IN THE SUPREME COURT OF THE STATE OF NEVADA

COYOTE SPRINGS INVESTMENT, LLC; LINCOLN COUNTY WATER DISTRICT; AND VIDLER WATER COMPANY, INC., Appellants, vs. ADAM SULLIVAN, P.E., NEVADA STATE ENGINEER, DIVISION OF WATER RESOURCES, DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, Respondent.	Electronically Filed Dec 27 2022 03:06 PM Elizabeth A. Brown Clerk of Supreme Court **Supreme Court No. 85137** District Court Case No. A816761

JOINT APPENDIX

VOLUME 2

APPENDIX – CHRONOLOGICAL TABLE OF CONTENTS

			000288
Order 1169		2	JA_000289-000299
Ruling 5712		2	JA_000300-000322
Ruling 5987		2	JA_000323-000326
Ruling 6255		2	JA_000327-000357
A Regional Interbasin Ground-Water System in the White River Area, Southeastern Nevada		2	JA_000358-000381
Settlement agreement Among the State Engineer, State of Nevada, Tracy Taylor, P.E., Nevada State Engineer, Jason King, P.E., Acting Nevada State Engineer, Lincoln County Water District and Vidler Water Company		2	JA_000382-000397
Excerpt from Center for Biological Diversity. Groundwater Management and the Muddy River		2	JA_000398

Springs, Report in Response to Nevada State Engineer Order 1303. Tom Meyers.			
Excerpts from Rebuttal Report – Tom Meyers		2	JA_000399-000404
Amended Stipulation for Withdrawal of Protests		2	JA_000405-000416
Coyote Spring Valley Water Supply		2	JA_000417-000419
US Dept. of Interior Memorandum Request for Formal and Informal Consultation on the Kane Springs Valley Groundwater Development Project in Lincoln County		2	JA_000420-000487
Excerpts of Testimony of Richard K. Waddell on Behalf of U.S. National Park Service		2	JA_000488
Excerpts of Testimony of Richard K. Waddell on Behalf of U.S. National Park Service		2	JA_000489
Excerpt of Post-Hearing Brief of Nevada		2	JA_000490

Cogeneration Associates Nos. 1 and 2 pertaining to Amended Notice of Hearing Interim Order #1303 Following the Hearing Conducted September 23, 2019, Through October 4, 2019, Before the Nevada State Engineer			
Excerpts of Hearing for 1303 on 09/23/2019		3	JA_000491-000494
Excerpts of Hearing for 1303 on 09/24/2019		3	JA_000495-000500
Excerpts of Hearing for 1303 on 09/25/2019		3	JA_000501-000505
Excerpts of Hearing for 1303 on 09/26/2019		3	JA_000506-000510
Excerpts of Hearing for 1303 on 09/27/2019		3	JA_000511-000515
Excerpts of Hearing for 1303 on 09/30/2019		3	JA_000516-000521
Excerpts of Hearing for 1303 on 10/01/2019		3	JA_000522-000526
Excerpts of Hearing for 1303 on 10/02/2019		3	JA_000527-000531
Excerpts of Hearing for 1303		3	JA_000532-

on 10/03/2019			000536
Excerpts of Hearing for 1303 on 10/04/2019		3	JA_000537-000541
Orders Granting Motions to Intervene	02/26/2021	3	JA_000542-000545
Coyote Springs Investment, LLC's Opening Brief on Petition for Judicial Review	08/27/2021	3	JA_000546-000614
Lincoln County Water District and Vidler Water Company, Inc.'s Opening Brief	08/27/2021	3	JA_000615-000709
Respondents' Answering Brief	11/23/2021	4	JA_000710-000762
Minute Order	12/03/2021	4	JA_000763-000764
Coyote Springs Investment, LLC's Reply in Support of Opening Brief	01/11/2022	4	JA_000765-000802
Lincoln County Water District and Vidler Water Company, Inc.'s Reply Brief	01/11/2022	4	JA_000803-000866
Transcript re: Petition for Judicial Review	02/14/2022	5	JA_000867-001056
Transcript re: Petition for Judicial Review	02/15/2022	5-7	JA_001057-001382
Transcript re: Petition for Judicial Review	02/16/2022	7-8	JA_001383-001678

Transcript re: Petition for Judicial Review	02/17/2022	8-9	JA_001679-001938
Findings of Fact, Conclusions or Law, and Order Granting Petitions for Judicial Review	04/19/2022	9	JA_001939-001978
Coyote Springs Investment, LLC's Motion for Attorney Fees	05/05/2022	9	JA_001979-001998
Appendix of Exhibits to Coyote Springs Investment, LLC's Motion for Attorney Fees	05/05/2022	10	JA_001999-002220
Lincoln County Water District's and Vidler Water Company, Inc.'s Motion for Attorneys' Fees	05/10/2022	11	JA_002221-002386
Errata Providing Exhibit to Declaration of Karen A. Peterson in Support of Lincoln County Water District's and Vidler Water Company, Inc.'s Motion for Attorney's Fees	05/11/2022	11	JA_002387-002401
State Engineer's Omnibus Opposition to Respective Motions for Attorney's Fees	05/19/2022	12	JA_002402-002507
Lincoln County Water District's and Vidler Water Company, Inc.'s Reply in Support of Motion for Attorneys' Fees	06/27/2022	12	JA_002508-002518

Coyote Springs Investment, LLC's Reply in Support of Motion for Attorney Fees	06/27/2022	12	JA_002519-002528
Recorder's Transcript re: Lincoln County Water District's and Vidler Water Company, Inc.'s Motion for Attorney Fees; Coyote Springs Investment, LLC's Motion for Attorney Fees; State Engineer's Motion to Retax Petitioners Apex Holding Company, LLC and Dry Lake Water, LLC's Costs	07/05/2022	12	JA_002529-002554
Order Denying Coyote Springs Investment, LLC's and Lincoln County Water District and Vidler Water Company, Inc.'s Motions for Attorney's Fees	07/22/2022	12	JA_002555-002564
Notice of Entry of Order Denying Coyote Springs Investment, LLC's and Lincoln County Water District and Vidler Water Company, Inc.'s Motions for Attorney's Fees	07/22/2022	12	JA_002565-002578
Coyote Springs Investment, LLC's Notice of Appeal	08/04/2022	12	JA_002579-002584
Lincoln County Water District's and Vidler Water Company, Inc.'s	08/09/2022	12	JA_002585-002587

Notice of Appeal			

APPENDIX – ALPHABETICAL TABLE OF CONTENTS

Coyote Springs Investment, LLC's Reply in Support of Motion for Attorney Fees	06/27/2022	12	JA_002519-002528
Coyote Springs Investment, LLC's Reply in Support of Opening Brief	01/11/2022	4	JA_000765-000802
Errata Providing Exhibit to Declaration of Karen A. Peterson in Support of Lincoln County Water District's and Vidler Water Company, Inc.'s Motion for Attorney's Fees	05/11/2022	11	JA_002387-002401
Excerpt from Center for Biological Diversity. Groundwater Management and the Muddy River Springs, Report in Response to Nevada State Engineer Order 1303. Tom Meyers.		2	JA_000398
Excerpt of Post-Hearing Brief of Nevada Cogeneration Associates Nos. 1 and 2 pertaining to Amended Notice of Hearing Interim Order #1303 Following the Hearing Conducted September 23, 2019, Through October 4, 2019, Before the Nevada State Engineer		2	JA_000490
Excerpts from Rebuttal Report –		2	JA_000399-

Tom Meyers			000404
Excerpts of Hearing for 1303 on 09/23/2019		3	JA_000491-000494
Excerpts of Hearing for 1303 on 09/24/2019		3	JA_000495-000500
Excerpts of Hearing for 1303 on 09/25/2019		3	JA_000501-000505
Excerpts of Hearing for 1303 on 09/26/2019		3	JA_000506-000510
Excerpts of Hearing for 1303 on 09/27/2019		3	JA_000511-000515
Excerpts of Hearing for 1303 on 09/30/2019		3	JA_000516-000521
Excerpts of Hearing for 1303 on 10/01/2019		3	JA_000522-000526
Excerpts of Hearing for 1303 on 10/02/2019		3	JA_000527-000531
Excerpts of Hearing for 1303 on 10/03/2019		3	JA_000532-000536
Excerpts of Hearing for 1303 on 10/04/2019		3	JA_000537-000541
Excerpts of Testimony of Richard K. Waddell on Behalf of U.S. National Park Service		2	JA_000488
Excerpts of Testimony of Richard K. Waddell on Behalf of U.S.		2	JA_000489

National Park Service			
Findings of Fact, Conclusions or Law, and Order Granting Petitions for Judicial Review	04/19/2022	9	JA_001939-001978
Lincoln County Water District and Vidler Water Company, Inc.'s Opening Brief	08/27/2021	3	JA_000615-000709
Lincoln County Water District and Vidler Water Company, Inc.'s Petition for Judicial Review	07/13/2020	1	JA_000033-000117
Lincoln County Water District and Vidler Water Company, Inc.'s Reply Brief	01/11/2022	4	JA_000803-000866
Lincoln County Water District's and Vidler Water Company, Inc.'s Motion for Attorneys' Fees	05/10/2022	11	JA_002221-002386
Lincoln County Water District's and Vidler Water Company, Inc.'s Reply in Support of Motion for Attorneys' Fees	06/27/2022	12	JA_002508-002518
Lincoln County Water District's and Vidler Water Company, Inc.'s Notice of Appeal	08/09/2022	12	JA_002585-002587
Minute Order	12/03/2021	4	JA_000763-000764
Notice of Entry of Order Denying	07/22/2022	12	JA_002565-

Coyote Springs Investment, LLC's and Lincoln County Water District and Vidler Water Company, Inc.'s Motions for Attorney's Fees			002578
Notice of Hearing		1	JA_000205-000225
Notice of Pre-Hearing Conference		1	JA_000244-000249
Order 1169		2	JA_000289-000299
Order 1169A		2	JA_000284-000288
Order 1303		1	JA_000186-000204
Order 1309		1	JA_000118-000185
Order Denying Coyote Springs Investment, LLC's and Lincoln County Water District and Vidler Water Company, Inc.'s Motions for Attorney's Fees	07/22/2022	12	JA_002555-002564
Orders Granting Motions to Intervene	02/26/2021	3	JA_000542-000545
Recorder's Transcript re: Lincoln County Water District's and Vidler Water Company, Inc.'s Motion for	07/05/2022	12	JA_002529-002554

Attorney Fees; Coyote Springs Investment, LLC's Motion for Attorney Fees; State Engineer's Motion to Retax Petitioners Apex Holding Company, LLC and Dry Lake Water, LLC's Costs			
Respondents' Answering Brief	11/23/2021	4	JA_000710-000762
Ruling 5712		2	JA_000300-000322
Ruling 5987		2	JA_000323-000326
Ruling 6255		2	JA_000327-000357
Settlement agreement Among the State Engineer, State of Nevada, Tracy Taylor, P.E., Nevada State Engineer, Jason King, P.E., Acting Nevada State Engineer, Lincoln County Water District and Vidler Water Company		2	JA_000382-000397
State Engineer Record on Appeal Documents	11/09/2020	1	
State Engineer's Omnibus Opposition to Respective Motions for Attorney's Fees	05/19/2022	12	JA_002402-002507

Transcript re: Petition for Judicial Review	02/14/2022	5	JA_000867-001056
Transcript re: Petition for Judicial Review	02/15/2022	5-7	JA_001057-001382
Transcript re: Petition for Judicial Review	02/16/2022	7-8	JA_001383-001678
Transcript re: Petition for Judicial Review	02/17/2022	8-9	JA_001679-001938
Transcripts of Proceedings – Public Hearing Pre-Hearing Conference on 08/08/2019		2	JA_000250-000283
US Dept. of Interior Memorandum Request for Formal and Informal Consultation on the Kane Springs Valley Groundwater Development Project in Lincoln County		2	JA_000420-000487

CERTIFICATE OF SERVICE

I certify that on the 27th day of December 2022, I served a copy of **JOINT APPENDIX** upon all counsel of record:

☐ BY MAIL: I placed a true copy thereof enclosed in a sealed envelope addressed as follows:

☐ BY FACSIMILE: I transmitted a copy of the foregoing document this date via telecopier to the facsimile number shown below:

■ BY ELECTRONIC SERVICE: by electronically filing the foregoing document with the Nevada Supreme Court's electronic filing system, which sends an electronic notification to the following parties at the email address on file with the Nevada Supreme Court:

Coyote Springs Investment, LLC
Emilia Cargill (Wingfield Nevada Group)
William L Coulthard (Coulthard Law PLLC)
Bradley J. Herrema (Brownstein Hyatt Farber Schreck, LLP/Las Vegas)
Kent R. Robison (Robison, Sharp, Sullivan & Brust)
Hannah E. Winston (Robison, Sharp, Sullivan & Brust)

Lincoln County Water District
Dylan V. Frehner (Lincoln County District Attorney)
Wayne O. Klomp (Great Basin Law)
Vidler Water Company, Inc.
Karen A. Peterson (Allison MacKenzie, Ltd.)

///

///

Adam Sullivan, P.E.

James N. Bolotin (Attorney General/Carson City)
Jeffrey M. Conner (Attorney General/Carson City)
Aaron D. Ford (Attorney General/Carson City)
Steven G. Shevorski (Attorney General/Las Vegas)
Laena St Jules (Attorney General/Carson City)

DATED this 27th day of December, 2022.

/s/ Christine O'Brien
Employee of Robison, Sharp, Sullivan & Brust

In The Matter Of:

State of Nevada

Department of Conservation and Natural Resources

August 8, 2019

Capitol Reporters

123 W. Nye Lane, Ste 107

Carson City, Nevada 89706

Original File 8-8-19wtrcoyot_1.txt

Min-U-Script® with Word Index

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF WATER RESOURCES

BEFORE MICHELINE N. FAIRBANK, HEARING OFFICER

IN THE MATTER OF THE ADMINISTRATION AND MANAGEMENT OF THE LOWER WHITE RIVER FLOW SYSTEM WITHIN COYOTE SPRING VALLEY HYDROGRAPHIC BASIN (210), A PORTION OF BLACK MOUNTAINS AREA HYDROGRAPHIC BASIN (215), GARNET VALLEY HYDROGRAPHIC BASIN (216), HIDDEN VALLEY HYDROGRAPHIC BASIN (217), CALIFORNIA WASH HYDROGRAPHIC BASIN (218), AND MUDDY RIVER SPRINGS AREA (AKA UPPER MOAPA VALLEY HYDROGRAPHIC BASIN (219).
_____/

TRANSCRIPT OF PROCEEDINGS

PUBLIC HEARING

PRE-HEARING CONFERENCE

THURSDAY, AUGUST 8, 2019

Reported by: Michel Loomis, RPR

APPEARANCES:

Micheline N. Fairbank, Hearing Officer

Melissa Flatley, Chief of the Hearing Officer Section

For SNWA:	Taggart & Taggart, Ltd. By: Paul G. Taggart, Esq. Carson City, Nevada
For CSI:	Robison, Belaustegui, Sharp & Low By: Kent R. Robison, Esq. Reno, Nevada
For NV Energy:	Justina Caviglia, Esq.
	Allison MacKenzie By: Karen Peterson, Esq. Carson City, Nevada
For the City of North Las Vegas:	Andy Moore, Esq.
For Lincoln County Water District:	Dylan Frehner, Esq.
For NCA:	Alex Flangas, Esq.
For the Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-Day-Saints:	Kaempfer Crowell By: Severin Carlson, Esq.
For Moapa Band of Paiutes:	Beth Baldwin, Esq.
Also Present:	Jeff Henkelman Sarah Peterson Peter Fehmy Karen Glasgow Patrick Donnelly

APPEARANCES:

Also Present:	Kathryn Brinton Gary Karst Levi Kryder Carl Savely Glen Knaves Sue Braumiller Mark Stock Steve King Steven Anderson Colby Pellegrino Scott Millington Greg Morrison Joseph Davis Tim O'Connor Rick Felling Greg Bushner Emilia Cargill Lonnie Roy Wade Poulsen Dwight Smith James Bolotin Brad Herrera

CARSON CITY, NEVADA, THURSDAY, AUGUST 8, 2019, A.M. SESSION

-o0o-

HEARING OFFICER FAIRBANK: Okay. Good morning. This is Micheline Fairbank, and I'm going to go ahead and get the hearing started, or the prehearing conference proceeding for the Lower White River Flow System Order 1303 hearing on the solicited reports.

I'm Micheline Fairbank and I'll be operating as the hearing officer for today's purposes. With me is Melissa Flatley, and she's the chief of our hearing section, and -- and so we'll go ahead and be conducting the hearing.

We do have a sign-in sheet, and so if all the people that are here present in Carson City, if you have not signed in on the sign-in sheet, if you'll make sure you do so before the -- before you leave today.

And for those individuals who are appearing on the phone conference, I think I have most everybody who accepted the calendar invite and so we'll go ahead and put you on the sign-in sheet via those calendar invites.

However, if you are calling in and you did not accept a calendar invite, if you'll please send an email so we can make sure we have your participation and attendance noted for the record.

Page 5

So this is the time set for the hearing, the prehearing conference for the Order 1303 reports that have been solicited by the State Engineer's office.

And as we've spoken at the last public workshop, the hearing on the Order 1303 reports is going to commence on September 23rd, but prior to issuing a scheduling order, there's obviously a bunch of logics we need to work out and want to make sure we have a clear playing field which will be outlined also in that scheduling order for all the parties and participants to this proceeding.

As we've kind of noted all a long, this is a different format than most of our protested hearings. There's not necessarily -- there's not an Applicant and a Protestant.

But what this is is really an opportunity for the participants and those stakeholders in the Lower White River Flow System to come forth and have an opportunity to present their reports that they've submitted or rebuttal reports that have been submitted to allow the State Engineer to go ahead and take that under advisement in making further determinations with respect to the issues.

So, just to go ahead and get started, I'm just going to state we're a little bit limited in time this morning, so we have to complete this by the noon hour because this room is actually being occupied this afternoon as well.

Page 6

So we're not going to extend past the lunch hour. And so I'm going to go ahead and give us a quick road map of what we are intending to accomplish during this meeting this morning, or this hearing this morning.

So the purpose of this conference is to go over the purpose of the Order 1303 hearing. So what are our expectations and what our goals for the State Engineer's office for having that hearing?

To address the timing and length of the hearing. To discuss the sequence of presentation by the different participants.

To go over procedures and other administrative matters relating to the Order 1303 hearing and to determine the time for disclosures of witnesses and evidence anticipated to be filed and relied upon during the hearing. And then to address any other questions.

So, just to kind of provide a summary for the purpose of the hearing. The purpose of the hearing is to consider the reports solicited pursuant to Order 1303.

And so the State Engineer views the purpose of Order 1303 and the report submitted in response to the solicitation as an opportunity for the participants who have or will have filed reports, rebuttal reports an opportunity to explain their positions and conclusions and to respond to any

Page 7

criticism of those positions and conclusions presented by other parties through rebuttal reports.

The participants are the stakeholders who have submitted either a report or rebuttal report or both a report and rebuttal report.

Individuals who do not submit a report will be allowed to provide public comment, but they're not participants for the purpose of presenting testimony, evidence or cross-examining.

And just because a participant has submitted a report or rebuttal report does not require to party to something evidence beyond their reports.

So the State Engineer will consider all reports and opinions submitted, regardless of whether there's -- actual parties proffer witnesses or testimony.

Participants will be limited to offering testimony and evidence relating to the most salient conclusions, including data, evidence and other information supporting those conclusions.

So, the idea is that participants who have submitted reports, the State Engineer and staff, we will have reviewed those reports prior to the commencement of the hearing and the State Engineer staff within the Division of Water Resources, we are well qualified to review, consider,

Page 8

analyze reports, including the data and evidence relied upon in preparing opinions and rendering those -- and rendering the conclusions within the reports.

And the State Engineer's expectation and intention for this hearing is that the parties who have submitted either a report or rebuttal reports will be permitted an opportunity to provide limited testimony and to submit evidence identifying those salient conclusions and findings contained in those reports.

And really the purpose is to direct the State Engineer and our staff to the data, information and relevant evidence within the State Engineer's administrative record or to provide that evidence in support of those conclusions.

So, this isn't -- the hearing is not intended to have everybody and every participant to go through each and every sub detail of their reports.

The idea is that we want you to go ahead and hit the high points, point us to those conclusions, point us in the direction what do you think is substantive and important for our office to really consider, but the intent is that we're trying to go ahead and keep this relatively limited and focused. We have the capability to go ahead and examine all the detail and such.

So the hearing is not and the State Engineer will

Page 9

not permit participants to address each and every detail. And the purpose is to afford participants the opportunity to highlight the points and to direct staff components which are the most significant matters as is addressed in the Order 1303 solicitation which are the geographic boundary of hydrologically connected groundwater and surface water systems comprising the Lower White Water River Flow System.

The information obtained from the Order 1169 aquifer test, and subsequent to the aquifer test, the Muddy River Headwater Spring Flow as it relates to aquifer recovery since the completion of the aquifer test.

The long term annual quantity of groundwater that maybe pumped from the Lower White River Flow System, including relationships between location of pumping on discharge to the Muddy River Springs and the capture of Muddy River flow.

The effects of movement on water rights between alluvial wells and carbonate wells on deliveries of senior decreed rights in the Muddy River and other matters participants have included in their reports that they believe to be relevant in the State Engineer's analysis.

MR. FLANGAS: A question?

HEARING OFFICER FAIRBANK: Yes.

MR. FLANGAS: When you say "other matters relevant", are you limiting to that to the hydrology, other

Page 10

matters relevant to the hydrology or any other matter relevant period?

HEARING OFFICER FAIRBANK: So it's not -- it's not any other matter relevant period. It's relevant to these particular issues and questions that we're asking.

And so, and I'm going to talk about this and we've spoken about this before, is that really this is a threshold reporting aspect, that this is part of a multi-tiered process in terms of determining the appropriate management strategy to the Lower River Flow System.

And in order for the office to go ahead and start to engage in working with the -- with the community, working with water right holders and determining what an appropriate management strategy is, there's threshold matters that have to be decided and determined.

And that is those particular, those four components that we've solicited in the Order 1303 report. This larger substantive policy determinations is not part of this particular proceeding.

That's part of later proceedings, but this is what has to occur in order to inform those future policy determinations and decisions.

And while some people have addressed some policy interplays, because there are some policy interplays into some

Page 11

of these findings and determinations, really this is more about a scientific analysis and data analysis.

MR. FLANGAS: Thank you for that clarification.

HEARING OFFICER FAIRBANK: So second, the purpose of the hearing is limited to those issues I've outlined and these particular issues must be addressed to decide the threshold matter.

So, kind of to follow up on Alex's question, to the extent participants intend or desire to spend time addressing future policy considerations which are not encompassed within the issues specifically identified in the solicitation of the reports, those matters will not be considered during these proceedings.

The State Engineer anticipates that any future decision will address -- that the future decision coming out of this Order 1303 hearing will address the following issues.

The geographic boundary of the hydrologically connected water system comprising the Lower White River Flow System. To whether or not that's a singular basin, whether or not it's encompassing multiple basins, that's going to be a decision that is ultimately determined by the State Engineer following this hearing.

The quantity of water that may be sustainably developed within the Lower White River Flow System without

Page 12

conflicting with senior rights, and whether there should be any restrictions or limitations on the movement of points of diversion within the LWRFS and other issues which will provide the framework for making future management decisions within the LWRFS.

And the purpose of the hearing is not to resolve or address allegations of conflict between groundwater pumping within the LWRFS and Muddy River decreed rights. That is not the purpose of this hearing and that's not what we are going to be deciding at this point in time.

The purpose of the hearing is to determine what the sustainability is, what the impact is on decreed rights, and then addressing and resolving allegations of conflict should that be a determination that will be addressed in, at a future point in time.

Also, I want to provide a little bit of kind of a framework for parties to understand what our office is looking at when we're reviewing the reports received in response to our solicitation.

Our office is looking for the following, and this is not a comprehensive list, but this is just kind of a framework.

We're looking for how conclusions are supported by the available data.

Page 13

How those conclusions differ from positions our office has previously taken.

Whether there's new interpretations of data based upon what has been observed since the conclusion of the Order 1169 aquifer test.

Whether the conclusions that are drawn are sufficiently supported by the available data and cited to data.

Whether the conclusions and data and evidence relied upon in rendering those conclusions are independently reproducible and verifiable.

So if our office can't go through and reproduce the data that you're relying upon in terms of making your conclusions, it's going to be difficult for us to go ahead and substantiate those findings. And we're also going to be looking for commonalities and conclusions amongst the various participants.

So, again, that's a general overview, it's not an exhaustive list of what we're looking for.

So that I just kind of wanted to provide everybody a little bit of a framework of what we anticipate the Order 1303 hearing to be encompassing and the little bit about what the direction and the lane in which we're intending to operate in.

Page 14

So moving onto the next item on kind of our agenda for this morning is the timing and the length of the hearing.

So, as I mentioned before, we're scheduling the hearing to commence on September 23rd, 2019. At this point in time, we're anticipating that the hearing will be held from 8:30 a.m. until 5 o'clock p.m. with an hour and 30 minute lunch break and the hearing will be set for two weeks and will end on October 4th.

So, again, as I've outlined, the purpose of the hearing is limited and the expectation of the parties will distill the reports and conclusions into a succinct presentation of the salient opinions and direct our office to the data and other information supporting of those conclusions.

And, again, the Division of Water Resources has the expertise and experience to review the reports submitted and we are actively engaged in reviewing all of the reports that have been submitted for our office and every report will be submitted prior to the hearing on September 23rd.

So the State Engineer does not desire participants to rehash the reports, and on that basis, the hearing is being set for two weeks. And we believe this should be more than adequate time for participants to present

Page 15

their opinions, respond to any rebuttal, and for inclusion for rebuttal opinions.

So we've been looking at what we're thinking for the hearing structure, and certainly this is going to be a point of discussion this morning, but the State Engineer's proposing the hearing be structured so that the first five days are assigned to those participants who have submitted substantial initial reports.

So in the sense we've had a variation as everybody has available, if they haven't seen already on our website, all of the reports that have been submitted to our office are available on the website under the news tab and then there's a tab for LWRFS and then we have all the reports within there.

And so we've been reviewing the reports and there are some that are more comprehensive than other reports. And so the more comprehensive reports and the more substantial ones that are addressing a more broad variety of the particular issues, we see those first, those five participants as being the Moapa Band of Indians, the National Park Service, the United States Fish and Wildlife Service, Coyote Spring Investments, and the Southern Nevada Water Authority.

And so what we are considering, and certainly this is part of the dialogue, is that for those first five

Page 16

days, each one of those parties, their reports and cross-examination of those parties' witnesses will occur in one day. So we'll assign a day to each of those parties.

MR. ROBISON: Sorry, could you repeat that, please?

HEARING OFFICER FAIRBANK: So each of those parties will be assigned one day, and so what we're trying to do is we are trying to balance the time and so that -- that one day would encompass both the presentation of that party's witnesses and evidence as well as an equal amount of time to go ahead and cross-examine.

MR. ROBISON: Does that one day include a rebuttal?

HEARING OFFICER FAIRBANK: Yes. Yes, that will include the rebuttal.

MR. ROBISON: Thank you. Kent Robison for CSI Projects.

HEARING OFFICER FAIRBANK: So the next participants we believe will need more than probably about a half day and perhaps a little more, but about a half day, but not a full day, would be the Moapa Valley Water District, Vidler, Lincoln County, the City of North Las Vegas and the centers -- Center for Biologic Diversity.

So we believe we should be able to move through

Page 17

those participants in not more than three days. Probably about -- and so, optimally, we're trying to do that within two and a half days.

And, finally, we believe that the remaining time will be sufficient to address Dry Lake and their Dry Lake Georgia Pacific and Republic Services, Great Basin Water Network, Technichrome and any rebuttal report submissions.

Yes, Mr. Robison.

MR. ROBISON: The one day that is assigned to the major report, the first week, that day includes cross-examination of whatever is presented by that person?

HEARING OFFICER FAIRBANK: Yes.

MR. ROBISON: That entity.

HEARING OFFICER FAIRBANK: Um-hum.

MR. ROBISON: Okay. Thank you.

HEARING OFFICER FAIRBANK: And, again, the idea is we have the capacity to go ahead and review the reports and the evidence and the data relied upon, but this is the opportunity for the participants to really highlight the salient conclusions and point us in the direction of what the evidence is that supports those conclusions.

MR. TAGGART: Could I just ask a question?

HEARING OFFICER FAIRBANK: Yes.

MR. TAGGART: For the record, Paul Taggart, for

Page 18

Southern Nevada Water Authority. In your view, have all the parties that you just listed submitted reports?

HEARING OFFICER FAIRBANK: No. There's still rebuttal reports, and we anticipate at this point in time, we'd obviously -- rebuttal reports are not due until next Friday. But at this point in time, I'm aware of probably at least three parties that will be submitting rebuttal reports.

But the rebuttal reports, again, they haven't submitted an initial report, so it's going it be a truncated period of time in which to go ahead and present their, you know, their -- their rebuttal opinions or to address those opinions to the extent necessary.

And part of the idea, and just to be completely candid with everyone, is as we move through these different processes and get through the different parties, a lot of the different issues and rebuttal issues are going to have been addressed.

And kind of the idea is starting out with the more substantive reports and the more substantive analysis first is that it's going to have a funnel effect in the extent that people will have had an opportunity to go ahead, get a lot of either evidence and conclusions that they have either supported already presented.

And so we're not going to have to spend a lot of

Page 19

duplicative time restating the same opinions or the same findings or the same interpretations of data. And also there's going to be opportunities for people to go an ahead and get the cross-examination or the challenging of evidence and opinions.

And so the rebuttal reports, while I understand and appreciate that some of those parties are going to want to go ahead and at least have a witness, present some of the data relied upon in rendering why they believe that certain conclusions are not supported by other parties.

Most of that will have and should have been drawn out during the proceedings leading up to it.

Yes, Kent.

MR. ROBISON: Yes. Is the order of presentation that which you just related for the major report -- reporting parties? Is that the order, or is that to be determined?

HEARING OFFICER FAIRBANK: That's to be determined. We'll have that discussion, but that's kind of a general order of which I've -- we've been contemplating at this point in time.

MR. ROBISON: Thank you.

HEARING OFFICER FAIRBANK: Yes.

MS. GLASGOW: Hi, Karen Glasgow for the Department of Interior representing the National Park Service.

Page 20

With respect to questioning or cross-examination, will the -- your office be participating in that, or is it just going to be report writers, rebuttal writers only?

HEARING OFFICER FAIRBANK: No. Our office will be asking questions. I mean, we always reserve our right during hearings to ask questions of the participants and of witnesses.

MS. GLASGOW: Thank you.

MR. MORRISON: Excuse me, Greg Morrison, Muddy Valley Water District. I understand the structure that you're looking at as far as the substance of the initial reports that were submitted.

I think my client anticipated submitting much more of a substantial rebuttal report and as the community who is essentially in the absolute heart of this entire matter, I'm not sure if we're a hundred percent comfortable being relegated to this second day truncated status in our participation.

HEARING OFFICER FAIRBANK: And certainly -- and that's why we're having the dialogue and the conversation is trying to balance out the time within that two-week window of time to allow parties, you know, a reasonable opportunity.

But, again, the idea is also to keep everything very, you know, focused and, again, have people highlight the

Page 21

salient points, the salient opinions and point us in the direction.
And we'll talk -- we'll talk about balancing this out here in a little while as well.
MR. MORRISON: Okay.
HEARING OFFICER FAIRBANK: So just to kind of -- so we understand that the NV Energy will be submitting a rebuttal report.
MS. CAVIGLIA: That is correct.
HEARING OFFICER FAIRBANK: Thank you, Justina. We also understand that Alex, I think.
MR. FLANGAS: Nevada Cogeneration.
HEARING OFFICER FAIRBANK: So, Nevada Cogen will be submitting a rebuttal report.
Are there any other parties who did not submit an initial report who will be submitting a rebuttal report?
Steve?
MR. KING: Steve King for Muddy Valley Irrigation Company. We will be submitting a rebuttal report.
HEARING OFFICER FAIRBANK: And does anybody know what the LDS Church, and the Church of --
MR. CARLSON: We haven't made a decision of -- at this point.
HEARING OFFICER FAIRBANK: Okay. And just

Page 22

because I'm trying to understand the number of participants so we can anticipate the window of time in which to try to balance everybody.
MR. CARLSON: Sev Carlson, for the record. I think in all likelihood we'll be monitoring closely what the City of Las Vegas will be --
HEARING OFFICER FAIRBANK: Okay.
MS. BRINTON: Kathryn Brinton for the Department of Interior, BLM. There's a chance we'll be joining with the Park Service, but we still haven't decided entirely what we're going to do.
HEARING OFFICER FAIRBANK: So, just to kind of understand, I mean, other than the Moapa Valley Water District, are there any other parties that believe that kind of the framework that we've outlined is unduly restrictive in terms of their ability to present their issues as the State Engineer has outlined the intent and purpose of the hearing?
MR. TAGGART: Yeah, again, Paul Taggart for Southern Nevada Water Authority. We think we'll need more than a day. We think we need a day and a half. And I think that we totally understand your effort to make presentations concise.
I think that we have three witnesses, and in anticipating the potential cross-examination time, we're

Page 23

just -- I mean, again, how do we manage how much time gets taken up on cross-examination, that's outside the control of the offering party.
So -- so, that's, you know, our view is we need a day and a half to make sure we have enough time to put on our presentation, there's enough time for cross-examination. And then we can put on our next witness.
But we will be concise as possible. I mean, we're imagining, you know, 45 minutes as a presentation on direct of a witness, then maybe another 45 minutes with the next witness, then maybe a half hour with the next.
But cross-examination is really difficult to anticipate. And just given my experience, you can eat up an entire half a day with one witness, even if direct is only 45 minutes, with the cross.
Particularly, if we have 10 or 12, I don't know how many parties are authorized to cross -- or how many parties have submitted reports, and therefore, would be authorized to cross-examine, but anyway, that's our point here.
HEARING OFFICER FAIRBANK: And so I think it's part of to follow up with a little bit, and I appreciate that, Mr. Taggart, is, you know, to follow up with regards to that, is -- you know, obviously our office is going to encourage the

Page 24

participants to, you know, be, you know, working to avoid redundancy in the cross-examination of witnesses.
Certainly if one party has elicited the information or a line the questioning that you intended to go ahead and address what that particular witness, we would like to avoid the redundancy. Not everybody has to, you know, as the saying goes, beat the dead horse.
And so, you know, that's what we're going to be looking for and that's one of the things that we're hoping will help maintain the time frame, and you know, obviously, you know, I -- for full transparency, in terms of what we're trying to do is, again, is we're trying to go ahead and keep that within that two-week period of time.
In all honesty, we still have to wait and see what rebuttal reports are submitted and we want to provide all the parties a reasonable opportunity, but not -- this isn't intended to become a six-week hearing.
If we to go ahead and extend the hearing once we get all the rebuttal reports in, the scheduling order will go ahead and account for that.
And so the concerns raised by the SNWA and the SNWA parties, as well as the Moapa Valley Water District, we'll take those under advisement in terms of setting the schedule, recognizing while we would -- we are endeavoring to

Page 25

not continue the hearing into the second week of October which would be the 7th, 8th.

If it's necessary in order to provide all the opportunities an adequate opportunity, we will continue -- the hearing will extend into that following week.

And so, I appreciate the feedback, because those are the type of things and, obviously, there's a bit of uncertainty not knowing how many rebuttal reports are going to be submitted.

MR. TAGGART: Well, and if I can, just to build on that, if -- if we go to day one and whoever that first party is can't get done, but we're all being, you know, efficient, we may find out quickly that this schedule, this time allocation isn't working completely and that's when we start talking about whether to continue on into the next week.

HEARING OFFICER FAIRBANK: Right. Well, so when we issued the scheduling order, the scheduling order will set out the days and times. And part of that is what we're going to try to talk about today is get an understanding of what the parties, you know, I understand that Moapa Valley Water District feels that a half of day would be unduly restrictive for their purposes.

I understand that SNWA believes that a day is unduly restrictive. And so we're going to take some of that

Page 26

feedback and we are going to develop the sequencing of the report of the participants' participation that is going to be set forth in the schedule order.

The scheduling order will also indicate that as necessary the hearing will continue, you know, day to day beyond that, as, you know, if necessary.

Yes, Mr. Robison.

MR. ROBISON: Rebuttal will overlap with cross-examination, so that provides some incentive to be succinct.

We are customarily and frequently restricted in time limitations in courtrooms, but that said, any major player that gets a day and a half, we want the same.

HEARING OFFICER FAIRBANK: And I also understand that's one of the other balancing interests.

MR. ROBISON: Thank you.

MR. TAGGART: And, again, just when we talk about rebuttal, we mean, like if I have a witness who had done a report and has a report, an initial report and rebuttal report, that witness will testify about both of those reports at the same time and then be subjected to cross-examination and then redirect and then questions of staff and then that witness would be done.

HEARING OFFICER FAIRBANK: Yes, that's correct.

Page 27

MR. DONNELLY: Patrick Donnelly, Center for Biological Diversity. I think -- I'm checking with our hydrologist about half day and whether that's adequate. I would think a half day plus, probably.

But I think we would be as -- as or more concerned about the structure and equity of the cross-examination process, particularly because there would be a week and a half before we get to go and could probably elicit a lot of our points during that process if it is structured properly. So, what is that going to look like?

HEARING OFFICER FAIRBANK: Well, the idea is that the cross-examination process will be not less than the amount of time that a participant -- that a particular witness was subject to their direct examination.

MR. ROBISON: By all parties.

HEARING OFFICER FAIRBANK: What?

MR. ROBISON: I'm sorry, by all parties.

HEARING OFFICER FAIRBANK: By all parties.

MR. ROBISON: Thank you.

HEARING OFFICER FAIRBANK: And, again, that's why we're encouraging the parties to go ahead and, you know, be cognitive of what the other questions and to the extent that there's parties that have similar perspectives, similar conclusions, similar opinions that, you know, perhaps that,

Page 28

you know, certainly can't tell people how to go ahead and manage their own cases, but coordination and communication amongst the parties is certainly encouraged.

But at the same time, there are going to be a lot more individuals intending to cross-examine a witness or an expert at any given time.

So there's probably going to be, again, it's we're trying to provide an opportunity for everybody to have -- have an opportunity to do that -- to have -- to have an opportunity to elicit and challenge the conclusions and evidence relied upon by a particular witness if that's so necessary for their positions and how they believe the State Engineer should be evaluating the conclusions.

But it's not going to be a free for all, and so we're going to be trying to balance that to the best of our ability.

In terms of assigning the number of minutes per each party, I just don't -- I think that's just unduly impossible. It's not going to happen at that point in time. So we're just going to have to work it out, and our -- our role and responsibility is to go ahead and try to manage the progress of the hearing to assure that the parties are all given an opportunity, you know, a fair opportunity.

Yes, Mr. Flangas.

Page 29

MR. FLANGAS: Alex Flangas, Nevada Cogeneration. In that vein, trying to be as efficient as possible, and given that there's going to be limited period of time for rebuttal, ultimate rebuttal, I'm contemplating the idea of whether the state would consider allowing cross-examination to be, for example, if a particular period of time was allowed for Nevada Cogeneration, whether my cross-examination could be by me or by my expert, specifically.

Because, let's be candid, my expert may have questions that they can phrase right then on the spot better than I can phrase and I don't want to be sitting, consulting with my expert then asking a question, then consulting with my expert and asking a question and wasting time.

At the same time, we all know in a courtroom, typically, you have one person that's allowed to cross-examine, not two, and this is not a courtroom.

So I'm wondering if there's any thought given to whether the cross-examination could literally be by experts of experts which I see happen from the State quite often where the State's expert is the one doing the cross examining, not an attorney.

HEARING OFFICER FAIRBANK: Mr. Flangas, I don't have an answer for that right off the top of my because we haven't contemplated that particular scenario, but something

Page 30

we will certainly take under advisement and we can either address when we have the scheduling order or address that at the commencement of the proceedings on the 23rd.

MR. DONNELLY: This is Patrick Donnelly, Center for Biological Diversity. I would echo that. I think that's a really important thing I think for our expert to do cross-examination. If we could hear that in the order and not the day of the hearing, that would be very helpful.

HEARING OFFICER FAIRBANK: So, I'm going to get to the timing, like the sequence of presentation of participant reports a little bit later.

But I'm going to move to the hearing procedures and kind of other administrative matters that might then help inform some of the other sequence issues or the sequence concerns, questions.

So, when the scheduling order setting the September 23rd hearing is issued, just let everyone know the scheduling order will come out the week of August 19th. So, it will come out the week following the submission of rebuttal reports.

And the scheduling order will include a list identifying all of the documents and records and evidence that the State Engineer will be taking administrative notice of for the purpose of the Order 1303 hearing.

Page 31

So attached to the scheduling order is going to be an Exhibit and it's going to identify each and everyone of the documents and records that are currently before the State Engineer within the office of the State Engineer that he will be taking administrative notice of in advance of the Order 1303 hearing.

So the State Engineer is going to request that with the exception of reports and rebuttal reports that will be listed, those will also be listed on that list of the documents and evidence before the State Engineer that he is taking administrative notice of, any documents and evidence that is identified in that list not being reintroduced for the purpose of this hearing.

So we would ask that the parties endeavor to the extent possible to refer back to those particular documents as the administrative record in this proceeding is already extremely voluminous and so we don't need a whole lot more redundancy of documents and records.

Additionally, to the extent that any party has, any participant has any evidence that is not identified on that list for inclusion for the State Engineer's consideration in rendering his decisions in this particular matter, and that any participant intends to rely upon or believes to be relevant to the State Engineer's decision, we're asking that

Page 32

the participant assure that such evidence is submitted prior to the comment of the hearing on September 23rd.

So in short, what we're going to do is list out everything that we believe is part of our administrative record and what we're going to be taking administrative notice of for purposes of this hearing.

And if there's something in there that you want to refer to, please feel free to refer to it. If you need to provide excerpts of it, that's fine as well. Certainly, some of these things are going to be quite voluminous. Most of these documents and records are available on our website.

But the other side if it, is if that's something that's not listed and you think it's important for our consideration, please get it in front of us before the hearing, and you're going to have an opportunity to go ahead and provide at that point in time.

Yes, Mr. Taggart.

MR. TAGGART: Thank you. The -- will those documents on that list have document numbers, State Engineer documents on those already and start the exhibit numbering process at that point?

HEARING OFFICER FAIRBANK: We will have a -- we will have them marked out, yes.

MR. TAGGART: Okay.

Page 33

HEARING OFFICER FAIRBANK: We'll have them Bate stamped and numbered out.
MR. TAGGART: Okay. And then will they be available, I think it's important that they be made available, and I don't want to burden your office more than it already is, but you know, if it was put on a website and all, not only is there the list, but then on a website someone could go in and every one of those documents is there on the website, then we don't have to serve everyone, or you don't have to serve everyone.
Is that what you contemplate, or --
HEARING OFFICER FAIRBANK: We're hoping to accomplish that. Again, it's a very voluminous record at this point in time, and so hoping to get everything that ties in a formatted manner.
I'll be completely candid with you, some it is a bunch data spread sheets and we're having a hard time getting those formatted into a mechanism that you can actually have them in a readable format.
MR. TAGGART: Okay.
HEARING OFFICER FAIRBANK: So to the extent where possible, we're trying to get everything into a digitized format and make it available. So that's the intent that it will be available prior to September 23rd.

Page 34

Is it all going to be available when we issue the scheduling order, probably not all of it because it's proving to be quite the task.
So, we are endeavoring to do so, but it's going to -- it may not all be complete by the time that the scheduling order comes out.
But it will be -- it will be coming up and it be will be part of our hearing under that news tab in LWRFS.
MR. TAGGART: For -- I'm just exploring how this is going can work. Is it possible that you could make things available here at your office if people wanted to come and look at it if it was just digital.
HEARING OFFICER FAIRBANK: Um-hum.
MR. TAGGART: And had you a hard time, you know, making it, replicating it for a PDF, then if it was available here for people to come look at, that might be one way of dealing with that.
And so if there's additional documents, then we would provide those to your office and to who? I guess, from a notice standpoint, how should we handle that?
HEARING OFFICER FAIRBANK: Right. So what we're going to do, and that's down a little bit --
MR. TAGGART: Okay.
HEARING OFFICER FAIRBANK: -- disclosure of

Page 35

witnesses and evidence. And so we're going to establish a deadline for the parties to disclose their witnesses, the anticipated testimony and to exchange any documents and evidence and so -- and it's going to have to be shared amongst all the parties.
MR. TAGGART: Okay. And can I just clarify one thing, is that when we submit exhibits, they are intended to be documents that support our expert reports. And will new expert opinions and new expert reports are not authorized to be submitted when exhibits are submitted?
HEARING OFFICER FAIRBANK: Correct.
MR. TAGGART: Okay.
HEARING OFFICER FAIRBANK: The expert reports, those deadlines are established pursuant to the order and the addendum to the order, or the amendment -- the amended order.
MR. TAGGART: All right.
HEARING OFFICER FAIRBANK: So, correct. New expert reports or new rebuttal reports beyond those deadlines will not be accepted.
The additional evidence is if there's supporting documentation for those things, you know, those things that are relevant to the point equally that you believe that the State Engineer should take it into consideration.
But there -- the administrative record should be

Page 36

relatively complete we believe, particularly with the inclusion of the expert report.
But, somebody may have something out there that they think is incredibly important for us to consider that's not there, and so we want to make sure everybody is afforded an opportunity to get that in front of you prior to the commencement of the hearing so that the State Engineer can consider that as part of his decision making process.
MR. ROBISON: Is there a definitive service list of who would be served with whatever additional documents we identify?
HEARING OFFICER FAIRBANK: It will be attached to the scheduling order.
MR. ROBISON: Thank you.
HEARING OFFICER FAIRBANK: So the scheduling order will establish that service list, and so then, just as everybody understands is we also have for the purposes is we have an email list which is really kind of a, more of an informal notification list, but for the purpose of the hearing, the scheduling order will have a service list attached to it.
MR. FLANGAS: Service meaning mailing?
HEARING OFFICER FAIRBANK: Mailing, yes.
MR. ROBISON: Does email suffice?

Page 37

HEARING OFFICER FAIRBANK: Currently our administrative regulations don't recognize electronic service, however the parties are free to go ahead and -- I mean, so -- so mail is technically the appropriate form of service.

If it was a smaller, you know, a smaller pool of participants, I think I would encourage people to go ahead and come up with their own stipulation regarding e-Service, and certainly if people want to endeavor to do that, I'm going to leave that to you all.

But for the purposes of this hearing, our current regulatory structure, it's good old fashioned United States mail.

MR. ROBISON: Then the date for disclosure becomes increasingly important.

HEARING OFFICER FAIRBANK: Correct.

MR. ROBISON: Thank you.

MR. TAGGART: Could we just ask the room if people are willing to agree to e-Service?

HEARING OFFICER FAIRBANK: I guess I could go ahead and ask it this way. Is there anybody who objects to utilizing e-Service based upon the emails that we have been using to communicate with parties?

MS. PELLEGRINO: Just the list on the order?

HEARING OFFICER FAIRBANK: Yes.

Page 38

THE COURT REPORTER: I don't know who spoke.

HEARING OFFICER FAIRBANK: Colby Pellegrino.

MS. PELLEGRINO: Colby Pellegrino.

HEARING OFFICER FAIRBANK: Well so you know, what we'll do is on the scheduling order, we will also provide that email list. And so the parties are free to exchange via email having heard no objection to do so.

Mr. Flangas?

MR. FLANGAS: I just like to make sure that I get added. I haven't been on that list and I don't know why. So, that's -- I keep getting things from my expert. My expert's on the list, but I am not.

HEARING OFFICER FAIRBANK: You will be added to it now, Mr. Flangas.

MR. FLANGAS: Thank you very much. I appreciate it.

MR. MOORE: Yeah, this is Andy Moore, City of North Las Vegas. Could I get added too, because the individual that is with the City that's on there is no longer with the City.

HEARING OFFICER FAIRBANK: And if there's any participants today that is not our service list, please feel free to email us and we will make sure that you are added to our service list and that's the best way of doing it.

Page 39

SPEAKER ON SPEAKER PHONE: The best contact, ma'am?

HEARING OFFICER FAIRBANK: The best contact will be, go ahead and do it to mfairbank, F as in Frank, A-I-R-B-A-N-K @ water.nv.gov. And so that's my email address, Micheline Fairbank with the Division of Water Resources.

So moving to that next question which is the disclosure of the witnesses and evidence is indicated to be relied on. So, obviously, we're going to have the expert reports, those would have already been submitted.

I was contemplating two weeks prior to the commencement of the hearing for the disclosure of witnesses and any evidence.

Does that seem to be a reasonable period of time for the participants?

MR. TAGGART: Again, Paul Taggart for SNWA. We were hoping September 3rd which would three weeks in advance which would give us more times to prepare for other sides' cases.

HEARING OFFICER FAIRBANK: Does anybody have any thought or feedback with regards to moving it to September 3rd?

I'm certainly supportive of that if that's going to help in terms of structuring the hearing to be more

Page 40

efficient and allow the parties to be more succinct and focused in terms of their examination and cross-examination of the witnesses.

MR. ROBISON: So, the scheduling order is coming out approximately August 19th?

HEARING OFFICER FAIRBANK: It will come out some time the week of the 19th.

MR. ROBISON: So that would give us three weeks to determine what has to be added?

HEARING OFFICER FAIRBANK: Correct. Having -- I'm hearing no objection? Yes.

MR. MOORE: I mean, I just want to clarify that. Again, Andy Moore. You looked at the September 3rd would give you two weeks; right? If it's the 19th.

HEARING OFFICER FAIRBANK: No, you're correct, that is, that's two weeks.

MR. ROBISON: Yep, two.

HEARING OFFICER FAIRBANK: Plus the time that you got right now.

MS. PETERSON: This is Karen Peterson. How about the end of that week? That's September 3rd.

HEARING OFFICER FAIRBANK: September 6th? I'm fine with that. Okay. So we will set the date --

MR. TAGGART: We're fine with that as well.

Page 41

HEARING OFFICER FAIRBANK: So, September 6th will be the deadline for the disclosure of witnesses, including their anticipated testimony and any additional exhibits the parties intend to submit for the State Engineer's consideration beyond those identified within the administrative record.

One other kind of witness issue I wanted to go ahead and address with the parties. Is the State Engineer has already qualified numerous individuals as experts before the office in the State Engineer.

And in an effort to go ahead and eliminate a lot of voir dire and qualification of witnesses which can take a substantial amount of time, the State Engineer also intends to go through the different -- as we're going through the expert reports, we're looking at those individual experts.

And once we get the disclosures, any individual who has already been qualified by the State Engineer as an expert in the particular discipline in which they're being offered to testify, we will take administrative notice that they've been qualified as an expert.

We don't -- if we've already found that they've been qualified to serve as an expert witness in that particular discipline before our office and prior proceedings, we're going to go ahead and allow that.

Page 42

Unless any party has a compelling reason as to why we should expend the amount of time qualifying each and every witness that has already been done so before our office.

And then if there's individuals who have been identified as a witness, one of the things that I wanted to kind of address with the parties this morning is potential concept is to establish a date prior to the commencement of the September 3rd hearing to just go ahead and run through expert qualification and allow parties to go ahead.

And if we have an individual who is submitted a report and it's going to be called or relied upon to testify as an expert, and they're not already qualified before our office in their discipline is to set a pre -- a pre date, probably the week before and allow the parties to go ahead and produce their witnesses for the purposes of qualifying.

And so that way then when we start the hearing on September 23rd, we don't have to go through that process of qualifying experts and voir dire and such.

It's a little bit of a different process, but we're also trying to determine efficiency, and so just trying to explore different ideas. Patrick?

MR. DONNELLY: Patrick Donnelly, Center for Biological Diversity. Is there a statutory or regulatory definition of expert?

Page 43

HEARING OFFICER FAIRBANK: Generally, we're going to offer, we're going to go through the -- while the rules of evidence in civil procedure don't strictly apply, that's what we rely upon in terms of, you know, the standard -- the standard roles for qualification of experts.

MR. DONNELLY: Is that NRS, or --

MR. ROBISON: NRS 48.

MR. DONNELLY: Thank you.

MR. ROBISON: Would the State Engineer consider a date by which all parties exchange the CVs, statement of qualifications for the experts to see which if any are going to be subject to a challenge?

HEARING OFFICER FAIRBANK: We could set that for September 6th as well.

MR. ROBISON: Thank you.

MR. TAGGART: Will that -- I don't -- I don't disagree, necessarily. I'm just exploring this idea. Is we could also in our witness statements, our witness list, identify when, or if that individual has been qualified previously by the State Engineer and in what discipline so everyone knows.

HEARING OFFICER FAIRBANK: Um-hum.

MR. TAGGART: And then we know which ones are not. And then we can all decide, okay, is this someone that

Page 44

we will challenge or not challenge. So that's, I think it's just an add on to what Mr. Robinson is saying.

MR. ROBISON: I agree, but the CV has to be disclosed so we know what the qualifications are.

MR. TAGGART: Sure. I would expect the CV would be part of the exhibits.

MR. ROBISON: That was my request.

HEARING OFFICER FAIRBANK: Then we'll go ahead and include that. And that way, then if, there's any objection or concern with respect to the qualification, if an individual has not been previously qualified before the State Engineer, then do we want -- are the parties, participants, is this an appetite for trying to go ahead and pre-qualify those experts prior to the commencement of the hearing the 23rd?

MR. TAGGART: I think it's a great idea. I just think there's some procedural, you know, issues, we got to let you know whether we are going to make a challenge. Like we have to have a time to decide whether we're going to make that challenge. We have to alert you to that and then you have to be able to schedule the time for it.

HEARING OFFICER FAIRBANK: So -- so, what I'm thinking, is just looking, and if we schedule the time for parties so within the scheduling order to present a challenge to a particular expert being qualified in their discipline, if

Page 45

we set a deadline within the scheduling order for that.
And then also in the scheduling order establish a date for that qualification hearing for any objected to experts, and then we can always vacate that qualifying hearing date if necessary.
So, let's go ahead and have objections to any submitted or proffered expert. Objections to be submitted to the State Engineer no later than the close of business on September 13th.
And then let me double check, and then I just want to see for location. And then 9:00 a.m., September 20th which will be the Friday before the commencement of the hearing, for a hearing on any challenged experts.
And that will be here at the Tahoe Hearing Room. Yes?
MR. FAHMY: Peter Fahmy for the National Park Service. Is it possible that experts could have been qualified in other jurisdictions and other administrative or judicial proceedings.
And I was wondering whether the State Engineer's office would consider, given it's going to have the CVs and this information contained in the expert witness reports, could make a judgment at that time whether that he or she believes that that expert is qualified and therefore dispense

Page 46

with the need for this challenge hearing.
HEARING OFFICER FAIRBANK: So, I think it's -- so what I am a thinking is part of that September 6th exchange of witnesses and identification of experts, as well as providing in the scheduling order, we'll set this out is to identify the qualifications and where those individuals have been previously qualified as an expert, and then the parties can go ahead and review that. And then I think if -- I'm hoping people will be reasonable, but --
MR. TAGGART: I'll just offer that I think we would all take that into consideration, but in the past, it isn't an automatic you're qualified in the State Engineer's office because you were qualified in the Federal District Court of, you know, Eastern Illinois or something.
HEARING OFFICER FAIRBANK: Correct.
MR. TAGGART: So, I think that we would certainly take that into account when looking at a CV if someone's been qualified in three other jurisdictions on the same topic, that would certainly go to the merit of whether we can challenge them.
HEARING OFFICER FAIRBANK: And I -- because I think we're going to an allow the parties to go ahead and present their, proffer their experts and provide the qualifications and demonstration that they should be qualified

Page 47

as an expert.
Certainly, I think the expectation of the parties are reasonable, but I think we're going -- I'm going to keep that hearing date and so that we can address those particular concerns, because there maybe subjective basis for the people to challenge the particular qualification of a particular expert.
MR. ROBISON: Does the scheduling order include the names of experts pre-qualified with the State Engineer?
HEARING OFFICER FAIRBANK: The scheduling order will direct the parties as part of the exchange of witnesses on September 6th to identify the name of every expert they intend to call, provide the support for their qualifications, where they have previously been qualified. If they've been qualified before the State Engineer.
And to provide their CVs so that the parties can then make a determination by that September 13th day as to whether or not to challenge any of those individuals.
And if an individual has already been qualified in that particular discipline before the State Engineer, then those individuals will -- the State Engineer will recognize those individuals as already being qualified as experts before this office.
MR. ROBISON: Thank you.

Page 48

MS. PETERSON: This is Karen Peterson, sorry. Is there any way we could have that hearing on the 19th? I have a conflict on the 20th and so does Dylan Frehner.
MS. CAVIGLIA: And this is Justina Caviglia. I have the same conflict as Ms. Peterson.
HEARING OFFICER FAIRBANK: Yes, we can do it on the 19th. So the hearing the date will be moved from the 20th of September to the 19th of September.
MS. GLASGOW: One last point. Karen Glasgow for the Park Service. With respect to the 9/'19 hearing, can we participate by telephone? Can somebody participate by telephone rather than in person?
HEARING OFFICER FAIRBANK: Yes. And, optimally, I'm going to be optimistic that our whole new system with the video-conferencing will be up and running by then. And there might actually be an opportunity for you to participate via video-conference from remote from your location.
So, but we'll allow telephonic appearances for that hearing on the 19th. And we will keep everyone posted for video capacity as well.
We should -- the new system is supposed to allow us to be able to stream on line and people can actually tie in and appear as long as they have at appropriate equipment and their end through the webcast as well, so -- so we'll see.

Page 49

Yes, fingers crossed. We're -- Water Resources is moving into the 20th century.
MS. PETERSON: This is Karen Peterson. So with the expert that is being challenged would be present in Carson City, though?
HEARING OFFICER FAIRBANK: Yes.
MS. PETERSON: Okay.
HEARING OFFICER FAIRBANK: We would need that in order for them to be able to examined, yes.
MS. PETERSON: Okay.
MR. TAGGART: Can I ask another clarifying question about the witness list?
HEARING OFFICER FAIRBANK: Yes, Mr. Taggart.
MR. TAGGART: Based on everything you've been about saying restricting this to the topics, and in the interim order, my understanding is the witness list should only have individuals who actually submitted a report. And so I think it's -- it would be prudent to indicate whether that's correct.
Otherwise, are we going -- is it possible we're going to have witnesses who are going to offer expert opinions who have not submitted a report at all?
HEARING OFFICER FAIRBANK: If they are being proffered as an expert, they should have offered -- they

Page 50

should have had a report or rebuttal report submitted.
So, if they're going to be proffered as an expert, they're going to be in relation to a report that has been submitted.
I'm not going to opine as to whether or not people may have non-expert individuals in who they intend to call to testify as to testify or relate into other elements of their reports.
But those would not be testifying as an expert with respect to those opinions that have been submitted to the office.
MR. DONNELLY: Patrick Donnelly, Center for Biological Diversity. This is somewhat related to this and also goes back to an earlier thing. The qualifications for cross-examiners, we are questioning whether an expert would be able to do that? Will, I mean, will I be able to do that as a non-attorney?
HEARING OFFICER FAIRBANK: So, the -- you know, in terms of appearance before the State Engineer, you're not required to have an attorney. If you have an attorney who is representing a participant or a party, then the attorney has to go ahead and be either, you know, pro hoc admitted for our office pursuant to Nevada Supreme Court rules, or be a licensed attorney in the State of Nevada. But there's no

Page 51

requirement that an individual be represented by an attorney.
So if a party or participant is representing themselves, that's permitted within the -- before the office of the State Engineer.
With respect -- like I said, we will address a particular question about allowing experts cross-examine. I -- that's something that I'm going to have to -- we're going to have to take under advisement and decide how we want to proceed with that particular question.
Yes?
MS. PELLEGRINO: I just -- as you can consider that question, I don't necessarily agree with experts cross-examining experts, but I -- I strongly feel it should only be one person that's allowed to examine them, having been through --
HEARING OFFICER FAIRBANK: I appreciate that.
MR. TAGGART: So, just so I'm clear about the question I asked before, because I don't want to end up getting into a big side show on whether someone is qualified to testify.
But if we get witness lists and there's people on those lists that are going to offer expert opinions, but they don't have a report, we're going to object to them being able to testify because we don't have a report.

Page 52

That's pretty elementary now. If someone wants to come up and give that testimony, I think I'm hearing you say that may be allowed, it may not, we will see. It still has to be tied to the - by the inquiries that were listed in the order?
HEARING OFFICER FAIRBANK: That is correct.
MR. TAGGART: Okay. And then one other question about that. We're -- we're going to get rebuttal reports. We anticipate those will be rebuttal reports. It won't be new reports.
HEARING OFFICER FAIRBANK: Correct.
MR. TAGGART: It won't be individuals who didn't file an initial report, but waited to see what everyone else's initial reports were going to look like and then now they're going to file their industry report.
So these rebuttal reports should be confined to rebutting, pointing to a statement in an existing report and addressing whether they agree or disagree with that statement.
As opposed to developing an entire new level of methodology, or entire new level of opinion that we have not had a chance to rebut and would not have a chance to rebut until the hearing.
HEARING OFFICER FAIRBANK: Correct. That's the intent. The rebuttal report, if people want to go ahead and

Page 53

challenge the opinions or the data or the conclusions relied upon by the parties who submitted initial reports, that's of the purpose of the rebuttal reports is to go ahead and challenge that.

You're absolutely correct, the intent for the rebuttal reports is not to go ahead and have them be independent reports with new conclusions.

MR. TAGGART: Thank you.

HEARING OFFICER FAIRBANK: So, and -- and, you know, just to make it clear too for those parties who are either submitting or contemplating submitting rebuttal reports, that those reports really should be, you know, substantive enough to stand on their own in the sense of being -- having, you know, being tethered to data that they're relying on that contradicts or undermines conclusions that they believe other people have, you know, that they believe to undermine or contradict conclusions and evidence relied upon by other parties.

The reports, you know -- so the idea is that the hearing is not an opportunity for people to go ahead and provide the substantive detail to support the reports. The reports should have enough substance and merit to them to stand on their own.

And, again, that's why we say too, if a party has

Page 54

submitted a report or a rebuttal report and they feel -- and they don't believe that they need to go ahead and participate in the hearing, we're happy to take -- we will take every single document that is submitted to us.

These reports and rebuttal reports, they will be taken under consideration by the State Engineer. That's -- we're not going to ignore participants' reports just because they don't participate in the hearing.

It's just we're providing an opportunity for people to provide some testimony and to point us in the direction as to why, you know, what -- what they believe we should be really focusing on within their particular conclusions and opinions?

MS. GLASGOW: Question?

HEARING OFFICER FAIRBANK: Yes.

MS. GLASGOW: Karen Glasgow, Park Service. To that point of testifying or offering an opinion up front on a given day, like the Park Service has been given over to week one a whole day.

If the Park Service chooses not to make a presentation because for -- they want to stand on what they've already written, will that preclude them, however, from participating in cross-examination of other people's presentations --

Page 55

HEARING OFFICER FAIRBANK: -- no --

MS. GLASGOW: -- or witnesses --

HEARING OFFICER FAIRBANK: -- it would not preclude. So, just because somebody doesn't want to -- so, you know, because this is, you know, it's kind of funny using vernacular that doesn't necessarily fit this really well.

But just because a participant doesn't want to put on a case-in-chief, doesn't preclude them if they submitted reports, and they submitted -- it doesn't preclude them from participating in any capacity if they don't want to -- you know, we certainly encouraging efficiency to the extent possible.

MS. GLASGOW: Thank you.

MS. PETERSON: I have a question.

HEARING OFFICER FAIRBANK: Yes.

MS. PETERSON: So what if there's somebody who wants to cross-examine the Park Service and their conclusions in their report, I think they have to have their witness available for cross-examination.

They may not want to put on a direct case, but they have to allow the parties an opportunity to cross-examine them.

MR. FLANGAS: Good point.

HEARING OFFICER FAIRBANK: No, I think you're

Page 56

right. I think you're absolutely right. If somebody's going to -- I think that's fair that they would have to make -- I think we would have to make -- if they're going to participate, they would have to make their witness available or their expert available.

MS. PETERSON: If they want you to consider their report, yes.

HEARING OFFICER FAIRBANK: No. No. I don't know that it -- if somebody submitted a report to us, we're going to take that under advisement whether or not they participate.

If you want -- if you believe a participant has submitted a report, and that -- then that's your opportunity to have your rebuttal reports to go ahead and challenge the evidence and the data relied upon by somebody, because I mean, the idea -- this is an opportunity for people to go ahead and present their evidence and also challenge conclusions that are present by the parties.

And you don't necessarily have to cross-examine that particular participant's expert in order to challenge the conclusions. You can do that through your own expert as well.

MR. FLANGAS: Excuse me. Doesn't the State Engineer have an administrative rule that says, if the witness doesn't show up, it will not be considered. I believe there's a rule in your -- in your procedures that says that.

Page 57

HEARING OFFICER FAIRBANK: I mean, we do have an admit, but at the same time, we're also encouraging efficiency, and the idea here is to allow people an opportunity, and allow people to also challenge the conclusions.

But at the same time, we have people that have submitted, you know, quite, you know, somewhat limited submissions to our office.

And to require those participants to go ahead and, you know, I mean obviously the intent is people, if they want us to take it seriously or if they have substantive types of dialogue, I think there's an opportunity.

Mr. Fahmy?

MR. FAHMY: Yes. Peter Fahmy for the National Park Service. I would question, you know, whether there's a right to question an expert witness for the parties that submitted these reports. I mean, that's what the rebuttal report is for is to basically rebut whatever is contained in the initial reports.

