREE IN THE CASE ENTITLED

MUDDY VALLEY IRRIGATION COMPANY ET AL.,

Plaintiffs

VS.

MOAPA & SALT LAKE PRODUCE COMPANY, ET AL.

Defendants.

and

IN THE MATTER OF THE DETERMINATION OF THE RELATIVE RIGHTS IN AND TO THE WATERS OF THE MUDDY RIVER AND ITS TRIBUTARIES IN CLARK COUNTY, STATE OF NEVADA.

now on file and of record in this office.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Seal of the Court at my office, Las Vegas, Nevada, the 12th day of March, , A. D. 19 20.

(SEAL)

/s/ Harley A. Harmon
CLERK.

/s/ Margaret Ireland
DEPUTY CLERK.

STATE OF NEVADA )
) ss.
COUNTY OF CLARK )

I, Helen Scott Reed, the duly elected, qualified and acting County Clerk of the County of Clark, State of Nevada, and ex-officio Clerk of the District Court of the Eighth Judicial District of the State of Nevada, in and for the County of Clark, do hereby certify and attest the foregoing to be a full, true and correct copy of the original: "JUDGMENT AND DECREE" in the action entitled;

MUDDY VALLEY IRRIGATION COMPANY, a corporation, NEVADA LAND & LIVESTOCK COMPANY, a corporation, SAMUEL H. WELLS, JOHN F. PERKINS and ELLEN C. PERKINS, his wife, Plaintiffs Vs.

MOAPA & SALT LAKE PRODUCE COMPANY, a corporation, GEORGE BALDWIN and ALETHA L. BALDWIN, his wife, ISAIAH COX and ANNA M. COX, his wife, JOSEPH PERKINS and KATHRYN PERKINS, his wife, D.H. LIVINGSTON and RICHARD SMITH, G. S. HOLMES and JULIA MAY KNOX, W. J. POWERS and MARY A. POWERS, his wife, SADIE GEORGE, LOS ANGELES & SALT LAKE RAILROAD COMPANY, a corporation, and WALKER D. HINES, as Director General of Railroads, and JACOB BLOEDEL, Defendants. and IN THE MATTER OF THE DETERMINATION OF THE RELATIVE RIGHTS IN AND TO THE WATERS OF THE MUDDY RIVER AND ITS TRIBUTARIES IN CLARK COUNTY, STATE OF NEVADA

Case No. 377

together with the endorsements thereon, now on file in my office, and that I have carefully compared the same with the original.

IN WITNESS WHEREOF, I have hereunto set my hand and annexed the Seal of the District Court of the Eighth Judicial District of the State of Nevada, in and for the County of Clark, this 16th day of May, 19 56

Helen Scott Reed

COUNTY CLERK OF THE COUNTY OF CLARK, STATE OF NEVADA, AND EX-OFFICIO CLERK OF THE DISTRICT COURT OF THE EIGHTH JUDICIAL DISTRICT OF THE STATE OF NEVADA, IN AND FOR THE COUNTY OF CLARK.

STATE OF NEVADA )
) ss.
COUNTY OF CLARK )

I, Frank McNamee, Judge of the District Court of the Eighth Judicial District of the State of Nevada, in and for the County of Clark, do hereby certify that Helen Scott Reed is County Clerk of the County of Clark, State of Nevada, and ex-officio Clerk of the District Court of the Eighth Judicial District of the State of Nevada, in and for the County of Clark (which Court is a Court of Record having a seal); that the signature to the foregoing certificate and attestation is the genuine signature of the said Helen Scott Reed, as such officer; that the seal annexed thereto is the seal of said District Court; that said Helen Scott Reed, as such clerk, is the proper officer to execute the said certificate of attestation, and that such attestation is in due form according to the laws of the State of Nevada.

IN WITNESS WHEREOF, I have hereunto set my hand in my official character as such Judge, at the City of Las Vegas, County and State aforesaid, this 16th day of May, A. D. 19 56

Frank McNamee

JUDGE OF THE DISTRICT COURT OF THE EIGHTH JUDICIAL DISTRICT OF THE STATE OF NEVADA, IN AND FOR THE COUNTY OF CLARK.

STATE OF NEVADA )
) ss.
COUNTY OF CLARK )

I, Helen Scott Reed, County Clerk of the County of Clark, State of Nevada, and ex-officio Clerk of the District Court of the Eighth Judicial District of the State of Nevada, in and for the County of Clark (which Court is a Court of Record, having a seal, which is annexed hereto) do hereby certify that Frank McNamee, whose name is subscribed to the foregoing certificate of due attestation was, at the time of signing the same, Judge of the District Court aforesaid, and was duly commissioned, qualified and authorized by law to execute said certificate. And I do further certify that the signature of the Judge above named to the said certificate of due attestation is genuine.

IN WITNESS WHEREOF, I have hereunto set my hand and annexed the Seal of the District Court of the Eighth Judicial District of the State of Nevada, in and for the County of Clark, this 16th day of May, 19 56

Helen Scott Reed

COUNTY CLERK OF THE COUNTY OF CLARK, STATE OF NEVADA, AND EX-OFFICIO CLERK OF THE DISTRICT COURT OF THE EIGHTH JUDICIAL DISTRICT OF THE STATE OF NEVADA, IN AND FOR THE COUNTY OF CLARK.

CC-51

# Exhibit 7

July 3, 2019

Tim Wilson, Acting State Engineer
Nevada Division of Water Resources
901 S. Stewart St., Suite 2002
Carson City, NV 89701

Mr. Wilson,

The Center for Biological Diversity is pleased to submit the attached technical memorandum from hydrologist Dr. Tom Myers, regarding the questions raised by Interim Order 1303.

As the Center has stated from the beginning of this process, our primary concern is ensuring long-term sustainable flows in the Muddy River Springs Area (MRSA) to ensure adequate habitat for the survival and recovery of the federally protected endangered Moapa dace. Protecting the dace is a legal obligation for the Division of Water Resources, in order to ensure compliance with the federal Endangered Species Act, and acting in compliance with NRS 533.370(2) to ensure that water right applications are not "detrimental to the public interest."

Dr. Myers' report contains three primary conclusions:

- The Division should not allow any pumping of the carbonate aquifer if the continued decrease in spring flow in the MRSA is to be avoided.
- The Kane Springs Valley should be managed as a part of the LWRFS.
- Some basin-fill pumping could occur without significantly affecting MRSA spring flow, with a preliminary estimate of 4,000 afa as a sustainable yield.

We appreciate this opportunity for engagement and look forward to further discussions on this issue.

Sincerely,

Patrick Donnelly
*Nevada State Director*
**Center for Biological Diversity**
7345 S. Durango Dr.
B-107, Box 217
Las Vegas, NV 89113
702.483.0449
pdonnelly@biologicaldiversity.org

Tom Myers, Ph.D.
Hydrologic Consultant
P.O. Box 177
Laporte, PA 18626
775-530-1483
tommyers1872@gmail.com

**Technical Memorandum**

**Groundwater Management and the Muddy River Springs, Report in Response to Nevada State Engineer Order 1303**

**June 1, 2019**

**Prepared for: Center for Biological Diversity**

The Nevada State Engineer (NSE) is planning to establish a plan to conjunctively use groundwater and surface water in the Lower White River Flow System (LWRFS). The NSE has established the LWRFS as the valleys shown in Figure 1, except that only the northern portion of Black Mountains Area would be included. The basis for his planning is the Order 1169 aquifer test results and observations ongoing since the end of the test. The NSE in order 1303 requested that stakeholders provide reports with "further analysis of the historic and ongoing groundwater pumping data, the relationship of groundwater pumping within the LWRFS to spring discharge and flow of the fully decreed Muddy River, the extent of impact of climate conditions on groundwater levels and spring discharge, and the ultimate determination of the sustainable yield of the LWRFS" (NSE Order 1303, p 11). This report addresses the four points the NSE requests stakeholders to address, although in a different order:

1. The report summarizes the Order 1169 aquifer test, specifically regarding groundwater levels throughout the LWRFS and spring flows at Muddy River Springs, and extends the interpretations through the recovery period of 2013 through the present,
2. The report considers the reasons to consider Kane Springs Valley (KSV)as part of the LWRFS (the water level is just five feet higher than in Coyote Springs Valley (CSV), and pumping in KSV could reverse the gradient pulling water from CSV,
3. The report addresses the long-term quantity of water that could be pumped from the LWRFS without harming any Muddy River Springs. (Because of the flat gradient over the 1100 sq miles of the joint management area, there can be no location for pumping within the LWRFS that is safe meaning it would not affect Muddy River Springs),
4. Finally, the report also considers the relationship between alluvial and carbonate wells and how that could affect senior decreed rights to the Muddy River.

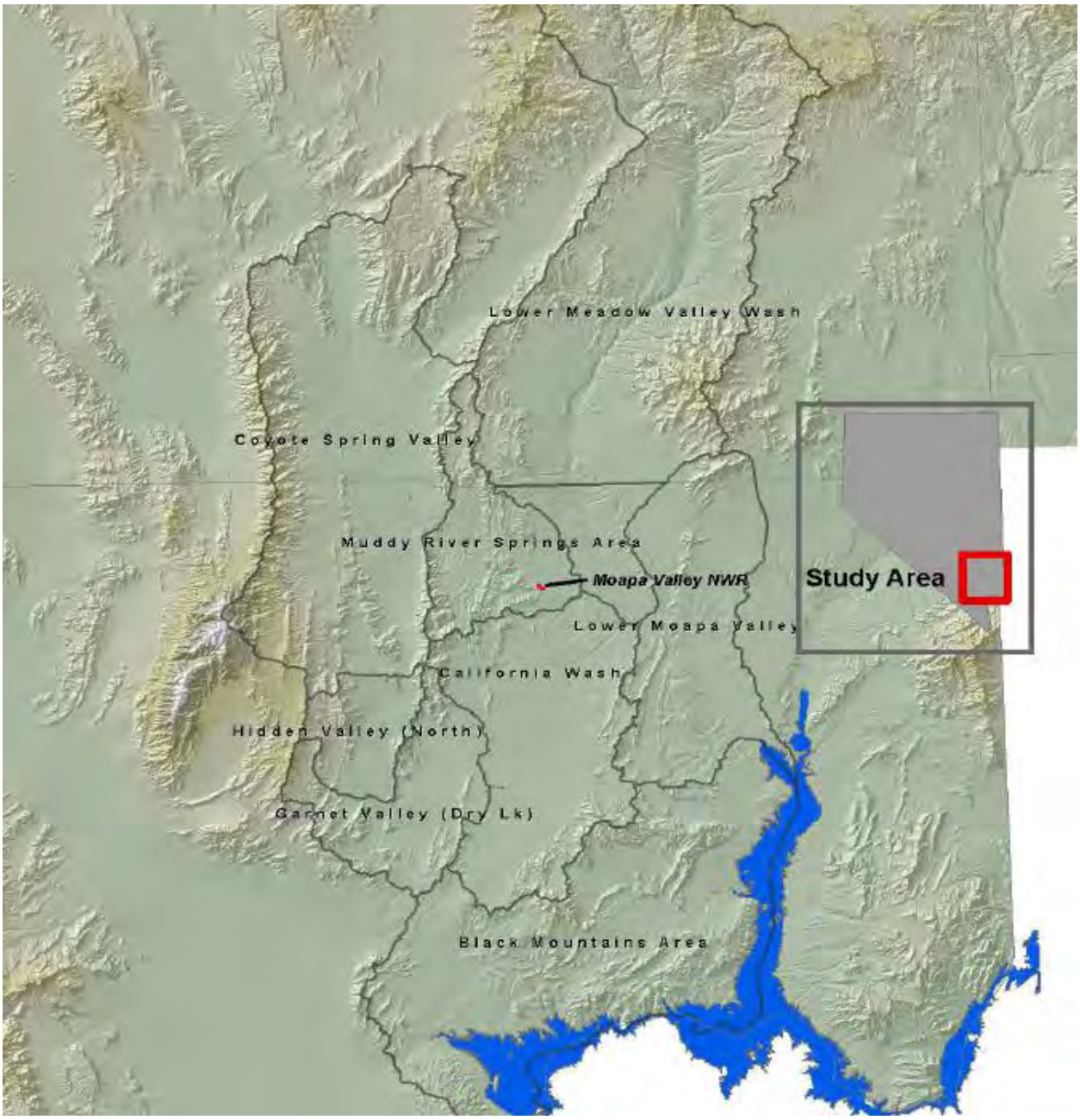


**Figure 1: Study area showing the Lower White River Flow System. Kane Springs Valley is northeast of Coyote Spring Valley. Source: USDOI (2013).**

### Order 1169 Aquifer Test and the Period 2013 to 2019

NSE Ruling 6254 summarizes the finding of the 1169 aquifer test as reported on by various stakeholders including SNWA (2013), US DOI (2013), Myers (2013), and Johnson and Mifflin (2013). The 1169 aquifer test had been required by NSE Order 1169 to determine the effects of developing the carbonate aquifer in CSV. The order had required the participants to pump 8050

acre-feet per year (afa) from wells in CSV for two years. However, for the duration of the test, from November 15, 2010 to December 31, 2012, the total pumpage from the CSI wells and MX-5 well was 11,249 af, or only 5290 afa. During the test period, 79 monitoring and pumping wells (MWs and PWs) monitored water levels throughout the area (Figures 2 and 3). The CSV carbonate PWs lie on the east side of the valley near the boundary with Muddy River Springs Area (MRSA) and basin fill and carbonate MWs lie throughout the valley (Figures 2 and 3). MRSA wells concentrate along a trend along a wash running southeast through the middle of the valley (Figures 2, 3 and 4). The Arrow Canyon wells (Figure 3) are high-producing carbonate wells. The basin fill pumping wells on the southeast portion of MRSA are commonly called the Lewis Well field. The Muddy River Springs also lie in the far southeast portion of MRSA. The clastic rocks just east of the MRSA (Figure 4) may provide a structural boundary that partly controls flow and the location of the Muddy River springs (Johnson and Mifflin 2013).

Southern Nevada is generally very dry and average recharge over the LWRFS is very low (NSE Ruling 6254). But some years can be relatively very wet and the runoff that occurs during those years can cause recharge into washes and into outcrops of conductive rock. The twelve-month moving average of monthly precipitation ranges averages near half an inch but was close to zero in 2002 and approached 1.3 inches in 2005 (Figure 5). These monthly values correspond with an annual average of about 1 inch and 14 inches per year in those years, as reported by USDOI (2013). Several years in the 1990s have monthly average precipitation near an inch. During the aquifer test, the first year, 2011, appears to be slightly wetter than the average and 2012 became dry relative to most years.

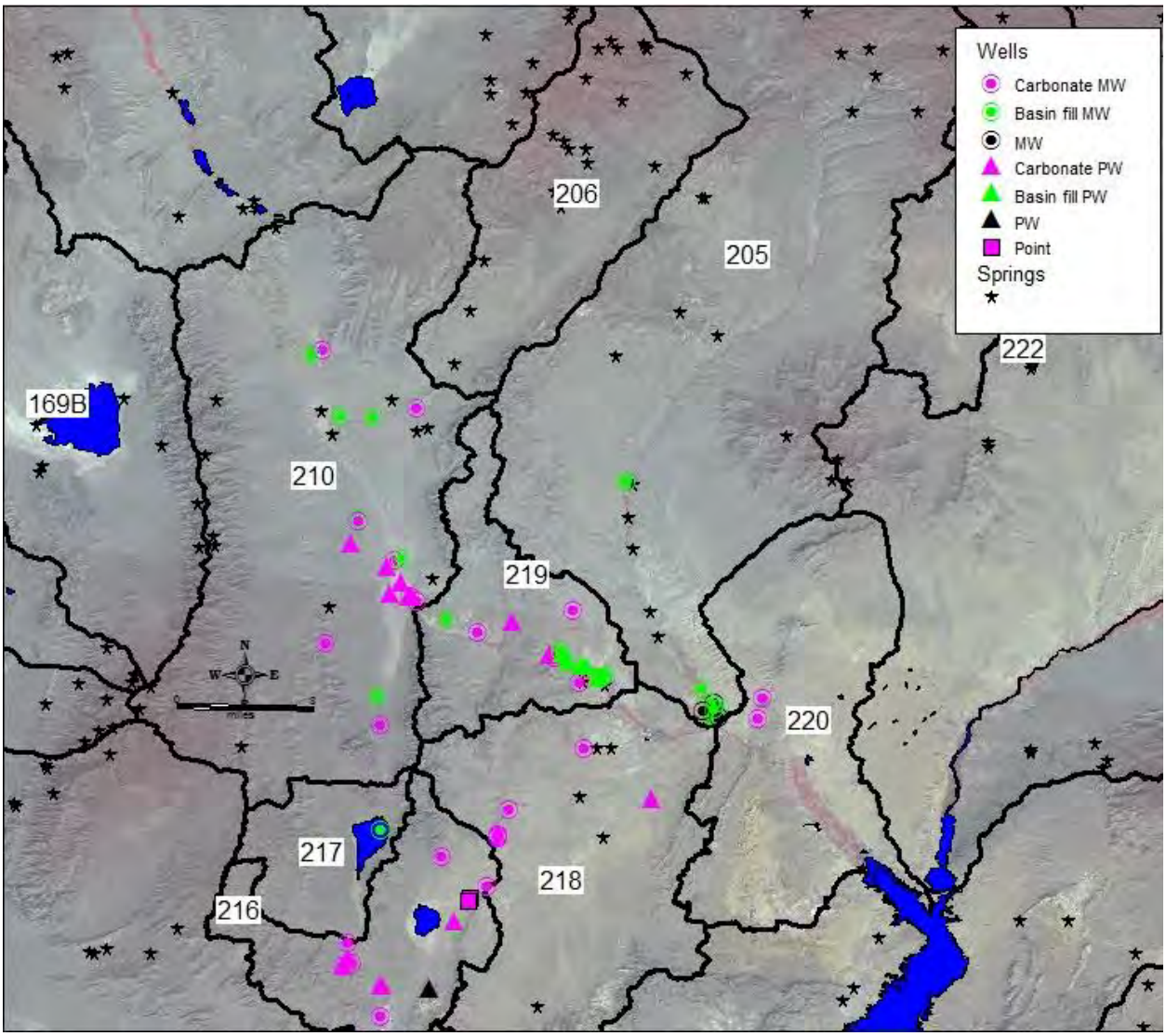


**Figure 2: General layout and type of wells in the Coyote Spring Area. Basin 210 is Coyote Spring Valley, 219 is Muddy River Spring Area, 220 is Lower Moapa Valley, 218 is California Wash, 217 is Hidden Valley, 216 is Garnet Valley, 205 is Lower Meadow Valley Wash, and 206 is Kane Springs Valley. MW is monitoring well; PV is production well. See Figure 3 for the names for some of the wells. Source of well data: NVSE website.**

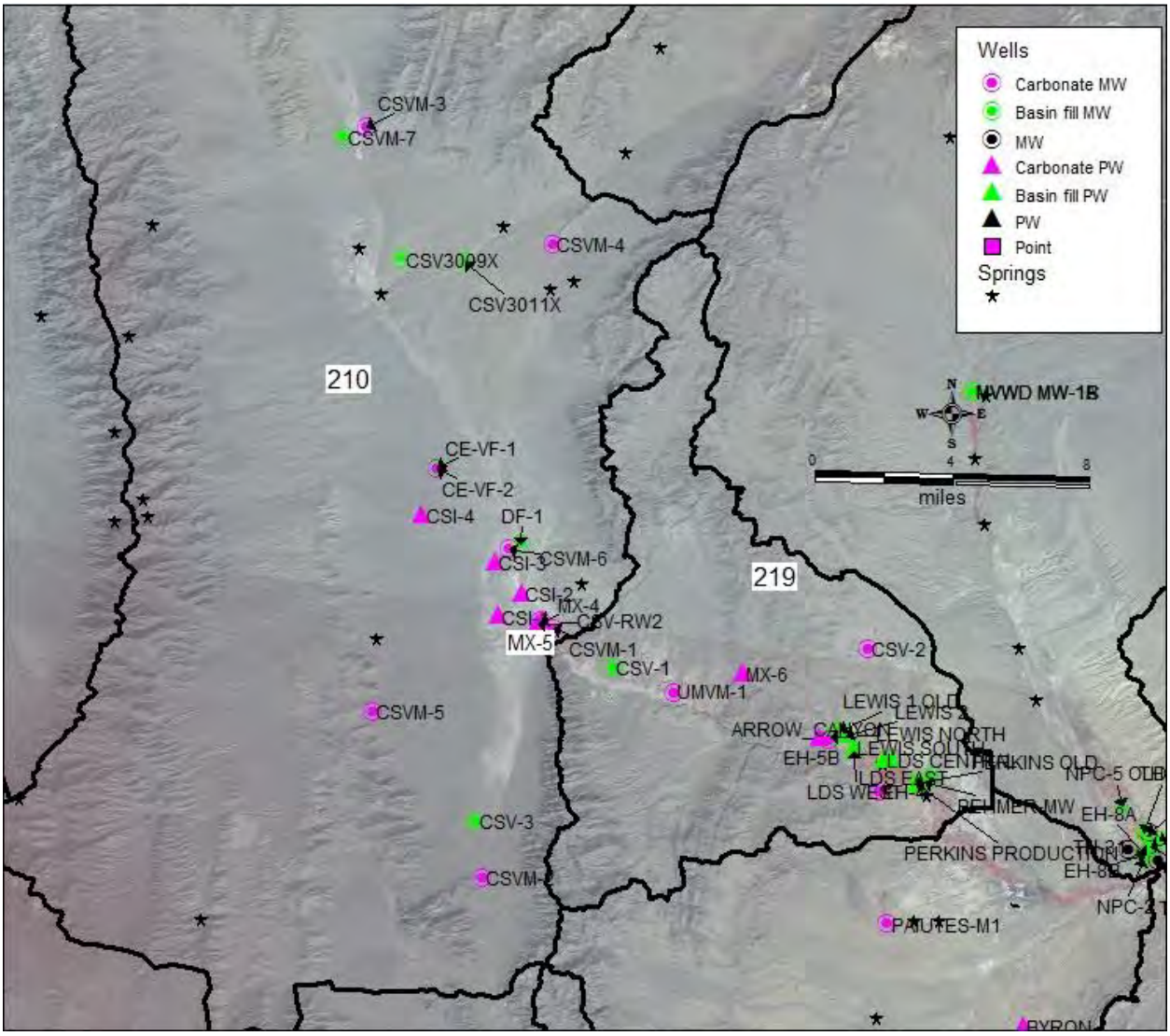


**Figure 3: Detailed well layout and names for Coyote Spring Valley (210) and Muddy River Springs Area (219). Source of well data: NVSE website.**

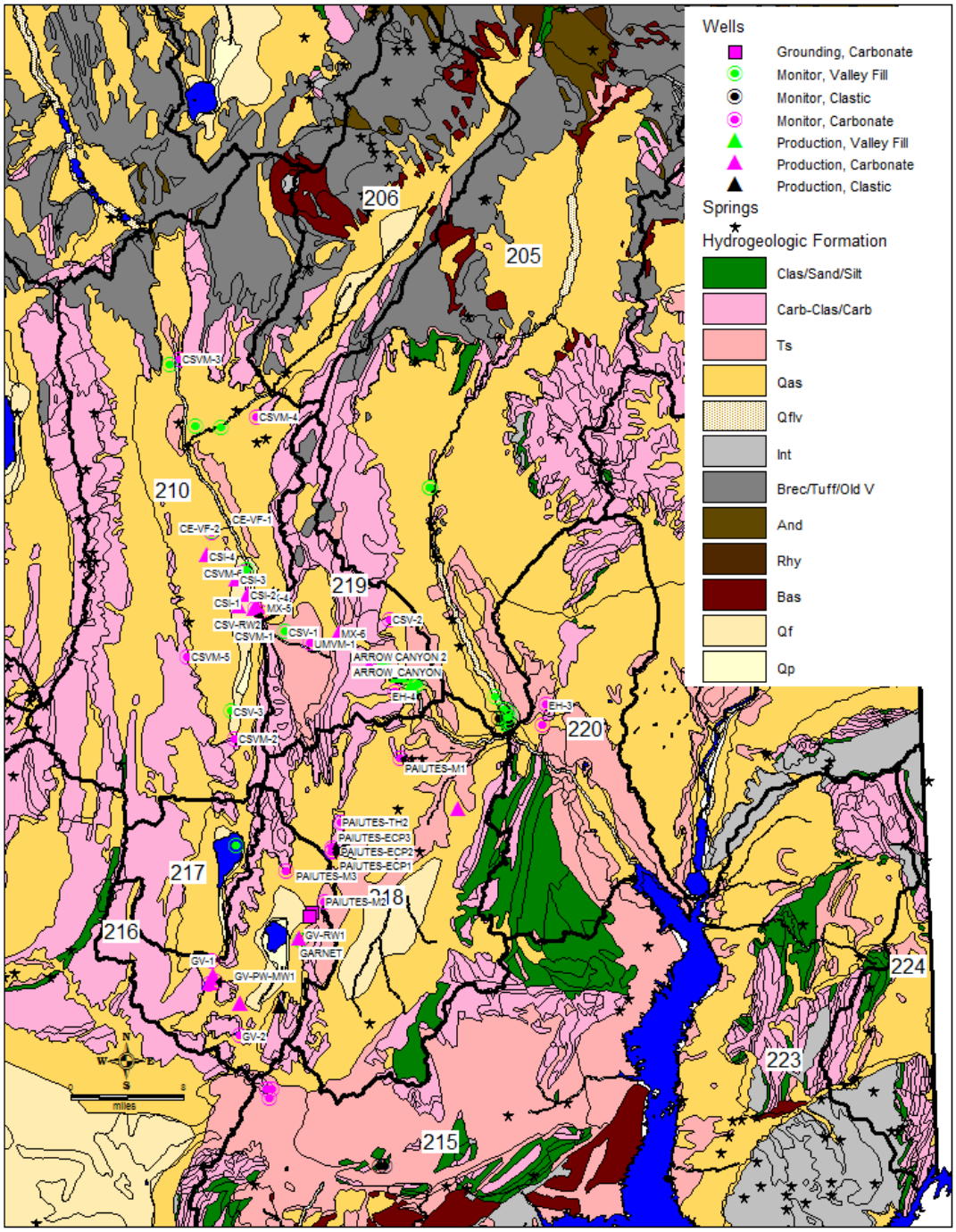


**Figure 4: Lower White River Flow System wells and hydrogeology.**

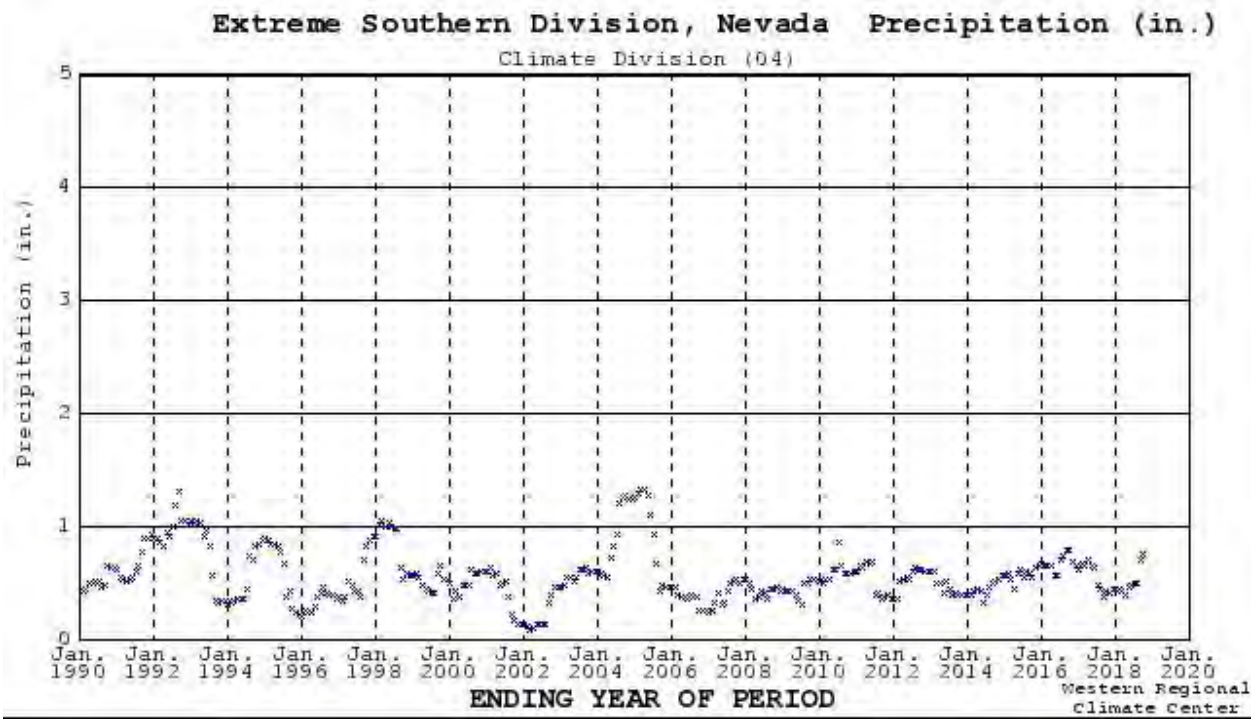


**Figure 5: Twelve-month running average of precipitation for the southern zone of Nevada. Data from the Western Regional Climate Center, https://wrcc.dri.edu/spi/divplot2map.html**

The NSE found that even the reduced pumping completed during the aquifer test satisfied its goals and that pumping in CSV caused impacts north in CSV "at least to Kane Springs Valley, south to Hidden Valley and Garnet Valley, and southeast to Muddy River Springs Area and California Wash" (NSE Order 6254, p 20-21). There was no monitoring for the test in Kane Springs Valley, so it is not possible to assess whether the impacts extended into that valley. USDOI (2013) concluded the impacts covered 1100 square miles. NSE summarized that groundwater level declines attributable to MX-5 pumping ranged from less than one foot in northern CSV to more than two feet in central CSV to more than a foot in central MRSA and California Wash (NSE Order 6254, p 21). The following paragraphs detail the water levels before, during, and after the aquifer test.

