Consultants in natural resources and the environment

Denver • Boise • Durango • Western Slope

WATER SUPPLY EVALUATION FOR PROPOSED PROJECTS ALONG THE I-84 CORRIDOR

Prepared for—

Idaho Power Company

Prepared by—

David B. Shaw and Norman C. Young

ERO Resources Corporation
3314 Grace Street
Boise, Idaho 83713
(208) 373-7983

November 14, 2012

ERO Resources Corp.
3314 Grace Street
Boise, ID 83703
(208) 373-7983
Fax: (208) 373-7985
www.eroresources.com
eroboise@eroresources.com

TABLE OF CONTENTS

INTRODUCTION
CONCLUSIONS
SITE OVERVIEW
REVIEW OF PROPOSED PROJECTS
1. Mayfield Springs
2. Elk Creek Canyon
3. Shekinah Industries
4. Orchard Ranch
5. Mayfield Townsite
REVIEW OF IDWR'S MAY 31, 2012 STAFF REPORT
1. Findings by IDWR
2. Issues Raised by IDWR's Staff Report
AQUIFER ANALYSIS
ANAYSIS OF SNAKE RIVER FLOW
REFERENCES
TABLES
APPENDIX A

WATER SUPPLY EVALUATION FOR PROPOSED PROJECTS ALONG THE I-84 CORRIDOR[1]

INTRODUCTION

The Idaho Department of Water Resources (IDWR) has consolidated the administrative hearing considering protests to approval of six applications for permit and two applications for transfer proposing use of ground water for municipal and irrigation development along I-84 near the Orchard and Simco Road interchanges. This report has been prepared to assist IDWR's evaluation of the applications, individually and cumulatively, in accordance with Idaho law.

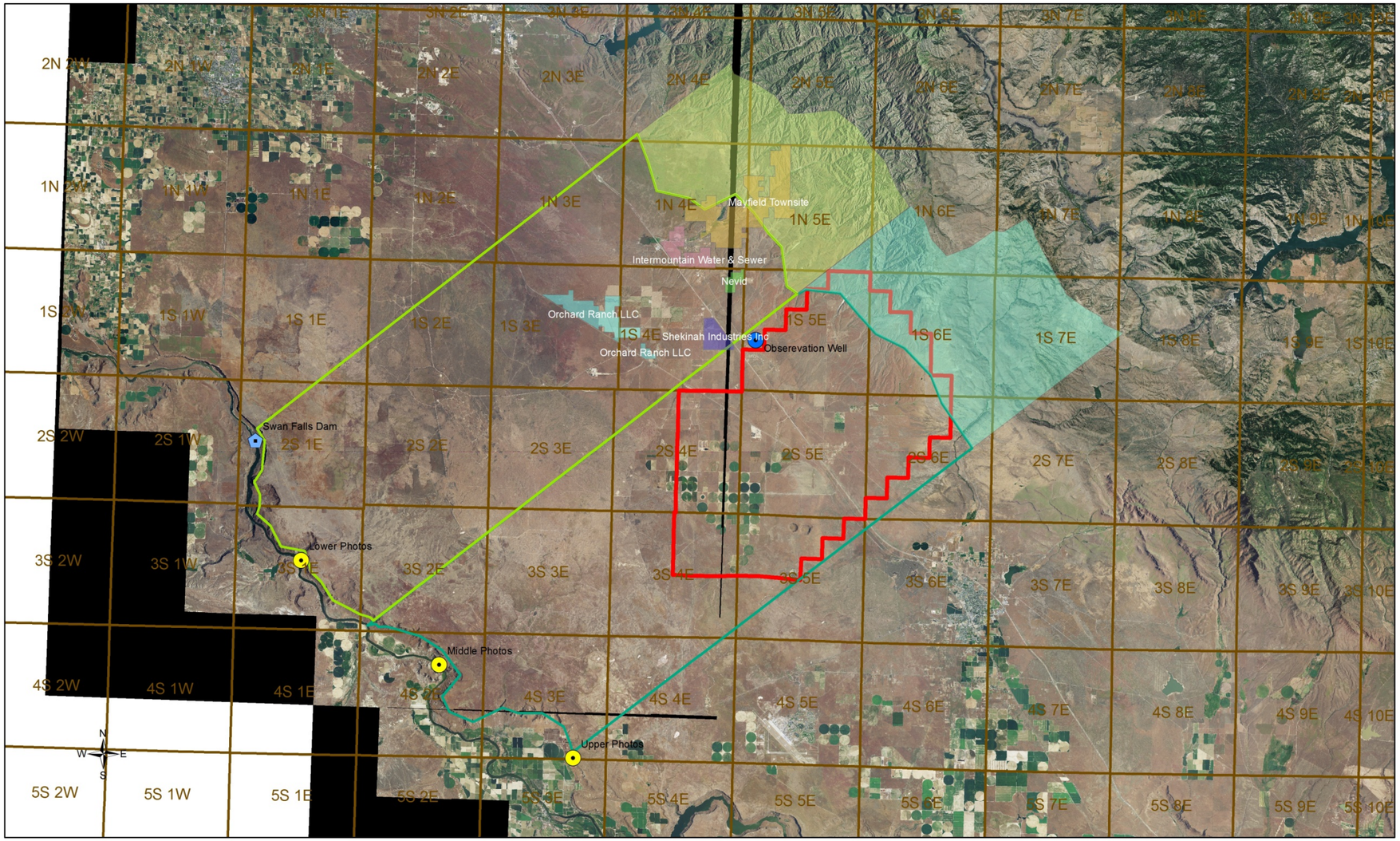
The eight applications under consideration in the consolidated hearing seek water for development of five separate projects for a combined development of 18,393 new housing units with 4,184 new irrigated acres. The location of the five projects is shown in Figure 1. Permits to use ground water have previously been issued to allow the initial phases for two of these projects without regard for trust water impacts. The total applied for and already permitted filings would locate nearly 22,000 new housing units with nearly 5,000 new acres of irrigation in an area now characterized by dry land grazing and farming. The pending applications are summarized in Table A of this report.

The nearby City of Mountain Home has a population of 14,200 (2010 Census), and the average number of person per household is 2.67 (http://quickfacts.census.gov, accessed November 5, 2012). Development of the consolidated hearing proposals would result in a community more than four times the size of Mountain Home.

Table B is a list of withdrawn, rejected and voided applications for permit and lapsed permits for nearly 25,000 additional housing units. Some of these filings were by the applicants seeking approval of the filings in the consolidated hearing. The extent of the latent interest in obtaining water for municipal and other purposes for municipal development in the consolidated hearing area far exceeds the projects now under consideration.

[1] This report was authored by Norm Young and David Shaw, both with ERO Resources Corp. The report was done cooperatively between the authors but Mr. Young was primarily responsible for the Introduction, Review of Proposed Projects and Review of IDWR's May 31, 2012 Staff Report and Mr. Shaw was primarily responsible for the remainder of the report.

Boise - Mountain Home I84 Corridor



2011 NAIP Photography

Figure 1

CONCLUSIONS

The following conclusions are based upon the information and analysis described in this report:

1. The applications under consideration in the consolidated hearing (applications) for municipal use seek water for non-interruptible uses unlike some other water uses that may be foregone during limited periods.
2. The water supply sought by the applications is known to be limited by the applicants, IDWR and the protestants and the volume of un-appropriated ground water in the study and comparison areas is not sufficient for the proposed projects and "alternative water sources" have not been identified.
3. Ground water levels in and around the Cinder Cone Butte Critical Ground Water Area continue to decline indicating the reasonably anticipated rate of future natural recharge is being exceeded.
4. IDWR's analysis of the water supply available for the applications should not have treated the study area and comparison area as separate non-interconnected areas. The diversion and use of water under the applications, if approved, will cause impacts that cross administrative and study boundaries.
5. Ground water sought by the applications is tributary to the Snake River, at least in part, upstream from Swan Falls Dam.
6. Stream flows in the Snake River downstream from Milner Dam to the Murphy Gage result entirely from inflows in that reach. These flows are declining and if present rates of decline continue the minimum flows established as part of the Swan Falls Agreement of 1984 and approved by the Idaho Legislature will be violated.
7. Diversion and use of ground water as proposed in the applications will injure existing water rights.

SITE OVERVIEW

In addition to the proposed projects, Figure 1 shows the relationship of the projects to the Snake River and Swan Falls Dam, the Cinder Cone Butte Critical Ground Water Area (CCBCGWA) and the study and comparison areas identified by IDWR. The shadings in the study and comparison areas are from IDWR's designation of recharge areas.

Figure 1 also shows the general location of 3 sets of photos taken along the north side of the Snake River during 2012. The purpose of the photos is to help illustrate the presence of springs, or changes to springs, occurring along the north side of the river. The springs are evidence of ground water from the Mountain Home Corridor including the study and comparison areas is tributary to the Snake River upstream from Swan Falls Dam. The photos and description of the springs and photos appears in Appendix A.

REVIEW OF PROPOSED PROJECTS

1. MAYFIELD SPRINGS (INTERMOUNTAIN SEWER AND WATER CORP.)
   PERMIT NO. 63-32225
   APPLICATION FOR PERMIT NO. 61-12256

This project is proposed to be located northeast of I-84 between the Orchard and Simco Road interchanges. IDWR has already issued Permit No. 63-32225 to allow this project to use 10 cfs of ground water for municipal purposes for 2,000 homes. The permit allows direct diversion of ground water for irrigation of ½ acre for each lot with a constructed house. In addition, the permit allows irrigation of common areas (parks, schools, golf courses, etc.) using treated wastewater from the project. Information submitted with the application indicates direct irrigation from the municipal system will be limited to 300 acres associated with the homes and additional acres to be irrigated using wastewater generated by the project. The total acreage to be irrigated with wastewater was not specified, but a 175-acre golf course is proposed in the first phase of development (Ref. "Notes from a meeting with IDWR and DEQ, June 6, 2006" in IDWR's files for Permit 63-32225). Proof of beneficial use was due on February 1, 2012, but IDWR has approved an extension of time to February 1, 2017.

Application for Permit No. 61-12256 seeks an additional 13.76 cfs of ground water for another 4,200 homes and 840 equivalent domestic units (commercial, industrial, etc.) with associated irrigation of 353 acres within the same place of use and an additional area to the east. Reclaimed wastewater will be used to irrigate an additional 344 acres.

Right Nos. 63-3070 and 63-32616, decreed in the SRBA, allow use of 2.39 cfs of ground water for irrigation of 146 acres within the project area. The application files and supporting reports do not discuss the potential use of these rights for project purposes.

SPF Water Engineering, LLC (SPF) has prepared two reports addressing the water requirements and water availability for the Mayfield Springs project. The first report (SPF, March 20, 2006) provides information supporting approval of Permit No. 63-32225. The report indicates that 5 wells ranging from 600 to 800 feet in depth would be used to divert 1815 af of ground water per year from an aquifer having a static water level of 300 to 600 feet below land surface. SPF used a water budget approach to estimate that recharge to the local aquifer is in the range of 8,600 to 32,600 af per year (See Table C for a summary of the technical reports filed in support of the applications and IDWR staff review memorandums.) The smaller recharge estimate was calculated assuming that all recharge resulted from flows in Indian Creek and tributaries infiltrating to the regional aquifer. The larger estimate was calculated as the difference between estimated average annual precipitation on a 3-mile radius surrounding the project area plus the Indian Creek watershed upstream of the area. SPF concluded that development and use of water by the project would not injure other rights because ground water levels are stable or rising at the location of the project and that ground water flow to the Mountain Home Ground Water Management Area (MHGWMA) would not be reduced

because the flow lines in the area are parallel to its northwest boundary with, ultimately, ground water from the aquifer discharging to the Snake River.

IDWR questioned whether all of the estimated recharge would reach the regional aquifer through the overlying perched aquifer zones and suggested a range of recharge to the regional aquifer of 4,000 to 5,000 af per year (IDWR, January 11, 2007). Permit No. 63-32225 was issued for a maximum diversion volume of 1,815 af per year. The applicant unsuccessfully sought reconsideration arguing that during high water demand years the annual volume diverted would exceed the amount authorized based upon average water use. (Johnson, February 25, 2007)

SPF's second report (SPF, May 16, 2011) reviews water needs and availability of ground water for the larger project proposed by Application for Permit No. 61-12256. The report begins with "This memorandum provides initial responses to IDWR questions. Additional data are actively being collected by IDWR, the applicant, and other water users …. These new data will provide additional insight regarding water availability and supply. A more detailed water-supply analysis will be submitted on the basis of the anticipated new information at a later date." A follow-up report has not been filed to verify the conclusions of the initial report.