Now, there may be some validity in the fact that you might want to be able to question what's contained in the rebuttal report, but it -- that would be extremely limited, I would think.

So, I don't think there is a fairness issue here

Page 58

with regards to not being able to examine that witness.

MS. PETERSON: I would disagree -- Karen. I would disagree. I mean, you can't lob a grenade in there and then not expect to ask questions about it. And so, I think if they want -- I think they have to have their witness here for cross-examination.

And maybe we can let people know in advance if there's not going to be any cross-examination, but until we see the rebuttal report.

HEARING OFFICER FAIRBANK: Ms. Glasgow.

MS. GLASGOW: To the point of -- and less in these witness reports or witness lists, you're asking the parties also to identify not just who they're just going to bring, but every other witness of every other participant that they might want to cross-examine, I don't have any idea of who they want to talk to.

I mean, I might able to decide that this witness or this expert or the not this other one, but that's leaving everything to chance. Because what if I don't bring the one that they're wanting to talk to, and I don't -- I mean, I --

If you're going to make a ruling that I have to bring somebody that they want to talk to, then you at some point have to decide tell me who that might be so that we have some opportunity to do that.

Page 59

HEARING OFFICER FAIRBANK: Correct.

MR. HERRERA: Brad Herrera. Won't we know after the witness lists are submitted who the parties are planning to put on. At that time, if you see someone that you are wanting to cross isn't on one of those lists you can let the party know that?

HEARING OFFICER FAIRBANK: But what would the resolution be?

MR. HERRERA: I think they would have to be available for cross as we discussed earlier. But, at that point, we would at least know who the parties are planning to call and who they are not.

HEARING OFFICER FAIRBANK: Mr. Donnelly.

MR. DONNELLY: Patrick Donnelly. Speaking now as a board member of the Great Basin Water Network, as an organization with no budget and cannot proffer someone to stand for testimony, however, they submitted a report, it should be considered by the State Engineer.

There's a matter, I think, of equity there if the report is disregarded.

HEARING OFFICER FAIRBANK: So let's go ahead and take a short --

MR. TAGGART: Can I just add one thing. I think that the question of whether or not cross-examine is required

Page 60

before a report gets submitted, I don't honestly know the answer what a Judge would say, but you get rid of that issue all together if you just went with what Miss Peterson said.

And you just said, if you want -- if you the gone to the meetings of the Public Utilities Commission, that's exactly how they do it. You submit your report. Actually, you submit written direct exam. And then you just have the witness proffered for cross. And then there may not be any cross questions, then you're done.

But, if you don't do that, I think you are leaving open a question of is it sufficient to have rebuttal opportunities -- rebuttal opportunities sufficient. I don't think we really know the answer to that question.

So, the only thing I would offer is the safest route is to go with the cross-exam to just avoid that potential appealable issue.

HEARING OFFICER FAIRBANK: Let's go ahead and take about a ten-minute break and we'll go ahead and take a recess.

(Recess.)

HEARING OFFICER FAIRBANK: Okay. Let's go ahead and get going. Back on the record. All right. So any individual -- so, basically, how we're going to resolve the concern about having an opportunity to cross-examine

Page 61

witnesses, and we agree that it is, you know, a full and fair opportunity for people to have you know to challenge evidence that's going to be relied upon by parties and submitted to the State Engineer.

So the proffering party may submit that -- submit their report without direct testimony of -- for any report, however, any individual who offered an expert report submitted to the State Engineer must be made available for cross-examination.

So we're going to have those windows and we're going to submit that and the scheduling order will establish the time frames.

So -- so, we're going to have to go ahead and if they've authored -- so, if they're authored and identified as an author of a report or rebuttal report, they're going to have to be made available for cross-examination.

MS. PETERSON: Thank you.

HEARING OFFICER FAIRBANK: Yes.

MS. GLASGOW: But what is made available mean? Do you mean I have them sit here, or do you mean I have to have somebody tell me, please bring that person, I want to talk to them.

Karen Glasgow, NPS. Because, I, like him, we just don't have money to have people sitting around on the

Page 62

chance that somebody wants to talk to them.

HEARING OFFICER FAIRBANK: So -- so, for the day that you are scheduled, so if a party is scheduled and they want to go ahead and submit their report without direct testimony on that particular day, that particular author of that expert report is going to have to be available.

So they don't have to sit here for the entire period of time, but they're going to have to be available on that particular day.

And so -- so, just kind of jumping ahead a little bit in some of the procedure and scheduling. The idea is we're going to have be having on going communications and ongoing dialogs at the beginning of the day and end of day, what's going on tomorrow.

So if, for example, you're up for the next -- the following day. The prior day we're going to have people planning on cross-examining and perhaps at that point in time somebody's going to say no, nobody in tends to cross-examine that particular individual and so we can go ahead and resolve those particular issues.

But at this point in time, we are going to have to make -- if somebody submitted a report, they don't have to submit -- they don't have to present for direct testimony, but that individual does have to be available for

Page 63

cross-examination.

Yes?

MR. FAHMY: Peter Fahmy for the National Park Service. When you say, "authored a report", which report are you referring to precisely?

HEARING OFFICER FAIRBANK: If you submitted -- if the initial report or a rebuttal report.

MR. FAHMY: Okay. So with regards to the -- oftentimes reports are not authored by one individual, they are authored by a number of individuals. Do we have to make all those individuals available?

HEARING OFFICER FAIRBANK: If they are identified as the as the individual who is signing off on the report or submitting the report, and I'll use for an example -- so for example, City of North Las Vegas submitted their expert report and it's identified Dwight Smith and Alexa Turrell as the authors of the report.

So those are the individuals that the State Engineer is expecting to be available for cross-examination if the City of North Las Vegas did not intend to present those individuals for direct examination on their behalf.

So that's -- so it's those individuals who have submitted the reports to the State Engineer.

MR. DONNELLY: Patrick Donnelly, Center for

Page 64

Biological Diversity. On behalf of Great Basin Water Network, I'm going to register an objection to this.

Order 1303 should have specified that witnesses would be mandatory to be made available as a condition of submitting a report.

Order 1303 did not specify that, and so just registering an objection to that. And then, I guess, I have a question. Could the same expert be here for two different entities?

HEARING OFFICER FAIRBANK: If they're preparing reports on behalf of two different entities, then yes, if they submitted a report, then that's -- yes?

MR. MOORE: Andy Moore, City of North Las Vegas. On the example you just read about the report that we submitted, I mean, would they -- the City need to have both of them present or just one?

HEARING OFFICER FAIRBANK: As they're the author, I think they have to both be present to the extent that they submitted they signed off on the report.

MR. TAGGART: And do all reports have to be signed by an expert?

HEARING OFFICER FAIRBANK: Well --

MR. TAGGART: -- or --

HEARING OFFICER FAIRBANK: No. I mean, I'm not

Page 65

going to go back, Paul -- Mr. Taggart, I'm not going to go back and start going through all of these.

And so if the reports identify particular individuals who submitted the reports. Whether or not there's a signature on it, I'm not going to go back and have people try to go back into different types of things.

So, if we have documents, we have reports that were submitted as initial reports and they have identified individuals as being authors, those are the individuals that the State Engineer is considering to be the authors of those reports and have to be available for cross-examination.

If they're not being presented by those particular participants as the primary, you know, as they're -- if they're not being produced for their own particular interests in presenting testimony on behalf of their client.

All right. So, we're going to go ahead and move on. All right. So, initially, earlier when I was talking about the timing and the duration of the hearing and how the State Engineer's evaluating or considering structuring this particular hearing, we established kind of different -- a different order.

Mr. Robison had asked whether or not that was intended to kind of -- or if that was a preliminary kind of listing of the planned order of the participants.

Page 66

And so, again, to kind of go through that. We had it listed out as the Moapa Band of Indians. Then the National Park Service. The U.S. Fish and Wild Life Service. Coyote Springs Investments. The Southern Nevada Water Authority. Moapa Valley Water District. Then Vidler, Lincoln County. The City of North Las Vegas. Centers for Biologic Diversity. Dry Lake Water, and the other participants on their report. Great Basin Water Network. Technichrome. And then the rebuttal report submissions. So you will only submit rebuttal reports.

Is there any -- anybody have any strong concern with going with that order?

MR. DONNELLY: Patrick Donnelly, Center for Biological Diversity. I would request since we have a half day plus and Great Basin Water Network has a short amount of time that we could combine that and be one date.

HEARING OFFICER FAIRBANK: Okay.

MR. DONNELLY: Thank you.

HEARING OFFICER FAIRBANK: Mr. Robison?

MR. ROBISON: Are the interests of the Park Service and Wild Life so similar they can take one?

HEARING OFFICER FAIRBANK: They submitted separate reports. I certainly would have to defer that to them, but they've submitted reports as separate entities.

Page 67

So I don't know if the National Park Service and Fish and Wildlife Service believes that they can combine their presentations into a single day.

I'm seeing shakes of the head, so I'm going to take that as a no.

Yes?

MS. BALDWIN: Beth Baldwin, Moapa Band of Paiutes. Our experts have expressed a preference not go first. They would like to go later in the order.

MR. ROBISON: We'll go first. We'll trade.

HEARING OFFICER FAIRBANK: Okay.

MR. ROBISON: We'll trade up to Monday.

MS. BALDWIN: Thanks.

HEARING OFFICER FAIRBANK: All right.

MR. ROBISON: Thank you.

HEARING OFFICER FAIRBANK: All right. So -- so that's essentially what we're going to do. Again, I'm going to take under advisement the request by the Moapa Valley Water District to have more time than a half day. How -- Mr. Morrison, how long do you think you guys --

MR. MOORE: I think, looking at this proposed order, I think we're comfortable with it, and I don't know that we're going to need more than that half day. So I'll withdraw to the extent it was an objection.

Page 68

HEARING OFFICER FAIRBANK: Okay. Mr. Taggart, with respect to Southern Nevada Water Authority, how much time do you guys really think you're going to need based upon, after the dialogue today?

MR. TAGGART: Still a day and a half. So we'll take Mr. Morrison's half day.

MS. GLASGOW: Karen Glasgow

HEARING OFFICER FAIRBANK: Yes.

MS. GLASGOW: With the National Park Service. So one of the questions -- one of the things that you indicated was a desire that people listen to each other and decide that some other person has asked that question and that information is out there and thus decide they don't need to do that themselves.

To that extent, would not the order benefit from people who have similar things going, you know, who have similar conclusions going one after the other to avoid, you know, like if you ask -- if, say, the Park and Fish had the same sort of attitudes and we were, day after day, or next to each other, that would allow everyone who might have wanted to ask questions of either or both to see oh, they already asked those questions of the Park Service, we don't really have to ask them of Fish and Wildlife Service.

HEARING OFFICER FAIRBANK: And that was part of

Page 69

our rationale in how we organized the particular -- that was part of the rationale in how we ordered the different participants, and when I laid it out was -- that's why I had National Park Service and Fish and Wild Life Service adjoining days was so that -- with that in mind.

But then we're also trying to keep the full day, those -- those participants and reports that we anticipate that we're going to take a full day during the first week and then those ones that would be -- have less of a time commitment during the second.

MR. MOORE: Andy Moore, City of North Las Vegas. Can I just make sure that -- I know -- I think it's going to be early in that second week based on the scheduling structure, but I just want to make sure that we don't get assigned to October 4th of that week, because our expert is not available, and I don't want to start opening it up to that stuff, but I wanted to clarify that and put it on the record.

HEARING OFFICER FAIRBANK: No. Absolutely, we'll accommodate that.

MR. MOORE: Thank you.

HEARING OFFICER FAIRBANK: All right. Yes, Mr. Donnelly?

MR. DONNELLY: Patrick Donnelly on behalf of Great Basin Water Network at the moment. I think I want to

Page 70

get back into what qualifies as an expert?

Are we setting up a situation where the only way you can participate in this is if you have a PHD level hydrologist as representing you which is somewhat exclusionary.

You know, for instance, for the water network, right. The water network submitted a report that asserts a position. It is backed up by many, many years of data over a different proceeding.

The water network may or may not have funds or ability to procure the expert who wrote those opinions years and years ago for this.

So, otherwise, the -- for instance, the executive director of the water network would be the one to appear since apparently it's mandated that someone appear?

HEARING OFFICER FAIRBANK: So, since -- so, for the purpose of Great Basin Water Network, Mr. Roerink was the individual who submitted the report. If he's going to be proffered as an expert, he has to go ahead and identify what his qualifications are.

If his qualifications is he's an expert in economics, I mean there's different types of experts. So, you know -- or if he's being offered as the author of that particular report, but not being offered as an expert in any

Page 71

particular field, he still can go ahead and if necessary, be proffered for that purpose as the author of that particular statement and position and he would be subject to cross-examination based upon that.

MR. DONNELLY: Okay, thank you. Thanks.

HEARING OFFICER FAIRBANK: All right. So -- so, we will -- so the week of August 16th -- the week of August 19th, excuse me, we will go ahead and issue the scheduling order.

So the order is going to be similarly, we're going to swap Coyote Spring Investment with the Moapa Tribe. So we're going to go ahead and swap that. We're going to then get everyone scheduled out in that order that I've identified. And if we're looking that we're probably going to have --

So for the rebuttal reports, it's probably going to be extremely limited, but like I said, you know, in terms of that time period because the rebuttal reports, if individuals had only submitted a rebuttal report, we're only offering the amount of time to allow individuals to basically just kind of set forth, you know, to the extent necessary the basis for what those opinions, but it's limited to that rebuttal component.

And so we're going to go ahead and set that. Like I said, once we get all the rebuttal reports in, while

Page 72

we're going to endeavor to have the hearing conclude on October 4th, and we will not set City of North Las Vegas on October 4th, just the parties anticipate that it may continue on into the week of October 7th.

And so -- but we will endeavor to finish the hearing as early in that week as possible. And, again, we're going to go ahead and promote efficiency.

So, are there any other questions or procedural questions with respect to the hearing or other matters that we need to address this morning?

Yes, Mr. Taggart.

MR. TAGGART: Paul Taggart for SNWA. One is, is this room big enough?

HEARING OFFICER FAIRBANK: So, I -- so, we will probably have it at the legislative building. So just to be completely candid with everyone, I wanted to see how full the room was today.

Also knowing that we were going to have video-conferencing capabilities and people would be able to view the hearing if we held it in this room in September on the internet. So not everybody has to be in the room at the same time.

But based upon the participation today, recognizing that not all of the experts and not all of the

Page 73

individuals, people are going to want to accompany them are here today, we're going to look to have it at probably the legislative building.

Just so that everybody -- all the participants do please recognize and know, when, if we do it, we're also intending, regardless of where the hearing is held, and like I said it will likely be at the legislative building.

It will also be broadcast to a location in Southern Nevada. So that individuals who want to attend the hearing and observe the hearing don't have to travel to Carson City.

And that's also making it available to those community members within the Low White River Flow System affected basins to be able to participate without having to travel to Carson City. So we'll be able to take public comment from both the north and the south.

Yes?

MR. MORRISON: Greg Morrison, Moapa Valley Water District. Just kind of a 10,000 foot question about how this moves forward after we do the hearing on the questions from Order 1303.

Obviously, the ultimate order that's going to come down in the Lower White River Flow System is going to involve more than just science, when the does the State

Page 74

Engineer's office anticipate considering evidence that isn't just scientific in nature?

HEARING OFFICER FAIRBANK: So, that will probably follow once we get a decision rendered in this particular proceeding. And then we have -- and then we will start moving on until we get those threshold consequence answered, then we can start moving on to some of those other --

MR. MORRISON: Sure.

HEARING OFFICER FAIRBANK: -- probably more challenging issues that we have to grapple with.

MR. MORRISON: The reason why --

HEARING OFFICER FAIRBANK: What I will say is the State Engineer, while we're not statutorily obligated in this particular proceeding, the State Engineer is committed to having a decision rendered in not more than 240 days.

Even though we don't have a statutory -- you know, we are not statutory bound to that time frame, we're going to go ahead and adopt that time frame. And certainly we endeavor to get it done well in advance of that, but, again, as I mentioned, we have a voluminous record.

There's a lot of testimony. We're going to have to go back through all the evidence and testimony and reports and have careful consideration of what ultimate decisions are rendered.

Page 75

So that's kind of a loose time frame, I know it's not very specific, but --

MR. MORRISON: That's okay. Confirming it's on the radar.

HEARING OFFICER FAIRBANK: Yes. And we're -- we recognize that there's a lot of different components in the decisions that come out of this particular proceeding are going to have significant effects in terms of how we go ahead and proceed on the moving forward basis in terms of people's viewpoints and what conclusions are made.

And so that -- and what impacts that may have on stakeholders is certainly going to be, you know, something that we want to -- we're cognitive of.

And so we're trying to be as timely as possible with while still doing, you know, practicing good, scientific analysis in relying on supported data to render ultimate decisions.

MR. MORRISON: Great. Thanks.

HEARING OFFICER FAIRBANK: There was a question in the back. Yes?

MR. MILLER: Luke Miller with the Office of the Solister, Department of the Interior working under Fish and Wildlife Service. I was looking at my notes trying to see if I missed anything in relation to possibly honing down the

Page 76

issues that might be presented on a day if we're now being required to bring forth a witness, even if we don't put on a case in chief to bring some one forward.

I didn't pick up on anything here that would indicate there's a focusing of what they might be obligated to testify about on a limited day when I got to bring somebody forward to say you got to deal with 70 pages of a technical report and be ready to testify on all of it.

And like I say, did I miss anything? Is there a winnowing of issues here to be presented?

HEARING OFFICER FAIRBANK: I mean, we haven't, and I think it's -- I think experts need to be prepared to testify on and defend their reports. If they've come up with conclusions and they've relied upon scientific data, they need to be go ahead and be prepared to defend those opinions and show or testify as to why that data supports those conclusions.

I don't know that there's really a feasible way of narrowing the focus at this point in time.

I'm certainly open to suggestions and those are things that we can address. And certainly, you know, in -- as we prepare for the following day, at the conclusion of the day that it's going to be perhaps there's an area that we can try to focus on more. Unfortunately, I don't know if there's a

Page 77

better way of doing that.
Are there any other questions regarding the procedurals? Mr. Felling?
MR. FELLING: Rick Felling for NV Energy. I just had a question about PowerPoint presentations or those giving direct testimony.
If those are extracted right from their reports, are they -- are they required to be presented ahead of time? Or are they required to be in a separate exhibit?
HEARING OFFICER FAIRBANK: They would be in a separate Exhibit. I think optimally they should be presented. I mean, otherwise, it would just be -- I mean, I think if it's -- if it's purely just a summarization of the -- of the expert report in taking data or analyses or hydrographs or other types of, you know, analysis out of those reports, it's demonstrative, and so I don't know that it has to be submitted ahead of time, but certainly would -- but if it's available, that's always appreciated.
Yes, Mr. Fahmy?
MR. FAHMY: Peter Fahmy for National Park Service. With regards to the case-in-chief or the direct, that can be in a narrative form? Is that presentable?
HEARING OFFICER FAIRBANK: Yes.
MR. FAHMY: Very good.

Page 78

MR. TAGGART: One other question is, can we use our time that you give us as we want? Can we make an opening? Can we make a closing if there's time available? I would assume we can do that.
And the other question is whether you'll entertain any type of written closings or written proposed orders? Maybe we can decide that during the course of the hearing, but have you put any thought into that?
HEARING OFFICER FAIRBANK: I think people are free to go ahead and use their time as they see fit. I'm not -- I don't know that we're necessarily going to micromanage how individuals want to go ahead and put forth their particular positions with respect to these order, the Order 1303 viewpoint, you know, what we solicited for the purposes of this hearing.
Again, I think we've tried to be fairly pointed in how we want, you know, what we intend this hearing to accomplish and what we're trying to derive out of the purpose of this hearing.
I mean, so to that extent, we're not going to micromanage how people use their time so long as just recognizing if time is spent on something, it's an exchange for other stuff that the State Engineer needs to take into consideration.

Page 79

With regards to proposed orders and those different types of things, that's probably something that we can address during the course of the hearing.
At this point in time, we haven't -- we haven't decided to accept and take or to solicit proposed orders, but that's something that we can certainly continue to consider.
And with regards to having a period of time, we've been contemplating and talking about whether or not they'll be a period of time for individuals, you know, for -- we'll probably have a window of time for additional public comment to be submitted in written format for the hearing, but we're to the going to take new evidence and arguments following the conclusion of the hearing.
MR. ROBISON: We just want to cross-examine the person who gives the opening.
HEARING OFFICER FAIRBANK: If they're identified as a witness.
MR. TAGGART: That's not part of the rules.
HEARING OFFICER FAIRBANK: Are there any other -- any other questions or issues today? And anybody on the phone, are there any other questions? All right.
Well, I thank everybody for their time and we appreciate it and we'll get that scheduling order out. And if we don't see everyone on the 20th -- or the 19th, excuse me,

Page 80

if we don't see you all on the 19th, we'll see you all on the 23rd.
Thank you.
(Proceedings concluded at 10:53 a.m.)

STATE OF NEVADA)
) ss.
CARSON CITY)

I, MICHEL LOOMIS, a Certified Court Reporter, do hereby certify;

That on the 8th of August, 2019, in Carson City, Nevada, I was present and took stenotype notes of the hearing held before the Nevada Department of Conservation and Natural Resources, Division of Water in the within entitled matter, and thereafter transcribed the same into typewriting as herein appears;

That the foregoing transcript, consisting of pages 1 through 80 hereof, is a full, true and correct transcription of my stenotype notes of said hearing.

Dated at Carson City, Nevada, this 11th day of August, 2019.

MICHEL LOOMIS, RPR
NV CCR #228

F

T

U

V

IN THE OFFICE OF THE STATE ENGINEER

STATE OF NEVADA **1169A**

ORDER

WHEREAS, on March 8, 2002, the State Engineer issued State Engineer's Order No. 1169.

WHEREAS, Order No. 1169 was issued after an administrative hearing was held before the Nevada State Engineer regarding protested Applications 54055 through 54059 held by the Las Vegas Valley Water District, and protested Applications 63272 through 63276 and 63867 through 63876 held by Coyote Springs Investment, LLC.

WHEREAS, Order No. 1169 indicated that there was insufficient information to determine if additional water was available for appropriation under the applications and additional study was needed in order to make that determination.

WHEREAS, pursuant to Order No. 1169, the State Engineer ordered that all applications pending and any new filings for the appropriation of water from the carbonate-rock aquifer system within Coyote Spring Valley (Basin 210), Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (North) (Basin 217), Muddy River Springs Area a.k.a. Upper Moapa Valley (Basin 219), and Lower Moapa Valley (Basin 220) would be held in abeyance until further information was obtained by stressing the aquifer by pumping water under those water right permits already issued to appropriate water from the system.

WHEREAS, Order No. 1169 ordered that a study covering a minimum five-year period of time during which at least 50% of the water rights then currently permitted in Coyote Spring Valley be pumped for at least two consecutive years. The amount of water to be pumped was 8,050 acre-feet annually for two consecutive years.

WHEREAS, Order No. 1169 included as study participants those certain entities identified as having applications for additional water rights or as currently holding water rights in the referenced basins, specifically, the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company and Moapa Valley Water District.

WHEREAS, on April 18, 2002, the State Engineer issued State Engineer's Ruling No. 5115 that addressed Applications 54075 and 54076 then held by the Las Vegas Valley Water District in California Wash (Basin 218). Pursuant to Ruling No. 5115, the State Engineer indicated that additional information was necessary before large quantities of groundwater could be appropriated from California Wash. Application 54075 was approved subject to a monitoring program to be prepared in conjunction with the study ordered under Order No. 1169 and Application 54076 was held in abeyance until the Order No. 1169 study was completed.

WHEREAS, by letter dated April 16, 2010, the State Engineer granted the Moapa Band of Paiute Indians' request to participate in the Order No. 1169 study. The Moapa Band of Paiute Indians' reservation is located within California Wash. The letter noted that the intent of Ruling No. 5115 was to include California Wash within the study area as the current evidence strongly supports a hydrologic connection between California Wash and the other hydrographic basins included in Order No. 1169.

WHEREAS, by letter dated May 26, 2010, the Moapa Band of Paiute Indians indicated their concern that the pumping test itself was likely to impact resources at the Muddy River Springs. On June 22, 2010, the State Engineer held a meeting to discuss the pumping test and the Tribe's concerns.

WHEREAS, by letter dated July 1, 2010, the State Engineer expressed his concern that it had been eight years since the pumping test was ordered and the pumping requirements of the Order No. 1169 study had not even begun. The State Engineer noted that the final reports ordered under Section 7 of Order No. 1169 and updating the groundwater model under Section 8 of the Order were only required after completion of the pumping test. However, the State Engineer indicated that decisions regarding future appropriations in the basins subject to Order No. 1169 could not be deferred indefinitely. Therefore, regardless of whether the 8,050 acre-feet minimum requirement was met or not, the study participants were ordered to comply with Sections 7 and 8 of Order No. 1169. The two-year pumping period was to commence when pumping and water export from well MX-5 commenced and the Section 7 report(s) were to be filed in the Office of the State Engineer within 180 days of completion of the first two years of pumping. The pumping test was expected to begin in August or September 2010 and actually began on November 15, 2010. The Southern Nevada Water Authority was also ordered to submit model simulation results showing the predicted effects of pumping both existing rights and current applications in Lower Meadow Valley Wash (Basin 205), Kane Springs Valley (Basin 206), Coyote Spring Valley (Basin 210), Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (North) (Basin 217), California Wash (Basin 218), Muddy River Springs Area a.k.a. Upper Moapa Valley (Basin 219), and Lower Moapa Valley (Basin 220). The State Engineer notified all study participants that monitoring activities were to be in place no later than August 1, 2010.

WHEREAS, the State Engineer has maintained information related to the pumping test on the Nevada Division of Water Resources website http://water.nv.gov/mapping/order1169/ and can be viewed by any member of the public.

WHEREAS, the State Engineer believes that sufficient information has been obtained through the pumping test and related monitoring in order to make a determination on the applications pending in these basins.

NOW THEREFORE, the State Engineer orders:

1. The pumping test is declared completed as of December 31, 2012.
2. In recognition of the information that has already been provided pursuant to the pumping test, the provisions of Section 8 of Order No. 1169 that required an update of Exhibit No. 54 from the July 2001 hearing is hereby rescinded.
3. Any study participant, which includes the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company, Moapa Valley Water District and Moapa Band of Paiute Indians, may file a report in the Office of the State Engineer in Carson City, Nevada, by June 28, 2013, addressing the information obtained from the study/pumping test, impacts of pumping under the pumping test and the availability of water pursuant to the pending applications.

JASON KING, P.E.
State Engineer

Dated at Carson City, Nevada

this 21st day of December, 2012

CERTIFICATE OF SERVICE

I hereby certify that a copy of Amended Order No. 1169 was served:

By U.S. certified mail, postage prepaid, on December 21, 2012, on the following:

Coyote Springs Investment, LLC
Attn.: Carl Savely
6600 N. Wingfield Pkwy.
Sparks, NV 89436
Certified Mail
#7106 7808 0630 0051 4231

Las Vegas Valley Water District
1001 S. Valley View Blvd., MS #485
Las Vegas, NV 89153
Certified Mail
#7106 7808 0630 0051 4262

Las Vegas Valley Water District
Attn.: John Entsminger
1001 S. Valley View Blvd., MS #485
Las Vegas, NV 89153
Certified Mail
#7106 7808 0630 0051 4378

Las Vegas Valley Water District
Attn.: Dana Walsh
1001 S. Valley View Blvd., MS #485
Las Vegas, NV 89153
Certified Mail
#7106 7808 0630 0051 4385

By U.S. regular mail, postage prepaid, on December 21, 2012, on the following:

Law Office of George N. Benesch
Attn.: George Benesch
190 W. Huffaker Lane, Ste. 408
Reno, NV 89511-2092

Christopher A. Brown
2014 Crawford Street, Apt. 1
North Las Vegas, NV 89030

Chemical Lime Company of Arizona
P.O. Box 363068
North Las Vegas, Nevada 89036

City of Caliente
Attn: Mayor
P.O. Box 1006
Caliente, NV 89008-1006

Dry Lake Water, LLC
2701 N. Tenaya Way, Suite 200
Las Vegas, NV 89102

Dyer, Lawerence, Penrose,
Flaherty and Donaldson
Attn.: Frank Flaherty
2805 Mountain St.
Carson City, NV 89703

James H. Fincher
2410 Bonita Lane
Henderson, NV 89014

Ely Shoshone Tribe
#16 Shoshone Circle
Ely NV 89301

Charles F. Hilfenhaus, Jr.
4465 Denia Circle
Las Vegas, NV 89108

High Country News
Attn.: Matt Jenkins
2832 Regent Street
Berkeley, CA 81428

INMC Mortgage Holdings, Inc.
Construction Lending Division
155 N. Lake Ave. CLCA-B 11th Floor
Pasadena, CA 91101

Las Vegas Fly Fishing Club
2728 Tidewater Ct.
Las Vegas, NV 89117

Lionel Sawyer & Collins
Attn.: Brian H. Schusterman
50 W. Liberty Street, Suite 1100
Reno, NV 89501

Moapa Band of Paiute Indians
Attn.: William Anderson, Chairman
P.O. Box 340
Moapa, NV 89025

Moapa Valley Water District
Attn.: Joe Davis
P. O. Box 257
Logandale, NV 89021

Carolyn Morrison
895 Ripple Way
Las Vegas, NV 89110

Nevada Cogeneration Associates
420 N. Nellis Blvd., #A3-117
Las Vegas, NV 89110

Nevada Cogeneration Associates
Attn.: Executive Director
P.O. Box 81378
Bakersfield, CA 93380

Nevada Power Company
Craig York
P.O. Box 230
Las Vegas, NV 89151

Republic Environmental Technologies, Inc.
770 East Sahara Ave.
Las Vegas, NV 89104

Debra Richardson
3601 Cambridge St. #151
Las Vegas, NV 89109

Southern Nevada Water Authority
Attn.: Bill Rinne
1001 South Valley View Blvd.,
Mail Stop #485
Las Vegas, NV 89153

Southern Nevada Water Authority
Attn.: Jeff Johnson
1001 South Valley View Blvd.,
Mail Stop #485
Las Vegas, NV 89153

Stewart Title of Nevada
Attn.: Linda Jones
3800 Howard Hughes Pkwy, Ste. 500
Las Vegas, NV 89109-0913

Taggart & Taggart, Ltd.
Attn.: Paul Taggart
108 N. Minnesota Street
Carson City, NV 89703

U.S. Bureau of Indian Affairs
Western Regional
Attn.: Barry Welch
2600 N. Central Avenue, 4th floor
Phoenix, AZ 85004

U.S. Bureau of Land Management
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

U.S. Fish and Wildlife Service
Attn.: Tim Mayer
911 NE 11th Ave.
Portland, OR 97232-4181

U.S. Fish and Wildlife Service
Attn.: Michael Eberle
911 NE 11th Ave.
Portland, OR 97232-4181

United States of America
National Park Service
Attn.: Bill Hansen
1201 Oakridge Dr., Suite 250
Fort Collins, CO 80525

U.S. National Park Service
Attn.: Gary Karst
601 Nevada Way
Boulder City, NV 89005

U.S. Department of the Interior
Office of the Solicitor
Attn.: Peter Fahmy
755 Parfet St., Suite 151
Lakewood, CO 80215

U.S. Department of the Interior
Office of the Solicitor
Attn.: Steven Palmer
2800 Cottage Way, Room E-1712
Sacramento, CA 95825-1890

Ziontz, Chestnut, Varnell, Berley & Slonim
Attn.: Richard Berley
2101 Fourth Ave., Suite 1230
Seattle, WA 98121

Juanita Mordhorst, AAII
Division of Water Resources
Hearings Section

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

1169

ORDER

HOLDING IN ABEYANCE CARBONATE-ROCK AQUIFER SYSTEM GROUNDWATER APPLICATIONS PENDING OR TO BE FILED IN COYOTE SPRINGS VALLEY (BASIN 210), BLACK MOUNTAINS AREA (BASIN 215), GARNET VALLEY (BASIN 216), HIDDEN VALLEY (BASIN 217), MUDDY RIVER SPRINGS aka UPPER MOAPA VALLEY (BASIN 219), LOWER MOAPA VALLEY (BASIN 220), AND FOR FURTHER STUDY OF THE APPROPRIATION OF WATER FROM THE CARBONATE-ROCK AQUIFER SYSTEM, LINCOLN AND CLARK COUNTIES, NEVADA.

WHEREAS, the Nevada State Engineer is designated by the Nevada Legislature to perform the duties related to the management of the water resources belonging to the people of the State of Nevada.[1]

WHEREAS, the State Engineer is empowered to make such reasonable rules and regulations as may be necessary for the proper and orderly execution of the powers conferred by law.[2]

WHEREAS, the State Engineer is empowered to conduct such studies as are necessary.[3]

WHEREAS, a large portion of the State of Nevada consisting of approximately 50,000 square miles of sparsely populated land is underlain by significant carbonate-rock sequences.[4]

WHEREAS, the carbonate-rock sequences contain groundwater aquifers, which are believed to contain significant, but undetermined, quantities of ground water.

WHEREAS, many persons or entities have filed water right applications requesting permission to appropriate substantial quantities of underground water from the carbonate-rock aquifer system.

WHEREAS, in 1984, the Water Resources Division of the United States Department of Interior, Geological Survey proposed a 10-year investigation of the entire Carbonate Terrane, which includes the carbonate-rock aquifers of the areas referenced above. This study was proposed because the water resources of the Carbonate Terrane were not well defined, the hydrology and geology of the area are complex, and data was sparse.[5]

---

[1] See, Nevada Revised Statutes chapters 532, 533, 534, 535 and 536.

[2] NRS § 532.120.

[3] NRS § 532.165(1), 533.368 and 533.370(2).

[4] Michael D. Dettinger, Distribution of Carbonate-Rock Aquifers in Southern Nevada and the Potential for their Development, Summary of Findings, 1985-1988, Summary Report No. 1, United States Geological Survey, Department of Interior and Desert Research Institute, University of Nevada System, p. 3, 1989. See also, Memorandum dated August 3, 1984, from Terry Katzer, Nevada Office Chief, Water Resources Division, United States Department of Interior Geologic Survey, Carson City, Nevada, to Members of the Carbonate Terrane Study, Attachment p. 8, which indicates that the area underlain by significant carbonate-rock sequences in Nevada is over 40,000 square miles of sparsely populated land, and includes 106 hydrographic areas and basins.

[5] Memorandum dated August 3, 1984, from Terry Katzer, Nevada Office Chief, Water Resources Division, United States Department of Interior Geologic Survey, Carson City, Nevada, to

WHEREAS, it has been known since 1984 that to arrive at some reasonable understanding of the carbonate-rock aquifer system, substantial amounts of money would be required to develop the science, a significant period of study would be required, and that "unless this understanding is reached, the development of carbonate water is risky and the resultant effects may be disastrous for the developers and current users."[6]

WHEREAS, the United States Geological Survey has indicated that given the multiple possible avenues of hydrologic connection between the various aquifers and flow systems, and the uncertainties of recharge and discharge mechanisms and processes, an investigation of the hydrology of the carbonate-rock aquifer system in Nevada is undoubtedly a difficult undertaking.

WHEREAS, an investigation of the carbonate-rock aquifer system is additionally complicated by factors including:[7]

- basic hydrologic data such as groundwater levels in the basin-fill aquifers and the carbonate-rock aquifers, and reliable flow measurements for important springs and major streams are scarce or infrequently obtained in much of the area;
- secondary hydrologic and other data, such as hydraulic parameters, geophysical and geochemical, are lacking in many areas;
- the geometry, properties, and boundaries of the carbonate-rock and basin-fill reservoirs are generally unknown, and definition of these properties can be expensive and difficult;
- climatic conditions today are inadequately defined (particularly at higher altitudes) and conditions during the development of the flow paths within the deep-rock aquifers and flow paths within the carbonate-rock aquifer are even more uncertain;
- uncertainties and inaccuracies exist in current methods of estimating precipitation;
- uncertainties and inaccuracies exist in current methods of estimating groundwater inflow and recharge;
- uncertainties and inaccuracies exist in current methods of estimating groundwater outflow and evaporative discharge;
- only a small number of wells tap the deep carbonate-rock aquifer system;
- because there has been no significant historical pumping of ground water from the carbonate-rock aquifer system, groundwater models can only be used as a limited predictive tool for estimating the principle location and magnitude of the impacts of pumping ground water from the system;
- limited stresses on the water resources of the area under current development conditions allow hydrologists information only on the narrow band of system responses to natural conditions; and
- the relationship between geothermal systems and the deep carbonate-rock aquifers and groundwater flow systems is not well understood.

WHEREAS, in 1985, the Nevada Legislature authorized a program for the study and testing of the carbonate-rock aquifer system of eastern and southern Nevada. The program was a cooperative effort between the State of Nevada and the Federal Government. The overall plan for the program was to study the carbonate-rock aquifers of southern, east-central, and northeastern Nevada as separate phases of work, with a summary of findings to be prepared at the end of each

---

Members of the Carbonate Terrane Study.

[6] Ibid.

[7] Id., Attachment p. 7.

phase. A report, Distribution of Carbonate-Rock Aquifers in Southern Nevada and the Potential for their Development, Summary of Findings, 1985-1988,[8] summarized the findings of the first phase of the study, which assessed the resources of the carbonate-rock aquifers of southern Nevada. The summary brought together results from more than 20 technical reports produced during the study. The summary indicated that:

> The rocks that compose the carbonate-rock aquifers are layers of limestone and dolomite that were deposited hundreds of millions of years ago in much of the eastern Great Basin. Subsequently, the carbonate rocks were much deformed; as a result, they no longer exist as continuous layers beneath the region. Instead, they have been pulled apart to form a few large areas of thick and relatively continuous carbonate rocks. Separating these areas are noncarbonate rocks, within which are isolated mountain-sized blocks of carbonate rock.
>
> Beneath southern Nevada, the thick carbonate-rock layers are continuous enough to transmit ground water at regional scales only beneath a north-south "corridor" 60-90 miles wide that extends southward from east-central Nevada to and beyond the Spring Mountains area west of Las Vegas. Within this corridor are the two major regional flow systems of southern Nevada: the Ash Meadows-Death Valley system and the White River-Muddy River Springs system. These flow systems link the ground water beneath dozens of valleys and over distances exceeding 200 miles. Flow in these systems probably is concentrated along highly transmissive zones associated with (1) recently active faults and (2) confluences of flow near major warm-water springs. Outside of the corridor, the carbonate rocks are present primarily as isolated blocks that form aquifers of limited extent, recharged mostly by local precipitation.
>
> * * *
>
> Large-scale development (sustained withdrawals) of water from the carbonate-rock aquifers would result in water-level declines and cause the depletion of large quantities of stored water. Ultimately, these declines would cause reductions in the flow of warm-water springs that discharge from the regional aquifers. Storage in other nearby aquifers also might be depleted, and water levels in those other aquifers could decline. In contrast, isolated smaller ground-water developments, or developments that withdraw ground water for only a short time, may result in water-level declines and springflow reductions of manageable or acceptable magnitude.
>
> Confidence in predictions of the effects of development, however, is low; and it will remain low until observations of the initial hydrologic results of development are analyzed. A strategy of staging developments gradually and adequately monitoring the resulting hydrologic conditions would provide information that eventually could be used to improve confidence in the predictions.[9]

WHEREAS, because assurances that the adverse effects of development will not overshadow the benefits cannot be made with a high degree of confidence, development of the carbonate-rock aquifer system must be undertaken in gradual stages together with adequate

---

[8] Michael D. Dettinger, Distribution of Carbonate-Rock Aquifers in Southern Nevada and the Potential for their Development, Summary of Findings, 1985-1988, Summary Report No. 1, United States Geological Survey, Department of Interior and Desert Research Institute, University of Nevada System, Forward, 1989.

[9] Id, pp. 1-2.

monitoring in order to predict, through the use of a calibrated model, the effects of continued or increased development with a higher degree of confidence.

WHEREAS, staging development gradually means not developing the resources in one large step, but rather starting with small projects that are possibly augmented gradually if conditions and confidence warrant. This approach allows the effects of development to be observed and analyzed continually, so that the benefits and adverse effects of development can be judged and the effects reversed or mitigated if they prove to be detrimental to existing rights and the environment. This approach would hopefully avoid the havoc that could be created by the curtailment of water use by those who have come to rely on it if impacts occur requiring curtailment of the water use.

WHEREAS, the 1995 Water-Resources Investigations Report 91-4146[10] estimates the total water budget of all southern Nevada aquifers from the natural recharge to the mountains and subsurface inflow to the study area[11] to be about 160,000 acre-feet annually, and discharges from major discharge areas to be about 77,000 acre-feet annually.[12]

WHEREAS, it is believed that all of the recharge and subsurface inflow cannot be captured for use.

WHEREAS, in July and August of 2001 nearly four weeks of public administrative hearings were conducted on applications filed by the Las Vegas Valley Water District (Applications 54055 - 54059, inclusive) and Coyote Springs Investment, LLC (Applications 63272 - 63276, inclusive, and 63867 -63876, inclusive), which together request to appropriate approximately 135,000 acre-feet of water annually from the carbonate-rock aquifer system within the Coyote Springs Valley Hydrographic Basin.[13]

WHEREAS, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that using the standard Maxey-Eakin technique for estimation of groundwater recharge from precipitation, the recharge for the Coyote Springs Valley, Muddy River Springs, Hidden Valley, Garnet Valley, Black Mountains and Lower Moapa Valley

---

[10] Michael D. Dettinger, et al., Distribution of Carbonate-Rock Aquifers and the Potential for Their Development, Southern Nevada and Adjacent Parts of California, Arizona and Utah, U.S. Geological Survey, Water-Resources Investigations Report 91-4146, p. 50, 1995.

[11] The study area is defined on p. 5 of Water-Resources Investigations Report 91-4146 to be most of southern Nevada south of Tonopah and Pioche.

[12] Discharge areas are identified as Muddy River Springs 36,000 acre-feet annually (afa) of spring flow, Blue Point Spring 240 afa of spring flow, Rogers Spring 920 afa of spring flow, Frenchman Mountain 2,100 afa of underflow toward Colorado River, Pahrump Valley 18,000 afa of underflow to California, Ash Meadows 17,000 afa of spring flow and evapotranspiration, Amargosa Desert 3,000 afa of underflow to Death Valley, and Grapevine Canyon 400 afa of underflow to Death Valley. Water-Resources Investigations Report 91-4146 at 53.

[13] It is noted that at the administrative hearing on Coyote Springs Investment, LLC Applications 63272 - 63276, inclusive, and 63867 -63876, inclusive, the applicant indicated they are requesting the State Engineer "to issue the permits as requested but limit their full use until the monitoring and mitigation program is in effect." Transcript, public administrative hearing before the State Engineer, August 20, 2001, p. 58. However, the applicant further indicated that it requested that a minimum of four permits be issued, two in each county, with the second permit in each county to be used to stress the aquifer. Two permits for a total amount of 14,478 afa would be for development, two permits for a total amount of 14,478 afa would be to stress the aquifer under some temporary development. Transcript, public administrative hearing before the State Engineer, August 20, 2001, pp. 91-96. This is after the 27,504 afa requested by the Las Vegas Valley Water District.

areas combined is approximately 3,550 acre-feet annually. Using the modified Maxey-Eakin technique introduced at the administrative hearing (known as the Donovan-Katzer 2000 technique), the recharge is estimated at approximately 6,761 acre-feet annually for the combined areas.[14]

WHEREAS, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that approximately 50,000 acre-feet of groundwater inflow comes into the Coyote Springs Valley from northern groundwater basins and approximately 53,000 acre-feet annually outflows[15] from Coyote Springs Valley of which a portion may be available for capture from that groundwater underflow. While testimony presented indicated a belief that significant quantities of water may be available for capture from storage, it is unknown what quantity that would be and if any underground water could be appropriated without unreasonable and irreversible impacts.[16]

WHEREAS, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that a portion of the ground water outflow from Coyote Springs Valley is believed to discharge at a rate of approximately 37,000 acre-feet annually at the Muddy River Springs area and approximately 16,000 to 17,000 acre-feet annually flows to groundwater basins further south.[17] This 37,000 acre-feet is counted as part of the 53,000 acre-feet outflow from Coyote Springs Valley resulting in 16,000-17,000 acre-feet annual flow that by-passes the Muddy River Springs area.

WHEREAS, these referenced large springs located near the central part of the Upper Moapa Valley, which that collectively discharge approximately 37,000 acre-feet annually of underground water, are fully appropriated pursuant to the Muddy River Decree.[18] It is believed that the source of water discharged originates mainly from the carbonate-rock aquifer system, but it is unknown if the discharge originates solely from the White River Flow System or is also influenced by discharge from the Meadow Valley Flow System or if there is influence from the alluvial aquifer.

WHEREAS, listed endangered and/or potential threatened species exist in the Muddy Springs/Muddy River area.

WHEREAS, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that their own expert witnesses are unable to make a suggestion to the State Engineer as to what part of the water budget could be captured without a great deal of uncertainty, and that the question cannot be resolved without stressing the system.[19]

---

[14] See, testimony of Terry Katzer and David Donavan; Exhibit 54, p. 4-25, public administrative hearing before the State Engineer, July 16-24, 2001.

[15] Taking into account for 4,000 afa of in-basin recharge and 1,000 afa of evapotranspiration.

[16] See, testimony of Terry Katzer and David Donavan, public administrative hearing before the State Engineer, July 16-24, 2001.

[17] See, testimony of Terry Katzer and David Donavan, public administrative hearing before the State Engineer, July 16-24, 2001.

[18] Judgment and 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, March 12, 1920, Tenth Judicial District Court of the State of Nevada, In and For the County of Clark.

[19] See, testimony of Terry Katzer and David Donavan, public administrative hearing before the State Engineer, June 16-24, 2001.

WHEREAS, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that the State Engineer's ability to determine if development of the carbonate-rock aquifer system will impact existing rights is dependent on how the water rights are brought "on-line" and monitored.[20]

WHEREAS, testimony and evidence from the administrative hearing on the Las Vegas Valley Water District's applications indicates that little is known about the hydrologic connectivity between the groundwater basins, that virtually nothing is known about the mountain blocks, estimates of recharge to the area can vary by a factor of two, there is probably some connectivity between the water in the carbonate-rock aquifers and the alluvial groundwater basins,[21] there is still little data available and not much has changed from the information known in 1984.

WHEREAS, the State Engineer has been provided several different models, which though based on little pumping data, all provide the State Engineer with different analyses, and which all indicate that the pumping of substantial amounts of carbonate-rock aquifer water will likely impact the sources of the Muddy River.

WHEREAS, the State Engineer has previously granted groundwater permits, which authorize use of underground water in the area underlain by the carbonate-rock aquifer system or directly from the carbonate-rock aquifer system in the following quantities:

Coyote Springs Valley (Basin 210)	16,300	acre-feet
Black Mountain (Basin 215)	10,216	acre-feet
Garnet Valley (Basin 216)	3,380	acre-feet
Hidden Valley (Basin 217)	2,200	acre-feet[22]
Muddy River Springs aka Upper Moapa Valley (Basin 219)	14,756	acre-feet
Lower Moapa Valley (Basin 220)	5,813	acre-feet
	50,465	acre-feet

WHEREAS, of all the water rights issued from the carbonate-rock aquifer system, to date very few have actually been pumped.

WHEREAS, if 16,000 to 17,000 acre-feet is believed to by-pass the Muddy River Springs area, the water right permits already issued in Coyote Springs Valley alone equal the estimate of the amount of carbonate flow that by-passes the region and is not part of the flow discharged from the Muddy River Springs area.

WHEREAS, Nevada Revised Statute § 533.370(2)(b) provides that the State Engineer may postpone action on an application in areas where studies of water supplies are necessary.

WHEREAS, Nevada Revised Statute § 533.368 provides that if the State Engineer determines that a hydrological study, an environmental study or any other study is necessary before he makes a final determination on an application, and the applicant, a governmental agency or other person has not conducted such a study or the required study is not available, the State Engineer shall advise the applicant of the need for the study and the type of study required.

---

[20] Ibid.

[21] Ibid.

[22] This 2,200 acre-feet is combined with 2,200 acre-feet issued in Garnet Valley for a total of 2,200 afa between the two basins.

WHEREAS, Nevada Revised Statute § 533.368(4) provides that the State Engineer shall consult with the applicant and the governing body of the county or counties in which the point of diversion and place of use are located concerning the scope and progress of the study.

WHEREAS, the State Engineer believes it is prudent to work with a model, and the appropriate model will be determined in conjunction with the parties identified below who are responsible for participating in the study.

WHEREAS, the State Engineer does not believe it is prudent to issue any additional water rights to be pumped from the identified portions of the carbonate-rock aquifer until a significant portion of the water rights which have already been issued are pumped for a substantial period of time in order to determine if the pumping of those water rights will have any detrimental impacts on existing water rights or the environment.

NOW THEREFORE, the State Engineer orders:

1. All applications pending and any new filings for the appropriation of water from the carbonate-rock aquifer system in Coyote Springs Valley (Basin 210), Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (Basin 217), Muddy River Springs aka as Upper Moapa Valley (Basin 219), and Lower Moapa Valley (Basin 220) will be held in abeyance until further information is obtained by stressing the aquifer by those water right permits already issued to appropriate water from the carbonate-rock aquifer system.

2. While the studies proposed in 1985 were a beginning, those studies indicated that large-scale developments with sustained withdrawals of water from the carbonate-rock aquifers would result in water-level declines and depletion of stored water, but that isolated smaller groundwater developments or developments of limited duration may result in water-level declines and springflow reductions of manageable and acceptable magnitudes. However, very little additional information based on hard science has been produced since that time. Nevada Revised Statute § 533.368 provides the State Engineer with the authority to withhold action on pending applications and to advise the applicant of the need for additional study. The State Engineer finds that further hydrological study is needed before a final determination can be made on carbonate-rock aquifer system water right applications in the referenced basins.

3. The State Engineer, in conjunction with those identified below as applying for additional water rights and already having an interest in water rights permitted from the carbonate-rock aquifer system, or their successors in interest, will conduct a study to provide information on the effect of pumpage of those water rights which have already been issued from the carbonate-rock aquifer. The entities that shall participate in the study must at a minimum include:

Las Vegas Valley Water District
Southern Nevada Water Authority
Coyote Springs Investment, LLC
Nevada Power Company
Moapa Valley Water District.

The study must cover a 5-year minimum period during which at least 50% of the water rights currently permitted in the Coyote Springs Valley groundwater basin are pumped for at least 2 consecutive years.

4. These referenced applicants or permittees shall bear the cost of the study, and a cash deposit divided pro rata among them will be required as set forth in NRS § 533.368(3) after a determination of the estimate of cost to complete the study.

5. The State Engineer will arrange meetings between the State Engineer and the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company, and Moapa Valley Water District, or their successors, and the governing bodies of the counties in which there are proposed points of diversion and places of use under their pending applications concerning the scope of the study.

6. The State Engineer orders the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company, Moapa Valley Water District, Dry Lake Water Company, LLC, Republic Environmental Technologies, Inc., Chemical Lime Co., Nevada Cogeneration Associates, or their successors, who presently hold water rights authorized for appropriation from the carbonate-rock aquifer, to provide the other parties to the study and the State Engineer with data on a quarterly basis as to the rate at which water was diverted under the specific water right permits issued, total acre-feet diverted per month, and monthly water level measurements

7. After the study period, the Las Vegas Valley Water District; Southern Nevada Water Authority; Coyote Springs Investment, LLC; Nevada Power Company; and Moapa Valley Water District are ordered to file with the State Engineer, within 180 days of the end of the fifth consecutive year, a report as to the information obtained and any impacts seen to the groundwater or surfacewater resources of the carbonate-rock aquifer or alluvial aquifer systems from the pumping of those rights presently permitted.

8. At the end of the study period, the Las Vegas Valley Water District/Southern Nevada Water Authority will update Exhibit 54 from the July 2001 hearings in order to show the State Engineer the effects, if any, of the water it requested for appropriation under Applications 54055 - 54059, inclusive, as they are filed. The State Engineer will then make a determination if he has sufficient information to proceed with ruling on those applications for which hearings have already been conducted, i.e., Las Vegas Valley Water District (Applications 54055 - 54059, inclusive) and Coyote Springs Investment, LLC (Applications 63272 - 63276, inclusive, and 63867 -63876, inclusive), and other applications pending for the appropriation of water from the carbonate-rock aquifer system.

HUGH RICCI, P.E.
State Engineer

Dated at Carson City, Nevada,

this 8th day of March, 2002

CERTIFICATE OF SERVICE

I, the undersigned, declare under penalty of perjury, that I am an employee of the Nevada Division of Water Resources, that I am over the age of eighteen (18) years, and that I am not a party to, nor interested in, this action. On this date, I mailed a true and correct copy of Nevada Division of Water Resources' Order No. 1169, addressed to the following:

Las Vegas Valley Water District
Attn: Kay Brothers
1001 S. Valley View
Las Vegas, NV 89153
Cert. Mail #7000 0520 0023 8555 9034

Coyote Springs Investment, L.L.C.
7755 Spanish Springs Road
Sparks, NV 89436
Cert. Mail #7000 0520 0023 8555 9041

C.S. Inc.
Judy Kuban
1625 Wendy Way
Reno, NV 89509
Cert. Mail #7000 0520 0023 8555 9058

Dry Lake Water, LLC
2701 North Tenaya Way, Suite 200
Las Vegas, NV 89128
Cert. Mail #7000 0520 0023 8555 9065

Bonneville Nevada Corp.
257 East 200 South, Suite 800
Salt Lake City, UT 84111
Cert. Mail #7000 0520 0023 8555 9072

C.O. Myers, Exec. Dir.
Nevada Cogeneration Ass.
P.O. Box 81378
Bakersfield, CA 93380
Cert. Mail #7000 0520 0023 8555 9089

Nevada Power Co.
Attn: Craig York
P.O. Box 230
Las Vegas, NV 89151-0001
Cert. Mail #7000 0520 0023 8555 9096

Oxford Energy of Nevada, Inc.
3510 Unocal Place
Santa Rosa, CA 95403
Cert. Mail #7000 0520 0023 8555 9102

James W. Adams
7439 La Palma Ave., Suite 234
Buena Park, CA 90620
Cert. Mail #7000 0520 0023 8555 9119

Stallion Sand & Gravel, LLC
624 Casa del Norte
North Las Vegas, NV 89031
Cert. Mail #7000 0520 0023 8555 9126

Moapa Band of Paiute Indians
P.O. Box 340
Moapa, NV 89025
Cert. Mail #7000 0520 0023 8558 4562

Moapa Valley Water District
P.O. Box 257
Logandale, NV 89021
Cert. Mail #7000 0520 0023 8558 4579

Three Kids Enterprises
4055 S. Spencer St., Suite 106
Las Vegas, NV 89119
Cert. Mail #7000 0520 0023 8558 4586

Sandia Construction Inc.
c/o Cameron Adams
Box 1297
Susanville, CA 96103
Cert. Mail #7000 0520 0023 8558 4593

Nevada Cogneration Associates
420 N. Nellis Blvd., #A3-148
Las Vegas, NV 89110
Cert. Mail #7000 0520 0023 8558 4609

N. Burgess
420 N. Nellis Blvd., #A3-117
Las Vegas, NV 89110
Cert. Mail #7000 0520 0023 8558 4616

North Valley Holdings
500 Damonte Ranch Parkway, Suite 1056
Reno, NV 89511
Cert. Mail #7000 0520 0023 8558 4623

Michael Buschelman
P.O. Box 51371
Sparks, NV 89435
Cert. Mail #7000 0520 0023 8558 4630

William Penn
CMS Generation Co.
330 Town Center Drive, Ste. 1100
Dearborn, MI 48126
Cert. Mail #7000 0520 0023 8558 4647

Thomas Shelton
CMS Generation Co.
2154 Hastings Ct.
Santa Rosa, CA 95495-8577
Cert. Mail #7000 0520 0023 8558 4654

Wyman Engineering Consultants
P.O. Box 60473
Boulder City, NV 89006-0473
Cert. Mail #7000 0520 0023 8558 4661

John E. Hiatt
8180 Placid St.
Las Vegas, NV 89123
Cert. Mail #7000 0520 0023 8558 4678

City of Caliente
Attn: George T. Rowe, Mayor
P.O. Box 158
Caliente, NV 89008
Cert. Mail #7000 0520 0023 8558 4685

County of Nye
P.O. Box 1767
Tonopah, NV 89049
Cert. Mail #7000 0520 0023 8558 4692

Ely Shoshone Tribe
16 Shoshone Circle
Ely, NV 89301
Cert. Mail #7000 0520 0023 8558 4708

Lincoln County, Board of Commissioners
P.O. Box 90
Pioche, NV 89043
Cert. Mail #7000 0520 0023 8558 4715

Clark County Commissioners
500 S. Grand Central Parkway
Las Vegas, NV 89106-4506
Cert. Mail #7000 0520 0023 8558 4807

Muddy Valley Irrigation District
P.O. Box 160
Logandale, NV 89021
Cert. Mail #7000 0520 0023 8558 4722

U.S. Bureau of Indian Affairs
Attn: Barry Welch
P.O. Box 10
Phoenix, Az. 85001
Cert. Mail #7000 0520 0023 8558 4739

U.S.D.I., B.L.M.
Attn: Ben F. Collins, District Manager
P.O. Box 26569
Las Vegas, NV 89126
Cert. Mail #7000 0520 0023 8558 4746

U.S. Fish and Wildlife Service
911 NE 11th Ave.
Portland, OR 97232-4184
Cert. Mail #7000 0520 0023 8558 4753

U.S. National Park Service
Dan McGlothlin
1201 Oak Ridge Drive, Suite 250
Fort Collins, CO 80525
Cert. Mail #7000 0520 0023 8558 4760

Republic Environmental Technologies, Inc.
770 E. Sahara Ave.
Las Vegas, NV 89104
Cert. Mail #7000 0520 0023 8558 4777

Chemical Lime Co.
P.O. Box 3609
North Las Vegas, NV 89036
Cert. Mail #7000 0520 0023 8558 4784

Nevada Cogeneration Associates
420 N. Nellis Blvd., A3-148 and 117
Las Vegas, NV 89110
Cert. Mail #7000 0520 0023 8558 4791

Richard Berley/Mark Slonim
Ziontz, Chestnut, Varnell, Berley and Slonim
2101 4th Ave., Suite 1230
Seattle, WA 98121

Robert Johnston
Kilpatrick, Johnston & Adler
412 North Division St.
Carson City, NV 89703

Ross de Lipkau
Marshall Hill Cassas & de Lipkau
P.O. Box 2790
Reno, NV 89505

Peter Fahmy
U.S. Dept. of Interior
755 Parfet St., Suite 151
Lakewood, CO 80215

Robert Marshall
Marshall Hill Cassas & deLipkau
P.O. Box 2790
Reno, NV 89505

Byron Mills
732 S. 6th St.
Las Vegas, NV 89101

Steve Palmer
Office of the Regional Solicitor
U.S. Dept. of Interior
2800 Cottage Way, Room E-2753
Sacramento, CA 95825-1890

Karen Peterson
Allison, MacKenzie, Hartman, et. al.
P.O. Box 646
Carson City, NV 89702

Peggy Twedt
Frank Flaherty
Dyer, Lawrence, Cooney & Penrose
2805 N. Mountain St.
Carson City, NV 89703

Harvey Whittemore
Carl Savely
Lionel, Sawyer & Collins
50 West Liberty St. Suite 1100
Reno, NV 89501

Don Winter
Agent C.S. Inc.
P.O. Box 35136
Las Vegas, NV 89133

Charles Cave
2325 W. Charleston Blvd.
Las Vegas, NV 89102

Dale Ferguson
Woodburn & Wedge
6100 Neil Road, Ste. 500
Reno, NV 89511

Mark Stock
Global Hydrologic Services, Inc.
561 Keystone Ave. #200
Reno, NV 89503

Linda Bowman
540 Hammil Lane
Reno, NV 89511

George Benesch
P.O. Box 3498
Reno, NV 89505

Dated this 8 day of March, 2002.

Sandra Allen

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

IN THE MATTER OF APPLICATIONS)
72218, 72219, 72220 AND 72221 FILED TO)
APPROPRIATE THE UNDERGROUND)
WATERS OF THE KANE SPRINGS)
VALLEY HYDROGRAPHIC BASIN (206))
LINCOLN COUNTY, NEVADA.)

RULING

#5712

GENERAL

I.

Application 72218 was filed on February 14, 2005, by Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cubic feet per second (cfs) of the underground water of the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin more specifically described as portions of T.8S., R.62E., T.8S., R.63E., T.8S., R.64E., T.9S., R.61E., T.9S., R.62E., T.9S., R.63E., T.9S., R.64E., T.10S., R.61E., all of T.10S., R.62E., portions of T.10S., R.63E., T.10S., R.64E., T.11S., R.61E., all of T.11S., R.62E., portions of T.11S., R.63E., T.11S., R.64E., T.12S., R.61E., all of T.12S., R.62E., all of T.12S., R.63E., portions of T.12S., R.64E., T.12.5S., R.61E., T.12.5S., R.62E., T.13S., R.61E., all of T.13S., R.62E., portions of T.13S., R.63E., T.13S., R.64E., T.13.5S., R.63E., T.14S., R.61E., all of T.14S., R.62E., portions of T.14S., R.63E., T.15S., R.61E., T.15S., R.62E., T.15S., R.63E., T.16S., R.62E., M.D.B.& M. The proposed point of diversion is described as being located within the SW¼ SE¼ of Section 25, T.8S., R.65E., M.D.B.&M.[1]

II.

Application 72219 was filed on February 14, 2005, by Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cfs of the underground water of the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin more specifically as described above. The proposed point of diversion is described as being located within the SE¼ SW¼ of Section 31, T.9S., R.65E., M.D.B.&M.[2]

---

[1] File No. 72218, official records of the Office of the State Engineer. Exhibit No. 2, public administrative hearing before the State Engineer, April 4-6, 2006. Hereinafter the exhibits and transcript will be referred to solely by exhibit number or transcript page.
[2] Exhibit No. 3.

III.

Application 72220 was filed on February 14, 2005, by Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cfs of the underground water of the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin more specifically as described above. The proposed point of diversion is described as being located within the SE¼ SW¼ of Section 6, T.11S., R.64E., M.D.B.&M.[3]

IV.

Application 72221 was filed on February 14, 2005, by Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cfs of the underground water of the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin more specifically as described above. The proposed point of diversion is described as being located in the SE¼ SW¼ of Section 11, T.9S., R.65E., M.D.B.&M.[4]

V.

Applications 72218 and 72219 were timely protested by White Pine County; however, said protests were withdrawn prior to the administrative hearing.[5]

VI.

Applications 72218 and 72219 were timely protested by Wayne Lister, Ruby Lister and Bevan Lister on the grounds that:

> 1. Lincoln County Water District has no written adopted plan for the use of the water applied for under this permit. There is no city or town within the area of this permit.
> 2. We have long argued that moving water from one basin to another is detrimental to the originating basin.
> 3. Lincoln County Water District is supposed to be a local government entity protecting and planning for the benefit of the citizens of Lincoln County but in teaming up with Vidler they become merely speculative with the sole objective to make a profit.[6]

VII.

Applications 72218, 72219, 72220 and 72221 were timely protested by the United States Department of Interior, National Park Service ("NPS") on the grounds that:

---

[3] Exhibit No. 4.
[4] Exhibit No. 5.
[5] Exhibit No. 6.
[6] Exhibit No. 7.

1. There is no water available for appropriation because committed water resources exceed ground-water recharge.

2. The approval and development of the appropriation proposed by this application will impair the water rights of the United States, because:

A. The appropriation, in combination with other appropriations and withdrawals in Coyote Spring Valley will further reduce the discharge of the Muddy River. The United States' senior water right and other existing rights to the Muddy River would be impaired, if the appropriation is approved and developed.

B. The proposed appropriation, in combination with existing appropriations and pending applications in the White River ground-water flow system, if approved and developed, would reduce the discharge of Lake Mead NRA [National Recreation Area] springs, because of the large potential withdrawal rate. The drawdown caused by such large withdrawals would extend to capture ground water that naturally discharges through the springs.

C. The effects of the appropriation proposed by this application, when combined with other existing and proposed appropriations, could impair the senior water rights of the Lake Mead NRA more quickly and/or to a degree greater than the withdrawal proposed under this application alone.

3. The public interest would not be served, by granting a permit to this application, because:

A. The public interest would not be served by granting this application, because the water and water-related resources in the nationally important Lake Mead NRA would be diminished or impaired, as a result of the appropriation proposed by this application.

B. The land which the applicant proposes to withdraw the water is not owned by the applicant. [This protest claim only goes to Applications 72218 and 72219.][7]

VIII.

Applications 72220 and 72221 were protested by the United States Department of Interior, Fish and Wildlife Service ("FWS") on the grounds that:

> The proposed groundwater development threatens the biological and water resources under the jurisdiction of the US Fish and Wildlife Service in the White River Groundwater Flow System. Kane Springs Valley is located upgradient of Coyote Spring Valley and the Muddy River Area. Pumping of groundwater from the basin could reduce the groundwater influx to springs at Moapa Valley National Wildlife Refuge in the Muddy River Area. The combined perennial yield for Coyote Spring valley [sic] and Kane Springs Valley may be on the order of 2,600 acre-feet/yr as estimated in ground-water Resources Reconnaissance Series Report 25. Although there are no permits in Kane Springs Valley, there are at least 200,000

[7] Exhibit No. 8.