Carbonate MWs in central and southern CSV have varied in parallel since the early 2000s (Figure 6). The trend has been downward except for the increase during the wet period around 2005. All the carbonate MWs in central and southern CSV decreased more than two feet during the pump test period and all have recovered less than half the pump-test decrease by 2019 (Figure 6). The lack of recovery indicates the increased gradient, caused by the 2-foot drawdown, does not draw substantially more water from beyond the boundaries of the high-transmissivity area. Drawdown in northern CSV was much less (not shown). Basin fill well groundwater levels in the southern portion of CSV have also trended downward since the late

1990s, with an exception being during the wet period around 2005 (Figure 7). Well CSV3011M water levels increased from its installation in 2008 until the aquifer test. Well DF-1, a basin fill well in the middle of southern CSV, has water levels about 200 feet higher than other wells in the area.

Carbonate MWs in the MRSA also show a long-term downward trend commencing in the 1990s with an uptick in 2005 (Figure 8). USDOI (2013, p 11) identified several wet year responses in the groundwater levels, including in 1992, 1993, 2005, and to a lesser degree in 1998 and 2011. The small seasonal fluctuation may relate to pumping in the basin fill (Id.), which would reflect the connection between aquifers. The 1169 aquifer test accelerated the decline in the MWs in the MRSA with a decrease of as much as 2.5 feet. Recovery since the decline was as much as a foot in the first year, but levels have remained steady since.

Basin fill MWs in the Lewis Field portion of the MRSA have been steady since the 1990s except for a three-foot decline in the Lewis North MW (Figure 9). Lewis South and Lewis 1 Old have declined a couple feet since the 1990s, but with an almost ten-foot seasonal variation. Seasonal variation in Lewis North was much less. All wells in the Lewis Field portion of the MRSA exhibited a substantial drawdown of several feet during and for two years after the pump test (Figure 9).

Basin fill MWs near the springs have declined, other than the uptick in 2005, since the 1990s much more than the Lewis Field wells (Figure 10). The decline accelerated through the aquifer test period, although, in contrast to the carbonate wells, these basin fill wells have mostly recovered since the aquifer test. Seasonal variations are as much as ten feet. The downward trend probably reflects the trend in the carbonate wells, the source for most basin fill water. Recovery however could be due to decreased pumpage in the Lewis Field, as discussed below.

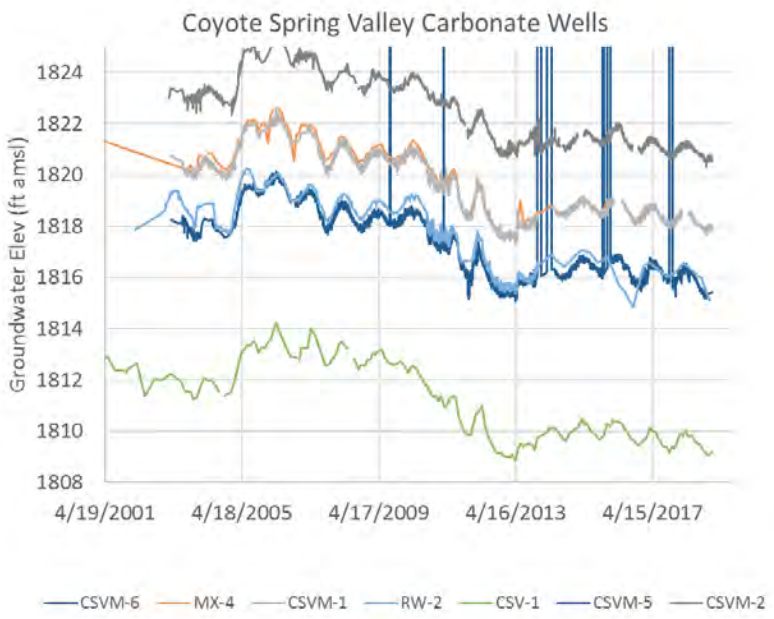


**Figure 6: Hydrograph of carbonate monitoring wells in Coyote Spring Valley, through the Order 1169 pump test and to 2019. Source of data-NSE web page.**

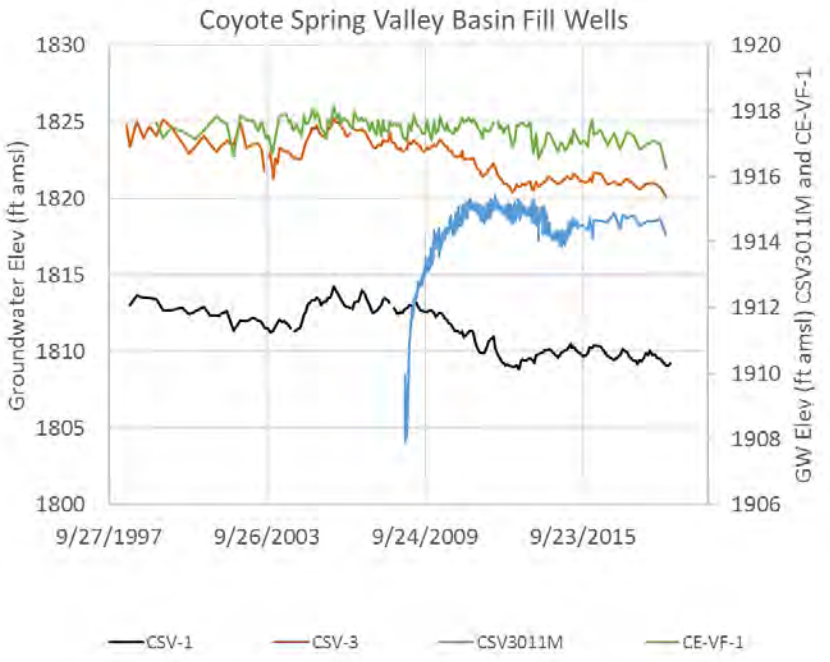


**Figure 7: Hydrograph of basin fill monitoring wells in the south half of Coyote Spring Valley. Source of data - NSE web page.**

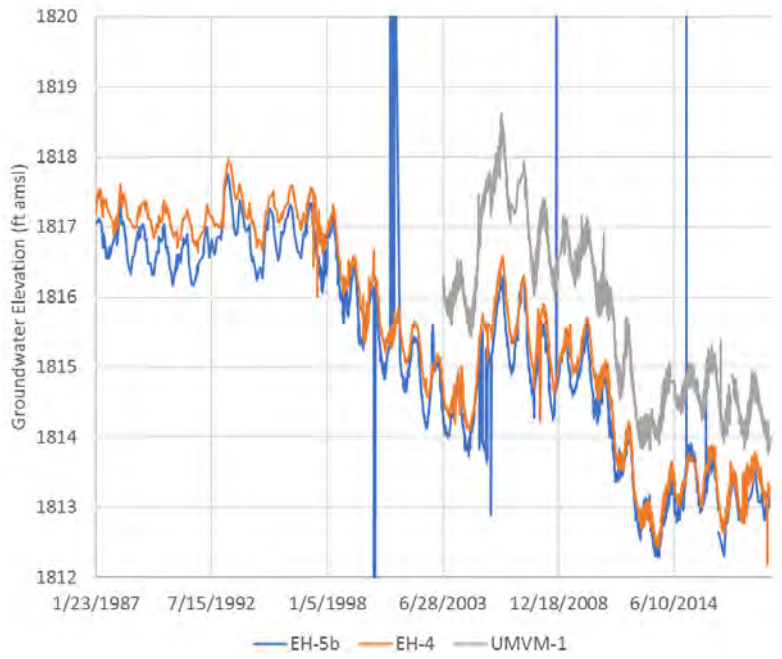


**Figure 8: Muddy River Springs Area carbonate monitoring wells.**

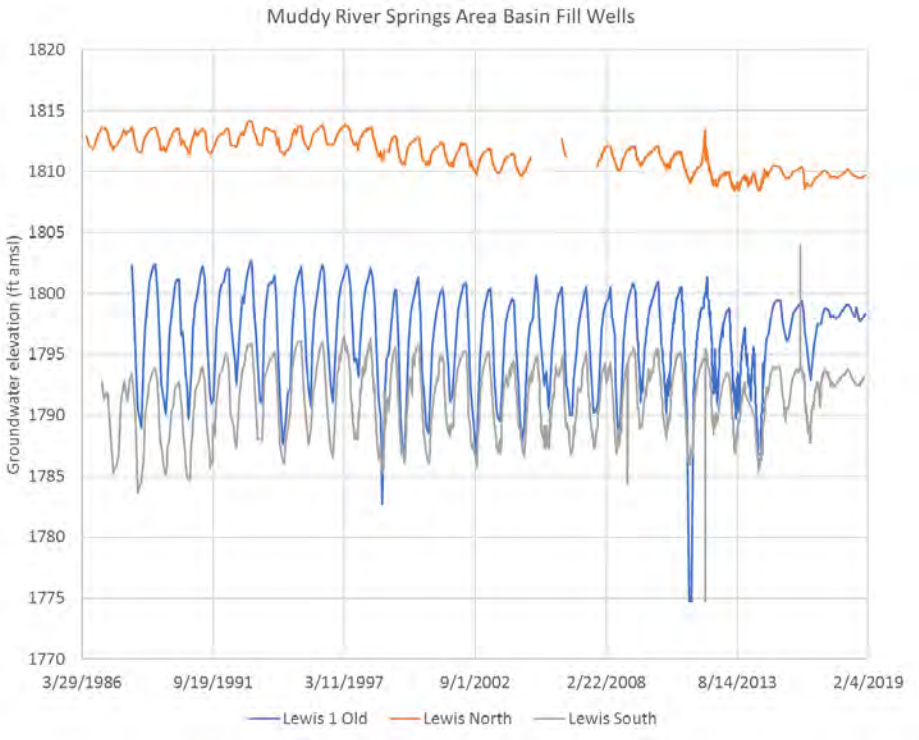


**Figure 9: Hydrographs of basin fill wells in the Lewis Field portion of the Muddy River Springs Area. Perforations are from 28 to 68 feet bgs for Lewis North and are unknown for the other wells. Source of data - NSE web page.**

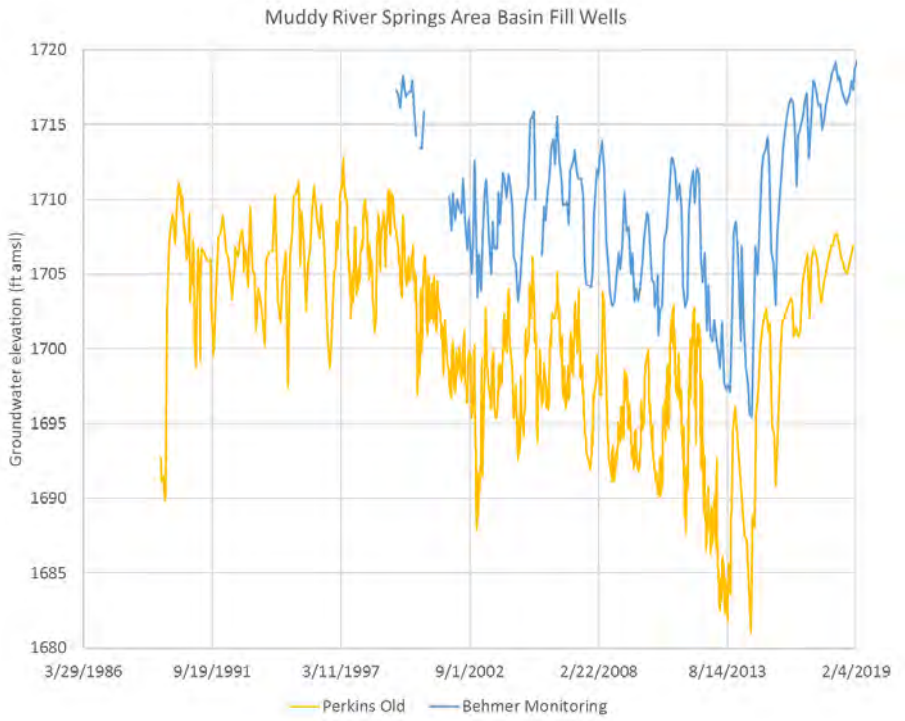


**Figure 10: Hydrographs of basin fill wells in the Muddy River Springs portion of the Muddy River Springs Area. The Perkins Old well is screened from 20 to 60 ft bgs. Source of data -NSE web page.**

The groundwater levels recorded at the end of the pump test throughout the CSV and MRSA show the very flat potentiometric surface from midway up CSV through the MRSA. The groundwater gradient through the area affected by the pump test is very flat because of the likely very high transmissivity from about the southern half of Coyote Spring Valley through the Muddy River Springs and further downstream to the Lower Moapa Valley (Figure 11). The groundwater elevation ranges from about 1815 ft above mean sea level (amsl) at CSVM-6 almost three miles northwest of MX-5 to about 1814 at UMVM-1 about 4 ½ miles southeast of MX-5. Interestingly, the groundwater elevation is 1817 at CSVM-1 which is very near MX-5, which itself is at 1813. In other words, there is a small rise in the potentiometric surface of the carbonate aquifer southeast of MX-5. The minor groundwater divide may be slightly southwest of the direct flow path, thereby partly bounding the divide. During pumping, water levels throughout this highly transmissive aquifer responded as if the aquifer water is a pond with water level changes transmitted quickly throughout.

Carbonate water levels in northern CSV are several tens to almost 400 feet higher than near the southeast portion of CSV, but the water levels did decline during the aquifer test (USDOI 2013). The groundwater level in MW CSVM-4, in CSV but near the southern end of Kane Springs Valley,

is just six feet lower than well KMW-1 (206 S11 E64 06CACC1) further north in Kane Springs Valley. This suggests the high transmissivity carbonate rock extends into that valley.

Carbonate groundwater levels drop almost 250 feet between the MRSA and the southeast portion of the Lower Meadow Valley Wash valley. The carbonate groundwater levels in the MRSA are several tens of feet above the levels in the basin fill, which drives upward flow into the basin fill. Both observations support the idea of a flow impedance in the carbonate aquifer near the southeast boundary of MRSA which could be a major cause of the springs.

Basin fill water levels in Coyote Spring are substantially higher than the carbonate water levels. Most apparent is CE-VF-2 for which the water level is more than 50 feet lower in the carbonate (Figures 2 and 11). Basin fill well DF-1 groundwater levels exceed 2000 ft amsl while underlying carbonate wells have levels 200 feet lower. Because of the aridity of the area and because of the likely confining unit between the aquifers, it is unlikely the higher basin fill levels reflect substantial recharge to the carbonate. Rather it suggests a hydrologic disconnect. Groundwater levels in basin fill wells CSVM3009M and DF-1 have been trending upward, with no signal from the aquifer test; this also indicates there is no connection between carbonate and basin fill.

Downgradient in the Muddy River Springs Area, the carbonate water levels exceed those in the basin fill, which reflects the discharging springs in the area. In the Lower Meadow Valley Wash area, outside of the pump test study area, at wells MW-1 there is a substantial upward gradient from depth in a very thick basin fill aquifer.

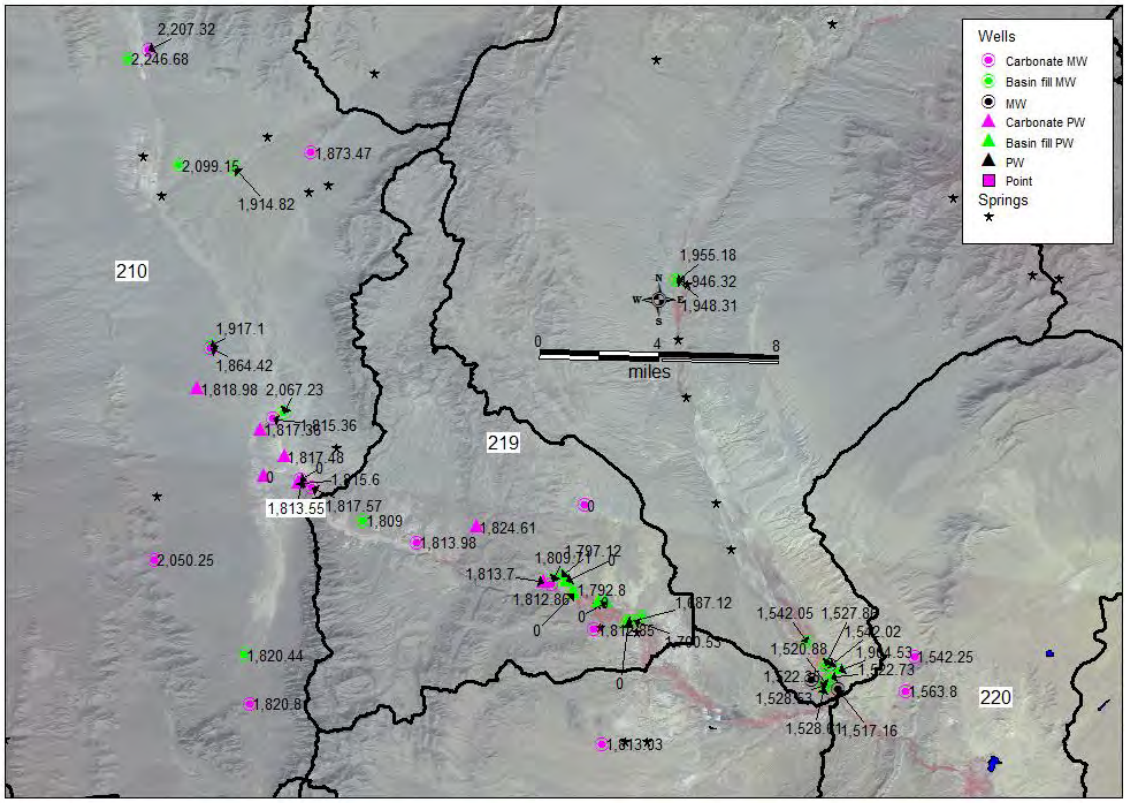


**Figure 11: Groundwater level at various wells throughout the study area. See Figure * for the well names. The label 0 means either the data is not available or the well is a production well and the water level is very low.**

A profile of the carbonate groundwater levels through CSV and MRSA at the beginning and ending of the aquifer test demonstrates the flatness of the potentiometric surface in the high transmissivity zone through the area and how the response decreases to the north (Figure 12). For almost 20 miles, the carbonate water level is between 1820 and 1813 feet amsl. During the aquifer test, the level consistently dropped about 2 feet. The small rise at CSVM-1 may reflect a slightly higher groundwater ridge south in CSV, as seen at well CSVM-2 where the groundwater levels exceed 1820 feet amsl about five miles south of the profile line (Figure 11). This slight rise suggests there is no flow south from CSV but the groundwater levels in southern CSV did decline during the aquifer test.

Further north at CSVM-4, the groundwater level change was less than a foot. Groundwater levels at well CSVM-4 are also several tens of feet higher than further south. As noted, groundwater levels rise about six feet into Kane Springs. Even further north, carbonate

groundwater levels are about 200 feet higher and there was little effect from the aquifer test. Transmissivity is probably lower in northern CSV as reflected by the steeper gradient. Inflow to CSV from Pahranagat or Delamar Valley flows through the lower transmissivity area to reach southern CSV and well MX-5.

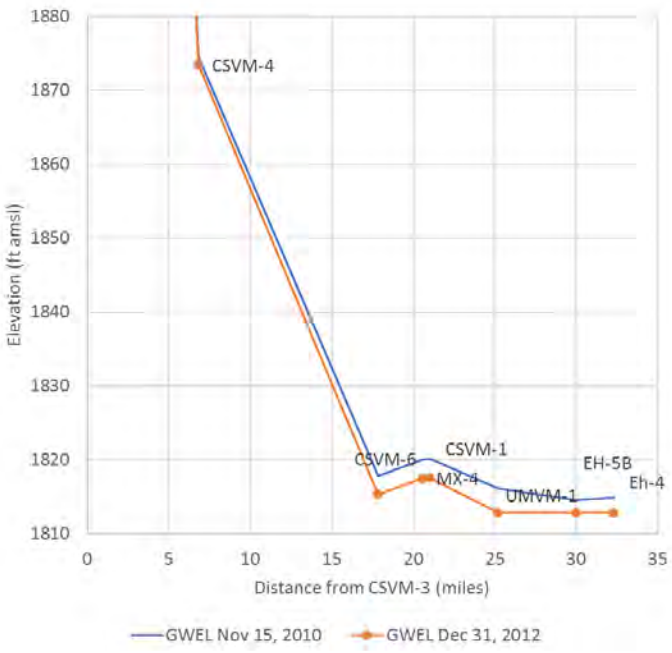


**Figure 12: GW elevation from northern Coyote Spring Valley to well EH-4 at the beginning and end of the Order 1169 pump test.**

The changes in groundwater levels in the carbonate aquifer manifests in the Muddy River Springs Area (Figure 13) spring flows. Pederson Springs and Warm Springs West provide most of the flow to one of the channels that is tributary to the Refuge Stream, which is then tributary to the Muddy River Channel (Figure 13). The Pederson Springs are the highest elevation springs on the site.

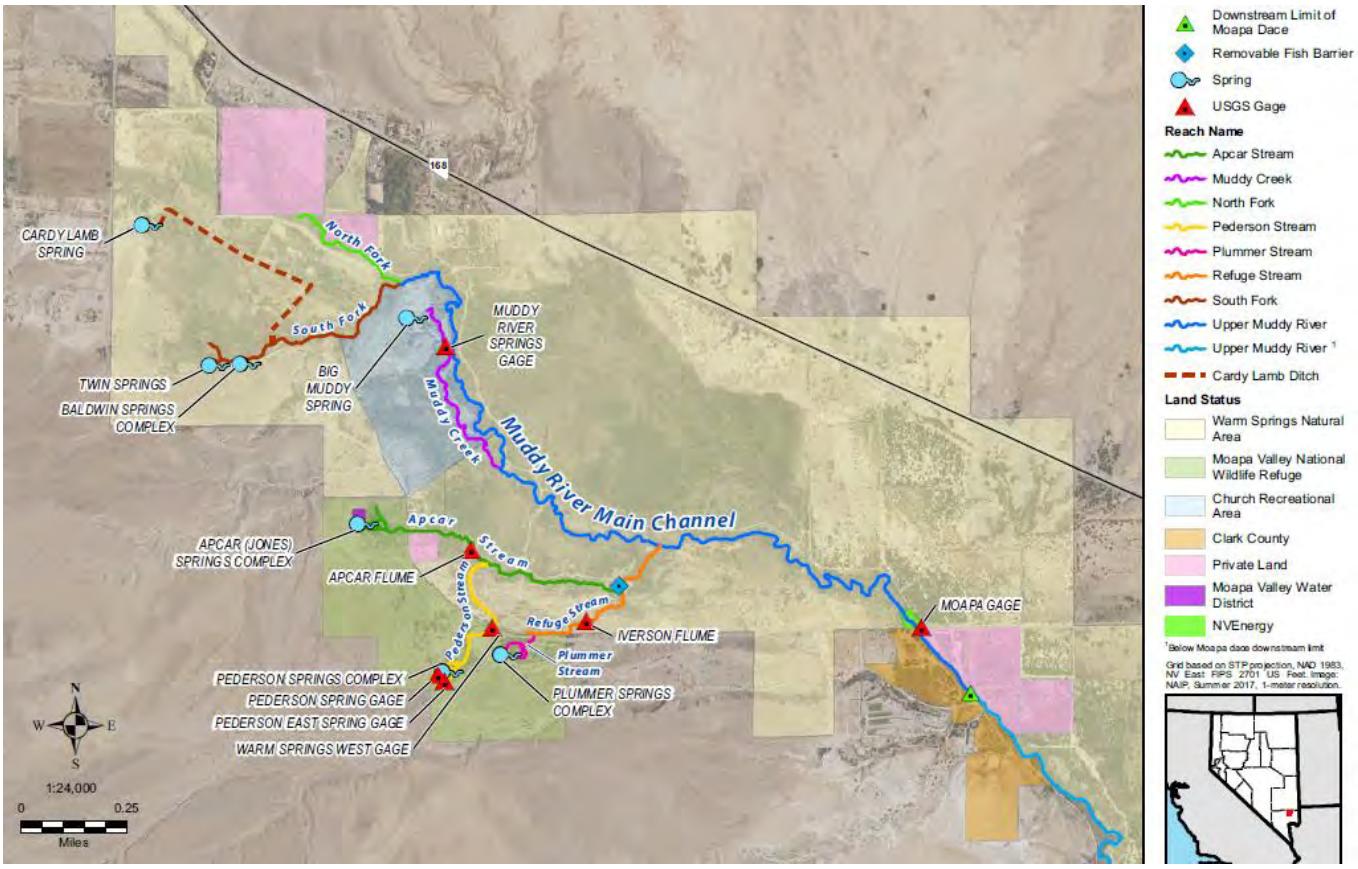


**Figure 13: Muddy River Springs area. Source, SNWA (2018) Figure 2-1.**

Discharge from the Warm Spring West decreased from about 4.0 cfs to as low as 3.4 cfs between the 1990s and mid-2000s, then after an uptick in flows in the wet period in 2005 (Figure 14) and during the Order 1169 pump test dropped to almost 3.2 cfs (Figure 14). It has recovered only to a little more than 3.4 cfs since 2012. At the Pederson springs, flow is about half of what it was in the mid-2000s, with much of the decrease occurring during the Order 1169 pump test (Figure 15). Flows recovered some after the test, but for about four years flows have been steadily low. At the Pederson Springs East gage, flows had fluctuated around 0.2 cfs prior to the pump test during which the flow decreased to about 0.14 cfs (Figure 15). The flow has not recovered at these springs.

USDOI (2013) determined that the flow rate at Pederson Springs had declined about 63% and at Pederson East Spring about 45% during the test. Flow at Warm Springs West (Figure 14) declined about 9% during the test. USDOI (2013) correlated spring flows to carbonate groundwater level drawdown and found that if the rate of drawdown observed during the aquifer test continued, Pederson Spring, the highest elevation spring in the MRSA, would have gone dry in 1.5 years. USDOI also estimated that Pederson East Spring would have gone dry in another 2.5 to 3 years if pumping continued. In other words, if the trend observed on Figure 15

had continued, the springs would be dry. Flow at Jones and Baldwin Springs (Figure 13) declined about 4%. Curiously, the flow at Muddy Springs increased by 19% per year, possibly due to decreased evapotranspiration (ET) resulting from a fire in July 2010.

USDOI also estimated that 80 to 90% of the groundwater pumped during the aquifer test was drawn from groundwater storage (USDOI 2013, p 4) which means that the groundwater system is far from being in equilibrium, which occurs when inflow (recharge and groundwater flow from adjoining basins) equals the outflow. Although several ecologically important springs had their flow reduced substantially during the aquifer test, those flow reductions represent only a small portion of the outflow from the LWRFS. Continued pumping at those rates would have continued to decrease spring flow as the pumping removed additional groundwater storage and decreased the groundwater level controlling discharge from the springs. Even after pumping ceases, groundwater discharge would continue to reduce as it is diverted to replenish the groundwater storage (make up drawdown).

The discharge before the aquifer test was spring discharge and existing pumpage. As pumpage increased, the spring discharge would decrease until the sum equals the inflow. Because of the extremely flat gradient through the carbonate system, the pump test has essentially reset steady state conditions. A major recharge event may eventually allow some temporary recovery, as was seen in 2005, but the ongoing pumping would resume the drawdown trend.

The limited recovery in carbonate groundwater levels and springs indicates there is a steady state inflow to the system. Inflow from upstream would not increase due to drawdown in CSV because the controlling gradient is quite high due to the drop from Delamar and Pahranagat Valley into CSV. Between Hoyt Spring in Pahranagat Valley and MW CSVM-3, a distance of 11.47 miles, the water level drops from 3195 to 2207 ft amsl for a gradient of 0.0163. This assumes the water level in Hoyt Springs is that of the carbonate aquifer. Between Delamar Valley and Coyote Spring Valley, the gradient would be the difference in water level between well 182 S07 E64 19ACDB1 at about 3480 ft amsl and CSVM-3 over 20 miles, or be 0.012. Between groundwater levels in Kane Springs Valley at well 206 S11 E64 06CACC1 at 1878 ft amsl and CSVM-4 at 1873 ft amsl over about 6 miles, the gradient is about 0.00016. The flat gradient through the Coyote Spring Valley apparently extends into Kane Springs Valley, so it is possible that some flow could be induced from Kane Springs Valley by pumping in CSV.

The drawdown in the MRSA alluvial wells suggests that lowering the water levels in the carbonate is decreasing the inflow from below into the alluvium. Spring flow has decreased but it is doubtful this has been sufficient to decrease secondary recharge.