Based upon SPF's "initial responses," the project proposed by Application for Permit 61-12256 requires 2,650 af per year for 4,200 residential units and 840 equivalent domestic units of commercial, industrial and miscellaneous uses. The ground water would be used to directly supply 353 acres with irrigation water associated with the residential units with reclaimed domestic wastewater used to irrigate 344 acres of commercial, institutional and common areas. SPF compares the recharge estimate of 8,600 af to 32,600 af per year developed for its earlier report to an estimated annual withdrawal of 7,240 af for approved permits and applications for which withdrawal estimates are available, but notes that annual volume estimates were not available at the time, and were therefore not included in the comparison, for Applications for Permit 63-32499, 61-12095 and 62-12096 (applications for Mayfield Townsite and Elk Creek Canyon projects filed prior to Application for Permit 61-12256). SPF concludes that "local aquifers are capable of sustaining additional withdrawals while noting that ground water levels in the Mayfield Springs project area are stable despite 40 years of pumping in the Cinder Cone Butte Critical Ground Water Area (CCBCGWA).

2. ELK CREEK CANYON (NEVID, LLC)
   PERMIT NO. 61-12090
   APPLICATION FOR PERMIT NO. 61-12095
   APPLICATION FOR PERMIT NO. 61-12096

This project is proposed to be located about 1 mile northeast of the Simco Road interchange. Permit No. 61-12090 allows 1.82 cfs (up to 345 acre feet diverted per year) of ground water to be used for municipal purposes and 2.2 cfs to be used for fire protection. IDWR based the approval on a planned community of 176 lots called Elk Creek Village having irrigation from the municipal system for 59 acres within these lots

and another 50 acres of common area irrigated using recovered wastewater. This is the first phase of a larger development called "Elk Creek Canyon." Proof of beneficial use is due on October 1, 2014.

Application for Permit Nos. 61-12095 and 61-12096 are for additional phases of the Elk Creek Canyon planned community development. Application for Permit No. 61-12095 seeks 5 cfs of ground water for municipal purposes for 750 residential units with 150 acres of irrigation from the municipal system associated with the residential units and another 30 acres using treated wastewater. The place of use is a 480-acre parcel east of the first phase.

Application for Permit No. 61-12096 as originally filed sought 35 cfs of ground water for municipal use for a 17,950 unit planned community development. It has been amended several times. The most recent amendment, filed July 1, 2010 seeks 14.91 cfs of ground water for municipal purposes for 4,603 commercial and residential units with about 460 acres within these units to receive irrigation water directly from the municipal system and an unspecified area to be irrigated with treated wastewater. An additional 5.57 cfs of ground water is sought for fire protection. The place of use is located on about 1,300 acres east of and separated by about ¼ mile from the place of use for the other two phases.

SPF (SPF, December 17, 2007) addressed water requirements and availability in support of Application for Permit No. 61-12090. SPF found that, although the entire Elk Creek Canyon development would consist of about 1,200 equivalent domestic units, Application for Permit No. 61-12090 would supply water for only 178 of these units diverting an estimated 577 af per year through two or more wells. SPF estimated that 1,200 to 12,100 af per year is available for appropriation from the aquifer that would be tapped for the proposed wells. This estimate was based upon a water budget analysis of precipitation, and evapotranspiration within an assumed capture area featuring a 2-mile buffer area around the project and the up-gradient drainage area, infiltration from streams entering the capture area, and water diversions for existing and permitted uses in the assumed capture area.

SPF submitted a follow-up memorandum (SPF, March 30, 2009) responding to two memorandums prepared by IDWR staff analyzing ground water supplies for projects proposed in the I-84 corridor. SPF used a smaller buffer zone (1 mile around the project) in accordance with a procedure applied by IDWR to a nearby development and concluded that 2,400 to 8,400 af per year of ground water is available for appropriation under Application for Permit 61-12090 that requires only 580 af per year. SPF objected to analyzing water availability and need by comparing the maximum diversion rate applied for to an estimate of the average annual flow rate available in the aquifer. SPF again noted that the effects of 40 years of pumping about 16,000 afa within the CCBCGWA has not resulted in ground water level declines in the Elk Creek Village project area.

SPF's conclusion that water levels have not been affected does not take into consideration that ground water rights in the CCBCGWA have not been fully exercised during the past 40 years. An IDWR study initiated because of an apparent hiatus in ground water declines in the Mountain Home Plateau (Castelin, August 1988) found that:

> "In general, water level declines in the regional system have moderated or even reversed in recent years …"
>
> "Shorter-term declines are also enlightening. As the water-level change maps for 186-1988 and 1987-1988 show (Figures 3 & 4, respectively (*in the Castelin Report*)), very little additional decline took place, despite severe drought conditions. The reason for this anomaly appears to be strongly related to Federal government set-aside programs, which encourage farmers not to plant crops, and therefore to not irrigate, reducing the amount of ground water removed from storage. Land set aside from production has steadily increased since 1984, reversing a trend of increasing irrigated acreages (see "Changes in Irrigated Acreages" below (*in the Castelin Report*))."

The modest declines in ground water levels described by Castelin are confirmed by the water level change maps in IDWR's staff report (IDWR, May 31, 2012, page 7) for 1981 to 1991 and 1991 to 2001. However, IDWR found ground water declines were deeper from 2001 to 2011 with an affected area expanding outside of the CCBCGWA even though the full authorized acreage was not being irrigated in 2011.

IDWR issued a final order (IDWR, September 30, 2009) approving Application for Permit No. 61-12090 for a smaller diversion rate (4.02 cfs instead of 5 cfs) and an annual volume of diversion limited to 345 af. IDWR found that only 811 af per year of water was available for appropriation from the target aquifer and that, of this amount, only 345 af per year could be captured by the proposed wells. IDWR's main objections to SPF's water budget approach related to SPF's assumptions that 5% of precipitation contributed to recharge in the capture area rather than 3% used by IDWR and that SPF assumed recharge from stream seepage would be 100% of the difference between precipitation and evapotranspiration in the up-gradient portion of the contributing basin rather than 14% used by IDWR.

A memorandum (SPF, April 28, 2010) submitted with an amended application for permit (the application has been further amended as noted above), addresses the water requirements and water availability for Application No. 61-12096, including limited information on these matters for Application No. 61-12095. This memorandum, although dated about 7 months after IDWR's final order on Application for Permit No. 61-12090, references the results of SPF's water budget prepared for that filing and generalizes that the water available for appropriation is larger because the additional wells proposed under Application for Permit 61-12096 will be spaced further apart so that the capture area is expanded. SPF estimates that the revised proposed development of 4,384 homes need a maximum diversion rate of 14.91 cfs for municipal purposes including about 438 acres of residential irrigation and 5.57 cfs for fire protection. SPF compared the

projected annual diversion volume of 2,400 af for Application for Permit No. 61-12096 alone and 3,357 af when combined with Permit No. 61-12090 and Application for Permit No. 61-12095 to the previous estimate of 2,400 to 8,400 af per year of recharge to the aquifer. SPF proposed to submit a refined analysis of water availability based upon the larger capture area and the results of a scheduled pump test to affirm that sufficient ground water is available for the project, but that information has not been filed.

3. SHEKINAH INDUSTRIES
   APPLICATION FOR TRANSFER NO. 73811

This project is located near the southeast corner of the Simco Road interchange. The application for transfer seeks to move to this location portions of six rights to use ground water with priorities ranging from 1963 to 1980 presently appurtenant to land just east of Mountain Home Airbase, about 7 miles southeast of the CCBCGWA. The application as now pending seeks to divert 5.56 cfs and 1,476 afa of ground water from up to 26 new wells for irrigation of 369 acres within a 924-acre PPU located less than a mile northeast of the CCBCGWA. Both the current location and the proposed location are within the MHGWMA.

The application was originally filed December 7, 2006 by Idaho Water Company and twice amended (8/21/2008 and 9/8/2008) to drop two rights and reduce the diversion, rate, annual volume of diversion and irrigated acres in a permissible place of use (PPU). Idaho Water Company assigned the application to Shekinah Industries on June 23, 2011.

A preliminary order was issued on February 25, 2011 rejecting the application for failure to submit requested information. The order was stayed based upon a petition for reconsideration.

Brockway Engineering, PLLC (Brockway) submitted to IDWR a numerical model for the Mountain Home Plateau aquifer developed to estimate the affect of the proposed change on ground water levels (Brockway, December 28, 2009). Comparing the results of model run with and without the changes proposed by Application for Transfer No. 73811, Brockway concluded that the change would positively affect ground-water levels in the vicinity of Mountain Home "to partially mitigate the groundwater declines that have been monitored in this area over the last several decades." Brockway also concluded that ground-water levels in the vicinity of the proposed point of diversion will be negatively affected if the proposed change is implemented. Results of model runs with and without the proposed change indicate that at steady state, ground water levels over most, if not all, of the CCBCGWA would be lowered by the change with a maximum reduction in level of about 4 feet on the northwest boundary of the area (Figure 18, appended to the Brockway report). The proposed place of use is at least 5 miles nearer the area of greatest ground water declines in the CCBCGWA, as identified by IDWR on Figure 5 in the May 31, 2012 staff report, than the decreed place of use for the rights under consideration.

Brockway estimated inflow to the modeled area from the Danskin Hills along the northeast boundary of the area modeled averaged 2,250 af per year per mile.

IDWR's Hydrology Section provided a technical review of the Brockway model and the conclusions reached using the model (IDWR, April 14,2010). IDWR questioned the validity of assumptions used in the model and consequently the results obtained from the model. IDWR's main concerns are:

a) The aquifer was modeled for steady state, equilibrium conditions even though water levels in parts of the area have dropped significantly for many decades and continue to fall.
b) Brockway's estimate of underflow entering the area from the hill front used Darcy's Law with inconsistent hydraulic conductivity and an assumed hydraulic gradient. IDWR notes that Brockway's estimate exceeds previous estimates derived using water budget methods.
c) Brockway used an estimate of precipitation that significantly exceeds estimates used in previous studies.
d) Brockway's estimate of 11 feet of draw down at the pumping well (one well rather than 26 listed in the application) based upon the dimension of the model cell (1/4 mile square) instead of a more likely well diameter. IDWR calculated that the draw down would be about 40 feet if all of the water were withdrawn from a 12-inch diameter well.

4. ORCHARD RANCH, LLC
   APPLICATION FOR PERMIT NO. 63-32703
   APPLICATION FOR TRANSFER NO. 73834

This project is located near the historic town site of Orchard, a reminder of previous attempts to develop this desert area, between I-84 and the UPRR track. The current project was initially proposed as a planned community of 8,758 homes with associated commercial, industrial and public uses, but the pending applications have been revised to now seek irrigation of 1,111 acres.

Amended Application for Permit No. 63-32703, filed September 27, 2010, seeks 9.6 cfs of ground water from four wells for irrigation of 480 acres within a 2,751.7 acre permissible place of use. Transfer No. 73834 was amended on December 22, 2010 and again on January 5, 2011 for approval to divert 11.36 cfs and 2,975 afa of ground water to irrigate 631 acres within the same 2,751.7-acre place of use as Application for Permit No. 63-32703 using four additional wells.