> acre-feet/yr of permitted and pending applications in Coyote Spring Valley, directly downgradient. An additional withdrawal would only add to the current exceedance of the perennial yield for the combined basins. Such a withdrawal of groundwater in excess of the perennial yield could result in reduced groundwater flow from Coyote Spring Valley to the Muddy River Area, or result in a reversed gradient causing groundwater outflow from Coyote Spring Valley to Kane Springs Valley. Senior water rights held by the Fish and Wildlife Service in the Moapa Valley National Wildlife refuge [sic] could be adversely impacted. Such an impact to the water rights and resources of the Moapa Valley National Wildlife refuge [sic] and environs could adversely impact threatened and endangered species including Moapa dace and Southwestern Willow Flycatcher; which depend on these water resources for survival. Water-dependent resources in Lower Meadow Valley Wash may be threatened by the proposed development too. The combined volume from all of these pending applications and permitted water rights exceeds all current estimates of the available water for appropriation in the White River Groundwater Flow System. Lacking more information to demonstrate that water is available for appropriation without adversely impacting existing water rights and water-related resources, these applications should be denied.[8]

IX.

By letter dated February 6, 2006, the NPS and FWS requested the State Engineer amend State Engineer's Order No. 1169 to include the Kane Springs Valley Hydrographic Basin within the provisions of the Order and included a request to hold these applications in abeyance until the pumping ordered in Coyote Spring Valley was completed and analyzed.[9] The reasoning behind the request is that these agencies believe Kane Springs Valley and Coyote Spring Valley, while administratively classified as separate hydrographic basins, are actually a single distinct hydrologic drainage basin and should be managed as such. At the public administrative hearing on these applications, the Applicant and Protestant FWS presented a stipulation to resolve the FWS's protests.[10] The resolution was also in lieu of statements made on behalf of the FWS in the February 6, 2006, letter that requested Kane Springs Valley be included in State Engineer's Order No. 1169.[11] Pursuant to the Stipulation, the FWS withdrew its protests and the parties requested that Exhibit A to the Stipulation be included as part of the terms and conditions of any applications that are granted. However, the NPS's request to include Kane Springs Valley Hydrographic Basin within the provisions of Order No. 1169 remains to be resolved.

---

[8] Exhibit No. 9.
[9] Exhibit No. 10.
[10] Exhibit No. 116.
[11] Transcript, p. 12.

X.

After all parties of interest were duly noticed by certified mail, an administrative hearing was held with regard to the protested applications on April 4-6, 2006, at Carson City, Nevada, before representatives of the Office of the State Engineer.[12]

FINDINGS OF FACT

I.

The Listers protested the applications on the grounds that Lincoln County Water District has no written plan for the use of the water applied for and there is no city or town within the area of the applications. The State Engineer finds there is no requirement in Nevada water law for a written plan to be provided in furtherance of a water right application. The State Engineer finds water right applications are almost always filed for proposed projects that are planned, but not in existence, and the water cannot be used until the State Engineer grants a permit that authorizes the use of the water. As discussed in Section III below, the Nevada Legislature has provided the Lincoln County Water District with the authority to serve water to all real property located within the boundaries of Lincoln County. Nevada water law requires that an applicant provide evidence of an actual beneficial use for the water applied for[13] and proof satisfactory to the State Engineer of his intention in good faith to construct any work necessary to apply the water to the intended beneficial use with reasonable diligence and his financial ability and reasonable expectation to actually construct the work and apply the water to the intended beneficial use with reasonable diligence.[14] The State Engineer finds, as discussed below, that the Applicant provided substantial evidence of a project where the water applied for would be used and proof satisfactory of construction of the work to apply the water to the intended beneficial use with reasonable diligence and the financial ability and reasonable expectation to actually construct the work and apply the water to the intended beneficial use with reasonable diligence.

II.

The Listers' protests allege that they have long argued that moving water from one basin to another is detrimental to the originating basin. The State Engineer finds that Nevada water law specifically provides for the interbasin transfer of water provided the applicant meets all of the

[12] Exhibit No. 1.
[13] NRS § 533.035.
[14] NRS § 533.370.

necessary criteria found in the Nevada Revised Statutes, including but not limited to NRS §§ 533.370(5) and (6). Nevada Revised Statute § 533.370(6)(c) and (d) require the State Engineer to take into consideration whether the proposed action is environmentally sound as it relates to the basin from which the water is exported and whether the proposed action is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported. The State Engineer finds Nevada water law requires the State Engineer to consider factors relevant to the originating basin, but specifically provides for the interbasin transfer of water.

III.

The Listers' protests allege that the Lincoln County Water District is supposed to be a local government entity protecting and planning for the benefit of the citizens of Lincoln County but, that in teaming up with Vidler Water Company, the Lincoln County Water District has become merely speculative with the sole objective to make a profit. In 2003, the Nevada Legislature enacted legislation that provided for the creation of the Lincoln County Water District.[15] The special legislative act that created the Lincoln County Water District provided that its jurisdiction and service area are all the real property located within the boundaries of Lincoln County and authorized the Lincoln County Water District to sell water and water rights and to enter into agreements with a private entity or corporation for the transfer or delivery of any water right or water appropriated.[16]

The State Engineer finds the Nevada Legislature gave the Lincoln County Water District its authority. The State Engineer finds the Lincoln County Water District like any other applicant has to demonstrate a beneficial use for the water applied for under these applications and has to satisfy the other statutory requirements. The State Engineer finds if the Protestant Listers have an issue with the operation of the Lincoln County Water District that is a matter outside of the State Engineer's jurisdiction.

IV.

Through testimony and evidence, the Applicants' expert witnesses presented their interpretation of the geology and hydrogeology of the Kane Springs Valley and vicinity. They conclude that the northern portion of the valley is underlain by a volcanic caldera complex and,

[15] Chapter 474, Statutes of Nevada 2003.
[16] *Id.* at Sections 11(7), 11(11), and 11(12).

therefore, has low potential for regional ground-water flow. However, they interpreted the evidence as indicating that the southwestern portion of the basin is underlain by a significant thickness of carbonate rocks.[17] The Applicants conducted a pumping test at their well KPW-1 and, based on the results of the test and their interpretation of the geology, concluded that there is the potential for considerable ground-water movement through the Paleozoic carbonate rocks in Kane Springs Valley.[18] The Kane Springs Wash fault zone is oriented in a northeasterly direction, and is thought to both channel ground-water flow along its length from northeast to southwest, and to act as a barrier to ground-water flow across it from north to south. The witnesses also presented testimony supporting ground-water inflow into the Kane Springs Valley from the north.[19]

The State Engineer finds that the Applicants' interpretation of ground-water movement in the Kane Springs Valley from northeast to southwest and into Coyote Spring Valley, preferentially along the Kane Springs Wash fault zone, is generally consistent with the available data. The State Engineer further finds that the Applicants' pumping test supports the conclusion that there is considerable potential for ground-water flow in the carbonate rocks in the vicinity of well KPW-1. The State Engineer also finds that there was not sufficient evidence presented to support a determination of the potential for ground-water inflow into the Kane Springs Valley.

V.

The Applicants presented evidence to quantify subsurface inflow and outflow across the Kane Springs Valley Hydrographic Basin boundaries. The Applicants propose that ground water enters Kane Springs Valley from northern Coyote Spring Valley, passing through its western tip, and exits southwesterly back into Coyote Spring Valley. Local recharge is thought to combine with the inflow and exit the basin to the southwest. Since the water table is relatively deep in Kane Springs Valley and ET of ground water is negligible, virtually all ground-water discharge from the basin must occur via subsurface outflow.

Mr. Lewis applied Darcy's law to estimate the magnitude of the ground-water inflow into Kane Springs Valley Hydrographic Basin via a three-mile corridor on the western edge of Kane Springs Valley.[20] Darcy's law states the volume of flow is equal to aquifer transmissivity multiplied by aquifer width multiplied by the hydraulic gradient. He estimated transmissivity for

[17] Transcript, pp. 43-47, 57; Exhibit No. 15, pp. 13-14; Exhibit No. 20, pp. 3-4.
[18] Transcript, pp. 58-59, 62-63.
[19] Exhibit No. 20, pp. 6-13.
[20] Exhibit No. 20, pp. 6-13.

the "bulk aquifer" from the pumping test performed at the well identified as KPW-1. He then multiplied that value by three on the assumption that the aquifer is three times thicker than penetrated by the test well. For a value of hydraulic gradient, Mr. Lewis used water levels in wells CSVM-3 and CE-VF-2, which are located near the center of Coyote Spring Valley.

The State Engineer finds the Applicants' inflow analysis is overly interpretive and without sufficient supporting evidence. Inflow into the basin is proposed to occur through a three-mile wide zone on the western basin boundary. Flow direction is assumed to be from the north to south even though there are no local hydraulic head data to support the hypothesis of hydraulic gradient or flow direction. The Applicants' witness used hydraulic data from the KPW-1 pumping test, which is located approximately six miles from the proposed inflow area. The hydraulic gradient is assumed to be equal to that between wells CSVM-3 and CE-VF-2 even though these wells are located six and 15 miles away, respectively, from the proposed inflow zone. Inflow through the three-mile wide corridor is proposed by the Applicants to be 13,000 acre-feet per year. This amount is approximately one-third of the total amount of regional flow from Pahranagat and Delamar Valleys to Coyote Spring Valley of approximately 37,000 acre-feet per year.[21] However, the proposed flow corridor into Kane Springs Valley is a relatively narrow zone at the corner of the basin. Geologic structures in the area of the proposed inflow corridor strike north northeasterly, and may have the effect of channeling flow along them parallel to the basin boundary, similar to the conceptual model of the Applicants along the Kane Spring and Willow Spring fault zones. Geologic cross-section B-B' shows a thrusted block of low-permeability basement rocks that would act to block potential inflow.[22] The State Engineer finds that sufficient data does not exist to substantiate or reliably estimate subsurface flows into the Kane Springs Valley Hydrographic Basin and the Applicants' inflow estimates are hereby discounted and not accepted.

The Applicants' outflow analysis utilized two estimates of transmissivity from the KPW-1 pumping test. This analysis used a measured transmissivity of 50,000 gallons per day/foot (gpd/ft), which is thought to be representative of the regional carbonate aquifer and a transmissivity of 300,000 gpd/ft, which is thought to be representative of the local Willow Spring fault zone. The Applicants "scaled-up" the pumping test transmissivities to a basin scale by

[21] State Engineer's Office, *Water for Nevada, State of Nevada Water Planning Report No. 3*, Oct. 1971.
[22] Exhibit No. 15.

multiplying the values by three. Outflow is thought to occur in a southwesterly direction parallel to the axis of the Kane Springs Valley. The outflow corridor is estimated to be four-miles wide by 3,000 feet thick. They attribute one-half mile of the four-mile width to the fault zone and the remaining three and one-half miles to regional conditions, each having separate hydraulic gradients for their flow calculations. For the regional flow they used a gradient of 0.005, and for the structural zone they used a gradient of 0.0005. Total basin outflow was calculated to be 16,000 acre-feet per year.[23]

The State Engineer finds several irregularities and inconsistencies with the Applicants' analysis. The Applicants' hydrologist used a hydraulic gradient of 0.005 for the regional component of flow based on the water levels in wells CSVM-3 and CE-VF-2, which are located near the center of Coyote Spring Valley, rather than using a hydraulic gradient of 0.0004 for the regional component of flow based on water levels in wells KPW-1 and CSVM-4, which are located at the outflow of Kane Springs Valley Hydrographic Basin and better situated to measure the applicable gradient.[24] The Applicant calculated the regional component of outflow to be 15,000 acre-feet per year using the hydraulic gradient of 0.005 as opposed to an outflow calculation of 1,250 acre-feet per year using the lower hydraulic gradient of 0.0004. The State Engineer finds that using the higher hydraulic gradient of 0.005 to compute outflow from Kane Springs Valley Hydrographic Basin rather than using the lower gradient of 0.0004 between KPW-1 and CSVM-4 is in error and inconsistent with the Applicants' documented conceptual view of the flow system.[25]

The Applicants' estimate of outflow along the structural zone was computed separately using a transmissivity of 900,000 gpd/ft and a hydraulic gradient of 0.0005. The State Engineer finds the Applicant incorrectly approximated the hydraulic gradient to be 0.0005, and should have used a hydraulic gradient of 0.0004.[26] Based on the actual hydraulic gradient of 0.0004 the resulting basin outflow along the structural zone would then be 1,000 acre-feet per year. Adding the estimated outflow along the structural zone of 1,000 acre-feet per year to the regional flow of 1,250 acre-feet per year results in an estimated basin outflow of 2,250 acre-feet annually rather than the Applicants' calculation of 16,000 acre-feet annually.

---

[23] Exhibit No. 16.
[24] *Ibid.*, pp. 20 and 31.
[25] Exhibit No. 17, p 21.
[26] Exhibit No. 20, p. 11.

The State Engineer finds the Applicants' inflow and outflow analyses lack sufficient data to provide a reliable estimate of basin boundary flows. Furthermore, he finds the Applicants' conceptual analyses were overly interpretive and, in part, were inconsistent with their conceptual model of regional flow. The State Engineer finds that sufficient data were not collected or presented to substantiate the Applicants' estimate of subsurface flow into or out of the Kane Springs Valley Hydrographic Basin.

VI.

The Applicant presented a witness to address the geochemical framework of the Kane Springs Valley Hydrographic Basin and the White River flow system south of the Pahranagat shear zone. The witness presented evidence on stable isotopes, major ion chemistry, and carbon-14 analyses.[27] In summary, the geochemical evidence supports the ground-water gradient data that indicates Kane Springs Valley ground water flows into Coyote Spring Valley and that, in general, water in the White River flow system flows from north to south and mixes with local recharge en route to discharge areas. The witness presented deuterium data collected from springs in Kane Springs Valley believed to represent local recharge water, springs in Pahranagat Valley believed to represent regional carbonate water, and ground water from KPW-1 believed to represent a mix of local recharge water and regional carbonate water. Using a mixing equation the witness computed the percent of regional carbonate ground water from the KPW-1 deuterium sample to equal 77 percent.[28] If the same analysis is repeated using oxygen-18 instead of deuterium, the percent of regional carbonate ground water from the KPW-1 oxygen-18 sample equals 87 percent.[29] As previously discussed, the reinterpretation of the Applicants' subsurface outflow analysis resulted in approximately 2,250 acre-feet per year of basin outflow from the Kane Springs Valley Hydrographic Basin. The State Engineer finds applying the percentages of regional carbonate ground water from KPW-1 for both the deuterium and oxygen-18 samples, the local ground-water recharge component of the outflow would therefore be approximately 518 acre-feet per year and 293 acre-feet per year, respectively. These values appear to support the reconnaissance estimate of 500 acre-feet per year of recharge, however, it is recognized that the re-interpreted outflow is only an estimate, and its value is limited due to uncertain hydraulic parameters.[30]

---

[27] Testimony of R. Glanzman; Exhibit No. 32.
[28] Exhibit No. 117, p. 10.
[29] Exhibit No. 34, Table 1, p. 2.
[30] State Engineer's Office, *Water for Nevada, State of Nevada Water Planning Report No. 3*, Oct. 1971.

VII.

Testimony and evidence was presented in an attempt to support a determination that significantly more water is locally recharged in the Kane Springs Valley Hydrographic Basin than previously reported. The Applicants presented Mr. Walker, who possesses a background in range management, as a witness who used plant communities as a method to estimate precipitation. However, Mr. Walker also testified that the use of plant communities as a method to calculate recharge does not exist, and his methodology for calculating recharge is not used anywhere else in the United States.[31] The Applicants then presented Mr. Lewis for the purpose of using Mr. Walker's estimation of precipitation for the establishment of new recharge estimates in the Kane Springs Valley Hydrographic Basin.[32]

Reconnaissance investigations by the U.S.G.S. estimate the combined recharge for Kane Springs Valley, Coyote Spring Valley and the Muddy River Springs Area to be 2,600 acre-feet annually.[33] Recharge for Kane Springs Valley was further delineated in 1971 and was estimated to be 500 acre-feet per year.[34] The methods and estimates presented by the Applicants in Exhibit Nos. 29 and 30 used four estimates of precipitation. With each of the four estimates of precipitation, ground-water recharge was then estimated using two methods: a version of the well-known Maxey-Eakin technique and a water budget method. In total, the Applicants computed eight recharge estimates ranging from 5,300 to 14,155 acre-feet per year[35]

One method for estimating precipitation tied plant communities to precipitation and elevation, and then used elevation zones to distribute precipitation throughout the basin. The second method used a spatial distribution of vegetative zones and their respective precipitation based on a United States Department of Agriculture, Natural Resource Conservation Service technical guide for ecological site descriptions.[36] A third precipitation method used PRISM[37]

---

[31] Transcript, pp. 244, 264.
[32] Transcript, pp. 245-246.
[33] T.E. Eakin, *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*, State of Nevada, Department of Conservation and Natural Resources, United States Department of Interior, Geologic Survey, February 1964.
[34] Transcript, p. 253.
[35] Exhibit No. 16, p. 5.
[36] Exhibit No. 29, pp. 6, 15-17.
[37] PRISM – Parameter-elevation Regressions on Independent Slopes Model and is a method of spatially distributing precipitation.

modeled precipitation.[38] The last precipitation estimate was based on a local altitude-precipitation method developed by the Las Vegas Valley Water District.[39] For each of these precipitation estimates, Mr. Lewis applied both a numerical form of the Maxey-Eakin technique and water budget approach for estimating recharge.

However, Mr. Halford, as expert witness for the Protestant National Park Service, testified that the use of the Maxey-Eakin technique in each of these cases was in error,[40] because using the Maxey-Eakin recharge coefficients with any precipitation estimates other than the Hardman precipitation map is inappropriate. The Maxey-Eakin recharge coefficients are married to the Hardman map and cannot be used otherwise.[41] Mr. Halford testified that if one is going to develop a new method of estimating recharge they must have the precipitation maps for the area of interest and controls on ground-water discharge, and then they can develop new recharge coefficients based on that information.[42]

The Applicants also used a water-budget approach with each of the precipitation estimates to arrive at an estimate of recharge. In the approach for Kane Springs Valley Hydrographic Basin, it was estimated that recharge is equal to precipitation less the sum of evapotranspiration (ET), surface runoff and spring discharge. Surface runoff and spring discharge were each estimated to average a few hundred acre-feet annually; therefore, recharge was estimated to be approximately equal to precipitation minus ET. Due to the lack of ET measurements or estimates of ET in Kane Springs Valley, the Applicants used data from a United States Geologic Survey report on evapotranspiration in Ruby Valley, over 200 miles to the north.[43] Their evidence provides that a report prepared by Berger in 2001 reports an estimate of ET using the Bowen-ratio method for an upland-shrub non-phreatophytic plant community of 12 inches per year where annual precipitation was estimated to be 13 to 15 inches.[44] On that basis, the Applicants assume 12 inches per year of ET for areas receiving 13 to 15 inches of precipitation in Kane Springs Valley and 13 inches per year of ET for areas receiving greater than 15 inches per year of precipitation.

---

[38] Exhibit No. 29, p. 9.
[39] Exhibit No. 54, public administrative hearing before the State Engineer, July 16-20, 23-27, 2001, official records in the Office of the State Engineer.
[40] Transcript, pp. 489-520.
[41] Transcript, p. 493.
[42] Transcript, p. 495.
[43] Exhibit No. 29, p. 13.
[44] *Ibid.*

However, the State Engineer believes the Applicants misinterpreted and/or misapplied the data from the Berger 2001 report, which states that precipitation at the Ruby Lake National Wildlife Refuge site for the 2000 water year was only 7.74 inches, or 58 percent of the 1961 to 1990 30-year average of 13.3 inches.[45] During this same time period, ET at the upland-shrub site was 11.96 inches.[46] The report does not indicate what ET rates might be in the upland-shrub community during average precipitation years, although the data does support higher daily ET rates in the summer months when there was an increase in available soil moisture from precipitation.[47] In addition, the Applicants did not provide evidence suggesting that the ET rates in areas that receive greater than 15 inches per year would remain constant at 13 inches. The Applicants also did not address other factors that differ between Kane Springs Valley and Ruby Valley that could have an effect on ET rates such as differences in temperature, solar radiation, time and type of precipitation, and variable plant species distinct from those in Kane Springs Valley.

The State Engineer recognizes the difficulty in accurately estimating recharge and even the Applicants admit that estimates of recharge are extremely problematic as it is a parameter that cannot be measured directly.[48] The State Engineer agrees that recharge is a very difficult parameter to measure, and if it is used to determine perennial yield, the uncertainty in the estimates must be recognized and a conservative approach taken. Given the uncertainties inherent in estimating recharge and the validity in the testimony of the Protestant's expert stating that the recharge technique applied was in error and inappropriate, the State Engineer finds that the Applicants' evidence and testimony lack the scientific and practical basis to substantiate the proffered recharge of 5,000 to 14,000 acre-feet annually and are hereby discounted and not accepted. However, the State Engineer also recognizes that the current reconnaissance estimate of average annual recharge is probably low.

The Death Valley flow system area lies west and southwest of Kane Springs Valley. Because the Kane Springs Valley climate, latitude, geology and soil types are similar to the Death Valley flow system basins, it is reasonable to expect that similar precipitation amounts will result in

---

[45] D.L. Berger, M.J. Johnson, M.L. Tumbusch, *Estimates of Evapotranspiration from the Ruby Lake National Wildlife Refuge Area, Ruby Valley, Northeastern Nevada, May 1999-October 2000,* Water-Resources Investigations Report 01-4234, United States Department of Interior, Geological Survey, Nevada Division of Water Resources and the United States Department of Interior, Fish and Wildlife Service, 2001.
[46] *Id.* at 25.
[47] *Id.* at 20.
[48] Transcript, p. 267.

similar amounts of ground-water recharge. Recharge within the Death Valley regional flow system has been calibrated to measured discharge, and therefore provides a greater level of certainty than recharge estimates made without a comparative discharge.[49] Several basins within the Death Valley regional flow system have similar amounts of precipitation as Kane Springs Valley with the ground-water recharge in those basins ranging from 1% to 2% of total precipitation.[50] Recent estimates of precipitation in the Kane Springs Valley range from 120,000 to 140,000 acre-feet per year as opposed to the Hardman estimate of 80,000 acre-feet per year.[51] Using a recharge to precipitation ratio of 1% to 2% as found in the Death Valley regional flow model for basins with similar amounts of precipitation, the recharge in Kane Springs Valley would be 1,200 to 2,800 acre-feet per year, which is substantially less than the Applicants' estimate of recharge of 5,000 to 14,000 acre-feet annually. This is a qualitative comparison, and is not proposed by the State Engineer to definitively estimate recharge in Kane Springs Valley, but serves as a barometer, for comparative purposes only, of recharge estimates in this area. The State Engineer finds recharge in Kane Springs Valley is uncertain, but is likely greater than the reconnaissance estimate of 500 acre-feet per year and less than the Applicant's estimates of 5,000 to 14,000 acre-feet per year.

VIII.

The perennial yield of a ground-water reservoir may be defined as the maximum amount of ground water that can be salvaged each year over the long term without depleting the ground-water reservoir. The perennial yield cannot be more than the natural recharge to a ground water basin and in some cases is less. In determining the amount of water available for appropriation in basins where outflow from one basin is part of the inflow to another basin, the State Engineer must take into consideration the amount of water appropriated in the upgradient basin and discount the amount from inflow into the downgradient basin. If the water appropriated in an upgradient basin is not deducted from the amount which discharges to the downgradient basin, it creates the potential for double accounting and regional over appropriation. Thus, the State Engineer is still able to manage the ground-water basins as they have been historically managed administratively, but also take into consideration the concerns that arise for ground-water basins that are hydrologically connected.

---

[49] Belcher, W., ed., 2004 Death Valley Regional Ground-Water Flow System, Nevada and California – Hydrogeologic Framework and Transient Ground-Water Flow Model, USGS SIR 2004-4205.
[50] Belcher, W., ed., 2004, Death Valley Regional Flow Model, USGS SIR 2004-4205.
[51] Exhibit 16, p. 5.

The Applicants propose that ground water flows from upgradient basins through Kane Springs Valley into downgradient basins. In the case of the Kane Springs Valley Hydrographic Basin, the upgradient basin and the downgradient basin is the Coyote Spring Valley Hydrographic Basin. That is, ground water is proposed to flow from northern Coyote Spring Valley into Kane Springs Valley then back into Coyote Spring Valley. The Protestant NPS argues that the State Engineer should consider any inflow into Kane Springs Valley from the Coyote Spring Valley as previously allocated in Coyote Spring Valley and the subsequent outflow from Kane Springs Valley should be permitted to flow into Coyote Spring Valley in its entirety to meet the approximate 16,000 acre-feet per year of senior appropriated rights there. The majority of those senior water rights were issued with the intent to develop ground water from the White River regional carbonate-rock aquifer system. Given the unique hydrologic connection between the Kane Springs Valley Hydrographic Basin and the Coyote Spring Valley Hydrographic Basin, the development of ground water within Kane Springs Valley will ultimately affect water levels and flows in the White River regional carbonate-rock aquifer system. However, the State Engineer believes a small amount of water can be developed in the Kane Springs Valley and not unreasonably impact existing rights in the discharge areas of the White River carbonate-rock aquifer system, which are already fully appropriated. Well KPW-1 lies within 1,000 feet of Coyote Spring Valley and pumping simulations by the Applicant show a cone of depression extending well into Coyote Spring Valley. To further minimize potential effects on existing rights in the discharge areas of the White River carbonate-rock aquifer system, the State Engineer will limit the amount of ground water that can be pumped from wells in Kane springs Valley near the boundary with Coyote Spring Valley. After careful consideration of the uncertainties regarding the ranges of ground-water recharge, quantification of subsurface inflows and outflows, the demonstrated connection of Kane Springs Valley with the White River Regional flow system, and senior appropriated rights in the down-gradient basins, the State Engineer finds that 1,000 acre-feet is a reasonable amount to allow for appropriation from Kane Springs Valley.

IX.

Nevada Revised Statute § 533.370(5) provides that an applicant provide proof satisfactory to the State Engineer of his intention in good faith to construct any work necessary to apply the water to the intended beneficial use with reasonable diligence and his financial ability and

reasonable expectation to actually construct the work and apply the water to the intended beneficial use with reasonable diligence. Nevada Revised Statute § 533.375 provides that in the case of an application or multiple applications proposing to divert more than 10 cubic feet per second (such as the applications under consideration here) the State Engineer may require in the case of an incorporated company the submission of articles of incorporation, the names and places of residence of directors and officers and the amount of its authorized and paid-up capital. If the applicant is not an incorporated company, he may require a statement as to the name of the person proposing to construct the work, and a showing of facts necessary to enable him to determine whether the applicant has the financial ability to carry out the proposed work and whether the application has been made in good faith.

The Applicants presented the Chairwoman for the Lincoln County Water District, Rhonda Hornbeck, as a witness who testified that the Lincoln County Water District through its partner Vidler Water Company has an agreement with Coyote Springs Investment (CSI) to provide wholesale water to CSI's development. Additionally, the witness indicated they are working with the United States Department of Interior, Bureau of Land Management to gain a right of way to bring water from the wellhead down to the CSI property. The testimony indicated that a general improvement district is in place, as is a planned unit development.[52] The Applicants provided evidence on the plan of development, which is a report that was submitted to the United States Department of Interior, Bureau of Land Management, that identifies how the ground water will be withdrawn, how the pipes will be installed, what equipment is needed to complete the well and addresses the pipeline project to deliver the water to the place where it will be used, and pipeline permitting is underway.[53]

When questioned whether the Lincoln County Water District had the financial resources to place the water to beneficial use, the witness for the Lincoln County Water District provided several scenarios as to how those financial resources might be obtained, but did not provide any specific evidence of having the financial resources in place. The testimony indicated that the possibilities include: (1) floating a bond with its partner Vidler Water Company; (2) asking the State of Nevada

[52] Transcript, pp. 388-389; Exhibit No. 41; Exhibit No. 122 (Agreement dated Oct. 17, 2005, between Coyote Springs Investment, LLC and Lincoln County Water District and Vidler Water Company - marked as an exhibit after the hearing when document was filed upon request of the State Engineer.)
[53] Transcript, p. 95; Exhibit No. 26.

for a low-interest loan; or (3) a development agreement with CSI, where CSI would pay for the infrastructure to place the water to beneficial use; however the witness then testified there is already an agreement in place with CSI paying the cost of infrastructure.[54]

Dorothy-Timian Palmer, as a witness for the Applicants, testified that Vidler Water Company has already drilled a production well and a monitoring well and has spent a considerable amount of money on field work and analyses of that field work and has the financial ability to construct the work necessary to put the water to beneficial use.[55] The Agreement between CSI, the Lincoln County Water District and Vidler Water Company provides that CSI will purchase "all water available within the Kane Springs Basin." "Upon payment in full of the purchase price of Kane Water, the DISTRICT and VIDLER will convey the Kane Water by Water Rights Deed to CSI and will partially assign to CSI certain rights and delegate to CSI certain obligations related to the underlying water rights permit(s)."[56] The Applicants only intend to develop the water to the wellhead and CSI will develop the infrastructure to deliver the water from the wellhead to the development.[57]

Harvey Whittemore, as a witness for the Applicants, testified that within the CSI project there would be two separate general improvement districts. The one in Lincoln County has already been formed; however, the one in Clark County was to be formed in June 2006. The testimony indicated that the water rights already held by CSI will be assigned for the benefit of the general improvement districts and the Clark and Lincoln County Commissions will act as trustees for the general improvement districts. Mr. Whittemore indicated that the development is at a stage where all of the approvals necessary for the first phase of construction have been acquired with respect to Clark County. As to the Lincoln County portion of the project, it is still subject to the completion of a multi-species habitat conservation plan, as well as a number of additional approvals from federal agencies. The water rights at issue here would ultimately be owned by the developer CSI and then transferred to the Lincoln County General Improvement District.[58] CSI has already received approval in the form of parcel maps, zoning entitlement and development agreements for 49,000 units in Clark County and 110,000 units in Lincoln County.[59]

---

[54] Transcript, pp. 392-393.
[55] Transcript, pp. 458-461.
[56] Exhibit No. 122.
[57] Transcript, pp. 412-415.
[58] Transcript, pp. 419-420.
[59] Transcript, pp. 427, 439; Exhibit Nos. 43, 44, 45.

The State Engineer finds the Applicants provided proof satisfactory to the State Engineer of an intention in good faith to construct any work necessary to apply the water to the intended beneficial use with reasonable diligence and a reasonable expectation to actually construct the work and apply the water to the intended beneficial use with reasonable diligence.

X.

Testimony and evidence indicate there are no permitted or certificated groundwater rights in Kane Springs Valley Hydrographic Basin.[60] However, the witness for the NPS testified that Kane Springs Valley Hydrographic Basin and Coyote Spring Valley are hydrographically and hydrologically one and the same basin. Approximately 16,100 acre-feet have been appropriated in Coyote Spring Valley and applications are pending for another 200,000 acre-feet annually. Therefore, there is no water available for appropriation.[61] The State Engineer finds no water has been appropriated in Kane Springs Valley Hydrographic Basin and by limiting the quantity of water authorized for appropriation, the potential impacts to existing rights in down-gradient hydrographic basins will be minimized.

XI.

Nevada Revised Statute § 533.370(6) provides that in determining whether an application for an interbasin transfer of ground water must be rejected the State Engineer shall consider: (a) whether the applicant has justified the need to import water from another basin; (b) if the State Engineer determines that a plan for conservation of water is advisable for the basin into which the water is to be imported, whether the applicant has demonstrated that such a plan has been adopted and is effectively being carried out; (c) whether the proposed action is environmentally sound as it relates to the basin from which the water is exported; (d) whether the proposed action is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported; and (e) any other factor the State Engineer determines is relevant.

Testimony was provided as to the extent of the project proposed in Coyote Spring Valley and estimates of the quantity of water necessary to carry out the project. That testimony satisfactorily addresses the provision of whether the applicant has justified the need to import water

[60] Transcript, pp. 208-209.
[61] Transcript, pp. 589-594.

from another basin.[62] Testimony was provided that indicated conservation measures are in place for the planned development similar to traditional development measures associated with development in southern Nevada that have been adopted and imposed,[63] and there is no evidence that the appropriation of water from Kane Springs Valley Hydrographic Basin will damage the environment of the valley.

Testimony was provided that indicated there is no private land within Kane Springs Valley Hydrographic Basin, rather all land within the valley is owned by the federal government; therefore, the use of the water will not unduly limit future growth and development in Kane Springs Valley Hydrographic Basin.[64]

The State Engineer finds the evidence does not support rejection of the application for an interbasin transfer of water.

XII.

Witnesses for both the Applicants (Glanzman)[65] and the Protestant NPS (Van Liew)[66] agree that the discharge at Rogers and Blue Point Springs in the Lake Mead National Recreation Area is not entirely carbonate-rock aquifer discharge, but is composed of some local precipitation that infiltrates and mixes with the carbonate-rock aquifer water that is flowing toward land surface along fault structures. Mr. Glanzman testified that in general when water in the White River flow system flows from north to south it mixes with local recharge en route to discharge areas at the Muddy River Springs Area and Rogers Springs and Blue Point Springs.[67] Using isotopic data, Mr. Glanzman estimated that approximately 25% of the discharge at Rogers Springs and Blue Point Springs could be characterized as regional carbonate water. For purposes of his analysis, Mr. Glanzman considered water in the carbonate aquifer of Pahranagat Valley to be 100% carbonate water.[68,69] Mr. Van Liew testified that discharge from the White River flow system appears to be predominantly at the Muddy River Springs, Rogers Springs and Blue Point Springs and raised the

[62] Transcript, pp. 427-445.
[63] Transcript, pp. 428-429.
[64] Transcript, pp. 207-208.
[65] Transcript, pp. 115-203, 221-236.
[66] Transcript, pp. 523-621.
[67] Exhibit No. 34; Transcript, pp. 115 –203, 221-236.
[68] Transcript, pp. 137-138.
[69] Exhibit No. 117.

argument that there does not seem to be anywhere else for the ground water to flow. In addition, he doubted much water moved out to the Lake Mead area and testified that the ground-water gradient supports that conclusion.

The State Engineer finds there is not substantial evidence that the appropriation of the limited quantity being granted under this ruling will likely impair the flow at Muddy River Springs, Rogers Springs or Blue Point Springs.

XIII.

By letter dated February 6, 2006, the NPS and FWS requested the State Engineer amend State Engineer's Order No. 1169 to include the Kane Springs Valley Hydrographic Area.[70] The reasoning behind the request is that these agencies believe Kane Springs Valley and Coyote Spring Valley, while administratively classified as separate hydrographic basins, are actually a single distinct hydrologic drainage basin and should be managed as such. However, during the public administrative hearing, the FWS indicated that the resolution of its protests pursuant to the Stipulation also goes to its statements in the February 6, 2006, letter. Thus, the Stipulation was presented in place of the FWS request to include Kane Springs Valley within the provisions of Order No. 1169.[71] However, the request by the NPS to include the Kane Springs Valley Hydrographic Basin within the provisions of Order No. 1169 still remains. Thus, two separate agencies within the United States Department of Interior take different positions with regard to the request to include Kane Springs within the provisions of Order No. 1169.

The witness for the Protestant NPS testified as to various reports and information that all conclude that the discharge from the Muddy River Springs is regional in nature, that a sufficient quantity does not come from local recharge to support the discharge and that a substantial portion of the discharge of the region is concentrated in the Muddy River Springs Area.[72] Citing to Exhibit No. 91, the witness noted that the writer of that report found that the "Coyote Springs Valley, Kane Springs Valley and the Muddy River Springs hydrographic areas (1,025 square miles) in southern Lincoln and Clark Counties have been combined for this report because the areas are hydrologically and topographically connected."[73] The faults in the area are believed to control the majority of

[70] Exhibit No. 10.
[71] Transcript, pp. 12-13.
[72] Transcript, pp. 530-581; *See*, Exhibit Nos. 87, 88, 91.
[73] Transcript, p. 533.

ground-water movement through the carbonate aquifer, including Kane Springs Wash fault zone, which the witness believes to be a conduit for flow to Coyote Spring Valley.[74] Additionally, the NPS witness believes that the Kane Springs Valley Hydrographic Basin and the Coyote Spring Valley are one hydrographic area.[75]

A witness for the Applicants indicated that there is a presumption that the Kane Springs Wash fault zone is effectively a no-flow boundary such that water flowing into Kane Springs Valley Hydrographic Basin flows out of Kane Springs Wash into Coyote Spring Valley, and that the water that is recharged in Kane Springs Valley Hydrographic Basin flows into Coyote Spring Valley.[76] Additionally, evidence developed from the well pump test and analyzed in conjunction with other evidence, such as the implication of a flat gradient, indicates a relatively high transmissivity across the southern half of the study area, indicating a high potential for regional ground-water flow.[77]

The State Engineer finds the evidence indicates a strong hydrologic connection between Kane Springs Valley and Coyote Spring Valley, specifically, that ground water flows from Kane Springs Valley into Coyote Spring Valley. However, carbonate water levels near the boundary between Kane Springs Valley and Coyote Spring Valley are approximately 1,875 feet in elevation, and in southern Coyote Spring Valley and throughout most of the other basins covered under Order No. 1169, carbonate-rock aquifer water levels are mostly between 1,800 feet and 1,825 feet. This marked difference in head supports the probability of a low-permeability structure or change in lithology between Kane Springs Valley and the southern part of Coyote Spring Valley. The State Engineer finds Order No. 1169 was issued to address the requests for the additional appropriation of water filed in Coyote Spring Valley, but the focus of the additional study ordered is the Muddy River Springs Area. The State Engineer finds there is not substantial evidence that the appropriation of a limited quantity of water in Kane Springs Valley Hydrographic Basin will have any measurable impact on the Muddy River Springs that warrants the inclusion of Kane Springs Valley in Order No. 1169. Therefore, the State Engineer denies the request to hold these applications in abeyance and include Kane Spring Valley within the provisions of Order No. 1169.

---

[74] Transcript, pp. 545-550.
[75] Transcript, pp. 589-591.
[76] Transcript, pp. 291, 303.
[77] Transcript, pp. 329-330.

XIV.

The Applicants requested that the State Engineer act on Applications 72220 and 72221 and grant them for a total combined duty of 5,000 acre-feet annually and hold Applications 72218 and 72219 in abeyance. The State Engineer finds that the total amount of 1,000 acre-feet annually of groundwater available to be appropriated in Kane Springs Valley Hydrographic Basin is less than the requested 5,000 acre-feet annually; therefore the State Engineer finds he will not hold any of the applications in abeyance.

CONCLUSIONS

I.

The State Engineer has jurisdiction over the parties and the subject matter of this action and determination.[78]

II.

The State Engineer is prohibited by law from granting a permit to appropriate the public waters where:[79]

A. there is no unappropriated water at the proposed source;
B. the proposed use or change conflicts with existing rights;
C. the proposed use or change conflicts with protectible interests in existing domestic wells as set forth in NRS § 533.024; or
D. the proposed use or change threatens to prove detrimental to the public interest.

III.

The State Engineer concludes that to permit the appropriation of water in an amount greater than permitted under this ruling will conflict with existing rights and threaten to prove detrimental to the public interest.

RULING

The protests to the applications are hereby upheld in part and overruled in part. Application 72220 is hereby granted for a duty of 500 acre-feet annually. Applications 72218, 72219, and 72221 are hereby granted for a total combined duty of 500 acre-feet annually.

---

[78] NRS chapters 533 and 534.
[79] NRS 533.370(5).

Applications 72218, 72219, 72220, and 72221 are granted subject to:

1. The payment of statutory permit fees;
2. A monitoring plan to be approved by this office.

Respectfully submitted,

Tracy Taylor, P.E.

TRACY TAYLOR, P.E.
State Engineer

TT /jm

Dated this 2nd day of February, 2007.

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

IN THE MATTER OF APPLICATIONS 74147, 74148, 74149, AND 74150 FILED TO APPROPRIATE THE UNDERGROUND WATERS OF THE KANE SPRINGS VALLEY HYDROGRAPHIC BASIN (206), LINCOLN COUNTY, NEVADA.

RULING
#5987

GENERAL

I.

Application 74147 was filed on April 10, 2006, by the Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cubic feet per second (cfs) of water from an underground source within the Kane Springs Valley Hydrographic Basin for municipal purposes within the Coyote Spring Valley Hydrographic Basin more specifically described as portions of T.8S., R.62E., T.8S., R.63E., T.8S., R.64E., T.9S., R.61E., T.9S., R.62E., T.9S., T.63E., T.9S., R.64E., T.10S., R.61E., all of T.10S., R.62E., portions of T.10S., R.63E., T.10S., R.64E., T.11S., R.61E., all of T.11S., R.62E., portions of T.11S., R.63E., T.11S., R.64E., T.12S., R.61E., all of T.12S., R.62E., all of T.12S., R.63E., portions of T.12S., R.64E., T.12.5S., R.61E., T.12.5S., R.62E., T.13S., R.61E., all of T.13S., R.62E., portions of T.13S., R.63E., T.13S., R.64E., T.13.5S., R.63E., T.14S. R.61E., all of T.14S., R.62E., portions of T.14S., R.63E., T.15S., R.61E., T.15S., R.62E., T.15S., R.63E., T.16S., R.62E., M.D.B.&M. The proposed point of diversion is described as being located in the SW¼ SE¼ of Section 25, T.8S., R.65E., M.D.B.&M.[1]

II.

Application 74148 was filed on April 10, 2006, by the Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cfs of water from an underground source within the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin as more specifically described above. The proposed point of diversion is described as being located in the SE¼ SW¼ of Section 31, T.9S., R.65E., M.D.B.&M.[2]

---

[1] File No. 74147, official records in the Office of the State Engineer.
[2] File No. 74148, official records in the Office of the State Engineer.

III.

Application 74149 was filed on April 10, 2006, by the Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cfs of water from an underground source within the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin as more specifically described in Section I of this ruling. The proposed point of diversion is described as being located in the SE¼ SW¼ of Section 6, T.11S., R.64E., M.D.B.&M.[3]

IV.

Application 74150 was filed on April 10, 2006, by Lincoln County Water District and Vidler Water Company, Inc., to appropriate 6.0 cfs of water from an underground source within the Kane Springs Valley Hydrographic Basin for municipal purposes within Coyote Spring Valley Hydrographic Basin more specifically as described in Section I of this ruling. The proposed point of diversion is described as being located in the SE¼ SW¼ of Section 11, T.9S., R.65E., M.D.B.&M.[4]

V.

Applications 74147, 74148, 74149 and 74150 were timely protested by the United States Department of Interior, Bureau of Indian Affairs, the Moapa Band of Paiute Indians and the United States Department of Interior, National Park Service on various grounds as summarized below.[1,2,3,4]

The Bureau of Indians Affairs alleges that the proposed diversions will impact the water rights of the Moapa Band of Paiute Indians and other state-based water rights, there is no unappropriated water in the Kane Springs Valley Hydrographic Basin and the proposed applications could adversely affect the implementation and success of a Memorandum of Agreement with the United States Fish and Wildlife Service, Coyote Springs Investment, LLC, the Moapa Valley Water District and the Southern Nevada Water Authority designed to protect the Muddy River Springs environment and other regional water resources.

The Moapa Band of Paiute Indians protested the applications on the grounds that there is no unappropriated water in the source of supply, the proposed withdrawals would conflict with

[3] File No. 74149, official records in the Office of the State Engineer.
[4] File No. 74150, official records in the Office of the State Engineer.

existing rights, especially those of the Tribe, the proposed withdrawals would threaten to prove detrimental to the public interest, the proposed withdrawals would be inconsistent and subvert the Applicants' Stipulation to limit ground-water withdrawals under Permits 72218 through 72221, the proposed withdrawals would undermine the efficacy of the critically important Memorandum of Understanding recently entered into by the United States Fish and Wildlife Service, the Southern Nevada Water Authority, Coyote Springs Investment, LLC, the Moapa Valley Water District and the Tribe to maintain Muddy Springs flows to protect the endangered Moapa Dace.

The National Park Service protested the applications on the grounds that there is no water available for appropriation because the committed water resources exceed the ground-water recharge, the approval and development of the proposed appropriations will impair the water rights of the United States and the public interest would not be served by diminishing or impairing the water-related resources in the Lake Mead National Recreation Area.

FINDINGS OF FACT

I.

In State Engineer's Ruling No. 5712, dated February 2, 2007, the State Engineer addressed applications filed by these same Applicants to appropriate ground water from the Kane Springs Valley Hydrographic Basin.[5] In that ruling, the State Engineer addressed the Applicants' argument regarding ground water availability in the Kane Springs Valley Hydrographic Basin and rejected the Applicants' argument and evidence for the appropriation of ground water above the quantity granted in that ruling. The State Engineer finds that with the issuance of State Engineer's Ruling No. 5712, there is no additional water available for appropriation in the Kane Springs Valley Hydrographic Basin.

CONCLUSIONS

I.

The State Engineer has jurisdiction over the parties and the subject matter of this action and determination.[6]

---

[5] State Engineer's Ruling No. 5712, dated February 2, 2007, official records in the Office of the State Engineer.
[6] NRS chapters 533 and 534.

II.

The State Engineer is prohibited by law from granting a permit to appropriate the public waters where:[7]

A. there is no unappropriated water at the proposed source;
B. the proposed use or change conflicts with existing rights;
C. the proposed use or change conflicts with protectible interests in existing domestic wells as set forth in NRS § 533.024; or
D. the proposed use or change threatens to prove detrimental to the public interest.

III.

The State Engineer concludes that there is no additional ground water available for appropriation in the Kane Springs Valley Hydrographic Basin; therefore, the granting of any appropriation under Applications 74147, 74148, 74149 or 74150 would conflict with existing rights and thus threaten to prove detrimental to the public interest.

RULING

Applications 74147, 74148, 74149 and 74150 are hereby denied on the grounds there is no unappropriated water in the source and to grant additional water rights would conflict with existing rights and threaten to prove detrimental to the public interest. No ruling is made on the merits of the protests.

Respectfully submitted,

for TRACY TAYLOR, P.E.
State Engineer

TT /jm

Dated this 29th day of April, 2009.

[7] NRS 533.370(5).

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

IN THE MATTER OF APPLICATIONS 64039, 64186, 64187, 64188, 64189, 64190, 64191, 64192, 67892, 71031, 72838, 72839, 72840, 72841, 79296, 79297, 79298, 79299, 79300, 79497, 79498 AND 79518 FILED TO APPROPRIATE THE UNDERGROUND WATERS OF THE COYOTE SPRING VALLEY HYDROGRAPHIC BASIN (210), CLARK COUNTY AND LINCOLN COUNTY, NEVADA.

RULING

#6255

GENERAL

I.

Application 64039 was filed on April 17, 1998, by Dry Lake Water, LLC to appropriate 10 cubic feet per second (cfs) of groundwater from the Coyote Spring Valley Hydrographic Basin for quasi-municipal purposes. The proposed point of diversion is described as being located within the NE¼ SE¼ of Section 28, T.14S., R.63E., M.D.B.&M. The proposed place of use is described as being within the Apex Industrial Park, which is described as being located within parts of Sections 32 and 33, T.17S., R.63E., parts of Sections 3, 4, 5, 8, 9, 10, 11, 13, 14, 17, 19, 20, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 34 and 35 and all of Sections 18 and 33, T.18S., R.63E., and parts of Sections 2, 3, 4, 5, 6, 7, 8 and 9, T.19S., R.63E., M.D.B.&M. The remarks section of the application indicates that Dry Lake Water, LLC intends to be a distributor of water to commercial and industrial developments within the Apex Industrial Park. Additionally, the remarks section informs that the Applicant has applied for water rights in five basins for 40,000 acre-feet annually (afa) under each application, but is requesting a total of 40,000 afa from all six applications and that the Applicant seeks to tap the deep carbonate aquifer.[1]

II.

Application 64039 was timely protested by Nevada Power Company, the U.S. Department of Interior National Park Service (USNPS), Moapa Valley Water District (MVWD)

[1] File No. 64039, official records in the Office of the State Engineer.

and the U.S. Department of Interior Fish and Wildlife Service (USFWS) on various grounds summarized as follows:[1]

1. The quantity of water requested is not available for appropriation.
2. Existing appropriations of groundwater exceed groundwater recharge.
3. The appropriation of the water would impair senior water rights held by the MVWD in the downgradient basin (Muddy River Springs Area Basin 219). The large magnitude of the requested appropriation will reduce the discharge of Baldwin Spring and Pipeline Jones Spring (Permits 28791 and 22739) and may decrease the production capacity of the MWVD's existing water supply wells at MX-5 (Permit 46932) and Arrow Canyon well (Permits 52520, 55450 and 58269).
4. Citing to State Engineer's Ruling No. 4542, Nevada Power asserts that the State Engineer has already recognized that: (1) recharge to the Coyote Spring Valley from precipitation above 6,000 feet is estimated at 1,900 acre-feet and, based on underflow to the Muddy River Springs Area, the perennial yield of Coyote Spring Valley is estimated at 18,000 acre-feet; (2) the carbonate-rock aquifer is the source of water for the Muddy River and springs in the Muddy River Springs Area and is recharge for the alluvial aquifer of the Muddy River Springs Area (Basin 219). At the time of the protest, Nevada Power asserted there were 28,272 afa already appropriated in Coyote Spring Valley; therefore, there was no water available for appropriation and permitting the appropriation of additional water would impair existing rights in the Muddy River Springs Area.
5. The USFWS protested the application on the grounds that use of the water may cause injury to the USFWS' water rights on the Moapa Valley National Wildlife Refuge and other senior water right holders in the Muddy River Springs Area.
6. Granting the application would damage habitat for species that are threatened or endangered under the Endangered Species Act.
7. The USNPS asserts that recharge from precipitation in Coyote Spring Valley is estimated at 2,000 afa, that inflow is estimated at 35,000 afa, and discharge from the valley is primarily by subsurface outflow (approximately 37,000 afa) to the Muddy River Springs Area and the Muddy River. Rights to the use of the water of the Muddy River were decreed by the Tenth Judicial District Court of the State of Nevada in the case of *Muddy Valley Irrigation Company vs. Moapa Salt Lake Produce Company* and there is no water available for appropriation as the source of the Muddy River is the springs in the Muddy

River Springs Area and tributaries. Citing to State Engineer's Ruling No. 4542, the USNPS asserts that the State Engineer has already found underflow from Coyote Spring Valley is tributary to the Muddy River. Additionally, that groundwater from the aquifers in Hidden Valley, Garnet Valley, California Wash and the Muddy River Springs Area is also tributary to the Muddy River. Therefore, if the application is approved it could reduce the discharge to the Muddy River and impair water rights held by the USNPS and others.

8. It would not be in the public interest to impair the water and water-related resources of the Lake Mead National Recreation Area.
9. It would not be in the public interest to approve an application where the applicant does not control the point of diversion or place of use.

III.

Applications 64186, 64187, 64188, 64189, 64190, 64191 and 64192 were filed on June 3, 1998, by Coyote Springs Investment, LLC to appropriate 10 cfs under each application, not to exceed 7,239 afa each, of groundwater from the Coyote Spring Valley Hydrographic Basin for quasi-municipal purposes. The proposed points of diversion are described as being located within the NW¼ SE¼ of Section 36, T.12S., R.63E., M.D.B.&M. The proposed place of use is described as being located within portions of Sections 13 and 36 and all of Sections 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34 and 35, T.11S., R.63E., M.D.B.&M., portions of Sections 1, 2, 3, 12, 13, 23, 24, 26 and all of Sections 8, 10, 11, 14, 17, 20, 25, and 36, T.12S., R.63E., M.D.B.&M., and a portion of Section 1 and all of Sections 9 and 16, T.13S., R.63E., M.D.B.&M., containing 19,422.57 acres; within portions of Sections 19, 30 and 31, T.11S., R.63E., M.D.B.&M., portions of Sections 5, 6, 7, 9, 16, 18, 19, 21, 28, 29, 30, 32 and 33, T.12S., R.63E., M.D.B.&M., portions of Sections 1, 3, 4, 5, 8, 10, 15, 17, 20, 21, 22, 23, 24, 25 and 26, T.13S., R.63.E., M.D.B.&M., a portion of Section 31, T.12S., R.64E., M.D.B.&M., and portions of Sections 6, 7 and 30 and all of Sections 18 and 19, T.13S., R.64.E., M.D.B&M., containing 9,633 acres; and portions of Sections 19, 30 and 31, T.11S., R.63E., M.D.B.&M, portions of Sections 5, 6, 9, 16, 21, 23, 26, 28 and 33 and all of Sections 15, 22, 27, 34 and 35, T.12S., R.63E., M.D.B&M., and portions of Sections 1, 3, 4, 10, 15 and 22 and all of Sections 2, 11, 12 13, 14, 23 and 24, T.23S., R.63E., M.D.B.&M., containing 13,767 acres.

The remarks section of the application indicates that the Applicant intends to use the water for a planned development of 42,800 acres for a variety of land use categories. Additionally, the remarks section provides that the total duty of water sought under the applications is in addition to and non-supplemental to any duty allowed under Permits 49414, 49660 through 49662 and 49978 through 49984, Applications 63272 through 63276 and Applications 63867 through 63876.[2]

IV.

Applications 64186, 64187, 64188, 64189, 64190, 64191 and 64192 were timely protested by Nevada Power Company, the U.S. Department of Interior National Park Service (USNPS), U.S. Department of Interior Bureau of Indian Affairs (USBIA) and the U.S. Department of Interior Fish and Wildlife Service (USFWS) on various grounds summarized as follows:[2]

1. The source of the water is the carbonate-rock aquifer and not the alluvial system and the quantity of water requested is not available for appropriation.
2. Existing appropriations of groundwater exceed the perennial yield of 19,900 acre-feet (groundwater recharge in Coyote Spring Valley from precipitation above 6,000 feet is estimated at 1,900 acre-feet and one-half of the underflow to Coyote Spring Valley is estimated at 18,000 acre-feet). At the time of the protest, Nevada Power asserted there were 28,272 afa already appropriated in Coyote Spring Valley; therefore, there was no water available for appropriation and permitting the appropriation of additional water would impair existing rights in the Muddy River Springs Area.
3. The USBIA asserts that it holds in trust senior federal reserved water rights in the Muddy River, which flows through the Moapa Band of Paiute Indian Reservation. Since many of the basins in eastern and southern Nevada are hydraulically connected through the carbonate-rock aquifer system, and the terminus of the White River Flow System, which is a regional carbonate groundwater flow system in southern Nevada is near the Tribe's reservation, its reserved rights may be impaired if discharge at the Muddy River Springs is impacted. Additionally, the USBIA claims that withdrawals of groundwater may result in significant reductions of flows in the carbonate-rock aquifer below the reservation, which would impact its claimed reserved rights to groundwater.

[2] File Nos. 64186, 64187, 64188, 64189, 64190, 64191 and 64192, official records in the Office of the State Engineer.

4. The USFWS protested the applications on the grounds that use of the water may cause injury to the USFWS' water rights in the Moapa Valley National Wildlife Refuge and other senior water right holders in the Muddy River Springs Area.
5. Granting the applications would damage habitat for species that are threatened or endangered under the Endangered Species Act.
6. The USNPS asserts that recharge from precipitation in Coyote Spring Valley is estimated at 2,000 afa, that inflow is estimated at 35,000 afa and discharge from the valley is primarily by subsurface outflow (approximately 37,000 afa) to the Muddy River Springs Area and the Muddy River. Rights to the use of the water of the Muddy River were decreed by the Tenth Judicial District Court of the State of Nevada in the case of *Muddy Valley Irrigation Company vs. Moapa Salt Lake Produce Company* and there is no water available for appropriation as the source is the same as the source of the Muddy River and the springs in the Muddy River Springs Area and tributaries. Citing to State Engineer's Ruling No. 4542, the USNPS asserts that the State Engineer has already found underflow from Coyote Spring Valley is tributary to the Muddy River. Additionally, that groundwater from the aquifers in Hidden Valley, Garnet Valley, California Wash and the Muddy River Springs Area is also tributary to the Muddy River. Therefore, if the applications are approved they could reduce the discharge to the Muddy River and impair water rights held by the USNPS and others.
7. It would not be in the public interest to impair the water and water-related resources of the Lake Mead National Recreation Area.

V.

Application 67892 was filed on August 8, 2001, by Dry Lake Water, LLC to appropriate 10 cfs of groundwater from the Coyote Spring Valley Hydrographic Basin for quasi-municipal purposes. The proposed point of diversion is described as being located within the NE¼ SE¼ of Section 28, T.14S., R.63E., M.D.B.&M. The proposed place of use is described as being located within the Apex Industrial Park, which is the same place of use as described under Application 64039. The remarks section of the application indicates that Dry Lake Water, LLC intends to be a distributor of water to commercial and industrial developments within the Apex Industrial Park. Additionally, the remarks section informs that the Applicant has applied for water rights in

five basins for 40,000 afa under each application, but is requesting a total of 40,000 afa from all six applications and that the Applicant seeks to tap the deep carbonate aquifer.[3]

VI.

Application 67892 was timely protested by Coyote Springs Investment, LLC (CSI), Moapa Band of Paiute Indians (MBOP), Las Vegas Valley Water District (LVVWD), Nevada Power Company and the U.S. Department of Interior Fish and Wildlife Service on various grounds summarized as follows:[3]

1. There is no unappropriated water in the basin and granting the applications would conflict with existing rights held by CSI.
2. The LVVWD asserts that existing permits and pending applications would over appropriate the groundwater basin, would potentially injure existing rights, and would not be in the best interest of the public.
3. The MBOP asserts that there is no water available in the quantities sought, the use of the water would conflict with and impair multiple existing water rights, including, but not limited to, the unquantified senior federally reserved rights of the MBOP in the waters of the Muddy River and groundwater underlying the MBOP's Reservation.
4. The MBOP and Nevada Power assert that granting the application would be detrimental to the public interest because the application appears redundant to applications previously filed by the Applicant.
5. Nevada Power asserts that granting the application would be detrimental to the public interest because the Applicant cannot demonstrate a beneficial use for the water as it had already secured sufficient water necessary to gain its subdivision approval and has not demonstrated its financial ability to place the water to beneficial use.
6. The MBOP asserts that the proposed export of water may be environmentally unsound for the basin of origin.

VII.

Application 71031 was filed on April 13, 2004, by Bedroc Limited to appropriate 0.35 cfs, not to exceed 200 afa, of groundwater from the Coyote Spring Valley Hydrographic Basin for commercial and domestic purposes. The proposed point of diversion is described as being located within the NW¼ SE¼ of Section 24, T.11S., R.62E., M.D.B.&M. The proposed place of use is described as being located within the SE¼, SE½ NE¼, E½ SW¼ and SE¼ NW¼ of

[3] File No. 67892, official records in the Office of the State Engineer.

Section 24, T.11S., R.62E., M.D.B.&M. The remarks section of the application indicates that the continued mining and milling has caused water to flow into the mining area and that ditches have been constructed to direct the water to a sump and pipeline to the place of use.[4]

VIII.

Applications 72838, 72839, 72840 and 72841 were filed on May 25, 2005, by Bedroc Limited to appropriate 200 afa of groundwater from the Coyote Spring Valley Hydrographic Basin for mining, milling and domestic purposes. The proposed points of diversion are described as being located as follows:

Application 72838 within the NW¼ SE¼ of Section 24, T.11S., R.62E., M.D.B.&M.

Application 73839 within the SE¼ NW¼ of Section 24, T.11S., R.62E., M.D.B.&M.

Application 72840 within the NW¼ SE¼ of Section 24, T.11S., R.62E., M.D.B.&M.

Application 72841 within the SE¼ NW¼ of Section 24, T.11S., R.62E., M.D.B.&M.

The proposed place of use is described as being located within the SE¼, SE½ NE¼, E½ SW¼ and SE¼ NW¼ of Section 24, T.11S., R.62E., M.D.B.&M. The remarks section of the applications indicate that the total combined duty of all its mining and milling applications will not exceed 200 afa.[5]

IX.

Applications 72838, 72839, 72840 and 72841 were timely protested by the USNPS on various grounds summarized as follows:[5]

1. The aquifers underlying the Coyote Spring Valley are part of the regional groundwater flow system (White River Flow System) that discharges through springs in the Muddy River Springs Area, which supply the base flow for the Muddy River.
2. The water budget for the Coyote Spring Valley is estimated at 36,000 to 37,000 afa and the perennial yield is estimated as 18,000 afa. Committed groundwater resources total approximately 16,300 afa and pending applications exceed 200,000 afa; therefore, there is no water available for appropriation.
3. The water resources of the Muddy River are appropriated and decreed and groundwater withdrawal will capture the groundwater that naturally discharges at the Muddy River Springs into the Muddy River; therefore, granting the applications will impair existing rights.

[4] File No.71031, official records in the Office of the State Engineer.
[5] File Nos.72838, 72839, 72840 and 72841, official records in the Office of the State Engineer.

4. Granting the applications will impair water rights of the USNPS, and therefore use of the water will threaten to prove detrimental to the public interest.

X.

Applications 79296, 79297, 79298, 79299 and 79300 were filed on January 28, 2010, by the Southern Nevada Water Authority (SNWA) to appropriate 6.0 cfs under Applications 79296, 79297, 79298 and 10 cfs under Applications 79299 and 79300 of groundwater from the Coyote Spring Valley Hydrographic Basin for municipal and domestic purposes. The proposed points of diversion are described as being located as follows:

Application 79296 within the SE¼ SW¼ of Section 5, T.13S., R.63E., M.D.B.&M.

Application 79297 within the SE¼ SE¼ of Section 32, T.13S., R.63E., M.D.B.&M.

Application 79298 within the SE¼ NW¼ of Section 16, T.14S., R.63E., M.D.B.&M.

Application 79299 within the NE¼ NE¼ of Section 1, T.13S., R.63E., M.D.B.&M.

Application 79300 within the NW¼ NW¼ of Section 19, T.13S., R.64E., M.D.B.&M.

The proposed place of use is described as being located within Clark, Lincoln, Nye and White Pine counties as more specifically described and defined in Nevada Revised Statutes (NRS) §§ 243.035-243.040 (Clark County), NRS §§ 243.210-243.225 (Lincoln County), NRS §§ 243.275-243.315 (Nye County), and NRS §§ 243.365-243.385 (White Pine County). The remarks section of the applications indicate that the water will be placed to beneficial use within the SNWA and Lincoln County Water District service territories. The approximate number of persons to be served is 2 million and is estimated to be 3.851 million by 2050.[6]

XI.

Applications 79296, 79297, 79298, 79299 and 79300 were timely protested by County of Inyo, California, Center for Biological Diversity, Defenders of Wildlife, Great Basin Water Network, and Moapa Band of Paiute Indians on various grounds summarized as follows:[6]

1. Granting the applications will reduce or eliminate the flows in springs and supplies of groundwater to eastern Inyo County, which are dependent upon recharge from the regional carbonate-rock aquifer.
2. There is insufficient unappropriated groundwater in the basin.
3. The proposed use will conflict impermissibly with existing water rights and protectable interests in domestic wells.

[6] File Nos.79296, 79297, 79298, 79299 and 79300, official records in the Office of the State Engineer.

4. Granting the applications will result in groundwater mining and threaten springs, seeps and phreatophytes, which provide water and habitat critical for wildlife and grazing livestock.
5. Granting the applications will deprive many areas of water needed to protect and enhance their environment and well being.
6. Granting the applications will threaten to prove detrimental to the public interest on environmental grounds and will be environmentally unsound for the basin of origin in that it will result in the drying out of springs, seeps, wetlands, etc. causing harm to habitat and wildlife, including threatened and endangered species.
7. Granting the applications will threaten to prove detrimental to the public interest as it will cause degradation of air quality, it will destroy recreational and aesthetic values, degrade water quality and degrade cultural resources.
8. The Applicant has failed to justify the need to import the water.
9. The Applicant has not implemented a sufficient water conservation plan.
10. The proposed action will unduly limit the future growth and development of the basin of origin.
11. The proposed action is not an appropriate long-term use of water.
12. The Applicant has not demonstrated the good faith intent or financial ability and reasonable expectation to actually construct the project and apply the water to beneficial use.

XII.

Applications 79497 and 79498 were filed on February 11, 2010, by the Clark County – Coyote Springs Water Resources General Improvement District to appropriate 1.5 cfs, not to exceed 750 afa, and 2.5 cfs, not to exceed 1,250 afa, respectively, of groundwater from the Coyote Spring Valley Hydrographic Basin for municipal and domestic purposes. The proposed points of diversion are described as being located as follows:

Application 79497 within the SW¼ SE¼ of Section 10, T.13S., R.63E., M.D.B.&M.

Application 79498 within the SE¼ SW¼ of Section 14, T.13S., R.63E., M.D.B.&M.

The proposed place of use is described as being located within portions of Sections 13, 19, 30, 31 and 36 and all of Sections 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34 and 35, T.11S., R.63E., M.D.B.&M.; portions of Sections 1, 6, 7, 12, 13, 18, 19, 24, 29, 30 and 32 and all of Sections 2, 3, 4, 5, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 33, 34, 35 and

36, T.12.S., R.63E., M.D.B.&M.; a portion of Section 31, T.12S., R.64E., M.D.B.&M.; portions of Sections 5, 8, 17, 20, 21, 22, 23, 25 and 26 and all of Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16 and 24, T.13S., R.63E., M.D.B.&M.; and portions of Sections 6, 7 and 30 and all of Sections 18 and 19, T.13S., R.64E., M.D.B.&M.[7]

XIII.