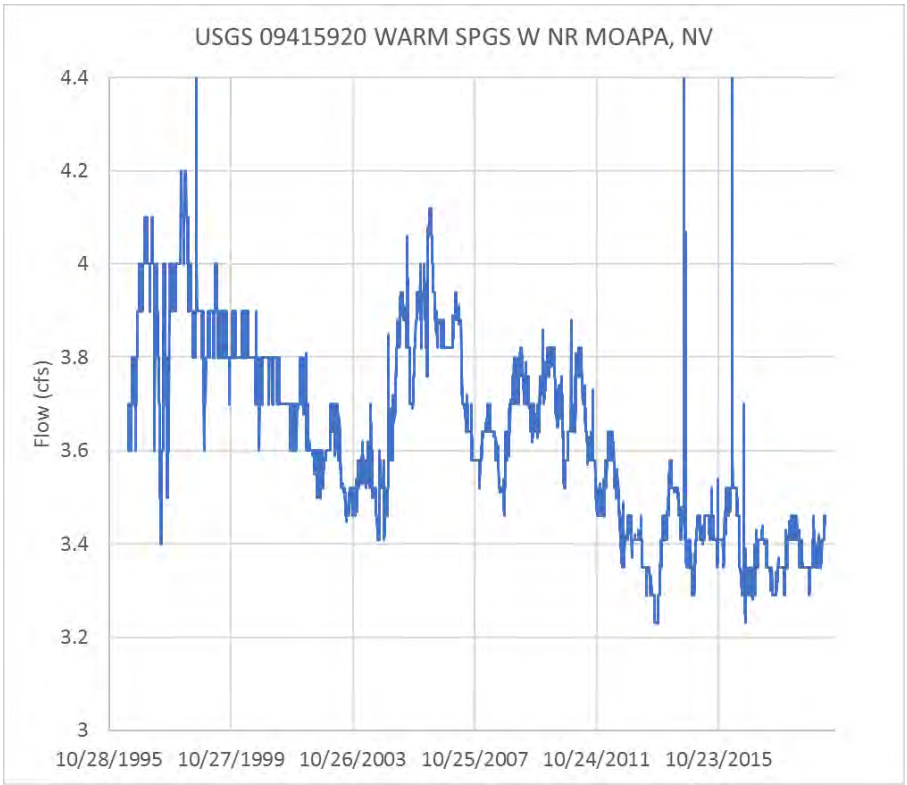


**Figure 14: Daily flow at Warm Springs W near Moapa.**

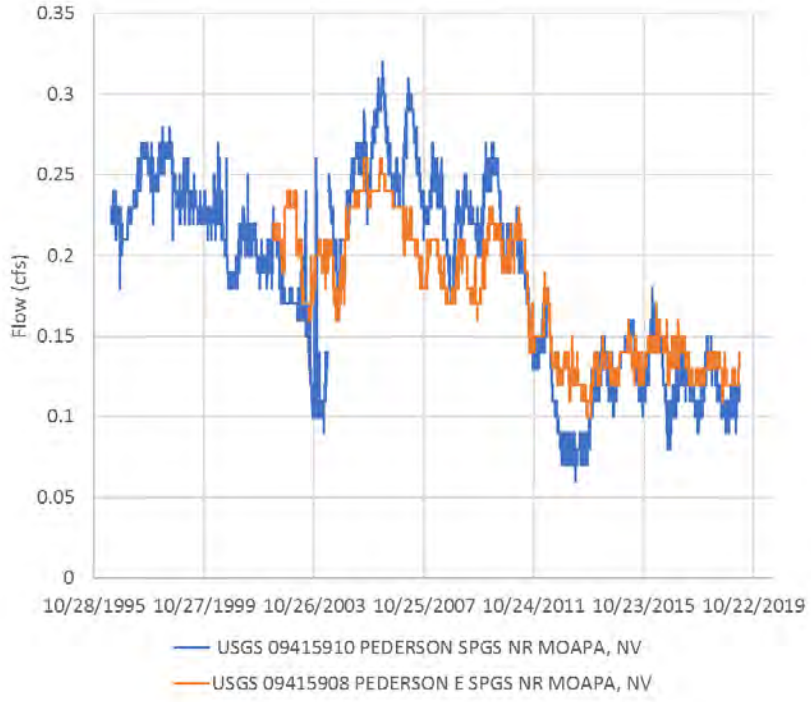


**Figure 15: Daily flow at the Pederson gages**

**Boundary of the Lower White River Flow System**

NSE Order 1303 requests the reports filed in response to the order address the "geographic boundary of the hydrologically connected groundwater and surface water systems comprising the Lower White River Flow System" (NSE Order 1303, p 13). The NSE has already outlined reasons for including CSV, MRSA, Garnet Valley, Hidden Valley, a portion of the Black Mountains Area, and the Lower Moapa Valley. The analysis herein and the analyses of USDOI (2013), SNWA (2013), Myers (2013), and NSE Order 5462 found a large high transmissivity area within the carbonate aquifer of these areas and basin fill aquifers within CSV, MRSA and Lower Moapa Valley that should be managed as one basin.

Information presented herein suggests that Kane Springs Valley should be added to the LWRFS. Because water levels in that basin are just a few feet higher than in adjoining portions of CSV, the gradient between them is very low. Pumping in Kane Springs Valley that decreases that gradient would decrease flow into CSV in a time frame likely measured in less than a few years. I base the time frame estimate on the rapid response observed in the aquifer in CSV and the assumption that a carbonate aquifer extending into Kane Springs Valley would also have a high transmissivity. Because of the very low perennial yield in Kane Springs Valley and lack of inflow to the valley from upgradient valleys, pumpage in Kane Springs Valley could reverse the gradient and draw water from CSV. Considering how fast MX-5 pumping manifest through the carbonate aquifer, a decreased flow into or reversed flow from the high transmissivity portion of the CSV carbonate aquifer would also spread through the system and lower the groundwater levels. It would have a significant effect on water rights through the LWRFS. Lowering the water table in CSV could increase the gradient between CSV and Kane Springs and draw a small amount of groundwater into the CSV. Because groundwater at the source in Kane Springs is limited, inducing flow from Kane Springs Valley is not a sustainable means of increasing the available water in LWRFS. Kane Springs should be managed as part of LWRFS.

Groundwater levels in northern CSV were several hundred feet higher than in southern CSV and there was no apparent effect of the drawdown reaching MW CSVM-3. Transmissivity in northern CSV is likely lower than further south. There is no evidence of an impedance caused by a fault structure isolating north CSV because a fault would prevent groundwater from flowing south through CSV. The pump test did not propagate to that point during the test but there is no evidence suggesting it would not do so if the pumping continued. Developing groundwater in this area would intercept groundwater flowing into southern CSV and have the same effect as diverting from Kane Springs Valley; it would decrease flow to the springs and downgradient water rights.

The ultimate source of groundwater for the LWRFS is upgradient in Pahranagat and Delamar Valley. Recharge in each of these valleys could combine with interbasin flow from upstream to provide the inflow to CSV. Groundwater developed upstream, especially in Delamar, Dry Lake or Cave Valleys, would ultimately decrease flow to CSV. The only question is timing. Once depletions upstream reach CSV, they will manifest as a loss of flow to the LWRFS. The inflow of approximately 47,900 afa will begin decrease[1]. As shown by the Order 1169 aquifer test, this reduced flow will propagate through the system and manifest as reduced carbonate water levels and spring flows. The Judge Esty order[2] properly requires that the NSE not grant any water rights above CSV in order to protect water rights and spring flows in the LWRFS in perpetuity.

The White River Flow System above CSV does not have to be added to LWFRS boundary in order to manage it properly. Developing groundwater in the LWRFS will not propagate impacts north of CSV.

**Long-term Quantity of Water that Could be Pumped from LWRFS**

One limit on pumping water in the LWRFS are the impacts caused by that pumping on spring flow necessary to support the Moapa Dace and water rights to flow from the springs and in the Muddy River. The recovery plan for the Moapa Dace requires that existing instream flow and historical habitat be protected in three of five channels supported by springs in order to reclassify the dace. The five channels are Apcar, Baldwin, Cardy Lamb, Muddy Spring, and Refuge (Figure 13) (USFWS 1996, p 33, 34). According to the recovery plan, all five must be protected for delisting. USFWS does not specify a required flow rate for each channel, but a Memorandum of Agreement (MOA) signed by Southern Nevada Water Authority, Coyote Springs Investment, Moapa Valley Water District, and the Moapa Valley Paiute Tribe, established trigger ranges for flows at Warm Springs West. Figure 16, sourced from the NSE

[1] The DEIS groundwater model (SNWA 2009) simulated that all flow went from Delamar Valley to Pahranagat Valley and then to CSV (as shown in a data file accompanying the original reference: folder/file deis groundwater model/simulation files/3_Detailed_Results/Interbasin-Flow-Tables/IBF_rev2_1b_NoAction.xls). The estimated flow was 41,900 afa. The value did not vary due to project development. There was also 1900 afa flow from Kane Springs Valley to CSV. NSE Ruling 6167 concluded that inflow from Tikaboo South Valley to CSV is 4100 afa. This brings the total inflow to 47,900 afa. In his presentation on LWRFS of July 24, 2018, the NSE estimated inflow equaled 47,502 afa. He also estimated CSV LWRFS recharge at approximately 3000 afa, so the total supply is 50,500 afa, which the NSE stated was "50,000 afa or less" (NSE July 24, 2018 LWRFS Presentation, p 41).

[2] White Pine County and Consolidate Cases, Et al, v Jason King, P.E., Nevada State Engineer, State of Nevada Division of Water Resources. In the Seventh Judicial District Court of the State of Nevada in and for the County of White Pine. Case No. CV1204049. The ruling required the NSE to recalculate "appropriations from Cave Valley, Dry Lake and Delamar Valley to avoid over appropriation or conflicts with downgradient, existing water rights". (NSE Ruling 6446, p 109)

July 24, 2018 presentation regarding the LWRFS, describes the trigger ranges and pumping limitations for the MOA. Warm Springs West is on the Pederson Stream which is not listed as one of the channels for protection in the recovery plan but does contribute to the Apcar Channel (Figure 13). Warm Springs West flows almost dropped to 3.2 cfs during the aquifer test (Figure 14).

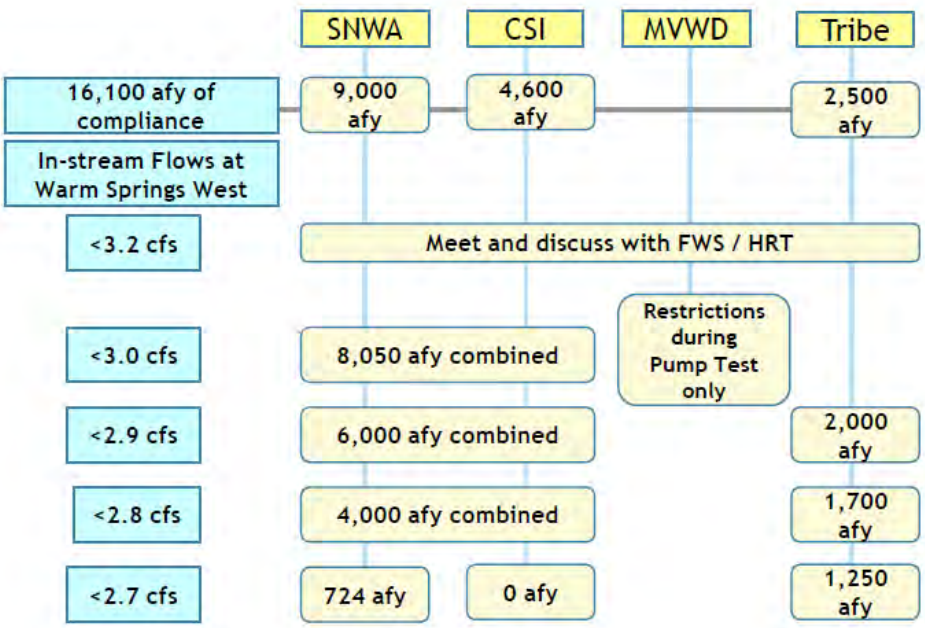


**Figure 16: Description of trigger flows and pumping limits for those trigger flow for the Memorandum of Agreement described in the text.**

The 1920 Muddy River Decree has total rights of 37,000 afa, as noted by NSE Order 1169. There are other stream and spring rights listed in the hydrographic abstract that could be in addition to Muddy River Decree rights.

The best way to determine the effect of pumping on the LWRFS is to consider the water balance of the system that feeds the Muddy River Springs. Ignoring local recharge which is probably to basin fill, the inflow through CSV is about 50,500 afa. The Muddy River Springs represent most of the outflow from the area, although estimating that ouflow is complicated by the irrigation in the area and ET from the basin fill. The gaging station Muddy River near Moapa (#9416000) is downstream of and therefore includes flow for all area springs (Figure 13) but the gaging station description notes irrigation diversions above the gage. Based on the gage, discharge from the LWRFS had been estimated to be about 36,000 afa from springs that supply the MRSA (Eakin 1964, p 24). However, none of the recorded flows since 1943 have been that

high (Figure 17). From about 1943 to 1960, the recorded flow was just less than 34,000 afa. After 1960, the flow rate decreased to less than 24,000 afa. After the wet year in 2005, it began to increase again to over 30,000 afa in 2012.

Trends at the Muddy River gage are likely due to surface and groundwater development upstream from the gage, including diversion of up to 9.2 cfs to the Reid-Gardner electrical generating station which began in 1968 (USFWS 1996). Decreasing spring flow likely began in the 1990s with carbonate pumping. The increase just after 2005 may be due to the high precipitation year and after 2010 could be due to the decreased ET after a fire in 2010 (Figure 17). Flows have been relatively constant at about 30,500 afa since 2014. Notwithstanding the portions of the decree satisfied by diversions upstream of the gage, flow at the gage has not been meeting the requirements of the Muddy River Decree because the flow has been less than 37,000 afa (Figure 17).

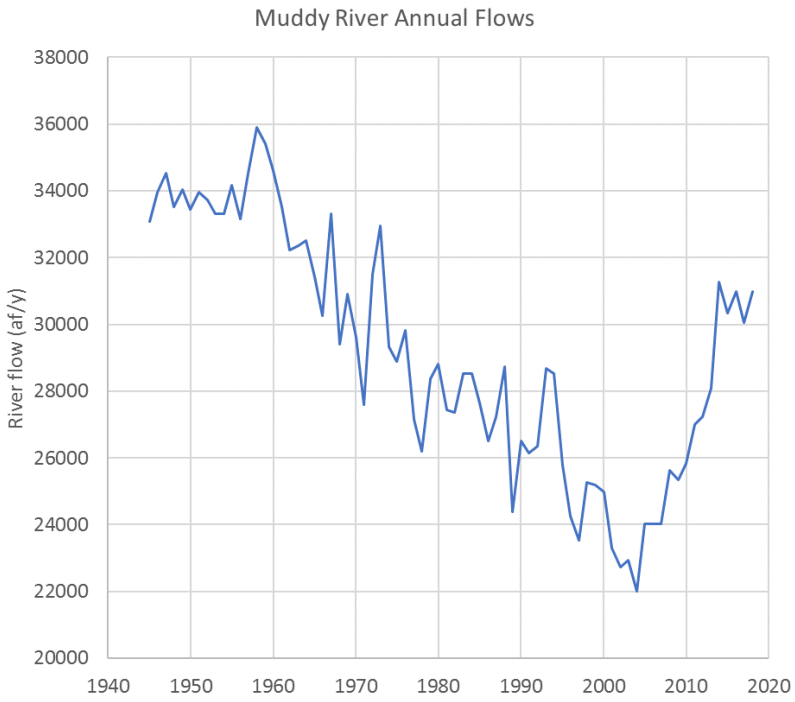


**Figure 17: Annual flows (cfs) at the Muddy River near Moapa, NV gage (09416000)**

Pumpage since 2000 has been from variable sources. Monthly pumpage varied from 500 to 1600 af/mnth between 2000 and 2010, with the 12-month average ranging from 800 to a little more than 1000 af/mnth (Figure 18), which converts to annual pumping from about 9600 to 12,000 afa. Total carbonate pumping increased from about 400 to 600 af/mnth, or 4800 to 7200 afa between 2000 and 2010, so there was a decrease in alluvial pumping in MRSA (Figure 18). There was a substantial jump in pumping between 2010 and 2012 due to the 1169 aquifer

test. After the test and especially since 2014, total pumping has decreased to just over 8000 afa with carbonate pumping being most of it. Alluvial pumping has dropped to close to zero since 2015 (Figure 19).

Carbonate pumping in CSV first began in 2005, so flow in the carbonate system upstream from the springs has only been pumped for 14 years. MRSA carbonate pumping has been steady or slightly decreasing with ranges from 100 to 400 af/mnth (Figure 19). Production is primarily from the Arrow Canyon wells. During the aquifer test, CSV carbonate pumping dominated the pumping from the carbonate aquifer. Since the aquifer test, CSV carbonate pumping has been about half that in MRSA.

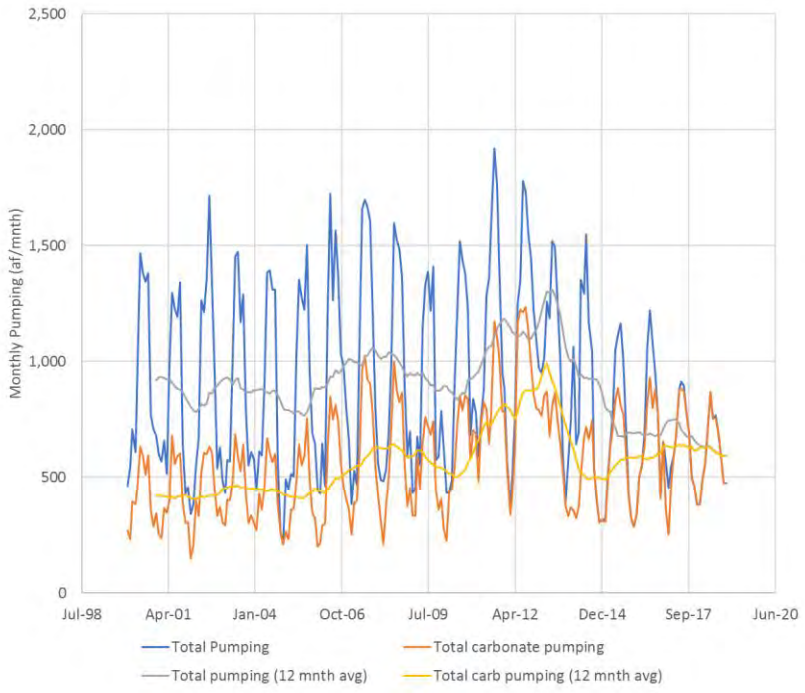


**Figure 18: Total pumping and total carbonate pumping, by month and by 12-month moving average, for the study area. Data from NSE Web page.**

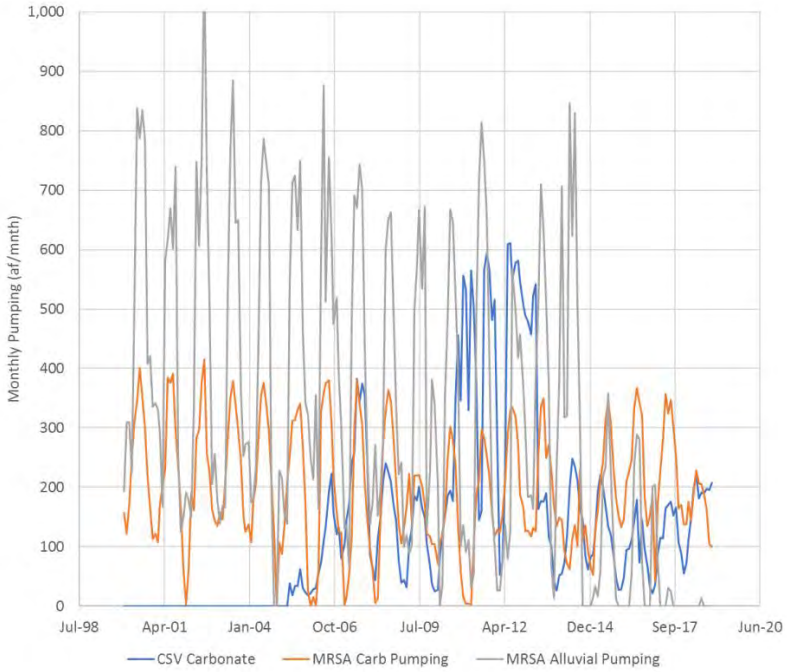


**Figure 19: Carbonate pumping for Coyote Spring Valley and the Muddy River Springs Area. Source of data: NSE web page.**

Prior to the pump test, the trend for water levels in most carbonate monitoring wells had been for them to decrease except during brief wet periods. This may be seen by plotting the carbonate groundwater levels with carbonate pumping, as done by the USDOI (Figure 20). Groundwater levels began to decrease as carbonate pumping commenced. Carbonate spring flow also began to decrease with pumping in the mid-1990s, also except during very wet years. The trend has been for the flows to decrease. At Warm Springs West, flow had been near 4.0 cfs in the 1990s and now is near 3.4 cfs, having recovered about 0.1 cfs since the aquifer test (Figure 14). Smaller, higher altitude springs are flowing at a little more than half of their 1990s flow.

Carbonate pumping as it occurred in the 1990s caused spring flow and groundwater levels to decline; total pumping was less than 10,000 afa and carbonate pumping was less than 5000 afa. Excepting those downstream of the springs, the basin fill wells were not experiencing a water level decline even with the alluvial pumping of near 5000 afa.

It is therefore apparent that any carbonate pumping removes water from the springs. Prior to the pump test, the small amount of carbonate pumping was causing a small but measurable decrease in spring flow. The decrease would occasionally be partially countered by extremely wet years, such as in 2005. As noted above, the majority of carbonate pumping was removed from storage, so the flow decreases would continue into the future as the storage recovers.

The conclusion therefore is that the NSE should not allow any carbonate pumping in the LWRFS to prevent further decreases and to allow recovery in the flow to Muddy River Area Springs. Pumping carbonate water intercepts spring flow and upward flowing groundwater recharge to the basin fill. With carbonate pumping, it is only a matter of time before the spring flow on which the Moapa dace depends decreases significantly or is completely lost. The next section addresses the potential for basin fill pumpage.

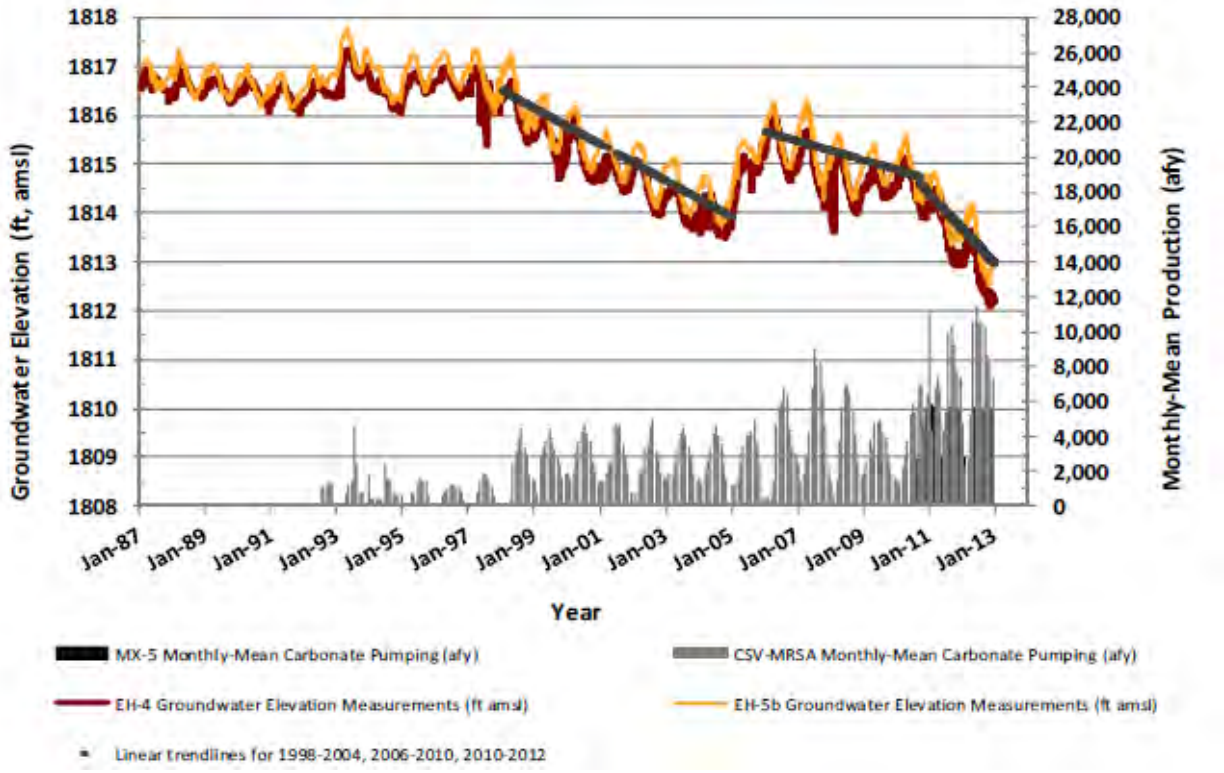


**Figure 20: Trends in carbonate water levels at MWs EH-4 and EH-5b with carbonate pumping in Coyote Spring Valley and Muddy River Springs Area. Source: USDOI (2013) Figure 1.2.**

### Relation between Carbonate and Basin Fill Wells and the Potential for Conjunctive Use

The pumping and water level relations discussed in the previous section suggest that some water can be pumped if sourced from the basin fill aquifer. Except in the far southeast portion of MRSA, basin fill groundwater levels did not decline due to carbonate pumping. This is probably because carbonate water discharging into the basin fill supports the basin fill aquifer. Secondary recharge, probably including both direct spring flow and irrigation recharge, supports the basin fill water levels. Some basin fill pumping could be acceptable in MRSA because alluvial groundwater is partly secondary recharge from the springs. As secondary recharge, the water has already been used in the spring channels most important for the dace. The existing levels of pumping in MRSA basin fill, about 4000 afa, is probably acceptable.

Although there is no basin fill pumping in CSV, it is possible that some basin fill pumping there could be sustainable. The evidence for this is that basin fill water is likely disconnected from the carbonate and not responsible for substantial recharge. That basin fill water levels increased during the aquifer test exemplifies that. Prior to allowing basin fill pumping, it is essential to determine where the basin fill groundwater discharges. If ultimately it supports carbonate groundwater, it should not be pumped.

NSE Order 1303 requests reports address "effects of movement of water rights between alluvial wells and carbonate wells on deliveries of senior decreed rights to the Muddy River" (NSE Order 1303, p 14). This suggests that reports consider the change in the point of diversion from one to the other aquifer. As noted previously, carbonate pumping would eventually dry the Muddy River Springs, but carbonate groundwater flow also supports basin fill water through direct discharge from the carbonate to the basin fill and secondary recharge of springflow into the basin fill. The long-term decline of flow in the Muddy River indicates there is a limit to the amount of even basin fill groundwater that can be pumped without affecting Muddy River flows.

**Conclusion**

The Order 1169 pump test made apparent that there is a broad highly transmissive carbonate aquifer underlying CSV, MRSA, Garnet Valley, Hidden Valley and California Wash. The aquifer is interconnected so much among basins that it is necessary to manage groundwater through all basins as if they were part of a whole basin. The primary conclusion of this analysis is that the NSE not allow any pumping of the carbonate aquifer if the continued decrease in spring flow in MRSA is to be avoided. This conclusion results from the direct correlation of carbonate pumping and carbonate water level and spring discharge decline. Because the spring flow is directly responsible for Muddy River flows, preventing any additional carbonate pumpage is also necessary for protecting downstream water rights.

Another conclusion is that Kane Springs Valley should be managed as part of LWRFS. This conclusion results from the flat carbonate water level extending into that valley and the likelihood that water pumped from Kane springs Valley would quickly contribute to the depletion of the carbonate aquifer in CSV and MRSA.

A third conclusion is that some basin fill pumping could occur without significantly affecting the spring flow. A preliminary estimate is the pumping that occurred prior to significant carbonate pumping, or about 4000 afa. It is probably not possible to increase that pumpage by transferring carbonate rights to basin fill wells because of the observed long-term decline in Muddy River flows.

**References**

Johnson C, Mifflin M (2013) Summary of Order 1169 Testing Impacts, per Order 1169A. Mifflin and Associates, Inc.

Myers T (2013) Technical Memorandum, Comments on Carbonate Order 1169 Pump Test Data and the Groundwater Flow System in Coyote Springs and Muddy River Springs Valley, Nevada. Prepared for Great Basin Water Network.

SNWA (Southern Nevada Water Authority) (2018) Assessment of Environmental Conditions Related to Moapa Dace in the Lower White River Flow System. Las Vegas, Nevada, 55 p.

SNWA (Southern Nevada Water Authority) (2013) Nevada State Engineer Order 1169 and 1169A Study Report. Las Vegas, Nevada, Doc. No, WMP-ED_0001, x p.

US DOI (US Fish and Wildlife Service, Bureau of Land Management, National Park Service) (2013) Test Impacts and Availability of Water Pursuant to applications Pending Under Order 1169.

USFWS (US Fish and Wildlife Service, Region 1) (1996) Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem, First Revision. Portland OR

# Exhibit 8

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**Technical Memorandum**

**Groundwater Management and the Muddy River Springs, Rebuttal in Response to Stakeholder Reports Filed with Respect to Nevada State Engineer Order 1303**

**August 16, 2019**

**Prepared for: Center for Biological Diversity**

The Nevada State Engineer (NSE) is planning to establish a plan to conjunctively use groundwater and surface water in the Lower White River Flow System (LWRFS) under Order 1303. The NSE has established the LWRFS as the valleys shown in Figure 1, except that only the northern portion of Black Mountains Area would be included, and excluding Lower Meadow Valley Wash and Lower Moapa Valley. The bases for this planning are the Order 1169 aquifer test results and observations ongoing since the end of the test. The NSE requested reports from stakeholders be filed by July 3, 2018. This technical memorandum is a review and rebuttal of those stakeholder reports, as requested by the NSE.

Throughout the rebuttal, I contrast the reviewed reports to the evidence I prepared for the submission by the Center for Biologic Diversity (CBD) (Myers 2019). This rebuttal also endorses the letter provided by the Great Basin Water Network in its last section. I organize the reports by stakeholder.