Technical reports (SPF, May 30, 2007 and SPF, February 24, 2009) submitted prior to the filing of the amended applications for only irrigation use, describe that the proposed municipal use would be developed over a 40-year period. According to these reports the planned community required a maximum daily diversion rate of 9.98 cfs and an annual average diverted volume of 4,820 af using up to 10 wells ranging in depth from 700 feet to over 1,000 feet. Irrigation of residential areas directly from the municipal system was

to be minimal with common areas to be irrigated using treated effluent through a separate system. The SPF reports do not include an estimate of availability of ground water and state that the "long-term sustainable production capacity in this area is unknown." SPF noted in the Executive Summary of its 2007 report that:

> "Ground water levels in the Orchard Ranch vicinity have been relatively stable water levels over the last 30 to 40 years. However, two wells located south or southeast of the property show water level declines ranging from 1 foot per year to approximately 2.5 feet per year.
>
> The long-term sustainable production capacity in this area is unknown. Large increases in ground-water production will likely be constrained by low recharge in upgradient areas. Structural controls (e.g., faulting) may limit ground-water flow into the general Orchard Ranch area. The long-term sustainability of aquifers in the Orchard Ranch area will best be determined through increased ground-water pumping and careful water-level monitoring. Pumping and static water levels in the area should be monitored over the aquifer development period to prevent over-pumping and evaluate sustainable yield.
>
> It may be possible to transfer water rights from the Lone Pine Dairy to the Orchard Ranch area, but the extent of ground water withdrawals from Orchard Ranch wells will still be determined by the available recharge. Ultimately, water from other areas (e.g., surface water from the Snake River or ground water from the Lone Pine Dairy) will be required if local ground water resources are insufficient for full project buildout." (Emphasis added).

SPF's 2009 report indicates that the applicant qualifies as a municipal provider because the project when built will be regulated by IDEQ. This report also indicates that this application and Application for Transfer No. 73834 are for the same project, are not to be considered additive, and asks that processing of the transfer be suspended pending a ruling on the application for permit.

IDWR's electronic files do not have any additional or amended technical reports concerning the project as proposed by the amended applications. However, it appears that the applications are now additive in diversion rate, volume and acres irrigated. The priority date of the application should be advanced to the date of the amended application if an enlargement in use of water is proposed.

IDWR's Hydrology Section reviewed water quantity issues related to approval of Application for Permit 63-32703 as amended for irrigation use in a technical report (IDWR, March 7, 2011). The review does not address these issues for Application for Transfer No. 73834 other than to note that it along with other "senior priority applications are in an area of limited recharge." IDWR, noting that the technical reports submitted by SPF do not provide information on water availability, used its earlier estimates of water availability prepared for IDWR's final order for the Elk Creek project (Application for Permit No. 61-12090). This order found only 811 afa of ground water available in the

local aquifers and issued a permit for Elk Creek to use 345 afa. Based upon this order, IDWR concluded that the annual volume of water available for the Orchard Ranch project and other filings proposing to use the same ground water source is no more than 466 afa. In contrast, IDWR estimated that 2,160 afa would be need for irrigation of the 480 acres identified on Application for Permit 63-32703.

An email (IDWR, September 1, 2011) from IDWR to a project representative indicates that "The Director has serious concerns regarding water availability for this project given the known water issues … and the fact this application is one of the more junior applications of the eight pending applications."

Preference for processing/approval of these applications relative to other pending applications for the same/interconnected ground water source is uncertain because of amendments to these applications and policy changes in response to an Idaho Supreme Court decision (Idaho Supreme Court, May 26, 2011). This decision may affect the seniority of applications for permit filed earlier than applications for transfer of vested rights with earlier priority dates.

5. MAYFIELD TOWNSITE (ARK Properties,LLC)
   APPLICATION FOR PERMIT 63-32499
   APPLICATION FOR PERMIT 63-33344

Application for Permit No. 63-32499, filed July 28, 2006, seeks to appropriate 10 cfs of ground water for municipal purposes for 8,000 housing units to be built within a 6,363-acre area along Indian Creek near the existing community of Mayfield. Application for Permit No. 63-33344, filed March 1, 2010 and amended on January 18, 2011, seeks to appropriate 9 cfs of ground water for irrigation of 475 acres within a 1,284-acre PPU within the proposed municipal area. These acres are in addition to those authorized to be irrigated by two existing rights appurtenant to the proposed place of use. Right No. 63-2046, decreed in the SRBA, allows 2.58 cfs to be diverted from Indian Creek for irrigation of 129 acres. Permit No. 63-12447 allows diversion of 4 cfs of ground water for irrigation of 200 acres within a 980-acre PPU. Application for Permit No. 63-32499 proposes to divert ground water from 8 wells ranging in depth from 600 to 800 constructed to prevent leakage from perched aquifers to the regional aquifer.

A report (SPF, November 1, 2007) addresses water requirements and availability for the municipal uses sought by Application for Permit No. 63-32499. This report does not include information for Application for Permit No. 63-33344 because it was prepared prior to filing of that application. SPF estimated that annual withdrawals for municipal purposes will total 4,860 af/yr with a depletion of 3,960 af/yr. SPF calculated that 6,000 to 31,590 af/yr are recharged to the local aquifers that will be used for this development. SPF determined that existing and permitted uses require about 2,500 af/yr leaving about 2,600 to 28,000 af/yr available for the Mayfield Townsite project. Even though the low estimate of water availability is less than that required for the project, SPF concludes "…that there is likely sufficient water available for application 63-32499." (Ref. Second

paragraph of the Executive Summary, Page ii). SPF's specific conclusions cited in the Executive Summary include:

> "7. The ultimate carrying capacity of aquifers in the Mayfield Townsite area is unknown. If the actual aquifer recharge falls in the upper two-thirds of our recharge estimates then the chances of developing the entire water supply for the project from ground water sources are good. "
>
> "11. Water supplies from an alternative source may be required for full project build out if on-site supplies are insufficient."

IDWR's Hydrology Section responded to the report in a memorandum (IDWR, February 19, 2009). IDWR concluded concerning water availability that:

> "These calculations indicate that proposed water right possibly would result in total withdrawals exceeding the average rate of recharge to the aquifer. In addition, the stream flow data that IDWR collected suggests that the low estimate of aquifer recharge presented by SPF is unrealistically high assuming that all other assumptions are correct. Lastly, SPF's high estimate of annual average recharge is not supported by field measurements and, because it relies upon a preliminary, uncertain estimate of ET for a partial year in a different basin, potentially grossly overestimates the amount of water available for appropriation." (Pages 13 – 14).

IDWR voided Application for Permit No. 63-33344, but reinstated it upon receipt of requested technical information (SPF, January 11, 2011). The application was amended January 18, 2011, to add two new wells to the proposed points of diversion. The water-bearing zone for one existing well is 432 to 622 feet below land surface and for the other, 602 to 792 feet. The new wells are proposed to be up to 850 feet deep. SPF clarified that the land to be irrigated is new and does not duplicate the 200 acres already irrigated within the PPU for Permit No. 63-12447. The new irrigation project will consume 1,188 afa of ground water (assuming 2.5 afa per acre) in addition to the 500 afa now consumed by irrigation under Permit No. 63-12447. SPF provided depth to water information for the wells in the project area. Water levels in the wells used for irrigation since development of Permit No. 63-12447 in 2007/2008 are stable or rising slightly, with a small decline in a deeper, unused well, and a stable water elevation in a shallower well thought to tap a perched zone.

REVIEW OF IDWR'S MAY 31, 2012 STAFF REPORT

1. FINDINGS BY IDWR

As requested by the hearing officer, IDWR staff reviewed the sufficiency of the water supply for the eight applications in the consolidated hearing (IDWR, May 31, 2012). IDWR identified an 11-mile wide study area extending from the crest of the Danskin Hills on the northeast approximately 35 miles southwest to the canyon rim along the

Snake River. The swath, oriented along the northwestern boundary of the CCBCGWA, encompasses the well locations and development area proposed in the applications in the consolidated hearing. A swath of similar size and orientation including the CCBCGWA was used for comparison. The net amount of recharge available in each area after accounting for existing and permitted uses within each area was estimated using water budget methodology. This analysis found a net recharge of 9.83 cfs in the study area and a deficit of 12.97 cfs of net recharge for the comparison area. This analysis assumes a separation exists between the water supplies and the affects of water diversion and use between the two areas.

Based upon its analysis of water conditions in the study and comparison areas, IDWR staffed reached a number of specific conclusions (page 19 and 20) including the following:

1. Assuming future hydrologic conditions similar to those during the recent past, the reasonably anticipated rate of future natural recharge is 11,100 afa.
2. The estimated net recharge rate for the study area is 7,100 afa. The estimate is positive, indicating that existing consumptive uses, including those for water rights that are not yet fully developed, are less than the rate of recharge.
3. The net recharge rate (7,100 afa) is an estimate of the maximum additional consumptive use that could normally be authorized within the study area. On a continuous basis, this amount is equivalent to 9.8 cfs, which is approximately an order of magnitude less than the maximum total appropriation amount being sought as part of the consolidated hearing (85 cfs).

…
…
…

7. Ongoing water level declines more than 30 years after establishment of the Cinder Cone CGWA indicate that the groundwater supply on the Mountain Home Plateau is limited and support the conclusion that consumptive use within the Cinder Cone comparison area exceeds the rate of recharge.
8. Unless inflow to the aquifer system in the study area is increased, mass balance requires that the withdrawals will decrease outflow to the Snake River by an equivalent amount at steady state.
9. Assuming hydrologic continuity, groundwater development in the study area would eventually exacerbate conditions in the Cinder Cone CGWA.

2. ISSUES RAISED BY IDWR'S STAFF REPORT

   a. Were the study and comparison areas properly sized and located?

   The size and location of the study area are arbitrary and not supported by technical analysis. The southeast boundary of the study area is located along the boundary of CCBCGWA without any apparent physical reason. This location does not center the proposed wells in the swath. Nearly all of the proposed wells are located within the

southeastern half of the swath nearest to the CCBCGWA. Without a documented technical basis, the width of the swath matches that of the comparison area that, in turn, was scaled to match the width of the CCBCGWA. IDWR had previously suggested that the capture area for determining water availability should be commensurate with the boundaries of the cone of depression caused by pumping the proposed well for a period of 10 years (IDWR, February 10, 2009). The diameter of the water level decline attributed to pumping in the CCBCGWA is approaching 20 miles (IDWR, May 31, 2012, Figure 5).

Inclusion of a portion of the Blacks Creek drainage in the area used for the recharge estimate is an unwarranted complication in the water budget because there is no information indicating the direction of ground water flow in the Blacks Creek basin is different than observed regionally. Including precipitation in the Blacks Creek Basin (about 18% of the defined recharge area) in the water budget is inconsistent unless the long-term effects of pumping in the Blacks Creek drainage just outside of the study area are included in the analysis.

b. Are water supplies in the study area and comparison area from separate sources and are the effects of pumping contained within these separate areas?

IDWR analyzed the water supplies and water impacts in the study area and the comparison area as if the two areas were separate. This premise is not supportable by other information in the report. The discussion of the hydrogeology of the study area (Page 6) does not identify a fault or other discontinuity in the regional aquifer oriented to provide a basis for concluding that the study area and the comparison area are hydrologically separate. Pumping affects clearly are shown to propagate across the hypothetical line drawn between the areas in the IDWR report. Figure 5 of the report shows the measured encroachment into the study area of water level declines resulting from pumping in the comparison area.

When viewed as a single area, IDWR's estimate of the combined rate of recharge (9.83 cfs – 12.97 cfs = -3.14 cfs or -2,273 afa) is not sufficient to satisfy the consumptive use of existing and permitted uses identified by IDWR. Although IDWR analyzed and reported the water budget for each area as if separated, the "bottom line" of the report (Conclusion Nos. 7 and 9, page 20) reaches the appropriate conclusion that use of ground water in the study area as proposed in the applications in the consolidated hearing will "exacerbate" conditions in the already over-appropriated CCBCGWA.

c. Does the water budget incorporate appropriate conservative assumptions, methodology and data for water availability and use?

The discussion that follows uses the term "conservative estimate" relative to IDWR's duty to protect existing rights and to limit diversions to the reasonably anticipated rate of future natural recharge. An assumption should not be used that jeopardizes

IDWR's duty unless technical data are available to indicate that the assumption is likely accurate.

The assumptions used in IDWR's water budget do not result in conservative estimates of the volume of water reaching the regional aquifer, the volume of water that can be taken from the aquifer by existing rights and the volume of water that would be taken from the aquifer if the pending applications are approved. IDWR also overestimates the portion of the water recharging the aquifer that can be captured by the proposed wells.

As noted above, recharge from precipitation on the Blacks Creek drainage should not be included and/or depletions within the study area caused by pumping of wells near the Blacks Creek interchange should be included in the estimate of depletions from the aquifer.