Applications 79497 and 79498 were timely protested by the U.S. Department of Interior Bureau of Land Management, U.S. Department of Interior Fish and Wildlife Service, U.S. Department Interior National Park Service (USNPS) and Moapa Band of Paiute Indians on the various grounds as summarized as follows:[7]

1. There is no unappropriated water in the source of supply.
2. The proposed use of the water will conflict with existing rights both within Coyote Spring Valley and groundwater and surface water in nearby, but hydrologically connected, basins.
3. The proposed use of the water threatens to prove detrimental to the public interest because it will likely lower water levels in the Muddy River Springs area to the detriment of the Moapa dace, an endangered species.
4. The proposed use of the water will degrade habitat on land managed by the U.S. Bureau of Land Management and impair management of special status species habitat.
5. The aquifers underlying the Coyote Spring Valley are part of the regional groundwater flow system (White River Flow System) that discharges through springs in the Muddy River Springs Area, which supply the base flow for the Muddy River.
6. The water resources of the Muddy River are appropriated and decreed and groundwater withdrawal will capture the groundwater that naturally discharges at the Muddy River Springs into the Muddy River; therefore, granting the applications will impair existing rights.
7. Granting the applications will impair water rights of the USNPS, and therefore use of the water will threaten to prove detrimental to the public interest.
8. Groundwater from aquifers in Hidden Valley, Garnet Valley, California Wash and the Muddy River Springs Area is also tributary to the Muddy River.
9. There is no natural discharge in Coyote Spring Valley; therefore, there is no perennial yield to be appropriated.

[7] File Nos.79497 and 79498, official records in the Office of the State Engineer.

10. A summary of existing groundwater rights for the six hydrographic areas down gradient of Coyote Spring Valley that are tributary to the Muddy River shows that existing rights exceed the resource.
11. The proposed use of the water will impair the water and water-related resources of the Lake Mead National Recreation Area.

XIV.

Application 79518 was filed on February 11, 2010, by the SNWA to appropriate 15 cfs, not to exceed 9,000 afa, of groundwater from the Coyote Spring Valley Hydrographic Basin for municipal and domestic purposes. The proposed point of diversion is described as being located within the NE¼ NE¼ of Section 26, T.13S., R.63E., M.D.B.&M. The proposed place of use is described as being located within Clark County as described in NRS §§ 243.035-243.040.[8]

XV.

Application 79518 was timely protested by County of Inyo, California, Center for Biological Diversity, Great Basin Water Network, Moapa Band of Paiute Indians and U.S. Department of Interior National Park Service on various grounds summarized as follows:[8]

1. Granting the application will reduce or eliminate the flows in springs and supplies of groundwater to eastern Inyo County, which are dependent upon recharge from the regional carbonate-rock aquifer.
2. There is insufficient unappropriated groundwater in the basin.
3. The proposed use will conflict impermissibly with existing water rights and protectable interests in domestic wells.
4. Granting the application will result in groundwater mining and threaten springs, seeps and phreatophytes, which provide water and habitat critical for wildlife and grazing livestock.
5. Granting the application will deprive many areas of water needed to protect and enhance their environment and well being.
6. Granting the application will threaten to prove detrimental to the public interest on environmental grounds and will be environmentally unsound for the basin of origin in that it will result in the drying out of springs, seeps, wetlands, etc. causing harm to habitat and wildlife, including threatened and endangered species.

[8] File No. 79518, official records in the Office of the State Engineer.

7. Granting the application will threaten to prove detrimental to the public interest as it will cause degradation of air quality, it will destroy recreational and aesthetic values, degrade water quality and degrade cultural resources.
8. The Applicant has failed to justify the need to import the water.
9. The Applicant has not implemented a sufficient water conservation plan.
10. The proposed action will unduly limit the future growth and development of the basin of origin.
11. The proposed action is not an appropriate long-term use of water.
12. The Applicant has not demonstrated the good faith intent or financial ability and reasonable expectation to actually construct the project and apply the water to beneficial use.

FINDINGS OF FACT

I.

Nevada Revised Statute (NRS) § 533.365(4) provides that it is within the State Engineer's discretion to determine whether a public administrative hearing is necessary to address the merits of a protest to an application to appropriate the public waters of the state of Nevada. The State Engineer finds that in the case of Applications 64039, 64186, 64187, 64188, 64189, 64190, 64191, 64192, 67892, 71031, 72838, 72839, 72840, 72841, 79296, 79297, 79298, 79299, 79300, 79497, 79498 and 79518, there is sufficient information contained within the records of the Office of the State Engineer to gain a full understanding of the issues and a hearing on these applications is not required.

II.

Order 1169 and 1169A

On March 8, 2002, after the close of hearings on other applications to appropriate groundwater in the Coyote Spring Valley that were senior in priority to the ones under consideration in this ruling, the State Engineer issued State Engineer's Order No. 1169 (Order 1169). In that order, the State Engineer addressed what is known as the carbonate-rock aquifers, which are groundwater aquifers that exist underneath a significant portion of eastern and southern Nevada. The carbonate-rock aquifers have long been recognized as a potential water resource, but for which the water resources are not well defined, the hydrology and geology of the area are complex and data is sparse. The State Engineer noted that since 1984 it has been known that to arrive at some reasonable understanding of the carbonate-rock aquifer system,

substantial amounts of money would be required to develop the science, that a significant period of study would be required, and "unless this understanding is reached, the development of carbonate water is risky and the resultant effects may be disastrous for the developers and current users."[9]

The State Engineer noted that previous studies suggested that confidence in predictions regarding the effect of development was low and would remain low until observations of the initial hydrologic results of development were analyzed. The State Engineer was concerned that the adverse effects of development would overshadow the benefits, and found that the development of the carbonate-rock aquifer system must be undertaken in gradual stages together with adequate monitoring. The State Engineer noted that it is unknown what additional quantity, if any, of groundwater could be appropriated in the Coyote Spring Valley Hydrographic Basin without unreasonable and irreversible impacts. The State Engineer pointed out that the Applicants' own experts were unable to make a suggestion as to what part of the water budget could be captured without a great deal of uncertainty and that the question could not be resolved without stressing the system.

Order 1169 noted that testimony and evidence indicated approximately 50,000 afa of underflow comes into the Coyote Spring Valley from northern groundwater basins and approximately 53,000 afa of subsurface water flows out of the Coyote Spring Valley. Of that 53,000 afa that flows out of Coyote Spring Valley, approximately 37,000 afa of water discharges at the Muddy River Springs, which is appropriated under the Muddy River Decree.[10] Testimony and evidence indicated another approximately 16,000-17,000 afa is believed to flow to the groundwater basins farther south. Additionally, the State Engineer found that 50,465 afa of groundwater was already appropriated in Coyote Spring Valley and the surrounding basins identified as Black Mountains Area, Garnet Valley, Hidden Valley, Muddy River Springs Area (a.k.a. Upper Moapa Basin) and Lower Moapa Valley Hydrographic Basins. Because very few of these groundwater rights had actually been pumped, and water rights already issued in Coyote Spring Valley alone equaled the estimate of the amount of flow that by-passes the region, the State Engineer ordered additional study before consideration of granting any additional water rights in Coyote Spring Valley.

---

[9] State Engineer's Order No. 1169, dated March 8, 2002, p. 2, official records in the Office of the State Engineer.
[10] Judgment and 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*, March 12, 1920, Tenth Judicial District Court of the State of Nevada, In and For the County of Clark.

Order 1169 ordered that all applications for new appropriations from the carbonate-rock aquifer system in Coyote Spring Valley (Basin 210), Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (Basin 217), Muddy River Springs Area a.k.a. Upper Moapa Valley (Basin 219) and Lower Moapa Valley (Basin 220) would be held in abeyance until further information could be gathered by stressing the aquifer system by way of a pumping test. *See*, Attachment 1, Location Map of the Order 1169 Hydrographic Basins, Clark County and Lincoln County, Nevada. Unlike other basins in Nevada, the above listed basins were tied together in Order 1169 because it was well established that the spring discharge in the Muddy River Springs Area was produced from a distinct regional carbonate-rock aquifer that underlies and uniquely connects the basins. There is a very high hydraulic transmissivity found in most of this area of the carbonate-rock aquifer which results in a flat potentiometric surface in these basins. Changes in the potentiometric surface in any one of these basins occur in lockstep directly affecting the other basins, further demonstrating the regional nature of the aquifer across these basins.

In Order 1169, the State Engineer ordered a study under the provisions of NRS § 533.368 that required at least 50% (8,050 afa) of the water rights then currently permitted in Coyote Spring Valley be pumped for at least two consecutive years, and that data be gathered from others who currently held water rights in the Order 1169 area. At the end of the study, the study participants, which included the Las Vegas Valley Water District, Southern Nevada Water Authority, Coyote Springs Investment, LLC, Nevada Power Company, Moapa Valley Water District, Dry Lake Water Company, LLC, Republic Technologies, Inc., Chemical Lime Company, Nevada Cogeneration Associates or their successors, were required to submit reports identifying the information obtained and any impacts seen to the groundwater or surface water resources of the carbonate-rock aquifer system or alluvial system from the pumping. The State Engineer also ordered the LVVWD to update a model it had presented during the course of its case-in-chief at the LVVWD hearing with the new data. The State Engineer indicated that he would then decide whether sufficient information had been gathered to act on the pending applications. By State Engineer's Ruling No. 5115, dated April 18, 2002, the California Wash Hydrographic Basin (Basin 218) was included in Order 1169 because of its hydrologic connection.

By letter dated May 26, 2010, the Moapa Band of Paiute Indians indicated their concern that the pumping test itself was likely to impact water resources at the Muddy River Springs, which are the source of water for the Muddy River.

At a meeting of the Order 1169 study participants on June 22, 2010, each of the participants agreed that the pumping test would provide sufficient information even if the minimum 8,050 afa was not pumped. In response to that meeting, in a letter dated July 1, 2010, the State Engineer expressed his concern that it had been eight years since the pumping test was ordered, that the pumping requirements of the study had not even begun, and found that decisions regarding future appropriations in the basins subject to the order could not be deferred indefinitely. The State Engineer ordered that the test was to go forward even if the 8,050 afa minimum amount of pumping designated in Order 1169 was not pumped.

On December 21, 2012, the State Engineer issued Order 1169A, wherein he revised the requirements of Order 1169, indicating his belief that sufficient information had been obtained and declaring the pumping test completed as of December 31, 2012. Order 1169A provided the study participants the opportunity to address the information obtained from the study/pumping test, the impacts of pumping, and to opine as to the availability of additional water resources to support the pending applications. These reports were due in the Office of the State Engineer by June 28, 2013. The State Engineer finds that reports were submitted in a timely manner and that all the requirements of Order 1169 and 1169A have been satisfied.

III.

Order 1169 and 1169A Pumping Test

The Order 1169 pumping test originally required the participants to pump 8,050 afa from wells in Coyote Spring Valley for two years. As stated above, the State Engineer ordered on July 1, 2010, that the test go forward with reduced pumping. The test officially began on November 15, 2010. Water pumped from the MX-5 well was piped to the Moapa Valley Water District municipal infrastructure, and ultimately piped to Bowman Reservoir in Lower Moapa Valley. This water was released from Bowman Reservoir in an open channel to Lake Mead. Water pumped from wells operated by CSI was put to beneficial use in Coyote Spring Valley.

The pumping test officially ended on December 31, 2012, after a period of 25½ months. The total amount pumped between the CSI wells and the MX-5 well during the test period was 11,249 acre-feet, which translates to about 5,290 acre-feet per year, well short of the intended amount to be pumped in the study. There were a number of mechanical problems encountered

during the test that required the MX-5 well to shut down. Even without the mechanical issues, the maximum pumping rate would not have resulted in a total pumpage from Coyote Spring Valley of 8,050 afa.

In addition to measuring pumping from wells in Coyote Spring Valley, pumpage was also measured and reported from 30 other wells in the Muddy River Springs Area, Garnet Valley, California Wash, Black Mountains Area, and Lower Meadow Valley Wash. Stream diversions from the Muddy River to the Reid Gardner power plant were reported by NV Energy. Measurements of the natural discharge of the Muddy River and of several of the Muddy River's headwater springs were collected daily. Water-level data were collected for 79 monitoring and pumping wells. Barometric data were collected at three sites: two sites in Coyote Spring Valley and one site in California Wash. The State Engineer finds the pumping test proceeded as required and all of the required data was collected and made available to each of the parties and the public.

IV.

Pumping Test Reports

Order 1169A provided the study participants the opportunity to file reports and requested they address three questions: (1) what information was obtained from the study/pumping test; (2) what were the impacts of pumping under the pumping test; and (3) what is the availability of additional water resources to support the pending applications. Reports or letters were submitted by the Southern Nevada Water Authority (SNWA), the U.S. Department of Interior Bureaus Fish and Wildlife Service, National Park Service and Bureau of Land Management (DOI Bureaus), Moapa Band of Paiute Indians (MBOP), Moapa Valley Water District (MVWD), Coyote Springs Investment, LLC (CSI), Great Basin Water Network (GBWN) and Center for Biological Diversity (CBD).

1. Southern Nevada Water Authority

SNWA prepared a comprehensive report that discusses water levels in monitoring wells throughout the Order 1169 basins and stream flows in the Muddy River Springs Area. As to Question 2, SNWA did not differentiate water-level decline due to pumping at the MX-5 well from other pumping in the area.

SNWA recognized that declines in spring flow occurred at Pedersen and Pederson East springs, and that the spring flows declined as a result of new pumping at the MX-5 well. Decline in flow at Warm Springs West was characterized as minimal, and it did not recognize any other

surface flow reductions caused by groundwater pumping at the MX-5 well. SNWA provided figures that illustrate how groundwater levels and some spring flows are highly correlated with climate. Figure 12 of SNWA's report clearly shows how the long-term declining trend in groundwater levels recovered after the wet winter of 2005.[11] A similar correlation is noted for flows at the Warm Springs West gage, where a declining trend in spring discharge reversed after the winter on 2005.[12] SNWA points out that the flows of the Muddy River at Moapa did not decline during the period of the pumping test and asserts that the river flows are primarily impacted by valley fill pumping, primarily by NV Energy, and not carbonate pumping.

As to the availability of additional water for appropriation, SNWA said that:

> It remains unclear if additional resource development beyond existing permitted rights could take place in Coyote Spring Valley at locations north of the Kane Spring fault in the area near CSMV-3. However, the presence of boundaries and variations in hydraulic conductivity suggest that, at a minimum, these areas may have the potential to be used for redistributing development of existing rights. Whether pending applications in Coyote Spring Valley are approved or denied, in whole or in part, they should be considered in order of priority with all other groundwater applications held in abeyance by Order 1169.[13]

2. Coyote Springs Investment, LLC

CSI submitted a letter in which they stated that they agree with the SNWA report. CSI believes water can be developed in Coyote Spring Valley north of the Kane Springs fault without impacting the Muddy River Springs and that pending applications of both CSI and SNWA should be granted in whole or part.

3. U.S. Department of Interior Bureaus

DOI Bureaus provided documentation and interpretations of the effects of the pumping test as well as predictions of the effects of various pumping scenarios. They analyzed water levels, spring and stream flows, and climate in the Order 1169 basins and some adjacent areas.

The DOI Bureaus found the pumping test was sufficient to document the effects of the pumping, identify regional drawdown, predict future effects of pumping on water levels and spring flow, and to determine the availability of water pursuant to the applications. Their

[11] Southern Nevada Water Authority, *Nevada State Engineer Order 1169 and 1169A Study Report*, pp. 23 – 25, June 2013, official records in the Office of the State Engineer.
[12] *Id.* at 26.
[13] *Id.* at 57 - 58.

analyses of impacts under the test were extensive. They used SeriesSEE[14] to discern and partition the effects of pumping at the MX-5 well from pumping at other locations. Their reported findings are that water-level decline due to MX-5 pumping (drawdown) encompasses 1,100 square miles and extends from northern Coyote Spring Valley through the Muddy River Springs Area, Hidden Valley, Garnet Valley, California Wash, and the northwestern part of the Black Mountains Area. Drawdown due to MX-5 pumping is estimated to be 1 to 1.6 feet in this area. They also found minor drawdown of 0.5 feet or less in the northern part of Coyote Spring Valley north of the Kane Springs Wash fault zone, in disagreement with SNWA. They found that water-level decline did not extend into Lower Moapa Valley. They estimate 80-90% of the pumped groundwater was derived from storage (hence the drawdown) and the remainder from capture of spring flow or from reductions in the flow of the Muddy River.[15]

They completed an in-depth analysis of spring flows in relation to nearby carbonate water levels and found a direct correlation. Measurable flow decline at Pedersen, Plummer and Apcar units and Baldwin Spring are highly correlated with water levels in adjacent carbonate wells. If linear trends continue, spring flow can be estimated as a function of water levels in the adjacent carbonate aquifer. They argue that all pumping from carbonate aquifers will ultimately capture spring flow.

They also compared observed water level changes to water levels simulated in a groundwater flow model of the region.[16,17] The model was updated to include pumping through 2012.[18] If the applications, which are the subject of Ruling No. 6254, were pumped along with current water rights, they predict springs in the headwaters of the Muddy River, and the Muddy River itself above Moapa, would cease to flow in less than 200 years. The effects would occur much sooner if all of the pending applications held in abeyance pursuant to Order 1169 were

---

[14] Halford, K., Garcia, C.A., Fenelon, J., and Mirus, B., 2012, *Advanced methods for modeling water-levels and estimating drawdowns with SeriesSEE, an Excel add-In, U.S. Geological Survey Techniques and Methods 4–F4*, 29 pp.

[15] U.S. Fish and Wildlife Service, U.S. Bureau of Land Management and U.S. National Park Service Order 1169A Report, *Test Impacts and Availability of Water Pursuant to Applications Pending Under Order 1169*, June 28, 2013, official records in the Office of the State Engineer.

[16] Tetra Tech, *Development of a Numerical Groundwater Flow Model of Selected Basins within the Colorado Regional Groundwater Flow System, Southeastern Nevada*, September 28, 2012. References provided along with the DOI Report, official records in the Office of the State Engineer.

[17] Tetra Tech, *Predictions of the Effects of Groundwater Pumping in the Colorado Regional Groundwater Flow System Southeastern Nevada*, September 28, 2012. References provided along with the DOI Report, official records in the Office of the State Engineer.

[18] Tetra Tech, *Comparison of Simulated and Observed Effects of Pumping from MX-5 Using Data Collected to the End of the Order 1169 Test, and Prediction of the Rates of Recovery from the Test*, June 10, 2013. References provided along with the DOI Report, official records in the Office of the State Engineer.

granted and pumped. They report that the model under-predicts drawdown and also would therefore under-predict flow losses in the springs. After analyzing model results and observations made from monitor wells and springs, they believe that pumping at current (Order 1169) rates of less than one-half of existing permits, will result in both of the Pedersen springs going dry in 3 years or less.[19]

The overall conclusions of the DOI Bureaus' report are that the effects of pumping from the MX-5 well are spread out over a 1,100 square-mile area. They suggest that five basins within that area, Coyote Spring Valley, Muddy River Springs Area, Hidden Valley, Garnet Valley, and California Wash should be managed as one hydrographic area because of their uniquely immediate hydrologic connection. Pumping within any of these five basins, with the possible exception of the northernmost part of Coyote Spring Valley, will have substantially similar effects on groundwater levels throughout the area because of the hydrologic connection, and will eventually capture water that discharges in the Muddy River Springs Area.[20]

As to the availability of water pursuant to the pending applications, the DOI Bureaus indicated that their review of the water budget and perennial yield information leads to the conclusion that there is no water available for new appropriation within the five-basin area delineated through their groundwater analyses. The five-basin area that the DOI Bureaus referenced includes Coyote Spring Valley, Muddy River Springs Area, Hidden Valley, Garnet Valley and California Wash. They assert that the water budget information and pumping test results suggest that all available water in Coyote Spring Valley is appropriated and that the basin may currently be over-appropriated. Additionally, the groundwater modeling simulation results, which examined progressively greater pumping of pending water right applications in these five basins, provide supporting evidence of the wide-ranging effects that can be expected in these five basins with increased pumping in a very short period of time.

The DOI Bureaus point out that groundwater that was withdrawn in the Coyote Spring Valley over the period of the pumping test is only one-third of the groundwater rights that already exist in the basin. The DOI Bureaus assert that the pumping test provides evidence that even this reduced volume of groundwater pumping cannot be developed long-term without adverse impacts to springs, endangered fish, Federal trust resources, and downstream senior

[19] U.S. Fish and Wildlife Service, U.S. Bureau of Land Management and U.S. National Park Service Order 1169A Report, *Test Impacts and Availability of Water Pursuant to Applications Pending Under Order 1169*, p. 85, June 28, 2013, official records in the Office of the State Engineer.
[20] *Id.* at 84.

water rights. They argue that the five-basin area uniquely behaves as one connected aquifer, and pumping in any of the basins will have similar effects on the whole. Consequently, they conclude that no additional groundwater is available for appropriation to satisfy the pending water right applications that are currently being held in abeyance for this portion of the carbonate-rock aquifer.[21]

4. Moapa Band of Paiute Indians

MBOP provided a report that analyzed varying lines of evidence in addition to data collected during the pumping test. They analyzed water budgets, climatic effects, stream base flow identification, water demand for power generation, and water temperature-electrical conductivity and mixing models. MBOP argues that the drawdown due to MX-5 pumping was significantly less than that cited by the DOI Bureaus, and that the limit of detection of drawdown due to MX-5 pumping extended only five miles from the MX-5 well.[22] Nevertheless, they contend that carbonate pumping in Coyote Spring Valley and Muddy River Springs Area will have a 1:1 impact on Muddy River flows. They interpret total flux of the system in the Muddy River Springs Area as variable, ranging from about 35,000 afa to 42,000 afa, with the average being about 38,000 afa. Their average annual estimate is similar to Eakin's estimate of 36,000 afa.[23] MBOP asserts that some of the regional water-level decline during the period of the pumping test, and much of the annual fluctuation, is attributed to changes in the water level in Lake Mead. MBOP argues that crustal loading and deformation is associated with the rising and falling Lake Mead surface, which in turn causes pore-pressure changes and pore-volume reductions in the carbonate aquifer. They argue that these crustal effects cause carbonate water levels to rise and fall in near tandem with lake levels. They assert that these conditions have resulted in the water-level decline on the MBOP reservation that others have attributed to pumping at well MX-5. They also argue for the existence of a southern carbonate aquifer flow field separated from Coyote Spring Valley and the Muddy River Springs Area by a northeasterly-trending barrier. MBOP argues this southern flow field, which includes California Wash, Hidden and Garnet valleys, and portions of the Black Mountains Area, is hydrologically

[21] *Id.* at 5.
[22] Johnson and Mifflin, *Summary of Order 1169 Testing Impacts, per Order 1169A*, p. 25, June 28, 2013, official records in the Office of the State Engineer.
[23] T.E. Eakin, *A Regional Interbasin Ground-water System in The White River Area, Southeastern Nevada,* Water Resources Bulletin No. 33, (Department of Conservation and Natural Resources, Division of Water Resources and U.S. Department of Interior, Geological Survey), p. 264, 1966.

isolated and could be developed without impacting spring flows. They estimate that groundwater supply to the southern flow field is 15,000 to 20,000 afa.[24]

As to the availability of additional water resources, the MBOP asserts that the Order 1169 test results indicate that the 1989 LVVWD applications for approximately 27,000 afa should be denied. Their rationale is that these applications equal about 72% of the flux in the carbonate-rock aquifer that discharged as pre-development base flows of the Muddy River and that all the hydrogeological evidence indicates such production would reduce the flux to the discharge area by a similar amount over a relatively short time. They assert that almost one-third of pre-development Muddy River flows are currently consumed before reaching the Moapa gage, and these applications should be denied on the grounds that they would impact senior rights by the full amount.[25]

The MBOP argues for the creation of a new water management unit that would include upgradient basins including at least the Muddy River Springs Area, Coyote Spring Valley and Kane Springs Valley. They assert to prevent future desiccation of the headwater springs, the currently undeveloped permits within the proposed management unit must be largely revoked, restricted, or otherwise creatively managed because they total up to a similar order of magnitude as the current flow of the Muddy River.[26] They indicate that the water-resource potential of the southern flow field should be evaluated with a large interim pumping experiment in the northern portion of the southern flow field near the MBOP reservation.[27]

5. Moapa Valley Water District

MVWD evaluated only data for water levels and flows in the Muddy River Springs Area. MVWD's report recognizes that water-level declines are attributable to MX-5 pumping, as are spring flow decreases at the two Pedersen springs, Warm Springs West gage, and Baldwin Spring, but it does not recognize effects at Jones Spring or Muddy Spring at LDS.

As to the availability of additional water resources, MVWD did not provide a direct response. However, MVWD submitted a supplemental report analyzing its applications in the Lower Moapa Valley, coming to the conclusion that those applications could be developed without impacting the springs.

---

[24] Johnson and Mifflin, *Summary of Order 1169 Testing Impacts, per Order 1169A*, p. 26, June 28, 2013, official records in the Office of the State Engineer.
[25] *Id.* at 30.
[26] *Ibid.*
[27] *Id.* at 31.

6. Great Basin Water Network

GBWN provided both a technical report by Dr. Tom Myers and a letter summarizing their position and interpretation of the test. Their report recognized a water-level decline in Coyote Spring Valley and the Muddy River Springs Area and decreases in spring flow that they assert are directly attributable to the MX-5 well pumping. The report states that the test did not provide adequate data to analyze water availability in the other Order 1169 basins. As to the availability of additional water resources for the pending applications, GBWN argues against granting any of the pending applications and states that pumpage of even the existing water rights in Coyote Spring Valley and the Muddy River Springs Area will result in spring flow reductions to rates that are insufficient to maintain a known endangered species.

GBWN somewhat contradicts their own report with a statement that the test did not provide adequate data to analyze water availability, and asserts that the information obtained was sufficient to make determinations on the effects of the pumping and of the availability of water not just in Coyote Spring Valley, but in all of the Order 1169 basins. The letter also argues that their report supports a conclusion that full pumping of existing rights in the Order 1169 basins will unacceptably decrease spring discharge.

7. Center for Biological Diversity

CBD used the same report from Dr. Myers that was filed by the GBWN. CBD believes that pumping of existing water rights will have unacceptable effects on the springs, and, therefore, all pending applications in the Order 1169 basins should be denied. Furthermore, they assert that all applications in the entire White River Flow System up to Cave Valley should be denied. CBD also recommends that the State Engineer take administrative action to reduce permits in the Order 1169 basins to sustainable levels.

Based on the responses received and the State Engineer's own interpretations of the test, the State Engineer finds that sufficient information has been obtained from the Order 1169 pumping test to rule on the pending applications.

Based on reports filed pursuant to Orders 1169 and 1169A and the State Engineer's analysis of the pumping test, the State Engineer finds:

1. The information obtained from the pumping test satisfied the goal of the test and is sufficient to document the effects of pumping on water levels and spring flows in the Order 1169 basins. The information obtained from the test and reports is adequate to

formulate an informed opinion as to the future impacts from groundwater pumping and the availability of groundwater in Coyote Spring Valley.

2. The impacts of pumping from the MX-5 well, and other existing wells, during the pumping test are widespread, and extend north in Coyote Spring Valley at least to Kane Springs Valley, south to Hidden Valley and Garnet Valley, and southeast to the Muddy River Springs Area and California Wash. Pumping effects were seen in a small part of the Black Mountains Area, but were not observed in Lower Moapa Valley. Groundwater-level declines attributable to MX-5 pumping range from less than one foot in northern Coyote Springs Valley, two feet or more in central Coyote Spring Valley, and one foot or more in the carbonate aquifer in the Muddy River Springs Area and California Wash. The additional pumping at the MX-5 well contributed significantly to decreases in spring flow at high-elevation spring (Pedersen Springs) sources of the Muddy River, and contributed to measurable decreases in flow at Baldwin and Jones Springs and to the numerous springs whose combined flows are measured at the Warm Springs West and Iverson gages. The pumping test effects documented in Coyote Spring Valley, Muddy River Springs Area, Hidden Valley, Garnet Valley, California Wash, and part of Black Mountains Area provide clear proof of the close hydrologic connection of the basins that distinguishes these basins from other basins in Nevada.
3. As to the availability of water pursuant to pending applications, the request in Order 1169A referred to pending applications in Coyote Spring Valley that were addressed in Ruling No. 6254. Several of the respondents also replied with an opinion concerning available groundwater in the remainder of the Order 1169 basins. As discussed above, the parties were not unanimous in their interpretation of the test and whether additional water is available to appropriate in the basins. The DOI Bureaus, GBWN and CBD agree that there is no unappropriated groundwater in any of the basins. The MBOP found there is no additional water available to appropriate in Coyote Spring Valley or Muddy River Springs Area, but that unappropriated water exists California Wash, and perhaps in Hidden and Garnet Valley. They are silent on the Black Mountains Area and Lower Moapa Valley. The SNWA did not directly answer the question; rather, they suggest groundwater might be developed in western or northern Coyote Spring Valley. The results of the pumping test, together with the submitted technical reports and existing records of the State Engineer's office have provided sufficient information to make a

determination on the availability of water pursuant to pending applications in all of the Order 1169 basins.

V.

Perennial Yield

Nevada Revised Statute § 533.370(2) requires that the State Engineer reject an application to appropriate water where there is no unappropriated water at the source of supply. For groundwater appropriations, the State Engineer uses the perennial yield of a basin as the measure of the amount of water available for appropriation. The perennial yield is based on water budgets for the basin in question. Water budgets and perennial yield were significant issues raised in the 2001 hearings on the pending applications that needed additional information.

The perennial yield of a groundwater basin has been defined in numerous State Engineer rulings. It can be defined as the maximum amount of groundwater that can be withdrawn each year over the long-term without depleting the groundwater reservoir. Perennial yield is ultimately limited to the maximum amount of natural discharge that can be utilized for beneficial use. The perennial yield cannot be more than the natural recharge to a groundwater basin and in some cases is less. If the perennial yield is exceeded, groundwater levels will decline and steady state conditions will not be achieved, a situation commonly referred to as groundwater mining. Additionally, withdrawals of groundwater in excess of the perennial yield may contribute to adverse conditions such as water quality degradation, storage depletion, diminishing yield of wells, increased pumping costs, and land subsidence.

In the eleven years since Order 1169 was issued, much additional hydrologic information has been made available, including publications by the U.S. Geological Survey and others. There have also been hearings before the Office of the State Engineer for water rights in nearby hydrographic basins. Technical exhibits and expert testimony in those hearings include hydrological analyses of the carbonate aquifers and water budgets in the Order 1169 basins. This information significantly expands on the available knowledge of the hydrology and water resources of the Lower White River Flow System in Coyote Spring Valley, the Muddy River Springs Area and the surrounding basins. In hearings held in the fall of 2011 concerning SNWA applications in Delamar Valley, Dry Lake Valley, and Cave Valley, several exhibits and expert

testimony were presented that revise and update information presented at the Coyote Spring Valley water rights hearings.[28]

SNWA Exhibit No. 452 from the 2011 hearing on Delamar, Dry Lake and Cave valleys is an Excel workbook that is designed to estimate groundwater recharge for all of the basins contributing to the White River Flow System from the Muddy River Springs Area northward. The exhibit was accepted by the State Engineer with some revisions,[29] and basin recharge and interbasin flows are specified for both Coyote Spring Valley and the Muddy River Springs Area hydrographic basins. From that exhibit, the supply of water to the Coyote Spring Valley is estimated to be approximately 41,000 afa, of which 39,000 is subsurface inflow from upgradient basins and 2,000 afa is derived from in-basin recharge. Prior to groundwater pumping in the region, all of this water flowed in the subsurface to the Muddy River Springs Area.

The total pre-development supply of water to the Muddy River Springs Area is estimated to be approximately 49,000 afa. The basin receives 41,000 afa from subsurface inflow from Coyote Spring Valley, and an estimated 8,000 afa from the Lower Meadow Valley Wash. In-basin recharge is minimal. Discharge from the basin by surface flow is estimated to be 33,600 afa, evapotranspiration is approximately 6,000 afa, and subsurface outflow to downgradient basins is an estimated 9,900 afa.[30] It is noted here that during periods of flood, inflows and outflows can be significantly greater than average. Flood flows are not included in these calculations, in part because these sources are transitory and not amenable to capture and long-term supply.

[28] SNWA Exhibit Nos. 258 and 452, In the Matter of Applications 53987 through 53992 filed by the SNWA to Appropriate the Groundwater in Spring Valley, Cave Valley, Dry Lake Valley and Delamar Valley Hydrographic Basins (180, 181, 182, 184), September 26 through October 14 and October 31 through November 18, 2011, official records in the Office of the State Engineer.
[29] State Engineer's Ruling No. 6166, dated March 22, 2012, pp. 72 – 73, official records in the Office of the State Engineer.
[30] SNWA Exhibit Nos. 258 and 452, In the Matter of Applications 53987 through 53992 filed by the SNWA to Appropriate the Groundwater in Spring Valley, Cave Valley, Dry Lake Valley and Delamar Valley Hydrographic Basins (180, 181, 182, 184), September 26 through October 14 and October 31 through November 18, 2011, official records in the office of the State Engineer.

For basins similar to Coyote Spring Valley, where there is no groundwater evapotranspiration and all of the groundwater flows in the subsurface to an adjacent basin, recent rulings have limited the perennial yield to the portion of recharge from precipitation in that basin that was not needed to satisfy rights in the immediate downgradient basin.[31] In State Engineer's Ruling Nos. 6165, 6166 and 6167, there was a consideration for how long it might take for an existing water right to be impacted, and the State Engineer found that where no significant effects would be felt for hundreds of years, the upgradient groundwater could be appropriated. Other early decisions of the State Engineer had allowed one-half of the total subsurface groundwater discharge to be appropriated as the perennial yield of such basins. State of Nevada Water Planning Report No. 3 lists the perennial yield of Coyote Spring Valley as 18,000 acre-feet, approximately one-half of the basin subsurface discharge.[32] One of the goals of the Order 1169 test was to determine the perennial yield of Coyote Spring Valley.

The vast majority of the scientific literature supports the premise that, unlike other separate and distinct basins in Nevada that do not feature carbonate-rock aquifers, all of the Order 1169 basins share virtually the same supply of water. The Order 1169 pumping test further supports the conclusion that pumping from any of the five basins with a close hydrologic connection (Coyote Spring Valley, Muddy River Springs Area, Hidden Valley, Garnet Valley and California Wash) will have a similar impact on water levels in the five-basin area and on the Muddy River spring flows. Therefore, because these basins share a unique and close hydrological connection, and share virtually all of the same source and supply of water, unlike other basins in Nevada, these five basins will be jointly managed. The perennial yield of these basins cannot be more than the total annual supply of 50,000 acre-feet. Because the Muddy River and Muddy River springs also utilize this supply, and are the most senior water rights in the region, the perennial yield is further reduced to an amount less than 50,000 acre-feet. The State Engineer finds that the amount and location of groundwater that can be developed without capture of and conflict with senior water rights on the Muddy River and springs remains unclear, but the evidence is overwhelming that unappropriated water does not exist.

[31] State Engineer's Ruling Nos. 6165, 6166 and 6167, dated March 22, 2012, official records in the Office of the State Engineer.
[32] Office of the State Engineer, *Water for Nevada, State of Nevada Water Planning Report No. 3,* p. 25, Oct. 1971.

VI.

Recent rulings by the State Engineer for groundwater applications in other basins within the White River Flow System allowed for the appropriation of additional water.[33] These basins, Cave Valley, Dry Lake Valley, and Delamar Valley Hydrographic Basins, lie 40 to 100 miles north of the Muddy River Springs. Groundwater from both Dry Lake Valley and Delamar Valley is believed to contribute to discharge from the springs. Water rights were granted in the Cave Valley, Dry Lake Valley and Delamar Valley basins based on two critical points that do not exist in the basins in Order 1169. First, the groundwater appropriated in the Cave Valley, Dry Lake Valley and Delamar Valley basins is recharged within the basins. Water is available at the source and can be developed without depleting the supply. Second, the water can be developed without conflicting with any existing rights for hundreds of years. In contrast, neither of these conditions is met in the Order 1169 basins. Recharge in each of the Order 1169 basins is already appropriated. Subsurface inflow is appropriated as well. Development of additional water will conflict with existing rights in months to years. The State Engineer finds the basins of Order 1169 fail on both statutory requirements.

VII.

Existing Rights

Nevada Revised Statute § 533.370(2) requires that the State Engineer reject an application to appropriate water where the use of the water conflicts with existing rights or with protectable interests in existing domestic wells. There are 16,200 acre-feet of senior groundwater rights in Coyote Spring Valley as well as approximately 33,000 acre-feet of senior groundwater rights in the other Order 1169 basins. The Muddy River and springs, the discharge location of the bulk of the region's water, have approximately 30,000 afa of decreed and appropriative rights.

One of the main goals of Order 1169 and the associated pumping test was to observe the effects of increased pumping on groundwater levels and spring flows. The Pedersen and Pedersen East springs, the highest elevation springs in the area and which are considered to be the "canary in the coal mine" with respect to impacts from pumping, showed an unprecedented decrease in flow during the pumping test. Pedersen spring flow decreased to 0.08 cfs, down from its average of about 0.22 cfs prior to the test. Pedersen East decreased to 0.12 cfs, down

[33] State Engineer's Ruling Nos. 6165, 6166 and 6167, dated March 22, 2012, official records in the Office of the State Engineer.

from its average flow of 0.2 cfs prior to the test.[34,35] The Warm Springs West gage, the site at which trigger levels have been set among parties to a memorandum of agreement,[36] declined from 3.6 to 3.3 cfs during the test.[37] Baldwin and Jones Springs declined about 4% during the test.[38] The Muddy River at the Moapa gage did not display any decrease in flow,[39] although the MBOP report points out that total flux of the system is variable, and argues that flows in the river would have been even higher if Order 1169 pumping had not occurred.[40]

The State Engineer finds that pumping under the Order 1169 test measurably reduced flows in headwater springs of the Muddy River, and it is clear that if pending water right applications were permitted and pumped in addition to existing groundwater rights in Coyote Spring Valley and the other Order 1169 basins, headwater spring flows would be reduced in tens of years or less to the point that there would be a conflict with existing rights. The State Engineer finds the Muddy River and the Muddy River springs, the discharge location of the bulk of the region's water, is fully appropriated. As for the Muddy River, the State Engineer finds that evidence submitted by the DOI Bureaus and MBOP is convincing that pumping of groundwater under the pending applications in addition to existing rights would reduce the flow of the Muddy River in tens of years or less to the point where there would be a conflict with existing rights.

VIII.

Public Interest

Nevada Revised Statute § 533.370(2) requires the State Engineer reject an application if the use of the water threatens to prove detrimental to the public interest. The State Engineer views this requirement in terms of Nevada water law and management of the public's water, but not to areas that are outside of his purview. The State Engineer finds to approve applications that

---

[34] U.S. Fish and Wildlife Service, U.S. Bureau of Land Management and U.S. National Park Service Order 1169A Report, *Test Impacts and Availability of Water Pursuant to Applications Pending Under Order 1169*, pp. 43 – 46, June 28, 2013, official records in the Office of the State Engineer.
[35] http://waterdata.usgs.gov/nv/nwis/.
[36] In 2006, a Memorandum of Agreement (MOA) was signed by the Southern Nevada Water Authority, U.S. Fish and Wildlife Service, Coyote Springs Investment, LLC, Moapa Band of Paiute Indians, and Moapa Valley Water District pursuant to which, the parties agreed to certain conservation measures for the protection and recovery of the Moapa dace, an endangered species found in the Moapa Valley National Wildlife Refuge.
[37] http://waterdata.usgs.gov/nv/nwis/.
[38] U.S. Fish and Wildlife Service, U.S. Bureau of Land Management and U.S. National Park Service Order 1169A Report, *Test Impacts and Availability of Water Pursuant to Applications Pending Under Order 1169*, pp. 50 – 51, June 28, 2013, official records in the Office of the State Engineer.
[39] Southern Nevada Water Authority, *Nevada State Engineer Order 1169 and 1169A Study Report*, p. 41, June 2013, official records in the Office of the State Engineer.
[40] Johnson and Mifflin, *Summary of Order 1169 Testing Impacts, per Order 1169A*, pp. 5 - 8, June 28, 2013, official records in the Office of the State Engineer.

will within a short period of time conflict with existing water rights threatens to prove detrimental to the public interest.

The Moapa dace is an endangered species that lives only in the headwater springs of the Muddy River. The USFWS holds water rights on some of the springs in the Muddy River Springs Area that were appropriated specifically for the protection of the dace. The State Engineer finds to permit the appropriation of additional groundwater resources in the Coyote Spring Valley, which is directly connected to the regional aquifer in the Order 1169 area, would impair protection of these springs and the habitat of the Moapa dace and therefore threatens to prove detrimental to the public interest.

CONCLUSIONS

I.

The State Engineer has jurisdiction over the parties and the subject matter of this action and determination.[41]

II.

The State Engineer is prohibited by law from granting a permit under an application to appropriate the public water where:[42]

A. there is no unappropriated water at the proposed source;
B. the proposed use or change conflicts with existing rights;
C. the proposed use or change conflicts with protectable interests in existing domestic wells as set forth in NRS § 533.024; or
D. the proposed use or change threatens to prove detrimental to the public interest.

III.

The State Engineer concludes that there is no additional groundwater available for appropriation in the Coyote Spring Valley Hydrographic Basin without conflicting with existing water rights in the Order 1169 basins.

IV.

The State Engineer concludes that approval of the applications would threaten to prove detrimental to the public interest by removing water that in the past has been available for the endangered species in the Muddy River Springs Area. The State Engineer concludes that while

[41] NRS Chapters 533 and 534.
[42] NRS § 533.370(2).

the use of the water under these applications may have a public benefit, removing the water from the springs would threaten to prove detrimental to the public interest in that it would threaten the water resources upon which the endangered Moapa dace are dependent.

RULING

The protests to Applications 64039, 64186, 64187, 64188, 64189, 64190, 64191, 64192, 67892, 71031, 72838, 72839, 72840, 72841, 79296, 79297, 79298, 79299, 79300, 79497, 79498 and 79518 are hereby upheld in part and the applications are hereby denied on the grounds that there is no unappropriated groundwater at the source of the supply, the proposed use would conflict with existing rights in the Order 1169 basins and the proposed use of the water would threaten to prove detrimental to the public interest in that it would threaten the water resources upon which the endangered Moapa dace are dependent. No ruling is made on the merits of the remaining protest grounds.

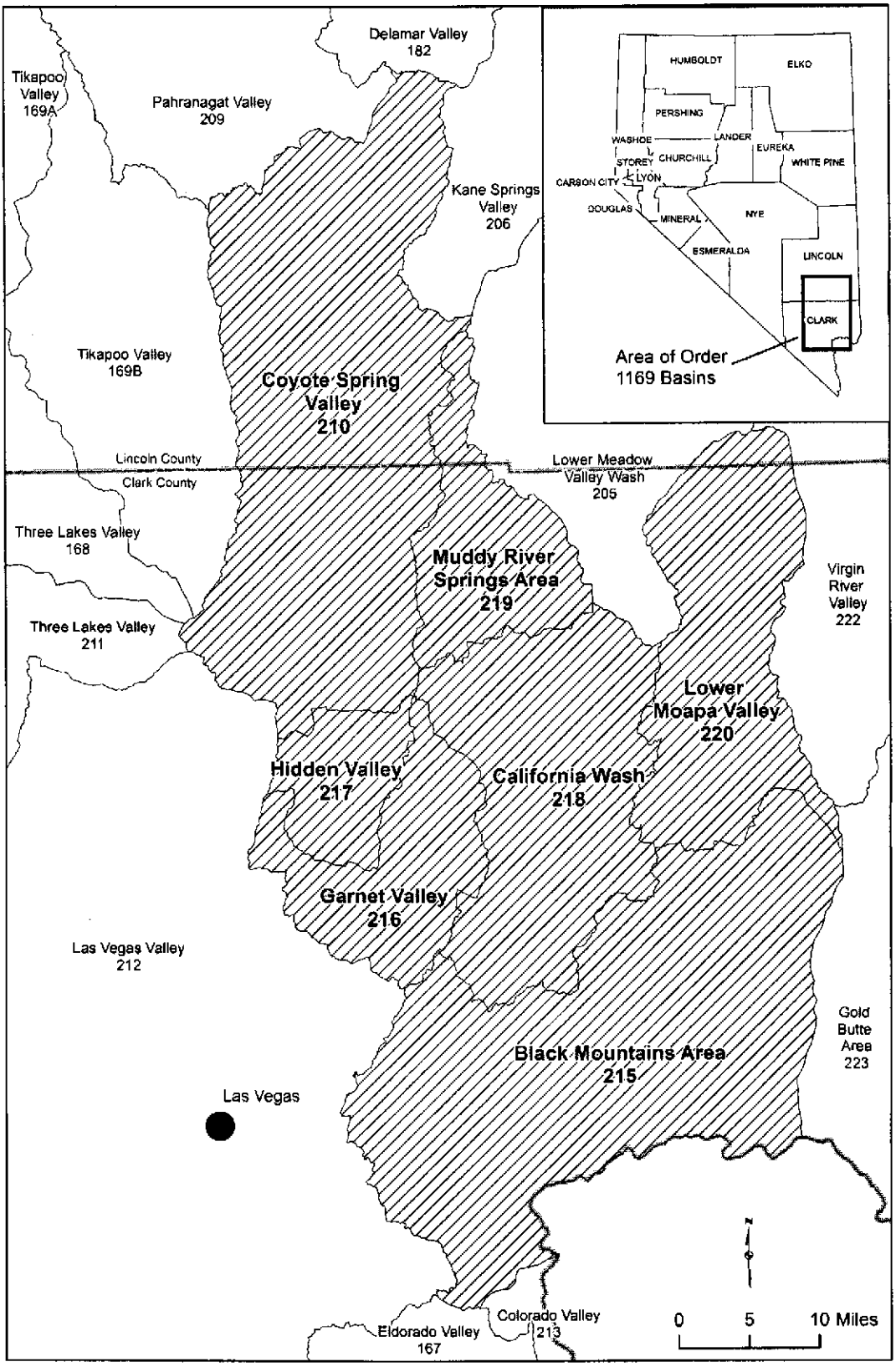
Respectfully submitted,

JASON KING, P.E.
State Engineer

Dated this 29th day of

January, 2014.

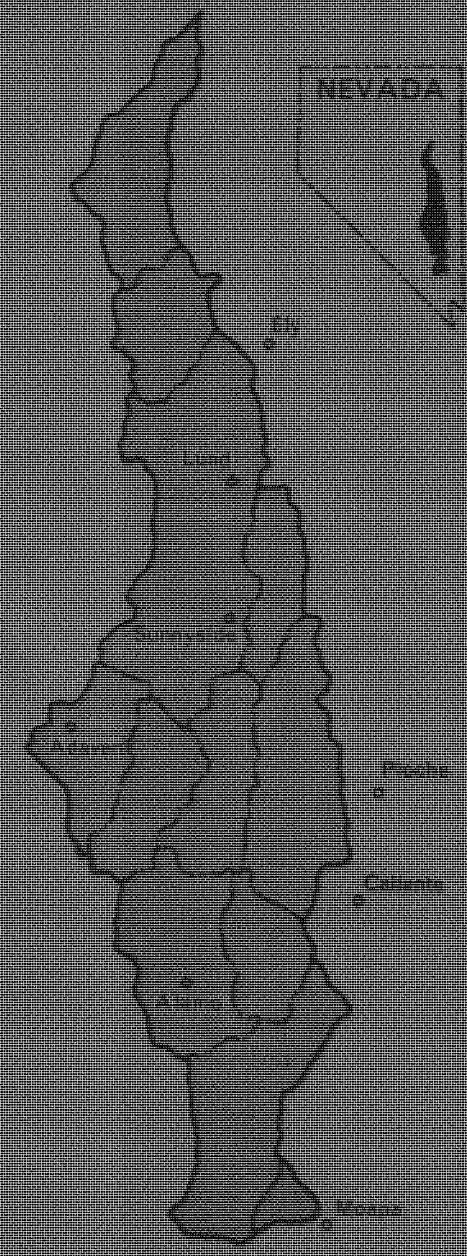
ATTACHMENT 1



Location Map of the Order 1169 Hydrographic Basins, Clark County and Lincoln County, Nevada.

A REGIONAL INTERBASIN GROUNDWATER SYSTEM IN THE WHITE RIVER AREA, SOUTHEASTERN NEVADA

By
Thomas E. Eakin



NEVADA
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

WATER RESOURCES
BULLETIN NO. 32
1966

STATE OF NEVADA

DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

WATER RESOURCES BULLETIN NO. 33

A REGIONAL INTERBASIN GROUND-WATER SYSTEM IN THE WHITE RIVER AREA, SOUTHEASTERN NEVADA

By

THOMAS E. EAKIN

Prepared Cooperatively by the

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Reprinted From

WATER RESOURCES RESEARCH
Vol. 2, No. 2, pp. 251–271, 1966

1966

FOREWORD

This report on A Regional Groundwater System in the White River Area in southeastern Nevada is a by-product of a cooperative program by the Nevada Department of Conservation and Natural Resources and the United States Geological Survey. Under this program, studies of the groundwater resources of the larger part of the area covered in this paper have been made and reports on these studies have been published by either the Office of the Nevada State Engineer or by this department.

The more recent of these studies have been made by the United States Geological Survey under a cooperative program with this department for reconnaissance surveys of the groundwater resources of the valleys of Nevada. Reports on these studies have been issued by this department in a series devoted to this subject.

All of the data on which this paper is based were derived from existing records and no field studies for its development have been made. All reports which bear on the subject of this study are listed in this publication and those reports that contain significant data are fully reviewed.

This well documented study is a significant contribution to the knowledge of the movement of groundwater in southeastern Nevada.

Elmo J. DeRicco

ELMO J. DERICCO, *Director*

A Regional Interbasin Groundwater System in the White River Area, Southeastern Nevada[1]

THOMAS E. EAKIN

Water Resources Division, U. S. Geological Survey, Carson City, Nevada

Abstract. A regional interbasin groundwater system including thirteen valleys in southeastern Nevada is generally identified on the basis of preliminary appraisals of the distribution and quantities of the estimated groundwater recharge and discharge within the region, the uniformity of discharge of the principal springs, the compatibility of the potential hydraulic gradient with regional groundwater movement, the relative hydrologic properties of the major rock groups in the region, and, to a limited extent, the chemical character of water issuing from the principal springs. The principal findings are: (1) Paleozoic carbonate rocks are the principal means of transmitting groundwater in the interbasin regional system—the regional transmissibility provisionally is estimated to be about 200,000 gal/day/ft; (2) estimates of recharge and discharge show wide discrepancies in individual valleys, but hydrologic balance with recharge and discharge estimates of about 100,000 acre-ft/yr obtains within the thirteen-valley region; and (3) the discharge of the Muddy River Springs, the lowest of the three principal spring groups, is shown to be highly uniform, which is consistent with their being supplied from a large regional groundwater system. The relation between this regional system and others in eastern and southern Nevada is now under study by the Geological Survey. (Key words: Hydrologic systems; hydrology (limestone); springs; groundwater)

INTRODUCTION

Reconnaissance appraisals of the groundwater resources of various valleys in Nevada have been made for several years. One of the assumptions on which these studies originally were predicated was the generally accepted concept that most hydrologic systems were more or less co-extensive with the topographically closed basins in the Basin and Range province. As studies for various areas were completed, it became evident that groundwater systems in certain valleys of eastern and southern Nevada extended beyond the limits of the particular valley. Some valleys have a much larger spring discharge than could be sustained by local recharge, and other valleys have deep water levels that preclude an annual groundwater discharge by evapotranspiration comparable with probable local recharge. If these observations are correct, a multivalley regional groundwater system is required to satisfy the general hydrologic equation that inflow equals outflow.

This report describes the general features of a regional groundwater system in a part of the Basin and Range province in southeastern Nevada. Although the scope of the report is limited by the reconnaissance nature of the investigations on which it is based, virtually all components of the hydrologic system are evaluated.

Location and extent of the region. The region discussed includes the area within the drainage divides of six valleys drained by the White River in Pleistocene time and seven adjacent but topographically separated valleys. It is in southeastern Nevada and lies within lat 36°40′ and 41°10′N and long. 114°30′ and 115°45′W. It includes parts of Clark, Elko, Lincoln, Nye, and White Pine counties (Figure 1). From its north end in southern Elko County, the region extends southward to include the upper Moapa Valley, a distance of about 240 miles. Its maximum width is about 70 miles near lat 38°N. The region includes an area of about 7700 square miles.

Topographic setting. Figure 2 shows the locations of the principal valleys and ranges in the region. Of the thirteen valleys, Long, Jakes, Cave, Dry Lake, and Delamar valleys are topographically closed. Garden Valley surfici-

[1] Publication authorized by the Director, U. S. Geological Survey.

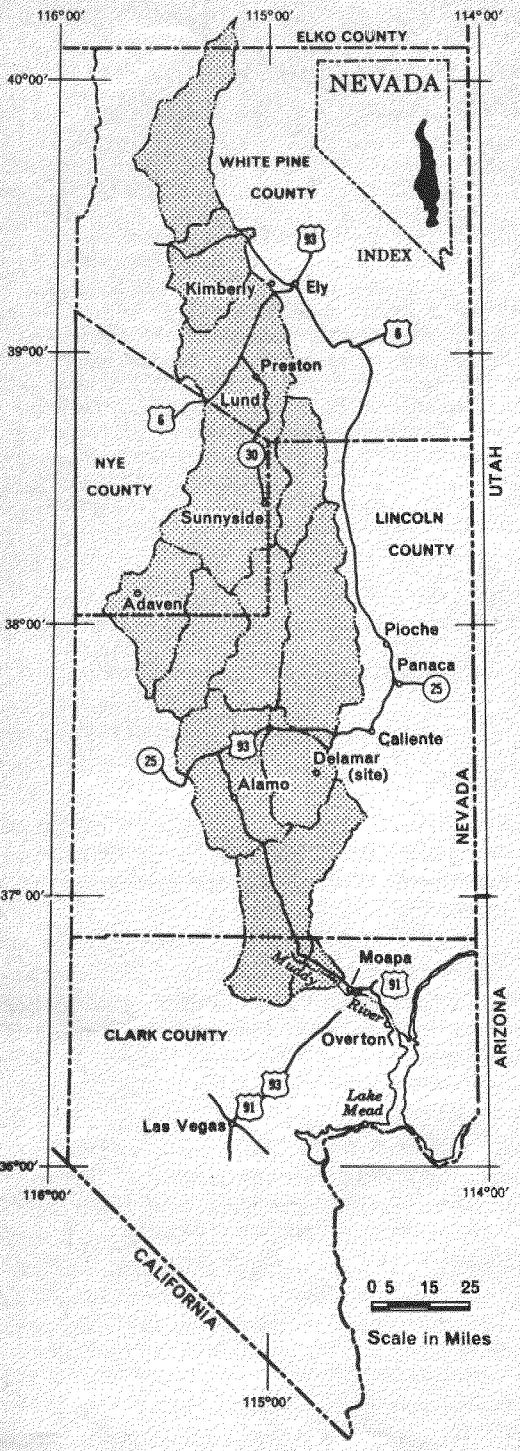


Fig. 1. Location of regional interbasin groundwater system described in this report.

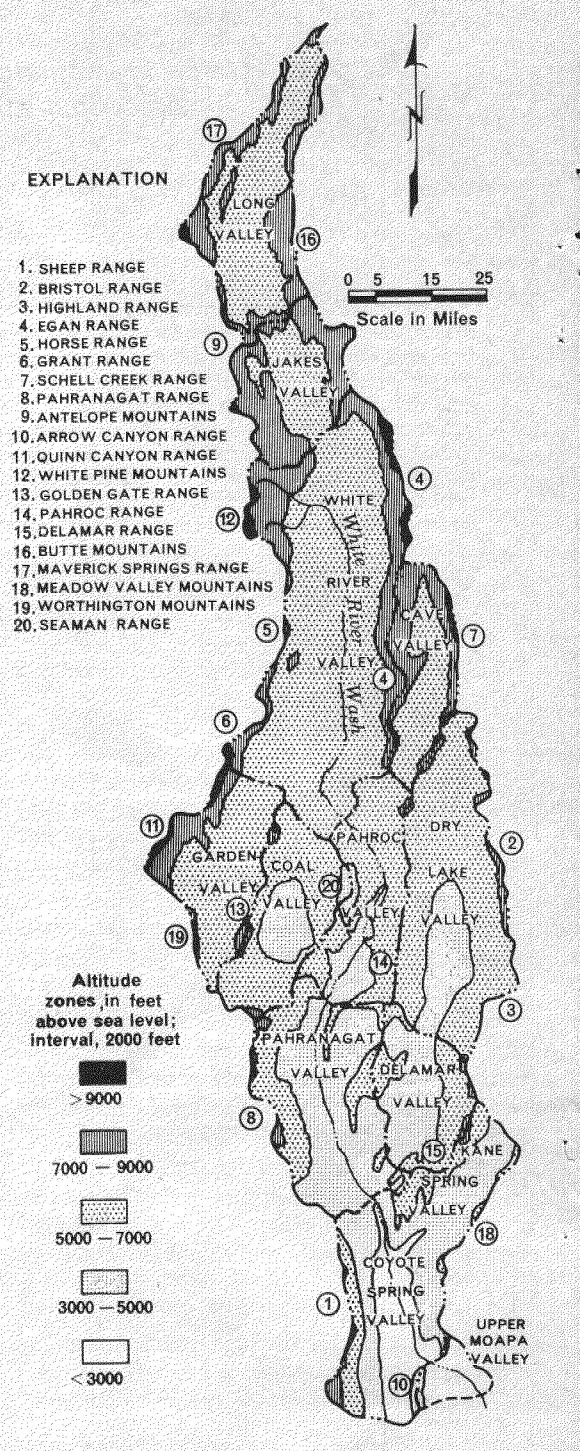


Fig. 2. General topography of the area of this report.

ally may drain into Coal Valley but together they form a topographically closed unit. The remaining six valleys were drained by the Pleistocene White River, then a tributary to the Colorado River system. The six valleys are White River, Pahroc, Pahranagat, Kane Spring, Coyote Spring, and upper Moapa.

This region of mountains and valleys generally has a southward gradient (Figure 2). Along the White River Wash the altitude decreases from about 5500 feet in the latitude of Lund to about 1800 feet in the vicinity of the Muddy River Springs in a channel distance of about 175 miles. The average gradient along the Wash is about 21 feet per mile. The White River Wash forms an axial topographic low between Garden and Coal valleys on the west and Cave, Dry Lake, and Delamar valleys on the east.

The mountains generally are 2000 to 4000 feet higher than the floors of the adjacent valley (Figure 2). The crests of the ranges commonly exceed 8000 feet above sea level and locally exceed 10,000 feet in the north part of the area. In the south part of the area the crests of the ranges exceed 8000 feet above sea level only locally and commonly are less than 7000 feet in altitude.

THE REGIONAL GROUNDWATER SYSTEM

The regional groundwater system includes both the rocks and the groundwater of the defined area. It includes the areas of recharge and discharge, storage and transmission of water, and geologic units that control the occurrence and movement of water. Semiperched groundwater in the mountains and in the valley fill of at least some valleys contributes to the regional system but is not emphasized herein.

The identification of this regional groundwater system is based upon (1) the relative hydrologic properties of the major rock groups in the area of consideration; (2) the regional movement of groundwater as inferred from potential hydraulic gradients; (3) the relative distribution and quantities of the estimated recharge and discharge; (4) the relative uniformity and long-term fluctuation of the discharge of the principal springs; and (5) the chemical quality of the water discharged from the principal springs. Much of the available data pertinent to the analysis is included in Tables 1, 4, 5, and 6 and on Figures 4 and 6. These elements are discussed in the following sections.

Geologic setting. The rocks provide the framework in which groundwater occurs and moves. Groundwater may occur in interstitial openings, in fractures, or in solution openings in the rocks. The openings may have been formed at the time the rocks were deposited or at a subsequent time by fracturing, weathering, or solution. The distribution and nature of these openings may relate generally to other physical and chemical characteristics of formations or groups of rocks. Thus, the general nature and distribution of the rocks in the region permit some inferences regarding the occurrence and movement of groundwater.

A number of geologic studies in parts of the area of this report have been made. For present purposes, the reconnaissance geologic map of Lincoln County [*Tschanz and Pampeyan,* 1961], the reconnaissance geologic map of Clark County [*Bowyer et al.* 1958], the general geologic map accompanying the guidebook to the geology of east-central Nevada [*Boettcher and Sloan,* 1960] for White Pine and parts of northeastern Nye counties, and unpublished information from F. J. Kleinhampl for segments of the region in northeastern Nye County have been most useful with reference to the areal geology of the region. For the White Pine County part of the region many of the papers in the guidebook to the geology of east-central Nevada [*Boettcher and Sloan,* 1960] are of much value.

Although not known to crop out within the area of this report, Precambrian rocks are exposed in the northern Egan Range east of Long Valley, in the Schell Creek Range [*Young,* 1960], along the east side of Cave Valley and northward, and in the Mormon Mountains [*Tschanz and Pampeyan,* 1961] east of Coyote Spring Valley and may be inferred to underlie all the region of this report.

A thick section of Paleozoic rocks was deposited throughout and beyond the area. Locally, the stratigraphic thickness of the Paleozoic rocks exceeds 30,000 feet [*Kellog,* 1963, p. 685]. Clastic rocks occur principally in the upper and lower parts of the section. Carbonate rocks, which comprise more than half of the section, are generally found in the central part of the Paleozoic section.

Lower Triassic marine deposits are noted by

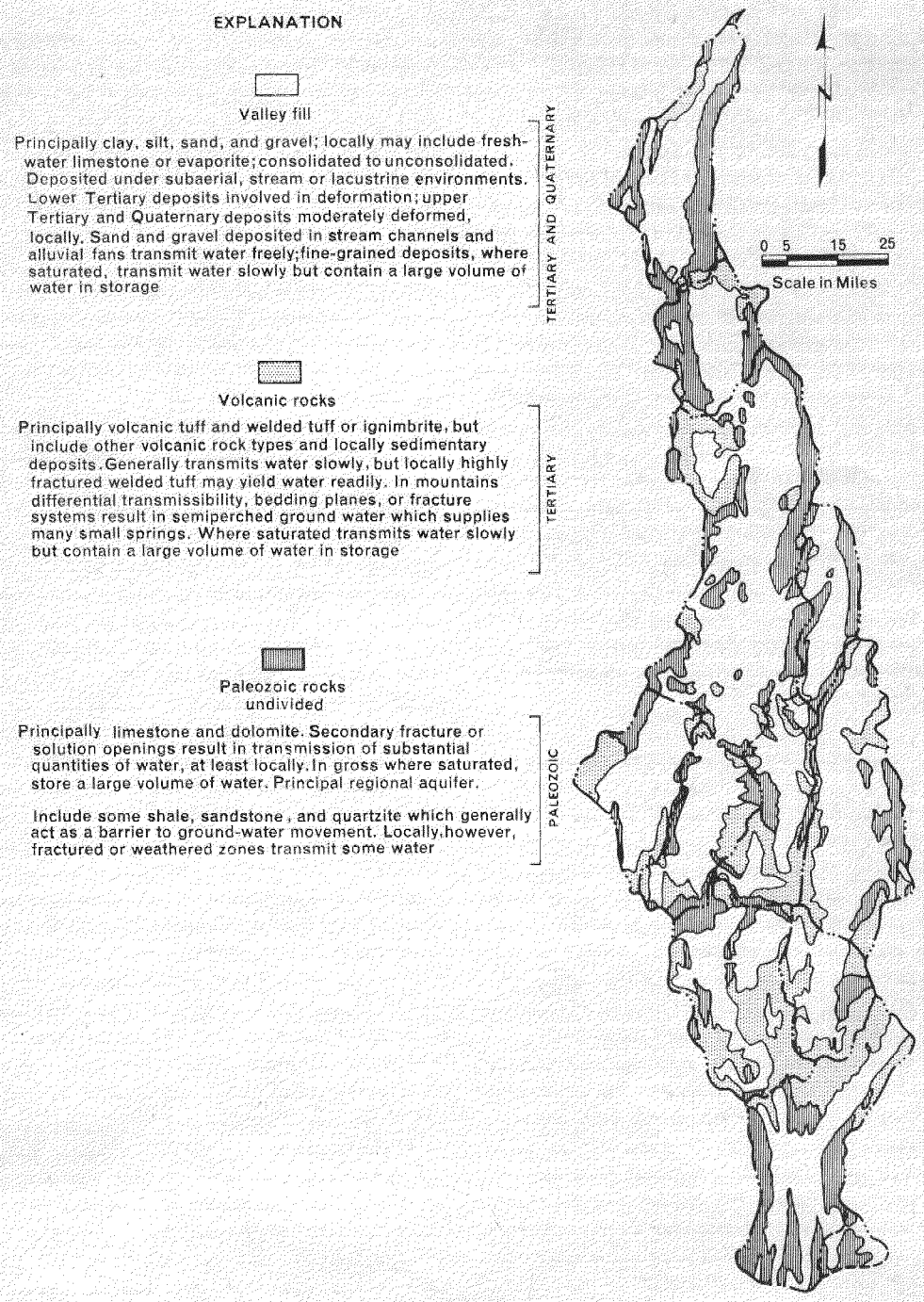


Fig. 3. Generalized geology of the region. Adapted from *Bowyer et al.* [1959] for Clark County; *Tschanz and Pampeyan* [1961] for Lincoln County; F. Kleinhampl (private communication, 1963) for parts of Nye County; and *Boettcher and Sloan* [1960] for remaining area.