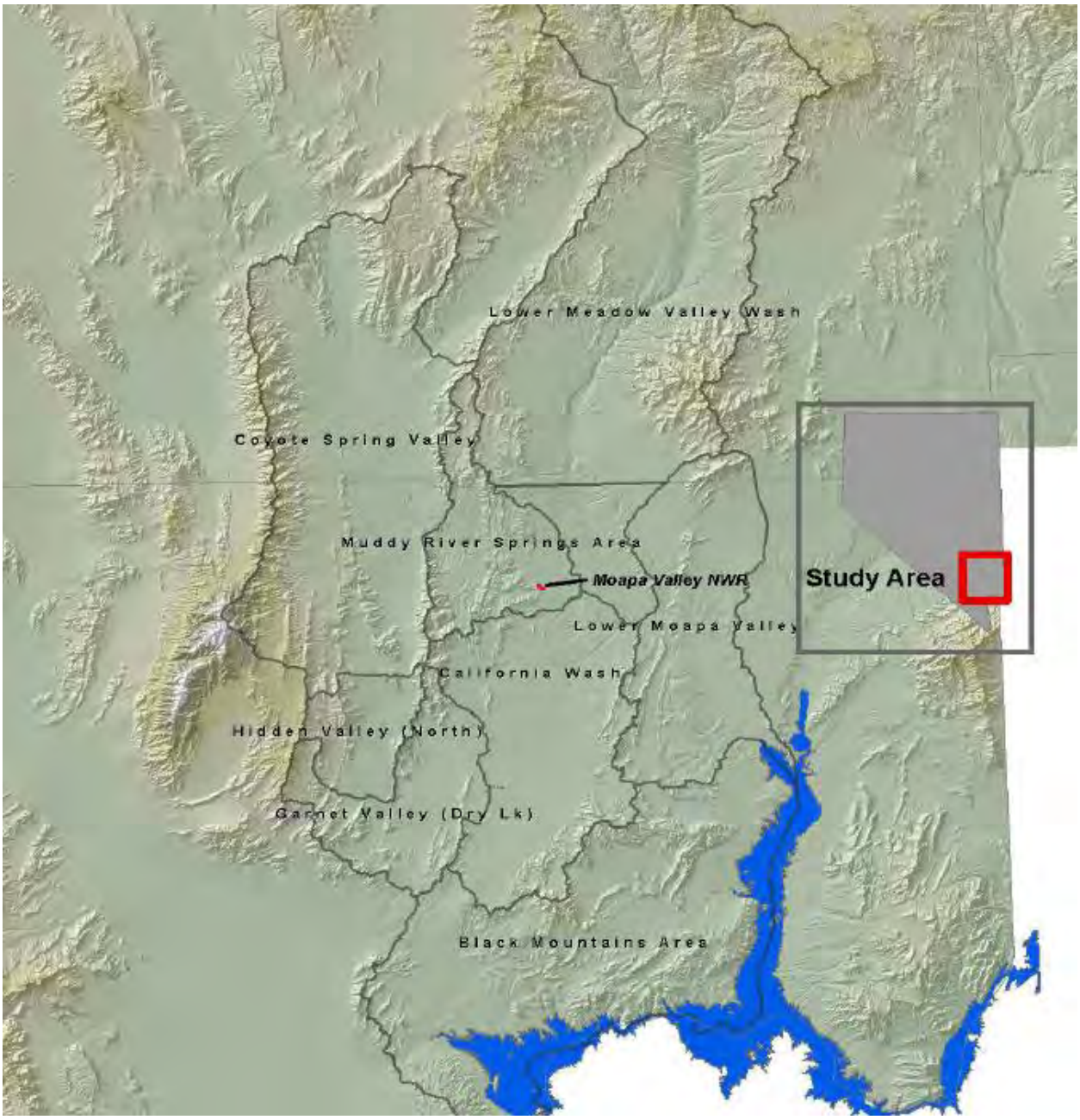


*Figure 1: Study area showing the Lower White River Flow System. Kane Springs Valley is northeast of Coyote Spring Valley. Source: USDOI (2013).*

**Rebuttal to Coyote Springs Investment Report**

Coyote Spring Investment (CSI) submitted a report prepared by Stetson Engineers (Stetson 2019) in support of its claim that up to 5280 acre-feet/year (af/y) can be pumped from Coyote Spring Valley (CSV) without harm to the Muddy River Springs Area (MRSA) (Stetson 2019, p 60).

The evidence presented by Stetson is faulty as presented herein and does not support the claim.

Stetson compares drawdown calculated using a Theis analysis of pumping all water from CSV from the MX-5 well on water levels at the Muddy River springs (Stetson 2019, p 7-12). Stetson claims that pumping could not cause drawdown as substantial as seen at the springs, which experience more drawdown than predicted using Theis. However, two of the assumptions that go into a Theis analysis, as properly listed by Stetson (p 8), that of an aquifer with infinite extent and no boundary effect, cannot be applied to the actual groundwater system here. Faults and unsaturated carbonate blocks, referenced by Stetson elsewhere in its report, provide a boundary that limits the size of the aquifer. As noted by Stetson, drawdown in aquifers with high transmissivity expands fast, and would encounter the boundary quickly. Boundaries limit the aquifer from which water can be drawn so drawdown is higher than predicted with Theis. Water is drawn to the well from all directions but the system between the pumping wells and springs is a relatively narrow interbasin connection through the Arrow Canyon Range, through which the discharge essentially squeezes, which could multiply the drawdown by many times over that estimated using the Theis solution.

Stetson (2019, p 47) incorrectly implies there is no effect of the aquifer test on water levels at EH-4 and that the response is due to climate effect: “What is most evident from the water level graphs is the long-term climatic impact of drying from 1998 through 2004, wetting in 2004 and 2005, drying from 2006 through 2013, and stable water levels from 2013 through 2018” (Stetson 2019, p 47). Stetson refers to its Figure 18 which compares water levels at EH-4 (the water level graphs referred to in the quote) to pumping in CSV and MRSA. Despite its claims in the previous quote, the lower half of Stetson Figure 18 shows clearly a decline at EH-4 with pumping in MRSA with the exception of an upward jump during the wet 2005 period. The decline steepens during the aquifer test period. Although Stetson claims the levels since 2013 are stable, it neglects to consider that precipitation during the period between 2014 and 2018 has trended upward.

Stetson’s interpretation of CSVM-1 in its Figure 19 is mostly correct, except for the period since the pump test. CSVM-1 water levels recovered about a foot between 2013 and 2014 which appears to correspond to substantial decrease in CSV pumping. As CSV pumping recovered to pre-pump test rates, CSVM-1 water levels began a slight decrease of about half a foot up to 2019, even though the precipitation had increased as shown on Stetson’s Figure 1.

Stetson finds that wells CSVM-2, -3, -4, -5 and CE-VF-2 “do not show a response to pumping” in either CSV or MRSA (Stetson 2019, p 48). Myers (2019) found similar results except I found minor decreases of up to half a foot at CSVM-5. Stetson’s explanation that the lack of response

is “due to barriers to flow created by normal (extensional) faults that impede groundwater flow in the east-west direction” (Id.) is incorrect. The wells in question lie north of the pumping so barrier to east-west flow would have no effect. Myers (2019) explained the decreasing response with distance north of MX-5 as being due to the higher ground level and to the aquifer becoming less transmissive to the north, not due to an impedance to east-west flow.

Stetson claims pumping at CSI-2 did not affect Warm Springs West (WSW) flow during the last three quarters of 2018 (Stetson 2019, p 52) and references its Figure 21. That figure also shows that MRSA pumping has decreased, which affects water levels at EH-4 which the spring discharge correlates with. Also, Stetson Figure 21 does show a minor flow decrease but the measurements are reported only at 0.1 cfs intervals and Stetson’s scale goes way beyond the bounds that the flow data is reported. In more detail, Myers (2019) Figure 14 shows a substantial fluctuation, but flows that are mostly less than 3.4 cfs, a decrease from levels exceeding 3.4 cfs subsequent to the aquifer test. In other words, Myers’ figure shows that spring discharge has been decreasing ever since it recovered from the pump test.

Stetson (2019) argues in its section 3 that Kane Springs Valley (KSV) should not be part of the LWRFS, but provides evidence that clearly supports KSV’s inclusion and fails to present evidence showing there is no connection. The hydrogeology map presented by Stetson as Figure 8 shows that volcanic rock forms the boundary of KSV (206) and CSV and that carbonate rock forms the boundary between CSV and KSV. Also, at no point did Stetson consider groundwater levels between CSV and KSV or whether drawdown in CSV would draw water from KSV. Myers (2019) showed the groundwater elevation difference between valleys was minimal.

In section 4, Stetson (2019) develops water budgets for LWRFS and CSV. First, Stetson estimates recharge for CSV using three recharge methods, (Maxey and Eakin 1949, Nichols 2000, and Epstein 2004). The Nichols and Epstein methods are based on methodology of Maxey and Eakin (1949) in that recharge is estimated as a coefficient applied to a precipitation interval within the basin. Stetson’s application of the methods is incorrect and shows a misunderstanding of the methodology.

Maxey and Eakin (1949) assumed that outflow from a basin, including groundwater evapotranspiration (GWET), spring flow, and interbasin outflow, would equal recharge and interbasin inflow to that basin. They analyzed 13 basins for which they could estimate the outflow because GWET is easier to estimate than any other flux in the method and for which they could assume interbasin outflow was minimal. They estimated precipitation by elevation using a precipitation map developed by Hardman (1936). The precipitation estimates were by zone, as Stetson shows in its Table 2 (precipitation zones <8 in/y, 8 to 12 in/y, 12 to 15 in/y, 15 to 20 in/y, and >20 in/y). Maxey and Eakin developed the coefficients shown in Stetson Table 2

by trial and error. By precipitation zone, the coefficients are 0, 0.03, 0.07, 0.15, and 0.25, respectively. This means the precipitation falling in the <8 in/y zone would be assumed to not become recharge whereas 25% of that falling in the >20 in/y zone would become recharge within the basin. For example, if 10,000 af falls in the >20 in/y zone, 2500 af of it would be assumed to become recharge within the basin. Several distinguishing points about the method are essential:

- The recharge occurs within the basin, not necessarily at the point the precipitation falls. The method does not consider geology, and it is obvious that precipitation runs off granitic and much volcanic rock but infiltrates carbonate rock. Runoff from granitic rock may become mountainfront recharge whereas infiltration into carbonate rock is recharge in place. An inherent assumption is that the basins have a relatively similar ratio of pervious to impervious geology. However, recharge may be much higher than expected by precipitation zone in an all carbonate basin.
- The method depends on the map used to estimate the precipitation intervals. Just like a regression analysis, the results only hold for dependent and independent values drawn from the same population of data. It is not appropriate to use M-E coefficients with PRISM-estimated rainfall as described (Stetson 2019, p 33-34). As shown in its comparison among methods, using PRISM precipitation yields a much higher estimated recharge. Being "more scientifically sophisticated" (Stetson 2019, p 38) does not make an estimate using most recent PRISM data more accurate because it was not made using the same precipitation estimates used to derive the coefficients.
- Because the M-E method was derived using outflow estimates and precipitation zones for entire basins, it is inappropriate to estimate recharge for small subbasins. Stetson inappropriately divided the Sheep Range portion of CSV into 15 zones in which to estimate recharge, introducing a level of granularity to the analysis which does not exist in the model. Its' estimated recharge of 5280 af/y is therefore not accurate.

Stetson develops a water budget for the LWRFS (Stetson Table 8) and states that "This report recommends and supports an initial estimate of groundwater available for appropriation should be based on capturing *all evapotranspiration* and groundwater outflow from the LWRFS." (Stetson 2019; emphasis added). Contrary to Stetson's assertion, the availability of all evapotranspiration (ET) from groundwater for appropriation is not supported in the report. First, capture of *all* ET is not possible. There is no evidence that all ET from the extensive LWRFS groundwater system that supports functioning ecosystems could feasibly be captured—as Stetson 2019 asserts. Second, the CSI report makes no showing that *any* of the estimated amount of evapotranspiration in the LWRFS (Stetson 2019, Appx. C, chart "LWRFS ET (AFY)") is "available" for capture. DeMeo et al. (2008), which is relied on by Stetson (2019, Appx. C),

shows that the estimated ET in the hydrographic areas in the LWRFS supports functioning ecosystems consisting of various native vegetation types including both dense and moderate meadowland, woodland, and shrubland vegetation as well as agriculture (Figure 2).

**Table 7.** Estimates of annual discharge from ground- and surface-water evapotranspiration for each ET unit in each hydrographic area in the study area, southern Nevada and adjacent areas in Utah and Arizona, 2003-06.

[ET, evapotranspiration; $ET_{gs}$, ground- and surface-water evapotranspiration. **ET unit identifier**: DMV, dense meadowland vegetation; DWV, dense woodland vegetation; MWV, moderate woodland vegetation; DSV, dense shrubland vegetation; MSV, moderate shrubland vegetation; AGU, agricultural unit; OWU, open water unit]

| Hydrographic area | Annual $ET_{gs}$ discharge, in acre-feet | | | | | | | | Total annual $ET_{gs}$ discharge (acre-feet) |
|---|---|---|---|---|---|---|---|---|---|
| | NPU | MSV | DSV | MWV | DWV | DMV | AGU | OWU | |
| Black Mountains Area | 0 | 1,000 | 440 | 320 | 0 | 0 | 0 | 192 | 1,952 |
| California Wash | 0 | 1,200 | 440 | 640 | 680 | 0 | 3,120 | 0 | 6,080 |
| Muddy River Springs Area | 0 | 1,450 | 660 | 960 | 1,020 | 0 | 0 | 0 | 4,090 |
| Lower Moapa Valley | 0 | 1,450 | 1,320 | 2,240 | 2,380 | 0 | 3,640 | 480 | 11,510 |
| Virgin River Valley | 0 | 8,700 | 7,260 | 11,520 | 16,660 | 340 | 6,760 | 720 | 51,960 |
| Lower Meadow Valley Wash | 0 | 6,500 | 1,760 | 2,880 | 2,380 | 0 | 2,600 | 48 | 16,168 |
| Clover Valley | 0 | 2,300 | 960 | 960 | 1,360 | 340 | 0 | 0 | 5,840 |
| Coyote Spring Valley | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kane Springs Valley | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tule Desert | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hidden Valley (North) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Garnet Valley | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 22,600 | 12,760 | 19,520 | 24,480 | 680 | 16,120 | 1,440 | 97,600 |

*Figure 2: Annual evapotranspiration (af/y) for hydrographic areas in southeast Nevada. Source: DeMeo et al (2008) Table 7*

Stetson also ignores that the capture of any significant amount of ET from the LWRFS could cause significant impacts to native vegetation and soils in areas across the LWRFS as well as to spring flow. For example, loss of vegetation and drying of soils would make them more vulnerable to erosion by water and wind creating impacts to air and water quality as well as habitats. Loss of ET in riparian areas or near springs and seeps could devastate those habitats.

Stetson claims that up to 5280 af/y could be pumped from the west side of CSV because of recharge in the Sheep Range and the unsaturated carbonate rock preventing a connection with flow to MRSA (Stetson 2019, p 57). The amount is the estimated recharge from the Sheep Range, which was shown to be incorrect in the bullet above. It also does not account for where that water discharges which means there is not a means of capturing this discharge from ET.

Thus, the CSI/Stetson proposal to include all ET as available water to be captured in the LWRFS is unsupported and should be rejected.

Stetson also presents a water budget for CSV that included inappropriate fluxes (Stetson 2019, Table 9). They claim ET in CSV is 1000 af/y and reference Thomas et al (2001). That reference does not show where in CSV that ET would occur. Figure 2 shows that DeMeo et al (2008) estimated ET from CSV is 0.

Stetson make an accurate statement about pumping from the aquifers in CSV or MRSA: “All groundwater pumping, regardless of which aquifer it is pumped from, will eventually affect the flow of the Muddy River or subflow out of the LWRFS” (Stetson 2019, p 58). This is a correct statement, and Stetson claims it is all a matter of timing. As shown by the aquifer test, pumping anywhere south of the middle of CSV has a rapid effect on spring flow and, pumping also affects flow from the alluvial aquifer to the river, although the effect is delayed.

Stetson (2019) does not at any point consider the effect of pumping on the spring flows necessary for the dace.

**Rebuttal to Moapa Band of Paiutes Report**

Moapa Band of Paiutes submitted a report prepared by Cody Johnson and Marty Mifflin of Mifflin Associates (Johnson and Mifflin 2019). They use this report to suggest there is much more water available for development, especially in the west portion of California Wash (CW). Johnson and Mifflin (2019) make the following conclusions based on their analysis of data completed for the NSE Order 1303.

> (1) the LWRFS designation and Order 1303 are responses to a flawed conceptual model based on conflated climate and pumping effects, because widespread water-level declines associated with Order 1169 pumping of MX-5 were mistakenly attributed entirely to pumping rather than to the superposition of local, fracture-controlled pumping responses with regional, climate-driven decline;
> (2) the LWRFS as drawn by the State Engineer ignores hydrochemical and hydrodynamic divides that suggest the existence of two separate capture zones influencing groundwater flow through the five designated basins;
> (3) ~40,000 afy of south-flowing groundwater may be the flux within the Las Vegas Valley capture zone south and southwest of the MRSA;
> (4) pumping from California Wash has little to no impact on the MRSA and much more groundwater is available in California Wash than previously assumed;
> (5) the State Engineer should supplement and extend the LWRFS concept to an analysis domain based on regional-spring capture zones, as delineated by the best available science; and
> (6) if the long-term drought trend evident in climate records persists, no amount of pumping curtailment will restore or maintain high-elevation spring flows, curtailment of pumping in sustainable locations will serve no purpose and thus mitigation measures, including curtailment, will not likely prove effective in protecting senior-rights holders in the Muddy River and Moapa dace habitat from continued drought impacts. (Johnson and Mifflin 2019, p 35)

The conclusions are erroneous because the data and analysis does not support them. This section rebuts these conclusions.

Johnson and Mifflin attempt to claim groundwater level trends can be explained as a response to drought with a few very poorly referenced statements and a series of groundwater level hydrographs. They claim that the longer records "indicate the drought trend began about 1999" (Johnson and Mifflin 2019, p 6) with a reference to their Figure 4 which shows groundwater levels at EH-4 as well as an estimated level adjusted for Arrow Canyon Pumping. They do not explain how the levels were adjusted or provide a reference explaining it. The adjusted groundwater level trend purportedly shows how the water level would have changed without pumping. From 2011 through 2015, they adjust for the aquifer test as well. Johnson/Mifflin use this analysis to claim that groundwater levels are on a major drought-induced downward trend. It is difficult to assess this without an explanation, but the coincidence of drought starting with pumping makes the conclusion suspect. It also does not comport with precipitation data; precipitation data, see Myers (2019) Figure 5, does not reveal a substantial drought spanning the period since 1999.

Johnson/Mifflin consider trends of wells in the Black Mountains Area and Garnet Valley by stating: "Superimposed on generally linear declines since 2006 are widespread but diminishing-with-distance effects from the Order-1169 pumping of MX-5, evidence as far south as the Apex area" (Johnson and Mifflin, p 6). Their Figures 5 and 6 supposedly support their assessment. A linear decline shown on the graphs apparently is intended to be the natural, drought-induced decline, without any analysis supporting that claim. BM-DL-2 in the Black Mountains and GV-1 in Garnet Valley each show a better than 1-foot decline during the pump test. Compared with the declines closer to MX-5, this is a substantial and about what would be expected at that distance. Johnson/Mifflin make no effort to show the rest of the decline is not in fact due to other pumping in the carbonate aquifer. They make similar unsupported claims regarding well MX-4 in CSV and TH-2 in California Wash (Johnson and Mifflin Figures 7 and 8).

Johnson/Mifflin incorrectly attributes the long-term decline in groundwater levels to being a response to a climate-driven trend, with pumping superimposed on that climate-driven decline, and also claims that other Order 1169 reports ignore climate (p 14). At no point does Johnson/Mifflin analyze the climate record and document their assertion that drought commenced in the 1990s at a time coincident with the commencement of pumping through the area. Myers (2019) Figure 5 shows no evidence for a 20-year drought during the period since 1990. Johnson/Mifflin argue that the large water level increases in 2006 refute the idea that "water-level changes in California Wash, Coyote Spring Valley, the Muddy River Springs Area, and Hidden and Garnet valleys have been observed as 'nearly identical'" (p 14). They argue the "cessation of pumping somewhere could not have caused water levels to rise over 1 foot at CSVM-4 in northern Coyote Spring Valley and 3 feet at GV-1 in southern Garnet Valley beginning in later 2004 because there was no cessation of pumping" (p 15). They are refuting a point no one made. Most of the Order 1169 reports that address the subject accept that a wet

year caused these water level increases in 2004-2006 (for example, FWS 2019). This is a case of a hugely wet year being imposed on a long-term pumping-caused decline in water levels rather than the other way around as claimed by Johnson/Mifflin. Recharge in the LWRFS is event driven as described by Myers (2019, p 4), meaning it is effective only during extremely wet years, rather than as a long-term average flux as is usually considered in Nevada when considering water rights appropriations.

Johnson/Mifflin claims that flow at WSW declined by 0.6 cfs between 2000 and 2015 and compared with EH-4 decreases, this would be about 0.6 cfs in four feet of decline (p 30). They claim that if the "drought-induced trend" continued, the spring would go dry in 100 years (p 31). They claim this would occur whether or not pumping is curtailed in up-gradient areas (Id.). This claim is unsubstantiated because there is no evidence that most of the declines were drought induced.

Johnson/Mifflin claim the aquifer test is responsible for a 0.3 cfs decrease at WSW (p 31) and suggest there is a similar decrease at the Iverson Flume. Iverson was downstream of WSW until 1999 when the flow at Iverson was considered separate from rather than combined with that at WSW. However, the graphs of flows at Iverson (Johnson/Mifflin Figure 26) shows a hydrograph that fluctuates between about 4.2 and 4.7 cfs from 2010 until 2017. There is no discernible aquifer test effect, contrary to the label on the figure and Johnson/Mifflin's assertions. The aquifer test impact is not discernible at Iverson Flume because the spring contributing to this flume is at a lower elevation so a change in head due to the aquifer test is likely to be much less than the change at the level of head above the WSW spring orifice. Even if the effective head decreases the same amount as at the higher spring, it would be a much smaller percent of the total head above the orifice. The effect of groundwater level decreases at EH-4 could be much different on the flows for the two different spring orifices, with the effect at Iverson being much less.

Johnson/Mifflin Figure 26 shows a substantial decrease at Iverson Flume through about 2018, resulting in the flow decreasing below 4.2 cfs before it recovered. This could represent a delayed response to changes at EH-4. Groundwater levels at EH-4 reached an all-time low point on November 9, 2018 of 1812.18 ft amsl. Whether this caused the low flow at Iverson is not certain.

Johnson/Mifflin continue their analysis of spring flow by claiming that WSW and Iverson streams have been decreasing at 0.3 and 0.7% per year, respectively, since October 2009 when the Refuge Stream was rerouted (p 32). This claim that there is a downward trend suffers from the fact that that assuming a linear flow decrease is not supported by the actual hydrographs for either spring (Johnson/Mifflin, Figure 27). The hydrograph fluctuates around the downward-sloping line labeled "trend" (Id.). This is especially obvious for WSW; for example, from 2013 through early 2015, all points plot beneath the line while from 2009 through 2011 most plot above the line. The hydrograph for WSW shows the sharper decrease during the

aquifer test and then a stabilizing after the aquifer test. Their figure is also misleading in that it shows several points higher than 3.6 cfs in the 2014 through 2016 period but the daily flow data base shows just a few points whereas almost all flows since 2011 are less than 3.6 cfs, with a couple of short-term exceptions; Myers (2019) Figure 14 shows several observations greater than 4.0 cfs, which are probably due to short-term events, such as runoff. Myers' figure based on daily flow data shows no observations of 3.8 cfs, which are shown on the Johnson/Mifflin figure.

Discharge from Big Muddy Spring, probably Muddy River Springs on Myers (2019) Figure 13, increased by 1 cfs from 2010 through 2014 after which it increased by more than 12% (Johnson and Mifflin 2019, p 32). They claim that the flow increases during the aquifer test and increase after the test "demonstrates climate-dominance rather than pumping as a forcing agent for water-level change within the MRSA, and perhaps a complete absence of Order-1169 pumping effect in Big Muddy Spring" (p 32). But Johnson/Mifflin fail to note that a fire in 2010 burned over 600 acres and that this caused a decrease in annual evapotranspiration of about 1000 af/y (SNWA 2019, p 5-2, -3 and Figure 5-1). This much-decreased ET would have had a much larger effect on these springs than pumping upstream.

Johnson/Mifflin conclude that the only pumping effects can be seen at WSW with no evidence of impact at other MRSA springs (p 32). Their conclusion is due to poor analysis of water level trends and reliance on an assumption that a drought had been occurring since the 1990s with one year of exception. What they fail to consider by stating the peak pumping rates show no indication that pumping "the Arrow Canyon Wells have any significant effect" (p 32) is that much of the pumping has removed water from storage. The very high transmissivity, or hydraulic diffusivity, allows a large-scale small decline in water levels that represents the removal of groundwater from storage. The discharge rates do not quickly recover because of the storage loss over a very large area does not allow the well levels to recover quickly.

In Appendix 1 of Johnson/Mifflin (2019), the authors present an analysis suggesting that the flow from the LWRFS to Las Vegas Valley is 40,000 af/y, but the report includes unreviewable information and a failure to consider whether that much water is available to flow toward Las Vegas Valley. The analysis is a Darcy's Law calculation with transmissivity estimated based on a report published for a pump test at a well along the proposed flow path. The reference Mifflin and others (1992) is unpublished so it is not possible to review whether the transmissivity as calculated is relevant to this situation. For example, the authors assume horizontal transmissivity and rely on the relationship of effective transmissivity equal to the square root of the product of transmissivity in perpendicular directions. No evidence provided supports the 10:1 ratio of maximum to minimum horizontal transmissivity. Even if the 1992 pump test transmissivity is accurate, the value chosen for the most transmissive direction could be much too high. The 40,000 af/y estimate for flow from LWRFS to the Las Vegas Valley should be given no credence because it is highly dependent on undocumented and unverified assumptions.

Appendix II of Johnson/Mifflin (2019) presents a claim the "fluxes of two tributary groundwater regimes are attributed to about 2 decades of regional climate" (Johnson and Mifflin 2019, p 43). Their first argument is that the "Muddy River is nourished by two proximal but distinct spring flow regimes as revealed by 30-year monitoring records" (p 43). They compare annual flow at Big Muddy Spring , which they consider to be a proxy for a northern-regime discharge, to groundwater levels at EH-4, which they consider a proxy for a southern-regime discharge. Based on the specified gauge id number 09415900, they are using USGS gage Muddy Spring at LDS Farm near Moapa, NV. Figure 3 shows Figure 1 from Johnson/Mifflin Appendix II. The evidence is misleading because the flows presented in Figure 3 are not just spring discharge but include flood flows and irrigation diversions. The following is the USGS description of the "Remarks" and "Extremes" (https://waterdata.usgs.gov/nv/nwis/wys_rpt/?site_no=09415900&agency_cd=USGS)

> REMARKS - Regulation for irrigation purposes occurs 0.1 mi upstream. 10/01/2013-09/30/2014: Records good except for estimated daily discharges, which are poor. 10/01/2014-09/30/2015: Records good except for estimated daily discharges, which are poor. 10/01/2015-09/30/2016: Records fair except estimated daily discharges, which are poor. 10/01/2016-09/30/2017: Records fair except for estimated discharges, which are poor.
>
> EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 41 $ft^3/s$, Feb. 23, 2002, gage height, 2.18 ft; the gage was submerged by backwater and over bank flow from Muddy River on Sep. 26, 2014, gage height 10.11 ft; discharge unknown; maximum gage height, 2.57 ft, Apr. 6, 2015; minimum daily, 5.9 $ft^3/s$, May 10, 1993, May 25, 2009.

Johnson/Mifflin do not account for the irrigation diversions that occur upstream from the site. Also, the fact the maximum discharge was 41 cfs indicates the channel could be periodically affected by high flows. Both diversions and flood events could account for the variability shown in Figure 3.

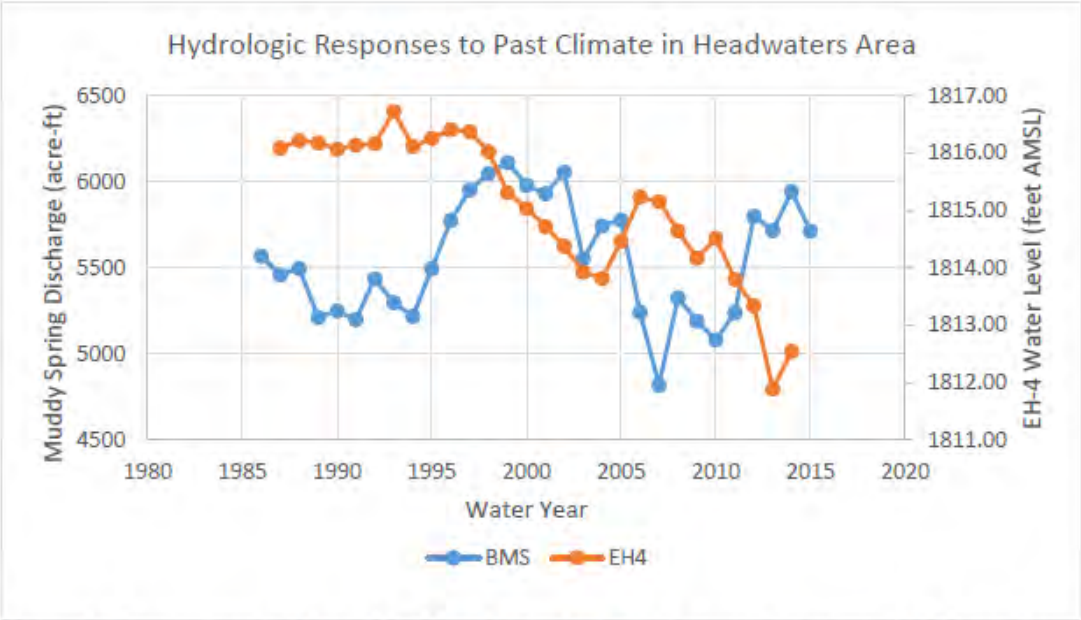


Figure 1. Average spring (April 16 –May 15) water levels in monitoring well EH-4, and annual discharge of Big Muddy Spring (BMS). EH-4 water levels are a proxy for southern-regime discharge, while Muddy Spring is proportional to northern-regime discharge [file SouthernLagComparison.xlsx, sheet 'ShowBMS_EH4']

*Figure 3: Snapshot of Johnson and Mifflin (2019) Appendix II Figure 1.*

Johnson/Mifflin claim that the groundwater which combines to form the Muddy River is influenced by both northern and southern climate regimes. This claim is reasonable especially considering that, as they state, the northern part of the White River Flow System lies hundreds of kilometers north of the Muddy River Springs. They also claim that the largest spring, the Muddy Spring, responds to past northern climate regimes as reflected by the historic base flow of the Humboldt River but do not substantiate that claim. Their Figure 2 purportedly shows the relationship between northern climate and Muddy Spring flows (Figure 4). Other than claiming the "climate index time-series dating to 1912" contains the explanatory variable set that determines discharge at Big Muddy Spring, there is no explanation or evidence of this relationship. Apparently, they used a multiple regression of lagged flows at the Humboldt River Palisade gage to explain flows at the springs. This is shown in their Figure 4. The regression coefficients correspond to lags from 12 to 22 years which is the basis for their conclusion that climate in the upper Humboldt River basin causes flows 12 to 22 years later (p 44) at the Muddy River. The northern portions of the WRFS bound the southern portions of the upper Humboldt River watershed, so conceivably there is some connection such as a similarity in climate. However, Johnson/Mifflin fail to consider three critical factors.