Recharge from precipitation on the non-recharge area should not be included. Portions of this area are outside of and down gradient of the "reach" of the proposed wells. Impermeable zones above the regional water table described in driller's reports for wells constructed in Townships 2 and 3 South and Ranges 4 and 5 East prevent precipitation from reaching the regional water table. Because the amount of potential evapotranspiration on the non-recharge area significantly exceeds precipitation on the area, little if any water is lost to deep percolation in areas with soil cover (USGS, December 1977, page 11). The driller reports were accessed at www.idwr.idaho.gov/WaterManagement/WellInformation/DrillerReports/dr_default.htm).

The water budget analysis used an estimate of the "actual" consumptive use of irrigated crops in the study and comparison areas. A conservative estimate accounts for the full volume of water authorized to be diverted under existing rights, including permits. The valid rights were not being fully exercised during the year (2011) used in IDWR's analysis, but all of the authorized diversions should be included in the analysis for purposes of determining whether un-appropriated water is available.

Management of an over-appropriated aquifer is more difficult than management of a surface water source that is over-appropriated at some or even all times. Prior rights from the surface water source can be protected in real time by appropriate and timely curtailment of junior priority rights. Such direct administration is not possible for an over-appropriated aquifer. Issuing rights for diversion of more ground water than an aquifer can support leads to a race to the bottom of the aquifer ultimately causing loss of financial investments, excessive pumping costs, expensive litigation and increased administration costs to IDWR. Caution is needed in issuing ground water permits to avoid this undesirable circumstance.

A conservative estimate of the volume of water depleted from the aquifer does not assume that water not consumed by the plants will return to the aquifer for re-diversion by wells in the study or comparison areas. Drillers' reports for wells in the

comparison area typically show that the first water bearing zones are deeper than the static water level reported for the completed well. This indicates that impermeable or low permeability zones exist that confine water in the aquifer while also preventing or restricting water applied to the land surface from percolating downward to return to the aquifer. The lithology descriptions in drillers' reports for the study and comparison areas often identify the first several hundred feet penetrated by the well as a complex sequence of fine to coarse grained sediment including clay zones. Near surface saturated zones (apparently perched) are described even for some wells located in the comparison area. Under these conditions, water pumped from the regional aquifer is unlikely to return to the regional aquifer at a location or within a time interval to make the water available for re-diversion and should not be included in the estimate of the volume available in the water budget.

The above-described conservative assumptions are incorporated in Table D to adjust IDWR's estimates of recharge for the study area, comparison areas and the combined area (See Table 5, Item 10 in IDWR, May 31, 2012). The volume of water authorized to be diverted under existing rights in the study and comparison areas is shown in Tables E, F and G. Because of conditions limiting the use of a right when used in combination with another right, the totals for diversion rate, annual diversion volume and acres allowed to be irrigated are less than indicated by simply summing the overall authorizations in the rights. Even so, the area allowed to be irrigated within the comparison area is more than 6,800 acres as compared to the 5,700 acres IDWR identified as irrigated in 2011. The rights in this area are authorized to divert 29,000 afa as compared to 13,000 afa of depletion IDWR attributed to use of these rights in 2011.

Without information to show that Blacks Creek water adds to the available supply, that all existing rights will not be exercised, that unconsumed water pumped from the aquifer does return to the aquifer, and/or that the water sources in the study area and comparison area are actually separate, the water budget for the combined area as shown on Table D should be used. This budget indicates that the reasonably anticipated rate of future natural recharge is already fully allocated with a 23,000 afa deficit of water available if all existing and permitted rights fully divert and use presently authorized amounts, clearly there is no water available to warrant approval of any of the pending applications. If those pending applications were approved as requested, their use would add another 19,000 afa to the deficit.

d. Adequacy of available data, timing of report relative to ongoing studies/data collection.

IDWR noted that several studies now underway could provide data and information to refine the estimate of water availability in the aquifer. Even so, the staff memorandum does not suggest delaying consideration of the applications until the information from these studies is available.

AQUIFER ANALYSIS

IDWR's May 31, 2012 technical memorandum regarding Sufficiency of Water Supply for Water Right Applications and Transfers along the I-84 Corridor describes a study area and a comparison area as part of their analysis. The study area was established to include all of the new uses proposed by new water right applications for permit and transfers of existing water rights to utilize ground water from a new area. The study area is described as patterned after a 1981 study by IDWR in conjunction with creating the CCBCGWA.

The study goes on to conclude there is a net positive recharge of 7,120 acre-feet per year in the study area and a negative recharge of 9,399 acre-feet per year in the comparison area that includes the CCBCGWA. (These are the actual values reported by IDWR even though none of the analysis techniques used is capable of providing recharge estimates accurate to 4 significant digits.) Included in these recharge amounts is recharge southwest of most existing and all proposed uses and likely does not contribute to the available water supply to meet existing or future needs.

A larger concern for the IDWR analysis is the treatment of the two areas as not hydraulically connected. Both Mr. Tesch and Mr. Owsley testified at deposition they did not consider impacts from existing ground water use in the comparison area might reduce the ground water supply available in the study area and, conversely, they did not consider impacts new development in the study area might have in the comparison area. Mr. Tesch testified he recognized such impacts are possible but they were not investigated as part of preparing the May 31, 2012 report. Mr. Owsley testified if the southeast boundary of the study area were moved to the southeast the net recharge for the study area would probably be reduced. It seems clear that if the study area had been defined as the combined study and comparison area the net recharge would be a negative 2,000 acre-feet per year using IDWR's approach.

Figure 5(d) of IDWR's Ma 32, 2012 report shows ground water level change conditions for the CCBCGWA through 2011. The contours for current conditions show existing uses in the comparison area are currently withdrawing water in the study area. The contours in Figure 4 of the IDWR report seem to ignore the drawdown that is occurring in and near the CCBCGWA.
In an attempt to better assess potential impacts of current ground water pumping in the comparison area on the study area and the impact of future pumping in the study area on the comparison area, a Theis analysis was prepared. The analysis looked at current conditions based upon existing water rights. A program by Koch and Associates, 1986 was used for the analysis. Inputs to the program are:

Hydraulic Conductivity in Gallons per Day per Foot^2
Specific Yield
Water Table Thickness in Feet
Time a well has been pumping in Days

Pumping rate in GPM per well
X – Y grid of well locations in Feet

Aquifer characteristics from IDWR, Brockway and SPF were reviewed and tried in the program. A pumping period of 20 years was selected to compare the program results to the CCBCRWA water level changes shown in Figure 5 of the IDWR May 31, 2012 report. Figure 5 shows the majority of the draw down occurred between 1991 and 2011, a period of 20 years. The program returned drawdowns of about 110 feet at the end of the 20 year period based upon diversion quantities for the water rights converted to a continuous diversion rate for a year to divert the annual volume of water authorized by the water right. This drawdown compared reasonably well with the actual drawdowns reported in Figure 5 for the most recent 20 year period resulting from actual diversions that are expected to be somewhat lower than authorized diversions.
The aquifer characteristics used to obtain those results come from Brockway's work and are:

Hydraulic Conductivity	90 GPD/ft^2
Specific Yield	0.15
Water Table Thickness	500 ft
Pumping Time	7300 days

To estimate the impact of continued pumping by existing water users the program was run for an additional 20 years. A simulated observation well was placed near the center of Sec 19 Twp 1S Rge 5E, B.M. which is near the location of the fault identified by Bond and near the boundary of the study area and the comparison area[2]. The results of the additional simulated pumping are shown in Figure 2 below. The analysis shows an estimated drawdown at this location of about 8 feet after 20 years of pumping the existing wells. When pumping of those wells continued for the second 20 years the analysis shows an increased rate of drawdown of about 15 feet for a total drawdown of about 23 feet by existing water uses after 40 years of pumping.

The existing permits, transfers and new water right applications were then added to the analysis and the second 20 year simulation was run a second time. The projected drawdown is shown on Figure 2 below as "All" and shows a drawdown of about 47 feet in the second 20 years, about double the drawdown that is forecast if existing conditions remain unchanged.

Recognizing the Theis analysis is a simplification of the actual conditions that may exist in both the study area and the comparison area, it does point to the potential interconnection between the two areas. Such an interconnection could cause some of the net recharge IDWR identified in the study area to not be available for future appropriations because it is part of the interconnected supply already being used by existing ground water users. It also shows the potential for any new water uses in the

[2] The simulated observation well was placed at this location to estimate potential drawdown in the immediate area without making assumptions about the transmissivity of any potential fault at this location.

study area to further deplete the CCBCGWA that IDWR's own analysis showing a net negative recharge, as discussed above, is being drafted beyond the reasonably anticipated rate of future natural recharge.

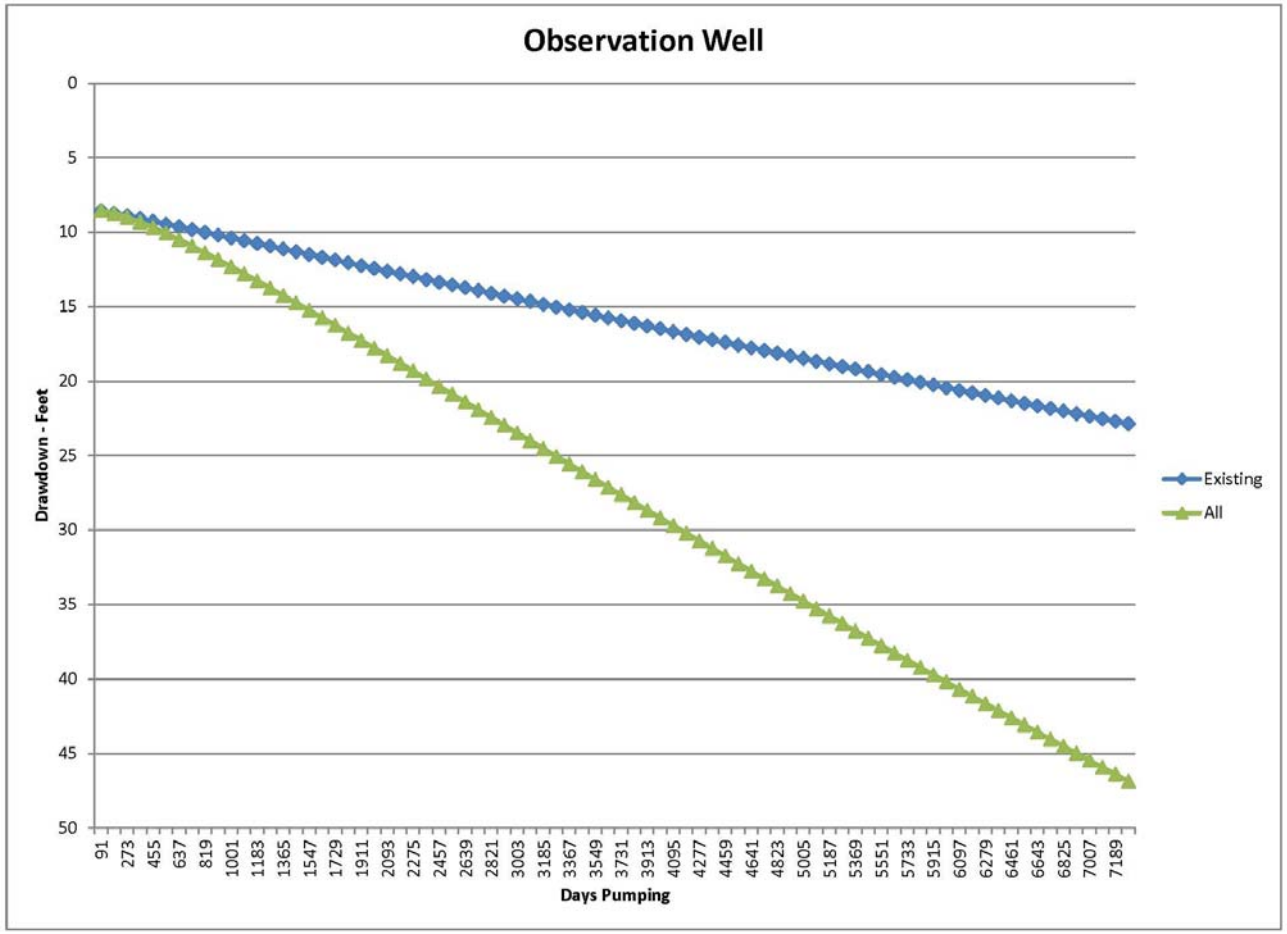

Observation Well
Drawdown - Feet
0
5
10
15
20
25
30
35
40
45
50
91
273
455
637
819
1001
1183
1365
1547
1729
1911
2093
2275
2457
2639
2821
3003
3185
3367
3549
3731
3913
4095
4277
4459
4641
4823
5005
5187
5369
5551
5733
5915
6097
6279
6461
6643
6825
7007
7189
Days Pumping
Existing
All

Figure 2

ANALYSIS OF SNAKE RIVER FLOW

The Site Overview section of this report and Appendix A describe the existence of springs along the north side of the Snake River in the C.J. Strike to Swan Falls Dam reach of the river. The springs are evidence of the presence of ground water discharging to the river in this reach. Both Mr. Tesch and Mr. Owsley testified in their depositions they understood both the study and comparison areas described in the May 31, 2012 IDWR Technical Memo are tributary to the Snake River. Technical reports submitted in support of several of the applications also acknowledge that ground water flow in the study and comparison areas is tributary to the Snake River. The location of the study and comparison areas, shown in Figure 1 above, shows the areas to be tributary to the Snake River upstream of Swan Falls Dam. The inventory of springs along the north side of the Snake River described above and further in the Appendix confirms ground water discharges to this reach of the river.