EXPLANATION

Area of evapotranspiration of ground water

4600

Playa and approximate altitude, in feet, above sea level

Lund Spring (5595)

Data point, name, and approximate altitude of water level above sea level

30

Data point and serial number. Points described below include name or well number followed by depth to water and by altitude of water level. For oil tests, only total depth (T.D.) of well given

1.—Well 21N/59-18d2; 88; 6000
2.—Well 21N/58-33b1; 68; 6000
3.—Well 20N/58-14a1; 117; 6000
4.—Oil test, Summit Springs Unit no. 1; T.D. 11453
5.—Illipah Creek
6.—Oil test, Hayden Creek Unit no. 1; T.D. 5117
7.—Well 14N/61-10c1; 280; 5780
8.—Ellison Creek
9.—White River
10.—Oil test, County Line Unit no. 1; T.D. 4850
11.—Emigrant Springs; 5415
12.—Morman Spring; 5300
13.—Butterfield and Flag Springs; 5275
14.—Well 5N/60-25a1; 25; 5100
15.—Well 8N/64-30c1; 331; 5800
16.—Well 5N/64-14a1; 214 (dry); <5385
17.—Well 3N/64-20b1; 317; 4820
18.—Well 2N/64-3b1; 664; 4350
19.—Well 1N/64-24a1; 398; 4300
20.—Well 4N/61-36c1; 90; 4970
21.—Well 3N/62-8c1; 217; 4835
22.—Well 3N/62-35b1; 252; 4770
23.—Well 2N/63-31b1; 800 (dry); <4125
24.—Well 2S/61-23d1; 302 (dry); <3900
25.—Well 2N/59-22b1; 250 (dry); <4775
26.—Well 4N/59-6d1; 9; 5340
27.—Well 3N/58-15b1; 235; 5040
28.—Well 3N/57-16c1; 33; 6150
29.—Well 1S/57-3a1; 570; 5020
30.—Well 6S/63-12a1; 900 (dry); <3700
31.—Well 4S/61-15b1; 670; 3700
32.—Well 5S/60-6c1; 380; 4025
33.—Well 3S/60-24d1; 187; 3815
34.—Well 4S/60-2a1; 105; 3870
35.—Hiko Spring, altitude 3890
36.—Crystal Springs, altitude 3805
37.—Ash Springs, altitude 3610
38.—Upper Pahranagat Lake
39.—Maynard Lake
40.—Well 10S/62-14a1; 416; 2175
41.—Coyote Spring, altitude 2575
42.—Well 13S/63-25a1; 330; 1875

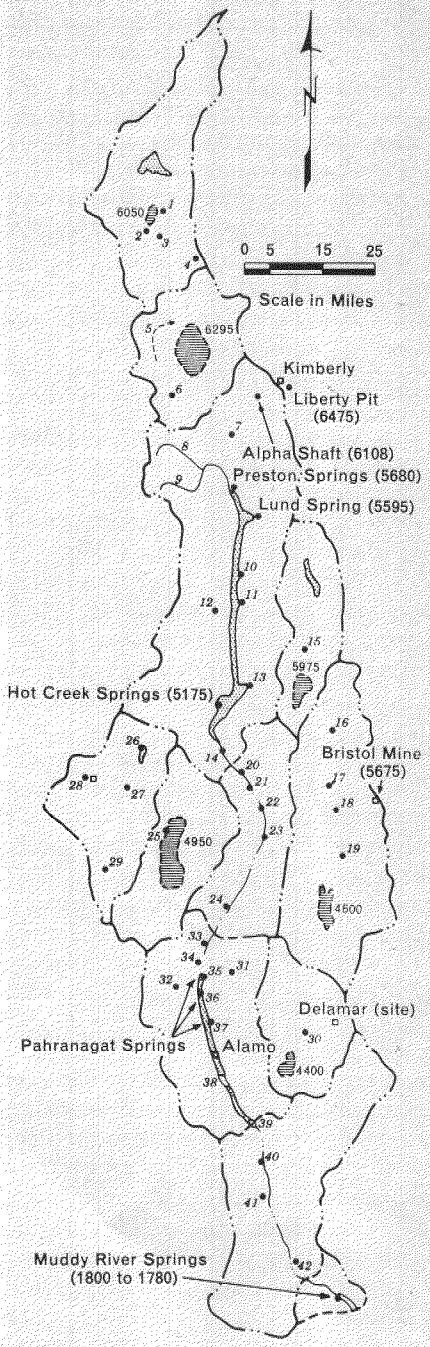


Fig. 4. Location points of selected data in the area of this report.

Stokes [1960, Figure 2] near Currie, Nevada, and near Wah Wah, Utah, about 70 miles north and 90 miles southeast of Ely, respectively. *Nolan et al.* [1956, pp. 68–70] described the nonmarine Newark Canyon Formation of Early Cretaceous age, which occurs in the vicinity of Eureka, Nevada, 70 miles west of Ely. To the southeast in northwest Arizona and adjacent

areas, substantial sections of Mesozoic rocks occur. *Stokes* [1960, p. 121] indicates that southeastern Nevada was generally above sea level for most of Mesozoic time. At least in late Mesozoic time, parts of the area were being eroded and had exterior drainage.

Nonmarine sedimentary rocks of Eocene age in and adjacent to the White River Valley have been described by *Winfrey* [1960], who named them the Sheep Pass Formation. Their aggregate thickness is 3220 feet. As tentatively outlined [*Winfrey,* 1960, Figure 3], the basin in which they were deposited extended from about T5N to T11N in the southern White River Valley and from Cave Valley on the east to beyond the White Pine Mountains on the west. Contemporaneous deposits have not been described elsewhere in the region, although the Horse Spring Formation of Eocene (?) age in the Muddy Mountains, south of Coyote Spring Valley, may be equivalent in age [*Winfrey,* 1960, p. 133].

During middle Tertiary time an extensive and thick section of volcanic rocks was laid down in eastern Nevada. *Cook* [1960, Figure 1] indicates that an extensive ignimbrite province included much of the area of this report. To some extent nonmarine sediments, such as the lacustrine limestone and cobble conglomerate in the Pahroc Range reported by *Tschanz* [1960, p. 204], are interbedded locally with the volcanic rocks. The thickness of the volcanic rocks varies substantially from place to place, but *Dolgoff* [1963, p. 878] estimates a thickness of over 3000 feet for the volcanic sequence in the Pahranagat area.

Continental deposits overlie the Tertiary volcanic rocks in the present valleys. Commonly these are fine grained lacustrine or playa deposits that grade laterally to coarser fractions toward the source areas in the mountains. The Muddy Creek Formation of Pliocene (?) age [*Longwell,* 1928, pp. 90–96] is partly exhumed in Moapa Valley. *Longwell* [1928, p. 94] suggested that a thickness of 1700 feet for the Muddy Creek Formation was not excessive in the central part of the basin. Somewhat similar fine grained deposits are exposed along parts of the White River Channel. Their maximum thickness is not known. In White River Valley the County Line oil test (point 10, Figure 4) penetrated 1475 feet of 'valley fill' as reported by *McJannett and Clark* [1960*a,* p. 245], who infer that part of this valley fill is of Pliocene (?) age. Obviously, as the deposits were laid down in basins or valleys, the thickness should be variable, ranging from a feather edge at the margins to a substantial thickness in the central parts of the valleys.

Quaternary deposits include gravel, sand, silt, and clay laid down in stream-channel, alluvial-fan, and playa environments. White River, when it was a through-flowing stream in late Pleistocene time, probably removed more material than it deposited in the lower parts of the valleys in which it flowed. The depth and extent of dissection are greatest in the southern or downstream valleys.

Most of the mining districts have areas of exposed intrusive rocks, and *Bauer et al.* [1960, p. 223] discuss some of the intrusive rocks in the Robinson Mining District west of Ely. *Adair and Stringham* [1960, Figure 1] show the location of five intrusive igneous bodies or dike groups adjacent to the White River Valley. Two areas are in the White Pine Mountains, and three areas are in the Egan Range.

The rocks have been faulted, fractured, and displaced in a complex way and in varying degrees within the region during several periods of structural activity.

Occurrence of groundwater. For the purposes of this report the several stratigraphic units discussed briefly in the previous section can be grouped broadly on the basis of apparent gross hydraulic properties.

Three groups are shown on Figure 3. The relative hydraulic properties are noted in the explanation. Not shown are Precambrian and intrusive rocks that have negligible fracture permeability. These rocks probably provide a lower limit to groundwater circulation, not otherwise limited, at depth. Where these rocks are exposed and are continuous with depth, they also should form a barrier to the lateral movement of groundwater.

Fracture and solution openings in the Paleozoic carbonate rocks locally store and transmit substantial quantities of groundwater. The great thickness of Paleozoic carbonate rocks in this region tends to favor a regional hydraulic continuity, even though the Paleozoic rocks have been subjected to several periods of substantial faulting.

The occurrence of groundwater in carbonate rocks is demonstrated by the widespread distribution of many large springs associated with Paleozoic carbonate rocks throughout eastern Nevada. For example, most of the flow of Crystal Springs in Pahranagat Valley (Figure 4) issues in the bottom of pools and adjacent seeps from valley fill. However, part of the flow of Crystal Springs issues directly from carbonate rocks, which are exposed and also underlie the adjacent valley fill. The other principal springs, such as Ash and Hiko springs in Pahranagat Valley, the large springs in upper Moapa Valley, and Hot Creek, Mormon, and Lund springs in White River Valley, issue from points at or near contacts with carbonate rocks and valley fill.

Groundwater occurs in carbonate rocks at depth, as in the Deep Ruth, Kelinske, and Starpointer shafts in the Robinson Mining District (L. Green and M. Dale, oral communication, 1964). These shafts are about 1 mile east of Liberty pit, shown on Figure 4. Groundwater also occurs in carbonate rocks in the Bristol Mine in the Bristol Range (Paul Gemmill, private communication, 1964). Fresh water was reported [*McJannett and Clark*, 1960*b*, p. 249] in 'cavernous zones' of the Joana Limestone (Lower Mississippian) at depths of 4058 to 4097 feet below land surface in the Hayden Creek oil test (data point 6, Figure 4). This interval is roughly 3000 feet lower than the floor of Jakes Valley, which is about 5 miles northeast of the test well.

The clastic rocks included in the Paleozoic group in Figure 3 tend to act as barriers to groundwater movement compared with carbonate rocks. However, fractured clastic rocks do store and transmit some groundwater at least locally, as in the Pioche district.

The older Tertiary sedimentary rocks, such as the Sheep Pass Formation of *Winfrey* [1960], are generally consolidated and are believed to have little primary permeability. Locally they are faulted, which may provide secondary fractures through which some water may be transmitted to springs, such as in T11N, R62E in the Egan Range where that formation is exposed. Where such rocks underlie the valley floor and are saturated, they may contain a considerable volume of groundwater in storage, even though the average permeability is small.

The Tertiary volcanic rocks generally have low permeability. These rocks ordinarily are rather fine grained, and the extent to which they may transmit groundwater is possibly controlled by the degree to which closely spaced fractures occur in them. Where these rocks are welded or more or less glassy, fractures may be somewhat open and locally transmit groundwater freely. A well north of Lathrop Wells in southern Nevada is known to be capable of producing several hundred gallons of water per minute from the welded tuff (Winograd, private communication, 1963). Commonly, however, semiperched groundwater in fracture systems in the Tertiary volcanic rocks supplies the water for numerous small springs in the mountains, such as those in the southern Butte Mountains, in the Quinn Canyon Range along the west side of Garden Valley, and in the Delamar Range along the northwest side of Kane Spring Valley. Where these rocks are beneath the valleys and are saturated, substantial quantities of groundwater may be stored in them. The extent to which they may transmit groundwater is rather a function of the cross-sectional area through which the water may move and the hydraulic gradient than of the unit permeability, which generally is very low.

The partly consolidated or cemented fine-grained valley fill of Pliocene(?) and Pleistocene age generally yields water slowly. However, Coyote Spring in Coyote Spring Valley yields a modest supply of water, at one time nearly half a cubic foot per second, from a combined development of a tunnel and several wells in fine-grained valley-fill deposits. Brownie Spring in Pahranagat Valley yields about 1 cubic foot per second from a tunnel in consolidated conglomerate. Where saturated, the fine-grain valley fill is capable of storing large quantities of water. The unconsolidated sand and gravel deposits of the younger valley fill and in alluvial fans are capable of transmitting water freely. The sand and gravel deposits of the younger valley fill commonly have the highest unit permeability of any unconsolidated deposits in the region. The large-capacity irrigation wells in the White River, Pahranagat, and upper Moapa valleys are developed in these deposits.

Groundwater movement. The hydraulic gradients between springs and selected wells, and, more generally, the regional topographic

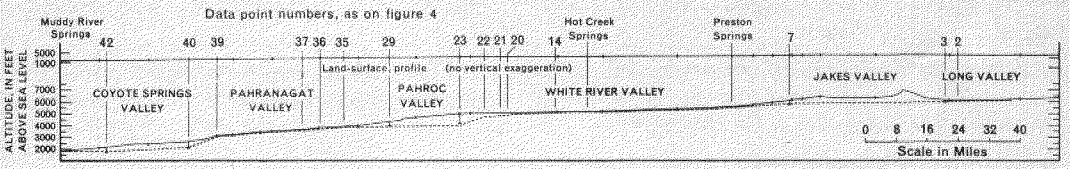


Fig. 5. Diagrammatic profile showing relation of water level to land surface along longitudinal axis of the area.

gradient, indicate the general direction of potential lateral groundwater movement in the regional system. Actual movement is dependent upon the hydraulic conductivity of the rocks.

The principal springs, which are the major points of discharge from the regional system, are in or adjacent to the White River Wash, and the altitudes of their orifices decrease southward. Thus, in White River Valley, Preston Big Spring issues at an altitude of 5680 feet above sea level and Hot Creek Springs, about 40 miles south, issues at an altitude of 5175 feet above sea level (Figure 4). In Pahranagat Valley from north to south, Hiko, Crystal, and Ash springs issue at altitudes of about 3890, 3805, and 3610 feet, respectively. In upper Moapa Valley, the closely grouped Muddy River Springs issue between altitudes of 1800 and 1780 ft.

Compared with the low parts of adjacent topographically closed valleys of the regional groundwater system, the White River Wash is generally considerably lower at equivalent latitudes (Figure 4). The playa of Cave Valley is about 5975 feet above sea level. Due west in White River Valley the Wash altitude is less than 5200 feet. In Coal Valley the playa is at an altitude of about 4950 feet, whereas due east the White River Wash altitude is about 4800 feet. In Dry Lake Valley the playa altitude is slightly less than 4600 feet. At the latitude of the central part of that playa, the White River Wash is about 440 feet. The Delamar Valley playa is about 4400 feet above sea level, and upper Pahranagat Lake due west is about 1000 feet lower.

In all the above valleys plus Garden Valley, which surficially drains to Coal Valley, water levels are several hundred feet or more below the respective playas. Representative known, reported, or inferred low water-level altitudes for Cave, Dry Lake, Delamar, Garden, and Coal valleys, respectively, are 5800, 4300, 3700 (?), 5020, and less than 4775 feet (points 15, 19, 30, 29, and 25 on Figure 4). The altitudes of these water levels are higher than known or inferred altitudes of water levels along White River Wash at or south of the equivalent latitudes. Most of these water levels are considered to represent semiperched groundwater in valley fill. As such, it is inferred that water levels in the carbonate rocks underlying the several wells would be at somewhat lower altitudes. Even so, the potential gradient and movement from the adjacent valleys apparently is toward the trough occupied by the White River Wash.

For Jakes and Long valleys, lying north of White River Valley, the valley floors are at altitudes of 6295 and 6050 feet, respectively, and are higher than White River Valley. The lowest known water-level altitude beneath the playa of Long Valley is about 6000 feet, and in Jakes Valley the water level is unknown but is estimated to be as much as 400 feet below the playa surface. A potential though low southward gradient through the carbonate rocks toward White River Valley apparently exists, as the altitude of the water level in a well (point 7, Figure 5) in northern White River Valley is about 5780 feet and at Preston Springs, about 12 miles farther south, is about 5680 feet.

Outcrops of Paleozoic carbonate rocks at or adjacent to most of the springs are at altitudes lower than other Paleozoic carbonate rocks at or north of the latitude of the respective outcrops within this region. For example, in White River Valley the carbonate-rock outcrops adjacent to Lund Spring (Figures 3 and 4) are at a lower altitude than other carbonate-rock outcrops at or north of that latitude in White River, Jakes, or Long valleys. The carbonate-rock outcrops from which Hot Creek Springs issue are also at lower altitudes than any others at or north of that latitude in White River, Jakes, Long, and Cave valleys.

Similarly, the Paleozoic carbonate rocks from which Crystal Springs issues in Pahranagat

Valley are at a lower altitude than other outcrops of carbonate rocks north of that latitude. This same relation applies to the Paleozoic carbonate rocks exposed adjacent to the Muddy River Springs. This repetitive association of large springs with areas of topographically low outcrops of Paleozoic carbonate rocks demonstrates their close association and supports the inference of the regional movement of groundwater.

The regional potential groundwater surface is not everywhere defined by a smooth surface. On the contrary, limited data suggest that the water surfaces have local hydraulic discontinuities resulting from barrier effects or from other causes.

The profile in Figure 5 shows the land-surface and water-level altitudes along the approximate longitudinal axis of the region. It follows the general alignment of the White River wash southward from the latitude of Preston Springs. The upper line of the profile shows land surface with the vertical and horizontal scales the same, to illustrate the small proportion of relief in the region as a whole. The lower profile shows the land surface and water levels at a vertical exaggeration 10 times the horizontal scale for the purpose of more readily showing the local divergence of water level from land surface. As can be seen from the lower profile, the water-level gradient is near and parallel to the land-surface gradient in the White River, Pahranagat, and upper Moapa valleys, the areas of principal spring discharge. Elsewhere, the gradient locally may be steeper than the land surface, as is indicated in the north end of Pahroc and Coyote Springs valleys, and in other sections the gradient is less than that of the land surface, as in the central and southern parts of Pahroc and Coyote Spring valleys.

At the north end of Pahroc Valley and the south end of White River Valley the depth to water in the valley fill along White River Wash in 4 wells (points 20, 21, 22, and 23, Figure 4) increases progressively from about 90, to 217, to 252, and to more than 800 feet below land surface. The land-surface gradient in this segment of the wash is about 14 feet per mile, and the distances between the wells are 3, 4.5, and 6 miles, respectively. Thus, the indicated water-level gradient between the upstream pair of wells (points 20 and 21) is about 56 feet per mile, between the middle pair of wells (points 21 and 22) is nearly 22 feet per mile, and between the downstream pair of wells (points 22 and 23) is over 100 feet per mile. Several miles northwest of the upstream well (point 20) the water-level gradient is parallel to and within about 10 feet of land surface. The steepening of the water-level gradient in the valley fill in this section of the White River Wash is inferred to reflect a relatively abrupt change of head in the groundwater in the underlying carbonate rocks. This change or difference in head may be associated with faulting in the carbonate rocks, which results in a barrier effect to the movment of groundwater across the fault, or with an increase in the relative capacity to transmit water in the Paleozoic carbonate rocks downstream from this section.

A somewhat similar discordance in altitude of water levels occurs in the valley fill southward from Maynard Lake (point 39, Figure 4). The reported depth to water in the well (point 40) in northern Coyote Spring Valley was 416 feet, or at an altitude of 2175 feet. The well is about 8 miles south of Maynard Lake. The indicated water-level gradient between Maynard Lake and the well is about 117 feet per mile. This gradient too is considered to reflect a relatively steep apparent water-level gradient of the groundwater in the underlying Paleozoic carbonate rocks in the vicinity of Maynard Lake gap. The most likely cause here is a barrier effect resulting from faulting in the vicinity of the Maynard Lake gap. *Tschanz and Pampeyan* [1961] show a prominent fault complex crossing White River Wash just south of Maynard Lake, which could provide the necessary local barrier effect to southward groundwater movement.

In central Pahroc Valley, the well (point 23) was dry at a depth of 800 feet, or at about an altitude of 4125 feet, as noted above; the altitude of Hiko Spring, 31 miles southwest along the Wash, is about 3890 feet. The indicated gradient is less than 8 feet per mile. However, the water-level altitude in the carbonate rocks is probably somewhat lower than in the overlying valley fill in the vicinity of the well. Thus, the inferred water-level gradient in the carbonate rocks between these two points may be even less than the above indicated gradient of 8 feet per mile.

In Coyote Spring Valley, the indicated hydraulic gradient between the two wells (points 40 and 42) is about 13.5 feet per mile. This lower gradient is in contrast with the steep gradient near the north end of the valley, as was also the case in Pahroc Valley. Between the southern well (point 42) and Muddy River Springs the difference in altitude of water level is about 75 feet in a distance of about 10 miles. The apparent gradient is about 7.5 feet per mile. Again the inference is that the water-level gradient in the underlying carbonate rocks is probably somewhat less than that in the valley fill for most of the length of the valley. The above information suggests that a general gradient in the carbonate rocks in this region may be less than 8 feet per mile. Thus, the relative altitudes of the principal springs, wells in key locations, and regional topography support the inference of regional groundwater gradient to the south.

Recharge of groundwater. Table 1 summarizes the estimates of recharge to and of discharge from the groundwater system. These estimates were derived mainly in the reports referred to in the table.

Precipitation provides the principal source of water for recharge to the regional groundwater system. The direct measurement of recharge is not feasible, nor perhaps even possible, over an area of any great size. However, the general relationships that potential recharge increases with increased precipitation and that precipitation generally increases with altitude have been used to make estimates of long-term average annual recharge. The average annual recharge to groundwater from precipitation in a valley has been estimated empirically for the reconnaissance investigations by a technique that seemingly produces reasonable estimates for most areas of Nevada. Briefly, precipitation zones indicated by *Hardman and Mason* [1949, p. 10] are taken to be approximately represented by altitude zones on the 1:250,000-scale topographic maps. The successively higher zones have higher average annual precipitation and accordingly are considered to have a higher percentage of the precipitation recharging the groundwater reservoir. The values generally assumed are shown in Table 2.

Obviously, recharge is not uniformly distributed either over the area or in time. However, average precipitation is greatest in the mountainous areas at altitudes of 7000 feet and higher. Much of the precipitation in the mountains occurs as snow, which accumulates during the winter and melts in the spring. This process is favorable for accomplishing recharge. In general, then, most of the recharge from precipitation is probably centered in and adjacent to the several principal mountain ranges.

The general relations of increased precipitation with altitude and the seasonal distribution of precipitation are shown by the average monthly and annual precipitation for Kimberly, Adaven, Alamo, and Overton (Table 3). Station locations are shown on Figure 1.

Winter precipitation usually results from general storms that originate in the north Pacific. Summer precipitation occurs as high-intensity showers resulting mainly from southeast storms and local convectional storms. This relationship results in a pattern in which most of the precipitation occurs during the winter half of the year but with a secondary summer maximum in July and August. The summer maximum tends to be more pronounced in the southern part of the region.

The distribution of water runoff from the mountains also permits some inferences of the distribution and manner of recharge to the groundwater system. For mountain areas of otherwise similar characteristics, proportionally large runoff suggests little recharge by deep infiltration in bedrock in the mountains, and small runoff suggests proportionally large recharge by deep infiltration in the bedrock. Also, substantial runoff from the mountains suggests that recharge by infiltration from streamflow on the valley fill may be significant.

Records are not available to demonstrate the magnitude and distribution of streamflow throughout this region, but a general description of the streamflow conditions provides illustrative support.

The present-day White River is a headwater remnant of the ancestral White River (Figures 1 and 4). The White River formerly was a throughflowing stream that surficially drained the White River, Pahroc, Pahranagat, Coyote Spring, Kane Spring, and upper Moapa valleys to the Colorado River. It was a prominent stream as late as late Pleistocene time. Probably, too, in extremely rare and most favorable con-

TABLE 1. Summary of Hydrologic Information Relative to the Regional Groundwater System

Valley or Area (1)	Area, mi² (2)	Estimated Average Annual Recharge from Precipitation, acre-ft (3)	Estimated Average Annual Discharge of Groundwater by Evapotranspiration, acre-ft (4)	Estimated Discharge from Principal Springs, acre-ft (5)	Probable Principal Means of Discharge U–Underflow Sp–Springs ET–Evapotranspiration (6)	Lowest Water Level: Location and Reported Depth below Land Surface, ft (7)	Lowest Water Level: Approximate Altitude Above Sea Level (8)	Lowest Water Level: Water in A–alluvium T–Tertiary Volcanics (9)	References (10)
Cave Valley	365	14,000	Few 100		U	8N/64–30c1 330	5,800	A(?)	*Eakin* [1962, pp. 2, 12, 13, 14]
Coal Valley	455	2,000	Minor		U	2N/59–22b1 250 (dry)	<4,750	A(?)	*Eakin* [1963*b*, pp. 14, 18, 19]
Coyote Spring and Kane Spring valleys	950	2,600	Few 100		U	13S/63–25a1 332	1,875	A(?)	*Eakin* [1964, pp. 20, 22, 25]
Delamar Valley	385	1,000	Minor		U	6S/63–12a1 900	3,700	A–T(?)	*Eakin* [1963*a*, pp. 13, 17, 18]
Dry Lake Valley	900	5,000	Minor		U	2N/64–3b1 664	4,350	A–T(?)	*Eakin* [1963*a*, pp. 13, 17, 18]
Garden Valley	490	10,000	2,000		U	1S/57–2a1 570	5,020	A–T(?)	*Eakin* [1963*b*, pp. 14, 18, 19]
Jakes Valley	430	17,000	Minor		U	...	?	...	Columns 2 and 3 computed in same manner as for other valleys. Value in column 3 is based on topographic maps now available and differs somewhat from value given by *Maxey and Eakin* [1949, p. 41]
Long Valley	650	10,000	2,200		U	21N/58–35b1	6,000	A	*Eakin* [1961, pp. 22, 23, 31, Fig. 2]
Upper Moapa Valley (Muddy River Springs)	75	Minor	2,300	*36,000	Sp, ET	River	1,660	A	*Eakin* [1964, pp. 4, 6, 22, 24]
Pahranagat Valley	790	1,800	25,000	†25,000	ET, Sp	Maynard Lake <5	3,115	A	*Eakin* [1963*c*, pp. 18, 20]
Pahroc Valley	510	2,200	Minor		U	2S/61–23d1 350	3,950	A–T(?)	*Eakin* [1963*c*, pp. 13, 19, 21, Fig. 3]
White River Valley	1,620	38,000	34,000	†37,000	ET, U	5N/60–25a1 25	5,100	A	*Mazey and Eakin* [1949, pp. 12, 41, 44]. Estimates in columns 3 and 5 differ slightly from Maxey and Eakin figures, owing to minor differences in computations.
Totals (rounded)	7,670	104,000	‡65,000	98,000					

* Average of about 33,700 acre-ft occurs as flow in Muddy River; remainder of about 2,300 acre-ft is consumed locally by evapotranspiration.
† Nearly all subsequently consumed by evapotranspiration within valley.
‡ Includes about 5,000 acre-ft of evapotranspiration of groundwater largely unrelated to major spring discharge.

TABLE 2. Assumed Values for Precipitation and Per Cent Recharge for Several Altitude Zones in Area of This Report

Precipitation Zone, in.	Altitude Zone, ft	Assumed Average Annual Precipitation, ft	Assumed Average Annual Recharge to Groundwater, % of average precipitation
Less than 8	below 6000	variable	negligible
8 to 12	6000 to 7000	0.83	3
12 to 15	7000 to 8000	1.12	7
15 to 20	8000 to 9000	1.46	15
More than 20	more than 9000	1.75	25

ditions, through streamflow may have occurred since Pleistocene time. The position of the ancestral White River is marked by a wash or trench along the topographical axis of the White River, Pahroc, Pahranagat, Coyote Spring, and upper Moapa valleys. The wash is incised from a few to several hundred feet below the adjacent valley surfaces. Perennial flow presently occurs only from the White Pine Mountains and downstream from the principal springs in the White River, Pahranagat, and Moapa valleys. The principal present-day flow occurs in the downstream part of the ancestral river. Here Muddy River flows from Muddy River Springs near the head of Moapa Valley through Moapa Valley to Lake Mead (Figure 1). Otherwise, flow occurs along limited sections of the wash only after high-intensity storms or very favorable snowmelt conditions.

The present-day White River and its principal tributary, Ellison Creek, drain a part of the east side of the White Pine Mountains. The White River flows from these mountains at a point about 5 miles northwest of Preston Springs. During periods of high flow or when evapotranspiration is at a minimum, the streamflow may extend to the south end of White River Valley, a distance of about 50 miles, in part sustained by flow from the several springs along the floor of the valley. However, during much of the year streamflow from the mountains is small and is dissipated by diversion for irrigation and evapotranspiration before it reaches the Nye County line. At times of minimum streamflow the channel may be dry only a short distance downstream from where the stream leaves the mountains. The streamflow reportedly [*Maxey and Eakin*, 1949, p. 15] has been as much as 75 cfs (cubic feet per second) during the spring freshet, although commonly the streamflow is about 2 cfs during the summer season in the vicinity of Preston. *Maxey and Eakin* [1949, Table 1] list a number of measurements on the White River, made during the period 1908–1943.

Most of the streams having sufficient flow to be utilized for irrigation head in the ranges bordering the west side of Jakes, White River, and Garden valleys. The streamflow is derived largely from the seasonal snow accumulation. Peak flow occurs with the spring runoff, and low flow is partly supplied from small mountain springs.

Throughout the area streamflow may occur for short periods after high-intensity storms, most of which probably occur during the sum-

TABLE 3. Average Monthly and Annual Precipitation for Adaven, Alamo, Kimberly, and Overton, Nevada, for Period of Record

Station	Period of Record	Altitude	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Adaven	1919–1962	6250	1.32	1.48	1.46	1.04	0.81	0.43	0.86	1.20	0.50	1.02	0.84	1.20	12.19
Alamo	1922–1960	3610	0.62	0.66	0.70	0.58	0.47	0.16	0.67	0.72	0.26	0.56	0.43	0.51	6.34
Kimberly	1931–1958	7230	1.55	1.50	1.55	1.32	1.32	0.66	0.90	0.83	0.68	0.89	0.84	1.51	13.30
Overton	1940–1962	1220	0.54	0.48	0.41	0.24	0.15	0.05	0.20	0.38	0.29	0.47	0.41	0.60	4.22

mer months. On the whole all streamflow is dissipated within the area by evaporation, transpiration, and recharge, except for minor amounts generated by high-intensity storms either in Coyote Spring or Kane Spring valleys, which occasionally results in runoff through Arrow Canyon into the Muddy River in upper Moapa Valley.

The nature of the bedrock in the mountains apparently affects the runoff in the area. Locally, the Paleozoic carbonate rocks, which transmit water readily, seemingly receive recharge from precipitation that otherwise would become runoff in the mountain canyons. Thus, Illipah Creek (point 5, Figure 4) seems to be smaller than one might expect from the altitude and area of its drainage basin. Perhaps a more surprising example is the near lack of perennial runoff into the valley for the well-watered Egan Range.

The distribution of present-day perennial and seasonal runoff is closely associated with the distribution of the higher mountain ranges and generally supports the concept that the greater average precipitation is associated with the higher mountain ranges.

Average annual runoff from the mountains of the region is estimated to be about 80,000 acre-feet, as computed by the altitude-runoff method described by *Riggs and Moore* [1965]. Of this amount, about 70% is estimated to be generated in the northern half of the region. Thus, the distribution of runoff indicates that the northern part of the area is relatively well watered. This indication in turn suggests that the potential for recharge from streamflow also is relatively favorable in the northern part of the region.

Discharge of groundwater. The principal natural discharge of groundwater is from the three groups of springs in the White River, Pahranagat, and upper Moapa valleys. The discharge of the springs in the White River and Pahranagat valleys subsequently is lost from those valleys, largely by evapotranspiration, including the water utilized for irrigation. In upper Moapa Valley most of the spring discharge leaves the valley as streamflow in the Muddy River. The combined average discharge of these three groups of springs is estimated to be about 98,000 acre-feet a year (Table 1). Additionally, discharge of groundwater by evapotranspiration in the other valleys, which is not associated with the principal springs, is estimated to be nearly 5000 acre-feet a year and largely occurs in Long, Garden, and Cave valleys.

The springs of the three groups generally are known to have relatively uniform flow. Some variation of flow undoubtedly occurs, but the occasional measurements of discharge made at most of the springs are not adequate to define minor variations. In White River Valley, the Preston Springs–principally Big, Arnoldson, Cold, and Nicholas–have been measured at regular weekly intervals sufficiently to demonstrate a relatively constant flow characteristic. Preston Big Spring (discharge about 8.5 cfs) has been measured at about weekly intervals during the periods March to August 1936, September to November 1948, April to November during 1949, 1950, and 1951, and from May to September 1952. Arnoldson Springs (discharge about 3.5 cfs) and Nicholas Springs (discharge about 3.0 cfs) have been measured at about weekly intervals from September 1948 to September 1952. These records indicate that the minimum discharge is only about 10% less than the maximum.

Arnoldson, Nicholas, and Cold springs also were measured at about weekly intervals from March to August 1936. These measurements also indicated nearly constant flow. During this period the flows of Arnoldson (3.8 cfs) and Nicholas (2.7 cfs) springs were somewhat different than the flows during the later period of measurement, apparently the result of changing the outlet level of one of the springs. However, the combined flow of the two springs for both periods was almost identical. These data suggest a highly uniform flow of the springs. The best record to indicate the long-term spring-flow characteristics, however, is the gaging record of the Muddy River near Moapa. The gaging station is within 2 miles of the Muddy River springs, which supply most of the flow of the Muddy River. With appropriate adjustments, that record can be used to represent the discharge of the springs.

The streamflow of the Muddy River, near Moapa, has been recorded for the periods July 1913 to September 1915, May 1916 to September 1918, June 1928 to October 1931, April to July 1932, and from October 1944 to the present. The streamflow record at this station

represents the actual discharge of the springs, except as follows: (1) streamflow at the station may be higher than spring discharge during periods of local runoff, particularly from high-intensity rains within the immediate drainage area; and (2) streamflow at the station is lower than spring discharge when water is diverted above the gaging station for irrigation, and when evapotranspiration between the station and the springs depletes the flow at the gaging station site.

A partial adjustment for the effect of overland runoff, during the period 1944–1962, was made by *Eakin* [1964, p. 23]. This adjustment resulted in a residual flow that, in effect, was entirely derived from spring discharge. The mean, median, and adjusted mean monthly and annual discharges for 25 complete water years of record through 1962 are given in Table 4.

Recently *Eakin and Moore* [1964] further analyzed the record of discharge of the Muddy River to evaluate the characteristics of the flow of the springs supplying the river. Corrections for evapotranspiration losses between the springs and gaging station virtually eliminated the seasonal variation shown by the month-to-month variations of mean streamflow at the gaging station. January characteristically is the month having the minimum average temperature and rate of evapotranspiration. Accordingly, the mean annual discharge of the springs supplying Muddy River is thus closely represented by the mean January discharge (49.8 cfs) recorded at the gaging station.

The analysis indicated a high degree of uniformity of spring discharge. The minimum annual mean discharge was about 90% of the maximum year. However, the small range in annual mean discharge apparently is significant in that the variations appear to be orderly and to occur, with considerable time lag, in response to variations in precipitation and consequent recharge. Both the high degree of uniformity of discharge and the small variations in annual mean discharge are compatible with the expected character of discharge from a regional groundwater system.

Relation of estimated groundwater recharge to discharge. The estimates of recharge to and discharge from the regional system shown in Table 1 agree closely for the region as a whole: the estimated recharge is 104,000 acre-feet a year, and the estimated discharge is 103,000 acre-feet a year. The estimates are considered reasonable and represent the magnitude of water naturally entering and leaving the regional system. The close agreement in the numerical values is considered to be coincidental rather than to indicate a high order of accuracy in the estimating techniques.

Although the regional estimates agree closely, there is wide divergence in the estimates for particular valleys. For example, in the White River and upper Moapa valleys the estimates of spring discharge are 37,000 and 36,000 acre-feet, respectively. The estimate of recharge (38,000 acre-feet) from precipitation within the surficial drainage area of White River Valley approximates the estimate for spring discharge, but the estimated recharge from precipitation in the local drainage area of upper Moapa Valley is negligible.

Figure 6 shows the distribution of the estimated recharge to and discharge from the regional groundwater system and a generalized representation of the regional flow system. From the figure it is seen that about 78% of the recharge is estimated to occur in the 4 northern valleys, and about 62% of the discharge is estimated to be from the springs in

TABLE 4. Monthly Discharge of Muddy River, near Moapa, for 25-year Period Ending September 30, 1962

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Year
25-year mean	46.1	48.7	49.5	49.8	49.7	48.1	46.8	45.0	43.2	43.4	44.2	44.4	46.5
25-year median	46.5	48.0	49.3	49.3	49.2	47.6	46.5	45.4	43.4	43.9	43.3	44.4	46.7
Mean adjusted for effect of local surface-water runoff	46.0	48.2	49.5	49.8	49.4	48.0	46.8	44.9	43.2	43.0	53.5	44.4	46.4

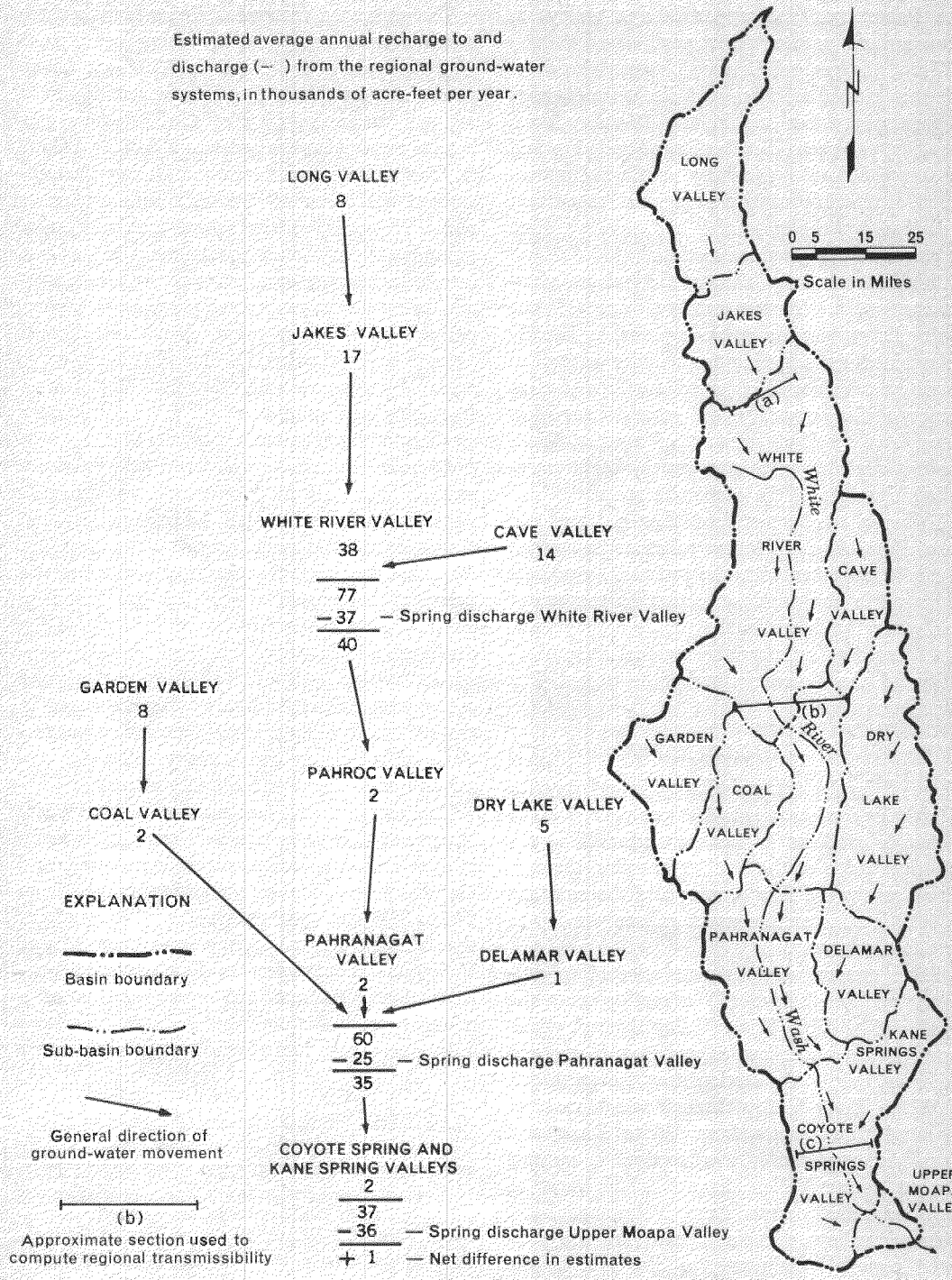


Fig. 6. Generalized flow pattern and estimated average annual recharge to and discharge from the regional groundwater system.

the Pahranagat and upper Moapa valleys in the southern part of the region.

Thus, the general balance between the overall estimates of recharge and discharge suggests a regional system within the 13-valley area. Further, the gross distribution of recharge and discharge infers a generally southward movement compatible with the regional movement indicated by the potential hydraulic gradient discussed in the previous section.

Regional transmissibility of the Paleozoic carbonate rocks. Transmissibility, one of the hydraulic properties of an aquifer, is usually determined by pumping tests under controlled conditions. Values so obtained are then used to compute the quantity of groundwater flow through a specified segment of aquifer. Wells are not available in this region to obtain transmissibility data of the carbonate rocks.

However, the generalized flow pattern and natural recharge-discharge relations shown on Figure 6, together with the hydraulic gradients discussed in the previous section on movement and generally shown in the profile on Figure 5, can be used to estimate the regional transmissibility of the Paleozoic carbonate rocks. The formula used is

$$T = Q/0.00112\,IW \qquad (1)$$

where T is the transmissibility in gal/day/ft; Q is the underflow in acre-feet per year; I is the hydraulic gradient in feet per mile; W is the effective width of the aquifer in miles, through which southward flow occurs; and the constant 0.00112 is a factor to convert gallons per day to acre-feet per year.

Three general sections were selected to estimate transmissibility: (1) a section near the north end of White River Valley through which most of the underflow occurs from Long and Jakes valleys; (2) a section near the south end of White River Valley through which most of the underflow occurs from White River and Cave valleys; and (3) a section in central Coyote Spring Valley through which most of the underflow occurs from Pahranagat and Delamar valleys. Gradients used are the indicated regional minimums, as discussed in the section on groundwater movement. Locally, actual gradients may be only a foot or two per mile or as much as several hundred feet per mile where controlled by barriers.

The estimated transmissibilities for the three sections were computed by using equation 1 and the values are listed in Table 5. These values suggest that a first approximation of the regional transmissibility of the Paleozoic carbonate rocks is on the order of 200,000 gal/day/ft. The value is not large considering the substantial thickness of the Paleozoic carbonate rocks. However, as the actual transmission of groundwater in the carbonate rocks is localized largely in fracture or solution zones, local transmissibility values undoubtedly are much higher, perhaps 10 times or more, than the indicated average regional value. On the other hand, large areas of carbonate rocks that have little or no fracturing and solution openings transmit very small amounts of water.

Chemical quality of water in the regional system. The chemical character of groundwater in part reflects an interaction between the water and the rocks through which it passes. Chemical analyses of water from several of the principal springs in the region are listed in Table 6. As these springs represent most of the discharge for the regional system, chemical constituents are a composite of the variations and concentrations that ordinarily may be found in the system. Locally, higher or lower concentrations of individual constituents and total dissolved constituents undoubtedly occur.

The water from the springs in the White River and Pahranagat valleys characteristically is a calcium-magnesium bicarbonate type, and the dissolved-solids concentration ranges from 246 to 343 ppm (parts per million). Water from the Muddy River Springs in upper Moapa Valley has about twice the dissolved-solids concentration (614 and 620 ppm) and is of a mixed type.

In a complex hydrologic system with many

TABLE 5. Three Estimates of Transmissibility in the Regional Groundwater System

Section	Underflow (Q) from Figure 2, acre-ft/yr	Estimated Effective Width (W), mi	Computed Gradient, ft/mi	Estimated Transmissibility, gpd/ft
(a)	25,000	15	6.4	230,000
(b)	40,000	25	8	180,000
(c)	35,000	15	8	260,000

TABLE 6. Chemical Analyses for Selected Springs in the Regional Groundwater System (in ppm)
(Analyses by U. S. Geological Survey)

*Springs	Date of Collection	Temperature, °F	SiO_2	Fe	Ca	Mg	Na	K	†HCO_3	SO_4	Cl	F	NO_3	B	Dissolved Solids (sum of determined constituents)	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific Conductance, μmhos at 25°C	pH
White River Valley																			
Preston Big	6-23-62	61	20	0.01	43	22	1	3.2	193	39	15	0.4	3.0	0.1	254	196	38	417	7.9
Lund	6-23-62	65	11	...	56	25	0.5	0.8	281	11	8.0	0.1	3.0	0.0	257	242	12	438	8.0
Lund	4-16-63	59	12	0.01	48	28	3.8	1.0	275	12	2.8	0.1	3.2	0.1	246	235	9	408	8.1
Butterfield	5-27-49	...	46	...	40	23	2.0	...	178	27	18	...	...	...	283	194	...	...	...
Hot Creek	6-23-62	88	28	...	60	22	29	5.3	288	45	8.9	1.0	0.4	0.0	342	238	2	540	8.0
Hot Creek	4-16-63	80	28	0.01	60	24	24	5.1	300	43	9.0	1.0	0.6	0.1	343	248	2	548	7.6
Pahranagat Valley																			
Hiko	3-10-62	80	33	...	44	23	29	7.2	260	36	11	0.5	1.2	0.1	313	206	0	494	8.0
Crystal	4-15-63	81	28	0.00	45	23	23	5.2	272	27	8.0	0.5	1.1	0.2	295	209	0	484	8.0
Ash	3- 9-62	88	31	...	39	18	32	6.8	231	34	9.7	0.5	1.2	0.1	286	172	0	443	8.1
Upper Moapa Valley																			
‡Warm	4-15-63	90	31	0.00	65	28	99	10	288	174	60	2.4	2.3	0.3	614	279	43	985	7.7
‡Iverson's	9-12-63	89	29	0.00	70	26	101	11	274	179	64	2.3	2.2	0.3	620	280	55	964	7.5
Muddy River gaging station near Moapa	3- 9-62	71	32	...	71	33	125	14	303	216	75	2.4	1.5	0.4	719	313	65	1,090	8.2

* CO_3 reported as 0 in all analyses except that for Butterfield Springs.
† See Figure 5 for location.
‡ Part of Muddy River Springs.

interrelated subsystems, the causes of many of the chemical variations of the groundwater naturally would be obscure. However, the analyses of water from springs in the White River Valley show a reasonable uniformity of composition for water that probably has been derived from nearby areas and has moved largely through carbonate rocks, but which includes some water that has moved partly in volcanic and sedimentary rocks. If the hypothesis of the regional system is approximately correct, most of the water supplying the springs in Pahranagat Valley should be derived from a considerable distance beyond the immediate surface drainage area; that is, several tens of miles at least. The concentration of water from these springs might remain relatively low if the water moved almost entirely in carbonate rocks. The analyses of water from Hiko, Crystal, and Ash springs shown in Table 6 are indeed low, ranging from 286 to 313 ppm of dissolved solids.

The dissolved-solids concentration of the water from two of the springs in upper Moapa Valley is about 2 times that of the other two groups of springs. Much of the increase is due to an increase in sodium, sulfate, and chloride ions. Calcium is moderately higher, but magnesium is nearly constant in the water from all the springs. This general increase in concentration is more or less to be expected for water issuing from a position in the regional system relatively removed from most areas of discharge. The moderate degree of concentration suggests that circulation in the regional system is comparatively active.

Boundaries of the regional groundwater system. In the preceding discussion the general boundary of the White River regional system has been represented as being approximately coincident with the outer topographic divides of the appropriate valleys. In basin and range hydrology, mountains usually are assumed to be hydraulic barriers. Ordinarily few data are available to demonstrate this assumption as a fact, but one or more of several factors provide the basis for this generally correct assumption. These factors include the following:

1. The consolidated bedrock forming the mountains is virtually impermeable. Secondary openings due to surficial fracturing or weathering, which rarely extend to depths of more than a few hundred feet, may transmit groundwater, but the lateral movement of water closely conforms to the general slope of the land surface.

2. The major structural trend commonly is about parallel to the principal topographic axis of the range. Ordinarily, faults and structural alignments tend to act as barriers to groundwater movement across or at right angles to them.

3. The mountains characteristically receive much greater average precipitation than do the adjacent valleys; greater precipitation provides a greater potential for recharge. If greater recharge occurs per unit area, other things being equal, a hydraulic high (or divide) will be maintained between the areas of lesser or no recharge.

4. Surface water divides are coincident with the topographic divides, which suggests that the groundwater divide is also aligned with the topographic divide.

The position of the hydraulic boundary of the regional groundwater system is indicated at only a few locations. For example, in the Egan Range, the water-level altitude in the well (point 7, Figure 4) 12 miles north of Preston Springs in White River Valley is about 5780 feet. Northeastward about 11 miles, the water-level altitude in the Alpha Shaft is reported to be 6108 feet [*Maxey and Eakin*, 1949, p. 41]. Eastward about half a mile, the water-level altitude in the Liberty Pit is maintained by pumping at an altitude of about 6475 feet. Drill holes on the east side of Liberty Pit are reported to have water-level altitudes ranging from about 6860 to 6960 feet. Groundwater in carbonate rocks was encountered in the nearby Deep Ruth and Kelinske shafts. About 2 miles east the water-level altitude in the Kimberly Pit is somewhat below 6600 feet, and adjacent altitudes in drill holes range from about 6618 to 6822 feet. The above-water-level information for the Robinson mining district area was reported by L. Green and M. Dale of the Kennecott Copper Company (private communication, 1964). About 3½ miles southeast of the Kimberly Pit, Murry Springs, which provide the municipal water supply for the City of Ely, issue at an altitude of about 6600 feet. Finally, several miles east in the floor of Steptoe Valley,

the water level is within a few feet of land surface, which is at an altitude of about 6375 feet. This mountain area is geologically and structurally complex, and water levels have been affected somewhat by mining operations. However, the generalized information indicates that a hydraulic divide is several hundred feet higher than the water level in either White River or Steptoe valleys and is within perhaps a mile of the topographic divide.

Limited water-level information also indicated the position of the hydraulic divide at the north end of the Bristol Range. The water-level altitude at a well (point 17, Figure 4) in Dry Lake Valley is about 4820 feet; about 8 miles east the water-level altitude in the Bristol Mine, as reported (oral communication, 1964) by Paul Gemmill (formerly of Combined Metals Reduction Company), is about 5675 feet. Still farther east in the next valley, about 4 miles northeast of Bristol Mine, the water-level altitude in a well is about 5610 [*Rush*, 1964, Table 15]. Groundwater in the Bristol Mine occurs in Paleozoic carbonate rocks, and, according to Gemmill, the level apparently fluctuates to some extent with variations in recharge. The groundwater encountered in the wells is in valley fill and may be under a higher head than in the underlying carbonate rocks. Nevertheless, the water-level altitude in the Bristol Mine indicates a hydraulic divide close to the topographic divide in the Bristol Range.

The Pahranagat and Sheep ranges form the west side of Pahranagat and Coyote Spring valleys, respectively. Recharge from precipitation in these mountains, although limited, probably maintains a hydraulic divide along the mountain alignment. Data on water levels in the Paleozoic carbonate rocks in these mountains are not available. However, the altitude of the water level in a well (point 32, Figure 4) in the valley fill is about 4025 feet, or about 220 feet higher than Crystal Springs, about 3½ miles to the east in Pahranagat Valley. This altitude suggests that the gradient of groundwater in the underlying carbonate rocks may also be generally from the Pahranagat Range toward the White River Wash to the east. Somewhat similarly, the semiperched groundwater supplying Coyote Springs in Coyote Spring Valley is considered to be derived from recharge in the Sheep Range to the west and moves through the older valley fill toward the White River Wash. As the recharge area is necessarily at a higher altitude than the spring area, it may be assumed to be at an altitude high enough to provide a hydraulic barrier in the carbonate rocks in the Sheep Range.

The Delamar Range and Meadow Valley Mountains form the east sides of Delamar and Kane Springs valleys. Some groundwater is perched in the Tertiary volcanic rocks and supplies several small springs in the Kane Spring Valley side of the Delamar Range. Near the townsite of Delamar (Figure 4), some water initially was developed at several small seepages from limestone and granite [*Carpenter*, 1915, p. 67] and was insufficient for the requirements. That these springs were derived from perched groundwater is suggested strongly by the fact that, according to Carpenter, the mine at Delamar was totally dry to a depth of 1400 feet. The altitude of the bottom of the mine is not known but apparently was of the order of 5300 feet. West of Delamar, in the lower part of Delamar Valley, the apparent water-level altitude may be below 3700 feet, based on reports that a well (point 30, Figure 4) was dry at a depth of 900 feet. East of Delamar, water levels in the floor of Meadow Valley Wash are at an altitude of about 3800 feet. The meager recharge in the Delamar Range and the presence of relatively impermeable Paleozoic clastic and Tertiary volcanic rocks are probably sufficient to maintain a hydraulic divide between Meadow Valley Wash and Delamar Valley, even though the divide may be much below the level of Delamar mine in that area.

More generally, on the basis of substantial recharge potential, it may be inferred that the Butte Mountains and Egan, Schell Creek, Bristol, and Highland ranges, which form the eastern boundaries of Long, Jakes, White River, Cave, and Dry Lake valleys, respectively, are probably aligned with the east side hydraulic boundaries of those valleys. Similarly, the Maverick Springs, Ruby, and the White Pine mountains and Grant and Quinn Canyon ranges are probably aligned with the west side hydraulic boundaries of Long, Jakes, White River, and Garden valleys.

Some sections of these east- and west-side groups of mountains, such as the Antelope Mountains and Horse Range, are relatively low,

and precipitation and resultant groundwater recharge alone may be insufficient to maintain a hydraulic divide in these sections. The effectiveness of these divides cannot be determined at this time. However, the prominent structural trends parallel to these ranges probably act as barriers or partial barriers to groundwater movement across those alignments. Provisionally, then, it is assumed that the principal structural trends are sufficient to maintain hydraulic divides in these mountains.

Very little recharge occurs in the low Meadow Valley Mountains. The degree of influence of these mountains on groundwater movement in the carbonate rocks in this area is not known but might very well be almost negligible. Groundwater in the carbonate rocks occurs at higher altitudes, both in the region of this report and northeastward in the Meadow Valley area. However, in the Meadow Valley area the estimates of recharge from precipitation and discharge by evapotranspiration are in relative agreement [*Rush*, 1964, pp. 20–24]. This agreement suggests that if the Meadow Valley area contributes groundwater that ultimately discharges from the Muddy River Springs, then the quantity is only a small proportion of the total discharge of the springs.

In contrast, the combined estimated recharge from precipitation in the area considered to be supplying this regional groundwater system is in reasonable agreement with estimates of discharge from the springs only if the Muddy River Springs are included with those in Pahranagat and White River valleys. For the present, then, information favors the theory that most of the water supplying Muddy River Springs is derived from within the boundaries of the regional groundwater system as described in this report.

CLOSING STATEMENT

The regional interbasin groundwater system here described reasonably explains several otherwise anomalous occurrences of large natural spring discharge in 'dry' areas and of very deep water levels in valleys where at least limited natural discharge of groundwater by evapotranspiration ordinarily would be expected. The identification of this regional system is provisional in that it is based largely on indirect methods and limited data. However, the gross nature of the regional system is considered to be valid.

Other regional or multivalley groundwater systems potentially may occur elsewhere in the Basin and Range province, especially within the principal area of carbonate deposition in Paleozoic time, which is the area sometimes referred to as the Paleozoic miogeosynclinal area in eastern and southern Nevada, parts of western Utah, and possibly in southern Idaho.

West of the area of this report, intensive studies are being completed on interbasin movement in Paleozoic carbonate rocks in and adjacent to the Nevada Test Site by the Geological Survey. Further, additional data are being obtained relating to the location and extent of regional groundwater systems, in conjunction with the regular investigations under the cooperative program of the Geological Survey in Nevada.

Acknowledgments. Critical reviews and comments by my colleagues G. F. Worts, Jr., J. L. Poole, S. E. Rantz, and S. F. Kaputska and others have materially contributed to the development of this paper.

This paper is a product of the reconnaissance project conducted as a part of the general program of water-resources investigations in Nevada by the U. S. Geological Survey, in cooperation with the Nevada Department of Conservation and Natural Resources.

REFERENCES

Adair, D. H., B. Stringham, Intrusive igneous rocks of east-central Nevada, in *Guidebook to the Geology of East-Central Nevada,* pp. 229–231, Intermountain Association of Petroleum Geologists, 1960.

Bauer, H. L., Jr., J. J. Cooper, and R. A. Breitrick, Porphyry copper deposits in the Robinson Mining District, White Pine County, Nevada, in *Guidebook to the Geology of East-Central Nevada,* pp. 220–228, Intermountain Association of Petroleum Geologists, 1960.

Boettcher, J. W., and W. W. Sloan, Jr., editors, *Guidebook to the Geology of East-Central Nevada,* 278 pp., Intermountain Association of Petroleum Geologists, 1960.

Bowyer, G., E. H. Pampeyan, and C. R. Longwell, Geologic map of Clark County, Nevada, *U. S. Geol. Surv. Mineral Inv. Field Studies Map MF-138,* 1958.

Carpenter, Everett, Groundwater in southeastern Nevada, *U. S. Geol. Surv. Water-Supply Paper 365,* 86 pp., 1915.

Cook, E. F., Great Basin ignimbrites, in *Guide-*

book to the Geology of East-Central Nevada, pp. 134–141, Intermountain Association of Petroleum Geologists, 1960.

Dolgoff, Abraham, Volcanic stratigraphy of the Pahranagat area, Lincoln County, southeastern Nevada, *Bull. Geol. Soc. Am., 74*(7), 875–900, 1963.

Eakin, Thomas E., Groundwater appraisal of Long Valley, White Pine and Elko Counties, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 3,* 35 pp. 1961.

Eakin, Thomas E., Groundwater appraisal of Cave Valley in Lincoln and White Pine Counties, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 13,* 19 pp., 1962.

Eakin, Thomas E., Groundwater appraisal of Dry Lake and Delamar valleys, Lincoln County, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 16,* 26 pp., 1963*a*

Eakin, Thomas E., Groundwater appraisal of Garden and Coal valleys, Lincoln and Nye counties, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 18,* 29 pp., 1963*b*.

Eakin, Thomas E., Groundwater appraisal of Pahranagat and Pahroc Valleys, Lincoln County, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 21,* 36 pp., 1963*c*.

Eakin, Thomas E., Groundwater appraisal of Coyote Spring and Kane Spring valleys and Muddy River Springs area, Lincoln and Clark counties, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 25,* 40 pp., 1964.

Eakin, T. E., and D. O. Moore, Uniformity of discharge of Muddy River Springs, in *Geological Survey Research 1964, U. S. Geol. Surv. Prof. Paper 501-D,* pp. D171–D176, 1964.

Hardman, George, and Howard G. Mason, Irrigated lands in Nevada, *Univ. Nevada Agr. Expt. Sta., Bull. 183,* 1949.

Kellog, Harold E., Paleozoic stratigraphy of the southern Egan Range, Nevada, *Bull. Geol. Soc. Am., 74*(6), 685–708, 1963.

Longwell, C. R., Geology of the Muddy Mountains, Nevada, *U. S. Geol. Surv., Bull. 798,* 1928.

Maxey, G. B., and T. E. Eakin, Groundwater in White River Valley, White Pine, Nye, and Lincoln counties, Nevada, *Nevada State Engr. Water Resources Bull. 8,* 59 pp., 1949.

McJannett, G. S., and E. W. Clark, County Line structure, Nye and White Pine counties, Nevada, in *Guidebook to the Geology of East-Central Nevada,* pp. 245–247, Intermountain Association of Petroleum Geologists, 1960*a*.

McJannett, G. S., and E. W. Clark, Drilling of the Meridian, Hayden Creek, and Summit Springs structures, in *Guidebook to the Geology of East-Central Nevada,* pp. 248–250, Intermountain Association of Petroleum Geologists, 1960*b*.

Nolan, Thomas B., C. W. Merriam, and J. S. Williams, The stratigraphic section in the vicinity of Eureka, Nevada, *U. S. Geol. Surv. Prof. Paper 276,* 71 pp., 1956.

Riggs, H. C., and D. O. Moore, A method of estimating mean runoff from ungaged basins in mountainous regions, in *Geological Survey Research 1965, U. S. Geol. Surv. Prof. Paper 525-D,* 1965.

Rush, F. E., Groundwater appraisal of Meadow Valley wash area, Lincoln County, Nevada, *Nevada Dept. Conserv. Nat. Resources, Ground-Water Resources–Reconnaissance Ser. Rept. 27,* 43 pp., 1964.

Stokes, W. L., Inferred Mesozoic history of east-central Nevada and vicinity, in *Guidebook to the Geology of East-Central Nevada,* pp. 117–121, Intermountain Association of Petroleum Geologists, 1960.

Tschanz, C. M., Geology of northern Lincoln County, Nev., in *Guidebook to the Geology of East-Central Nevada,* pp. 198–208, Intermountain Association of Petroleum Geologists, 1960.

Tschanz, C. M., and E. H. Pampeyan, Preliminary geologic map of Lincoln County, Nevada, *U. S. Geol. Surv. Mineral Inv. Field Studies Map MF-206,* 1961.

Winfrey, Walter M., Jr., Stratigraphy, correlation, and oil potential of the Sheep Pass Formation, east-central Nevada, in *Guidebook to the Geology of East-Central Nevada,* pp. 126–133, Intermountain Association of Petroleum Geologists, 1960.

Young, J. C., Structure and stratigraphy in north-central Schell Creek Range, in *Guidebook to the Geology of East-Central Nevada,* pp. 158–172, Intermountain Association of Petroleum Geologists, 1960.

(Manuscript received November 9, 1965.)

SETTLEMENT AGREEMENT AMONG THE STATE ENGINEER, STATE OF NEVADA, TRACY TAYLOR, P.E., NEVADA STATE ENGINEER, JASON KING, P.E., ACTING NEVADA STATE ENGINEER, LINCOLN COUNTY WATER DISTRICT AND VIDLER WATER COMPANY

Lincoln County Water District (the "District"), Vidler Water Company ("Vidler"), the State Engineer, State of Nevada, Tracy Taylor, P.E., Nevada State Engineer, and Jason King, P.E., Acting Nevada State Engineer, (collectively, the "State Engineer") enter into the following Settlement Agreement and Mutual Release ("Agreement") this 1st of April, 2010. The parties shall be referred to individually as "Party" and collectively as "Parties."

RECITALS

1. On December 11, 1998, the District and Vidler filed Application 64692 to appropriate 7,240 acre feet of groundwater in the Tule Desert Hydrographic Basin.

2. On December 11, 1998, the District and Vidler filed Application 64693 to appropriate 7, 240 acre feet of groundwater in Tule Desert Hydrographic Basin. On November 8, 2000, the District and Vidler filed Change Application 66932 to change the point of diversion and place of use requested under Application 64693.

3. On November 26, 2002, the State Engineer issued Ruling 5181 granting Application 66932 in the amount of 2,100 acre feet per year.

4. Ruling 5181 also allowed the District and Lincoln to perform additional work to determine if additional water was available for appropriation in the Tule Desert Hydrographic Basin under Application 64692.

5. After the District and Vidler performed the work provided for under Ruling 5181, the State Engineer issued Ruling 5986 granting Application 64692 in the amount of 396 acre feet per year.

6. On May 27, 2009, the District and Vidler appealed Ruling 5986 to the Seventh Judicial District Court of the State of Nevada, in and for the County of Lincoln in Case No. CV-0518009 entitled *Lincoln County Water District and Vidler Water Company v. State Engineer, State of Nevada.*

7. On July 21, 2009, the District and Vidler sued State Engineer Tracy Taylor and Acting State Engineer King in the United States District Court for the District of Nevada in Case No. CV00392-LRH-VPC entitled *Lincoln County Water District and Vidler Water Company v. Tracy Taylor, P.E. and Jason King, P.E.*

8. In order to avoid the expense and uncertainty of litigation the Parties desire to settle the two lawsuits on the terms and conditions set forth below.

AGREEMENT

In consideration of the mutual promises, duties, and agreements set forth below, the Parties agree as follows:

I. Conditional Grant of 7,240 Acre-Feet of Groundwater Per Year to the Lincoln County Water District and Vidler Water Company in the Tule Desert Hydrographic Basin Under N.R.S. § 533.3705 with 2,900 Acre-Feet Per Year Immediately Available for Use and the Remainder Subject to Staged Development.

A. There are two projects supported by the water rights developed from the Tule Desert that have been identified under Lincoln County's Water Master Plan: the development of 13,000 acres under the Lincoln County Land Act and the development of the Toquop Energy Park. The District and Vidler estimate the total water demand for these projects at build out to range from 15,000 acre feet per year to 16,000 acre feet per year. The State Engineer granted 2,100 acre feet per year to the District and Vidler under Permit 66932. The water rights granted under Permit 66932 have been conveyed to owner-developers for dedication under the Lincoln County Land Act.

B. The State Engineer shall grant Application 64692 in the amount of 7,240 acre feet annually. The total combined duty of Permits 64692 and 66932 shall not exceed 9,340 acre-feet annually. However, the State Engineer finds, in order to gather the necessary information to more accurately determine the additional water available to appropriate under N.R.S. § 533.370, development of water will occur in stages in conjunction with the updated June 2005 Monitoring Plan approved by the State Engineer.