First, the data base is very limited and the authors did not consider whether earlier flows at Palisade could correlate better with MRS. Second, they do not provide significant statistics for the regression coefficients, so there is no explanation or evidence for why this lag was chosen.

Third, they also do not discuss whether they accounted for irrigation diversions above the Palisade gage, which would have decreased the flow, or mine dewatering discharges, which increased the flow substantially for a few years. These anthropogenic impacts could have had a large effect on the regression analysis.

Johnson/Mifflin do not discuss the physical connection that would allow climate in the upper Humboldt River to control flows at Muddy River Springs at a 12- to 22-year lag. The watersheds are separated by a groundwater divide, so clearly they are not claiming that water crosses the topographic and groundwater divides to affect the White River flows. Possibly, climate in the northern half of the WRFS correlates with flows in the Humboldt River, but they do not test this even though there are climate statistics that could be used for regression analysis.

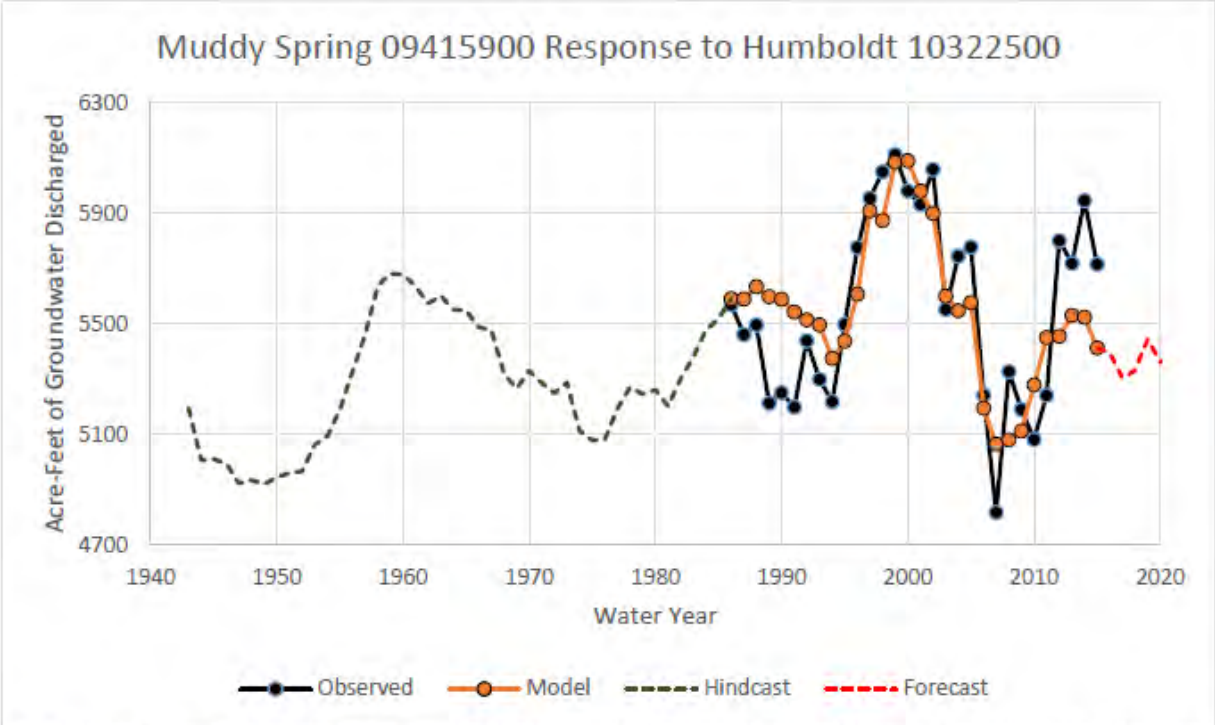


Figure 2. The annual total base flow of the Humboldt River at Palisade provides a climate index time-series dating to 1912, which contains the explanatory variable set that determines discharge at Big Muddy Spring. [file HumboldtBFI.xlsx, sheet 'Hindcast1222']

*Figure 4: Snapshot of Johnson and Mifflin (2019) Appendix II Figure 2.*

Their Appendix II Figure 3 shows a similar relationship for the water levels at EH-4 and flows at North Fork Virgin River gage 09405500, copied here as Figure 5. Apparently, Virgin River flows

are used as the surrogate for climate, even though the watershed contributing to the gage is significantly east of the LWRFS and being largely on the Colorado Plateau, has a significantly different climate and precipitation regime. Johnson/Mifflin do not explain why they chose this flow gage as a surrogate over the various measures of climate that could be available, such as Myers (2019) Figure 5. There is also no explanation of lag as was done for the Humboldt River surrogate.

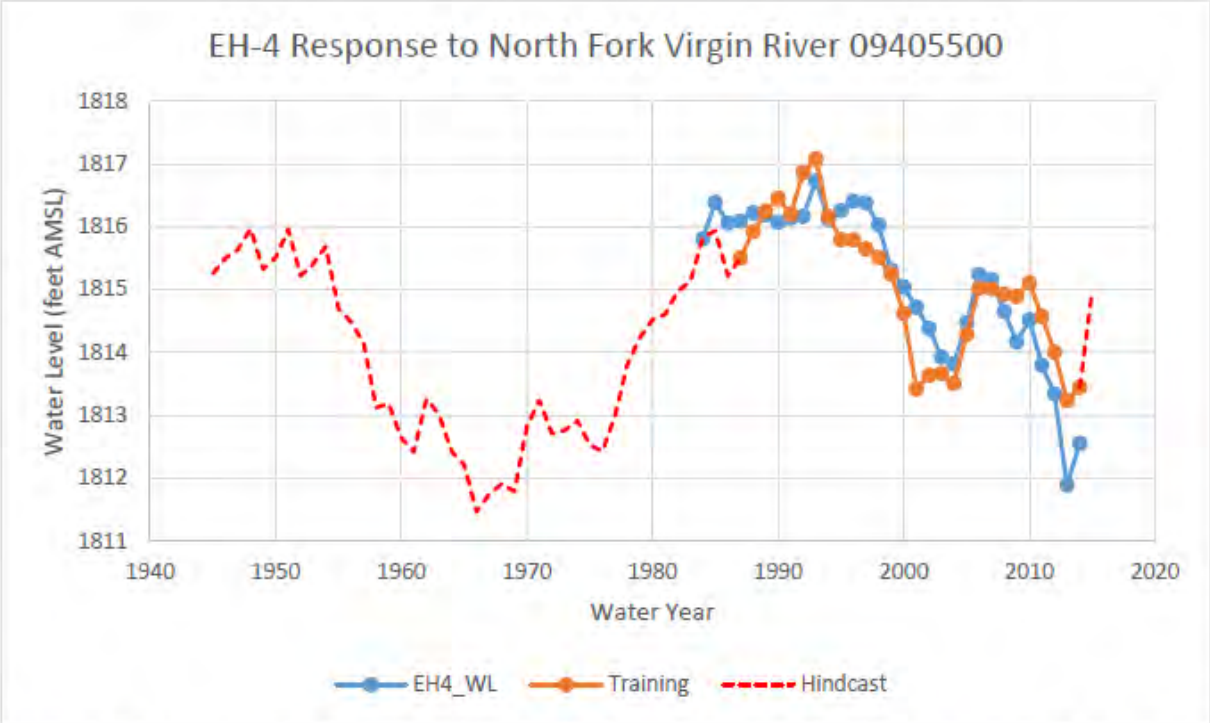


Figure 3. The annual total base flow of the Virgin River (North Fork) at Springdale provides a climate index dating to 1928, which contains the explanatory variable set that determines groundwater elevations in the Reservation area. [file NFvirginBFI2.xlsx, sheet 'Hindcast_0116']

*Figure 5: Snapshot of Figure 3 from Johnson and Mifflin (2019) Appendix II.*

Johnson/Mifflin also apparently use these correlations to justify their arguments that climate controls EH-4, WSW, and Big Muddy Springs with very little impact from pumping. There is no discussion as to how they included pumping variables in the regression in a way they can argue they controlled for pumping in their analysis. They simply dismiss the obvious causation of decreasing spring flow and EH-4 water levels found by Myers (2019) and the authors of other Order 1169 reports.

Finally, Johnson/Mifflin develop a graph of reconstituted discharge, which apparently includes "all known diversions and evapotranspiration effects" to estimate the natural discharge to the Muddy River headwaters (Johnson and Mifflin 2019, Appendix II Figure 6). They do not

describe the known diversions and evapotranspiration effects or provide their method for adding these effects to the flow making this graph unsupported.

Johnson/Mifflin (2019) Appendix III describes a FEFLOW groundwater flow model completed to "evaluate interbasin groundwater flow within a region sufficiently large to encompass the 'Eureka Low' of Sass and Lachenbruch (1982) by using head a hydrologic tracer to constrain the physics" (p 50). They consider it a scoping model to "establish if regional flow from northern recharge areas in the highest mountains to discharge at the southern warm springs is physically possible and more importantly, plausible within the decadal time scales suggested by climate response in the MRSA" (p 51). More specifically, they claim to study whether "rapid signal propagation indicated by modern climate response of spring in the MRSA is corroborated by plausible groundwater velocities needed to deliver the 'missing' heat lost from the Eureka Low to the regional springs in a steady-state process" (Id.). The concept is that heat is lost based loosely on flow rate and the Eureka Low is an area of different heat loss that can be used to calibrate the flow model.

Johnson/Mifflin chose to use the FEFLOW finite-element modeling environment (p 51), which is proprietary software so details of the model can only be reviewed by those who have the software. In fact, they imply they used just a demonstration version of the software (Id.).

The report does not document how they constructed the model. Their Appendix III, Figure 2 shows the finite element mesh and a couple of essential properties but no explanation. The figure on the left shows "anisotropy angles", which presumably means the direction of the axis of the highest transmissivity in the horizontal directions. Without expressing the actual anisotropy, this information is not very useful. On the right, the figure characterizes the Eureka Low in terms of the rate of heat input to the aquifer; there is no information about how this is calibrated or even any discussion as to how the heat flow presumably affects the groundwater flow.

Johnson/Mifflin essentially argue that the terminal end of much of the WRFS is in Las Vegas Valley rather than MRSA (p 61). Their Appendix III is most of their technical evidence in support of this idea, but the evidence is little more than a poorly documented modeling study that cannot be reviewed and a random collection of statements regarding heat transport with little discussion of groundwater flow. Evidence based on this model should not be considered in this proceeding because the model is not reviewable.

Appendix IV attempts to establish a relationship between Arrow Canyon pumping and drawdowns at EH-4 with the intent of developing a pristine (no pumping) water level series at EH-4. The multiple regression, presented in Johnson/Mifflin Appendix IV Table 1, claims to establish a relationship that explains EH-4 water levels based on weekly pumping at Arrow Canyon for the previous 13 weeks. Their Figure 1 shows there is a reasonable fit. However, this

effectively assumes that water levels at EH-4 are controlled by Arrow Canyon pumping and nothing else. Johnson/Mifflin do not provide evidence supporting this.

Their Appendix IV, Figures 2 and 3 are not referenced in the report, but provide some graphical evidence regarding the regression. They analyzed the original pump test of the Arrow Canyon well on EH-4 based on pristine water levels, after the effects of pumping are removed from the data (Johnson and Mifflin, Appendix IV, Figure 4). Figure 4 suggests that without the pumping (from a pump test) the water level would have been several tenths of feet higher. Figure 5 then shows drawdown based on the difference between the observed water level and the reconstructed pristine water level. Figure 6 plots the new drawdown with log 10 time to allege the pump test encountered a recharge boundary, which they identify as the Muddy River. Using this methodology Johnson/Mifflin could be missing all of the relevant effects. The slope in Figures 5 and 6 changes several times which could be due to the fact that other factors control the water level at EH-4 than just pumping Arrow Canyon. The evidence in Appendix IV does not prove that the primary control on water levels at EH-4 is pumping at Arrow Canyon.

Next, Figure 7 shows EH-4 water levels "cleaned of Arrow Canyon pumping effects". Because they have not eliminated any other effects, this is not a pristine, without pumping, water level. Johnson/Mifflin then suggest that less than 8% of the discharge from Arrow Canyon pumping is drawn from the Warm Springs Refuge, based on 6.5 cfs pumping and a 0.5 cfs springflow reduction (p 68). They acknowledge that other unmonitored springs could be affected, but do not mention that if not captured from spring discharge, the water is withdrawn from storage. Because of the high transmissivity documented in the Order 1169 pump test, that withdrawal at Arrow Canyon may be drawn over up to 1100 square miles. It adds to a cumulative loss of storage that will eventually capture much more discharge. There is no evidence, other than the biased regression analysis in Appendix IV, that allows the statement that recovery at EH-4 is complete 3 months after the cessation of pumping (p 68).

Johnson/Mifflin claim that 40,000 af/y flows from the LWRFS into the Las Vegas Valley, although it refers to this flow as occurring within the Las Vegas Valley capture zone which they describe using model-generated flow lines that emanate within LWRFS and cross basin boundaries to enter Las Vegas Valley. Even if the concept of cross-basin flow from the LWRFS is correct, a Darcy's law calculation would not be the way to estimate it. Darcy's law depends on transmissivity and gradient which means they would have to assume a conductivity value and cross-sectional area. The proper way would be to use Darcy's law to verify the interbasin flow estimated in other ways.

Arguing that Appendix V Figure 12 shows a 2% per year pumping increase based on pumping shown in that figure is fallacious. With the exception of two periods over which pumping increased substantially, year to year pumping decreased. The "trend" is based solely on an almost 1000 af/y increase between 2017 and 2018.

Johnson/Mifflin discuss a regional hydraulic-head gradient and flow between a Steptoe MX well and Tule Springs Pond (p 20), but do not provide evidence of a connection or discuss the flow path. This claim begins a paragraph that seems to be a series of unconnected sentences that together are almost impossible to review. The second sentence references an unpublished report (Mifflin and Johnson 2013) to claim there is a 2832 $m^2$/day transmissivity across the width of California Wash. Without a figure showing the cross-section, this cannot be considered. They determine the width of California Wash that would be necessary, based on the assumed transmissivity, to pass 33,771 $m^3$/day, a hypothetical flow (equal to 10,000 af/y) (p 19).

In sum, the Johnson/Mifflin report is riddled with unsupported claims and its conclusions should not be relied on.

**Rebuttal to Vidler/Lincoln County Report**

The report submitted by Lincoln County and Vidler Water Company in response to interim order #1303 primarily argues that the northern portion of CSV should not be administered as part of the LWRFS and that KSV should not be added to the LWRFS for administration. However, the data and analysis presented by Lincoln County et al (2019) actually supports adding KSV to the LWRFS and certainly does not support removing the northern portion of CSV from the LWRFS.

Lincoln County et al (2019) cited the NSE Ruling #6254 in support of allowing appropriation of groundwater that is hundreds of years upgradient (p 2-3). However, there was no evidence presented in the hearing or the order #6254 that KSV is hundreds of years upgradient from LWRFS. The hearing concerned Delamar, Dry Lake and Cave Valley which some argued is that far upgradient from CSV and Las Vegas Valley and therefore water could be appropriated, although that aspect of Order #6254 has been reversed by the Judge Esty order[1]. The Lincoln County et al assertion that KSV is hundreds of years upgradient from CSV and LWRFS is not supported.

Lincoln County et al invoke NSE Ruling # 5712 as claiming that there is "not substantial evidence" that pumping in KSV will affect the flow at Muddy River Springs, Rogers Spring or Blue Point Springs. That ruling predates the Order 1169 pump and that conclusion has been challenged by Myers (2019). Lincoln County et al also reference Ruling #5712 as suggesting the difference in groundwater levels (1875 ft amsl near KSV and less than 1825 ft amsl near MX-5 and the MRSA) as being due to low transmissivity between the areas. Myers (2019) and FWS (2019) acknowledged the transmissivity is lower than in the larger very high transmissivity zone affected by the Order #1169 pump test, but also noted that the gradient through the lower

[1]White Pine County and Consolidate Cases, Et al, v Jason King, P.E., Nevada State Engineer, State of Nevada Division of Water Resources. In the Seventh Judicial District Court of the State of Nevada in and for the County of White Pine. Case No. CV1204049.

transmissivity is still low as discussed in the following paragraphs and does not represent a barrier or even a substantial impedance to flow. Myers (2019) documented aquifer test effects on the CSV wells near KSV.

Lincoln County et al present a north-south transect of carbonate water level data through CSV and MRSA in Figure 3-4 through 3-7. These figures illustrate well the very flat gradient through a large portion of the transect within the carbonate aquifer. They also illustrate the aquifer becomes steeper in northern CSV, as was also documented by Myers (2019). The steeper gradient indicates the transmissivity in the north of CSV is lower for most of the inflow to the system than from Pahranagat Valley through to MRSA. It is not evidence the northern portion of the valley is separate from the southern portion.

Lincoln County et al also presents data from well KMW-1 that they argue shows how KSV is not part of CSV. The geologic section presented as Figure 3-3 does not show a separation between KSV and CSV; in fact, the cross-section shows that carbonate rock spans the downstream end of KSV so that there would be a connection between KSV and CSV.

Lincoln County et al allege differences between KMW-1 and well CSVM-4 in CSV are evidence that the valleys are different. Their location map, Figure 3-1, shows that KMW-1 lies at the mouth of KSV and CSVM-2 lies about 2.5 miles southwest in CSV. There is 5.5 feet of vertical difference in their water levels which is a 0.00042 gradient. That is very flat and certainly not evidence that a fault they postulate (p 3-4) has any effect on flow between the wells. With the carbonate rock that separates the wells they would be expected to have water level trends that are very similar to trends further south in CSV.

Figure 6 shows a figure from the Lincoln County et al report that compares water level at the two wells. The lines added to their figure show up to four different periods that trend similar to each other and to wells south in CSV. Monitoring at CSVM-4 began just before the wet 2005 period began, so it shows an increase due to the recharge from that wet year. A similar increase probably occurred in KMW-1. After the recharge, a long-term decline began. This decline was not due to “years to dissipate in the aquifer” the effects of a high recharge event (p 3-4) but the response to pumping that began in CSV in 2006. Both wells had a long-term decline from 2006 through about the beginning of the aquifer test period during which the decline became much steeper, as shown on Figure 5. FWS estimated the decline at these wells during the aquifer test to be 0.5 feet (FWS 2019, Figure 5), but their analysis did not account for the lag in the response as discussed here. There is no evidence that the aquifer test occurred during an abnormally dry period, so these wells responded similar to wells further south in CSV. A brief recovery occurred at each well a few months after the aquifer test. The recovery lasted a few months longer in the north than further south because of the lower transmissivity in northern CSV. Since the brief recovery, the water levels have trended downward but at a slower rate than before the aquifer test. The slower rate reflects slightly less pumping in CSV than prior to the test and slightly above average moisture conditions.

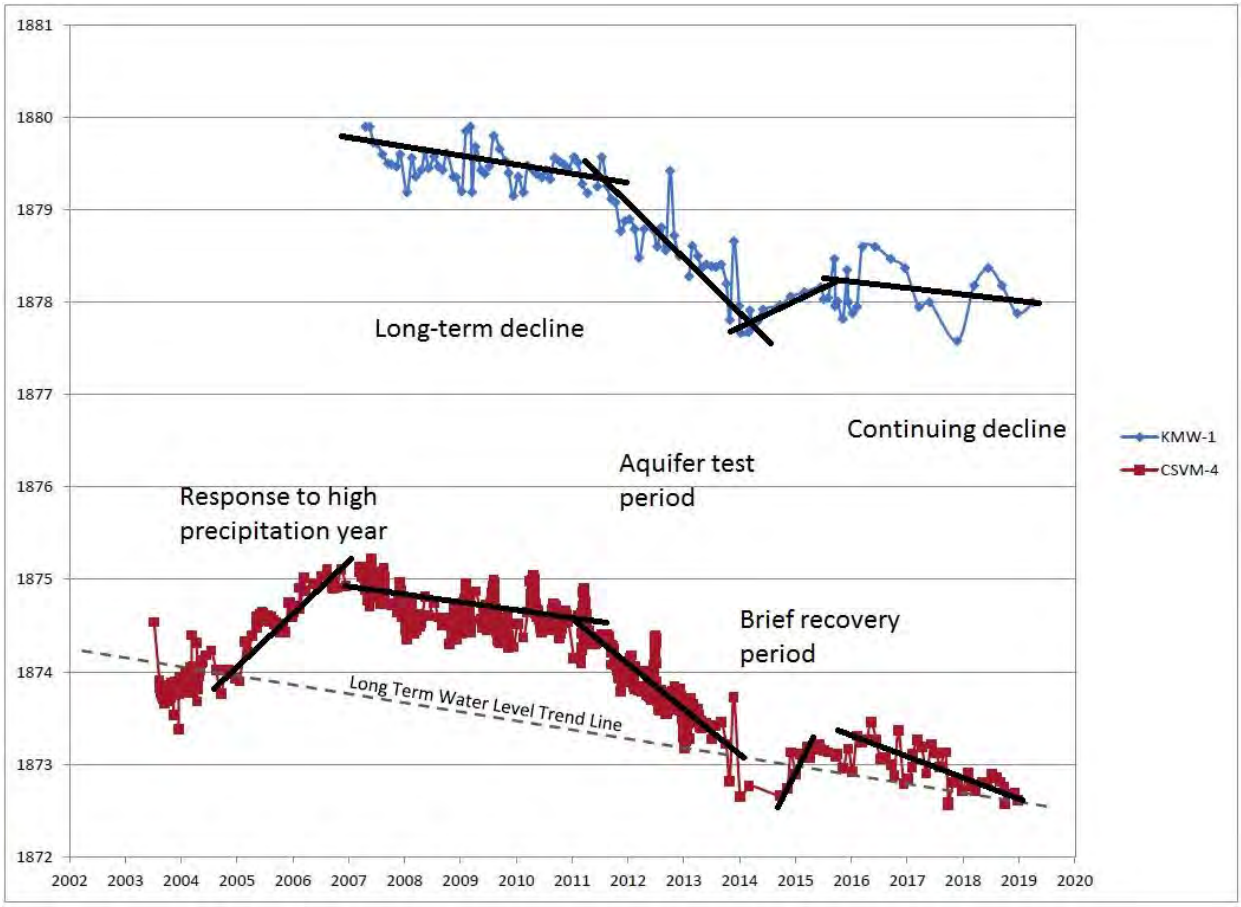


FIGURE 3-9. COMBINED HYDROGRAPHS OF WELLS KMW-1 AND CSVM-4

*Figure 6: Trends at hydrographs of wells KMW-1 and CSVM-4. Adapted from Lincoln/Vidler et al (2019) Figure 3-9*

Lincoln County et al (2019) document well the huge precipitation event that occurred during 2005, but its claim of estimating in-basin recharge for KSV to be from approximately 4700 to 7500 af/y (p 3-5), based on data they presented in their Appendix B is inaccurate. The appendix contains precipitation, runoff, and chloride data for precipitation and runoff, but no analysis to estimate the recharge. Assuming the precipitation data is representative of the basin and the runoff data accurately captures the runoff from the basin, two variables remain, evapotranspiration and recharge. They do not present enough data with which to estimate recharge. The estimate presented is not useful evidence of the amount of water available in KSV.

Lincoln County et al (2019) Section 3.3 attempts to use simple chemistry, age, and thermal data as evidence that KSW water differs from the other water in LWRFS that will be managed as one.

As will be described in the following paragraphs, nothing in their analysis prescribes that KSV water does not mix into CSV water and eventually discharge at MRSA or that pumping throughout CSV or KSV will not affect water levels and spring flows throughout the LWRFS.

Groundwater from KPW-1 has total dissolved solids (TDS) at 774 mg/l, a little higher than the groundwater at CSVM-4 which is 682 mg/l (p 3-8). The authors do not describe the basis for these observations, meaning they do not describe whether it is an average or how many samples were taken to obtain that average. It is common for TDS to vary more than 20% between measurements, so the difference between the wells could be random fluctuation in the data. None of the wells in their Table 3-2 stand out as substantially different than the others.

Assuming the observations are accurate, the groundwater at KPW-1 is almost the oldest (29,000 years) and hottest (136° F) of the wells in the area (p 3-9, -10). If the water in KPW-1 originated in KSV as recharge, it circulated deeply over a long time period to exhibit these characteristics. Once it joins water in CSV, the average age of the mixed water is younger and the temperature is cooler due to mixing. Its circulation depth is not relevant to whether KSW mixes with water in CSV and is affected by pumping in CSV or further downgradient. The supposed pathways in Lincoln County et al Figure 3-12 do not account for mixing along the pathways.

Lincoln et al Section 4.0 presents substantial geophysical data and analysis for KSV and northern CSV and attempts an interpretation of the hydrogeologic effects of the interpreted geology. This review does not rebut the geophysical sections and interpretations of the sections, but it does question and rebut the interpreted effects on groundwater flow. As the next paragraphs discuss, the data presented by Lincoln County et al does not support the interpretations, and the geophysics are not evidence that KSV should not be considered part of the LWRFS.

Lincoln County et al claim that “faulting that occurs in northern CSV … explains why the water levels in KMW-1 and CSVM-4 are distinctly higher than those found in the rest of the basin” (p 4-9). They cite their figures 3-4 through 3-9 as demonstrating the change in water level. The correct interpretation of those figures is that the steadily increasing water level going north of CSVM-6 is due to decreasing transmissivity. Their Figure 3-5 shows there is a much more substantial increase in water level north of KSMW-1. Even so, the increase in water levels to CSVM-3 of about 330 feet (Figure 3-6) occurs over about 4 miles, so the gradient is only about 0.0156. This is not evidence of a step increase over a fault.

The claim that “faults significantly impede the flow of groundwater from KSV and northern CSV … into the southern portion of CSV” (p 4-9) ignores the fact that most flow reaching MRSA passes through CSV from Pahranagat Valley and Delamar Valley. The gradient calculated above between KSV and CSV is not a significant impedance.

There is also no evidence to suggest the faulting is substantial enough to "cause the water levels to build up on the upthrown side of the fault … until there is enough head built up (a few tens of feet) for groundwater to push through into northern CSV". If that were the case, there would be evidence of water flowing parallel to the fault through the higher conductivity zone along the fault (p 4-8). Lincoln County et al are simply wrong to say "there were no effects ascribable to the start and subsequent stop of a major pumping stress in monitoring wells KMW-1 or CSVM-4, as shown above in Figure 5 and associated text" (p 4-10). The aquifer test effects simply lasted longer at those wells than at others closer to MX-5 because of the lower transmissivity in northern CSV, and the increasing distance from the point of diversion.

Lincoln County el al claims that these wells are too far from the pumping well for the cone of depression to reach that far (p 4-10). They disprove their own claim by noting the "very large sequence of carbonate rocks between the location of the Order No. 1169 pumping and KSV and northern CSV and that thick sequence likely has a very large transmissivity, which is indicated by the nearly flat-water level elevation in much of the LWRFS" (Id.). This nearly flat-water table declined everywhere due to the pumping, as documented by almost all reports filed on Order 1169. It was more like the lowering of a lake than the spread of a cone of depression. The lowering water table beyond the end of the flat-water table surface more resembles a cone of depression. Myers (2019) Figure 12 shows the expansion of the drawdown with distance from the pumping, similar to a cone of depression.

Finally, they seem to argue there is no connection because "groundwater from KSV has to flow through the Northern LWRFS Boundary Fault where the geologic structure changes" (p 4-10). If it does not flow through the boundary, it has to go somewhere, but Lincoln County et al does not explain where else it would go. FWS noted that "Kane Springs Wash Fault must be permeable over much of central Coyote Spring Valley" (FWS 2019, p 22) based on the observation that water flowing into CSV at the Pahranagat Shear Zone must flow through the carbonate aquifer to the MRSA.

Lincoln County et al (2019) does not present a compelling argument for not managing KSV as part of the LWRFS.

Lincoln County et al also argues that pumpage from the MRSA completely explains reductions in flows of the Muddy River and associated springs and that pumping in CSV has no effect (p 5-3). They support this argument by comparing normalized flows of the Muddy River, which means adjusting recorded flows by removing flood flows and adding back in the diversions, plotting this with the annualized pumping in the MRSA (broken out by carbonate and alluvial pumping) and CSV carbonate pumping. Figure 6 is Figure 5-1 from Lincoln County et al (2019).

The deficit peaks at just less than 8000 af/y in 2003 and 2004 and began to decrease afterwards (Figure 7). MRSA pumping had peaked in 2000 at almost 8000 af/y before dropping to just over 6000 af/y from 2001 through 2006. The most significant decrease in Muddy River deficits

occurred from 2005 through 2009 when they had dropped to almost 4000 af/y. Through this period the deficits almost equaled MRSA pumping without including any CSV pumping (Figure 7). Beginning in 2010, the deficit increased about 1500 af/y and remained above 5000 af/y while MRSA pumping increased about 500 af/y for one year before decreasing during 2012. This is the period of the aquifer test as may be seen by the much higher pumping in CSV. For five years, the deficits are higher than pumping in MRSA. This would seem to be a direct reaction to the higher pumping in CSV. The aquifer test pumping caused a broad drawdown which means that it mostly drew water from storage. It slowly captured groundwater discharge, as documented by the hydrograph at Warm Springs West (Myers 2019, Figure 14) and other springs, and as documented for the Muddy River in Figure 7. Overall pumping rates from 2015 through 2018 are similar to 1995 through 1997, although the sources are different, and Muddy River depletions are similar.

Contrary to their claims, Lincoln Co et al's analysis of Muddy River depletions and groundwater pumping is not evidence that pumping in CSV has no effect on discharge from MRSA.