IDAPA 37.03.08.030.01.a describes trust water as water located in the Snake River between Swan Falls Dam and Milner Dam and all surface and ground water sources tributary to the Snake River in that reach. IDAPA 37.03.08.030.01.c goes on to define trust water as flow in excess of an average daily flow of 3,900 cfs from April 1 through October 31 (summer) and flow in excess of an average daily flow of 5,600 cfs from November 1 to March 31 (winter) while the flow at Milner is 0 cfs year-round. See also § 42-203B(2), Idaho Code, "For the purposes of the determination and administration of rights to the use of the waters of the Snake River or its tributaries downstream from Milner dam, no portion of the Snake River or surface or ground water tributary to the Snake river upstream from Milner dam shall be considered."

An analysis of the discharge of the Snake River at the Murphy Gage located downstream of Swan Falls Dam was completed to evaluate the current conditions of the Snake River at Murphy. The analysis used available mean daily data for the Murphy Gage and for the total discharge of the Snake River at Milner[3].

In order to evaluate the water supply defined as trust water, the discharge measured at Murphy must first be reduced by subtracting the flow passing Milner Dam. Analysis by IDWR and others suggest using a 3 day lag time between the measured discharge of the Snake River at Milner and the Snake River at Murphy to account for the travel time of flow changes from Milner to Murphy. As flows increase water velocity also increases and travel time decreases resulting in a shorter lag time.

The data selected for analysis began with 1981, consistent with the analysis by others, but also reflecting conditions as they were believed to exist at the time of the Swan Falls Agreement. Modeling efforts by IDWR and others prior to and during the Swan Falls Agreement negotiations attempted to define the water supply in the Snake River at Swan Falls Dam available at the time of the negotiations in the early 1980s. Beginning this

[3] Discharge of the Snake River at Milner is measured at two locations; the discharge is measured at the Snake River at Milner Gaging Station and at the Lower Milner Power Plant. The total flow of the river is the sum of these two measurements and that is the quantity used here.

analysis with 1981 data is an attempt to measure the changes, if any, to the river since the time of the Agreement.

Figures 3 and 4 below were produced using mean daily flows for Murphy and Milner, modified as described above, and averaged for the winter and summer periods respectively. Figure 3 suggests the average mean daily winter discharge at Murphy, as modified above, has declined about 2,000 cfs since 1981 and is continuing to decline at about 65 cfs per year. Projecting this rate of decline forward from 2012 for 13 years suggests the average mean daily flow for the winter of 2025 will be 5,600 cfs, the winter minimum flow established by the Swan Falls Agreement and approved by the Idaho Legislature.

Figure 4 suggests the average mean daily summer discharge at Murphy, as modified above, has declined about 1,850 cfs since 1981 and is continuing to decline at about 58 cfs per year. The average summer flows are still high enough there is no immediate danger the entire average summer flow will decline to 3,900 cfs, the summer minimum flow established by the Swan Falls Agreement and approved by the legislature. Summer flows are, however, quite variable, and time periods shorter than the 7 months from April through October were examined to determine if one period was consistently lower than the entire summer period. To perform that analysis, monthly averages of mean daily summer flows at Murphy, as modified, were calculated for the months April through September with the lowest month being July.

A 3 day lag time produced reasonable results on a monthly or longer basis but when shorter time periods are examined using a 3 day lag time does not produce consistent results. Some trials were completed using varying time periods and 10 days was selected as a compromise to minimize the effects of varying lag times and actual low flows masked by using mean daily flows averaged over a longer time period.[4] Several 10 day periods were tested in July and the 10 day period with the lowest average mean daily flows, as modified, was determined to be from July 1 through July 10 of each year. The result of the analysis is shown on Figure 5 below. The average of the mean daily flows for the July 1 – 10 period is shown to have declined over 2,000 cfs for the 1981 through 2012 period. The linear trend for that period shows a decline of about 63 cfs per year, on average and the linear trend line goes below 3,900 cfs prior to 2025.

Further analysis was made by finding the minimum 10 day average flow, adjusted as described above, for both the winter and summer periods. Periods during which the resulting average flow appeared to be an anomaly as described in footnote 4 were discarded. The resulting minimum 10 day average flow for the winter was 5,690 cfs for the period March 13 through March 22, 1991. The resulting minimum 10 day average flow for the summer was 4,250 cfs for the period July 12 through July 21, 2003.

[4] During the July 1 to 10 period in 1997 the discharge at Murphy dropped rapidly from over 11,000 cfs to about 6,500 cfs then back up to over 8,000 cfs. The discharge at Milner was similarly changing but the 3 day lag time did not produce reasonable results. Shifting the period to July 9 through July 19 for 1997 only, produced results more consistent with the 1997 flow difference before and after the period July 1 through July 10.

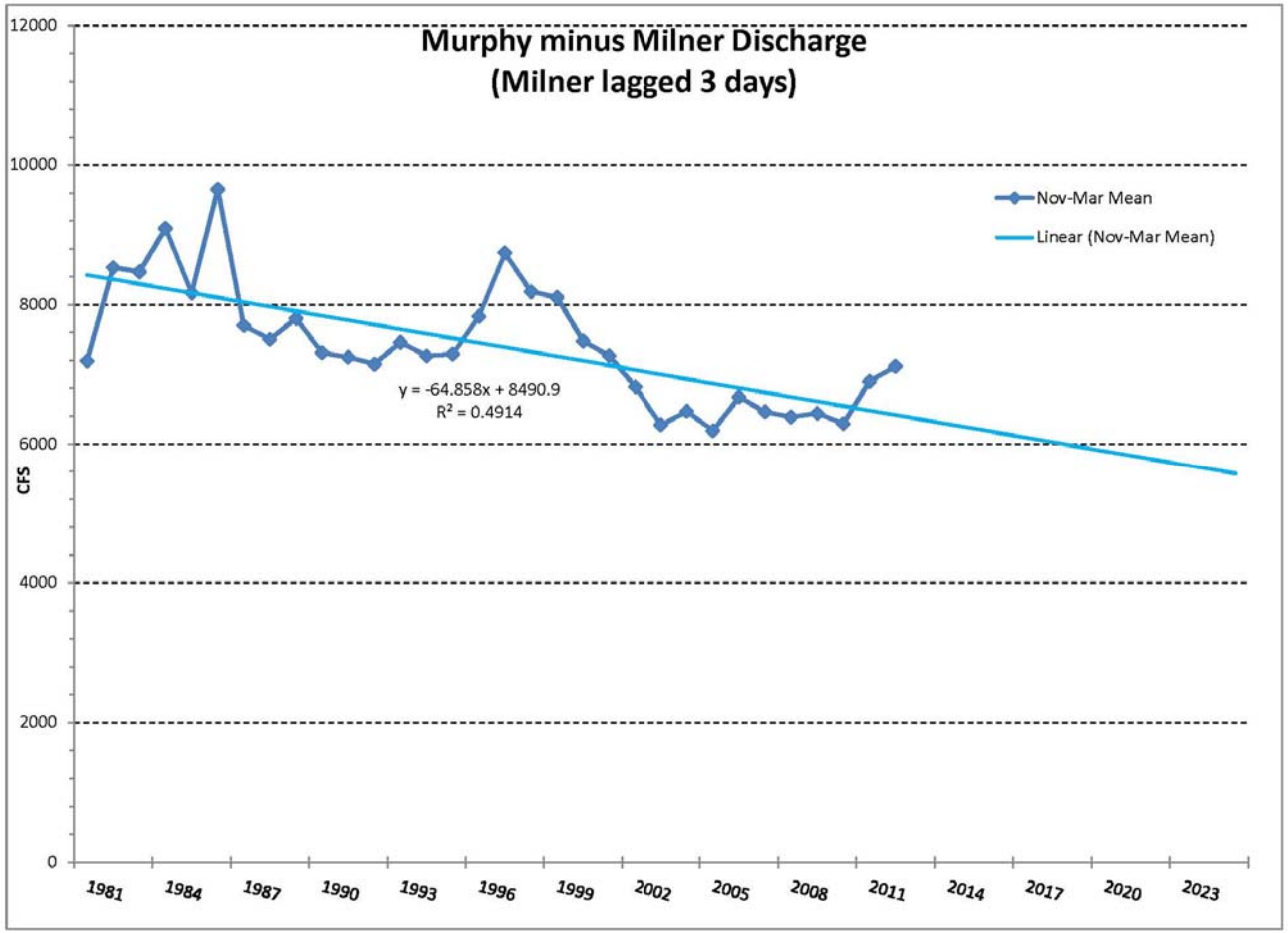

Murphy minus Milner Discharge
(Milner lagged 3 days)
Nov-Mar Mean
Linear (Nov-Mar Mean)
y = -64.858x + 8490.9
R² = 0.4914
CFS
12000
10000
8000
6000
4000
2000
0
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023