1. The initial use of water under Permit 64692 is limited to 2,900 acre-feet annually (a total of 5,000 acre-feet annually including Permit 66932).
2. The Applicant shall calibrate to actual field conditions the Tule Desert Groundwater Flow Model developed by Peter Mock Groundwater Consulting, Inc., which calibration may be peer reviewed by the third party Reviewing Consultant (as described below) at the cost of the District and Vidler.
3. The District and Vidler shall continue to collect hydrologic data throughout Tule Desert using the existing metering and data collection equipment at the locations they currently maintain and submit such data at least annually to the State Engineer.
4. The State Engineer, the District, and Vidler shall meet annually to review the data submitted by the District and Vidler. The third party Reviewing Consultant (as described below) shall participate in these meetings. The State Engineer shall apply the provisions of Section III of this Settlement Agreement in setting criteria and in determining whether to authorize the use of additional water under Permit 64692 and in identifying necessary studies.

5. The District and Vidler shall implement a staged pumping development program that shall consist of a minimum of eight consecutive years (the "Staged Development Period"). During this Stage Development Period, pumping must average at least 2,500 acre feet annually, and in no year shall pumping be less than 2,000 acre feet annually.

6. Annually after the initial calibration and every year thereafter during the Staged Development Period, the District and Vidler shall submit the updated groundwater flow model with the data obtained during the Staged Development Period and provide predictive results for 10 years, 25 years, 100 years, and 500 years.

7. The District and Vidler may at any time seek the use of additional water up to the full amount under Permit 64692 to the extent that the additional studies and evidence demonstrate to the satisfaction of the State Engineer that additional water is available for appropriation under N.R.S. § 533.370.

8. At any time, the State Engineer may at his discretion authorize the use of all or a portion of the remaining quantity of water permitted under Application 64692 to the extent that the additional studies and evidence demonstrate to the satisfaction of the State Engineer that such additional water is available for appropriation and use pursuant to N.R.S. § 533.370. If, prior to the completion of the Staged Development Period described above, the State Engineer refuses a request from the District and Vidler to pump additional water, such refusal by the State Engineer shall not be considered an appealable order or decision under N.R.S. § 533.370.

9. The District, Vidler, and the State Engineer agree that Daniel B. Stephens and Peter Mock shall serve as the Study Consultants (as described below) for Application 64692.

II. **Monitoring and Reporting**.

The District and Vidler shall submit a revised Monitoring Plan, updating the June 2005 Monitoring Plan approved by the State Engineer in the matter of Permit 66932, to include pumping under Permit 64692.

III. **Studies Under N.R.S. § 533.368 and the Use of Third Party Technical Consultants**.

A. Nevada Revised Statute § 533.368 provides that if the State Engineer determines that a hydrological study, an environmental study, or any other study is necessary before he makes a final determination on an application pursuant to N.R.S. § 533.370 and the applicant, a governmental agency or other person has not conducted such a study or the required study is not available, the State Engineer shall advise the applicant of the need for the study and the type of study required. The required study must be conducted by the State Engineer or a person designated by him, the applicant, or a consultant approved by the State Engineer, as determined by the State Engineer. The applicant is to bear the cost of study. The State Engineer is to consult with the applicant and the governing body of the county in which the point of diversion and place of use is located concerning the scope and progress of the study.

B. The following steps will be followed for all current and future applications to appropriate groundwater in hydrographic basins located wholly or partially within the boundaries of Lincoln County, filed by the District and Vidler, either individually or jointly, unless it is necessary for the State Engineer to deny the applications pursuant

to N.R.S. § 533.370(1) and (6). This provision shall stay in effect for five (5) years from the date of the settlement, but may be renewed by agreement of the State Engineer, the District, and Vidler.

1. The State Engineer shall require the District and/or Vidler to perform a hydrological study to address the water resources of the particular hydrographic basin unless otherwise agreed to by the State Engineer, the District and Vidler. The District and Vidler may select the consultant ("Study Consultant") to perform the hydrologic study.

2. As set forth in NRS § 533.368(4)(a), the State Engineer shall consult with the District and Vidler concerning the scope and progress of the study and to determine the criteria necessary to adequately evaluate the applications. In addition to those required by Nevada law, the State Engineer shall set forth in writing as part of the criteria, any other procedures, policies, or methodologies that will be used to determine the amount of groundwater that is appropriable in the basins in which the applications are filed. This consultation will include the Reviewing Consultant discussed below. Additional meetings may be held as necessary among the State Engineer, the Reviewing Consultant, the District and Vidler concerning the scope and progress of the study. If during the course of study the State Engineer finds that additional studies, criteria, or scientific information are required to determine the amount of groundwater that is appropriable in the basins in which the applications are filed, the State Engineer shall identify the additional studies, criteria, or scientific information necessary and inform the District and/or Vidler. The District and/or Vidler

shall then develop studies and reports relating to the identified criteria. The State Engineer will agree to a reasonable extension of time to complete approved studies that are in progress. Once all reasonable extensions of time have elapsed, if the District and Vidler have not performed and submitted the required hydrologic study, the State Engineer may move forward under the provisions of N.R.S. § 533.368 with any study the State Engineer considers necessary for consideration of pending applications in the relevant hydrographic basins.

3. The State Engineer shall use an independent third party Reviewing Consultant selected by the State Engineer and paid for by the District and/or Vidler as set forth in N.R.S. § 533.368(3) to review and analyze the study or studies submitted to the State Engineer by the District and/or Vidler. The State Engineer shall advise the applicant of his selection and the applicant may indicate concerns relative to the qualifications and experience of the selected Reviewing Consultant, in writing to the State Engineer. The Reviewing Consultant shall serve as an advisor to the State Engineer on a hydrologic study prior to taking action on any application filed by the District and/or Vidler. The Reviewing Consultant may subcontract with other technical consultants to provide expertise in a given discipline after consulting with and approval by the State Engineer. If the State Engineer determines that an independent third party technical consultant is not needed, this provision to appoint a Reviewing Consultant can be waived by agreement of the Parties.

4. After a hydrologic study is completed and submitted to the State Engineer, the Reviewing Consultant shall evaluate the study and provide a report to the State Engineer regarding the study. The report shall be made part of the public records of the Nevada Division of Water Resources and shall be served by the applicant on any protestant to the particular applications. The District and/or Vidler and any protestant may comment on the Reviewing Consultant's report within 30 days after the date the report is filed in the Nevada Division of Water Resources. Under N.R.S. § 533.365(3), the State Engineer shall determine whether an administrative hearing is required or may require the filing of additional information as necessary for a full understanding of the matter before him. If a hearing is held, the Reviewing Consultant shall attend the hearing. The State Engineer shall consult with the Reviewing Consultant prior to issuing a ruling on the applications.

5. The State Engineer shall make the determination of the amount of water to be appropriated under each application taking into account the criteria established in Section III (B)(2), above, the report of the Reviewing Consultant, the comments filed with the State Engineer, and the criteria established in the Nevada Revised Statutes. The final determination of the water available for appropriation is the sole authority of the State Engineer.

IV. **Kane Springs Hydrographic Basin**.

Applications 74147 through 74150 for appropriations in the Kane Springs Hydrographic Basin filed by the District and Vidler will be returned to application status in the same priority as the applications had under the original filing in the records of the Nevada Division of Water Resources

under a separate settlement agreement that follows the same general format as found in Section III of this Agreement.

V. **Ratification by Lincoln County Water District and Authority**.

A. The Parties recognize that this Agreement needs ratification by Lincoln County Water District's Board of Trustees.

B. The representatives of the Parties executing this Agreement represent and warrant that they are authorized to enter into this Agreement.

VI. **Dismissal of Actions**.

Upon full execution of the Agreements containing the terms herein and ratification by the Lincoln County Water District Board of Trustees, the State Engineer, the District, and Vidler shall stipulate to dismiss the state district court appeal of State Engineer's Ruling No. 5986, more specifically identified as *Lincoln County Water District and Vidler Water Company v. State Engineer, State of Nevada*, Case No. CV-0518009, filed in the Seventh Judicial District Court in and for the State of Nevada, and the federal lawsuit, more specifically identified as *Lincoln County Water District and Vidler Water Company v. Tracy Taylor, P.E. and Jason King, P.E.*, Case No. CV00392-LRH-VPC filed in the United States District Court in and for the District of Nevada, with each Party to bear its or his own costs and attorneys fees.

VII. **Extensions of Time**.

This Agreement shall not affect or limit the State Engineer's discretion in considering any applications for extensions of time for the filing of proof of completion of work, proofs of beneficial use, or to avoid a forfeiture. Any requests for extension of time shall be addressed under controlling provisions of law.

VIII. No Precedential Effect.

The State Engineer enters into this Agreement because of the unique factual circumstances surrounding this case. Aside from the rights and responsibilities established in this Agreement, the Agreement has no precedential effect in any proceeding involving these Parties or any other parties and may not be relied upon as evidence of policy or practices of the State Engineer; provided, however, that the provisions of Section III may be relied upon and control the processing of applications as set forth in the provisions of Section III. This Agreement does not limit the State Engineer's authority or discretion as it relates to consideration of any application to appropriate water, application for extension of time, or any application to change the manner of use, place of use, point of diversion, or means of diversion of any water right.

IX. Mutual Release.

Other than claims arising from rights and obligations set forth in this Agreement, each of the Parties, for and in consideration of the mutual promises, duties, agreements, and consideration set forth in this Agreement, release, acquit, and forever discharge the other Parties, their agents, employees, officers, directors, representatives, affiliate, successors, and assigns, of and from any and all claims, liabilities, demands, and causes of action, known or unknown, asserted or unasserted, which they had or may now have as a result of or arising out of or by reason of the facts and circumstances surrounding the claims and allegations filed in Case No. CV-0518009 entitled *Lincoln County Water District and Vidler Water Company v. State Engineer, State of Nevada* and in Case No. CV00392-LRH-VPC entitled *Lincoln County Water District and Vidler Water Company v. Tracy Taylor, P.E. and Jason King, P.E.*

X. **No Admission of Liability.**

The Parties agree and acknowledge that this is a compromise of disputed claims and that the agreements shall not be construed as an admission of liability on the part of any Party; the Parties expressly deny any liability relating to the claims asserted.

XI. **Entire Agreement.**

This Agreement contains the entire agreement among the Parties, and the terms of the Agreement are contracted and not mere recitals. No provision of the Agreement may be modified except in writing signed by all Parties hereto.

XII. **Successors and Assigns.**

This Agreement, and the rights and obligations contained herein, shall inure to the benefit and burden of and shall be binding on the grantees, successors, and assigns of the Parties to this Agreement.

XIII. **Governing Law.**

This Agreement will be governed by and in accordance with the laws of the State of Nevada. Any rule requiring construction or interpretation against the drafter of the document is waived and this Agreement has been and is deemed drafted by all Parties in a mutual effort.

XIV. **Agreement Freely Entered into by the Parties.**

Each Party represents and warrants that each has freely entered into this Agreement without fraud, duress, or any undue influence. Each Party represents and warrants that no promise or inducement has been offered except as set forth herein; that this Agreement is executed without reliance upon any statement or representation except as contained herein; and that the terms and conditions of this Agreement are fair and reasonable. Each Party represents and warrants that it or he was represented by competent counsel and was advised regarding the risks, duties, and obligations set forth in this Agreement.

XV. **Facsimile and Photocopies.**

Facsimiles and photocopies of this Agreement shall be considered originals for all purposes, including, but in no way limited to, any court proceedings.

XVI. **Signed Counterparts.**

This Agreement may be executed in any number of counterparts, each of which together shall be deemed to be an original, and all of which together shall be deemed to be one and the same instrument. The signatures required for execution may be transmitted by facsimile or e-mail, and such signatures shall be deemed duplicate originals, shall be effective upon receipt, may be admitted in evidence, and shall fully bind the Parties and persons making such signatures.

THE STATE ENGINEER, STATE OF NEVADA

By: Jason King, P.E.,
Acting State Engineer

Dated: 4/15/10

TRACY TAYLOR, P.E., NEVADA STATE ENGINEER

By: Tracy Taylor, P.E.,
Nevada State Engineer

Dated: 4/15/10

JASON KING, P.E., ACTING STATE ENGINEER

By: Jason King, P.E.,
Acting State Engineer

Dated: 4/15/10

LINCOLN COUNTY WATER DISTRICT

By: Wade Poulsen, Lincoln
County Water District Manager

Dated: 4/15/2010

VIDLER WATER COMPANY

By: Dorothy Timian-Palmer, P.E.,
President and Chief Operating Officer

Dated: 4/16/2010

Approved and Consented to as to form:

RYLEY CARLOCK & APPLEWHITE

By: _____
John C. Lemaster, Esq.
Jenny J. Winkler, Esq.
Sean T. Hood, Esq.

Dated: _____

ALLISON, MacKENZIE, PAVLAKIS, WRIGHT & FAGAN, LTD.

By: _____
Karen A. Peterson, Esq.

Dated: April 16, 2010

Attorneys for Vidler Water Company, Inc.

DYLAN V. FREHNER, ESQ.

By: _____
Dylan V. Frehner, Esq.

Dated: _____

Attorney for Lincoln County Water District

LINCOLN COUNTY WATER DISTRICT

By: Wade Poulsen, Lincoln
County Water District Manager

Dated: _____

VIDLER WATER COMPANY

By: Dorothy Timian-Palmer, P.E.,
President and Chief Operating Officer

Dated: _____

Approved and Consented to as to form:

RYLEY CARLOCK & APPLEWHITE

By: J. J. Winkler
John C. Lemaster, Esq.
Jenny J. Winkler, Esq.
Sean T. Hood, Esq.

Dated: 4/16/10

ALLISON, MacKENZIE, PAVLAKIS, WRIGHT & FAGAN, LTD.

By: _____
Karen A. Peterson, Esq.

Dated: _____

Attorneys for Vidler Water Company, Inc.

DYLAN V. FREHNER, ESQ.

By: _____
Dylan V. Frehner, Esq.

Dated: _____

Attorney for Lincoln County Water District

LINCOLN COUNTY WATER DISTRICT

By: Wade Poulsen, Lincoln
County Water District Manager

Dated: _____

VIDLER WATER COMPANY

By: Dorothy Timian-Palmer, P.E.,
President and Chief Operating Officer

Dated: _____

Approved and Consented to as to form:

RYLEY CARLOCK & APPLEWHITE

By: _____
John C. Lemaster, Esq.
Jenny J. Winkler, Esq.
Sean T. Hood, Esq.

Dated: _____

ALLISON, MacKENZIE, PAVLAKIS, WRIGHT & FAGAN, LTD.

By: _____
Karen A. Peterson, Esq.

Attorneys for Vidler Water Company, Inc.

Dated: _____

DYLAN V. FREHNER, ESQ.

By: _____
Dylan V. Frehner, Esq.

Attorney for Lincoln County Water District

Dated: 4/15/10

NEVADA ATTORNEY GENERAL'S OFFICE

By: _____ Dated: 15 APR 2010
Bryan L. Stockton, Esq.
Michael L. Wolz, Esq.

Attorneys for the State Engineer, State of Nevada, Tracy Taylor, P.E., Nevada State Engineer, and Jason King, P.E., Acting State Engineer

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.

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.

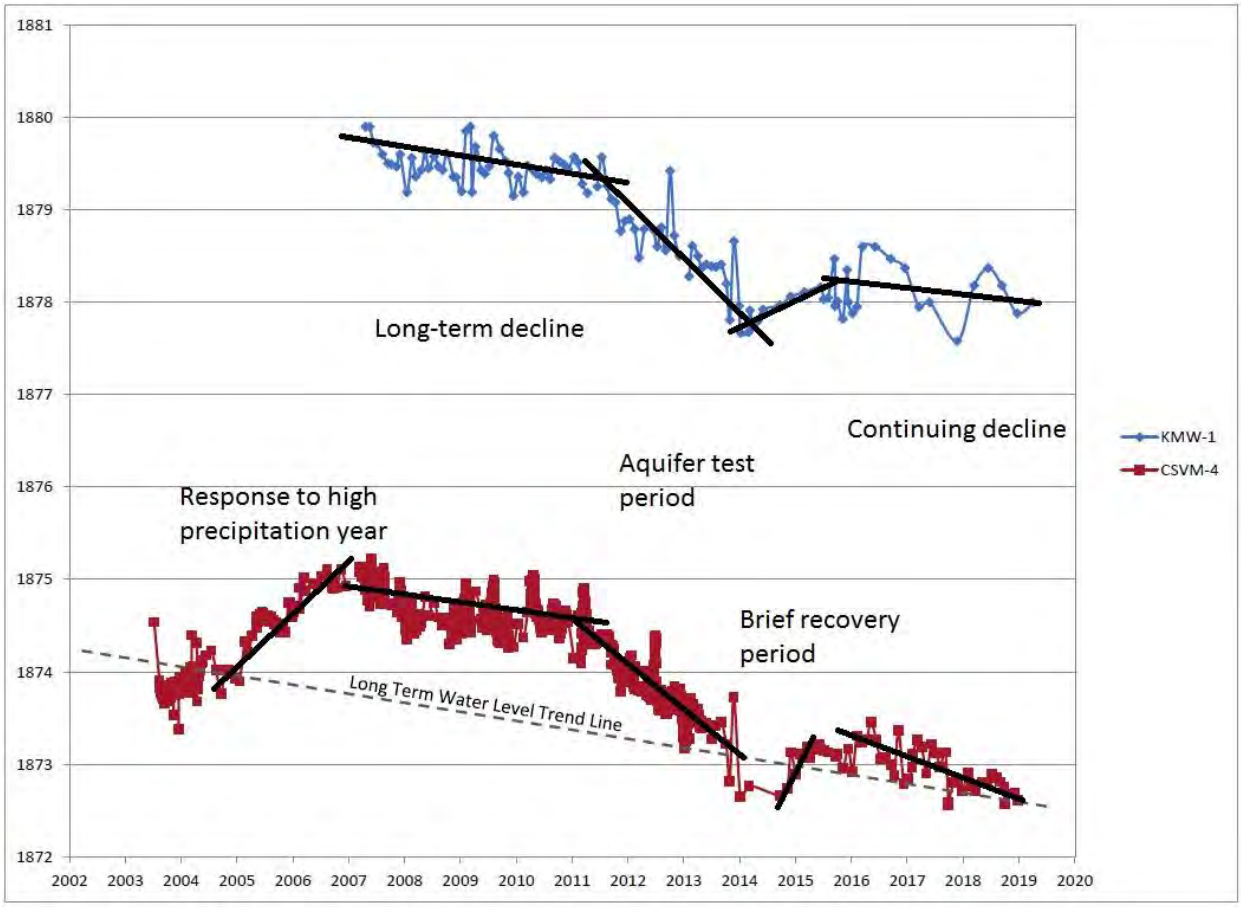


FIGURE 3-9. COMBINED HYDROGRAPHS OF WELLS KMW-1 AND CSVM-4

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.

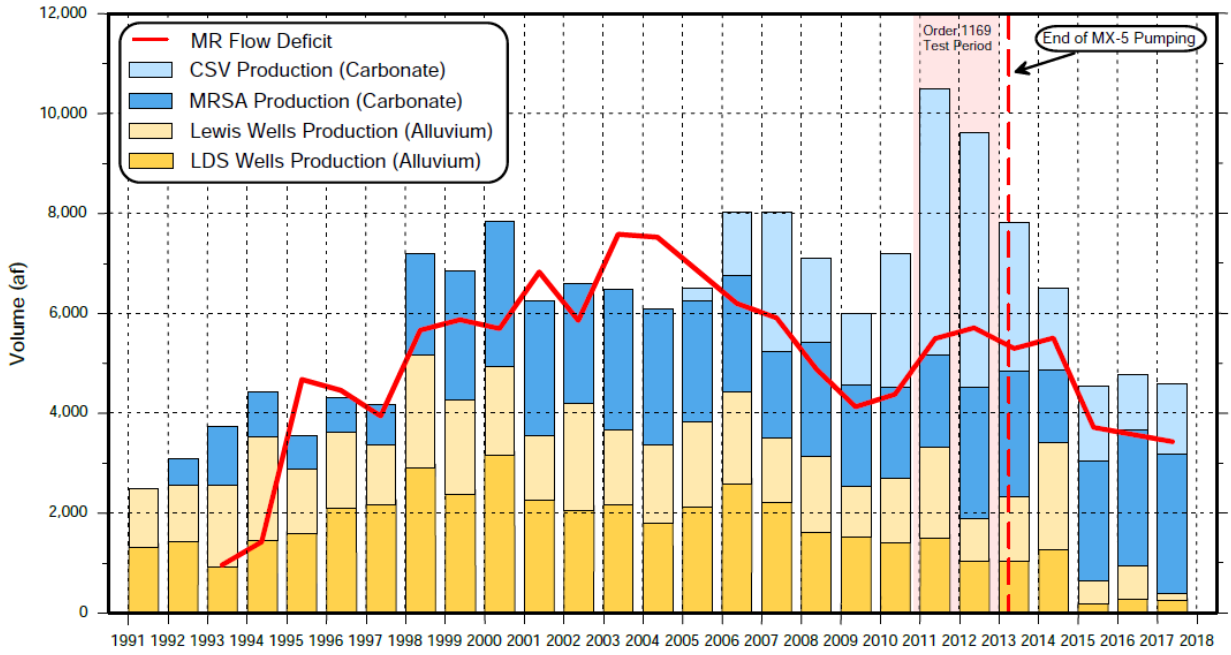


Figure 7: Muddy River (MR) flow deficit and CSV and MRSA groundwater production. Source: Lincoln County et al (2019) Figure 5-1.

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

AMENDED STIPULATION FOR WITHDRAWAL OF PROTESTS

This Amended Stipulation is made and entered into between the Lincoln County Water District and Vidler Water Company, Inc. ("LCWD&VWC") and the United States Department of the Interior, Fish and Wildlife Service (FWS). Collectively, LCWD&VWC and the FWS are referred to as the "Parties".

RECITALS

A. On February 14, 2005, LCWD&VWC filed Applications 72278, 72219, 72220, and 72221, for a combined maximum duty of approximately 17,375.28 acre-feet per year (afy), with the Nevada State Engineer's Office. The above listed applications shall hereinafter be referred as the "Applications". LCWD&VWC initially intend to pump up to 5,000 afy of groundwater from the Kane Springs Valley Hydrographic Basin (hereinafter referred to as "Kane Springs Valley") pursuant to these Applications, for municipal and domestic uses associated with the Coyote Springs Project in Lincoln County.

B. The FWS filed timely protests to the granting of water rights under the Applications pursuant to the FWS' responsibilities under 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"). The Moapa dace (Moapa coviacea) is an endemic fish that inhabits the upper Muddy River and tributary thermal spring systems within the Muddy River Springs/Warm Springs Area in Clark County, Nevada. The Moapa dace was federally listed as endangered on March 11, 1967 (32 FR4001). FWS manages the Moapa Valley National Wildlife Refuge established in 1979 as part of the National Wildlife Refuge System.

C. LCWD&VWC assert that the withdrawal of up to 5,000 afy of groundwater from the proposed wells in Kane Springs Valley will not have an unreasonable adverse affect on endangered species in the Coyote Springs Valley or the Muddy River Springs/Warm Springs Area. LCWD&VWC propose to request the State Engineer hold in abeyance the remaining amount requested in the Applications, until a determination is made from the monitoring of the initial groundwater withdrawal that there are no unreasonable adverse affects due to LCWD&VWC's groundwater pumping.

D. The FWS together with the United States National Park Service sent a letter to the Nevada State Engineer, dated February 6, 2006, recommending that the State Engineer amend his Order 1169 to include Kane Springs Valley and these Applications. This Stipulation is entered into in part to address the FWS's concern expressed in the February 6, 2006 letter. As such, the FWS will withdraw its request to the State Engineer by so stating on the record at the beginning of the hearing when the Stipulation is presented to the State Engineer as provided in paragraph 6 of the Stipulation.

E. The FWS asserts that the proposed groundwater withdrawals from Kane Springs Valley pose a risk of adversely impacting senior federal water rights and water-related resources, as described above, and are desirous of working in a cooperative manner with LCWD&VWC to protect these resources.

F. There are a number of existing monitoring programs required by the State Engineer for existing rights and pending applications within Coyote Spring Valley Hydrographic Basin. The State Engineer has determined in Order No. 1169 (Order) that further hydrological study is needed before a final determination can be made on pending applications and new filings to appropriate water from the carbonate-rock aquifer system in Coyote Spring Valley (Basin 210), Black Mountains Area (Basin 215), Garnet Valley (Basin 216), Hidden Valley (Basin 217), Muddy River Springs (Basin 219) and Lower Moapa Valley (Basin 220) in Lincoln and Clark Counties, Nevada. While the Order does not currently include Kane Springs Valley or the Applications, the FWS and LCWD&VWC agree there is a need to develop data relating to a better understanding and analysis to assist the State Engineer in studying the impacts from the pumping of groundwater in the regional aquifer system.

G. The Parties acknowledge that Nevada Water Law provides pursuant to NRS 534.110(4) that "It is a condition of each appropriation of ground water acquired under this chapter [534] that the right of the appropriator relates to a specific quantity of water and that the right must allow for a reasonable lowering of the static water level at the appropriator's point of diversion." Further, pursuant to NRS 534.110(5), Nevada Water Law "does not prevent the granting of permits to applicants later in time on the ground that the diversions under the proposed later appropriations may cause the water level to be lowered at the point of diversion of a prior appropriator, so long as the rights of holders of existing appropriations can be satisfied under such express conditions." It is the intent of the Parties that this Stipulation provides the initial "express conditions" to allow the development of the LCWD&VWC Applications to proceed, however, such future conditions may be different based on implementation of the monitoring, management and mitigation plan specified in Exhibit A, attached to this Stipulation and made a part hereof.

H. The State Engineer has set an administrative hearing on the protests of the FWS and other protestants commencing April 4, 2006.

I. The Parties acknowledge that White Pine County, Wayne, Ruby and Bevan Lister, and the United States National Park Service have lodged protests to the Applications, but that those entities are not Parties to or in any way bound or prejudiced by this Stipulation. Further, these protestants may enter into stipulations with LCWD&VWC concerning the LCWD&VWC Applications. Such stipulations shall not require the participation of the FWS nor modify in anyway the intent or content of this Stipulation, nor shall the FWS be bound or prejudiced by such stipulations.

J. The Parties agree that the preferred conceptual approach for protecting senior federal water rights from injury and federal water-related resources from unreasonable adverse impacts from ground water pumping is through the use of monitoring, management and mitigation of groundwater pumping. The common goal of the Parties is to manage the development of the regional carbonate-rock aquifer and overlying basin-fill aquifer systems as a water resource without causing any injury to senior federal water rights and/or unreasonable adverse impacts to federal water-related resources. Groundwater and the effects of pumping need to be properly monitored and managed to avoid adverse impacts to the water rights and water resources of the FWS. To accomplish this goal, there is a need to obtain accurate and reliable information of the aquifer's response to pumping stresses and the impact of that pumping on water rights and resources of interest. This is to be accomplished by implementing the monitoring, management and mitigation plan as set forth in Exhibit A to this Stipulation. The Parties have determined that it is in their best interests to cooperate in the collection of additional hydrologic and hydrogeologic information as set forth in Exhibit A to this Stipulation.

K. The Parties desire to resolve the issues raised by the protests according to the terms and conditions contained herein.

L. On April 10, 2006, LCWD & VWC filed application nos. 74147, 74148, 74149, and 74150 to appropriate underground water in Kane Springs Valley Hydrographic Basin (subsequent applications). Each of these subsequent filings are identical in quantity (in cfs and acre-feet per year) and point of diversion to the water right applications which are the subject of the Stipulation (application nos. 72218, 72219, 72220, and 72221). LCWD & VWD filing of the subsequent applications was precautionary in nature, and was made to protect Lincoln County Water District and Vidler Water Company's standing in the Kane Springs Hydrographic Basin in the event that applications 72218, 72219, 72220, or 72221 are denied by the State Engineer on a technical or administrative ground. The filing of the subsequent applications raises the same concerns by the FWS as stated in Recital E above. In lieu of filing protests to the subsequent applications, the parties agree that the subsequent applications shall be subject to the terms and conditions of this Amended Stipulation and do not in any way supplement applications 72218, 72219, 72220, and 72221, which are currently under consideration by the State Engineer.

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

1. The FWS hereby expressly agrees to withdraw its protests to the Applications and agrees that the Nevada State Engineer may rule on the Applications based upon the terms and conditions set forth herein. The FWS agrees not to file protests to the subsequent applications based on the inclusion of the subsequent applications in this Amended Stipulation (hereinafter referred to as "Stipulation") and that the terms and condition of this Stipulation apply equally to the subsequent applications. Hereinafter in this Stipulation, the term "Applications" shall also refer to the subsequent applications. It is expressly understood that this Stipulation is binding only upon the Parties hereto and their successors, transferees and assigns, and shall not bind or seek to bind or prejudice

any other Parties or protestants, including the United States as trustee on behalf of the any Indian tribe. The execution and filing of this Stipulation with the State Engineer shall have the effect of withdrawing the FWS protests as provided for in Nevada Administrative Code § 533.150.

2. The Parties agree to implement the Monitoring, Management and Mitigation plan, attached hereto "Exhibit A", which is expressly incorporated into this Stipulation as if set forth in full herein upon the State Engineer's granting of the Applications, in total or in part, and upon the terms and conditions contained in Exhibit A.

3. This Stipulation does not waive any authorities of the FWS or the United States, including any other agency or bureau not specified in this Stipulation, nor relieves LCWD&VWC, or any party acting in conjunction with or through LCWD&VWC from complying with any federal laws, including, but not limited to, the National Environmental Policy Act, the Endangered Species Act, the Federal Land Policy and Management Act, and any and all rules and regulations thereunder. It is the expressed intention of the Parties that by entering into this Stipulation, the FWS and the United States are waiving no legal rights of any kind, except for the withdrawal of its protests as provided in Paragraph 1 of this Stipulation. Likewise, LCWD&VWC, or any party acting in conjunction with or through LCWD&VWC, by entering into this Stipulation, are not waiving any legal rights of any kind, except as expressly provided in this Stipulation and its Exhibit A.

4. Further, except as expressly stated in this Stipulation or its Exhibit A, this Stipulation does not affect any legal or administrative process or proceeding concerning rights-of-way or any action that may be necessary to further the development and/or use of the water sought under the Applications.

5. The Parties expressly acknowledge that the Nevada State Engineer has, pursuant to both statutory and case law, broad authority to administer groundwater resources in the State of Nevada and, furthermore, that nothing contained in this Stipulation shall be construed as waiving or in any manner diminishing such authority.

6. The Parties agree that a copy of this Stipulation shall be submitted to the Nevada State Engineer prior to the commencement of the administrative proceedings scheduled to begin on April 4, 2006. The Parties shall request on the record at the beginning of the scheduled proceeding, that the State Engineer include Exhibit A of the Stipulation as part of the permit terms and conditions, in the event that he grants Applications 72278, 72219, 72220, and 72221, in total or in part. The FWS, at its option, may attend the hearing, but will present no issues or statements unless necessary to explain or defend this Stipulation or Exhibit A.

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

If to FWS:

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

If to LCWD&VWC:
Chairman
Lincoln County Water District
P.O. Box 685
Pioche, NV 89043

And:
Dorothy Timian-Palmer
Vidler Water Company, Inc.
704 W. Nye Lane, Suite 201
Carson City, NV 89703

8. LCWD&VWC may transfer or assign its interest in the water rights here involved. Any and all transferees and assignees shall be bound by the terms and conditions of this Stipulation. As a condition to any such transfer or assignment, the transferee and/or assignee shall execute a stipulation expressly stating it is bound to all of the terms and conditions of this Stipulation.

9. This Stipulation shall be governed in accordance with the laws of the State of Nevada to the extent not inconsistent with federal law.

10. Copies of all correspondence between and data gathered by the Parties pertinent to the terms of Exhibit A shall be submitted to the Nevada State Engineer. It is the intentions of the Parties hereto that the Nevada State Engineer shall be kept informed of all activities in the same fashion as are the Parties hereto.

11. By entering into this Stipulation, the FWS does not become a party to any proceeding other than the protest proceeding referenced above or waive its immunity from suit or consent to or acknowledge the jurisdiction of any court or tribunal. Nothing in the Stipulation shall affect any federal reserved water rights of the FWS or the United States on behalf of any Indian Tribe and the FWS by entering into this Stipulation do not waive or prejudice any such rights. The FWS reserves all legal rights, of any kind, it possesses pursuant to or derived from Executive Orders, acts of Congress, judicial decisions, or regulations promulgated pursuant thereto. Neither party waives its rights to seek relief in any appropriate forum of its choice not expressly prohibited by this Stipulation.

12. Any commitment of funding by the FWS or Lincoln County Water District in this Stipulation or otherwise is subject to appropriations by Congress or the governing body of the Lincoln County Water District as appropriate.

13. This Stipulation may be amended by mutual agreement of the Parties.

14. This Stipulation sets forth the entire agreement of the Parties and supercedes all prior discussions, negotiations, understandings or agreements. No alteration of variation of this Stipulation shall be valid or binding unless contained in an amendment in accordance with paragraph 13.

15. This Stipulation is entered into for the purpose of resolving a disputed claim. The Parties agree that the Stipulation shall not be offered as evidence or treated as an admission regarding any matter herein and may not be used in proceedings on any other application or protest whatsoever, except that the Stipulation may be used in any future proceeding to interpret and/or enforce the terms of this Stipulation. Further, the Parties agree that neither the Stipulation nor any of its terms shall be used to establish precedent with respect to any other application or protest in any water rights adjudication or water rights permitting proceeding before the Nevada State Engineer or any other proceeding.

16. The terms and conditions of this Stipulation shall be binding upon and inure to the benefit of the Parties hereto and their respective, successors, transferees and assigns.

17. This Stipulation will become effective as between the Parties upon all Parties signing this Stipulation. The Parties may execute this Stipulation 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.

18. Other entities may become Parties to this Stipulation by mutual assent of the Parties.

19. Nothing contained herein shall limit the right of LCWD & VWC, or their successors, transferees, or assigns to assign, pledge, or encumber as security the Applications that are the subject of this Stipulation.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the dates written below.

UNITED STATES DEPARTMENT OF THE INTERIOR

Date: 8/1/2006

Fish and Wildlife Service

By Steve Thompson

Title: CNO MANAGER

Date: 7-17-06

LINCOLN COUNTY WATER DISTRICT

By Rena Hornbeck

Title: Chairwoman

Date: 7-19-06

VIDLER WATER COMPANY, INC.

By

Title: Chief Operating Officer

ATTEST:

Lead Legal Counsel

EXHIBIT A
for
Amended Stipulation between LCWD&VWC and the United States Fish and Wildlife Service

MONITORING, MANAGEMENT AND MITIGATION PLAN GROUNDWATER DEVELOPMENT IN KANE SPRINGS VALLEY

The purpose of this plan is to describe the agreements of Lincoln County Water District and Vidler Water Company, Inc. (LCWD&VWC) and the United States Fish and Wildlife Service (FWS) regarding the monitoring, management, and mitigation of potential impacts due to development of ground-water resources in the Kane Springs Valley area. This plan applies to proposed ground-water development in Kane Springs Valley that consists of the use of water under State of Nevada water-rights applications numbered 72218, 72219, 72220 and 72221 and the subsequent applications 74147, 74148, 74149, and 74150, filed by LCWD&VWC.

The Plan describes the LCWD&VWC and FWS (hereinafter referred to as "the parties") obligations regarding the development, monitoring, management, and mitigation related to the above numbered applications in Kane Springs Valley Hydrographic Basin for use that water in Coyote Spring Valley Hydrographic Basin.

This plan consists of four principle components, as follows:

1. *Monitoring Requirements,* related to production wells, monitoring wells, elevation control, and springflow, water quality, quality of data, and reporting;
2. *Management Requirements,* related to the creation and role of a Technical Review Team (hereinafter referred to as "the TRT"), the development and use of a numerical ground-water flow model, the establishment of action criteria, and the details of the decision-making process;
3. *Mitigation Requirements;* and
4. *Modification of the Plan.*

The common goal of the parties is to manage the development of the LCWD&VWC Water Rights in their entirety from Kane Springs Valley Hydrographic Basin, without resulting in any losses to senior federal water rights or unreasonable adverse impacts to federal water resources. The parties will collaborate on technical data collection and analysis and will rely on the best scientific information available in making decisions required by the Plan.

1. Monitoring Requirements

A. Production Wells

- LCWD&VWC will record discharge and water levels in their production wells in Kane Springs Valley on a continuous basis as is feasible.

B. Monitoring Wells

LCWD&VWC, as determined by the parties to this agreement, in consultation with the Nevada State

Engineer, shall locate and construct two monitoring wells down gradient from the Kane Springs Valley ground-water production well (KMW-1). The location of the first proposed monitoring well (CSIMW-1) is to be an equal distance between the existing Southern Nevada Water Authority Monitoring Well Four (CSVM-4) and the Coyote Spring Investment monitoring well CE-VF-2. Further, CSIMW-1 will be located on the north (hydraulically upgradient) side of the interpreted southwestern extension of the Kane Springs Wash fault zone on Coyote Springs Investment property along the existing abandoned Highway 93. The second proposed monitoring well (CSIMW-2) is to be located on the south (hydraulically downgradient) side of the interpreted southwestern extension of the Kane Springs Wash fault zone on Coyote Springs Investment property along the existing abandoned Highway 93. Specifically, the second well would be sited such that the distance between the monitoring well CSIMW-1 and the aforementioned fault zone is approximately equal to the distance between the fault zone and CSIMW-2. See Attachments "A-1", "A-2", "A-3" and "A-4" to this Exhibit A. FWS shall work with LCWD&VWC in good faith to ensure that the well is located and constructed in a cost-effective manner, to enable the monitoring of the potential southward progression of groundwater level declines resulting from proposed ground-water production in Kane Springs Valley.

- All monitoring wells used as part of this plan shall be installed and water levels recorded on a continuous basis as is feasible, beginning as soon as possible after the State Engineer decision relative to the Kane Springs Valley Applications.

- The initial groundwater level would be established at the time that the pumping wells in Kane Spring Valley were ready to go on-line.

- The term "as is feasible" shall relate to mechanical failures and the issues associated with the remoteness of the locations, or other events outside the control of the parties that do not permit data collection.

- The locations and monitoring frequency of the monitoring-well network will be reviewed by the TRT on an annual basis beginning in 2007, and may be reduced or expanded in scope upon its recommendation.

C. Elevation Control

- LCWD&VWC will conduct a detailed elevation survey of all their wells used for monitoring as part of this plan. LCWD&VWC will cooperate in any regional plan organized by the Nevada State Engineer to determine elevation above sea level of all major spring orifices and monitoring and production wells in the Lower Colorado Flow System region. LCWD/VWC will match the Southern Nevada Water Authority's current datum relating to monitoring and production well elevations.

D. Water Quality

- LCWD&VWC will collect water quality samples and have them analyzed for major ions, trace elements, and isotopes at all production and monitor wells used as part of this plan (as specified in Sections 1.A and 1.B.) commencing July 1, 2007.

- Thereafter, LCWD&VWC will collect and analyze water-quality samples for major ions, trace

elements, and isotopes at all production and monitoring wells used as part of this plan every five years thereafter.

- Samples will be collected, analyzed and reported according to standard methods.

- Frequency, sampling location, and water quality parameters will be reviewed by the TRT on an annual basis beginning in 2007, and may be reduced or expanded in scope upon its recommendation.

E. *Reporting*

- All data collected under or as described in this plan, shall be fully and cooperatively shared among the parties.

- Water level and production data shall be provided to the FWS within 60 days of its collection by LCWD&VWC. LCWD&VWC will use its best efforts to provide data to the FWS within 30 days of its submission to LCWD&VWC, or in the case of water quality data, within 90 days of receipt of laboratory results.

- LCWD&VWC will report the results of all monitoring and sampling under this plan in an annual monitoring report

2. Management Requirements

A. Action Criteria

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. Further, the parties recognize that existing data is insufficient to determine if the groundwater development in Kane Springs Valley Hydrographic Basin, that is the subject of the Plan, affects the in-stream flows in the Muddy River Springs/Warm Springs Area, and if so, to what extent. Thus, the parties agree as follows:

1. For purposes of this paragraph A., 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 B(2) through (7) ("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. Any adjustment in the rating curve for the Warm Springs West flume shall result in a pro-rata adjustment of the Trigger Ranges.

2. 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; and

3. If the Average Flow Level is within the Trigger Range of 3.15 cfs or less but greater than 3.0 cfs, LCWD&VWC agree to reduce pumping from all wells in Kane Springs Valley by 50% or to a pumping level no greater than 2,500 afy, whichever results in the lesser amount of pumping, until the Average Flow Level exceeds 3.15 cfs.

4. If the Average Flow Level is within the Trigger Range of 3.0 cfs or less, LCWD&VWC agree to cease pumping from all wells in Kane Springs Valley until the Average Flow Level exceeds 3.0 cfs. However, if LCWD&VWC, together with Coyote Springs Investment, LLC ("CSI"), effectuate a reduction in the quantity of water CSI would have otherwise been entitled to pump in a given year from wells within the Coyote Spring Valley, then LCWD&VWD shall have the right to pump a like quantity of water from wells within Kane Springs Valley in that year.

B. Technical Review Team

1. Upon execution of this Stipulation, the Parties shall establish a Technical Review Team ("TRT") whose members shall include two representatives ("TRT Representatives") each from LCWD&VWC and the FWS, including at least one with substantial formal training and experience in hydrogeology ("Technical Representative"). Except as otherwise provided herein, the two TRT Representatives shall together have one vote on TRT matters. By consensus, the TRT Representatives may offer voting or non-voting TRT membership to others who provide regional monitoring records and analyses to the TRT.

2. The objectives of the TRT shall be to review existing data, make recommendations concerning the monitoring efforts required by this Plan, and determine whether other criteria, such as water levels in monitoring wells, are a better indicator of potential effects of the pumping wells on the springs in the Muddy River Springs/Warm Springs Area. Either party may advance any recommendation for consideration by the other party to modify the action criteria. However, no change in the action criteria shall occur within the first five (5) years following the effective date of the Plan. After this five year period, and if the TRT reaches a consensus on changes to the action criteria, such criteria may be changed.

3. If the TRT Representatives are unable to reach consensus on the action criteria, 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, Nevada State Engineer (if the Nevada State Engineer declines to participate, then the Desert Research Institute shall be substituted), 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 action criteria, the data upon which it is based, all previously submitted data and 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 action criteria. 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 action criteria will constitute the best available scientific information concerning the impacts on Muddy River Springs/Warm Springs Area 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.

3. **Mitigation Requirements**

- LCWD&VWC will mitigate unreasonable adverse impacts either as agreed upon by the parties or after the Nevada State Engineer determines whether there are unreasonable adverse impacts due to LCWD&VWC pumping. LCWD&VWC will take the necessary steps to ensure that mitigation actions are feasible.

- As part of their commitment to the recovery of the Moapa dace, LCWD&VWC shall commit $50,000, annually for a period of five (5) years following the granting of the Applications, in total or in part, for the restoration of Moapa dace habitat outside the boundaries of the Moapa National Wildlife Refuge. Such restoration shall be conducted as agreed to by the FWS. In the event that the Applications as granted by the State Engineer total less than 2,500 afy, the parties agree to meet and renegotiate the annual funding amount to be consistent with the lesser quantity of water granted and the commitment by LCWD&VWC to participate in restoration activities of the Moapa dace. FWS acknowledges that Coyote Springs Investment LLC, a Nevada limited liability company (CSI), has dedicated certain quantities of water pursuant to a Memorandum of Agreement by and between the Southern Nevada Water Authority, the United States Fish and Wildlife Service, CSI, the Moapa Band of Paiutes, and the Moapa Valley Water District. FWS further acknowledges that CSI is the intended beneficiary of the water to be developed pursuant to the Applications. Thus, in the event that pumping of groundwater pursuant to the Applications is restricted pursuant to Section 2. A. of this Exhibit A to the Stipulation, FWS agrees to use any quantities of water dedicated by CSI pursuant to the MOA for the survival and recovery of the Moapa dace as directed in the MOA.

4. **Modification of the Plan**

- LCWD&VWC and the FWS may modify this plan by mutual agreement. The parties also acknowledge that the State Engineer has the authority to modify this plan. In addition, LCWD&VWC and the FWS may individually or jointly petition the State Engineer to modify this plan in the event that mutual agreement cannot be reached. Any such petition shall only be filed after 90 days written notice to the remaining party. Either LCWD&VWC or the FWS may submit written comments to the State Engineer regarding the merits of any such petition for modification.

BRIAN SANDOVAL
Governor

STATE OF NEVADA

BRADLEY CROWELL
Director

JASON KING, P.E.
State Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
901 South Stewart Street, Suite 2002
Carson City, Nevada 89701-5250
(775) 684-2800 • Fax (775) 684-2811
http://water.nv.gov

May 16, 2018

Gregory Walch, Esq.
General Counsel
Las Vegas Valley Water District
1001 South Valley Blvd.
Las Vegas, NV 89153

Re: Coyote Spring Valley Water Supply

Dear Mr. Walch:

The Nevada Division of Water Resources (NDWR) is in receipt of your letter dated November 16, 2017, on behalf of the Las Vegas Valley Water District (LVVWD). In that letter, you provided background on groundwater supply in the Coyote Spring Valley based on existing water rights and related hydrologic data from the NDWR, including Order 1169 pumping test results and the subsequent issuance of Ruling 6255. Your letter concluded by asking the State Engineer, as Administrator of the NDWR, for an opinion regarding the extent to which subdivision maps for the Coyote Springs Development Project (Project) "predicated on the use of groundwater owned by the Coyote Springs Water Resources General Improvement District (CSWRGID) or developers in Coyote Spring Valley" would be executed by the NDWR.[1]

As you are aware, the development of groundwater resources in Coyote Spring Valley, Muddy River Springs Area, California Wash, Hidden Valley and Garnet Valley (*five-basin area*), are inextricably connected and can influence the flows in the Muddy River Springs and the Muddy River. Although your question is specific to the use of existing water rights

[1] Your letter identified the developers as Coyote Springs Land Development Corporation (CSLD), Coyote Springs Investment LLC (CSI), and Coyote Springs Nevada LLC (CSN), whom are developing the Coyote Springs development project.

held by the CSWRGID or the Project developers, it is necessary to address your inquiry within the broader context of appropriately managing and developing groundwater resources within the larger *five-basin area.*

1169 Pumping Test Background

During the Order 1169 pumping test conducted from November 2010 through December 2012, approximately 8,500 acre-feet per year of water was pumped from the carbonate aquifer, and 3,700 acre-feet per year was pumped from the alluvial aquifer within the larger *five-basin area.* Almost all of the alluvial pumping came from the Muddy River Springs Area. Results of the 2-year test clearly indicate that pumping at that level from the carbonate aquifer caused unprecedented declines in groundwater levels and flows in the high-altitude springs. These springs have a direct connection to the fully appropriated Muddy River and are part of the source of water for the endangered Moapa Dace, a fish federally listed as an endangered species since 1967, and the decreed senior rights of the Muddy River.

Post 1169 Pumping Test Considerations

Monitoring of pumpage and water levels has continued since the completion of the pumping test on December 31, 2012. This additional data provides NDWR a better understanding of the amount of groundwater pumping that may be sustainable in the *five-basin area* carbonate aquifer. Since completion of the pumping test, groundwater levels and spring flows have remained relatively flat while precipitation has been nearly average and the five-basin carbonate pumping has been about 6,000 afa.

Adding to the consideration as to how much groundwater can be sustainably pumped from the *five-basin area* is the Memorandum of Agreement (MOA) that was entered into on April 20, 2006, between the Southern Nevada Water Authority, the United States Fish and Wildlife Service, Coyote Springs Investment, the Moapa Band of Paiute Indians, and the Moapa Valley Water District. The purpose of the MOA was "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." Analysis of the Order 1169 pumping test and the observed correlation between pumping and spring flow indicates that MOA-required curtailment thresholds could be rapidly triggered should carbonate pumping exceed its current rate.

Future Groundwater Development

Ultimately, the amount of groundwater pumping that will be allowed in the *five-basin area* will be limited to the amount that will not conflict with the Muddy River Springs or the Muddy River as they are the most senior rights in the *five-basin area* and, by law must be protected. Moving forward, in order to <u>not</u> conflict with the senior decreed rights and

negatively impact the Moapa Dace, carbonate pumping will have to be limited to a fraction of the 40,300 acre-feet already appropriated in the *five-basin area* as demonstrated by the hydrologic data and analysis from Order 1169 and Ruling 6255.

Therefore, specific to the question raised in your November 16, 2017, letter, considering current pumping quantities as the estimated sustainable carbonate pumping limit, **pursuant to the provisions found in Nevada Revised Statutes Chapter 278, 533 and 534, the State Engineer cannot justify approval of any subdivision development maps based on the junior priority groundwater rights currently owned by CWSRGID or CSI unless other water sources are identified for development.**

In closing, as outlined in this letter, the matter you're inquiring about is part of a much broader need to appropriately manage groundwater resources across the *five-basin area*. As such, it is incumbent upon the NDWR to work with all the water right holders on a conjunctive management plan for the *five-basin area*.

Sincerely,

P.E.

Jason King, P.E.
State Engineer

cc: Albert Seeno III, Coyote Springs Investments, LLC

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
Ph: (702) 515-5230 ~ Fax: (702) 515-5231

October 29, 2008
File Nos. 84320-2008-F-0007 and
84320-2008-I-0216

Memorandum

To: Field Manager, Ely Field Office, Bureau of Land Management, Ely, Nevada

From: Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: Request for Formal and Informal Consultation on the Kane Springs Valley Groundwater Development Project in Lincoln County, Nevada

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed Kane Springs Valley Groundwater Development Project and its possible adverse effects on the desert tortoise (*Gopherus agassizii*) (Mojave population), listed as threatened under the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), and its designated critical habitat, and the Moapa dace (*Moapa coriacea*), listed as endangered under the Act. No critical habitat has been designated for the Moapa dace. Further, the Bureau of Land Management (BLM) requests concurrence that the proposed project *may affect, but is not likely to adversely affect* the southwestern willow flycatcher (*Empidonax traillii extimus*), listed as endangered under the Act. No designated critical habitat for the southwestern willow flycatcher occurs in the project area. The Lincoln County Water District (LCWD) has applied for a BLM right-of-way to construct and operate a system of water facilities on BLM-managed land in southern Lincoln County.

This biological opinion is issued in accordance with section 7 of the Act and based on information provided in BLM's memorandum dated September 27, 2007, to the Service (received on September 28, 2007), and revised biological assessment (BA), dated December 2007 (ARCADIS 2007); Amended Stipulation for Withdrawal of Protests (Stipulated Agreement) dated August 8, 2006; discussions between the Service and BLM; and our files. A complete administrative record of this consultation is on file in the Service's Nevada Fish and Wildlife Office in Las Vegas.

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

INFORMAL CONSULTATION

Southwestern willow flycatcher

No habitat is present for the southwestern willow flycatcher within the project area. The closest breeding populations occur at Pahranagat National Wildlife Refuge (NWR) approximately 23 miles northwest and in the Warm Springs Area, approximately 25 miles southeast. Since the springs in the Warms Springs Area are supplied by water from the deep carbonate aquifer, groundwater pumping in the Kane Springs Valley Hydrographic Basin could affect water levels in the Muddy River System. These effects to riparian vegetation will be minimized by actions contained in the Stipulated Agreement among the Service, LCWD and Vidler Water Company, Inc (VWC), which are designed to maintain minimum in-stream flows in the Warm Springs Area of the Muddy River system in order to protect and recover the Moapa dace. (See section below entitled "Proposed Minimization Measures for Moapa Dace"). The project is anticipated to have insignificant effects to the southwestern willow flycatcher since any decreases in groundwater flow to the Muddy River system will be minimized by the Stipulated Agreement.

In consideration of the proposed action, potential effects of the proposed action, and measures proposed by BLM, the Service concurs with BLM's determination that the proposed action *may affect, but is not likely to adversely affect* the southwestern willow flycatcher. This response constitutes informal consultation under regulations promulgated in 50 CFR§402.14, which establishes procedures governing interagency consultation under section 7 of the Act. This informal consultation does not authorize take of any listed species.

CONSULTATION HISTORY

The following chronology documents the consultation process that culminated in the following biological opinion for the desert tortoise and its designated critical habitat and for the Moapa dace:

On May 8, 2006, the Service sent BLM a memorandum containing a species list of endangered, threatened, and candidate species that may occur in or near the proposed Kane Springs Valley Groundwater Development Project (Service File No. 1-5-06-SP-499).

On July 12, 2007, BLM sent the Service a memorandum requesting formal consultation on the Kane Springs Valley Groundwater Development Project for potential adverse effects to the desert tortoise and its designated critical habitat. A BA accompanied the memorandum.

On September 4, 2007, the Service sent BLM a memorandum recommending formal consultation for the Moapa dace and requesting additional information necessary to initiate formal consultation for the desert tortoise (Service File No. 1-5-07-F-558).

On September 27, 2007, BLM sent the Service a memorandum requesting formal consultation on the project for potential adverse effects to the desert tortoise and its designated critical habitat and the Moapa dace. A revised BA accompanied the memorandum.

On October 19, 2007, the Service sent BLM a memorandum that initiated formal consultation on September 28, 2007, since the revised BA contained sufficient information (Service File No. 84320-2008-F-0007).

On December 4, 2007, BLM, the Service, and the project proponent participated in a conference call to discuss several topics including the monitoring wells that are required by the stipulated agreement among LCWD, VWC, and the Service for withdrawal of the Service's protests of water rights applications in Kane Springs Valley. It was decided that the BA would include acreages and potential effects associated with the two new monitoring wells.

On December 6, 2007, ARCADIS, the project consultant, sent the Service a revised BA on behalf of BLM, which included acreages associated with the two new monitoring wells.

On January 28, 2008, the Service sent BLM a memorandum extending the consultation period for this project by 60 days due to a substantial consultation workload.

On June 17, 2008, VWC sent the Service comments on the terms and conditions of the draft biological opinion.

On June 18, 2008, the Service provided BLM a copy of a draft biological opinion via email.

On June 30, 2008, a Memorandum of Understanding (MOU) among LCWD, VWC, and the Service was signed. Pursuant to the MOU, the Service will issue a biological opinion for the project which will include an incidental take statement authorizing such take of Moapa dace as may occur in connection with the pumping and transfer of 1,000 acre-feet of groundwater under Phase I of the Project and implementation of the Monitoring, Management and Mitigation Plan. Upon receiving authorization from the Nevada State Engineer to appropriate more than 1,000 and up to 5,000 acre-feet per year of groundwater from the Kane Springs Valley for use in the Coyote Springs Valley, the Service will reinitiate consultation for the project pursuant to section 7 of the Act.

On July 15, 2008, the Service received a copy of BLM's comments on the draft biological opinion via email.

On July 28, 2008, the Service and BLM met to discuss the draft biological opinion.

On August 18, 2008, BLM sent the Service proposed language for term and condition 4.d. and 5. of the biological opinion via email.

On October 1, 2008, BLM sent the Service updated proposed language for term and condition 4.d. of the biological opinion via email.

On October 1, 2008, the Service and BLM met to discuss deposition of remuneration fees for offsetting desert tortoise habitat loss.

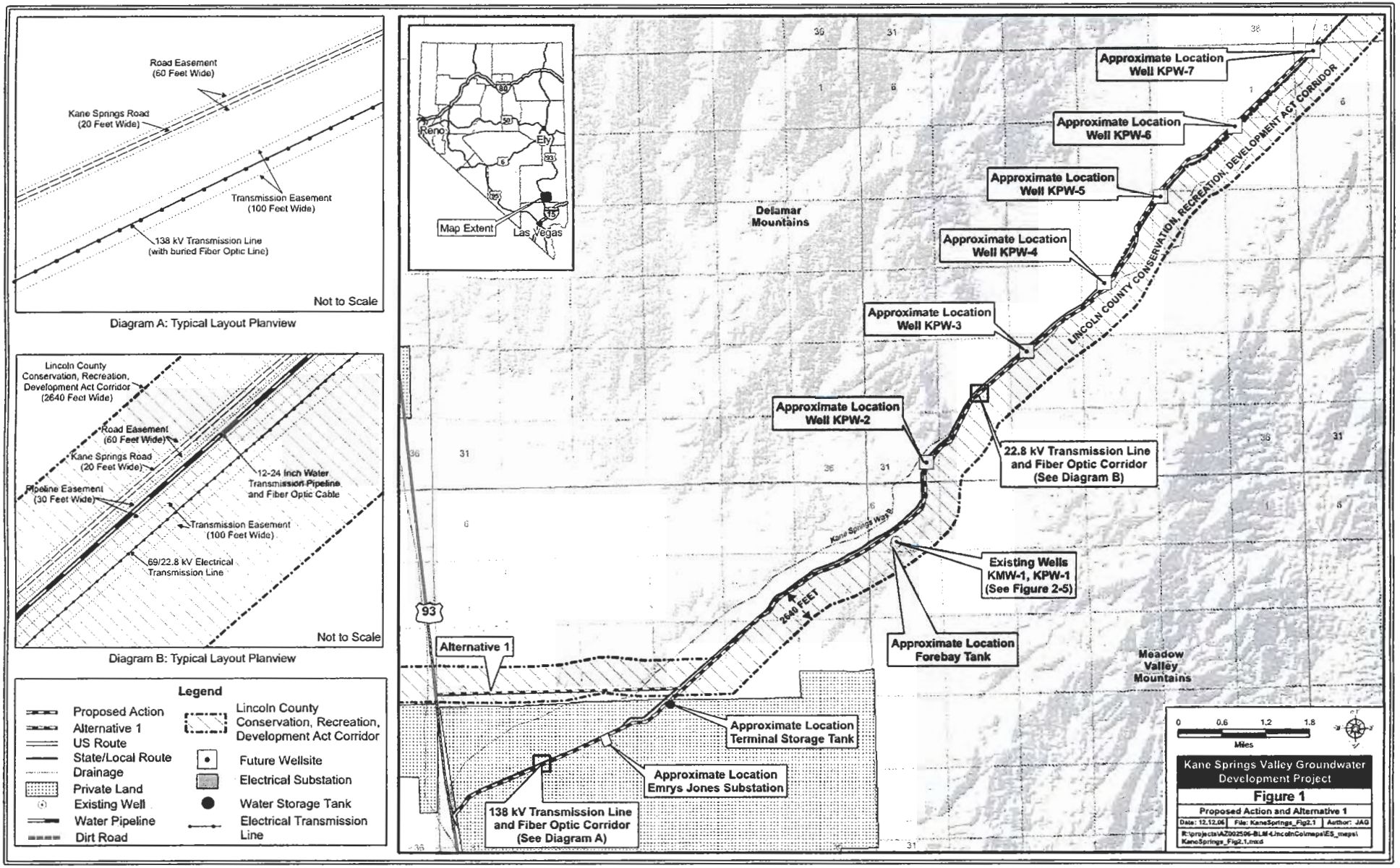
BIOLOGICAL OPINION

A. Description of the Proposed Action

The purpose of the proposed action is to develop a system for tapping groundwater resources in the Kane Springs Valley Hydrographic Basin for municipal water purposes within the Coyote Spring Valley Hydrographic Basin. The project proponents applied to the Nevada State Engineer's Office for 17,375 acre-feet per year (afy), but to date have been granted 1,000 afy under Ruling # 5712. The proposed pipeline would have capacity to transport up to 5,000 afy. Construction and operation of the proposed action would supply a small, but initially substantial portion of the total water requirements for the Coyote Springs Investment (CSI) development projects in southern Lincoln County. The majority of the proposed facilities would be located along or near the Kane Springs Road, within the 2,640-foot wide Lincoln County Conservation, Recreation, and Development Act (LCCRDA) utility corridor on public land, or on private land owned by CSI. The project area extends approximately 16.6 miles along Kane Springs Road from the intersection with US 93 (US 93).

The proposed action consists of several components including, groundwater production wells, monitoring wells, water pipelines, storage tanks, power transmission lines and substations, access roads and a fiber optic line. Figure 1 shows the approximate location of the project components in the lower Kane Springs Valley. LCWD is developing this project in cooperation with Lincoln County Power District (LCPD) Number 1 and Lincoln County Telephone Company. Each utility agency is responsible for the construction, operation, and rehabilitation of disturbed land associated with their utility. Each utility agency may be required to apply for a separate right-of-way with BLM.

Although the BA included the construction of the Emrys Jones Substation and power line west of the Substation, LCPD is constructing these facilities under another project, the Coyote Springs Transmission Line Project. Therefore, these facilities are not considered to be part of the proposed action for this consultation.



SE ROA 49910

JA_000424

1. Project Features

a. Wells

Groundwater from the Kane Springs Valley Hydrographic Basin would be supplied to the Coyote Spring Valley area from up to seven groundwater production wells. All production wells would be located within the LCCRDA corridor on public land, spaced approximately 1.3 to 1.8 miles apart. The first well (KPW-1), approved under BLM Serial Number NVN-079630, was drilled in 2005. Each wellhead would be enclosed in a masonry block structure, which would also contain all aboveground piping, shutoff valve, check valve, flow meter, air release valve, and electrical equipment. The size of each fenced well yard would be approximately 150 feet by 150 feet. Production wells would be equipped with an electric pump.

An existing monitoring well, KMW-1, is located adjacent to KPW-1 (Figure 1). The monitoring well was installed in 2005 to assist in assessing the hydrogeology of the Kane Springs Valley Hydrographic Basin. Two new monitoring wells may also be installed per the stipulated agreement for withdrawal of the Service's protests of LCWD and VWC's water rights applications in Kane Springs Valley. The wells would be placed on CSI land and would each have a footprint of less than 1 acre in size. The final location would be coordinated through the Technical Review Team (TRT) established under the stipulated agreement. Should the TRT decide that these monitoring wells are not necessary, funds for the material and construction of the monitoring would be used instead for Moapa dace conservation.

b. Pipelines

There are two types of pipelines associated with the proposed action: the well field pipeline collection system and the main transmission pipeline. Ancillary pipeline components include isolation valves, cathodic protection, control valves, air release/vacuum valves, blow-off valves, access manways, fiber optic splice vaults, and pipe alignment markers.

The well field pipeline collection system would consist of individual branch pipelines from each well to a single main collection pipeline terminating at the forebay storage tank. The total pipeline collection system would extend approximately 9.4 miles. The pipeline, to be constructed of ductile iron, would vary in size (telescope) from 12 inches to 24 inches in diameter, with the largest diameters located closest to the forebay storage tank. The pipeline would be buried to a minimum depth of three feet below grade, or three times scour depth in washes in accordance with engineering requirements. In general, the pipeline would parallel the Kane Springs Road to the south, with a 60-foot wide construction easement and a 30-foot wide permanent easement. If cross-country construction is required, the temporary construction easement would be 75 feet wide, with a permanent easement of 60 feet.

Approximately 3.8 miles of buried 24-inch diameter transmission pipeline would be constructed adjacent to the Kane Springs Road between the forebay storage tank and the terminal storage tank. Appurtenant groundwater facilities (e.g., isolation valves, control valves) would occur, on

average, every mile along the alignment. These facilities would be located predominantly below existing grades in traffic-rated, lockable, concrete vaults that would vary in dimension. Typically, these vaults would be located outside of traffic areas and may require small location markers extending several feet above the surface of the ground.

c. Storage Tanks

A 50,000-gallon forebay storage tank would be installed adjacent to the existing production well (KPW-1) and would initially serve as the termination point for the groundwater collection system. This tank would be used to normalize flow pressures in the system and provide storage for secondary lifting to the terminal storage tank, if required. The water level in the forebay storage tank would control the operation of the well field via telemetry. Either wireless telemetry or direct-burial fiber optic telemetry cable located in pipeline trenches would enable communication between the collection system, forebay storage tank, and the terminal storage tank.

A terminal water storage tank would ultimately be located at the southern end of the water transmission pipeline to receive the imported water and to serve as a water distribution source for the northern Coyote Spring Valley area. The storage tank would be constructed with a maximum capacity of 700,000 gallons, subject to final design requirements.

d. Power Distribution

In order to provide reliable electric service to the well fields, LCPD would construct and operate transmission lines and substations. Power facilities built for this project would connect to the Emrys Jones Substation, part of the Coyote Springs Transmission Line Project.

Under the proposed project, LCPD would construct an overhead transmission line with a 69 kV/22.8 kV distribution circuit from the Emrys Jones Substation to the proposed well fields along the Kane Springs Road, parallel to the pipeline. A total of 14 miles of transmission line would be installed. The 69 kV/22.8 kV transmission line would be a single-circuit line supported by wood pole structures. The 69 kV/22.8 kV transmission line would primarily be located on public lands managed by BLM, with a short section near the Emrys Jones Substation located on private property. Each wood pole structure would require a temporary construction easement of 0.07 acre and after construction, each structure would occupy 0.02 acre. The transmission line would have a 100-foot permanent easement.