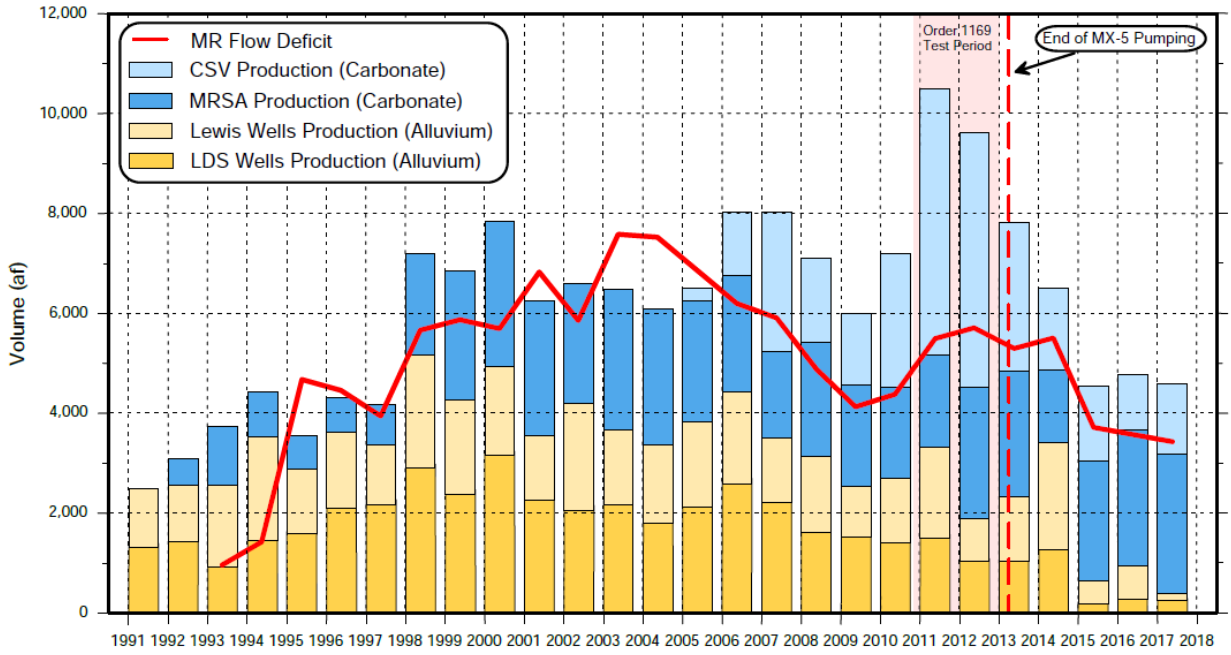


*Figure 7: Muddy River (MR) flow deficit and CSV and MRSA groundwater production. Source: Lincoln County et al (2019) Figure 5-1.*

**Rebuttal to US Fish and Wildlife Service Report**

Most US Fish and Wildlife Service (FWS) data and analysis is accurate but their report argues for a too-high allowable pumpage from LWRFS. FWS claims that full recovery from the aquifer test occurred by late summer 2015 based on measured water levels in carbonate well EH-4 and

spring flows. Graphs of EH-4 and WSW flow do not allow that conclusion of full recovery. The water levels at EH-4, EH-5b and UMVM-1 show a distinct downward trend through the aquifer test and continued pumping of MX-5, which ended about April 2013 (Figure 8). Water levels continued a small decline for several months before they began to recover, as reported by FWS. However, water levels at those three wells never reached within a foot of levels seen near the beginning of the aquifer test (Figure 8). The levels remain steady with just a seasonal fluctuation until early 2016 when they again began a downward trend. The same occurred at Warm Springs West. Near the beginning of the aquifer test, flows were near 3.8 cfs but they decreased to less than 3.3 cfs by several months after the test (Figure 9). Although they briefly recovered to almost 3.6 cfs, flows have been decreasing since.

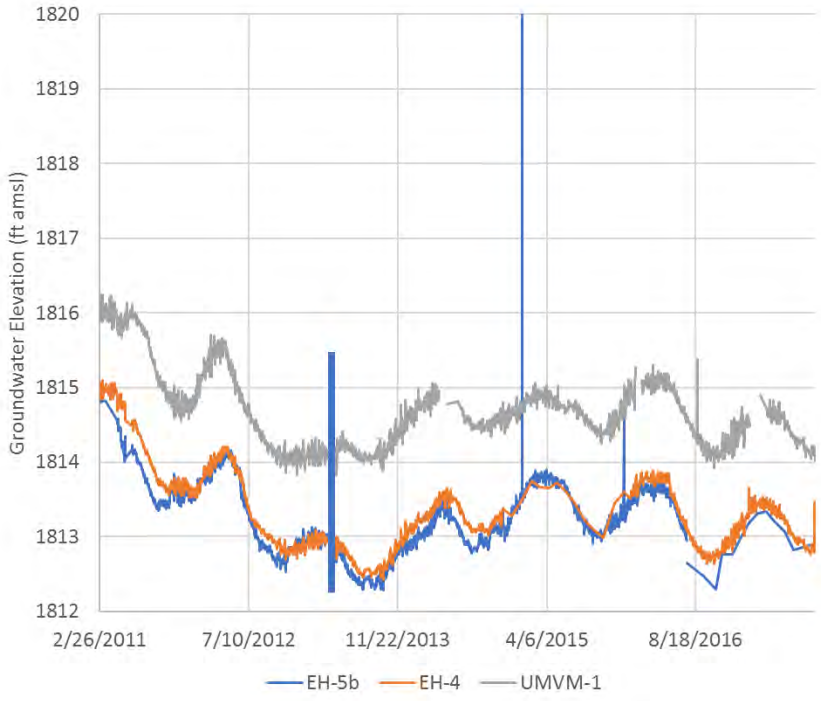


*Figure 8: Plot of monitoring wells EH-5b, EH-4, UMVM-1 for the period during and after the aquifer test. Source: Myers (2019) Figure 8.*

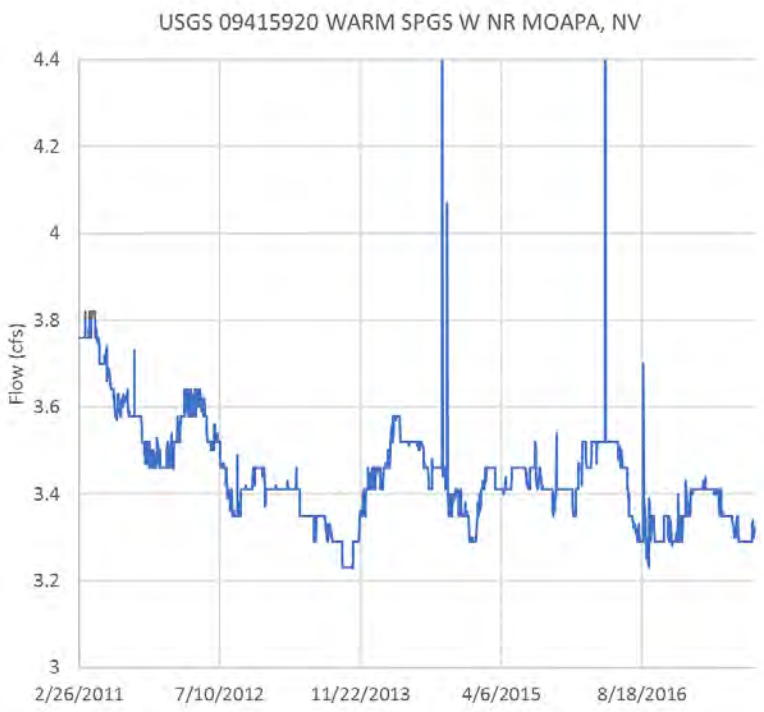


*Figure 9: Hydrograph of Warm Springs West for the period during and after the aquifer test. Source: Myers (2019) Figure 14.*

FWS states that the average pumping of years 2015 through 2017 should be the long-term allowed total pumping rate from carbonate and alluvial aquifers because it claims the discharge of Muddy River Springs and Muddy River at Moapa gage was relatively constant (p 37, 38). This is incorrect, Muddy River flows were steady but flows at Big Muddy Springs (gage #09415900) dropped over 200 cfs from 2015 to 2017 (5799 to 5546 cfs). FWS also incorrectly claims that flow rates at the Refuge springs were reasonably stable in 2015 to 2017 (p 37). Myers (2019) Figures 14 and 15 show a continuing slight decrease in flow rates at Warm Springs West and the Pederson Springs. Myers (2019) concluded that any pumping from the carbonate aquifer would decrease spring flow over the long term because discharge equals the long-term recharge and that infrequent short-term recharge events provide minimal recovery. NPS' groundwater modeling discussed below also predicts long-term spring flow decline due to pumping. Experiencing a long-term decrease does not mean there will be no temporary upticks in flow, as seen at the end of MX-5 pumping, as groundwater storage throughout the carbonate aquifer is depleted. Myers (2019) suggests that the total pumpage from the LWRFS should occur only from alluvium after the flow has discharged from springs and become secondary recharge into the alluvium. This objection to FWS' recommended pumping is not so much to the amount but to the location from which it would be drawn.

FWS argues that total carbonate pumping can continue but not be increased from 2015-2017 levels even if it would replace alluvial pumping. This FWS recommendation will not protect the high-elevation springs. Most carbonate pumping is removed from storage and only a small percent is currently being removed from discharge (the spring flow). As pumping continues and storage removed, which also lowers the head at the carbonate monitoring wells (see the continued lowering at EH-4 and EH-5b in Figure 8). Eventually, more carbonate pumping will be captured from discharge and the spring flow will decease until it reaches critical levels.

FWS section 1.6 develops relationships between the water level at EH-4 and discharges from various springs. All have significant coefficients demonstrating that decreases in water level decreases the discharge at all springs (except Muddy Springs at the LDS). The highest elevation springs have the most significant relationship and proportionally lose the most water as EH-4 water levels decrease. The higher elevation springs will be the first to go dry as carbonate pumping continues. This evidence suggests that FWS should not recommend a continuation of the existing carbonate pumping rates.

**Rebuttal to US National Park Service Report**

The National Park Service (NPS) submitted a report prepared by Tetra Tech which was based on the model Tetra Tech had previously prepared of the LWRFS. Tetra Tech (2019) used their LWRFS groundwater model to analyze various pumping scenarios. Regardless of the simulation, the model results indicate that the long-term trend will be for drawdown to expand and spring discharge to decrease. Unfortunately, none of the simulations pumped as little as was being pumped during 2017 (Tetra Tech, Table 4-1, reproduced here as Figure 10).

| Water Right Holder Pumping Basin | 2017 Withdrawals (ac-ft) | Simulation #1 Withdrawals (afy) | Simulation #2 Withdrawals (afy) | Simulation #3 Withdrawals (afy) |
|---|---|---|---|---|
| | | | | |
| Coyote Springs Investment | | | | |
| Coyote Spring Valley | 1,399 | 4,140 | 1,650 | 1,477 |
| | | | | |
| SNWA | | | | |
| Coyote Spring Valley | | 1,957 | | |
| Garnet Valley | 1,048 | | 1,433 | 1,709 |
| | | | | |
| Moapa Valley Water District | | | | |
| California Wash | | 90 | | |
| Muddy River Springs Area | 2,823 | 1,000 | 5,079 | 2,823 |
| | | | | |
| Moapa Band of Paiutes | | | | |
| California Wash | 43 | | 2,063 | 2,960 |
| Muddy River Springs Area | | 500 | | |
| | | | | |
| NV Energy | | | | |
| California Wash | 29 | | 299 | 356 |
| Garnet Valley | 75 | 75 | 62 | 1,800 |
| Muddy River Springs Area | 296 | 3,160 | 795 | |
| | | | | |
| LDS Church | | | | |
| Muddy River Springs Area | 240 | 2,329 | 655 | 586 |
| | | | | |
| Nevada Cogeneration Associates | | | | |
| Black Mountains Area | 1,507 | | 1,374 | 1,638 |

Table 4-1. Summary of the largest simulated annual withdrawals for selected water-right holders in the LWRFS basins and aquifers.

*Figure 10: Tetra Tech (2019) Table 4-1 showing 2017 pumping withdrawals by water rights hold and basin and the amount pumped for three simulations.*

Each simulation pumped the same amount, but the difference was the location from which it was withdrawn (Tetra Tech 2019, p 20). Simulation #1 included substantially more pumping in CSV than observed in 2017 (Figure 10). Simulations #2 and #3 have much less pumping in CSV but still more than observed in 2017. The simulations also have much more pumping in MRSA than observed, but the location of the pumping, both by aquifer and water right holder, varies.

The biggest difference in the results shows in the drawdown maps (Tetra Tech Figures 4-4 through 4-12). They present drawdown for 10-, 100-, and 200-year simulations for each simulation. After 10 years in the high CSV-pumping simulation #1, drawdown exceeds 2 feet and ranges from 1 to 2 feet over larger portions of CSV and approaches 10 feet for portions of MRSA. Simulation #2 shifts pumping south into Garnet and Hidden Valley with a large area experiencing 1 to 2-foot drawdown. The shift south is greater for Simulation #3 with a large area experiencing 2 to 5-foot drawdown. Going forward 100 years, the differences are much less because drawdown up to 10 feet covers most of the area west of Meadow Valley Wash. There is a large area near Garnet and Hidden Valleys over which drawdown approaches 20 feet.

After 200 years, drawdown approaches 20 feet over large areas. Tetra Tech acknowledges these differences at Tetra Tech (p 20, 21).

Spring discharge decreases with the simulations as well, but the difference among simulations is much less. Over the 500-year period simulated, spring flows would decrease by about 20% with just small variation among simulations. This reflects the long period required to reestablish hydrologic equilibrium (Tetra Tech, p 20). Equilibrium is reestablished when the reduction in spring flow equals the amount being pumped; when this happens, the pumping will have completely captured the discharge. This would violate the trigger points in Warm Springs West and surface water rights on the Muddy River. The lack of difference among outcomes in these simulations is evidence that there is not some perfect scenario that would allow pumping to continue at a much higher rate (that is not to say other scenarios should not be tested, especially those with even less pumpage than simulated by Tetra Tech). The simulations basically confirm Myers (2019) results regarding continued pumping in the carbonate aquifer – drawdown will increase and spring flow decrease regardless of pumping rate; the only difference is the rate of decrease. Eventually the reduction in spring flow will equal the amount of water being pumped.

Tetra Tech' model simulations lead NPS to conclude that all of the Black Mountains Area (BMA) and KSV should be included in the LWRFS management area. Myers (2019) argued the same for inclusion of KSV (and this is discussed further above in rebuttal to Lincoln County et al). The Tetra Tech model showed drawdown in KSV coalescing with that in CSV, although it must be recognized that there was no monitoring well data with which to calibrate the connection between valleys.

Myers (2019) did not address the BMA. Model-simulated drawdown, such as was simulated through the BMA, rarely is accurate near structural boundaries so the accuracy of the predicted drawdown in BMA is questionable. Although there is little doubt that pumping in LWRFS would affect Rogers and Blue Point Spring, the model does not provide evidence that pumping within BMA would spread into LWRFS. Without more evidence it appears that the connection may be distant enough that including the remainder of BMA is not necessary and that flow at the springs should be considered as a long-term impact, tantamount to the way pumping in Delamar, Dry Lake and Cave Valley is considered at MRSA.

The Tetra Tech model raises a quandary that should be addressed. Its simulated drawdown reached the model boundary with Las Vegas Valley. This could have caused the model to overestimate drawdown in the southern reaches of LWRFS. It also suggests that the connection with Las Vegas Valley be better examined. Is there flow from LWRFS to LVV, as suggested by Johnson/Mifflin? Tetra Tech (p 22) suggests any flow would be minimal, although they present no evidence other than unreferenced estimates from the USGS.

**Rebuttal to Southern Nevada Water Authority Report**

SNWA in its abstract claims that "[i]f the conflicts with senior water-right holders are adequately addressed, the annual groundwater production from the carbonate aquifer should be managed between 4,000 – 6,000 afy over the long-term" (SNWA 2019, p ix). This conclusion however violates all of the findings SNWA makes throughout its report. The most important finding that does not support the conclusion is "(c) the data indicated that groundwater production from the MRSA alluvial reservoir or the carbonate aquifer simply cannot occur over the long-term without depleting spring and streamflows and conflicting with senior surface-water rights" (Id.). This rebuttal reviews SNWA (2019) and discusses additional points as to why the ultimate conclusion is faulty.

SNWA shows there have not been any significant climatic trends or shifts in the area since 1895 (SNWA, p 5-1). SNWA Figure 4-2 shows a slight, non-significant upward trend which is likely due to the very high precipitation in 2005.

SNWA notes that since 2016, heads in the carbonate aquifer and discharge measured at Pederson Spring and WSW have declined (SNWA, p 6-2). It notes that a significant increase in pumping as occurred during the aquifer test would increase the rate of decline. The only way to recover groundwater levels to pre-test levels would be for a pulse recharge event like in 2004-2005 (Id.). Stopping pumping is not sufficient. It further elaborates:

> In the long-term, it is expected that **any groundwater production from the carbonate system with in the LWRFS will ultimately capture discharge** to the MRSA (e.g., spring discharge, subsurface inflow the o the alluvial reservoir and, consequently, Muddy River streamflow) because of the high aquifer diffusivity and hydraulic connectivity throughout the flow system and because the MRSA constitutes the majority, if not all, of the discharge from the flow system" (Id., emphasis added).

Moving the pumping center will not help in the long term either, but may just take longer (Id.). SNWA presents four important conclusions:

- groundwater production from the carbonate aquifer in the LWRFS has impacted discharge to the MRSA and, consequently, senior surface-water rights associated with the 1920 Muddy River Decree
- impacts due to groundwater production within areas directly upgradient of the MRSA occur relatively quickly, and the magnitude of the impacts depends upon the pumping rates and durations
- **additional appropriations** that increase groundwater production from the carbonate aquifer within the LWRFS will **accelerate the timing and magnitude** of impacts

- **changing the spatial distribution of pumping within the LWRFS will change the distribution of drawdown and the timing of impacts, but not the long-term outcome**. (SNWA, p 6-4, emphases added)

SNWA's conclusions quoted here are accurate and are supported by the evidence they have analyzed. However, SNWA's attempt to quantify these analyses with ratios of spring flow to total MRSA flow may be incorrect. If high elevation spring discharge drops more rapidly than overall discharge, the ratio would change. Higher elevation springs will be dry before the flow reduction of lower elevation springs are substantively affected. This is based on the fact that a given change in groundwater level causes a larger change in the gradient controlling the discharge than it does for the lower elevation springs. The change in flow is proportional to the change in gradient, and therefore the claim that each "spring contributes to MRSA discharge in the same proportion under any stress conditions" (p 6-11) is incorrect. This does not obviate the overall conclusion that in the long term, capture of aquifer storage will decrease MRSA discharge on a nearly 1:1 ratio (Id.).

SNWA's analysis supports the concept that any carbonate pumping anywhere in the LWRFS will lead to a decrease in critical spring flow. SNWA's analysis does not support the recommendation that 4000 to 6000 af/y can continue to be developed from the carbonate aquifer.

**Endorsement of Great Basin Water Network Letter**

Great Basin Water Network (GBWN) addresses one issue directly pertinent to the subject of Order 1303, that of the boundary of the LWRFS. GBWN argues that the entire White River Flow System (WRFS) should be managed as one. This is a well-founded idea because most of the water that reaches MRSA originates in the northern portions of the WRFS. Myers (2019, p 19) explained how pumping in the northern portion of the WRS will diminish inflow to the LWRFS and eventually decrease water levels and discharges from the springs. It is completely reasonable to manage the entire WRFS as one unit.

**References**

DeMeo, G.A., Smith, J.L., Damar, N.A., Darnell, J., 2008. Quantifying groundwater and surface water discharge from evapotranspiration processes in 12 hydrographic areas of the Colorado Regional Groundwater Flow System, Nevada, Utah, and Arizona. U.S. Geol. Surv. Sci. Invest. Rep. 2008-5116, 22 p.

FWS (U.S. Fish and Wildlife Service) (2019) Issues Related to Conjunctive Management of the Lower White River Flow System. Presentation to the Office of the Nevada State Engineer in Response to Order 1303. July 3, 2019

Lincoln County et al (Lincoln County Water District, Vidler Water Company, Zonge International, Inc.) (2019). Lower White River Flow System Interim Order #1303 Report Focused on the Northern Boundary of the Proposed Administrative Unit. July 3, 2019.

Myers T (2019) Technical Memorandum: Groundwater Management and the Muddy River Springs, Report in Response to Nevada State Engineer Order 1303. Prepared for Center for Biological Diversity.

Myers T (2013) Technical Memorandum, Comments on Carbonate Order 1169 Pump Test Data and the Groundwater Flow System in Coyote Springs and Muddy River Springs Valley, Nevada. Prepared for Great Basin Water Network.

SNWA (Southern Nevada Water Authority) (2019) Assessment of Lower White River Flow System Water Resource Conditions and Aquifer Response, Presentation to the Office of the Nevada State Engineer. Las Vegas NV.

Tetra Tech (2019) Prediction of the Effects of Changing the Spatial Distribution of Pumping in the Lower White River Flow System. Present to US National Park Service. Superior, CO

US DOI (US Fish and Wildlife Service, Bureau of Land Management, National Park Service) (2013) Test Impacts and Availability of Water Pursuant to applications Pending Under Order 1169.

USFWS (US Fish and Wildlife Service, Region 1) (1996) Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem, First Revision. Portland OR

# Exhibit 9

AMENDED

**ASSIGNED**

**Nº 46777**

# APPLICATION FOR PERMIT

## TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF NEVADA

Date of filing in State Engineer's Office MAR 3 1 1983

Returned to applicant for correction APR 1 8 1983

Corrected application filed MAY 1 6 1983

Map filed MAY 1 6 1983

The applicant Nevada Power Company

P. O. Box 230 (Street and No. or P.O. Box No.), of Las Vegas (City or Town),

Nevada 89151 (State and Zip Code No.), hereby make application for permission to appropriate the public waters of the State of Nevada, as hereinafter stated. (If applicant is a corporation, give date and place of incorporation; if a copartnership or association, give names of members.) Incorporated in 1929 in State of Nevada

1. The source of the proposed appropriation is underground (Name of stream, lake, spring, underground or other source)

2. The amount of water applied for is 55.0 cfs (One second-foot equals 448.83 gals. per min.) second-feet

(a) If stored in reservoir give number of acre-feet

3. The water to be used for Industrial (cooling) (Irrigation, power, mining, manufacturing, domestic, or other use. Must limit to one use.)

4. If use is for:

(a) Irrigation, state number of acres to be irrigated:

(b) Stockwater, state number and kinds of animals to be watered:

(c) Other use (describe fully under "No. 12. Remarks" (x)

(d) Power:

(1) Horsepower developed

(2) Point of return of water to stream

5. The water is to be diverted from its source at the following point: SE ¼, SE ¼, Section 23, T. 13 S., R. 63 E, M.D.M. The SW corner of Section 23 bears S 88° 12' 27" W., 5103 feet from the point of diversion. (Describe as being within a 40-acre subdivision of public survey, and by course and distance to a section corner. If on unsurveyed land, it should be so stated.)

6. Place of use T. 17 S, R. 63 E, Sections 12 (portion), 13 (portion), 24, 25, 35 (portion), and 36; T. 17 S, R. 64 E, Sections 7 (portion),18, 19, 30, and 31; T. 18 S, R. 63 E, Sections 1 (portion) and 2 (portion). (Describe by legal subdivision. If on unsurveyed land, it should be so stated.)

7. Use will begin about January 1 (Month and Day) and end about December 31 (Month and Day), of each year.

8. Description of proposed works. (Under the provisions of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) Drilled well, pump, piping and electrical power service. (State manner in which water is to be diverted, i.e. diversion structure, ditches and flumes, drilled well with pump and motor, etc.)

9. Estimated cost of works 1,000,000.

10. Estimated time required to construct works 9 years
If well completed, describe works.

11. Estimated time required to complete the application of water to beneficial use 16 years

12. Remarks: For use other than irrigation or stock watering, state number and type of units to be served or annual consumptive use.

40,000 AF/year is the annual consumptive use. See Attachment for additional information on the water usage.

By s/James H. Zornes
James H. Zornes Vice President
Nevada Power Company
P. O. Box 230
Las Vegas, Nevada 89151

Compared js/ bl cl/cms

Protested Pro. w/d 1/23/85
Pro. 6/21/83 by William A. Molini;
7/29/83 by US Fish and Wildlife Service

Pro. Overruled 6/19/97
See Ruling No. 4542

APPROVAL
OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit is issued subject to existing rights. It is understood that the amount of water herein granted is only a temporary allowance and that the final water right obtained under this permit will be dependent upon the amount of water actually placed to beneficial use. It is also understood that this right must allow for a reasonable lowering of the static water level. This well shall be equipped with a two (2) inch opening for measuring depth to water. If the well is flowing, a valve must be installed and maintained to prevent waste. A totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of water begins, or before the Proof of Completion of Work is filed. This source is located within an area designated by the State Engineer, pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

(CONTINUED ON PAGE 2)

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, and not to exceed 10.0 cubic feet per second, but not to exceed 5,000.00 acre-feet annually.

Work must be prosecuted with reasonable diligence and be completed on or before October 7, 2000

Proof of completion of work shall be filed before November 7, 2000

Application of water to beneficial use shall be made on or before October 7, 2005

Proof of the application of water to beneficial use shall be filed on or before November 7, 2005

Map in support of proof of beneficial use shall be filed on or before N/A

Completion of work filed

Proof of beneficial use filed

Cultural map filed

Certificate No. Issued

IN TESTIMONY WHEREOF, I R. MICHAEL TURNIPSEED, P.E.
State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 7th day of October
A.D. 19 97

State Engineer

218 (Rev.)

Abrogated By: 70429 C.O
70130 4.2

(PERMIT TERMS CONTINUED)

This permit is subject to Items 4 and 5 of the Ruling under No. 4542 dated June 19, 1997.

The permittee shall obtain a right of way from the owner of the property on which the point of diversion of this permit is located. The agreement granting the right of way between the parties must be submitted to the State Engineer not later than December 31, 1997. Failure to provide the agreement by the above mentioned date will result in the cancellation of this permit.and the water granted herein will revert to the source.

# Exhibit 10

IN THE OFFICE OF THE STATE ENGINEER
OF THE STATE OF NEVADA

IN THE MATTER OF APPLICATION 46777 )
FILED TO APPROPRIATE THE PUBLIC WATERS )
FROM AN UNDERGROUND SOURCE WITHIN THE ) RULING
COYOTE SPRINGS GROUNDWATER BASIN (210) )
CLARK COUNTY, NEVADA. )

#4542

GENERAL

I.

Application 46777 was filed on March 31, 1983, by Nevada Power Company (NPC) to appropriate 55.0 cubic feet per second (cfs), 40,000 acre feet annually (afa), from the underground waters of the Coyote Springs Groundwater Basin, Clark County, Nevada, for industrial (cooling) purposes within Sections 12, 13, 24, 25, 35 and 36, T.17S., R.63E., and Sections 7, 18, 19, 30 and 31, T.17S., R.64E., and Sections 1 and 2, T.18S., R.63E., M.D.B.&M.[1] The proposed point of diversion is described as being located within the SE¼ SE¼ of Section 23, T.13S., R.63 E.; M.D.B.&M. The proposed manner of use is for the planned 2,000 megawatt Harry Allen Power Plant located in the Dry Lake region approximately 25 miles northeast of Las Vegas, Nevada.

II.

Application 46777 was timely protested by the Nevada Department of Wildlife (NDOW) on the grounds that the granting of the permit would not be in the best public interest as it would have a detrimental impact on the wildlife values of the Muddy River drainage including the Moapa Dace (Moapa Coriacea) which is classified as an endangered species; and, as past studies have indicated that Coyote Springs Valley supplies a major portion of the groundwater recharge for the Muddy River springs, which lie in the Muddy River Springs Groundwater Basin (#219), located south and east and down gradient of Coyote Springs Valley.

[1] File No. 46777, official records in the office of the State Engineer.

III.

Application 46777 was timely protested by the United States Fish and Wildlife Service (FWS) on the grounds that the granting of this permit would not be in the best public interest as it would have a diminishing effect on the springs supplying the Muddy River; thereby, having an adverse impact on the fish and wildlife living in the drainage, including the Moapa Dace (Moapa Coriacea) classified as an endangered species. The FWS alleges that studies indicate water moves through the Coyote Springs Valley area discharging from the Muddy River springs; therefore, the appropriation would intercept the water discharging at the Muddy River springs which would not be in the best public interest.[1]

IV.

The State Engineer initially described and designated the Coyote Springs Valley Groundwater Basin on August 21, 1985, under the provisions of Nevada Revised Statute § 534.030, as a basin in need of additional administration.[2]

V.

After a meeting with the applicant and the Division of Water Resources, NDOW withdrew its protest on the basis that a detailed monitoring plan be established, and on the understanding that groundwater pumping would be stopped should the project adversely affect the water table in the Muddy River Springs Area.[1]

## FINDINGS OF FACT

I.

When the State Engineer analyzes whether water is available for appropriation in a groundwater basin the first analysis addresses the perennial yield of the particular groundwater basin. The perennial yield of a hydrologic basin is the maximum amount of water of usable chemical quality that can be consumed economically each year for an indefinite period of time. Perennial yield cannot exceed the natural replenishment to an area indefinitely, and

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[2] State Engineer's Order No. 905, dated August 21, 1985, official records in the office of the State Engineer.

ultimately is limited to the maximum amount of natural recharge that can be salvaged for beneficial use. If the perennial yield is continually exceeded groundwater levels will decline until the groundwater reservoir is depleted.[3] Withdrawals of groundwater in excess of the perennial yield contribute to adverse conditions such as water quality degradation, storage depletion, diminishing yield of wells, increased economic pumping lifts, land subsidence and possible reversal of groundwater gradients which could result in significant changes in the recharge-discharge relationship.