Figure 3

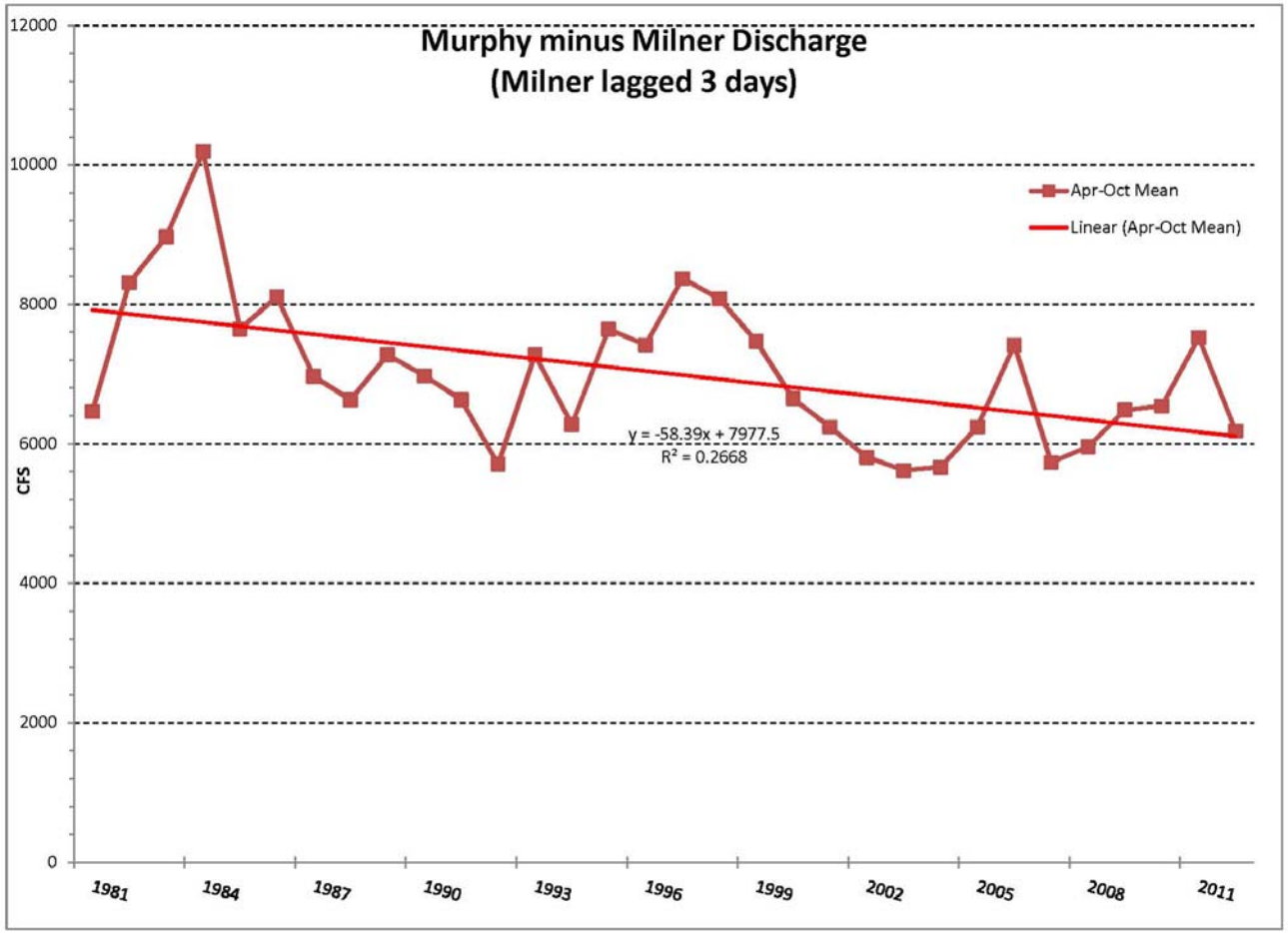

Murphy minus Milner Discharge
(Milner lagged 3 days)
Apr-Oct Mean
Linear (Apr-Oct Mean)
y = -58.39x + 7977.5
R² = 0.2668
CFS
12000
10000
8000
6000
4000
2000
0
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011

Figure 4

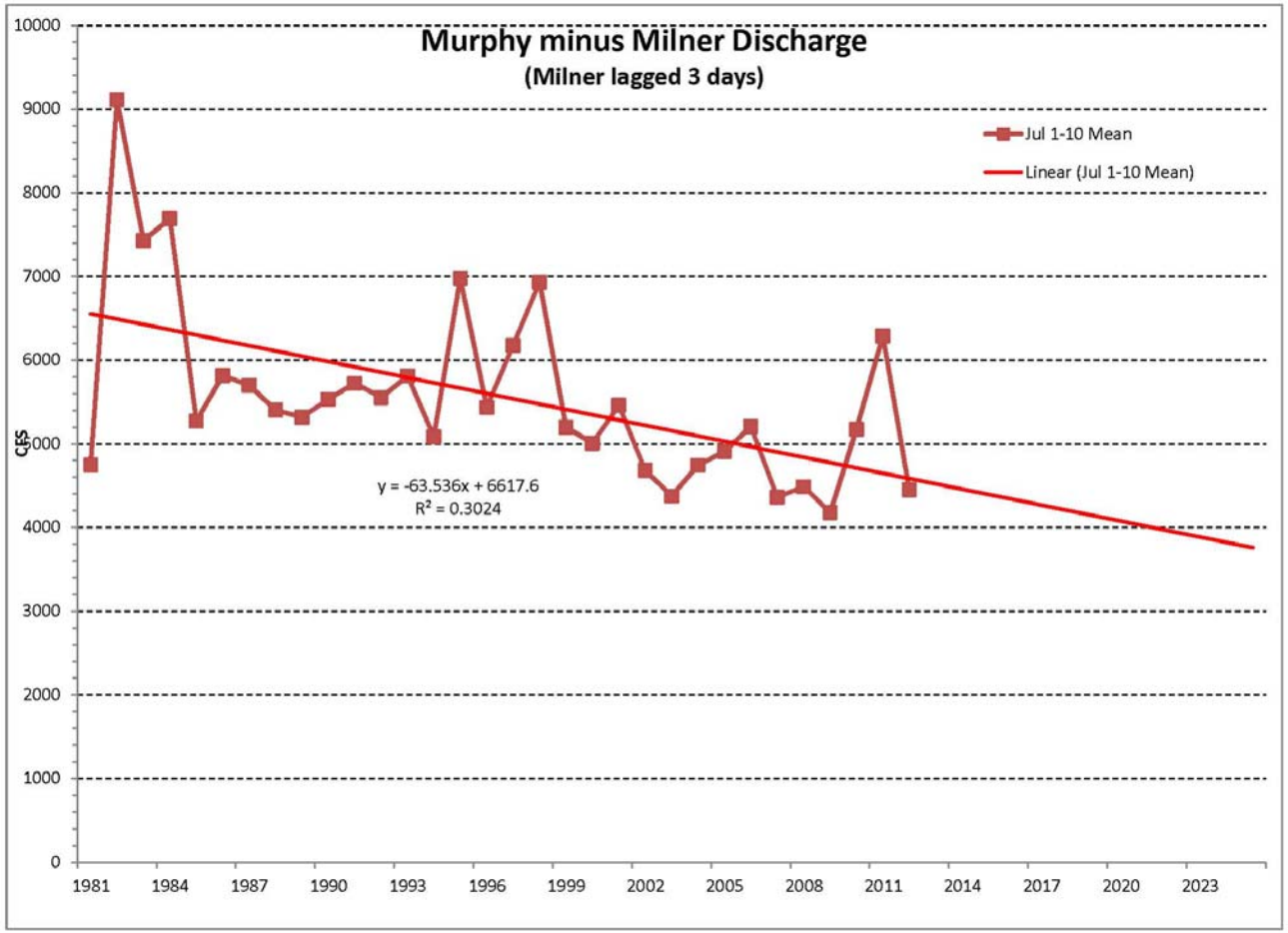

Murphy minus Milner Discharge
(Milner lagged 3 days)
Jul 1-10 Mean
Linear (Jul 1-10 Mean)
y = -63.536x + 6617.6
R² = 0.3024
CFS
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023

Figure 5

Any new development at any location that reduces the discharge to the Snake River from the Study Area or Comparison Area will hasten the decline of Snake River discharge at the Murphy Gage if all other conditions remain the same. If future development does occur in the Study Area or Comparison Area and either the summer or winter minimum flows at Murphy are violated, junior upstream water users, including new development in the Study Area or Comparison Area would be subject to a delivery call. With the current declining flows in both summer and winter, that call seems inevitable.

REFERENCES

Brockway, Charles E. and Powell, G. Erick, December 28, 2009. Shekinah Industries Groundwater Model Development and Transfer Scenario Runs.

IDWR, August 1988. Paul M. Castelin, Review of Factors Affecting Ground-Water Levels in the Mountain Home Plateau Area Elmore and Ada Counties, Idaho.

IDWR, September 30, 2009. Final Order in the matter of application to appropriate water No. 61-12090 in the name of Nevid LLC

Idaho Supreme Court, May 26, 2011. In the Supreme Court of the State of Idaho Docket No. 37348. In the matter of licensed water right No. 03-1018 in the name of Idaho Power Company.

Johnson, Gregory B., February 25, 2007. Letter to Shelley Keen, Idaho Department of Water Resources, Petition for Reconsideration – Preliminary Order for Permit No. 63-32225.

Koch, Donald. General Aquifer Analysis Program, Koch and Associates, 1986.

IDWR, Steve, February 10, 2009. Memo from Owsley, Vincent to Steve Lester, Evaluation of SPF Report entitled Ground-Water Supply Evaluation for the Mayfield Townsite Property.

IDWR, April 14, 2010. Memo from Tesch and Vincent to Steve Lester, Technical Review of Groundwater Modeling in Support of Idaho Water Company Water Right Transfer #73811.

IDWR, March 7, 2011. Memo from Tesch and Owsley to Steve Lester, Technical Review of Orchard Ranch LLC application #63-32703.

IDWR, January 11, 2007. Gary Spackman, Memorandum File No. 63-32225 in the name of Intermountain Sewer and Water.

IDWR, February 24, 2009. Gary Spackman, Memo from Tesch and Vincent, Evaluation of aquifer recharge in areas of planned community applications along the I-84 corridor from Boise to Mountain Home.

IDWR, May 31, 2012. Memo from Tesch to Gary Spackman, Sufficiency of Water Supply for Water Right Applications and Transfers along the I-84 Corridor.

SPF, March 20, 2006. Water Supply Assessment for the Mayfield Springs Planned Community.

SPF, May 30,2007 (updated). Ground-Water Resources Evaluation of the Orchard Ranch Property.

SPF, November 1, 2007. Ground-Water Supply Evaluation for the Mayfield Townsite Property.

SPF, December 17, 2007. Groundwater Supply Evaluation for Elk Creek Village, Application for Permit No. 61-12090.

SPF, February 24, 2009. Letter to John Westra, IDWR, Orchard Ranch, LLC Application 63-32703.

SPF, March 30, 2009. Memorandum from Petrich and Jennifer Sukow, IDWR to Norm Semanko-Response to IDWR memos regarding aquifer recharge along I-84 corridor from Boise to Mountain Home.

SPF, April 28, 2010. Memorandum from Petrich and Brown to John Westra, IDWR-Application for Permit No 61-12096-Nevid LLC.

SPF, January 11, 2011. Letter to John Westra, IDWR, from Scott King-Request to Reconsider Preliminary Order Voiding Application Permit Application 63-33344 (ARK PROPERTIES LLC & MAYFIELD TOWNSITE LLC).

SPF, May 16, 2011. Memorandum to Steve Lester, IDWR, from Petrich-Application for Permit 61-12256 – Response Regarding Water supply and Availability.

U.S. Geological Survey, December, 1977. H. W. Young, Reconnaissance of Ground-Water Resources in the Mountain Home Plateau Area, southwest Idaho. Water-Resources Investigations 77-108.

TABLES

TABLE A APPLICATIONS FOR PERMIT AND TRANSFER
SEEKING GROUND WATER IN THE CONSOLIDATED HEARING
(INCLUDING EXISTING PERMITS ASSOCIATED WITH THE PROJECTS)

PROJECT NAME	APP. NUMBER	STATUS	PRIORITY	DIVERSION RATE CFS	DIVERSION VOLUME AFA	PURPOSE OF USE	ACRES OF IRRIGATION	NUMBER OF HOMES	REMARKS
Mayfield Springs (Intermountain Sewer)	61-12256	Application for permit	1/17/2008	13.76	2650	Municipal	353 mun. sys. 344 waste water	4200 plus 840 equiv. units	
	63-32225	Permit issued 2/16/2007	9/16/2005	10	1815	Municipal	300 mun. sys. 175+ waste water	2000	Proof due 2/1/2017
Elk Creek Canyon (Nevid)	61-12090	Permit issued 11/24/2009	9/28/2006	4.02	345	Municipal, Fire	109 mun. sys.	176	Proof Due 2014
	61-12095	Application for permit	4/3/2007	5	612	Municipal	150 mun. sys. 30 waste water	750	
	61-12096	Application for permit	4/3/2007	20.48	2400	Municipal, Fire	460 mun.sys. unspecified area from waste water	4603	Original Application for 17,950 units
Shekinah Industries	73811 (Application for transfer of existing rights)	SRBA Decrees 61-2154 61-2155 61-7005	1/14/1963 1/14/1963 8/23/1967	1.61 1.74 1.55	1476	Irrigation to Irrigation	369	----	Filed 12/7/2006 amended 8/21/2008 2nd amend.