At each well location, a fenced power substation (approximately 155 feet by 95 feet) would be constructed to serve the well pump motor and ancillary equipment. The substation yards would consist of a 69 kV/22.8 kV to 4.16 kV pad-mounted step-down transformer, primary metering, switch cabinet, capacitor bank, and a station service transformer.

e. Fiber Optic

The Lincoln County Telephone Company is proposing to install fiber optic cables within the proposed project right-of-way. The fiber optic line would be buried in the same trench as the pipeline and adjacent to the 138 kV transmission line on private lands proposed under the Coyote Springs Transmission Line Project. The fiber optic cables would be used for communication to manage the pipeline operation. The fiber optic cables would tie into an existing fiber optic line located on the east side of US 93.

f. Additional Project Components

Approximately 50 acres may be used for temporary extra work spaces. These areas would be spaced approximately 0.5 mile apart and would cover approximately 2 acres. Some larger staging areas may be sited in suitable areas near steeply incised drainages, above and below slopes where construction is expected to be difficult, and at pipe laydown areas. All extra work spaces on Federal lands would be located within the project right-of-way. Staging areas on private lands would be used during construction for storage of materials and equipment, construction office trailers, fuel storage, equipment maintenance, stockpiling and handling of excavated material, and other construction-related activities. Following construction, the staging areas would be restored as described in the Kane Springs Valley Groundwater Development Project Environmental Impact Statement (EIS).

g. Road Access and Transportation

US 93 and the Kane Springs Road would provide primary access into the project area. Spur roads would be constructed from the Kane Springs Road to temporary and permanent facilities sites, such as contractors' yards, well fields, and power pole locations, within the project right-of-way corridor. The number of new spur roads would be held to a minimum, consistent with their intended use (e.g., facility construction, conductor stringing and tensioning). It is estimated that seven new minor access roads would be required to access the proposed well houses. Each of these roads would be approximately 100 feet long and 12 feet wide. Access roads not required after construction would be removed and restored to their approximate original contour and dimensions and made to discourage vehicular traffic. All temporary road surfaces would be ripped or harrowed to establish conditions appropriate for reseeding, drainage, and erosion prevention.

Table 1 lists the estimated temporary and permanent disturbance acreage required for construction and operation of the proposed project. The estimated disturbance acreage is based on preliminary engineering plans and therefore may change slightly.

Table 1 Estimated Surface Disturbance by Land Ownership (at full buildout of the proposed project)		
	Temporary (acres)*	**Permanent (acres)***
Federal (BLM)		
Well House and Well Substation	3.2	3.0
KPW-1 Well, Forebay Tank, KMW-1 Well	0.3	1.0
Pipeline Construction right-of-way	148.7	0.0
Terminal Storage Tank	0.0	0.0
Electrical Substation	0.0	0.0
Electrical Transmission Line	14.8	5.0
Electrical Transmission Line Access Roads	0.0	8.0
Fiber Optics Line	0.0	0.0
Subtotal	**167.0**	**17.0**
Private		
Well House and Well Substation	0.0	0.0
KPW-1 Well, Forebay Tank, KMW-1 Well	0.0	0.0
Pipeline Construction right-of-way	0.0	0.0
Terminal Storage Tank	0.7	0.3
Electrical Substation	0.0	0.0
Electrical Transmission Line	2.4	1.1
Electrical Transmission Line Access Roads	0.0	0.7
Fiber Optics Line	14.2	0.0
Two Groundwater Monitoring Wells	4.0	2.0
Subtotal	**21.3**	**4.1**
Total	**188.3**	**21.1**

h. Construction Procedures

Each utility agency would conduct all activities associated with the construction, operation, and rehabilitation of temporarily disturbed areas within the authorized limits of their BLM right-of-way. To supply electrical power to the well fields, it is anticipated that LCPD would be the first utility agency to begin construction after all approvals have been acquired. During construction activities, water would be used to suppress dust in the construction area.

Construction of the electric transmission lines and substation would involve the following general sequence: engineering surveys and staking, clearing and grading, material storage and handling, creation of structure holes or foundations, structure assembly and erection, installation of security fencing around substation, post construction cleanup and reclamation, and construction monitoring. Construction of the overhead lines would be completed in two phases: setting the pole structures and installing the cable. The setting of the pole structures is accomplished with a single multi-purpose truck. The truck has a small crane suitable for lifting and placing poles. A pole trailer is towed behind the crane truck to transport the poles to the

installation site. Affixed to the crane is an auger for boring the holes for the pole structures. Soil excavated during construction would be used for backfill and for restoration of disturbed areas. The cable would be installed using two vehicles: a cable truck and a truck with a power lift. The cable would be strung out along the installation route and the man lift would be used to place the cable on the pole structure.

Construction of the groundwater facilities and fiber optic line would involve the following sequence: engineering surveys and staking, topsoil salvage and storage, clearing and grading (including access road construction), trenching and blasting, pipeline stringing/installation, installation of fiber optic line in common pipeline trench, backfilling, hydrostatic testing, re-grading, post-construction cleanup, and reclamation, and construction monitoring. Trenching would consist of excavating the trench using either a trenching machine or track-mounted excavator. In general the bottom of the trench would be five feet wide and up to six feet deep to provide the required cover over the top of the installed pipe. In areas of weathered rock, track-mounted excavators may be preceded by a bulldozer equipped with a single-shank ripper. Limited blasting may be required in areas where shallow or exposed bedrock is present. This project would be constructed utilizing a "Dig and Lay" procedure. In other words, a portion of trench would be dug, the pipe would be laid, welded, and back filled and another segment would begin. There would be minimal (less than 500 feet) open trench at any one time and the backfill would occur almost immediately following pipe installation.

i. Operation and Maintenance

The electrical facilities would be in continuous operation and water facilities would be operated and maintained to ensure safe operation and integrity of the pipeline. Periodic inspection and maintenance of power and water facilities would be required. If a pipeline break were to occur, immediate steps would be taken to isolate the break, the break would be repaired, and the trench backfilled. Areas would be contoured and revegetated after these types of repairs. Emergency maintenance of power lines, such are repairing downed wires and correcting unexpected outages would be performed by LCPD.

j. Project Phases

Construction of the project would occur in three phases, with one to three years between phases. Phases would correspond to demand for water and issuance of permits for additional water rights. Eventually LCWD would like to harvest 5,000 afy from the carbonate aquifer within the Kane Springs Valley Hydrographic Basin but so far has been granted an appropriation of 1,000 afy by the Nevada State Engineer. This appropriation granted four points of diversion, which constitutes the initial production under Phase 1 of the project. If additional appropriations are granted, production from Phase 1 wells could be increased, and Phase 2 and Phase 3 wells could be developed.

- Construction of Phase 1 would occur over a 90- to 180-day period and would begin upon completion of environmental reviews and the acquisition of necessary permits

and approvals. Phase 1 water facilities would include the transmission pipeline (main water line) and approximately 9.4 miles of well field collection pipelines for up to four wells (main collection plus laterals to wells), up to four production wells, the storage tanks, and up to two monitoring wells. Power facilities would include 14 miles of 69 kV/22.8 kV overhead power lines and up to four smaller substations to serve each well.

- Construction of Phase 2 would occur over a 30- to 60-day period. Phase 2 water facilities would include one to two production wells and lateral pipelines from these wells to the main collection pipeline (combined length of the two lateral pipelines is expected to be less than 1 mile). Power facilities would include 22.8 kV underground power lines from the main transmission line to the substation(s) and one to two smaller substations to serve the new well(s).
- Phase 3 construction would only occur if production from Phase 1 and Phase 2 were insufficient to meet anticipated demand or if production from previous wells were lower than estimated or designed. Phase 3 facilities and construction times are similar to Phase 2.

2. State Engineer Ruling

On February 2, 2007, the Nevada State Engineer issued Ruling 5712, which granted 1,000 afy of groundwater from the Kane Springs Valley Hydrographic Basin to LCWD and VWC for municipal purposes within the Coyote Spring Valley Hydrographic Basin. Specifically 500 afy was granted under Application 72220 and applications 72218, 72219, and 72221, were granted for a total combined duty of 500 afy.

The State Engineer concluded that to permit the appropriation of water in an amount greater than permitted under this ruling would conflict with existing rights and threaten to prove detrimental to the public interest. After reviewing the existing information, the State Engineer concluded that a small amount of water can be developed in the Kane Springs Valley and not unreasonably impact existing rights in the discharge areas of the White River carbonate-rock aquifer system, which are already fully appropriated. The State Engineer found that no water has been previously appropriated in the Kane Springs Valley Hydrographic Basin and by limiting the quantity of water authorized for appropriation the potential impacts to existing waster rights in down-gradient hydrographic basins would be minimized.

3. Proposed Minimization Measures for Desert Tortoise (Mojave population)

a. The applicant will implement an Environmental Training Program. Prior to beginning work, all contractor personnel assigned to the field for construction-related activity will attend a mandatory one-time Worker Environmental Training Program presented by the project developer's Environmental Compliance Team. The presentation will review topsoil salvage, access restrictions, general site restrictions, and other environmental

requirements regarding the project. Participants will sign a statement declaring that they understand and will abide by any guidelines set forth in the material presented.

b. All areas around structures will be backfilled, compacted, and returned as close as possible to the original condition and grade.

c. Signs will be placed along the access roads to discourage off-highway vehicle use of adjacent areas.

d. Clearance surveys will be performed prior to any construction activities within the right-of-ways. Any tortoises located will be handled and relocated by a qualified tortoise biologist in accordance with Service-approved protocol (Desert Tortoise Council 1994, revised 1999). Burrows containing tortoises or nests will be excavated by hand, with hand tools, to allow removal of the tortoise or eggs. Desert tortoises moved during the tortoise inactive season or those in hibernation, regardless of date, must be placed into an adequate burrow; if one is not available, one will be constructed in accordance with Desert Tortoise Council (1994, revised 1999) criteria. During mild temperature periods in the spring and early fall, tortoises removed from the site will not necessarily be placed in a burrow. Tortoises and burrows will only be relocated to federally managed lands. If the responsible Federal agency is not BLM, verbal permission, followed by written concurrence, will be obtained from BLM and the Service before relocating the tortoise or eggs to lands not managed by BLM.

e. Construction monitoring will employ a field contact representative, authorized biologist(s), and qualified biologist(s) during construction activities except in those areas with high disturbance. The Service employs a specific set of guidelines for such monitoring.

f. Tortoises requiring moving will only be handled by the authorized and qualified tortoise biologist or other trained personnel approved by the Service and the Nevada Department of Wildlife (NDOW).

g. A 25 mile per hour (mph) project access road speed limit will be enforced for all project vehicles and personnel.

h. The area limits of project construction and survey activities would be predetermined based on the temporary and permanent disturbance areas noted on the final design engineering drawings to minimize environmental effects arising from the project, with construction activities and traffic restricted to and confined within those limits.

i. Littering is not allowed. Project personnel would not deposit or leave any food or waste in the project area, and no biodegradable or non-biodegradable debris would remain in the right-of-way following completion of construction.

j. No wildlife, including rattlesnakes, may be harmed except to protect life and limb.

k. Project personnel are not allowed to bring pets to any project area in order to minimize harassment or killing of wildlife and to prevent the introduction of destructive animal diseases to native wildlife populations.

l. Wildlife species may not be collected for pets or any other reason.

m. Project supplies or equipment where wildlife could hide will be inspected prior to moving or working on them, to reduce the potential for injury to wildlife. Supplies or equipment that cannot be inspected or from which wildlife cannot escape or be removed, will be covered or otherwise made secure from wildlife intrusion or entrapment at the end of each work day.

n. All steep-walled trenches or excavations used during construction will be inspected twice daily (early morning and evening) to protect against wildlife entrapment.

o. All new access roads constructed as part of the project that are not required as permanent access for future project maintenance and operation would be permanently closed to minimize impacts from increased public access.

p. To minimize perching opportunities for raptors near habitats supporting sensitive prey species, structures incorporating a design to discourage raptor perching will be selected.

q. Only the minimum amount of vegetation necessary for the construction of structures and facilities will be removed. Topsoil will be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation.

r. Construction holes left open overnight will be covered. Covers will be secured in place nightly, prior to workers leaving the site, and will be strong enough to prevent livestock or wildlife from falling through and into a hole.

s. Holes and/or trenches will be inspected prior to filling to ensure absence of mammals and reptiles.

t. Where necessary, a biological resource monitor shall be present during the construction to ensure resources are protected in the construction area.

u. Excavations will be sloped on one end to provide an escape route for small mammals and reptiles.

v. A revegetation plan will be developed and implemented for the project which describes procedures the LCWD and its contractors would use to conduct revegetation of the disturbed areas. The Plan describes seedbed preparation; seed mixtures; seeding,

salvaging, and transplanting methods; revegetation schedule; post-construction monitoring; evaluation of revegetation success; remediation; and reporting.

w. A noxious weed management plan will be developed and implemented for the project which includes site-specific measures that LCWD and its contractors would implement to control noxious weeds including, but not limited to, the use of cleaned, weed-free equipment, pressure washing of all vehicles and equipment prior to arrival at the work site, and the use of certified weed-free straw/hay bales to control erosion. A key element of the noxious weed management plan is to identify and treat existing weed infestations prior to construction.

x. A fire mitigation plan will be developed and implemented for the project which identifies measures to be taken during construction, operation, and maintenance of the project facilities to prevent and suppress fires. The purpose is to establish standards and practices to minimize the risk of fire or, in the event of fire, to implement immediate suppression procedures.

4. Proposed Minimization Measures for Moapa Dace

On August 8, 2006, the Service entered into a stipulated agreement with LCWD and VWC for water rights applications in the Kane Springs Valley Hydrographic Basin, then under review by the Nevada State Engineer's Office. The Service agreed to withdraw its protests for the granting of these water rights in exchange for the parties agreeing to implement the Monitoring, Management, and Mitigation Plan which would help protect senior Federal water rights in the Muddy River Springs/Warm Springs Area from unreasonable adverse impacts from groundwater pumping. The common goal of the parties is to manage the development of the LCWD and VWC water rights in their entirety from the Kane Springs Valley Hydrographic Basin, without resulting in any losses to senior water rights or unreasonable adverse impacts to Federal water resources.

The Monitoring, Management, and Mitigation Plan lists monitoring requirements in relation to the production wells, two new monitoring wells, elevation control and springflow, water quality, data quality, and reporting. The management requirements include action criteria to help to maintain minimum in-stream flows in the Warm Springs Area in order to protect and recover the Moapa dace. The parties agreed to the following, summarized from the Plan:

a. The Average Flow Level shall be determined by flow measurements at Warm Springs West flume. See the Plan for the definition of Average Flow Level.

b. If the Average Flow Level decreases to an amount within the Trigger Range of 3.2 cubic feet per second (cfs) or less, the parties agree to meet as soon as practically possible to discuss and interpret all available data and plan for mitigation measures in the event that flows continue to decline.

c. If the Average Flow Level is within the Trigger Range of 3.15 cfs or less but greater than 3.0 cfs, LWCD and VWC agree to reduce pumping from all wells in Kane Springs Valley by 50 percent or to a pumping level not greater than 2,500 afy, whichever results in the lesser amount of pumping, until the Average Flow Level exceeds 3.15 cfs. The subsequent State Engineer ruling limited pumping to 1,000 afy. Accordingly, under this scenario, LCWD and VWC would be required to reduce pumping by 50 percent.

d. If the Average Flow Level is within the Trigger Range of 3.0 cfs or less, LWCD and VWC agree to cease pumping from all wells in Kane Springs Valley until the Average Flow Level exceeds 3.0 cfs. However, if LWCD and VWC, together with CSI, effectuate a reduction in the quantity of water, CSI would have otherwise been entitled to pump in a given year from wells within the Coyote Spring Valley, then LWCD and VWC shall have the right to pump a like quantity of water from wells within Kane Springs Valley in that year.

The management requirements also include the establishment of a TRT with two representatives each from LCWD/VWC and the Service. The objectives of the TRT include reviewing existing data, making recommendations concerning the monitoring efforts required by this Plan, and determining whether other criteria, such as water levels in the monitoring wells, are a better indicator of potential effects of the pumping wells on the springs in the Muddy River Springs/ Warm Springs Area. As part of their commitment to the recovery of the Moapa Dace, LCWD and VWC will commit annual funds for a period of five years following the granting of the water rights applications, for the restoration of Moapa dace habitat outside the boundaries of the Moapa Valley National Wildlife Refuge (NWR).

B. Definition of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action, including interrelated and interdependent actions, and not merely the immediate area involved in the action (50 CFR § 402.02). Subsequent analyses of the environmental baseline, effects of the action, cumulative effects, and levels of incidental take are based upon the action area as determined by the Service.

For the desert tortoise and its designated critical habitat, impacts will be tied to the project area and a zone-of-influence extending 0.5 miles (2,400 feet) beyond the project area to cover potential effects to desert tortoises that could move into construction areas or onto access roads.

For the Moapa dace, which depends on thermal springs in the Warm Springs Area for survival, the action area includes the Kane Springs Valley Hydrographic Basin and the hydrographic basins down gradient of this basin in the White River Groundwater Flow System that are hydrologically connected to the Muddy River ecosystem. These hydrographic basins are the Coyote Spring Valley (Basin 210) and Muddy River Springs Area (Basin 219). The Service acquired the Moapa Valley NWR to secure habitat and assist the recovery efforts for the endangered Moapa dace, a species restricted to the Warm Springs Area and the mainstem of the

upper Muddy River. Springs in this area are considered regional discharge points for the carbonate aquifer of the White River Flow System.

C. Status of the Species- Rangewide

1. Desert Tortoise (Mojave population) and Designated Critical Habitat

The current rangewide status of the desert tortoise and its critical habitat consists of information on its listing history, species account, recovery plan, recovery units, distribution, reproduction, and numbers, and critical habitat units and their constituent elements. This information is provided on the Service's website at: http://www.fws.gov/nevada. If unavailable, contact the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230 and provide File No. 84320-2008-F-0007.

2. Moapa Dace

See the description in the Intra-Service Programmatic Biological Opinion for the Proposed Muddy River Memorandum of Agreement Regarding the Groundwater Withdrawal of 16,100 afy From the Regional Carbonate Aquifer in the Coyote Spring Valley and California Wash Basins and Establishment of Conservation Measures for the Moapa Dace, Clark County, Nevada (Service 2006c) (File No. 1-5-05-FW-536). Updated information on the Moapa dace is provided below.

Warm Springs Natural Area

In September 2007, Southern Nevada Water Authority (SNWA) purchased 1,179 acres of private property that encompasses several springs in the Muddy River headwaters area, including the former Warm Springs Ranch. The property includes 3.8 miles of the mainstream Muddy River. The Warms Springs Natural Area is to be managed as a nature preserve for protection of Moapa dace; and restoration and management of the areas as an ecological reserve.

Current Distribution and Abundance

Moapa dace surveys have been conducted annually throughout the upper Muddy River system. Dace surveys conducted semi regularly between 1994 and 2006 indicate Moapa dace numbers range between 1,296 and 3,825 individuals. The 2007 survey data indicate that there were approximately 1,172 fish in the population that occurred throughout 5.6 miles of habitat in the upper Muddy River system. Approximately 97 percent of the total population occurred within one major tributary that included 1.78 miles of spring complexes that emanate from the Pedersen, Plummer, and Apcar spring complexes on the Moapa Valley NWR and their tributaries (upstream of the gabion barrier). Approximately 48 percent of the population was located on the Moapa Valley NWR and 48 percent occupied the Refuge Stream supplied by the Pederson-Plummer springs. The highest densities of Moapa dace occurred on the Moapa Valley NWR's Plummer and Pedersen units.

In 2008, there was an approximately 60 percent decrease in the number of Moapa dace, from 1,172 fish in 2007 to 460 in 2008. Most of this decline is due to large changes in the numbers of dace in the Pederson, Plummer, and Refuge Stream areas which supported more than 92 percent of the population in 2007. The cause of the population decline is currently unknown, although beavers have recently changed stream characteristics in the Refuge Stream and vegetation management occurred along the Pederson Unit. In addition, habitat restoration projects have been implemented over the past few years in the Pederson and Plummer units of the Moapa Valley NWR, restoring the streams to a more natural state to augment Moapa dace habitat and populations.

D. Environmental Baseline

1. Status of the Listed Species/Critical Habitat in the Action Area

a. *Desert Tortoise (Mojave Population) - Status within the Action Area*

The action area occurs in the Mojave Desert Scrub Biome (Turner 1982), along the Kane Springs Road located in the valley between the Meadow Valley Mountains to the south and the Delamar Mountains to the north. The project area crosses Kane Springs Wash, which flows southwest to its confluence with the Pahranagat Wash in the northern part of the Coyote Spring Valley, in several locations. The vegetation in the action area consists of creosote bush scrub and desert wash scrub along Kane Springs and Pahranagat washes. Elevations in the action area range from approximately 2,600 to 3,300 feet.

Between October 16 and 18, 2006, Greystone-ARCADIS biologists conducted desert tortoise presence-absence surveys in the project area for BLM (ARCADIS 2007). Evenly spaced along the project area were 18, 1.5 mile long by 10 yard wide triangular strip transects. Transects were surveyed for live or dead desert tortoise, and any tortoise sign including burrows, scat, tracks, and water scrapes. The total corrected sign method was used to estimate tortoise densities. Estimated tortoise densities ranged from 10 to 0 tortoises per square mile. No live tortoises were found and most of the tortoise sign was comprised of burrows and water scrapes. The highest tortoise densities were 10 per square mile at 3 transects, and 7 per square mile at 3 transects. The remainder of the transects had densities of 5 per square mile or less. No desert tortoise sign were found in the two transects that overlapped with a wildfire perimeter from 2005 at the northeast end of the project area. Over the project area, tortoise densities average 4 desert tortoises per square mile. Densities in the project area are therefore estimated to be very low.

Recent surveys have been conducted in the Coyote Spring Valley as part of the rangewide population monitoring program. Survey data from 2005 line-distance sampling in the Coyote Spring Valley, which includes transects in the CSI private and lease lands located in the Mormon Mesa Critical Habitat Unit (CHU), estimate the tortoise densities in the valley to be 8.3 tortoises per square mile (Service unpublished data). Over the first five years of line-distance sampling monitoring, tortoises were least abundant in the Northwest Mojave Recovery Unit (2 to 8 tortoises per square mile) as compared to other recovery units (Service 2006b). Tortoise

densities in the Coyote Spring Valley are therefore among the highest in the recovery unit. These results are preliminary and additional analysis is needed, incorporating 2006 and 2007 survey results. Desert tortoise clearance surveys were conducted in 2006-2007 in the southern part of the Coyote Spring Valley. One hundred percent clearance surveys were conducted on 5,302 acres of CSI private lands in Clark County as of January 2008. Based on the total number of tortoises cleared during surveys (108 adults and juveniles), we estimate a density of around 13 tortoises per square mile on the CSI private lands in Clark County.

Older desert tortoise survey data exists for the action area including BLM strip triangle surveys and the Coyote Springs Permanent Study Plot (PSP). Prior to 1991, BLM surveyed for tortoises using the strip triangle method, recording all tortoise sign within approximately 5 meters (15 feet) of the transect and estimating species density based on methods described by Karl (1981) for southern Nevada. Densities within one half mile of Kane Springs Road ranged from high to very low. Densities averaged medium (45 - 90 tortoises per square mile) and low (10 - 45 tortoises per square mile) over the project area. Densities on the northeast part of the project area were very low (0 - 10 tortoises per square mile). It appears that densities have declined somewhat since 1991.

The closest 1-square-mile PSP to the project area is the Coyote Spring plot, which is located 1.9 miles east of US 93 and 1.9 miles north of Kane Springs Road. This plot was established in 1986 and resurveyed in 1992 and 1995. EnviroPlus Consulting (1995) characterized this site as having moderately high tortoise numbers, with a size distribution typical of that observed on other PSPs and a significantly skewed sex ratio with female tortoises comprising two-thirds of the observed sub-adult and adult population (however, this effect was not significant for tortoises >208 mm mid-carapace length). Over the three survey periods, total estimated population size on the plot ranged from 96 ± 31 to 116 ± 29 (Esque1986, Converse Environmental Consultants Southwest, Inc. 1992, EnviroPlus Consulting 1995). This is considerably higher than densities in the action area. The annual adult mortality rate for the Coyote Spring plot in 1995 was estimated at 4 percent, which is higher than the 2-3 percent rate that the Service believes necessary to sustain desert tortoise populations (Service 1994). However, the tortoise population at the Coyote Spring PSP was apparently stable over the 10 years that the surveys spanned (EnviroPlus Consulting 1995).

Tortoises with symptoms of cutaneous dyskeratosis and URTD were observed during plot surveys; however, comparisons across survey periods are unreliable due to differences in diagnosis/evaluation criteria used to evaluate health status. In 1995, approximately one-third of tortoises had trauma-related injuries, likely caused by a predator. Overall, mortality by predation was characterized as present, but not at a high rate. Human impacts on tortoise populations in this area were considered low and inconsequential (EnviroPlus Consulting 1995). The PSP is located in the northern part of the Coyote Spring Valley and BLM strip triangle survey data corroborates that this area north of the Kane Springs Road and east of US 93 has higher tortoise densities than the surrounding areas with several very high density (greater than 140 tortoises per square mile) and high density (90 -140 tortoises per square mile) survey triangles.

b. ***Desert Tortoise Critical Habitat - Status within the Action Area and the Mormon Mesa CHU***

The project area is located mostly within the 427,900 acre Mormon Mesa CHU of the Northeastern Mojave Recovery Unit for the desert tortoise. The primary vegetation community within the Mormon Mesa CHU is creosotebush-white bursage desert scrub, which in Nevada is found in broad valleys, lower bajadas, plains and low hills of the Mojave Desert. Shrub cover is sparse to moderately dense, consisting primarily of creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) with a variety of different shrubs and cacti as co-dominants or understory species. Where poorly-drained soils with high salt and clay content are found on valley bottom floors, pockets of salt desert scrub community may be present, typified by one or more *Atriplex* species.

The CHU boundaries were based on proposed desert wildlife management areas (DWMAs) in the Draft Desert Tortoise Recovery Plan. The land management agencies have subsequently designated areas of critical environmental concern (ACECs) in each DWMA, where they are managing the land as reserves. In general, land management activities that may negatively affect the desert tortoise and its habitat such as domestic livestock grazing, grazing by wild burros and horses, commercial harvest of desert flora, and off-road vehicle use are mostly restricted or not allowed in these areas, as per Recovery Plan recommendations. The Mormon Mesa CHU contains the following ACECs: Kane Springs, Coyote Springs, and Mormon Mesa. The project area is in the Kane Springs ACEC.

CSI owns 29,055 acres of lands in Coyote Spring Valley, in Clark and Lincoln counties, Nevada, all of which is designated critical habitat for the desert tortoise. In addition CSI has a lease for approximately 13,767 acres of BLM-administered land in Coyote Spring Valley for 99 years. In Clark County, CSI is currently constructing a residential and golf community with associated commercial development on 6,881 acres of private land. Construction will occur over 25 years, with an eventual build out of 29,000 residential units, approximately 72,500 residents, and a visitor capacity equal to 14,500 residents (based on full-time equivalency). In Lincoln County, CSI proposes to develop 21,454 acres of private land over a 40 year period. It is estimated that there would be up to 111,000 residential units, resulting in an increase of population of 275,300 residents in Lincoln County. CSI plans to create a natural reserve on 13,767 acres of BLM leased land (approximately 7,548 acres in Lincoln County and 6,219 acres in Clark County).

EnviroPlus Consulting (1995) characterized the Coyote Spring PSP as having low historical and present-day human impact: Old Highway 93 was rarely used and had large shrubs growing through cracks in the pavement; little trash was observed on the plot; no power lines were present; no cattle or burros were observed; and while a few old two-track roads were discernible for short distances, none appeared to be recently made. Furthermore, this area was characterized as having somewhat variable but adequate tortoise habitat, with abundant forage and good soil for burrowing (EnviroPlus Consulting 1995).

The Mormon Mesa CHU is highly fragmented with an extensive network of primarily unimproved and two-track roads. The Desert Tortoise Recovery Plan (companion document for proposed DWMAs, Service 1994), describes this area as having the highest density of roads and trails (1.3 linear miles per square mile) of any desert tortoise *crucial* habitat in southern Nevada based on a 1984 status report [crucial habitat was defined by BLM in the California Desert Plan (1980) as "...Portions of the habitats of sensitive species that if destroyed or adversely modified could result in their being listed as threatened or endangered pursuant to section 4 of the Act or in some category implying endangerment by a State agency or legislature."]. US 93 runs along the western edge and bisects the southwestern tip of the unit, providing a substantial barrier between the unit and protected tortoise habitat in the Desert NWR to the west. State Route (SR) 168 also runs through the western part of the CHU, and I-15 traverses the southeastern edge of the unit. Other well-established roads include the Kane Springs Road and the Carp-Elgin Road which bisects the unit. Powerlines, pipelines, and access roads dissect much of the area.

The 2005 wildfire season in southern Nevada was severe due in large part to the high bio-mass of flammable non-native annual grasses after above-average moisture conditions the previous winter. Approximately eight acres in the northeast part of the project area burned in 2005 in the Meadow Valley Fire, which burned approximately 148,000 acres overall, including a small amount of the Mormon Mesa CHU. In total, over 56 fires of various sizes in southern Nevada, southwestern Utah, and northern Arizona burned roughly 964,806 acres in the Northeastern Mojave Recovery Unit in 2005 including 15,559 acres (4 percent) within the Mormon Mesa CHU. The wildfire hazard in the Mormon Mesa CHU remains significant although fire activity in 2006 and 2007 was lower due to dryer conditions over the winter and spring. Monitoring of the 2005 fires in critical habitat being conducted by the U.S. Geological Survey (USGS) shows that proportionally less tortoise activity occurred in burned areas (treatment plots and control plots) compared to unburned reference plots.

The Mormon Mesa CHU is primarily in Federal ownership, administered by BLM. In addition to CSI's private lands, there are several small privately-held parcels along the Meadow Valley Wash that are within or adjacent to the CHU. Other privately-held lands or Federal land slated for disposal adjacent or near the Mormon Mesa CHU have the potential for future development. Land near the extreme southwestern tip of the Mormon Mesa CHU and northeast of Las Vegas is also in private ownership. Future development of these private lands, as well as possible future disposals of Federal land to allow for expansion of existing cities will create additional challenges for the Service and Federal lands managers in terms of management of the Mormon Mesa DWMA/ACEC, and conservation and recovery of desert tortoises in the Mormon Mesa CHU.

c. *Moapa Dace - Status within the Action Area*

The action area encompasses the entire range of the Moapa dace. Population numbers were discussed in detail in the section entitled "Status of the Species Rangewide, C. Moapa Dace;" thus, no further details are provided here. The relationship of the dace's habitat to groundwater is discussed in more detail below.

2. Factors Affecting the Listed Species/Critical Habitat in the Action Area

The action area is located primarily within the Kane Springs Valley, Coyote Spring Valley and Muddy River Springs Area hydrographic basins. These basins are part of the White River Groundwater Flow System, a regional groundwater flow system located in southern Nevada (Eakin 1966, Harrill *et al.* 1988, Prudic *et al.* 1993). The flow system consists of numerous local basin fill aquifers underlain by a large regional carbonate aquifer that transmits groundwater from basin to basin, beneath topographic divides. Groundwater inflow or recharge to the regional carbonate aquifer is primarily through precipitation. The terminal discharge of the White River Groundwater Flow System is most likely the Warm Springs in the Upper Moapa Valley, an area consisting of about twenty regional springs, with numerous seeps and wetlands. Since the Moapa dace is dependent upon these springs for survival it is important to discuss the hydrology of this area in more detail.

The source water supporting spring discharge in the Warm Springs Area is from the regional carbonate groundwater (62 percent) and from local recharge based on precipitation in the surrounding mountain ranges (BLM 2008). The production wells in the Kane Springs Valley that would be pumped under the proposed action are located about 20 miles northwest of the Warm Springs Area. The high permeability and transmissivity of the carbonate aquifer underlying the Kane Springs Valley and down-gradient Coyote Spring Valley could connect the proposed action to springs in the Warm Springs Area. Long-term effects from groundwater extraction could be propagated over great distances. Barriers to flow, such as faults or rock units with low permeability, also affect the extent of drawdown. There may be a break in the regional hydraulic gradient at the location of the Kane Springs Wash fault zone; however until additional long-term pumping data are obtained, the true relationship cannot be fully evaluated (BLM 2008).

a. Existing Groundwater Rights and State Engineer Rulings in the Action Area:

Groundwater wells within the Kane Springs Valley and Coyote Spring Valley Hydrographic Basins are associated with municipal, mining, industrial, commercial and irrigation use. Permitted diversion rates for existing wells vary from 145 to 7,242 afy. Within the Kane Springs Valley Hydrographic Basin, permitted water rights are limited to the LCWD/VWC applications recently approved by the State Engineer under Ruling 5712. The LCWD has an additional four groundwater applications pending before the Nevada State Engineer. Currently, in the Kane Springs Valley Hydrographic Basin permitted groundwater rights are 1,000 afy (BLM 2008).

In the Coyote Spring Valley Hydrographic Basin, groundwater rights filed with the Nevada State Engineer include 15 industrial use permits owned by SNWA, 4 municipal use permits owned by CSI, 1 industrial use permit owned by Nevada Power Company, and 4 permits owned by Bedrock Limited, LLC associated with sand and gravel mining operations. Bedrock Limited, LLC also has one vested application for irrigation use. Currently, in the Coyote Spring Valley Hydrographic Basin permitted groundwater rights are 16,304 afy (BLM 2008). There are 34 pending applications by Las Vegas Valley Water District (LVWD); CSI; Dry Lake Water, LLC;

and Bedrock Limited, LLC in the Coyote Spring Valley Hydrographic Basin. A list of surface water and groundwater rights in the Kane Springs Valley and Coyote Spring Valley hydrographic basins is provided in Appendix D of the Kane Springs Valley Groundwater Development EIS (BLM 2008).

There are three Nevada State Engineer rulings that affect the withdrawal of groundwater in the action area. In these rulings the Nevada State Engineer has required "staged development," an incremental approach for phasing in development of the carbonate aquifer with adequate monitoring in cooperation with other parties in order to assist in assessing effects. This approach was adopted by the Nevada State Engineer "...in order to predict, through the use of a calibrated model, the effects of continued or increased development with a higher degree of confidence." Ruling 5712, granting 1,000 afy of groundwater from the Kane Springs Valley to LCWD and VWC was summarized in the section entitled "Description of the Proposed Action." The other two rulings are summarized below.

In Order 1169 issued in 2002, the Nevada State Engineer held in abeyance applications for new groundwater rights in the Coyote Spring Valley, Black Mountains Area, Garnet Valley, Hidden Valley, Upper Moapa Valley, and Lower Moapa Valley groundwater basins until a pump test is completed. All major water right holders in these basins (SNWA, LVVWD, Moapa Valley Water District [MVWD], CSI, and Nevada Power Company) were required to 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. Order 1169 is designed to evaluate how groundwater pumping activities in Coyote Spring Valley will impact water rights and the environment within the Warm Springs Area, including the Muddy River ecosystem. Data obtained from the study will be used to evaluate groundwater development activities within the regional carbonate groundwater system.

To date, there has been limited pumping of the permitted groundwater rights in Coyote Spring Valley. In 2005, CSI drilled and pump tested two wells in Coyote Spring Valley under Nevada Division of Water Resources permit numbers 70429 and 70430. Currently, CSI is monitoring and pumping water as needed for their development activities in Clark County.

In Ruling 4243 in the Muddy River Springs Area Hydrographic Basin, the Nevada State Engineer granted permits to MVWD for 5,800 afy from Arrow Canyon Well, but with pumping phased in over a 10-year period while monitoring surface water flows and groundwater levels in order to assess potential effects to wells and springs. Annual volume pumped is limited to annual demand, up to the maximum permitted. Annual pumping has consistently been less than the amount allowed in the ruling.

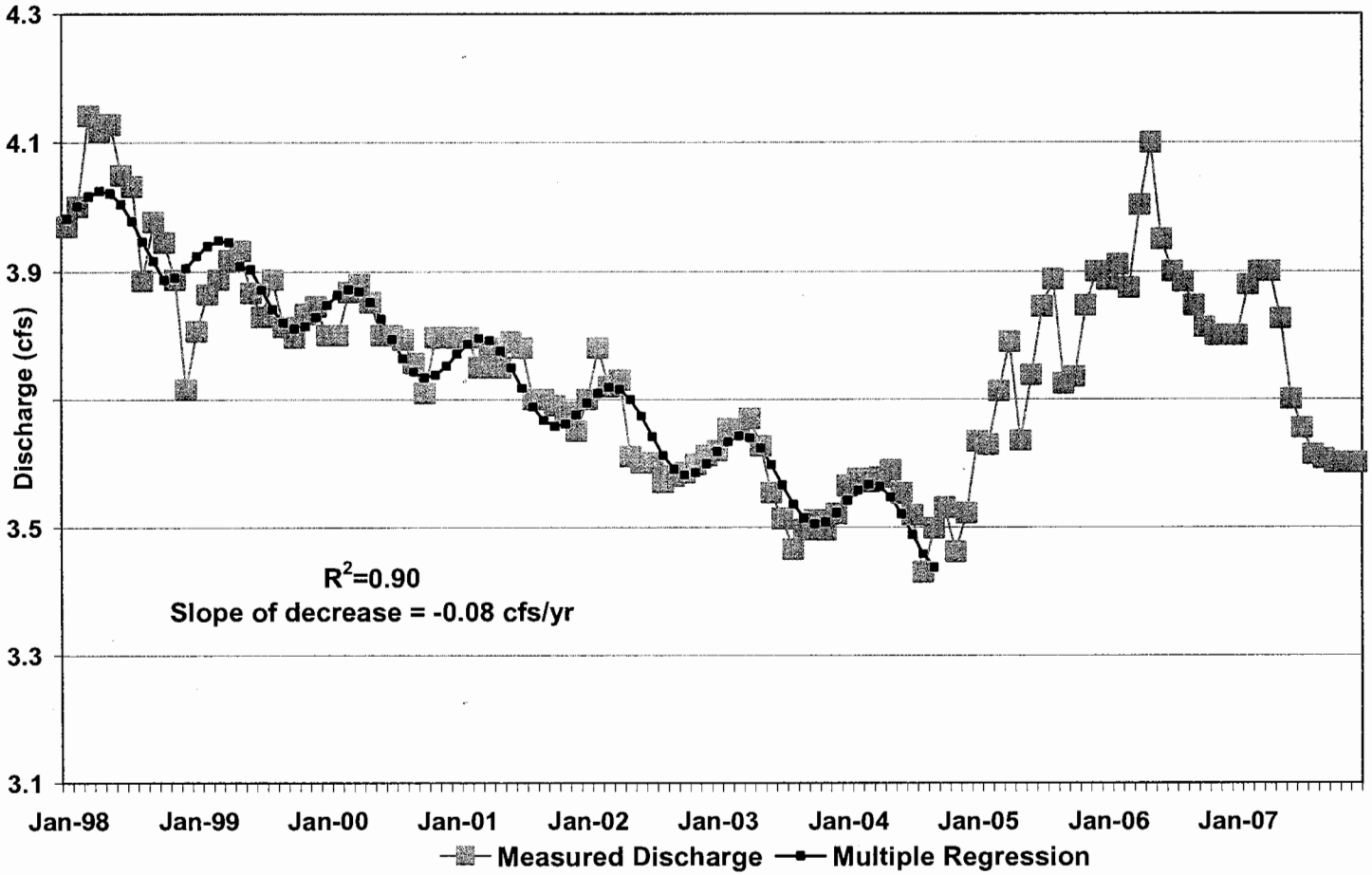
As of 2002, the Nevada State Engineer had granted a total of approximately 14,800 afy of groundwater permits for the alluvial and carbonate aquifer in the Muddy River Springs Area Hydrographic Basin (Service 2006c). Included in these are MVWD permits for the Arrow Canyon Well totaling 7,240 afy (1,440 afy prior to Ruling 4243 plus 5,800 afy from Ruling 4243) from the carbonate aquifer. To date, the actual pumping from the Arrow Canyon Well has

been far less than the permitted volume. Approximately 2,400 afy has been pumped on average since 1998.

Concurrent with groundwater pumping between 1998 and 2004, groundwater levels and spring discharge in the Warm Springs Area consistently declined (Service 2006c). Over the same period, the total spring discharge from the Pedersen Unit, as measured at Warm Springs West, decreased from 4.00 cfs to 3.55 cfs (Service 2006c) (Figure 2). The discussion in Mayer (2004) shows that the observed decreases in spring discharge are consistent with expected decreases based on the two-foot decline in groundwater levels observed in the carbonate monitoring wells in the Warm Springs Area. The extremely wet winter of 2005 appears to have recharged the springs with monthly discharge peaking at 4.1 cfs in May of 2006, and decreasing since that time (Mayer 2008). This is expected to be a transient response but the timing and level of a return to equilibrium conditions is not known for certain. Discharge has currently declined to 3.6 cfs (USGS 2008).

The exact timing of the groundwater level decline is important because if the actual decline precedes in time any action or event suspected of causing the decline (such as increased pumping or drought), then this is strong evidence that there are other factors causing the decline. The Service (2006c) analyzed the timing of the decline as it was concerned about the rate and magnitude of the 1998 to 2004 decrease. The start of the decline coincides with MVWD's increased pumping from the carbonate aquifer. In order to address the possibility that drought caused the groundwater level declines, the Service (2006c) compiled precipitation records from a number of stations in the southeastern Nevada area. Their analysis showed that the decline from 1998 to 2004 was not likely to be drought-related. These declines observed between 1998 and 2004 have occurred not only locally in the Warm Springs Area, but have also occurred in monitoring wells 12 miles upgradient in Coyote Spring Valley and 15 miles south in monitoring

Figure 3: Warm Springs West, Moapa Valley NWR - USGS Average Monthly Discharge, Apr 1998 to Dec 2007



wells in the California Wash Basin, based on USGS monitoring well data and monitoring well data shared with the Service in July 2004 (Service 2006c).

On July 14, 2005, a Memorandum of Agreement (MOA) was signed by the SNWA, MVWD, CSI, Moapa Band of Paiutes (Tribe), and the Service, regarding groundwater withdrawal of 16,100 afy from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins, and establishment of conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 afy of groundwater from two basins within the regional carbonate aquifer system.

To minimize effects to the Moapa dace, conservation actions were identified in the MOA. In order to be considered a benefit to the species, the proposed conservation measures will be initiated or fully implemented prior to the proposed groundwater withdrawal of 16,100 afy. Since development of these water rights requires the construction of facilities, as identified above, there would be a two to five year timeframe in which to implement many of these actions prior to the pumping of the full amount of water. CSI would utilize a small portion of their water right in Coyote Spring Valley prior to full implementation of all of the conservation measures. The action items identified in the MOA include development of a Recovery Implementation Program, restoration, ecological studies, construction of fish barriers, eradication of non-native fish, and dedication of water rights. Minimum in-stream flow levels were established in the MOA that trigger various conservation actions should those predetermined levels be reached. The flow levels will be measured at the Warm Springs West Flume located on the Moapa Valley NWR.

b. Section 7 Consultations Completed for Activities and Projects in the Action Area

1. **File Nos. 1-5-99-F-450 and 84320-2008-F-0078:** On March 3, 2000, the Service issued a programmatic biological opinion (File No. 1-5-99-F-450) to BLM's Ely District Office for implementation of actions in the Caliente Management Framework Plan Amendment (CMFPA). The planning area consisted of public lands in White Pine, Lincoln, and a portion of Nye counties in east-central Nevada. Cumulatively, 25,521 acres of desert tortoise habitat were projected to be affected by the proposed activities within the planning area over a 10-year period.

   On September 9, 2008, the Service issued a programmatic biological opinion (File No. 84320-2008-F-0078) to BLM for the Ely District Resource Management Plan (Ely RMP). This programmatic biological opinion superseded the March 3, 2000, programmatic biological opinion for the CMFPA. Programs in the 2008 programmatic biological opinion included: vegetation management; weed management; wild horse management; lands, realty, and renewable energy projects; travel and off-highway vehicle management;

recreation; livestock grazing management; geological and mineral extraction; and fire management.

Implementation of multiple-use activities (excluding vegetation and weed management) were projected to result in the disturbance of 22,624 acres of desert tortoise critical habitat and 37,311 acres of desert tortoise habitat. During the 10-year term of the programmatic biological opinion, the Service authorized the take of no more than 47 desert tortoises and estimated that 972 tortoises would be taken by non-lethal means (i.e. harassment).

2. **File Nos. 1-5-94-F-334, 335, 336, and 035:** On May 15, 1995, the Service issued a non-jeopardy biological opinion to BLM for the issuance of a right-of-way to install four proposed fiber-optic lines in Clark and Lincoln counties, Nevada. Four applicants comprising the Fiber Toll Joint Venture Project requested a 7.6-m-wide (25-foot-wide) right-of-way for construction of four buried fiber-optic lines. Segments of these lines would parallel SR 168 for approximately 23 miles, and for 43 miles along US 93 (File Nos. 1-5-94-F-334 and 336). Approximately 98 and 65 acres of long- and short-term habitat disturbance, respectively, was attributed to the two segments adjacent to US 93 and SR 168 described above, a majority of which runs through the action area for the CSI project. This included approximately 53 acres of long-term disturbance and 35 acres of short-term disturbance to designated critical habitat (Mormon Mesa CHU) for the desert tortoise. The Service anticipated that up to 34 tortoises would be incidentally taken, 8 through mortality and 26 through injury or harassment.

3. **File No. 1-5-98-F-053, as amended:** On June 18, 1998, the Service issued a programmatic biological opinion to BLM for implementation of the Las Vegas Resource Management Plan (RMP). The project area for this consultation covers all lands managed by BLM's Las Vegas Field Office, including desert tortoise critical habitat, desert tortoise ACECs, and BLM-withdrawn land. The Las Vegas Field Office designated approximately 648 square miles of tortoise habitat as desert tortoise ACEC in the Northeastern Mojave Recovery Unit, and approximately 514 square miles of tortoise habitat as desert tortoise ACEC in the East Mojave Recovery Unit, through the final RMP. As identified in the RMP, BLM manages 743,209 acres of desert tortoise habitat within four tortoise ACECs for desert tortoise recovery. To accomplish desert tortoise recovery in the Northeastern and Eastern Mojave Recovery Units, the Las Vegas Field Office implements appropriate management actions in desert tortoise ACECs.

4. **File No. 1-5-98-FW-177:** On November 2, 1998, the Service issued a non-jeopardy biological opinion to the Nevada Fish and Wildlife Office for the implementation of eradication of non-native fish activities and installation of fish barriers in the Apcar Stream in the Warm Springs Area of the Muddy River. The Service concluded that the project was not likely to jeopardize the continued existence of the Moapa dace.

Incidental take was authorized and Reasonable and Prudent Measures were identified to minimize take to the species.

5. **File No. 1-5-99-F-411:** On December 8, 1999, the Service issued a non-jeopardy biological opinion to BLM for issuance of a right-of-way permit for the Nevada segment of the Las Vegas to Salt Lake City Long-haul Fiber-Optic Project. This consultation evaluated impacts to the desert tortoise and designated critical habitat from the construction, operation, and maintenance of a buried fiber-optic cable and related structures over an 180-mile linear stretch from the Utah-Nevada border to its terminus north of Nellis Air Force Base in Las Vegas. The section of the fiber-optic cable that runs through the Mormon Mesa CHU and CSI lands was located in NDOT's right-of-way east of US 93. The final area of disturbance was calculated at approximately 270 acres, including 158 acres of permanent impacts. The Service estimated that 4 desert tortoises may be incidentally injured or killed and 200 tortoises could potentially be affected by project activities.

6. **File No. 1-5-01-F-463:** On December 26, 2001, the Service issued a non-jeopardy biological opinion to the Bureau of Indian Affairs for approval of a lease for lands on the Reservation for construction and operation of the Moapa Paiute Energy Center. The proposed project would disturb up to 7 percent of the total available spawning habitat for the Moapa dace. As of the date of this biological opinion, the proposed project has not moved forward and the Service is not aware of any plans in the near future to construct the project.

7. **File No. 1-5-02-FW-463:** On March 13, 2002, the Service issued a non-jeopardy biological opinion to the Desert NWR Complex, Las Vegas, Nevada for the implementation of riparian and aquatic habitat restoration activities in the Pedersen Unit of the Moapa Valley NWR. The Service concluded that the incidental take of less than 10 percent of the 180-200 individuals (18-20 individuals) that may be present in the project area, would not likely jeopardize the continued existence of the Moapa dace. Reasonable and Prudent Measures were identified and implemented to minimize take of the species.

8. **File No. 84320-2008-F-0066 and 1-5-94-F-28R:** On December 20, 2007, the Service issued a biological opinion to BLM-Las Vegas for their proposal to amend an existing right-of-way for construction, operation, and maintenance of a single-circuit, overhead 500 kV transmission line (Southwest Intertie Project). The southern portion of the project begins at the Harry Allen Substation in Clark County, Nevada, crossing through the planning area, and ending approximately 34 miles north of Ely in White Pine County, Nevada. The project would disturb 231 acres of non-critical and 365 acres of critical desert tortoise habitat.

9. **File No. 1-5-05-FW-536:** On January 30, 2006, the Service issued a non-jeopardy intra-Service programmatic biological opinion for the Proposed Muddy River MOA, regarding the groundwater withdrawal by multiple parties of 16,100 afy from the regional carbonate aquifer in the Coyote Spring Valley and California Wash Basins. Given that there will be groundwater withdrawn from the same regional carbonate aquifer concurrently by different users and at different locations, it was difficult to assign loss to a specific action. The most accurate way to establish incidental take is at the landscape-level, which was analyzed in the Programmatic Biological Opinion. In that parent document, the cumulative withdrawal of 16,100 afy from all parties associated with the MOA predicted a loss of approximately 22 percent riffle and 16 percent pool habitat (as measured at the Warm Springs West gage downstream from the Pedersen Unit) when the flows reach 2.78 cfs. This amount included habitat losses potentially occurring under both the CSI development and SNWA pipeline. Three tiered biological opinions have been issued under this programmatic opinion:

   a. **File No. 1-5-05-FW-536 Tier 1:** On March 2, 2006, the Service issued a non-jeopardy tiered biological opinion to the Corps for the issuance of a Section 404 permit under the Clean Water Act of 1972, as amended, for the CSI residential development project. The Service concluded the proposed residential development is an interdependent activity with the Corps' action and will result in the permanent loss of 6,881 acres of desert tortoise habitat and take of no more than 645 desert tortoises. The proposed action falls within the scope and coverage of the 10(a)(1)(B) permit issued to Clark County for its multiple species habitat conservation plan (MSHCP), and exemption for the anticipated take of the desert tortoise is provided via the incidental take statement for the MSHCP. The Service estimated that the proposed action will result in the incidental take of Moapa dace associated with the loss of 6 percent of riffle habitat and 5 percent of pool habitat, in the Pedersen Unit. Incidental take was authorized, and reasonable and prudent measures were identified to minimize take of the species.

   b. **File No. 1-5-05-FW-536 Tier 2:** On May 9, 2007, the Service issued a non-jeopardy tiered biological opinion to BLM for a right-of-way to the SNWA to construct a water conveyance pipeline. SNWA's appropriated water right of 9,000 afy from Coyote Spring Valley would be pumped in order to participate in the Nevada State Engineer Study (Order 1169), and to provide water to the Moapa Valley area for residential and commercial purposes. The right-of-way would allow construction of approximately 16 miles of 24-inch diameter pipeline to transport water from three existing groundwater pumping wells in the southern end of the Coyote Spring Valley to an existing storage tank and pipeline. The Service estimated that 12 percent of riffle habitat and 9 percent of pool habitat will be lost due to the withdrawal of 9,000 afy associated with the SNWA action; however there were other factors which complicated the establishment of incidental take at this level for the proposed action.

c. **File No. 1-5-05-FW-536 Tier 3:** On August 6, 2007, the Service issued a non-jeopardy tiered biological opinion to the U.S. Department of Housing and Urban Development for construction of a water pipeline from an existing well on the Moapa River Indian Reservation to the Moapa Valley of Fire Travel Plaza. The use of 7 of the 16,100 afy for the proposed Travel Plaza will independently have no significant impact on the Muddy River Springs area discharge and subsequently the Moapa dace, but was authorized under the Programmatic Biological Opinion.

On October 22, 2008, the Service issued a non-jeopardy intra-service biological opinion for the Coyote Springs Investment Planned Development Project Multiple-Species Habitat Conservation Plan (MSHCP) (File No. 84320-2008-F-0113). The Service subsequently issued a 40-year incidental take permit to CSI under the authority of section 10(a)(1)(B) of the Act. The Permit covers take of desert tortoise on up to 21,454 acres of private lands in Lincoln County, and management of 13,767 acres of lease lands in Clark and Lincoln counties as the Coyote Springs Investment Conservation Lands. Groundwater withdrawal is not a Covered Activity in the CSI MSHCP. Groundwater withdrawals and their effects to the Moapa dace are subject to evaluation under separate biological opinions for several groundwater development projects, and any appropriate incidental take would be authorized through those biological opinions when issued, or under section 10 (a)(1)(B) if these actions did not involve a Federal agency.

E. Effects of the Proposed Action on the Listed Species/Critical Habitat

Effects of the action refer to the direct and indirect effects of the proposed action on the listed species, together with the effects of other activities that are interrelated and interdependent with that action. Direct effects encompass the immediate, often obvious effect of the proposed action on the listed species or its habitat. Indirect effects are caused by or will result from the proposed action and are later in time, but still reasonably certain to occur. In contrast to direct effects, indirect effects can often be more subtle, and may affect listed species populations and habitat quality over an extended period of time, long after project activities have been completed. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

1. Effects to the Desert Tortoise (Mojave Population)

Linear construction projects can negatively affect desert tortoise populations. Studies suggest that differences in the extent of the threat are related to the scale of the project, the ability of crews to avoid disturbing burrows, and timing of construction to avoid peak activity periods of tortoises (Boarman 2002). In addition to the discrete disturbance points formed by towers and lines, maintenance roads and repeated operations can (1) introduce continuous sources of disturbance and (2) provide potential sites for invasion of exotic species. Rights-of-way can

cause habitat destruction and alteration where vegetation is minimal, possibly increasing mortality, directly or indirectly (Boarman 2002).

Direct impacts to the desert tortoise would be the permanent and temporary loss of habitat utilized by tortoises for foraging, breeding, and cover. Approximately 21 acres will be permanently lost by the construction of well houses and well power substations, water storage tanks, access roads, ancillary pipeline facilities, and power poles. Approximately 188 acres will be temporarily lost by the construction of the pipelines, power lines, fiber optic line, temporary access roads, and temporary workspaces such as pipe and power line laydown areas, power line pulling sites, staging areas, and construction easements. Many of these activities will involve blading and excavation of the area. These areas will be rehabilitated as described in the Revegetation Plan in the Plan of Development; however, it will likely take a long time (potentially more than 10 years) before these areas can provide foraging and cover sites for the desert tortoise.

Other areas that have heavy machinery moving over them will have crushed vegetation and compacted soil. LCWD and BLM propose to salvage topsoil during excavation and to reuse the topsoil later as cover on disturbed areas to facilitate re-growth of vegetation. LCWD and BLM will also flag the work areas so that unauthorized habitat removal does not occur.

Any tortoise within the construction area during work activities would be highly vulnerable. Desert tortoises may be killed or injured by project vehicles and equipment in the project area. Construction equipment and vehicles could crush tortoises or collapse burrows both occupied and unoccupied if not located during clearance surveys. Project vehicles and equipment that stray away from designated access roads and areas may crush desert tortoises aboveground or in their burrows. Tortoises may take refuge underneath project vehicles and equipment and be killed or injured when the equipment or vehicle is moved. Blasting during construction could collapse burrows and injure tortoises. Tortoises that wander into the project area could also fall into holes or trenches from which they are unable to escape. The following measures proposed by LCWD and BLM should reduce these potential effects to desert tortoises: 1) conduct tortoise clearance surveys within the project area; 2) enforce a 25 mph speed limit on project access roads; 3) cease project activities that may endanger a tortoise until it is moved out of harm's way by an authorized desert tortoise biologist; 4) present a worker education program; 5) cover construction holes left open overnight and check trenches twice daily to check for entrapment of wildlife; and 6) restrict vehicles and equipment to the work area boundaries and designated access roads.

Tortoises moved during clearance surveys and tortoises that are physically moved out of harm's way to prevent mortality or injury could be inadvertently harmed if not handled properly. Urine and large amounts of urates are frequently voided during handling and may represent a severe water loss, particularly to juveniles (Luckenbach 1982). Overheating can occur if tortoises are not placed in the shade when ambient temperatures equal or exceed temperature maximums for the species (Desert Tortoise Council 1994, revised 1999). Tortoise eggs moved during clearance

surveys could also be harmed if not handled properly. The following measures proposed by LCWD and BLM should reduce these potential effects to desert tortoises: 1) implementing a worker education program; 2) utilizing Service-approved protocols for handling desert tortoises and tortoise eggs; and 3) ensuring that only authorized individuals handle tortoises.

The resulting indirect impacts to the desert tortoise may include the risk of death, injury, or lower reproductive potential through increased predation and degradation and fragmentation of the habitat surrounding the project area. There is a potential for an increase in the number of predatory and scavenger species due to the presence of humans and improper disposal of trash. Workers associated with the proposed project may provide food in the form of trash and litter; or water, which attracts important tortoise predators such as the common raven, kit fox, and coyote (BLM 1990, Boarman and Berry 1995). Natural predation in undisturbed, healthy ecosystems is generally not an issue of concern. However, predation rates may be altered when natural habitats are disturbed or modified (BLM 1990). Ravens likely would be attracted to human activities and buildings for perch sites and food sources, increasing the potential for predation on juvenile desert tortoise in adjacent habitats. LCWD and BLM will implement a litter-control program and a worker education program to avoid or minimize these potential effects.

The project may degrade habitat in the surrounding landscape by introducing non-native weeds or plants into the project area, which later spread in to the surrounding desert, increasing fuel loads for wildfires and competing with native forbs and shrubs. Land clearing activities in the project area may lead to increased soil erosion especially on steeper slopes. The following measures proposed by LCWD and BLM should help reduce these potential effects to desert tortoise habitat: 1) implementation of a Stormwater and Pollution Prevention Plan; 2) implementation of a Revegetation Plan; and 3) implementation of a Noxious Weed Management Plan.

Following construction, the public may use project access roads which may result in adverse effects to tortoise populations. Humans use the desert for off-road exploration, casual shooting and target practice, personal or commercial collection of animals and plants, searches and digging for minerals and gems, geocaching (GPS guided stash hunts), and even the production of illegal drugs. Desert tortoise shells found in the Mojave Desert with bullet holes were examined forensically with the finding that the tortoises were alive when they were shot (Berry 1986), suggesting that illegal shooting of tortoises could occur. Project personnel could illegally collect tortoises for pets or bring dogs to the project area. Measures proposed by LCWD and BLM to 1) clear project areas of tortoises, 2) prohibit pets from the project area, 3) impose a speed limit, and (4) close unnecessary roads following construction and control public access, should minimize the potential effects to the tortoise described above.

2. Effects to Critical Habitat for the Desert Tortoise (Mojave Population)

Direct impacts to desert tortoise critical habitat would be the permanent and temporary loss of areas that contain the PCEs of desert tortoise critical habitat. Approximately 18 acres will be

permanently lost by the construction of well houses and well power substations, water storage tanks, access roads, ancillary pipeline facilities, and power poles. Approximately 155 acres will be temporarily lost by the construction of the pipelines, power lines, fiber optic line, temporary access roads, and temporary workspaces such as pipe and power line laydown areas, power line pulling sites, staging areas, and construction easements. Many of these activities that temporarily impact areas will involve blading and excavation of the area which would remove all of the PCEs of critical habitat. These areas will be recontoured and rehabilitated as described in the Revegetation Plan; however, it will likely take a long time before these areas can provide a sufficient quantity and quality of forage species (PCE 2) and sufficient vegetation to provide shelter from temperature extremes and predators (PCE 5). Other areas that have heavy machinery moving over them, will impact PCE 3 (suitable substrates for burrowing, nesting, and overwintering), PCE 4 (burrow, caliche caves, and other shelter sites), and PCE 5. These areas will also likely take a long time to recover and may also need some revegetation or soil de-compaction treatments. LCWD proposes to salvage topsoil during excavation and to reuse the topsoil later as cover on disturbed areas to facilitate re-growth of vegetation. As per the Revegetation Plan only native species will be used and cacti and yucca will be salvaged when possible.

Indirect impacts to the desert tortoise critical habitat may include fragmentation of the habitat surrounding the project area which will degrade PCE 1 (space to support viable populations and to provide for movement, dispersal, and gene flow). Since the project is linear, it has a greater potential to fragment habitat, although it does follow the existing Kane Springs Road. The project is in the LCCRDA corridor which is 0.5 miles wide. This project is the first to use this designated utility corridor so it may have greater impacts than future projects, although the proposed development on CSI lands in Lincoln County will be a greater barrier to tortoise movement.

Indirect impacts also include the introduction or spread of non-native plants in the project area and into the surrounding landscape which may impact PCE 2 and PCE 5. If red brome increases in the project area or surrounding landscape, this could increase the fuel load which increases the chance of large scale fires. Red brome can often out-compete native species because red brome extracts soil water and nutrients more rapidly than similar native annuals (DeFalco *et al.* 2003) and also reduces the growth of mature native perennials (DeFalco *et al.* 2007b). The project could also introduce new non-native plants into the area which could impact PCE 2 and PCE 5 in the future. LCWD and BLM should help reduce these potential effects to critical habitat by the implementation of a Noxious Weed Management Plan and the implementation of a Fire Management Plan. The Noxious Weed Management Plan includes the following measures: survey of area prior to land clearing, cleaning of vehicles and equipments, treating weed infestations, post-construction monitoring and employee education.

Project activities could also increase soil erosion. Increased soil erosion could negatively impact PCE 2, PCE 4, and PCE 5. LCWD and BLM should help reduce these potential effects to critical habitat by the implementation of a Stormwater and Pollution Prevention Plan.

3. Effects to the Moapa Dace

The Moapa dace will not be directly affected by the physical construction of the proposed groundwater wells, pipelines, and power facilities; however, groundwater pumping will likely indirectly affect the headwater spring discharges of the Muddy River, and therefore, the Moapa dace. The magnitude and timing of impacts from pumping in Kane Springs Valley are uncertain. Differences in boundary conditions relating to the areal extent of the aquifer, location of the pumping, transmissivity, and permeability, all influence the magnitude and timing of pumping impacts. Also, if the proposed pumping lowers carbonate water levels in the Warm Springs Area further, not all springs will be affected equally. The decrease in spring discharge will be proportional to the decrease in head elevation at each spring. Higher elevation springs have a lower head difference initially and are therefore more susceptible to decreases in groundwater levels. Therefore, the higher elevation springs will be affected proportionately more for a given decline in groundwater levels. The highest elevation springs occur on the Pedersen Unit of the Moapa Valley NWR, an area which also comprises some of the most important spawning habitat for Moapa dace in the system.

As discussed in the programmatic biological opinion for the Muddy River MOA (Service 2006c), existing data suggests that current groundwater pumping of the Arrow Canyon Well is causing a decline in the regional carbonate aquifer levels locally and in the Coyote Spring Valley, and a decrease in spring discharge in the Warm Springs Area (Mayer 2004). The average pumping rate at the Arrow Canyon Well since 1998 has been 3.3 cfs or 2,400 afy. Pumping rates will increase with commencement of the pump test, and may further increase pending the outcome of the pump test and associated monitoring. The proposed action includes pumping of an additional 1,000 afy from the same regional carbonate aquifer. The pumping will be located along the same flow path that supplies the Warm Springs Area and is within the low-gradient, high-transmissivity zone that connects Kane Springs Valley, Coyote Spring Valley and the Warm Springs Area.

Under the terms of the stipulated agreement, if the Average Flow Level reaches 3.15 cfs or less but greater than 3.0 cfs at the Warm Springs West gage, LWCD and VWC agree to reduce pumping from all wells in Kane Springs Valley by 50 percent. This would mean pumping at these flow levels would be reduced to 500 afy. If the Average Flow Level reaches 3.0 cfs or less, LWCD and VWC agree to cease pumping from all wells in Kane Springs Valley until the Average Flow Level exceeds 3.0 cfs. The exact magnitude and timing of the impacts from pumping groundwater from the carbonate aquifer in Kane Springs Valley are unknown at this time, as are the effects of reduced or cessation of groundwater pumping or whether there will be some equilibration of the aquifer to the proposed pumping.

In the programmatic biological opinion for the MOA, the Service (2006c) used the potential effects on spring discharge at the Warm Springs West gage to predict potential effects to Moapa dace habitat. The results indicated that both spring discharge and dace habitat are reduced with declines in groundwater levels. Flows and habitat loss were projected as a function of

incremental declines in groundwater levels (Service 2006c). If flows were reduced to 3.02 cfs at the Warm Springs West gage this would be a 25 percent reduction of flows from the 1998 conditions which would reduce riffle habitat by 17 percent and pool habitat by 13 percent in the Petersen Unit. Because pumping for the Kane Springs project will occur concurrently with the potential pumping of 16,100 afy in the carbonate aquifer of White River Flow System, only a very small amount of this possible reduction would be attributable to pumping in Kane Springs Valley. Given the amount of 1,000 afy authorized by the State Engineer, effects from this project will be difficult to tease apart from effects of pumping 16,100 afy as described in the programmatic biological opinion for the MOA. However, monitoring of the Kane Springs wells concurrent with other monitoring under the MOA will lend greater understanding to the overall effects.

The primary effect to the Moapa dace of diminished flows within the spring channels will be a decrease in the hydraulic conditions that create the diversity of habitat. A decrease in velocity and depth within riffles would result in a decrease of invertebrate and phytoplankton (food) production. Drift stations in pools are maintained by the scouring effect of turbulent flow. Scour will decrease in pools as water velocity and depth at the upstream end of the pool decreases. Perhaps the most prominent impact that would occur, as a result of decreased discharge and subsequent depth, is the reduction of overall volume of water that will be available to the species within the channel. Scoppettone *et al.* (1992) demonstrated that Moapa dace size is scaled to water volume. Thus, larger water volumes provide the habitat necessary for increased food production and subsequently larger fish, therefore greater fecundity. Hence, more numerous, larger eggs provide a better opportunity for the long-term survival of the species.