Presently, scientists can estimate the perennial yield of a groundwater basin by two distinct methods, recharge to the groundwater basin from precipitation, and discharge from the groundwater basin by spring/surface discharge, interbasin flow, consumption by plants tapping the groundwater and consumption by man. The State Engineer finds that in the Coyote Springs Valley Groundwater Basin the perennial yield (recharge) as a direct result of precipitation above the 6,000 foot elevation in the basin's watershed is estimated at 1,900 afa.

Another method for estimating the total quantity of water available for appropriation uses interbasin flow and discharge flow as the method by which to approximate the annual safe yield. Ground water is discharged from Coyote Springs Valley by the natural processes of transpiration of vegetation, evaporation from the soil and free-water surfaces, and to a greater extent by underflow from the Coyote Springs Valley to the Muddy River Springs Area Groundwater Basin. The majority of the underflow from Coyote Springs Valley can be best estimated by the amount of water

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[3] State Engineer's office, WATER FOR NEVADA, STATE OF NEVADA WATER PLANNING REPORT NO. 3, Nevada Water Resources, p. 13, Oct. 1971.

[4] Eakin, Thomas E., GROUND-WATER RESOURCES - RECONNAISSANCE SERIES REPORT 25, GROUND-WATER APPRAISAL OF COYOTE SPRING AND KANE SPRING VALLEYS AND MUDDY RIVER SPRINGS AREA, LINCOLN AND CLARK COUNTIES, NEVADA, Nevada Department of Conservation and Natural Resources, pp. 22-26, Feb. 1964.

discharged by the Muddy River Springs. This amount is estimated to be in the range of 33,700 to 36,000 afa.[4] In using a discharge analysis, any influence of the carbonate aquifer is taken into consideration because the analysis looks at the total quantity of water flowing through the system and not at precipitation. Based on the underflow, it has been estimated that the perennial yield of the Coyote Springs Groundwater Basin is 18,000 afa.[5] The State Engineer finds that there are no permitted groundwater rights in Coyote Springs Valley Groundwater Basin; therefore, there is unappropriated water in the Coyote Springs Valley Groundwater Basin.[6]

III.

The State Engineer finds that NPC has both ground water and surface water rights in the Muddy River Springs Area Groundwater Basin.[7]

IV.

The point of diversion under Application 46777 is within Coyote Springs Valley Groundwater Basin and just up gradient of the Muddy River Springs Area Groundwater Basin. However, Application 46777 does not seek water from the alluvial aquifer, but rather seeks to appropriate water from a deep regional groundwater flow system referred to as the carbonate aquifer. The carbonate aquifer is part of a regional interbasin groundwater flow system identified as the White River System.[8]

Several thousand feet of saturated carbonate-rock aquifers are believed to lie under portions of this region, and carbonate-rock

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[5] Nowlin, Jon, GROUND-WATER QUALITY IN NEVADA - A PROPOSED MONITORING PROGRAM, OPEN FILE REPORT 78-768, U.S.G.S., p. 203.

[6] Official records in the office of the State Engineer.

[7] Official records in the office of the State Engineer.

[8] Eakin, Thomas E., A REGIONAL INTERBASIN GROUNDWATER SYSTEM IN THE WHITE RIVER AREA, SOUTHEASTERN NEVADA, Water Resource Bulletin No. 33, Nevada Department of Conservation and Natural Resources, 1966.

aquifers also transmit a regional flow of water, in this case, to the Muddy River Springs Area.[9] The regional distribution of carbonate rocks has hydrologic significance because they transmit a flow of ground water in regional groundwater systems beneath topographic divides.[10]

The State Engineer finds that the carbonate aquifer is the source of water for the Muddy River, springs in the Muddy River Springs Area Groundwater Basin, and is an additional source of recharge, from beyond the drainage area, to the underground source of water known as the alluvial aquifer in the Muddy Springs Area Groundwater Basin. The State Engineer finds that the regional groundwater flow system known as the carbonate system provides an additional ground water supply available for appropriation. The State Engineer further finds that the quantity of water available in the carbonate aquifer may be more important as a water source than the availability of unappropriated water within the alluvial aquifer.

V.

Since the quantity of water available for appropriation in the carbonate aquifer is unknown, the issue is one of whether the additional diversion requested under Application 46777 from the carbonate aquifer in the Coyote Springs Groundwater Basin would reduce the spring flow and the inflow to the alluvial aquifer in the Muddy River Springs Area Groundwater Basin in an amount that would interfere with existing water rights within the Muddy River Springs Area Groundwater Basin.

An aquifer test of the carbonate system was conducted by the Moapa Valley Water District (MVWD) in support of their water right Applications 55450 and 58269. Applications 55450 and 58269 were

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[9] Eakin, Thomas E., GROUND-WATER RESOURCES - RECONNAISSANCE SERIES REPORT 25, GROUND-WATER APPRAISAL OF COYOTE SPRING AND KANE SPRING VALLEYS AND MUDDY RIVER SPRINGS AREA, LINCOLN AND CLARK COUNTIES, NEVADA, Nevada Department of Conservation and Natural Resources, p. 20, Feb. 1964.

[10] Rush, supra note 9 at 7.

filed to appropriate water from the carbonate aquifer in the Muddy River Springs Area Groundwater Basin.

A public administrative hearing was held in 1995 concerning Applications 55450 and 58269.[11] These two applications are supplemental to one another and have the same point of diversion from a well completed in the carbonate aquifer in the Muddy River Springs Area Groundwater Basin. This point of diversion is referred to as the Arrow Canyon Well. Application 46777 is similar to these applications in that it is also to be completed to the regional carbonate aquifer system in the White River System.

Protests to Applications 55450 and 58269 were submitted by NPC, FWS and the National Park Service. Representatives of the office of the State Engineer conducted seven (7) days of hearings and received eighty-nine (89) exhibits into evidence. The State Engineer heard testimony from expert witnesses and received extensive evidence regarding the effects of pumping a well completed in the carbonate aquifer on the springs and the alluvial aquifer in the Muddy River Springs Area Groundwater Basin. The State Engineer finds that testimony and evidence from that hearing is of great value in the consideration of Application 46777.

The State Engineer further finds that evidence from the 1995 Moapa Valley Water District hearings on Applications 55450 and 58269 indicates that the historical estimates of the quantity of water flowing from the carbonate aquifer in Coyote Springs Valley to the springs in the Muddy River Springs Area has been estimated at 51 cfs or 37,000 afa.[12] During the MVWD hearing, MVWD estimated the range of quantity of carbonate water underflow to the springs in the Muddy River Springs Area to be from 51,000 afa to 63,900

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[11] Transcript and exhibits, public administrative hearing before the State Engineer, January/February, 1995, official records of the office of the State Engineer.

[12] Transcript, pp. 1282-1286, and Exhibit Nos. MWD 15 and NPC 20, public administrative hearing before the State Engineer, January/February, 1995, official records in the office of the State Engineer.

afa, an amount greater than the total of existing water rights from all sources from the alluvial aquifer (45,260 afa).[13]

VI.

The aquifer test conducted from December 1993 to April 1994 under Applications 55450 and 58269, pumped 1,550 acre feet of water at a rate of 2,900 gallons per minute (gpm) (6.46 cfs) for 121 days.[14] This is equivalent to an average annual pumping rate of 2.14 cfs. Water levels in several carbonate and alluvial wells were monitored throughout the test and selected data are shown in Table A.[12]

Table A. Maximum Drawdown in Several Wells

| Well Name | Aquifer | Distance from Arrow Canyon well, ft. | Maximum Drawdown, ft. |
|---|---|---|---|
| EH-4 | Carbonate | 14,000 | 0.50 |
| EH-5B | Carbonate | 1,800 | 0.50 |
| MX-6 | Carbonate | 16,000 | 0.30 |
| Dahlberg East | Alluvial | 200 | 0 |
| Lewis North | Alluvial | 1,800 | 0 |
| Lewis Farm | Alluvial | 2,700 | 0 |

Discharge rates from certain springs within the Muddy River Springs Area Groundwater Basin were also measured during the test. The State Engineer finds that the discharge rates for the springs were unchanged.[15] The State Engineer further finds that the data

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[13] Transcript, pp. 899-900, public administrative hearing before the State Engineer, January/February, 1995, official records in the office of the State Engineer.

[14] Exhibit No. NPC-1, public administrative hearing before the State Engineer, January, February, 1995, Applications 55450 and 58269.

[15] Exhibit Nos. NPC-1 and MWD-23, public administrative hearing before the State Engineer, January, February, 1995, Applications 55450 and 58269.

based on the observations from the monitoring wells from the 121-day pump test shows little or no impact to either the alluvial or carbonate aquifers. The State Engineer finds that the proposed well under Application 46777 is approximately 9 miles further away to the north and west of the Arrow Canyon well used in that pump test; therefore, it would be expected that even less impact would be seen to either the alluvial aquifer or the springs in the Muddy River Springs Area Groundwater Basin.

VII.

As a result of a search for a testing ground for the MX missile, the United States Air Force, Ballistic Missile Office contracted with the Earth Technology Corporation, ERTEC, to investigate potential sites for water resources.[16] As a result of this search, aquifer tests were conducted on a well (CE-DT-5) completed in the carbonate aquifer and located in the same 40 acre piece of land (SE¼ SE¼ of Section 23, T.13S., R.63E., M.D.B.&M) as the proposed point of diversion under Application 46777.[17] The well was pumped at a constant discharge of 3,400 gpm (7.58 cfs) for thirty (30) days.[18] The maximum well yield is not known because the yields obtained were at the limit of the pump capability used for the test, not the yield of the carbonate aquifer.[19] The

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[16] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, p. 1, official records in the office of the State Engineer.

[17] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, pp. 1-2, official records in the office of the State Engineer.

[18] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, p. A-23, official records in the office of the State Engineer.

[19] Ertec Western, Inc., MX Siting Investigation Water Resources Program, Preliminary Water Management Report, Volume 1, p. 84, official records in the office of the State Engineer.

aquifer test yielded drawdowns in the test well itself of 11 to 12 feet.[20] The only other well seeing any response due to the test was a monitor well, CE-DT-4, drilled 330 feet away and in the same formation as CE-DT-5. CE-DT-4 showed no response during the first 500 minutes of the aquifer test and yielded a maximum drawdown of 0.38 feet after 12,000 minutes (8.3 days). During maintenance shutdowns or pump failures, the water levels in CE-DT-4 recovered fully to prepumping levels within three minutes.[21] At the end of the thirty (30) day test, the drawdown measured in CE-DT-4 was measured at 0.22 feet.[22] Monitoring of the springs in the Muddy River Springs Basin found no changes in discharge rates.[23]

It was concluded from the aquifer test of the CE-DT-5 well that the carbonate aquifer is capable of a long-term, sustained yield in excess of 3,400 gpm and that the long-term, constant discharge testing of the well resulted in no detectable impacts upon either the discharge rate or water quality of the regional springs in the Muddy River Springs area.[24] Clearly there is high transmissivity and storativity associated with this aquifer. The

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[20] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, pp. A-31-A-47.

[21] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, p. 35.

[22] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, p. A-67, official records in the office of the State Engineer.

[23] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing, Coyote Springs Valley, Nevada, pp. 34-38, official records in the office of the State Engineer.

[24] Ertec Western, Inc., MX Siting Investigation Water Resources Program; Results of Regional Carbonate Aquifer Testing. Coyote Springs Valley, Nevada, p. 62, official records in the office of the State Engineer.

State Engineer finds that there is sufficient system yield and system storage for new water right appropriations.

VIII.

Data to address the question of interference with existing water rights in Muddy River Springs Area Groundwater Basin from appropriations in Coyote Springs Valley Groundwater Basin is currently being sought through a monitoring plan conducted by Moapa Valley Water District under Permits 55450 and 58269.[25] The State Engineer finds that if, at some future time, it is determined that pumping the proposed well under Application 46777 in Coyote Springs Valley Groundwater Basin has adverse effects on the springs and the alluvial aquifer in the Muddy River Springs Area Groundwater Basin, then those effects would be detected early on by the reduction of water inflow from the carbonate aquifer to the alluvial system. If on the other hand, no adverse effects are indicated then there must be unappropriated water available for appropriation from the carbonate aquifer.

IX.

The State Engineer finds there are adequate safeguards in place by way of the monitoring sites to give an early warning before any environmental damage is done or before pumping from the carbonate aquifer in Coyote Springs Valley Groundwater Basin would decrease the flow of springs in the Muddy River Springs Area Groundwater Basin.

X.

The State Engineer previously stated, in the ruling under Applications 55450 and 58269, that the only way to know whether or not long term pumping of the carbonate aquifer at high diversion rates will affect the alluvial aquifer, springs, Muddy River and water right holders is to allow pumping to occur and monitor the aquifers, springs and river through a comprehensive monitoring program. Such a program already exists in the Muddy Springs area

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[25] File Nos. 55450 and 58629, monitoring plan, official records in the office of the State Engineer.

and some monitoring is being done in Coyote Springs Valley. The successful implementation of the monitoring plan requires the cooperation of at least four parties: Nevada Power Company, Moapa Valley Water District, U.S. Fish and Wildlife Service, and Nevada Division of Water Resources.

The State Engineer finds it to be prudent to merge the separate monitoring plans in existence today into one, all encompassing, monitoring plan that will accurately show the hydrologic health of the separate aquifer systems. It is imperative that the comprehensive plan have the following objectives:

1. provide an "early warning" so that any negative impact can be mitigated or reversed by decreasing or ceasing pumping;

2. protect the groundwater table in the alluvial aquifer;

3. protect the groundwater table in the carbonate aquifer;

4. protect the flow from the springs in the Muddy Springs area;

5. protect the flow in the springs which supply water to the Moapa Dace habitat; and

6. protect the flow in the Muddy River.

XI.

Correspondence dated April 25, 1996, from the State Engineer to Nevada Power Company, asked the following questions or clarifications from NPC:

1. Do you have access to the lands where the points of diversion are located? If the answer to that question is yes, and the land is in private holdings, please provide a copy of the access agreement.

2. There is a great deal of distance between points of diversion and the place of use and I assume there are Federal lands that have to be crossed in order to get the water from the points of diversion to the place of use. What type of arrangements have been made for easements or rights of way across Federal lands and please provide copies of the various permits or applications needed to cross the subject lands and whatever environmental work is required for those permits.

3. Application 46777 was protested. What work has been completed to date, in the way of negotiations, or resolutions in order to resolve the protests?

4. It is my understanding that the intended use of the water was for the Harry Allen Power Plant. Is the Harry Allen Power Plant still in the capital improvement/resources plans filed with the PSC and if so, what is the time intended to put this water to beneficial use?

Nevada Power Company responded to the April 25, 1996, letter with correspondence dated May 22, 1996, with answers as to their plans for the Harry Allen Power Plant:[1]

1. NPC has obtained a right-of-way grant for 6,200 acres from the Bureau of Land Management for well sites and a pipeline to deliver the water to the plant;

2. NPC's air quality permit was modified to allow the construction of up to eight (8) combustion turbine units rather than coal fired units at the Harry Allen Power Plant;

3. NPC has spent over a million dollars on groundwater monitoring and inventory studies in order to better understand any hydrogeological connection between Coyote Springs Valley and the groundwater, springs and river flow in the Muddy River Springs Area Groundwater Basin;

4. NPC's best estimate for putting all of the water to beneficial use is between 5 and 8 years, depending on growth in southern Nevada. A copy of the 1994 Resource Plan was submitted to the State Engineer to show these plans;

5. NPC may amend its applications to show a total water need of approximately 5,000 acre-feet for the Harry Allen Station instead of the 40,000 acre-feet requested.

Correspondence dated December 19, 1996, from the State Engineer to Nevada Power Company, asked for clarification on land access to the proposed well sites given that Aerojet is now the owner of the well site proposed under Application 46777. Additionally, the State Engineer asked for clarification on the amount of water sought by NPC for the Harry Allen Power plant.[1] At the time Application 46777 was filed, the State Engineer understood the proposal to be industrial cooling in a 500 megawatt coal fired power plant. The Harry Allen Power plant now consists of a 70 megawatt natural gas fired power plant.

Nevada Power Company responded to the December 19, 1996, letter with correspondence dated January 28, 1997. This letter stated that NPC has contracted with an engineering firm to conduct exploratory drilling at other sites to establish realistic diversion points that can be included in its amended applications. NPC has also contracted with an engineering firm to model the groundwater system in Coyote Springs Valley, and has not determined the actual amount of water needed for the power plant. They would like to wait until late May 1997 to provide that amount.[1] NPC has stated that the Harry Allen Power Station will eventually consist of eight (8) combustion turbine units, in lieu of the coal fired units initially envisioned. Based on this new information, the State Engineer finds that the amount of water now required by the Harry Allen Plant is 5,000 afa. The State Engineer further finds that NPC has shown diligence towards getting the necessary easements and has modified their air quality permits to reflect the proposed addition to the Harry Allen Plant.

## CONCLUSIONS

I.

The State Engineer has jurisdiction over the parties and of the subject matter of this action and determination.[26]

II.

The State Engineer is prohibited by law from granting an application to appropriate water where:[27]

1. there is no unappropriated water in the proposed source of supply;

2. the proposed use conflicts with existing rights; or

3. the proposed use threatens to prove detrimental to the public interest.

III.

The source of water for Application 46777 is the carbonate aquifer, not the alluvial system. The State Engineer concludes there is no evidence as to the exact quantity of water available for appropriation from the carbonate aquifer, but there is at least 18,000 afa available in total quantity.

IV.

As a result of the MX aquifer test and the MVWD aquifer test, the State Engineer concludes that the approval of Application 46777 would not interfere with any existing rights in the Coyote Springs Groundwater Basin or the Muddy River Springs Area Groundwater Basin.

V.

The 121 day carbonate aquifer test conducted in support of Applications 55450 and 58269 showed little or no effect on the water levels in the alluvial aquifer or the springs in the Muddy River Springs Area. A monitoring plan has been implemented in the Muddy River Springs Area and trigger levels have been established

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[26] NRS Chapters 533 and 534.

[27] NRS § 533.370.

to identify possible adverse effects. The monitoring data collected from the monitoring plan are submitted to the State Engineer for review. If any signs of adverse effects are identified by the State Engineer, the State Engineer may order a reduction of pumping in the area. The point of diversion for Application 46777 is upgradient and further away from the Muddy Springs Area than the test well and is to be completed in the carbonate aquifer. The State Engineer concludes that the approval of Application 46777 for industrial use by the Harry Allen Power Plant does not threaten to prove detrimental to the public interest. The State Engineer further concludes that NPC must obtain additional water rights for the Harry Allen Power Station to meet growing demands for electricity in southern Nevada; thus, Application 46777 would not threaten to prove detrimental to public interest.

VI.

The FWS manages the Moapa Wildlife Refuge, the location of the habitat for the endangered Moapa Dace. The source of water for the springs on the refuge is the carbonate aquifer. The FWS is concerned that additional pumping of the carbonate aquifer will reduce the flow of water from the springs and damage the Dace habitat. A monitoring plan for the springs has already been put in place by Moapa Valley Water District and is an essential element in protecting the Dace habitat. The State Engineer concludes that additional monitoring by NPC will help provide an "early warning" program in order to avert any impacts to the springs in the Muddy River Springs Area.

VII.

The State Engineer concludes that the diversion rate of 55.0 cfs requested under Application 46777 is far in excess of the aquifer test diversion rate and considerably more than needed for a total diversion of 5,000 afa now required by the Harry Allen Power Plant, and it would be detrimental to the public interest to

grant a permit for a quantity of water that will not be beneficially used.

VIII.

NPC's Application 46777 seeks to obtain additional water rights for the Harry Allen Power Plant to expand their electricity producing capability because of the increasing population growth in southern Nevada. The protestants fear that additional pumping from the carbonate aquifer will reduce the flow of water to the alluvial system, which is the source of water within the Muddy River Springs Area Groundwater Basin, the springs within the basin, and the Muddy River. From the MVWD hearing, and from other records of the State Engineer, the State Engineer concludes the following:

1. the hydraulic connection between the carbonate aquifer and the alluvial system is poorly defined;

2. it is unlikely that groundwater pumping under any permit granted pursuant to Application 46777 from the carbonate aquifer will reduce the quantity of water entering the alluvial system, the groundwater table of the alluvial aquifer, the flow of the springs, and the flow in the Muddy River to a point that creates a conflict with existing rights;

3. it is unknown whether the quantity of water entering the alluvial system from the carbonate aquifer is 37,000 afa, or if higher quantities in the range between 51,000 afa to 64,000 afa, are available for appropriation and use in the basin; and

4. the way to determine the impacts is to allow additional pumping of the carbonate aquifer and monitor the effects.

**RULING**

The protest to Application 46777 is hereby overruled and said application is hereby approved subject to the following conditions:

1. existing water rights;

2. payment of the statutory permit fees;

3. the pumping rate being reduced to 10 cubic feet per second, not to exceed 5,000 acre feet annually;

4. a comprehensive monitoring plan to be submitted by NPC to the State Engineer and the protestant within ninety (90) days of the date of this ruling. It is paramount that NPC work with MVWD and FWS to put together a monitoring plan that when reviewed along side MVWD's monitoring plan, will give an overall picture of the Coyote Springs Valley and Muddy River Springs Area. The plan shall be submitted and approved by the State Engineer prior to pumping the well;

5. NPC will be required to submit an annual report of the monitoring results. The FWS and MVWD will have the opportunity to review and comment on the annual report. The State Engineer will then retain the option of reducing the pumping rate for the next year, or any other action that may be necessary to protect the public interest or to prevent conflicts with existing rights; and,

6. NPC must obtain a right of way from Aerojet for the point of diversion and submit the agreement to the State Engineer.

Respectfully submitted,

R. MICHAEL TURNIPSEED, P.E.
State Engineer

RMT/JK/ab

Dated this 19th day of

June, 1997.

# Exhibit 11

# MEMORANDUM OF AGREEMENT

This Memorandum of Agreement ("MOA") is entered into this 20th day of April, 2006, (the "Effective Date") by and between the Southern Nevada Water Authority ("SNWA"), a political subdivision of the State of Nevada, the United States Fish and Wildlife Service ("FWS"), Coyote Springs Investment LLC, a Nevada limited liability company ("CSI"), the Moapa Band of Paiute Indians ("Tribe") and the Moapa Valley Water District ("MVWD"), a political subdivision of the State of Nevada. For convenience, SNWA, FWS, CSI, the Tribe and MVWD are at times herein referred to individually as "Party" and collectively as "Parties."

## RECITALS

A. In Order No. 1169 the Nevada State Engineer held in abeyance applications for new groundwater rights in certain groundwater basins, and mandated that SNWA, MVWD and other parties conduct a regional groundwater study including the pumping of at least 50 percent of the permitted water rights within the Coyote Spring Valley hydrographic basin for a period of at least two consecutive years ("Pump Test").[1] SNWA currently owns 9,000 afy of water rights with points of diversion within the Coyote Spring Valley hydrographic basin under Permit Nos. 49414, 49660 through 49662 and 49978 through 49987 ("SNWA Water Rights").

B. To facilitate the Pump Test and delivery of SNWA Water Rights, SNWA applied to the Bureau of Land Management ("BLM") for a right-of-way across Federal land for the

[1] Currently there are 16,100 acre-feet per year ("afy") of permitted groundwater rights in the Coyote Spring Valley hydrologic basin, including the SNWA Water Rights and CSI Water Rights, defined in Recitals A and D herein, and Order No. 1169 requires the continuous diversion of 8,050 acre-feet per year during the Pump Test.

construction and operation of a pipeline to deliver groundwater from the Coyote Spring hydrographic basin to either the Muddy River System or to MVWD's service system.

C. In Ruling No. 5115 the Nevada State Engineer granted Application No. 54075, filed by the Las Vegas Valley Water District ("District") on October 17, 1989, for a total duty of 2,500 afy with a diversion rate of 5.0 cubic feet per second ("cfs") within the California Wash hydrographic basin ("Permit No. 54075"). By separate agreement, the District has transferred ownership of Permit No. 54075 to the Tribe. The Tribe plans to divert and utilize groundwater under Permit No. 54075.

D. CSI is a private landowner in the Coyote Spring Valley hydrographic basin and owns 4,600 afy of water rights with points of diversion within the basin under Permit Nos. 70429 and 70430 ("CSI Water Rights").

E. MVWD is responsible for supplying the municipal water needs of Upper and Lower Moapa Valley located in Clark County, Nevada. MVWD owns several water rights within Upper Moapa Valley including surface rights to spring flows in the Muddy Springs area and groundwater rights (Permit Nos. 52520, 55450 and 58269) with points of diversion at the Arrow Canyon well and a right to 1.0 cfs of spring flow from the Jones Spring (Certificate No. 10060) ("Jones Water Right").

F. FWS is a Federal agency within the Department of the Interior. FWS' responsibilities include implementation of the Endangered Species Act and administration of the National Wildlife Refuge System. FWS holds a Nevada State water right certificate for a flow rate of not less than 3.5 cfs as measured at the Warm Springs West flume (Permit No. 56668; Certificate No. 15097 issued subject to the terms of Permit No. 56668) for the maintenance of habitat of the Moapa dace and other wildlife purposes ("FWS Water Right").

G. The Moapa dace (*Moapa coriacea*) is an endemic fish that inhabits the upper Muddy River and tributary thermal spring systems within the Warm Springs area in Clark County, Nevada. The Moapa dace was federally listed as endangered on March 11, 1967 (32 FR 4001). FWS manages the Moapa Valley National Wildlife Refuge established in 1979 as part of the National Wildlife Refuge System.

H. Based upon its evaluation of available data, FWS postulates that current groundwater pumping by MVWD at the Arrow Canyon well is causing a decline in spring flows in the Warm Springs area and that future withdrawals of groundwater by SNWA and/or CSI in the Coyote Spring Valley hydrographic basin and/or by the Tribe in the California Wash hydrographic basin may cause spring flows to decline. SNWA, CSI, and MVWD do not believe the available hydrologic data supports these conclusions.

I. The Tribe believes that regional groundwater monitoring and scientifically valid, but conservative, regional computer modeling have demonstrated and will continue to demonstrate that on-Reservation groundwater pumping authorized under Permit No. 54075 will not cause appreciable declines in spring flows in the Warm Springs area.

J. Prior to the issuance of Order No. 1169, a stipulation was executed on July 19, 2001, between Federal agencies and SNWA regarding protests filed by Federal agencies against SNWA applications for new groundwater rights in the Coyote Spring Valley hydrographic basin. The Federal agencies and SNWA agreed to implement a monitoring study that was clarified in a Monitoring, Management, and Mitigation Plan for Existing and Future Permitted Groundwater Development in Coyote Spring Valley ("3M Plan") attached to and incorporated in that stipulation.

K. As part of the approval of the MVWD water rights at the Arrow Canyon well, the Nevada State Engineer required a monitoring plan. A monitoring plan has been developed and agreed upon jointly by MVWD, Nevada Power Company, FWS and National Park Service, with the most recent amendments to that plan being submitted to the State Engineer in September 2002 ("MVWD Monitoring Plan").

L. State Engineer Ruling No. 5115 requires that "[a] monitoring program approved by the State Engineer prior to the diversion of any water [under Permit No. 54075] be prepared in conjunction with the [Pump Test] ordered in State Engineer's Order No. 1169."[2] The Tribe will develop, in coordination with the other Parties, a monitoring plan approved by the Nevada State Engineer prior to applying any groundwater to beneficial use under Permit No. 54075 ("Tribal Monitoring Plan").

M. On March 11, 2005, the Nevada State Engineer approved a document entitled "Southern Nevada Water Authority's Monitoring Plan for Groundwater Applications and Permits in Coyote Spring Valley, Hidden and Garnet Valleys, and California Wash Hydrographic Basin, Clark and Lincoln Counties March, 2005" ("SNWA Monitoring Plan"). The State Engineer directed that the SNWA Monitoring Plan serve as the monitoring plan required by the State Engineer for the SNWA Water Rights and the CSI Water Rights.

N. The Parties share a common interest in the conservation and recovery of the Moapa dace and its habitat. Each Party also has an interest in the protection, use and enjoyment of its water rights and entitlements. To serve these interests, the Parties have identified certain conservation measures with the objective of making measurable progress toward the conservation and recovery of the Moapa dace, and have agreed to coordinate the monitoring, management and mitigation measures included and to be included in the 3M Plan, MVWD

Monitoring Plan, SNWA Monitoring Plan, and Tribal Monitoring Plan (collectively the "Regional Monitoring Plans").

O. The Parties desire that FWS engage in consultation and prepare a formal biological opinion under the provisions of Section 7 of the Endangered Species Act and its implementing regulations prior to execution of this MOA. The consultation shall consider the effects on the Moapa dace from the pumping of 9,000 afy under the SNWA Water Rights, 4,600 afy under the CSI Water Rights, and 2,500 afy by the Tribe under Permit No. 54075, together with the implementation of the monitoring, management and conservation measures identified herein.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, the Parties do agree as follows:

I. Conservation Measures. The Parties agree that in order to make measurable progress toward protection and recovery of the Moapa dace and its habitat concurrent with the operation and development of water projects for human use, it is beneficial to the public interest to establish the following conservation measures:

1. Establishment of Recovery Implementation Program. To effectuate the goals of this MOA the Parties agree to establish a Recovery Implementation Program ("RIP") whereby measures necessary to accomplish the protection and recovery of the Moapa dace, the operation and development of regional water facilities, and the inclusion of necessary and interested third parties are outlined and implemented. To facilitate establishment of the RIP:

a. The Parties agree to cooperate in the selection of qualified personnel and/or contractors to oversee the development of the RIP.

[2] Ruling No. 5115 at 40.

b. SNWA agrees to provide funding in the amount of $300,000.00 to develop the RIP. SNWA agrees to execute such documents as may be necessary to ensure that these funds are available to meet the needs of those persons designated by the Parties with the task of establishing the RIP.

c. The Parties agree to seek the cooperation of other parties within the region that have an interest in the development and management of water and biological resources. To achieve the goals of the RIP, the Parties agree to employ principles of adaptive management to further the current understanding of the habitat and aquatic needs of the Moapa dace. The Parties will jointly negotiate the participation of any other party in the RIP.