		61-7119 61-7396 61-10374	7/10/1972 1/4/1980 4/30/1974	1.55 0.65 0.24 5.56 (Total)					8/28/2008 Reinstated 4/1 to 6/3/2011
Orchard Ranch	63-32703	Application for permit	6/21/2007 Amended to irrigation 9/27/2010	9.6	2160	Irrigation	480	----	Orig. App sought 8758 homes
	73834 (Application for transfer of existing rights)	SRBA Dec. 61-7263 61-7264A 61-7264B	4/1/1976 6/10/1976 6/10/1976	2.4 10.74 0.4 11.36 (Total)	2975	Irrigation to Irrigation	631	---	6/21/2007 amended 12/22/2010 2nd amend. 1/5/2011
Mayfield Townsite	63-32499	Application for permit	7/28/2006	10	4860	Municipal	696 mun. sys. 200 waste water	8000	
	63-33344	Application for permit	1/20/2011 amended 1/18/2011	9	1900 @ 4 af/ acre	Irrigation	475	----	Originally filed 3/1/2010
	63-12447	Permit issued 3/10/1999	1998-04-28	4	800 @ 4 af/ acre	Irrigation	200	----	Proof filed 2/26/2009
Totals				84.76 applic. 18.02 permit 102.78 cfs	19,033 app. 2960 permit 21,993 afa		3614 app/609 permit direct. 574 app/175 per w. water 4972 acres	18393 app 2176 per. 20,569 res. units	

TABLE B. WITHDRAWN, REJECTED AND VOIDED APPLICATIONS AND LAPSED PERMITS

Right Number/ Transfer Number	**Right Holder/ Applicant**	**Status**	**Priority**	**Date Right/App closed**	**Quantity**	**Source**	**Purpose**	**Point of Diversion**	**Remarks**
61-7737	Shekinah	Permit Lapsed	10/14/1997	N.A.	0.04 cfs	Ground Water	Commercial	1S 4E 23	
61-7739	Shekinah	Permit Lapsed	10/14/1997	N.A.	0.51 cfs	Ground Water	Industrial	1S 4E 23	66 units
61-7760	Beacon Height	Permit Lapsed	5/3/2000	2/14/2011	0.62 cfs	Ground Water	Domestic	1S 5E 18	67 homes
61-12097	Pacific West Land	Application Withdrawn	5/23/2007	10/9/2007	3711 afa	Ground Water	Domestic etc	1S 4E 8, 16	5934 homes
61-12162	Cloverleaf	Application Voided	12/28/2007	8/3/2010	2 cfs	Ground Water	Domestic	1S 4E 2	347 homes
61-12168	Cloverleaf	Application Voided	1/2/2008	8/3/2010	4.5 cfs	Ground Water	Domestic	1N 5E 33, 34 1S 5E 4	3672 homes
61-12173	Rider	Application Voided	3/21/2008	12/1/2010	4.5 cfs	Ground Water	Domestic	1N 5E 20, 21, 30	4665 homes
61-12174	Rider	Application Voided	3/21/2008	12/1/2010	4.5 cfs	Ground Water	Domestic	1N 5E 26, 28	610 homes
61-12257	Pacific West Land	Application Withdrawn	4/15/2008	3/29/2011	18.2 cfs	Ground Water	Municipal	1S 3E 12 1S 4E 7, 8, 16, 17, 18	9613 homes
73788	Eisenman Family	Application withdrawn	11/7/2006 Transfer	8/26/2009	1 cfs	Ground Water	Irrigation	1S 4E 15, 22	50 acres

	Trust		app. filed						
73789	Elk Creek Canyon LLC	Application Rejected	4/3/2007 Transfer app. filed	4/15/2010	17.92 cfs	Ground Water	Irrigation	1N 5E 21 - 33 1S 5E 5 - 11	924 acres
74414	Mayfield Townsite	Application Withdrawn	11/19/2007 Transfer app. filed	3/29/2011	1.91 cfs	Ground Water	Irrigation	1N 4E 25, 26	146 acres
Totals					56.9 cfs + 3711 afa				1120 acres + 24974 home and bus. units

Note: Pending Applications for Permit Nos. 61-12096 and 63-32703, as initially filed, proposed a combined total of another 22,105 residential units. The total number of units proposed in the area exceeded 47,000 units. If the number of people per household matched that of the City of Mountain Home, the population of the proposed community would exceed 125,000.

TABLE C. SUMMARY OF WATER AVAILABILITY ESTIMATES FOR PROPOSED PROJECTS IN CONSOLIDATED HEARING AREA

PROJECT NAME	FILING NUMBER/ APPLICANT NAME/ STATUS	REPORT DATE	REPORT AUTHOR	ESTIMATED RECHARGE	ESTIMATED VOLUME NEEDED FOR EXISTING USES	ESTIMATED DIVERSION VOLUME FOR PROPOSED USES	NET VOLUME	RECHARGE AREA
MAYFIELD SPRINGS	63-32225 Mayfield Sp. (Permit)	March 20, 2006	SPF	8,600 to 32,600 af	700 af	1,815 af	6,085 to 30,085 af	Indian Cr. + 3 m. buffer 49,000 acres
		January 11, 2007	IDWR	4,000 to 5,000 af				
	61-12256 Inter. Sewer & Water (Application for Permit)	May 16, 2011	SPF	8,600 to 32,600 af	2,860 (calc. from Page 12)	2,650 af	3,090 to 27,090 af	Indian Cr. + 3 m. buffer
ELK CREEK CANYON	61-12090 Elk Creek (Permit)	December 17, 2007	SPF	3,100 to 14,000 af	1,900 af	577 af	623 to 11,523 af	Sand Hollow. and Bowns Cr. + 2 m. buffer 26,800 acres
		March 30, 2009	SPF	2,400 to 8,400 af	10 af	580	1,810 to 7,810 af	Sand Hollow and Bowns Cr. + 1 m. buffer 12,000 acres
		September 30, 2009	IDWR (Final Order)	821 af	10 af	345 af (permit limit)	466 af	
	61-12095 Nevid (Application for permit)	---	---	---	---	612 af	---	See 61-12096 report
	61-12096 Nevid (Application for permit)	April 28, 2010	SPF	More than 2,400 to 8,400 af	10 af	2,400 af	-10 to +5990 af	Sand Hollow and Bowns Cr. + 1 m. buffer

SHEKINAH INDUSTRIES	73811 Shekinah (Application for transfer)	December 28, 2009	Brockway, Engineering	2,250 af of under flow per mile	---	1,475 af	---	Model evaluates change in g. w. levels caused by transfer
		April 14, 2010	IDWR	---	---	1,476 af	---	Technical review of Brockway, December 28, 2009 report
ORCHARD RANCH	73834 Orchard Ranch (Application for transfer)	---	---	---	---	---	---	See 63-32703 tech reports
	63-32703 Orchard Ranch (Application for permit)	May 30, 2007	SPF	Not estimated	Not estimated	Not estimated	Not estimated	Amended to irrigation after this report.
		February 24, 2009	SPF	Not estimated	Not estimated	4,820 af (combined/ transfer)	Not estimated	Amended to irrigation after this report.
		March 7, 2011	IDWR	821 af	355 af	1,920 to 2,160 af	-1,454 to -1,654 af	Est. from Final Order for Permit No. 61-12090
MAYFIELD TOWNSITE	63-32499 Mayfield T.S. (Application for permit)	November 1, 2007	SPF	6,000 to 31,590 af	2,500 af excluding Permit No. 63-12447	4,860 af	-1,360 to +24,230 af	Indian Cr. + 2 m. buffer 27,500 acres
		February 10, 2009	IDWR	2,504 to 12,761 af	2,627 af	4,860 af	-4,983 to +5,274 af	18,000 acres
	63-33344 Ark/Mayfield T.S. (Application for permit)	January 11, 2011	SPF	6,000 to 31,590 af	3,100 af including Permit No. 63-12447	1,188 af (depletion)	1,712 to 27,302 af	Uses estimate for 63-32499
-----	GENERAL REPORTS	February 24, 2009	IDWR	-5.3 to 50.1 cfs				391,680 acres
		May 31, 2012	IDWR	11,063 af	3,943 af	---	7,120 af	Study area
				4,897 af	14,296 af	---	-9399 af	Comparison area
				15,960 af	18,239 af	---	-2279 af	Combined area

TABLE D. WATER BUDGET FOR THE CONSOLIDATED HEARING STUDY AREA AND THE CINDER CONE COMPARISON AREA (CONSERVATIVE ASSUMPTIONS)

COMPONENT	CONSOLIDATED HEARING STUDY AREA	CINDER CONE COMPARISON AREA	COMBINED AREA	EXPLANATORY INFORMATION AND ASSUMPTIONS
Recharge	11,063 afa	4,897 afa	15,960 afa	IDWR Table 3, Item 10
Adjustments: Blacks Creek Non-recharge Area	-1485 afa -2656 afa	NA -2025 afa	-1485 afa -4681 afa	No input from Blacks Creek or Non-charge area
Adjusted Recharge (Rounded to nearest thousand)	6922 afa (7000 afa)	2872 afa (3000 afa)	9794 afa (10,000 afa)	
Water Required to Satisfy Existing and Permitted Water Rights	4148 afa (4000 afa)	29010 afa (29,000 afa)	33, 158 afa (33,000 afa)	No return of pumped water to regional aquifer. De minimis rights not included
Net Volume Available for Appropriation	3000 afa	-26,000 afa	-23,000 afa	
Volume sought by pending applications	19,000 afa	0 afa	19,000 afa	No return of pumped water to regional aquifer
Shortage of water available to satisfy existing rights and all pending applications	-16,000 afa	-26,000 afa	-42,000 afa	

TABLE E. ACTIVE RIGHTS FROM GROUND WATER IN THE HEARING AREA
(IRRIGATION AND USES OTHER THAN DE MINIMIS DOMESTIC AND STOCKWATER)

RIGHT NUMBER	OWNER	PRIORITY DATE	STATUS	SOURCE	AMOUNT	PURPOSE	ACRES	DIVERSION T/R/SEC.	REMARKS
63-2655	Lord Ranch	December 27, 1946	SRBA Decree	Ground Water	1 cfs 212 afa	Irrigation	53 acres	1N 4E 23	
61-10124	State of Idaho	March 1, 1954	SRBA Decree	Ground Water	0.18 cfs 87.5 afa	Domestic	--	1S 4E 30	
63-3070	Agenbroad, Carl	December 13, 1955	SRBA Decree	Ground Water	0.02 cfs 4.5 afa	Irrigation, Domestic	1 acre	1N 4E 28	
63-7571	French, Robert	March 21, 1972	SRBA Decree	Ground Water	0.09 cfs 4 afa	Commercial	--	1N 4E 29 and 32	
63-32615	Helmick, Keith	October 17, 1974	SRBA Decree	Ground Water	0.07 cfs 19.2 afa	Irrigation	4 acres	1N 4E 28	
63-32616	Johnson, Gregory	October 17, 1974	SRBA Decree	Ground Water	2.37 cfs 651.3 afa	Irrigation	145 acres	1N 4E 28	
61-7246B	State of Idaho	December 16, 1975	SRBA Decree	Ground Water	0.3 cfs 67.5 afa	Industrial etc.	--	1S 3E 35 2S 3E 2	
61-7283B	State of Idaho	August 23, 1976	SRBA Decree	Ground Water	0.1 cfs 22.5 afa	Industrial etc.	--	1S 3E 33	
63-10372	French, Robert	July 28, 1986	License	Ground Water	0.2 cfs 16.7 afa	Irrigation Commercial etc	1 acre	1N 4E 29 and 32	Combined limit 0.2 cfs 63-7571
63-11382	Danskin Properties	May 15, 1990	License	Ground Water	0.22 cfs 44.2 afa	Irrigation Domestic	8.5 acres	1N 4E 27	
63-11524	State of Idaho	April 17, 1991	License	Ground Water	0.11 cfs 42.8 afa	Domestic	--	1N 3E 11	
63-12447	Ark/May-field T.S.	April 28, 1998	Permit	Ground Water	4 cfs 800 afa*	Irrigation	200 acres	1N 4E 24; 1N 5E 19	Proof filed 2/26/2009

63-12494	Danskin Properties	December 9, 1998	Permit	Ground Water	0.16 cfs 16 afa*	Domestic	--	1N 4E 27 and 34	Proof filed 2/27/2004
63-32225	Inter. Sewer	September 16, 2005	Permit	Ground Water	10 cfs 1815 afa	Municipal	--	1N 4E 28 and 33	Proof due 2/1/2017
61-12090	Nevid	September 28, 2006	Permit	Ground Water	4.02 cfs 345 afa	Municipal Fire Prot.	--	1S 4E 2 and 11	Proof due 7/1/2014
Totals	---	---	---	---	22.8 cfs / 4148.2 afa		412.5 acres	---	---