Additional factors that would influence channel and hydraulic characteristics within the stream channels following a decline in spring discharge include, but are not limited to, changes in sediment transportation rates, and the alteration of riffle and pool maintenance that is accomplished at the present rate of discharge in each spring channel. Additionally, vegetative encroachment and subsequent channel obstruction may also occur as the wetted cross sectional area of the channel decreases, and new surfaces become exposed for vegetation growth. Decreases in these parameters will likely have an adverse impact on the overall diversity and quantity of hydraulic habitat.

The Pedersen Unit of the Moapa Valley NWR is one of the six spring complexes that the Moapa dace depends on for successful reproduction. It includes the highest elevation spring, presumed most susceptible to groundwater level declines. The analysis presented in the programmatic biological opinion for the MOA (Service 2006c) estimated that at 3.02 cfs, there is a 25 percent loss in flow on the Pedersen Unit from 1998 conditions. This loss is estimated to reduce available riffle habitat by 17 percent and pool habitat by 13 percent within the Pedersen Unit. In addition to the loss of habitat, decreased flows would also result in a loss of temperature that would extend downstream, thereby reducing the thermal load in the system and thus the amount of available habitat at the appropriate spawning temperature. The additional 1,000 afy of groundwater pumping under the Kane Springs Groundwater Development Project would

potentially increase overall habitat loss and temperature declines, however, trigger levels identified in the Monitoring, Management and Mitigation Plan (starting at 3.2 cfs or less) are a higher threshold than those established under the MOA. Accordingly, adverse effects on Moapa dace habitat should be prevented.

Conservation Measures Identified to Minimize Effects of the Proposed Action

Guaranteed Groundwater Pumping Reductions (Trigger ranges): LCWD and VWC have agreed to reduce groundwater pumping by half in the Kane Springs Valley should stream flows reach 3.15 cfs or less but greater than 3.0 cfs at the Warm Springs West gage. The groundwater pumping will be stopped in the Kane Springs Valley should stream flows reach 3.0 cfs or less at the Warm Springs West gage. This conservation measure will result in a reduction in the rate of decline of water levels and spring discharge. Further reduction in the rate of decline will depend on the effect of remaining groundwater pumping by other parties in the Coyote Spring Valley, California Wash, and the Warm Springs Area.

Restore Moapa Dace Habitat Outside of the Moapa Valley NWR Boundary: LCWD and VWC agreed to provide funds annually for five years to be used for habitat restoration outside of the Moapa Valley NWR boundary to promote recovery of the Moapa dace. This funding will be applied towards various on-going or proposed activities that would improve and secure habitat that is currently not being utilized due to degraded conditions (i.e. illegal diversions or non-native species presence). The funding will provide a mechanism to restore habitat to a level that would provide a higher quality of habitat for the species. These habitat improvements would contribute to the long-term survival of the species by increasing the food production potential, providing additional habitat types that would be available for the various life stages and providing an environment that is devoid of predatory non-native fishes.

F. Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

1. Desert Tortoise (Mojave Population)

The action area is on both Federal and private lands. The Service determined that future actions in the action area would likely require section 7 consultation or fall under purview of an HCP (section 10 of the Act). Thus, no future non-Federal activities are reasonably certain to occur in the action area; thus, there are no cumulative effects to the desert tortoise as a result of the proposed action. Private lands in the action area include CSI property. These activities are proposed to be covered under the Coyote Springs Investment MSHCP and associated incidental take permit, which are currently under development.

2. Critical Habitat for the Desert Tortoise (Mojave Population)

The Mormon Mesa Critical Habitat unit occurs mostly on Federal lands with CSI private land along US 93 and private property along Meadow Valley Wash. The Service determined that future actions in the action area would likely require section 7 consultation or fall under purview of an HCP (section 10 of the Act). No future non-Federal activities are reasonably certain to occur in the action area; thus, there are no cumulative effects to designated critical habitat as a result of the proposed action. Activities on CSI lands in Clark County are covered under the approved Clark County MSHCP and associated incidental take permit, and the activities in Lincoln County are proposed to be covered under the CSI MSHCP and associated incidental take permit, which are currently under development. The Southeastern Lincoln County Habitat Conservation Plan and associated incidental take permit, which are currently under development, will cover activities on private land along Meadow Valley Wash.

3. Moapa Dace

Future demand for groundwater will continue to threaten spring flows and surface water important for aquatic species such as the Moapa dace. In the Warm Springs Area, MVWD's existing permit would allow more groundwater to be pumped from the Arrow Canyon Well in the future. The maximum permitted pumping rate at the Arrow Canyon Well is 7,200 afy, as compared with the annual average of 2,400 afy pumped currently. Depending on the outcome of the pump study mandated in the State Engineer Order 1169 and subsequent ruling by the State Engineer, additional groundwater could potentially be pumped in Coyote Spring Valley. The maximum volume that could be removed from the Coyote Spring Valley and Muddy River Springs Area basins under existing permits is 31,100 afy. This represents more than a tenfold increase from current withdrawals in the system. In addition to the existing permitted water rights, there are pending applications for a far greater volume of groundwater above and beyond the permitted amount in the Coyote Spring Valley, Muddy River Springs Area, and Kane Springs Valley hydrographic basins.

G. Conclusion

1. Desert Tortoise (Mojave Population)

After reviewing the current status of the desert tortoise, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the project, as proposed and analyzed, is not likely to jeopardize the continued existence of the threatened desert tortoise (Mojave population). This conclusion for the desert tortoise is based on the following:

a. The proposed project will not result in a level of take of desert tortoise that would significantly affect the rangewide number, distribution, or reproduction of the species; tortoises that are taken as a result of the project are anticipated to remain in the wild with

no long-term effects except for two desert tortoise estimated to be killed or injured by project activities.

b. The desert tortoise densities in the project area are considered low and measures have been proposed by LCWD and BLM to minimize the effects of the proposed action on the desert tortoise.

2. Critical Habitat for Desert Tortoise (Mojave Population)

The Service has reviewed the current rangewide status of designated critical habitat for the desert tortoise (Mojave population), the environmental baseline, the effects of the project, and the cumulative effects. Based on this review, it is the Service's biological opinion that these actions are not likely to destroy or adversely modify designated critical habitat for the desert tortoise (Mojave population). The project actions will not diminish the capability of the area to serve its role for recovery by continuing to provide the PCEs of critical habitat. The basis for this conclusion is summarized as follows:

a. The amount of critical habitat permanently and temporarily disturbed by the project is 173 acres, approximately 0.05 percent of the Mormon Mesa CHU.

b. Measures have been proposed by LCWD and BLM to minimize the effects of the proposed action on critical habitat for the desert tortoise.

3. Moapa Dace

After reviewing the current status of and environmental baseline for the Moapa dace, the effects of the project, and the cumulative effects, it is the Service's biological opinion that the action, as proposed and analyzed, is not likely to jeopardize the continued existence of the endangered Moapa dace. The project could contribute to groundwater level declines and spring flow reductions; however, implementation of the project's conservation actions will minimize these impacts.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, as amended, prohibits take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 CFR § 17.3). "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the

Federal agency or applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The terms and conditions may include: (1) restating measures proposed by BLM; (2) modifying the measures proposed by BLM; or (3) specifying additional measures considered necessary by the Service. Where these terms and conditions vary from or contradict the minimization measures proposed under the Description of the Proposed Action, specifications in these terms and conditions shall apply. The measures described below are nondiscretionary and must be implemented by BLM so that they become binding conditions of any project, contract, grant, or permit issued by BLM or other jurisdictional Federal agencies as appropriate, in order for the exemption in section 7(o)(2) to apply. The Service's evaluation of the effects of the proposed actions includes consideration of the measures developed by BLM, and repeated in the section entitled "Description of the Proposed Action" of this biological opinion, to minimize the adverse effects of the proposed action on the desert tortoise. Any subsequent changes in the minimization measures proposed by BLM may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR § 402.16. These reasonable and prudent measures are intended to clarify or supplement the protective measures that were proposed by BLM as part of the proposed action.

BLM, or other jurisdictional Federal agencies as appropriate, have a continuing duty to regulate the activity that is covered by this incidental take statement. If BLM, or other jurisdictional Federal agencies as appropriate, fail to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to permits or grant documents, and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

A. Amount of Take

Desert Tortoise (Mojave Population)

Based on the analysis of effects provided above, measures proposed by BLM, and anticipated project duration the Service anticipates that the following take could occur as a result of the proposed action:

1. No more than two adults and an unknown number of hatchling and juvenile desert tortoises would be incidentally killed or injured as a result of the proposed project. Should any desert tortoise be killed or injured in association with the proposed action, all activity in the vicinity of the incident shall cease and the project proponent shall contact the Service within 24 hours to assess the circumstances and discuss if additional protective measures are necessary.

2. All desert tortoises located during clearance surveys or located in harm's way in work areas may be harassed by capture and removal from the project area. Based on survey data, timing of the proposed project, and description of the project area, the Service estimates that no more than 33 desert tortoises may be taken (other than killed or injured) by non-lethal means as a result of project activities.

3. An unknown number of desert tortoise nests with eggs may be excavated and relocated. The Service determined that no desert tortoise nests with eggs are anticipated to be destroyed as a result of project activities.

4. An unknown number of desert tortoises may be preyed upon by ravens or other subsidized desert tortoise predators drawn to trash in the project area; however, the Service estimates that the potential increase in ravens will be minimized by litter-control measures proposed by BLM.

Moapa Dace

The Service anticipates that incidental take of Moapa dace through harm (i.e., habitat modification or degradation that results in death or injury) will occur, but the actual death or injury of fish will be difficult to detect for the following reasons: the species has a small body size and finding a dead or impaired specimen is unlikely in a flowing stream environment. On the other hand, significant habitat modification or degradation that could result in take of Moapa dace will be detectable and measurable. Therefore, we are expressing take of Moapa dace in terms of habitat loss resulting from changes in habitat characteristics, such as water temperature or chemistry and water flows. Although the extent of effects to the species as a result of the proposed action is not yet known, future and on-going biological and hydrological studies will assist us in determining how flow reductions and thermal load losses will affect Moapa dace habitat, food availability, reproduction, and fecundity.

Perhaps the most significant impact to Moapa dace habitat that could result from implementation of the proposed action, as a result of decreased discharge and subsequent wetted area, is the reduction of overall volume of water that would be available to the species within the channel. The amount of groundwater pumping permitted under the Kane Springs Groundwater Development Project (1,000 afy) is substantially smaller than the amount of pumping that could potentially co-occur under Order 1169 (16,100 afy). A small but unquantifiable amount of take in the form of habitat loss would occur in the Pedersen Unit if flows reached 3.0 cfs at the Warm Spring West gage. Should flows at the Warm Springs West gage decline below 3.0 cfs, the amount of incidental take for this project would be exceeded for the Moapa dace.

B. Effect of Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the desert tortoise or Moapa dace. These determinations are based in part on the implementation of conservation measures detailed in the BA for this project.

C. Reasonable and Prudent Measures with Terms and Conditions

The Service believes that the following reasonable and prudent measures (RMPs) are necessary and appropriate to minimize take of desert tortoise or Moapa dace.

RPM 1: *BLM, LCWD, VWC, and other jurisdictional Federal agencies as appropriate, shall ensure implementation of measures to minimize injury or mortality of desert tortoises due to surface-disturbing activities and operation of project vehicles or equipment:*

Terms and Conditions:

1.a. An authorized desert tortoise biologist shall be onsite at all locations where ground-disturbing activities are occurring within desert tortoise habitat. The authorized biologist will be responsible for approving, evaluating, and supervising monitors to assist in implementing the desert tortoise measures of this biological opinion. Potential biologists shall complete the Qualifications Form (Attachment A) and submit it to the Service for review and approval as appropriate. Allow 30 days for Service review and response.

1.b. Prior to initiation of construction, an authorized biologist or approved monitor shall present a desert tortoise awareness program to all personnel who will be onsite, including but not limited to contractors, contractors' employees, supervisors, inspectors, and subcontractors. This program will contain information concerning the biology and distribution of the desert tortoise and other sensitive species, their legal status and occurrence in the project area; the definition of "take" and associated penalties; the terms and conditions of this biological opinion; the means by which employees can help facilitate this process; responsibilities of workers, approved monitors, and biologists; and reporting procedures to be implemented in case of desert tortoise encounters or non-compliance with this biological opinion. The name of every individual trained will be recorded on a sign-in sheet. Each trained individual will be given evidence indicating they have received this training and will keep that evidence with them at all times when they are in the project area.

1.c. Immediately prior to surface-disturbing activities or traveling off of main access roads on the right-of-way, the authorized biologist shall survey for desert tortoises

and their burrows using techniques providing 100-percent coverage of the right-of-way and an additional area approximately 90 feet from both sides of the right-of-way. Transects will be no greater than 30 feet apart. All potential desert tortoise burrows will be examined to determine occupancy of each burrow by desert tortoises and handled in accordance with Term and Condition 1.d. – 1.f and 2.a – 2.c. below.

1.d. All potential desert tortoise burrows located within the project area that are at risk for damage shall be excavated by hand by an authorized biologist, tortoises removed, and burrows collapsed or blocked to prevent occupation by desert tortoises.

1.e. Desert tortoises located in the project area, but outside of an area to be disturbed by ground disturbing activities, sheltering in a burrow during a period of reduced activity (*e.g.,* winter), may be temporarily penned. Tortoises shall not be penned in areas of moderate or heavy public use. Penning shall be accomplished by installing a circular fence, approximately 20 feet in diameter to enclose the tortoise/burrow. The pen should be constructed with durable materials (*i.e.,* 16 gauge or heavier) suitable to resist desert environments. Fence material should consist of ½-inch hardware cloth or 1-inch horizontal by 2-inch vertical, galvanized welded wire. Pen material should be 24 inches in width. Steel T-posts or rebar (3 to 4 feet) should be placed every 5 to 6 feet to support the pen material. The pen material should extend 18 to 24 inches aboveground. The bottom of the enclosure will be buried several inches; soil mounded along the base; and other measures should be taken to ensure zero ground clearance. Care shall be taken to minimize visibility of the pen by the public. An authorized biologist, approved monitor, or designated worker shall check the pen daily.

1.f. Desert tortoises and eggs found within construction sites shall be removed by an authorized biologist in accordance with the most current protocols identified by BLM and the Service. Desert tortoises will be moved solely for the purpose of moving them out of harm's way. Desert tortoises shall be relocated up to 1,500 feet into adjacent undisturbed habitat on protected public land in accordance with Service-approved handling protocol (Desert Tortoise Council 1994, revised 1999). The disposition of all tortoises handled shall be documented in accordance with 6.b. below.

1.g. All fuel, transmission or brake fluid leaks, or other hazardous materials shall not be drained onto the ground or into streams or drainage areas. All petroleum products and other potentially hazardous materials shall be removed to a disposal facility authorized to accept such materials. Waste leaks, spills or releases shall be reported immediately to BLM. BLM or the project proponent shall be responsible for spill material removal and disposal to an approved off-site landfill.

Servicing of construction equipment will take place only at a designated area. All fuel or hazardous waste leaks, spills, or releases will be stopped or repaired immediately and cleaned up at the time of occurrence. Service and maintenance vehicles will carry a bucket and pads to absorb leaks or spills.

1.h. Vehicles shall not exceed 25 mph on access roads. Authorized desert tortoise biologists and/or approved monitors will ensure compliance with speed limits during construction.

1.i. Project personnel shall exercise caution when commuting to the project area and obey speed limits to minimize any chance for the inadvertent injury or mortality of species encountered on roads leading to and from the project site. All desert tortoise observations, including mortalities, shall be reported directly to an authorized biologist and the Service.

1.j. Any vehicle or equipment on the right-of-way within desert tortoise habitat shall be checked underneath for tortoises before moving. This includes all construction equipment and the area under vehicles should be checked any time a vehicle is left unattended, as well as in the morning before any construction activity begins. If a desert tortoise is observed, an authorized biologist will be contacted.

1.k. Project activity areas shall be clearly marked or flagged at the outer boundaries before the onset of construction. All activities shall be confined to designated areas. The authorized biologist and approved monitors shall ensure that no habitat is disturbed outside designated areas as a result of the project, including ensuring that all vehicles and equipment remain on the right-of-way or areas devoid of native vegetation.

1.l. To prevent mortality, injury, and harassment of desert tortoises and damage to their burrows and coversites, no pets shall be permitted in any project construction area.

1.m. All desert tortoises observed within the project area or access road shall be reported immediately to the authorized biologist. The authorized biologist shall halt activities as necessary to avoid harm to a desert tortoise. Project activities that may endanger a desert tortoise shall cease until the desert tortoise moves out of harm's way or is moved out of harm's way by an authorized biologist.

1.n. Only water or an alternative substance approved by BLM shall be used as a dust suppressant. Water application shall avoid pooling of water on roadways. Pools of water may act as an attractant to desert tortoises.

l.o. In the event that blasting is required, a 200-foot-radius area around the blasting site shall be surveyed by an authorized biologist for desert tortoises prior to blasting, using 100-percent-coverage survey techniques. All tortoises located above ground or in pallets within this 200-foot radius of the blasting site shall be moved 500 feet from the blasting site. Additionally, tortoises in burrows within 75 feet of the blasting will be placed into an artificial or unoccupied burrow 500 feet from the blasting site. This will prevent tortoises that leave their burrow upon translocation from returning to the blasting site. Tortoises in burrows at a distance of 75 to 200 feet from the blasting site will be left in their burrows. Burrow locations will be flagged and recorded using a GPS unit and burrows would be stuffed with newspapers. Immediately after blasting, newspaper and flagging will be removed. Blasting would only occur in the brief time period after an area has been cleared by an authorized biologist, but before any relocated tortoises could return to the site.

l.p. If possible, overnight parking and storage of equipment and materials shall be located in previously-disturbed areas or areas to be disturbed that have been cleared by an authorized tortoise biologist. If not possible, areas for overnight parking and storage of equipment shall be designated by the authorized biologist.

l.q. Within desert tortoise habitat, any construction pipe, culvert, or similar structure with a diameter greater than 3 inches stored less than 8 inches above ground on the construction site for one or more nights shall be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored on the construction site.

l.r. Flagging and wire shall be removed from the project area at the end of project to ensure debris is not consumed by desert tortoises.

l.s. All project activities in desert tortoise habitat shall be conducted from dawn until dusk.

l.t. Any excavated holes left open overnight shall be covered, and/or tortoise-proof fencing (Attachment B) shall be installed to prevent the possibility of tortoises falling into the open holes.

l.u. Open pipeline trenches shall be fenced with temporary tortoise-proof fencing or inspected by an authorized biologist or approved monitor periodically throughout and at the end of the day, and immediately prior to backfilling, and tortoise escape ramps (of at least 3:1 slope) shall be installed at least every quarter mile. Any tortoise that is found in a trench or excavation shall be promptly removed by an authorized biologist in accordance with Service-approved protocol or alternative

method approved by the Service if the biologist is not allowed to enter the trench for safety reasons.

1.v. In areas to be encircled by a security fence, such as well yards and well substations, the fence shall be installed at least one foot below the surface of the ground or install permanent desert tortoise fencing around the area, to ensure that tortoises do not get trapped inside. See Attachment B for the Service's recommendations on tortoise exclusion fencing, dated September 2005. Fences should be checked during regular maintenance of the facilities to ensure zero ground clearance.

1.w. Any tortoise injured as a result of the proposed project shall immediately be transported to a qualified veterinarian and reported to the Service's Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

RPM 2: *BLM, LCWD, and other jurisdictional Federal agencies as appropriate, shall ensure implementation of the following measures to ensure that tortoises are not injured as a result of capture and handling:*

Terms and Conditions:

2.a. All appropriate NDOW permits or letters of authorization shall be acquired prior to handling desert tortoises and their parts, and prior to initiation of any activity that may require handling tortoises.

2.b. Tortoises and nests shall be handled and relocated by an authorized tortoise biologist in accordance with the Service-approved protocol (Desert Tortoise Council 1994, revised 1999). If the Service or Desert Tortoise Council releases a revised protocol for handling of desert tortoises before initiation of project activities, the revised protocol shall be implemented for the project area. A pair of new, disposable latex gloves shall be used for each tortoise that must be handled. After use, the gloves will be properly disposed. Burrows containing tortoises or nests shall be excavated by hand, with hand tools, to allow removal of the tortoise or eggs. Desert tortoises moved during the tortoises less active season or those in hibernation, regardless of date, must be placed into an adequate burrow; if one is not available, one shall be constructed in accordance with Desert Tortoise Council (1994, revised 1999) criteria. Desert tortoises that are located aboveground and need to be moved from the project area shall be placed in the shade of a shrub. All desert tortoises removed from burrows shall be placed in an unoccupied burrow of approximately the same size and orientation as the one from which it was removed.

2.c. Special precautions shall be taken to ensure that desert tortoises are not harmed as a result of their capture and movement during extreme temperatures (i.e., air temperatures below 55° F or above 95° F). Under such adverse conditions, tortoises captured will be monitored continually by an authorized biologist or approved monitor until the tortoise exhibits normal behavior. If a desert tortoise shows signs of heat stress, procedures will be implemented as identified in the Service-approved protocol (Desert Tortoise Council 1994, revised 1999). The disposition of all tortoises handled shall be documented in accordance with 6.b. below.

RPM 3: *BLM, LCWD, and other jurisdictional Federal agencies as appropriate, shall ensure implementation of the following measures to minimize predation on desert tortoises by predators drawn to the project area:*

Terms and Conditions:

Trash and food items shall be disposed properly in predator-proof containers with resealing lids. During construction activities, trash containers will be emptied and waste will be removed from the project area daily. Trash removal reduces the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens.

RPM 4: *BLM, LCWD, and other jurisdictional Federal agencies as appropriate, shall ensure implementation of the following measures to minimize loss and long-term degradation and fragmentation of desert tortoise habitat, such as soil compaction, erosion, crushed vegetation, and introduction of weeds or contaminants as a result of construction activities:*

Terms and Conditions:

4.a Off-road travel outside construction zones shall be prohibited.

4.b. The designated utilities shall follow the Noxious Weed Management Plan which includes the following: washing vehicles and equipment prior to mobilizing to the project area, providing onsite personnel with BLM weed identification information, reseeding the project area with a BLM-approved certified weed-free seed mix, and controlling noxious weeds should they be introduced as a result of the proposed action.

4.c. After completion of the project, the designated utilities shall follow the Revegetation Plan to restore all temporarily-disturbed areas to functioning desert tortoise habitat, using native seeds or plants.

4.d. BLM shall ensure payment of remuneration fees by the project proponents, the designated utilities, for compensation of the loss of desert tortoise habitat as a result of the proposed project. BLM shall require a receipt of payment from each designated utility prior to issuing the Notice to Proceed.

The right-of-way applicant is required to submit a Final Plan of Development to the BLM, which must be approved by BLM prior to issuance of the Notice to Proceed. It is likely that the amount of disturbance will change with the final engineering design; therefore, BLM will reevaluate the project disturbance and adjust the total compensation fee accordingly. A copy of the Final Plan of Development and a breakdown of the final compensation fee will be provided to the Service. The applicant will be made aware that, depending on final engineering designs, the final compensation fee may be lower than the estimated value provided in this document.

Currently, the basic compensation rate for disturbance to desert tortoise habitat is $753 per acre. For disturbance to desert tortoise critical habitat a multiplier is used to increase the cost per acre as described in Hastey *et al.* (1991). For each project, this multiplier for critical habitat is based on assignment of ratings to the following five factors:

- Category of Habitat (value of the land to tortoise populations)
- Term of Effect (short term vs. long term)
- Existing Disturbance on Site
- Growth Inducement (growth inducing effects of the proposed action)
- Effect of Adjacent Lands (whether adjacent lands will be affected)

The proposed project will disturb 209 acres of desert tortoise habitat on lands in Lincoln County. The total compensation fee for this project is $808,722. Attachment C shows a breakdown of these calculations. Fees for disturbances on Federal land will be deposited into the Lincoln County Section 7 Account, while fees for disturbance on private land will be deposited into the CSI MSHCP Section 10 Trust Fund. The payee will fill out the attached fee payment forms (Attachment D) and include these with the payments.

Each year these fees will be indexed for inflation based on the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (CPI-U). Information on the CPI-U can be found on the internet at: http://stats.bls.gov/news.release/cpi.nr0.htm. The next rate adjustment will occur on March 1, 2009.

Fees deposited in the Lincoln County Section 7 account will be managed consist with an MOA to be developed between BLM and the Service. The development of a MOA will be initiated within 30 days of the ROD.

Section 7 fees collected under this biological opinion may be used in coordination with the mitigation program of the CSI MSHCP, to implement conservation and recovery measures within the Mormon Mesa critical habitat unit.

RPM 5: *BLM, LCWD, VWC, and other jurisdictional Federal agencies as appropriate, shall ensure implementation of the following measures to minimize impacts to Moapa dace that may result from groundwater pumping associated with the project in the Kane Springs Valley:*

Terms and Conditions:

BLM shall assure that all provisions of the proposed actions including the Monitoring, Management and Mitigation Plan of the Stipulated Agreement are fully implemented.

RPM 6: *BLM, LCWD, and other jurisdictional Federal agencies as appropriate, shall ensure implementation of the following measures to comply with the reasonable and prudent measures, terms and conditions, reporting requirements, and reinitiation requirements contained in this biological opinion:*

Terms and Conditions:

6.a. LCWD shall designate a field contact representative. The field representative will be responsible for overseeing compliance with protective stipulations for the desert tortoise and coordinating directly with BLM and the Service. The field contact representative shall have the authority to halt activities or construction equipment that may be in violation of the stipulations. A copy of the terms and conditions of this biological opinion shall be provided to the field contact representative, biologists, and monitors for the project.

6.b. The authorized biologist shall record each observation of desert tortoise handled. Information will include the following: location, date and time of observation; whether tortoise was handled, general health and whether it voided its bladder; location tortoise was moved from and location moved to; and unique physical characteristics of each tortoise. A final report will be submitted to the Service's Nevada Fish and Wildlife Office in Las Vegas within 90 days of completion of the project.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take or loss of habitat identified is exceeded, such incidental take and habitat loss represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The designated utilities must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

D. Reporting Requirements

Upon locating a dead or injured endangered or threatened species within the action area, notification must be made to the Service's Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230. Care should be taken in handling sick or injured endangered or threatened species to ensure effective treatment and be taken for handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by the Service to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. All deaths, injuries, and illnesses of endangered or threatened species, whether associated with project activities or not, will be summarized in an annual report.

Desert Tortoise (Mojave Population)

The following actions should be taken for injured or dead tortoises if directed by the Service:

1. Injured desert tortoises shall be delivered to any qualified veterinarian for appropriate treatment or disposal.

2. Dead desert tortoises suitable for preparation as museum specimens shall be frozen immediately and provided to an institution holding appropriate Federal and State permits per their instructions.

3. Should no institutions want the desert tortoise specimens, or if it is determined that they are too damaged (crushed, spoiled, etc.) for preparation as a museum specimen, then they may be buried away from the project area or cremated, upon authorization by the Service.

4. The designated utilities shall bear the cost of any required treatment of injured desert tortoises, euthanasia of sick desert tortoises, or cremation of dead desert tortoises.

5. Should sick or injured desert tortoises be treated by a veterinarian and survive, they may be transferred as directed by the Service.

Moapa Dace

The following action should be taken for injured or dead Moapa dace if directed by the Service: Dead Moapa dace suitable for preparation as museum specimens shall be frozen immediately and provided to the Service's Nevada Fish and Wildlife Office in Las Vegas.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service provides no conservation recommendations at this time.

REINITIATION

This concludes formal consultation on the actions outlined in your requested dated September 27, 2007. As required by 50 CFR § 402.16, reinitiation of formal consultation is required where the discretionary Federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. In particular, if the State Engineer grants additional water rights beyond the currently permitted 1,000 afy for the Kane Springs Groundwater Development Project, then formal consultation should be reinitiated.

The incidental take statement provided with this Biological Opinion authorizes take of the Moapa dace as may occur in connection with the pumping and transfer of 1,000 afy of groundwater under Phase I of the Project, and implementation of the Monitoring, Management, and Mitigation Plan established under the amended stipulated agreement for the Kane Springs Valley Hydrographic Basin. In June 2008, the LCWD, VWC, and the Service executed a Memorandum of Understanding to ensure additional consultation on this project should additional water rights be appropriated to LCWD and VWC in the Kane Springs Valley Hydrographic Basin (Attachment E). Specifically, the Memorandum requires that the Service reinitiate Section 7 consultation, and, if required, LCWD and VWC will apply for an incidental take permit under Section 10(a)(1)(B) of the Act to cover any take that may occur due to the pumping and transfer of such additional groundwater.

If we can be of further assistance regarding this consultation, please contact me at (775) 861-6300, or Janet Bair in the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

Sincerely,

Robert D. Williams
Field Supervisor

Attachments

cc:
Lincoln County Treasurer, Pioche, Nevada
Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada
Field Manager, Caliente Field Office, Bureau of Land Management, Caliente, Nevada
Nevada Groundwater Projects Office, Nevada State Office, Bureau of Land Management, Reno, Nevada
T&E Species Coordinator, Nevada State Office, Bureau of Land Management, Reno, Nevada

LITERATURE CITED

ARCADIS. 2007. Kane Springs Valley Groundwater Development Project Biological Assessment. Revised December 2007.

BLM (Bureau of Land Management). 1990. Draft Raven Management Plan for the California Desert Conservation Area. Prepared by Bureau of Land Management, California Desert District, Riverside, California. April 1990.

BLM (Bureau of Land Management). 2008. Final environmental impact statement for the Kane Springs Valley Groundwater Development Project. FES 08-01. BLM, Nevada State Office, Reno, Nevada. February 2005.

Boarman, W. I. 2002. Threats to desert tortoise populations: a critical review of the literature. unpublished report prepared for the West Mojave Planning Team, Bureau of Land Management. U.S. Geological Survey, Western Ecological Research Center, San Diego, California. August 9, 2002.

Boarman, W. I. and K. H. Berry. 1995. Common ravens in the southwestern United States, 1968-92. Pages 73-75 in E. T. LaRoe, G. F. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, editors. Our living resources: A report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. National Biological Service. Washington, D.C.

BRI [Bitterroot Restoration, Inc.]. 2005. Kern River gas pipeline plant salvage, Las Vegas, Nevada. http://www.bitterrootrestoration.com/BRIWeb/Projects/KernRiver.html.

Brooks, M. L. 2002. Peak fire temperatures and effects on annual plants in the Mojave Desert. Ecological Applications 12(4):1088-1102.

Brooks, M. L., and T.C. Esque. 2002. Alien plants and fire in desert tortoise (*Gopherus agassizii*) habitat of the Mojave and Colorado deserts. Chelonian Conservation and Biology 4: 330-340.

Brown, D. E., and R. A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonoran Desert, California. American Midland Naturalist 116(2): 411-422.

Converse Environmental Consultants Southwest, Inc. 1992. 1992 census and final report, Coyote Springs permanent study plot, Lincoln County, Nevada. Unpublished report prepared for Nevada Department of Wildlife, Las Vegas, NV. CECSW Project No. 92-43196-01. July 1992

D'Antonio, C. M. and P. M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics 23:63-87.

DeFalco, L. A., T. C. Esque, K. E. Nussear, S. J. Scoles, M. A. Walden, and K. Drake. 2007a. Monitoring the Effectiveness of Seeding Burned Critical Habitat for the Desert Tortoise, 2006 Progress. Prepared for BLM, Las Vegas Field Office and the Desert Tortoise Recovery Office. Prepared by the Las Vegas Field Station, USGS Western Ecological Research Center. 27 pages.

DeFalco, L. A., G. C. J. Fernandez, and R. S. Nowak. 2007b. Variation in the establishment of a non-native annual grass influences competitive interactions with Mojave Desert perennials. *Biological Invasions* 9:293-307.

DeFalco, L. A., D. R. Bryla, V. Smith-Longozo, and R. S. Nowak. 2003. Are Mojave Desert annual species equal? Resource acquisition and allocation for the invasive grass *Bromus madritensis* ssp. *rubens* (Poaceae) and two native species. *American Journal of Botany* 90(7):1045-1053.

Desert Tortoise Council. 1994. Guidelines for handling desert tortoises during construction projects. Edward L. LaRue, Jr., editor. San Bernardino, California. Revised 1999.

Eakin, T. E. 1966. A regional interbasin groundwater system in the White River Area, Southeastern Nevada. Water Resources Research 2(2):251-271.

EnviroPlus Consulting. 1995. Desert tortoise population studies at two plots in southern Nevada in 1995. Prepared for U.S. Department of the Interior, National Biological Service, 4765 West Vegas Drive, Las Vegas, Nevada 89108. September 1995.

Esque, T. C. 1986. A preliminary investigation of the population dynamics and ecology of the desert tortoise (*Xerobates agassizii*) at the Coyote Springs Permanent Study Plot of Lincoln County, Nevada. Final report to Nevada Department of Wildlife, Contract No. 86-63. 39 pages plus appendices.

Harrill, J. R., J. S. Gates, and J. M. Thomas. 1988. Major ground-water flow systems in the Great Basin region of Nevada, Utah, and adjacent states. Hydrologic Investigations Atlas, Report: HA-0694-C (USGS).

Henen, B. T. 1997. Seasonal and annual energy and water budgets of female desert tortoises (*Gopherus agassizii*) at Goffs, California. Ecology 78: 283-296.

Karl, A. 1981. The distribution and relative densities of the desert tortoise *(Gopherus agassizii)* in Lincoln and Nye Counties, Nevada. Proceedings of the 1981 Desert Tortoise Council Symposium. Pages 76-92.

Kern River Gas Transmission Company. 2005. Kern River 2003 expansion project. http://2003expansion.kernrivergas.com/.

Longshore, K. M., J. R. Jaeger, and J. M. Sappington. 2003. Desert tortoise (*Gopherus agassizii*) survival at two eastern Mojave Desert sites: death by short-term drought? Journal of Herpetology 37: 169–177.

Luckenbach, R. A. 1982. Ecology and management of the desert tortoise *(Gopherus agassizii)* in California. *In*: R. B. Bury, editor. North American tortoise: Conservation and ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12, Washington, D.C.

Mayer, T. 2004. Possible impacts of groundwater pumping on spring discharge and dace habitat at Moapa Valley National Wildlife Refuge. Fish and Wildlife Service; Region One, Portland, Oregon. 16 pages.

Mayer, T. 2008. Personal communication between Tim Mayer, Hydrologist, Service and Christiana Manville, Wildlife Biologist, Service. On March 25, 2008. About discharge at the Warm Springs West gage.

McLuckie, A. M., M. R. M. Bennion, and R. A. Fridell. Draft 2006. Regional desert tortoise monitoring in the Red Cliffs Desert Reserve, 2005. Salt Lake City: Utah Division of Wildlife Resources, Publication Number 06-06. 44 pages.

Peterson, C. C. 1994. Different rates and causes of high mortality in two populations of the threatened desert tortoise *Gopherus agassizii*. Biological Conservation 70: 101–108.

Peterson, C. C. 1996. Ecological energetics of the desert tortoise (*Gopherus agassizii*): effects of rainfall and drought. Ecology 77: 1831–1844.

Prudic, D. E., J. R. Harrill, and T. J. Burby. 1993. Conceptual evaluation of regional ground-water flow in the carbonate-rock province of the Great Basin, Nevada, Utah, and adjacent states. U.S. Geological Survey Open-File Report 93-170.

Scoppettone, G. G, H. L. Burge, and P. L. Tuttle. 1992. Life history, abundance, and distribution of Moapa Dace (*Moapa coriacea*). Great Basin Naturalist 52 (3):216-225.

Service (Fish and Wildlife Service). 1994. Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 73 pages, plus appendices.

Service (Fish and Wildlife Service). 1996. Recovery plan for the rare aquatic species of the Muddy River ecosystem. Service; Portland, Oregon. 60 pages.

Service (Fish and Wildlife Service). 2000. Final Biological Opinion on Certain Multiple-Use and Desert Tortoise Recovery Activities Proposed in the Caliente Management Framework Plan Amendment. Southern Nevada Field Office, Las Vegas, Nevada. Service File No. 1-5-99-F-450. 139 pp.

Service (Fish and Wildlife Service). 2006a. Biological Opinion for the Proposed Coyote Springs Investment Development in Clark County, Nevada (Army Corps of Engineers Permit Application No. 200125042). Service File No. 1-5-05-FW-536 Tier 1. March 2, 2006. 114 pp plus appendices.

Service (Fish and Wildlife Service). 2006b. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005. Summary report prepared by the Desert Tortoise Recovery Office, Reno, Nevada.

Service (Fish and Wildlife Service). 2006c. Intra-Service programmatic biological opinion for the proposed Muddy River Memorandum of Agreement regarding the groundwater withdrawal of 16,100 afy from the regional carbonate aquifer in the Coyote Spring Valley and California Wash basins and establishment of conservation measures for the Moapa dace, Clark County, Nevada. Prepared by the Nevada Fish and Wildlife Office, on January 30, 2006. Service File No. 1-5-05-FW-536. 68 pp plus appendices.

Turner, R. M. 1982. Mohave desertscrub. *In*: Biotic communities of the American southwest-United States and Mexico. D. E. Brown, editor. Special issue of desert plants, volume 4. Pages 157-168.

USGS (U.S. Geological Survey). In Draft. Discharge, Water-Property and Water-Chemistry measurement for Muddy River Springs, Muddy River, Nevada, February 7, 2001. Scientific Investigation Report.

USGS (U.S. Geological Survey). 2008. Real-Time Water Data for USGS 0941590, Warm Springs West, Moapa, Nevada. Accessed online on March 25, 2008. Available at http://waterdata.usugs.gov/nv/nwis.

Wilson, D. S., K. A. Nagy, C. R. Tracy, D. J. Morafka, and R. A. Yates. 2001. Water balance in neonate and juvenile desert tortoises, *Gopherus agassizii*. Herpetological Monographs 15: 158–170.

ATTACHMENT A

GENERAL DESERT TORTOISE QUALIFICATIONS STATEMENT

This form should be used to provide your qualifications to agency officials if you wish to undertake the duties of an authorized biologist with regard to desert tortoises during construction or other projects authorized under Sections 7 (Biological Opinions) or 10(a)(1)(B) (i.e. Habitat Conservation Plans) of the Endangered Species Act.

(If you seek approval to attach/remove/insert any devices or equipment to/into desert tortoises, withdraw blood, or conduct other procedures on desert tortoises, a recovery permit or similar authorization may be required. Application for a recovery permit requires completion of Form 3-200-55, which can be downloaded at http://www.fws.gov/forms/3-200-55.pdf.)

1. Contact Information:

Name	
Address	
City, State, Zip Code	
Phone Number(s)	
Email Address	

2. Date:

3. Areas in which authorization is requested (check all that apply):

□ San Bernardino, Kern, and Los Angeles Counties, California (Ventura office)
□ Riverside and Imperial Counties, California (Carlsbad office)
□ Nevada □ Utah □ Arizona

4. Please provide information on the project:

USFWS Biological Opinion or HCP Permit No.		**Date:**
Project Name		
Federal Agency		
Proponent or Contractor		

5. If you hold, or have held, any relevant state or federal wildlife permits provide the following:

Species	Dates	State (specify) or Federal Permit Number	Authorized Activities

6. Education: Provide up to three schools, listing most recent first:

Institution	Dates attended	Major/Minor	Degree received

7. Desert Tortoise Training.

Name/Type of Training	Dates (From/To)	Location	Instructor/Sponsor
1. Classes			
2. Field Training			
3. Translocation			
4.			

8. Experience – Include only those positions relevant to the requested work with desert tortoises. Distinguish between Mojave desert tortoise and other experience. Include only your experience, not information for the project you worked on (e.g., if 100 tortoises were handled on a project and you handled 5 of those tortoises, include only those 5. List most recent experience first. Handling a Mojave desert tortoise must be authorized by a Biological Opinion or other permit and reported to the USFWS. Information provided in this section will be used by the USFWS to track the numbers of tortoises affected by previous projects (baseline). **Be sure to include a project supervisor or other contact that can verify your skills and experience in relation to your job performance.** Attach additional sheets as necessary.

ATTACHMENT A

Experience by project and activity:

Project Name, Job Title, Dates	Project Contact name, phone no., & Email address	Conduct Clearance Surveys (Hrs/Days)	Excavate DT burrows (No.)	Locate DT No. < 100mm ≥100mm	Relocate DTs (No.)	Excavate, and relocate DT nests (No.)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Experience by project and activity (continued): Each project number should correspond with the project listed on the previous page

Project Number (Corresponds to previous page)	Construct Artificial Burrows (No.)	Monitor project equipment and activities (Hrs/Days)	Oversee project compliance (Hrs/Days)	Supervise field staff (Hrs/Days)	DT fence Installation and inspection (Hrs/Days)	Present DT Awareness Training (No.)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Summary of experience:

Total time spent for all desert tortoise-related field activities (referenced above):
Specify total number of hours
OR total number of 8-hour days: _____

Total number of miles/kilometers walked conducting survey transects:

Total number of wild, free-ranging desert tortoises you personally handled:

<100 mm: _____

≥100 mm: _____

I certify that the information submitted in this form is complete and accurate to the best of my knowledge and belief.
I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. Ch.47, Sec. 1001.

Signed: _____ **Date:** _____

ATTACHMENT B

RECOMMENDED SPECIFICATIONS FOR DESERT TORTOISE EXCLUSION FENCING
September 2005

These specifications were developed to standardize fence materials and construction procedures to confine tortoises or exclude them from harmful situations, primarily roads and highways. Prior to commencing any field work, all field workers should comply with all stipulations and measures developed by the jurisdictional land manager and the U.S. Fish and Wildlife Service for conducting such activities in desert tortoise habitat, which will include, at a minimum, completing a desert tortoise education program.

FENCE CONSTRUCTION

Materials

Fences should be constructed with durable materials (*i.e.,* 16 gauge or heavier) suitable to resist desert environments, alkaline and acidic soils, wind, and erosion. Fence material should consist of 1-inch horizontal by 2-inch vertical, galvanized welded wire, 36 inches in width. Other materials include: Hog rings, steel T-posts, and smooth or barbed livestock wire. Hog rings should be used to attach the fence material to existing strand fence. Steel T-posts (5 to 6-foot) are used for new fence construction. If fence is constructed within the range of bighorn sheep, 6-foot T-posts should be used (see New Fence Construction below). Standard smooth livestock wire fencing should be used for new fence construction, on which tortoise-proof fencing would be attached.

Retrofitting Existing Livestock Fence

Option 1 (see enclosed drawing). Fence material should be buried a minimum of 12 inches below the ground surface, leaving 22-24 inches above ground. A trench should be dug or a cut made with a blade on heavy equipment to allow 12 inches of fence to be buried below the natural level of the ground. The top end of the tortoise fence should be secured to the livestock wire with hog rings at 12 to 18-inch intervals. Distances between T-posts should not exceed 10 feet, unless the tortoise fence is being attached to an existing right-of-way fence that has larger interspaces between posts. The fence must be perpendicular to the ground surface, or slightly angled away from the road, towards the side encountered by tortoises. After the fence has been installed and secured to the top wire and T-posts, excavated soil will be replaced and compacted to minimize soil erosion.

Option 2 (see enclosed drawing). In situations where burying the fence is not practical because of rocky or undigable substrate, the fence material should be bent at a 90° angle to produce a lower section approximately 14 inches wide which will be placed parallel to, and in direct contact with, the ground surface; the remaining 22-inch wide upper section should be placed vertically against the existing fence, perpendicular to the ground and attached to the existing fence with hog rings at 12 to18-inch intervals. The lower section in contact with the ground should be placed within the enclosure in the direction of potential tortoise encounters and level

with the ground surface. Soil and cobble (approximately 2 to 4 inches in diameter; can use larger rocks where soil is shallow) should be placed on top of the lower section of fence material on the ground covering it with up to 4 inches of material, leaving a minimum of 18 inches of open space between the cobble surface and the top of the tortoise-proof fence. Care should be taken to ensure that the fence material parallel to the ground surface is adequately covered and is flush with the ground surface.

New Fence Construction

Options 1 or 2 should be followed except in areas that require special construction and engineering such as wash-out sections (see below). T-posts should be driven approximately 24 inches below the ground surface spaced approximately 10 feet apart. Livestock wire should be stretched between the T-posts, 18 to 24 inches above the ground to match the top edge of the fence material; desert tortoise-proof fencing should be attached to this wire with hog rings placed at 12 to 18-inch intervals. Smooth (barb-less) livestock wire should be used except where grazing occurs.

If fence is constructed within the range of bighorn sheep, two smooth-strand wires are required at the top of the T-post, approximately 4 inches apart, to make the wire(s) more visible to sheep. A 20 to 24-inch gap must exist between the top of the fence material and the lowest smooth-strand wire at the top of the T-post. The lower of the top two smooth-strand wires must be at least 43 inches above the ground surface.

(72-inch T-posts: 24 inches below ground + 18 inches of tortoise fence above ground + 20 to 24-inch gap to lower top wire + 4 inches to upper top wire = 66 to 70 inches).

INSPECTION OF DESERT TORTOISE BARRIERS

The risk level for a desert tortoise encountering a breach in the fence is greatest in the spring and fall, particularly around the time of precipitation including the period during which precipitation occurs and at least several days afterward. All desert tortoise fences and cattleguards should be inspected on a regular basis sufficient to maintain an effective barrier to tortoise movement. Inspections should be documented in writing and include any observations of entrapped animals; repairs needed including bent T-posts, leaning or non-perpendicular fencing, cuts, breaks, and gaps; cattleguards without escape paths for tortoises or needed maintenance; tortoises and tortoise burrows including carcasses; and recommendations for supplies and equipment needed to complete repairs and maintenance.

All fence and cattleguard inventories should be inspected at least twice per year. However, during the first 2 to 3 years all inspections will be conducted quarterly at a minimum, to identify and document breaches, and problem areas such as wash-outs, vandalism, and cattleguards that fill-in with soil or gravel. GPS coordinates and mileages from existing highway markers should be recorded in order to pinpoint problem locations and build a database of problem locations that may require more frequent checking. Following 2 to 3 years of initial inspection, subsequent inspections should focus on known problem areas which will be inspected more frequently than

twice per year. In addition to semi-annual inspections, problem areas prone to wash-outs should be inspected following precipitation that produces potentially fence-damaging water flow. A database of problem areas will be established whereby checking fences in such areas can be done efficiently.

REPAIR AND MAINTENANCE OF DESERT TORTOISE BARRIERS

Repairs of fence wash-outs: (1) realign the fence out of the wash if possible to avoid the problem area, or (2) re-construct tortoise-proof fencing using techniques that will ensure that an effective desert tortoise barrier is established that will not require frequent repairs and maintenance. Gaps and breaks will require either: (a) repairs to the existing fence in place, with similar diameter and composition of original material, (b) replacement of the damaged section to the nearest T-post, with new fence material that original fence standards, (c) burying fence, and/or (d) restoring zero ground clearance by filling in gaps or holes under the fence and replacing cobble over fence constructed under Option 2. Tortoise-proof fencing should be constructed and maintained at cattleguards to ensure that a desert tortoise barrier exists at all times.

All fence damage should be repaired in a timely manner to ensure that tortoises do not travel through damaged sections. Similarly, cattleguards will be cleaned out of deposited material underneath them in a timely manner. In addition to periodic inspections, debris should be removed that accumulates along the fence. All cattleguards that serve as tortoise barriers should be installed and maintained to ensure that any tortoise that falls underneath has a path of escape without crossing the intended barrier.

Attachment C

Calculation of Desert Tortoise Remuneration Fees

Table 1. Project specific multiplier for calculating remuneration fees for critical habitat.

COMPENSATION FACTOR*	DESCRIPTION	RATING
Category of Habitat	The habitat has been rated as Category I, which is the most valuable and protected (i.e. critical habitat).	3.0
Term of Effect	The term of effect has been rated as long term (> 10 years)	1.0
Existing Disturbance on Site	The existing disturbance has been rated as little or no existing habitat disturbance	1.0
Growth Inducement	The proposed action has been rated as having growth inducing effects	0.5
Effect of Adjacent Lands	The proposed action has been rated as having a direct or indirect deleterious impacts	0.5
TOTAL RATING FOR COMPENSATION FACTORS = MULTIPLIER		6.0
MULTIPLIER X CURRENT COST/ACRE (6 x $753)**		$4,518/acre

Table 2. Calculation of remuneration fees for the Kane Springs Valley Groundwater Development Project.

ACRES	COST PER ACRE**	COST
Compensation for disturbance not within designated critical habitat on Federal land:		
36 acres	$753/acre	$27,108
Compensation for disturbance within designated critical habitat:		
148 acres Federal land	$4,518/acre	$668,664
25 acres private land	$4,518/acre	$112,950
TOTAL COST		**$808,722**

*Compensation Factors are rated based on the *Compensation for the Desert Tortoise; A Report Prepared for the Desert Tortoise Management Oversight Group* (Hastey *et al.*, 1991).

** Each year these fees will be indexed for inflation based on the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (CPI-U). Information on the CPI-U can be found on the internet at: http://stats.bls.gov/news.release/cpi.nr0.htm. The next rate adjustment will occur on March 1, 2009.

Attachment D

LINCOLN COUNTY SECTION 7
LAND DISTURBANCE FEE
PAYMENT FORM
Entire form is to be completed by project proponent

Biological Opinion File Number: 84320-2008-F-0007

Biological Opinion issued by: Nevada Fish and Wildlife Office, Las Vegas, Nevada

Species: Desert tortoise (*Gopherus agassizii*) (Mojave population)

Project: Kane Springs Valley Groundwater Development Project

Number of acres anticipated to be disturbed: 184 acres on Federal land (148 acres critical habitat, 36 acres non-critical habitat)

Fee rate (per acre): $4,518 for critical habitat, $753 for non-critical habitat

Total payment required: $_____

Amount of payment received: _____

Date of receipt: _____

Check or money order number: _____

Project proponent: _____

Telephone number:

Authorizing agencies: Bureau of Land Management, Ely, Nevada

Make checks payable to: Lincoln County Treasurer

Deliver check to:
Lincoln County Habitat Conservation Section 7 Account
Lincoln County Treasurer
Attn: Ms. Cathy Hiatt
P.O. Box 416
Pioche, Nevada 89043
(775) 962-5805

If you have questions, you may call the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

Attachment D (continued)

CSI MSHCP SECTION 10 TRUST FUND
LAND DISTURBANCE FEE
PAYMENT FORM
Entire form is to be completed by project proponent

Biological Opinion File Number: 84320-2008-F-0007

Biological Opinion issued by: Nevada Fish and Wildlife Office, Las Vegas, Nevada

Species: Desert tortoise (*Gopherus agassizii*) (Mojave population)

Project: Kane Springs Valley Groundwater Development Project

Number of acres anticipated to be disturbed: 25 acres of critical habitat on private land

Fee rate (per acre): $4,518 for critical habitat

Total payment required: $_____

Amount of payment received: _____

Date of receipt: _____

Check or money order number: _____

Project proponent: _____

Telephone number:

Authorizing agencies: Bureau of Land Management, Ely, Nevada

Make checks payable to: Coyote Springs Investment, LLC/CSI MSHCP Section 10 Trust Fund

Deliver check to:
CSI MSHCP Section 10 Trust Fund
Coyote Springs Investment, LLC
Attn: Mr. James England
3100 State Route 168
Coyote Springs, Nevada 89037

If you have questions, you may call the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

ATTACHMENT E

Memorandum of Understanding Between
Lincoln County Water District, Vidler Water Company, Inc.
and Nevada Fish and Wildlife Office, US Fish and Wildlife Service

The Nevada Fish and Wildlife Office of the US Fish and Wildlife Service (SERVICE), Lincoln County Water District (LCWD) and Vidler Water Company, Inc. (VIDLER) have entered into this memorandum of understanding (MOU) with reference to the following facts and circumstances:

1) The SERVICE is responsible for administering and implementing the Endangered Species Act of 1973, as amended, (ESA) (16 U.S.C. §§ 1531 – 1544), including conducting consultation pursuant to Sections 7 and 10 of the ESA and as described in its implementing regulations (50 CFR Part 402).

2) LCWD and VIDLER propose to complete the Kane Springs Valley Groundwater Development Project (Project), which involves the pumping and transfer of up to 5,000 acre-feet of groundwater from the Kane Springs Valley Hydrographic Basin for use in the Coyote Spring Valley Hydrographic Basin in Lincoln County, Nevada. The Project will be completed in three phases. Phase I of the Project involves the pumping and transfer of 1,000 acre-feet per year of groundwater.

3) LCWD and VIDLER applied to the Nevada State Engineer for authorization to appropriate up to 5,000 acre-feet per year of groundwater from Kane Springs Valley for use in Coyote Spring Valley, and the SERVICE filed protests to the applications.

4) The SERVICE, LCWD and VIDLER entered into an Amended Stipulation for Withdrawal of Protests under which the SERVICE, LCWD and VIDLER agreed to implement a Monitoring, Management and Mitigation Plan and the SERVICE agreed to withdraw its protests to the applications.

5) The purpose of the Monitoring, Management and Mitigation Plan is to obtain accurate and reliable information regarding the aquifer's response to pumping and the impact of pumping on water-related resources within the regional carbonate-rock aquifer and overlying basin-fill aquifer systems so that the Project can be managed to avoid adverse impacts to the Moapa Dace or its habitat.

6) The Nevada State Engineer has authorized LCWD and VIDLER to appropriate 1,000 acre-feet of groundwater from Kane Springs Valley for use in Coyote Spring Valley and may in the future authorize LCWD and VIDLER to appropriate up to 5,000 acre-feet of groundwater from Kane Springs Valley for use in Coyote Spring Valley.

7) The Bureau of Land Management is expected to issue a Record of Decision granting a right-of-way for the Project.

8) The SERVICE is expected to issue a biological opinion concluding that the Project "may affect, is likely to adversely affect" the Moapa dace or its habitat.

9) The extent of any impact to the Moapa dace or its habitat is uncertain and cannot be known until pumping begins and reliable data is collected under the Monitoring, Management and Mitigation Plan.

10) The sole purpose of this MOU is to ensure ongoing cooperation and consultation between LCWD, VIDLER and the SERVICE, the timely, economical and successful completion of the Project and the protection of the Moapa Dace and its habitat.

11) By entering into this MOU, the SERVICE is taking "action" as defined in 50 CFR §402.02.

12) By entering into this MOU, the SERVICE, LCWD, and VIDLER seek to create a federal nexus to enable the SERVICE to reinitiate consultation under Section 7 of the ESA concerning impacts to the Moapa dace that may occur if the Nevada State Engineer authorizes LCWD and VIDLER to appropriate more than 1,000 acre-feet of groundwater from the Kane Springs Valley Hydrographic Basin.

Now, therefore, in consideration of the mutual promises contained in this MOU, LCWD, VIDLER and the SERVICE agree as follows:

A. The SERVICE will issue a biological opinion for the Project. The biological opinion will include an incidental take statement authorizing such take of the Moapa dace as may occur in connection with the pumping and transfer of 1,000 acre-feet of groundwater under Phase I of the Project and implementation of the Monitoring, Management and Mitigation Plan.

B. Upon receiving authorization from the Nevada State Engineer to appropriate more than 1,000 and up to 5,000 acre-feet per year of groundwater from the Kane Springs Valley for use in Coyote Springs Valley, the SERVICE will reinitiate consultation for the Project pursuant to Section 7 of the ESA; and if necessary, LCWD and VIDLER will apply for an incidental take permit under Section 10(a)(1)(B) of the ESA to cover any take of the Moapa dace that may occur due to the pumping and transfer of such additional groundwater.

US Fish and Wildlife Service
Nevada Fish and Wildlife Office

Robert Williams
Field Supervisor

6/30/08
Date

Lincoln County Water District

By George T. Rowe
Title: Chairman LCWD

6/16/08
Date

Vidler Water Company, Inc.

By Dwight A. Smith
Title: President

6/26/08
Date

Kane Springs Valley

- Water levels responded to Order 1169 pumping

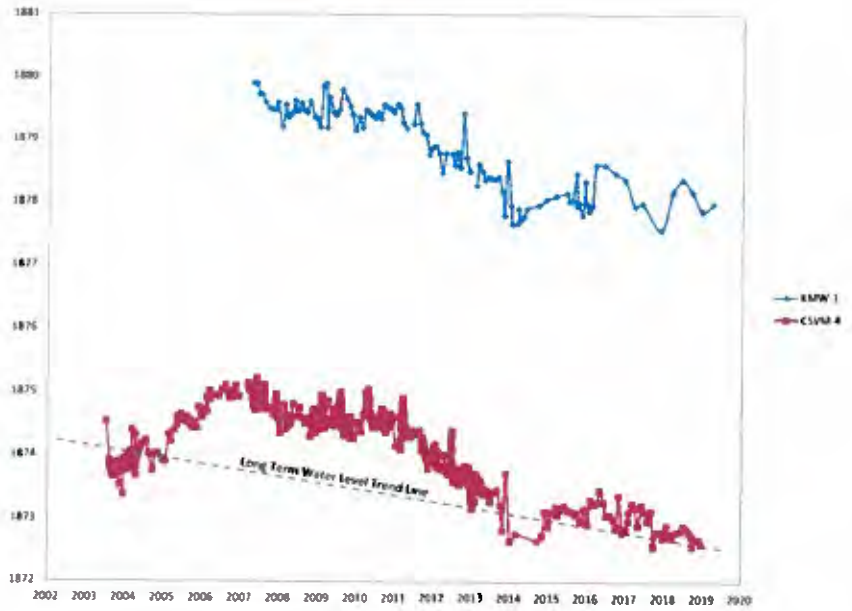
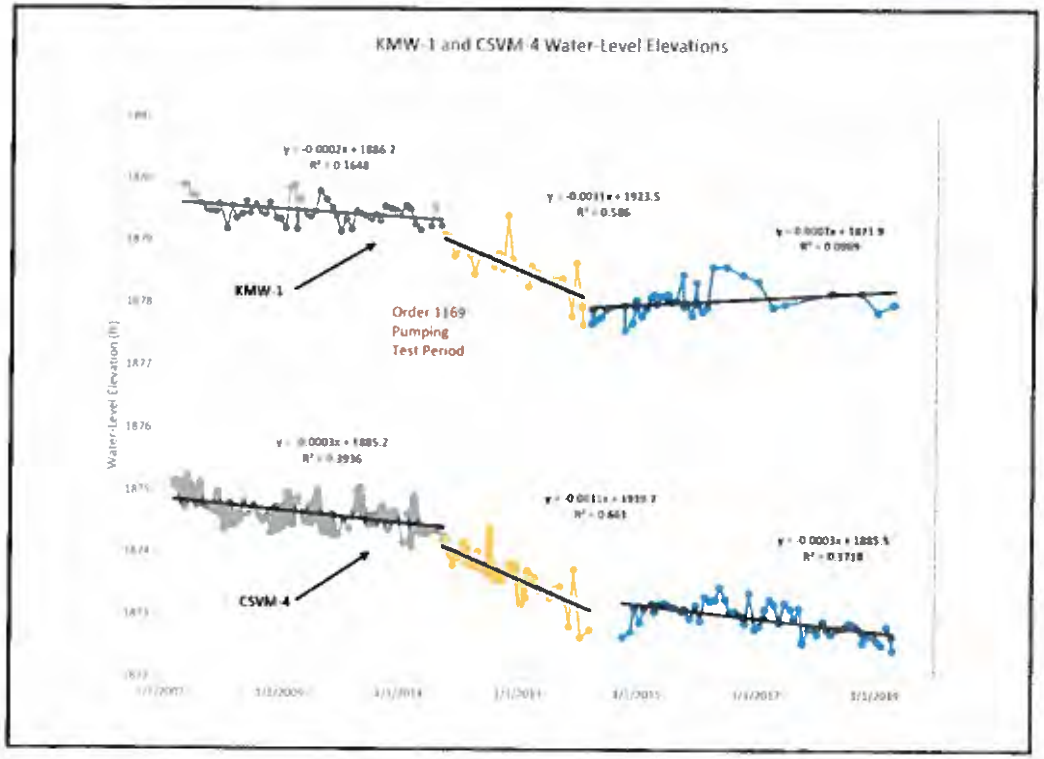


FIGURE 3-9. COMBINED HYDROGRAPHS OF WELLS KMW-1 AND CSVM-4

Ex. LC-V_001



NPS Ex. No. 3

Kane Springs Valley (continued)

- Hydraulic gradients are higher in the northernmost part of Coyote Spring Valley
- But not enough to create a significant barrier, based on observed pumping responses in KMW-1 and CSVM-4

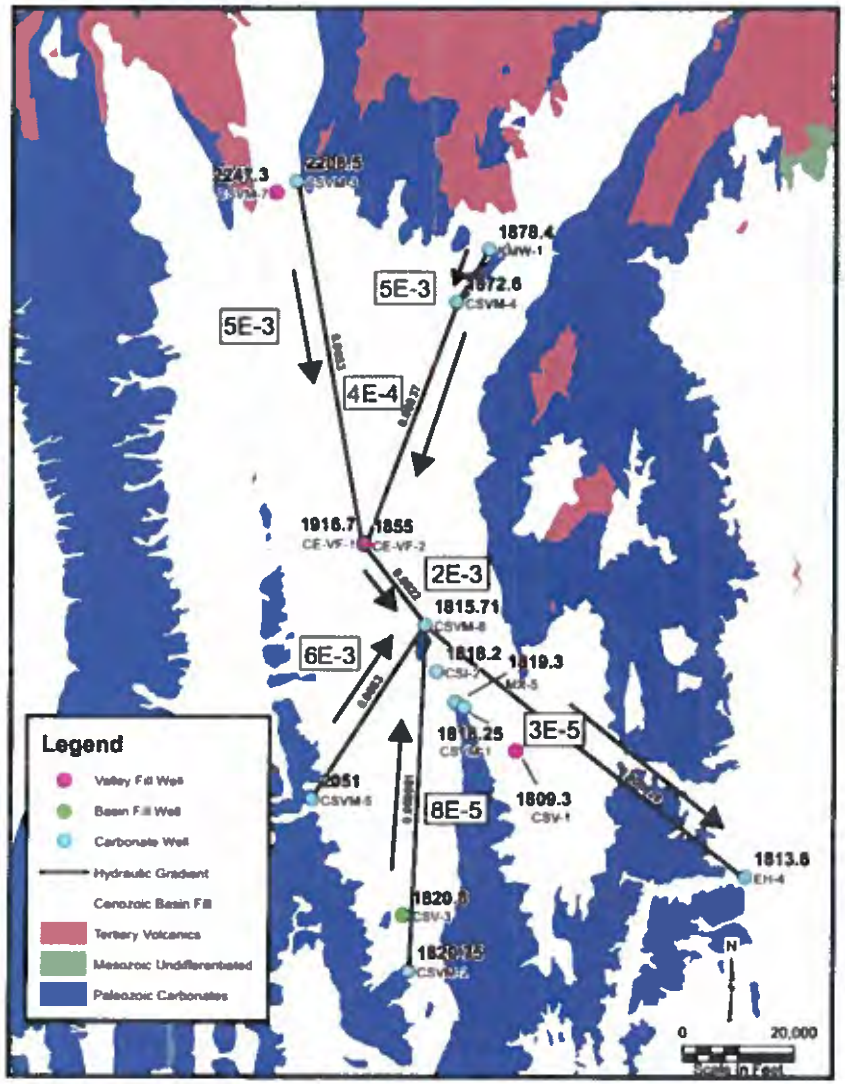


Figure 2
Horizontal Hydraulic Gradients Between Selected Well Points, Coyote Springs Valley and Vicinity
8/16/2019

NPS Ex. No. 3

As such, the geographic boundary of the LWRFS should be adjusted to include Kane Springs Valley Basin.

In NCA's Rebuttal Report at section 4, beginning on page 8, NCA's experts addressed several comments made by Lincoln County/Vidler in their initial report titled, "Lower White River Flow System Interim Order #1303 Report Focused on the Northern Boundary of the Proposed Administrative Unit," dated July 3, 2019 (the "Lincoln/Vidler Report"), beginning with the reliance by Lincoln/Vidler on the purported statement that the State Engineer had supposedly found that there would be no significant impact for hundreds of years. In fact, as pointed out by NCA's experts, no such determination was made by the State Engineer with regard to Kane Springs Basin or Lincoln/Vidler's rights.

An actual review of Ruling 5712 -- issued February 2, 2007, at a time when the State Engineer had only limited data relevant to the impacts caused by carbonate groundwater pumpage within the LWRFS and no direct statutory right to "conjunctively manage" water sources – nonetheless *still* highlights the following findings made by the State Engineer *at that time:*

- "The State Engineer further finds that the Applicants' pumping test supports the conclusion that there is considerable potential for ground-water flow in the carbonate rocks in the vicinity of well KPW-1" (Pg. 7)

- "The State Engineer finds the evidence indicates a strong hydrologic connection between Kane Springs Valley and Coyote Spring Valley, specifically, that ground water flows from Kane Springs Valley into Coyote Spring Valley." (Pg. 21)

- "Given the unique hydrologic connection between the Kane Springs Valley Hydrographic Basin and the Coyote Spring Valley Hydrographic Basin, the development of ground water within Kane Springs Valley will ultimately affect water levels and flows in the White River regional carbonate-rock aquifer system." (Pg. 15)

Notably, as was pointed out in slide 31 of the NCA presentation, several parties – not just NCA – found that CSVM-4 and KMV-1 (in Kane Springs Valley Basin) showed effects resulting from the Order 1169 aquifer test; SNWA, Moapa Valley Water District, US Fish and Wildlife Service, National Park Service, the Center for Biological Diversity, and NCA all made similar findings. Additionally, the values for several wells including CSVM-4 were then plotted against EH-4 for various periods and there was a high correlation between all the carbonate wells within the LWRFS plotted against EH-4, indicating a high level of hydraulic connectivity across the basins