2. Dedication of the Jones Water Right. The Parties agree that the recovery of the Moapa dace will be enhanced by the guarantee of additional in-stream flows in areas of historical Moapa dace habitat. One such area is the Apcar Stream down gradient of the Jones Spring. The Parties concur that the dedication of the Jones Water Right to the purpose of providing in-stream flows will be beneficial to the Moapa dace population in this area and further the recovery of the species. To effectuate the dedication of the Jones Water Right to the provision of in-stream flows in the Apcar Stream, the Parties agree as follows:

a. MVWD agrees to record an agreement between MVWD and FWS ("Jones Springs Agreement") on the Jones Water Right with both the Nevada State Engineer and the Clark County, Nevada, Recorder's Office that requires the entire 1.0 cfs flow right under the Jones Water Right to be dedicated to the purpose of maintaining in-stream flows in the Apcar Stream subject to the provisions of paragraph 7 of the Jones Springs Agreement. MVWD shall retain ownership of the Jones Water Right. The Jones Springs Agreement shall be executed and recorded promptly upon execution of this MOA. A draft of the Jones Springs Agreement is

attached hereto as "Exhibit A." The Jones Springs Agreement ultimately recorded pursuant to this paragraph shall be in substantially the same form as Exhibit A.

b. SNWA agrees to transfer to MVWD, at no cost, a portion of Permit No. 49414 equal to 724 afy. This transferred portion of Permit No. 49414 shall remain of equal priority date with that portion of Permit No. 49414 retained by SNWA.

c. MVWD agrees to transfer to SNWA, at no cost, the first 724 afy, or any portion thereof if less than 724 afy is permitted, of any permit(s) issued by the Nevada State Engineer pursuant to Application Nos. 54055 through 54059, inclusive.

d. The Parties agree to cooperate with MVWD in the filing and processing of any change applications, including applications to change the manner or place of use that are filed by MVWD with the Nevada State Engineer in order to effectuate the Jones Springs Agreement referenced in paragraph I(2)(a) above.

e. Subject to paragraph 2 of the Jones Springs Agreement, the Parties agree to cooperatively determine the best methods to ensure that the Jones Water Right accomplishes the purpose stated in paragraph I(2)(a) above, as related to the recovery of the Moapa dace and other endemic species, including the possibility of restoration of the springhead at Jones Spring.

3. Dedication of Portion of CSI Water Rights.

a. CSI agrees to record a conservation easement with both the Nevada State Engineer and the Clark County, Nevada, Recorders Office dedicating 460 afy of the CSI Water Rights to the survival and recovery of the Moapa dace and its habitat. The use of this water would be at the discretion of the FWS in consultation with the CSI and the Parties.

b. In addition, CSI agrees to dedicate 5 percent of all water rights above 4,600 afy that CSI may in the future be entitled to withdraw from Coyote Spring Valley

hydrographic basin or any water rights that CSI imports into and uses in the basin. The Parties, consistent with the RIP, will determine the most effective method for utilizing such water rights. CSI shall execute and record such documentation, including conservation easements, deeds, change applications and reports of conveyance, as may be necessary to effectuate the dedication of that portion of such water rights that is subject to the terms and conditions contained herein.

4. Habitat Restoration and Recovery Measures. To restore the habitat necessary for the Moapa dace and take other steps to protect and recover the species, the Parties agree as follows:

a. SNWA agrees to provide funding in the amount of $750,000.00 for the restoration of Moapa dace habitat under the direction of FWS on the Apcar Unit of the Moapa National Wildlife Refuge or otherwise. All tasks funded under this paragraph I(4)(a) shall be agreed to in advance by SNWA and FWS in consultation with the other Parties. SNWA agrees to execute such documents as may be necessary in order to ensure that these funds are available for such habitat restoration.

b. FWS agrees to provide funding in the amount of $125,000.00 and SNWA agrees to provide funding in the amount of $125,000.00 to develop an ecological model designed to investigate the effects of habitat change on the ecology of the Moapa dace. FWS and SNWA shall, in consultation with the other Parties, agree upon the selection of a contractor to prepare the model.

c. SNWA agrees to provide funding in the amount of $50,000.00 to construct fish barriers to help eliminate the predacious Tilapia from areas of Moapa dace habitat. FWS and SNWA shall, in consultation with the other Parties, agree upon the selection of a contractor to perform such work.

d. SNWA agrees to provide funding in the amount of $25,000.00 to implement programs related to the eradication of non-native fish species, including predacious Tilapia, in the Warm Springs area. FWS and SNWA shall, in consultation with the other Parties, agree upon the selection of a contractor to perform such work.

e. CSI agrees to provide FWS with funding on an annual basis in the amount of $50,000.00 for a period of four years following the execution of this MOA for the restoration of Moapa dace habitat outside the boundaries of the Moapa National Wildlife Refuge along the Apcar Stream, or at such other locations as CSI and FWS, in consnltation with the other Parties, agree.

f. The Tribe agrees to use a reasonable portion of the existing on-Reservation greenhouse facility for a reasonable period of years, for the purpose of cultivating native vegetation for use in RIP-approved habitat restoration. The Parties understand that the greenhouse is in a state of major disrepair and that such use of the greenhouse will require repairs and a water supply. FWS will work with the Tribe to obtain the funding necessary to provide for such repairs and to identify and secure a water supply adequate for such use. The Tribe reserves the right to pursue, and if feasible implement, separate arrangements for the improvement and commercial operation of the remainder of the greenhouse.

g. The Tribe agrees to provide access to the Tribe's Reservation for the construction and subsequent maintenance of at least one fish barrier, at a mutually agreeable location, to help eliminate the predacious Tilapia from Moapa dace habitat. FWS will work with the Tribe to obtain the funding necessary for construction, maintenance and repair of such barrier(s).

h. The Tribe agrees to provide the services of the Tribe's Environmental Director for in-kind staff services and participation in the RIP.

5. Protection of In-Stream Flows. The Parties recognize that maintenance of minimum in-stream flows in the Warm Springs area is essential for the protection and recovery of the Moapa dace. Although those flows are unknown at this time, the Parties agree as follows:

a. For purposes of this paragraph I(5), all "Average Flow Levels" specified herein shall be determined by flow measurements at the Warm Springs West flume. Average Flow Levels will be determined to have reached a particular level within a range specified in paragraphs I(5)(b) through (g) ("Trigger Range"): (1) if the daily average flow for each of 45 consecutive days decreases to an amount within the Trigger Range, or if the 90 day average flow over any 90 consecutive day period decreases to an amount within the Trigger Range; or (2) if the daily average flow for each of 90 consecutive days increases to an amount within the Trigger Range, or if the 135 day average flow over any 135 consecutive day period increases to an amount within the Trigger Range. If determined to be necessary by the Parties, the Parties will cooperate in removing phreatophytes, repairing or replacing the flume or taking any other steps to ensure the accuracy of flume measurements. Any adjustment in the rating curve for the Warm Springs West flume shall result in a pro-rata adjustment of the Trigger Ranges. The remaining provisions of this paragraph I(5) apply both during and after the Pump Test, except for paragraphs I(5)(c)(i) and (ii) which apply only during the Pump Test.

b. If the Average Flow Level decreases to an amount within the Trigger Range of 3.2 cfs or less, the Parties agree to meet as soon as practicably possible to discuss and interpret all available data and plan for mitigation measures in the event flows continue to decline.

c. If the Average Flow Level decreases to an amount within the Trigger Range of 3.0 cfs or less, the following Parties agree to take the following further actions:

i. During the pendency of the Pump Test, MVWD agrees to immediately cease pumping from the Arrow Canyon well; and

ii. While the Arrow Canyon Well is shut down pursuant to paragraph I(5)(c)(i) above, SNWA agrees to supply MVWD with all necessary municipal and domestic water supplies from the MX-5 and RW-2 wells or other sources available to the SNWA. Except for the express provision contained in paragraph I(2)(b) of this MOA, nothing in this MOA will obligate SNWA to supply MVWD with any water from SNWA's existing permits in the Coyote Spring Valley following the completion of the Pump Test; and

iii. SNWA and CSI agree to take necessary actions to prepare to geographically redistribute their groundwater pumping in the Coyote Spring Valley should flow levels continue to decline; and

d. If the Average Flow Level is within the Trigger Range of 3.0 cfs or less but greater than 2.9 cfs, the pumping of SNWA from the MX-5, RW-2, CS-1 and CS-2 wells in combination with the pumping of CSI from the MX-5, RW-2, CS-1 and CS-2 and CSI's pumping from other wells within the Coyote Springs Valley ("CSV") shall be restricted to 8,050 afy.

e. If the Average Flow Level is within the Trigger Range of 2.9 cfs or less but greater than 2.8 cfs, the pumping of SNWA from the MX-5, RW-2, CS-1 and CS-2 wells in combination with the pumping of CSI from the MX-5, RW-2, CS-1 and CS-2 and CSI's

pumping from other wells in CSV shall be restricted to 6,000 afy, and the pumping of the Tribe under Permit No. 54075 shall be restricted to 2,000 afy.

f. If the Average Flow Level is within the Trigger Range of 2.8 cfs or less but greater than 2.7 cfs, the pumping of SNWA from the MX-5, RW-2, CS-1 and CS-2 wells in combination with the pumping of CSI from the MX-5, RW-2, CS-1 and CS-2 and CSI's pumping from other wells in CSV shall be restricted to 4,000 afy, and the pumping of the Tribe under Permit No. 54075 shall be restricted to 1,700 afy.

g. If the Average Flow Level is within the Trigger Range of 2.7 cfs or less, the pumping of SNWA from the MX-5, RW-2, CS-1 and CS-2 wells in combination with the pumping of CSI from the MX-5, RW-2, CS-1 and CS-2 and CSI's pumping from other wells in CSV shall be restricted to 724 afy, and the pumping of the Tribe under Permit No. 54075 shall be restricted to 1,250 afy.

h. The Parties agree that any pumping of the 460 afy of CSI Water Rights dedicated to the survival and recovery of the Moapa dace pursuant to paragraph 3.a. of this MOA shall be at the discretion of FWS and not counted against the pumping restrictions set forth in paragraphs 5(d) through 5(g) of this MOA.

6. Hydrologic Review Team. Upon execution of this MOA, the Parties shall establish a Hydrologic Review Team ("HRT") which shall be constituted and function as follows:

a. Membership. Each Party shall appoint two representatives ("HRT Representatives"), including at least one with substantial formal training and experience in hydrogeology ("Technical Representative"). Except as otherwise provided herein, the two HRT Representatives shall together have one vote on HRT matters. By consensus, the HRT

Representatives may offer voting or non-voting HRT membership to others who provide regional monitoring records and analyses to the HRT.

b. Objectives. The objectives of the HRT shall be: (1) to identify opportunities and make recommendations for the purpose of coordinating and ensuring accuracy, consistency and efficiency in monitoring, other data collection, and analytical activities performed under the Regional Monitoring Plans; (2) to establish technically sound analyses of impacts on Muddy River Springs and Muddy River flows resulting from regional groundwater pumping; (3) to assess based thereon whether the pumping restrictions, but not the Trigger Ranges, under paragraphs I(5)(c) through (g) above (or any successors thereto) should be adjusted to better reflect the extent to which regional groundwater pumping by the respective Parties causes, or is likely to cause, impacts on Muddy River Springs and Muddy River flows; and (4) to adopt by consensus appropriate adjustments to such restrictions, if warranted.

c. Regional Baseline Pumping Analysis. Within one year following the execution of this MOA, the Technical Representatives shall prepare a written analysis of regional groundwater pumping data and impacts ("Regional Baseline Pumping Analysis"). In preparing such baseline analysis, the HRT shall consider all relevant and available data and analytical materials. The Regional Baseline Pumping Analysis shall set forth all shared and dissenting analyses, interpretations and recommendations of the participating Technical Representatives. All modeling analyses contained therein shall be based on modeling codes in the public domain and data files that are available for comprehensive review by all Technical Representatives.

d. Annual Determination. Based on the Regional Baseline Pumping Analysis, and no later than one year after preparation of that analysis and annually thereafter, the HRT shall endeavor to determine by consensus ("Annual Determination") whether the

groundwater pumping restrictions, but not the Trigger Ranges, under paragraphs I(5)(c) through (g) above (or any successors thereto) should remain in place, or whether and how any of such restrictions should be adjusted ("Pumping Restriction Adjustments") to better reflect the extent to which regional groundwater pumping hy the respective Parties causes, or is likely to cause, impacts on Muddy River Springs and Muddy River flows. However, no Pumping Restriction Adjustments will be made within the first five years following the Effective Date of this MOA. All Annual Determinations (including any Pumping Restriction Adjustments adopted by HRT consensus) shall be final and binding on all Parties, except that by consensus the HRT may at any time modify or vacate any Annual Determination.

e. Annual Determination Reports. Each Annual Determination shall be set forth and explained in a written Annual Determination Report which includes as appendices the Regional Baseline Pumping Analysis, all previously submitted Annual Technical Representative's Reports, and any other data or analytical materials considered by the HRT. If the Annual Determination is not made due to lack of consensus or any other reason, the positions thereon of the HRT Representatives shall be set forth and explained in the Annual Determination Report. Furthermore, if the HRT fails to adopt Pumping Restriction Adjustments recommended in a timely submitted Annual Technical Representative's Report, the Annual Determination Report shall briefly explain why such recommendation was not adopted.

f. Annual Technical Representative's Reports. Within six months after the close of the year of this MOA and annually thereafter, based on the best available scientific data and information, any Technical Representative may submit to all other HRT Representatives a written report ("Annual Technical Representative's Report") containing both: (1) a well-

documented professional analysis of monitored regional pumping and pumping impacts; and (2) recommendations, if any, for Pumping Restriction Adjustments.

g. Provision for Peer Review. If the HRT Representatives are unable to reach consensus on an Annual Determination, the Parties shall refer the matter to a qualified panel of third party reviewers ("Panel") consisting of three scientists unaffiliated with any Party and having substantial formal training and experience in hydrogeology. If the Parties cannot agree by consensus on the make-up of the Panel, one member of the Panel shall be designated by each of the following from its own ranks: U.S. Geologic Survey, Desert Research Institute and a private firm with the requisite expertise designated by a majority of the Parties ("Appointing Entities"), provided that the Parties by consensus may designate different similarly qualified Appointing Entities. If any Appointing Entity for any reason is unable or refuses to designate a member of the Panel, the Parties by majority vote shall designate a qualified replacement Appointing Entity. The purpose of the referral to the Panel will be to obtain peer review of the then-current Annual Determination Report, the data upon which it is based, all previously submitted Annual Technical Representative's Reports, and any other relevant and available data and analytical materials. The Panel will be asked to make its recommendation based on the foregoing information concerning the appropriate content of the Annual Determination. All Parties shall have a fair and reasonable opportunity to present factual and analytical submissions in person and/or in writing to the Panel. The Parties contemplate that a determination of the Panel on the Annual Determination will constitute the best available scientific information concerning the impacts on Muddy River Springs and Muddy River flows resulting from regional groundwater pumping, and the appropriateness of any proposed Pumping Restriction Adjustments. The cost of the Panel shall be borne equally by the Parties.

7. Acquisition of Additional Land and Water Rights. As a potential conservation measure, the Parties agree to work cooperatively to identify both land and water rights that, if acquired and dedicated to the recovery of the Moapa dace, will assist in making measurable progress towards the recovery of the Moapa dace. SNWA agrees to make a good faith effort to acquire land and water rights identified by the Parties. The Parties expressly agree that the reasonableness of any terms and conditions for any acquisition of land or water rights by SNWA shall be determined by SNWA at SNWA's sole discretion, and that SNWA shall have no obligation to acquire any land or water rights upon terms and conditions that SNWA finds unreasonable. When such land or water rights are acquired by SNWA, SNWA will cooperate with FWS in establishing restrictions upon the use of such lands and water rights consistent with existing laws so as to effectuate the conservation of these resources and the recovery of the Moapa dace.

8. Operational Coordination Among FWS, SNWA, CSI and MVWD. Consistent with the terms of this MOA and to accomplish the goals of protecting and recovering the Moapa dace, and accommodating the operation of municipal water supply infrastructure, FWS, SNWA, CSI and MVWD agree to examine all reasonable water operational scenarios and agree to implement feasible scenarios that will minimize impacts to the Moapa dace and its habitat, including, but not limited to the provision of water to MVWD from the Coyote Spring Valley hydrographic basin during the Pump Test or other water supplies available to SNWA and MVWD. MVWD shall have the right during the Pump Test to use the Arrow Canyon Well only in the event and to the extent SNWA is unable to supply MVWD with "all necessary municipal and domestic water supplies" pursuant to the provisions of paragraph I(5)(c)(ii) of this MOA. Except for the express provision contained in paragraph I(2)(b) of this MOA, nothing in this

MOA will obligate SNWA to supply MVWD with any water from SNWA's existing permits in the Coyote Spring Valley hydrographic basin following the completion of the Pump Test.

SNWA and CSI agree, following the execution of this MOA, and in coordination with FWS, to cooperate in locating and drilling one or more production wells in the northern part of the Coyote Spring Valley hydrographic basin. The details of this cooperative effort shall be contained in a separate agreement between CSI and SNWA.

9. Adaptive Management Measures. The Parties agree to carry out additional conservation measures that will need to be taken to protect and recover the Moapa dace following the initiation of the RIP and as more data becomes available both as to the biology of the Moapa dace and regional hydrology. Thus, the Parties agree to cooperate in carrying out the following measures as may be appropriate:

a. Funding, preparation and implementation of biological and hydrological studies and activities supporting the recovery of the Moapa Dace; and

b. Establish a regional monitoring and management plan that will include science-based management and mitigation measures for RIP participants; and

c. Assessing the feasibility of augmenting and/or restoring in-stream flows and establishing those flows as deemed feasible.

d. Continue to re-evaluate necessary measures to protect and recover the Moapa dace.

II. Current Access Agreement. SNWA currently has an access agreement with the owners of the Warm Springs Ranch, which contains Moapa dace habitat, in order to conduct biological surveys of the Moapa dace. SNWA agrees to use its best efforts to seek to amend this access

agreement so that each of the Parties to this MOA will have similar rights of access to the Warm Springs Ranch.

III. Modification of MVWD Monitoring Plan. Pursuant to the MVWD Monitoring Plan, submitted to the Nevada State Engineer in September 2002, FWS and MVWD agreed to a monitoring plan for development of MVWD's water rights at the Arrow Canyon well that contained certain management and mitigation measures that would be taken if flows at the Warm Springs West flume reached 3.17 cfs and 2.94 cfs respectively. This monitoring plan was recognized by the Nevada State Engineer in Ruling No. 5161. The Parties agree that, in order to effectuate a uniform regional monitoring and management plan, that the flow level restrictions and mitigation measures contained in this MOA shall replace the flow and water level restrictions and mitigation measures contained in the MVWD Monitoring Plan.

IV. No Assertion of FWS State Water Right. Provided that the other Parties to this MOA are in full compliance with the terms of this MOA, FWS expressly agrees not to assert a claim of injury to the FWS Water Right against either MVWD for pumping at the Arrow Canyon Well, against the Tribe for pumping within the California Wash hydrographic basin or against SNWA or CSI for any pumping in the Coyote Spring Valley for any diminution in flows at the Warm Springs West flume above 2.7 cfs. This provision shall in no way prejudice the FWS' ability and/or right to assert any and all rights inherent to the FWS Water Right for any diminution in flows at the Warm Springs West flume below 2.7 cfs.

V. No Waiver of Statutory Duties or Legal Rights. This MOA does not waive any of the authorities or duties of the FWS or the United States, nor does it relieve SNWA, CSI, the Tribe and MVWD from complying with any Federal laws, including but not limited to, the National Environmental Policy Act, Endangered Species Act, National Wildlife Refuge System

Improvement Act of 1997, and Federal Land Policy and Management Act of 1976, and any and all rules and regulations thereunder. Except as provided in paragraph IV of this MOA, it is the expressed intention of the Parties that FWS and the United States are not waiving any legal rights or obligations of any kind, including obligations to consult or re-consult under the Endangered Species Act, by entering into this MOA. Further, this agreement is entered as a good faith resolution of certain issues and is not intended to waive any party's rights in a subsequent legal proceeding regarding those issues. In addition, except for the restrictions set forth in paragraphs I(5)(e) through (g) above, this MOA does not in any respect waive, limit, or diminish any rights or claims of the Tribe to any federally-reserved or State surface or groundwater rights.

VI. No Modification of Previous Agreements. The Parties recognize that CSI, SNWA and MVWD have previously entered into multiple agreements concerning the sale, purchase and settlement of water rights within the Coyote Spring Basin including a certain *Agreement For Settlement Of All Claims To Groundwater In The Coyote Spring Basin* entered into between MVWD, CSI, SNWA and the District on March 7, 2002, and a certain *Agreement For Option, Purchase and Sale of Water Rights, Real Property and Easements* entered into between SNWA and CSI on April 16, 1998. Nothing contained herein is intended to abrogate or modify in any manner any of the provisions contained in any of those agreements except as expressly provided in paragraphs I(2)(b) and I(2)(c) of this MOA.

VII. Miscellaneous Provisions.

1. Notices. If notice is required to be sent by the Parties, the addresses are as follows:

If to FWS:

Supervisor
Nevada Fish and Wildlife Office
Fish and Wildlife Service
1340 Financial Blvd., #234
Reno, Nevada 89502

If to SNWA:

General Manager
Southern Nevada Water Authority
1001 South Valley View Boulevard
Las Vegas, Nevada 89153

If to MVWD:

General Manager
Moapa Valley Water District
Post Office Box 257
Logandale, Nevada 89021

If to CSI:

Carl Savely, General Counsel
Wingfield Nevada Group
6600 North Wingfield Parkway
Sparks, Nevada 89436

If to the Tribe:

Chairperson, Moapa Band of Paiute Indians
Post Office Box 340
Moapa, Nevada 89025
Fax: 702-865-2875

With copies to:

Steven H. Chestnut
Richard M. Berely
Ziontz, Chestnut, Varnell, Berely & Slonim
2101 Fourth Avenue, Suite 1230
Seattle, Washington 98121
Fax: 206-448-0962

2. Choice of Law. This MOA shall be governed in accordance with applicable Federal laws, and the laws of the State of Nevada to the extent not inconsistent with Federal law.

3. Funding. Any commitment of fnnding by FWS, MVWD or SNWA under this MOA is subject to appropriations by the respective governing bodies of those entities.

4. Amendment. This MOA may be amended in writing by mntnal agreement of the Parties.

5. Integration. This MOA sets forth the entire agreement of the Parties and supercedes all prior discnssions, negotiations, understandings or agreements with respect to the subject matter hereof. No alteration or variation of this MOA shall be valid or binding unless contained in an amendment in accordance with paragraph VI(4) of this MOA.

6. Binding Effect, Withdrawal From MOA. The terms and conditions of this MOA shall be binding upon and inure to the benefit of the Parties hereto and their respective personal representatives, successors, transferees and assigns. However, the Parties expressly agree that should the execution of this MOA, or any consultation held or biological opinion issued under Section 7 of the Endangered Species Act which is premised thereon, be challenged in a court of competent jurisdiction and be found in violation of the Endangered Species Act or any other law, any of the Parties may withdraw from the MOA upon thirty days written notice to the other Parties. Upon such withdrawal, the withdrawing Party shall have no further obligation to perform any commitment contained in this MOA.

7. Effective Date, Counterparts. This MOA will become effective as between the Parties upon all Parties signing this MOA. The Parties may execute this MOA in two or more counterparts, which shall, in the aggregate, be signed by all Parties; each counterpart shall be deemed an original as against any party who has signed it.

8. Additional Parties. Other entities may become Parties to this MOA by mutual written assent of the Parties.

9. Headings. The underlined paragraph headings used in this MOA are for the convenience of the Parties only, and shall not be deemed to be of substantive force in interpreting the MOA.

10. No Third Party Beneficiaries. This MOA does not create any right or benefit, substantive or procedural, enforceable by any third parties against the Parties or against any other person or entity. The terms of this MOA are not enforceable by any person or entity other than a Party.

IN WITNESS WHEREOF, the Parties have executed this Memorandum of Agreement on the 20th day of April, 2006.

MOAPA VALLEY WATER DISTRICT

By: Ivan Cooper
Title: Chairman

U.S. FISH AND WILDLIFE SERVICE

for By: Steve Thompson
Title: Manager, California/Nevada Operations Office

SOUTHERN NEVADA WATER AUTHORITY

By: Amanda M. Cyphers
Title: Chair

COYOTE SPRINGS INVESTMENT, LLC

By: Robert R. Derck
Title: General Manager

MOAPA BAND OF PAIUTE INDIANS

By: Dalton Tom
Title: Chairman

**When Recorded Mail To:**

_____

_____

_____

## Jones Springs Agreement

This Jones Springs Agreement ("Agreement") is entered into for the purposes described herein this 20th day of April, 2006 by between Moapa Valley Water District ("MVWD"), Muddy Valley Irrigation Company ("MVIC") and the U.S. Fish and Wildlife Service ("FWS").

## RECITALS

1. MVWD was created in 1983 by an act of the Nevada Legislature and is the municipal water purveyor in upper and lower Moapa Valleys and serves the communities of Moapa, Glendale, Logandale and Overton, and the surrounding areas, located in Clark County, Nevada.

2. One of MVWD's water sources is a spring known locally as Pipeline Jones Spring ("Jones Spring"). Certificate No.10060 issued by the Nevada State Engineer provides MVWD the right to divert 1 c.f.s. of flow of water from Jones Spring for municipal purposes. The waters of Jones Spring and Certificate No.10060 constitute a portion of the Muddy River Decreed water rights.

3. Water from Jones Spring, as well as numerous other springs, form small streams which make up the Muddy River ("Tributary Streams").

4. There lives in the upper reaches of the Muddy River and in the Tributary Streams, a small minnow known as the Moapa Dace ("Dace"). The Dace was listed as endangered in 1967 under the Endangered Species Preservation Act of 1966 and continues to be so listed and protected under the Endangered Species Act of 1973 as amended.

5. MVWD needs the quantity of water represented by Certificate No.10060 to serve its municipal customers.

6. As an inducement to MVWD to grant this Agreement, the Southern Nevada Water Authority ("SNWA") has agreed to furnish to MVWD a quantity of water equal to MVWD's rights under Certificate No.10060 from SNWA's wells and water rights in Coyote Spring Valley ("Coyote Spring Water"). The terms and conditions of SNWA's obligations are set forth in a separate agreement.

7. MVWD desires to help in the recovery and preservation of the Dace.

NOW THEREFORE, for the purpose of aiding in the recovery and preservation of the Dace, MVWD and FWS hereby agree as follows:

1. Effective on MVWD receiving Coyote Spring Water from Southern Nevada Water Authority, the water from Jones Spring shall not be diverted for municipal purposes pursuant to Certificate No.10060, but shall be allowed to flow down the Tributary Streams to the Muddy River.

2. MVWD may, as soon as Coyote Spring Water is available and being furnished to MVWD for municipal purposes disconnect their existing pumping facilities from the Jones Spring diversion pipe and or otherwise affix appurtenances that will allow the entire flow of water from Jones Spring to flow down to the Muddy River, thus increasing the flow of water in one or more Tributary Streams.

3. MVWD shall file any necessary change applications with the State Engineer as may be required by Nevada Law as a result of this Agreement.

4. The Agreement herein granted shall be for a non-consumptive use of water, with no warranty as to quality or quantity of flow.

5. MVWD reserves the right to change the point of diversion for its consumptive use right to the water from Jones Spring to a point on the Muddy River below that site generally known as the White Tank Narrows and to utilize such water for any purpose permitted by the Nevada State Engineer. Any such change shall not affect the flow of water at Jones Spring for in-stream purposes.

6. This Agreement will be recorded with the Clark County Recorder and filed with the Nevada State Engineer.

7. So long as MVWD is in full compliance with the terms and conditions applicable to MVWD in the Memorandum of Agreement dated April 20, 2006 and attached hereto as Attachment 1, then, if for any reason, whether natural, man-made or otherwise, any portion of the Coyote Spring Water becomes unavailable or unusable to meet MVWD's municipal needs previously supplied by Certificate 10060 (Jones Spring), then MVWD shall have the right to utilize a like portion of water from Jones Spring to replace such portion of the Coyote Spring Water that remains unavailable to MVWD for so long as the Coyote Spring Water remains unavailable.

8. MVIC has joined in the execution of this Agreement to reflect MVIC's approval of the terms thereof.

IN WITNESS WHEREOF, MVWD, MVIC and FWS have executed this Agreement the date first above written.

MOAPA VALLEY WATER DISTRICT

By: _____
Ivan Cooper, Chairman of the Board

U.S. FISH AND WILDLIFE SERVICE

By: _____
FOR Steve Thompson, Manager
California/Nevada Operations Office

MUDDY VALLEY IRRIGATION COMPANY

By: _____
Todd Robison, Chairman of the Board

STATE OF NEVADA )
)
COUNTY OF CLARK )

This instrument was acknowledged before me on April 20, 2006, by Ivan Cooper as Chairman of the Board of MOAPA VALLEY WATER DISTRICT.

DIANNE K. WEST
Notary Public State of Nevada
No. 98-0443-1
My appt. exp. Dec. 16, 2009

Dianne K West
NOTARY PUBLIC in and for the State of Nevada
My Commission Expires: 12-16-09

[SEAL]

STATE OF NEVADA )
)
COUNTY OF CLARK )

This instrument was acknowledged before me on April 20, 2006, by Robert D. Williams as Field Supervisor of U.S. FISH AND WILDLIFE SERVICE

DIANNE K. WEST
Notary Public State of Nevada
No. 98-0443-1
My appt. exp. Dec. 16, 2009

Dianne K West
NOTARY PUBLIC in and for the State of Nevada
My Commission Expires: 12-16-09

[SEAL]

STATE OF NEVADA )
)
COUNTY OF CLARK )

This instrument was acknowledged before me on April 20, 2006, by Todd Robison as Chairman of the Board of MUDDY VALLEY IRRIGATION COMPANY.

DIANNE K. WEST
Notary Public State of Nevada
No. 98-0443-1
My appt. exp. Dec. 16, 2009

Dianne K West
NOTARY PUBLIC in and for the State of Nevada
My Commission Expires: 12-16-09

[SEAL]