* Estimated at 4 afa per acre

TABLE F. ACTIVE RIGHTS FROM GROUND WATER IN CINDER CONE COMPARISON AREA
(IRRIGATION AND USES OTHER THAN DE MINIMIS DOMESTIC AND STOCKWATER)

Owner Name	Right No. (61-____)	Priority Date	Status	Authorized Diversion Rate (cfs)	Purpose	Acres	Authorized volume (af/yr)	Diversion T/R/Sec	Remarks
Hall	7197	9/16/1974	SRBA Dec	13 *	Irrigation	785 *	3532.5 *	2S 4E 27, 28, 34	
	7239	8/25/1975	SRBA Dec	“	Irrigation	“	“	“	
	7321	4/4/1977	SRBA Dec	“	Irrigation	“	“	“	
	7442	6/24/1997	License	2.92 (1.7 cfs additional)	Irrigation	146	584	2S 4E 28	14.7 cfs limit
	7210	12/19/1974	SRBA Dec	15.74 *	Irrigation	1068.3 *	4273.2*	2S 4E 36 2S 5E 30	
	12013	12/8/1980	License	“	Irrigation	“	“	“	
	12080	9/6/1974	SRBA Dec	“	Irrigation	“	“	“	
	12079	12/8/1980	License	0.92	Irrigation	63	252	3S 5E 6	
	12081	9/6/1974	SRBA Dec	1.99	Irrigation	99.7	398.8	3S 5E 6	
	7265	4/12/1976	SRBA Dec	0.72	Irrigation	87.8	351.3	3S 5E 6	
Carl Reynolds	7204	1/5/1975	License	17.92*	Irrigation	924*	4037.5*	2S 4E 35 2S 5E 19 3S 5E 6	
	7206C	11/8/1974	SRBA Dec	“	Irrigation	“	“	“	

	7330	5/24/1977	SRBA Dec	“	Irrigation	“	“	“	
	12015	9/10/1975	SRBA Dec	“	Irrigation	“	“	“	
	12017	9/6/1974	SRBA Dec	“	Irrigation	“	“	“	
	7207A	11/18/1974	SRBA Dec	7.17*	Irrigation	451*	1804*	2S 4E 20, 22	
	7207B	11/18/1974	SRBA Dec	“	Irrigation	“	“	“	
	7306B	2/1/1977	SRBA Dec	“	Irrigation	“	“	“	
Adams	12253	4/20/1979	SRBA Dec	0.12	Irrigation	10.9	43.4	2S 5E 1	
Wegner	12143	4/20/1979	SRBA Dec	0.12	Irrigation	10.5	41.9	2S 5E 1	
N. Cinder Cone	7306C	5/19/1987	SRBA Dec	16.39*	Irrigation	812*	3248*	2S 5E 20	
	7390	5/19/1987	SRBA Dec	“	Irrigation	“	“	"	
	12011	9/6/1974	SRBA Dec	“	Irrigation	“	“	“	
	12078	12/8/1980	License	“	Irrigation	“	“	“	
Atwood	12132	12/16/1975	SRBA Dec	0.2	Irrigation	10	45	2S 4E 23	
Eisenman	7283A	8/23/1976	SRBA Dec	1.5	Irrigation	75	337.5	2S 4E 11	
	11966	12/16/1975	SRBA Dec	0.6	Irrigation	30	135	“	
Idaho Waste	7306D	5/19/1987	SRBA Dec	1.0	Irrigation, etc	14.5	171.5	2S 5E 7 2S 5E 20	
Van Grouw	7202	10/22/1974	SRBA Dec	2.6	Irrigation	133	598.5	2S 4E 36	
	7247C	1/10/1976	SRBA Dec	2.88	Irrigation	144	576	“	

	7253B	1/23/1976	SRBA Dec	2.32	Irrigation Commercial Stock	80.5	608.4	2S 4E 14	
	7255	2/17/1976	License	2.76	Irrigation	138	552	2S 4E 25	
	7271	6/22/1976	SRBA Dec	1.97	Irrigation	126	504	2S 4E 24, 25	
	7420	9/30/1980	SRBA Dec	2.27	Irrigation	140	560	2S 4E 14	
Juniper St.	12133	12/16/1975	SRBA Dec	0.92	Irrigation	46	207	2S 4E 11	
Reade	12126	12/16/1975	SRBA Dec	0.05	Irrigation	2.5	11.3	2S 4E 23	
Brooks	12131	12/16/1975	SRBA Dec	0.2	Irrigation	10	45	2S 4E 23	
Jason Reynolds	7203	11/25/1976	License	2.3*	Irrigation	279*	1103*	3S 4E 2	
	7399	4/5/1980	SRBA Dec	“	Irrigation	“	“	3S 4E 2	
	7247B	1/10/1976	SRBA Dec	1.2	Irrigation	60	240	2S 5E 31	
	7247D	1/10/1976	SRBA Dec	1.96	Irrigation	98	392	3S 5E 6	
Denning	12019	4/20/1979	SRBA Dec	0.12	Irrigation	11	44.1	2S 5E 1	
Prindle	12130	12/16/1975	SRBA Dec	0.4	Irrigation	20	90	2S 4E 23	
Johnson	7263	4/1/1976	SRBA Dec	11.36*	Irrigation	165	2975*	3S 5E 6	
	7264A	6/10/1976	SRBA Dec	“	Irrigation	446	“	“	
	7264B	6/10/1976	SRBA Dec	“	Irrigation	20	“	“	
Galbreath	12127	12/16/1975	SRBA Dec	0.05	Irrigation	2.5	11.3	2S 4E 23	

Norstebon	7435		SRBA Dec	0.1	Irrigation	8	32	2S 6E 6	
Suncrest	12128	12/16/1975	SRBA Dec	0.1	Irrigation	5	22.5	2S 4E 23	
Frisbee	12129	12/16/1975	SRBA Dec	0.1	Irrigation	5	22.5	2S 4E 23	
Perez	12125	12/16/1975	SRBA Dec	0.1	Irrigation	5	22.5	2S 4E 23	
Viel Gluck	12112	4/20/1979	SRBA Dec	2.78	Irrigation	248	992	2S 5E 2, 11	
Pac. Hide	12113	4/20/1979	SRBA Dec	0.06	Commercial	--	15.6	2S 4E 1	
Rose	12254	4/20/1979	SRBA Dec	0.25	Irrigation	21.7	87	2S 5E 1	
Kelly	12038	4/20/1979	SRBA Dec	0.12	Irrigation	10.9	43.5	2S 5E 1	
Totals				116.1 cfs		6812.8 acres	29010.8 afa		

*Combined limits apply to the diversion rate, annual diversion volume, and/or acreage allowed to be irrigated in a single season for the indicated right and the right(s) immediately following in the list.

TABLE G. ACTIVE WATER RIGHTS FROM SURFACE WATER SOURCES IN STUDY AREA AND COMPARISON AREA (IRRIGATION AND USES OTHER THAN DE MINIMIS DOMESTIC AND STOCKWATER)

RIGHT NUMBER	OWNER	PRIORITY DATE	STATUS	SOURCE	AMOUNT	PURPOSE	ACRES	Diversion T/R/Sec.	REMARKS
61-251	Mack	October 1, 1878	SRBA Decree	Canyon Creek	1.5 cfs	Irrigation	20 acres	1S 6E 36	
61-260	Taylor	October 1, 1890	SRBA Decree	Syrup Creek	1 cfs	Irrigation	10 acres	1S 6E 25	Combined Limit: 18 acres with 61-261A
61-261A	Taylor	October 1, 1890	SRBA Decree	Long Tom Creek	1 cfs	Irrigation	10 acres	1S 7E 31	Combined Limit: 18 acres with 61-260
61-261B	Cox	October 1, 1890	SRBA Decree	Long Tom Creek	0.5 cfs	Irrigation	5 acres	1S 7E 31	
61-10856	Urquidi	March 3, 1893	SRBA Decree	Syrup Creek	0.33 cfs	Irrigation Stock	14.6acres	1S 6E 24	
61-7600	Russell	September 25, 1989	License	Ditto Creek	0.7 cfs	Irrigation, Storage, etc.	35 acres	1S 5E 23	Trust water
61-7664	Norstebon	May 1, 1991	Permit	Mud Springs Creek	0.18 cfs	Irrigation Stock	8 acres	2S 6E 6	Trust water Proof filed 11/6/1991
61-12062	Doyle	December 16, 2004	Permit	Mud Springs Creek	2.4 cfs	Irrigation, Storage, etc	240 acres	2S 6E 6	Trust water Proof due 10/1/2015
63-2046	Ark Properties	November 7, 1906	SRBA Decree	Indian Creek	2.58 cfs	Irrigation	129 acres	1N 5E 8 and 17	
63-2118	Lord	February 2, 1910	SRBA Decree	Slater Creek	1.37 cfs	Irrigation	68.4 acres	1N 4E 12	

63-4679	IDFG	October 13, 1920	SRBA Decree	Indian Creek	2450 afa	Rec. Storage	--	1N 4E 29 and 30	
63-32536	Lord	April 1, 1910	SRBA Decree	WF Slater Ck & unnamed streams	1.95 cfs	Irrigation, Storage, Stockwater	91.4 acres	1N 4E 1 & 2 2N 4E 36	
63-33233	Lord Ranch	October 21, 1910	SRBA Decree	Slater Ck & unnamed streams	0.66 cfs	Irrigation, Domestic	33 acres	1N 4E 23	Combined limit of 1.06 cfs and 53 acres with 63-2655 & 63-33393
63-33393	Lord Ranch	June 26, 1911	SRBA Decree	Slater Ck and unnamed streams	0.4 cfs	Irrigation	20 acres	1N 4E 23	Combined limit of 1.06 cfs and 53 acres with 63-2655 & 63-33233
Totals					14.6 cfs + 2450 afa		682 acres		

APPENDIX A

SPRING SITE VISITS NORTH SIDE OF SNAKE RIVER ABOVE SWAN FALLS DAM

Figure 1 in the body of this report shows the area between Mountain Home and Boise and south to the Snake River Canyon including the areas visited to identify springs on the north side of the Snake River. Site visits were made by ERO staff and Pete Vidmar of Idaho Power Company on June 14 and June 22, 2012. The photos following in this appendix show evidence of the presence of springs on the north side of the Snake River Canyon between Swan Falls Dam and CJ Strike Dam and Reservoir.

Figure A-1 shows the area along the Snake River where a group of photos were taken on June 14, 2012 showing evidence of springs along the north side of the Snake River. The blue map pins in Figure A-1 show the approximate location of photos 1-7 that follow. These photos were taken from about 9:30 a.m. until about 11:30 a.m. on the morning of June 14, 2012. The number by each pin gives the location of the photo with the same number. The arrow is the approximate direction the camera was facing for the photo.

Photo 1 shows evidence of moisture close to the surface to support the Russian olive and willow growth visible in the photo. Photo location SW¼SW¼ Sec 15 Twp 3S Rge 1E.

Photo 2 is of the same area showing the lush growth present on June 14, 2012. No water was apparent on the surface in this area but the growth indicates water is close to the surface and has been for a number of years to produce the size growth present. Photo location SW¼SW¼ Sec 15 Twp 3S Rge 1E.

Photo 3 shows tule growth in addition to the Russian olives indicating water is likely more available at this location than at the location of photos 1 and 2. Photo location NW¼SW¼ Sec 15 Twp 3S Rge 1E.

Photo 4 shows water standing on the surface near the location of Photo 3 but where vegetation is less dense and the water is visible. Photo location Lot 6 Sec 16 Twp 3S Rge 1E.

Photo 5 shows a fairly large expanse of rushes indicating plentiful water availability along with Russian olives near the locations of Photos 3 and 4. The extent of vegetation here indicates a relatively large area maintains moisture sufficient for Russian olive and other water loving plants to survive. Photo location Lot 6 Sec 16 Twp 3S Rge 1E.

Photo 6 is looking away from the river up a small canyon showing the water loving vegetation that extends along the bottom of the gulley. Photo location Lot 6 Sec 16 Twp 3S Rge 1E.

Photo 7 is another area farther down the Snake River where moisture is present in sufficient quantity to support water loving plant growth including Russian olives, tules, and willows. Photo location Lot 6 Sec 16 Twp 3S Rge 1E.

Lower Reach Photo Locations

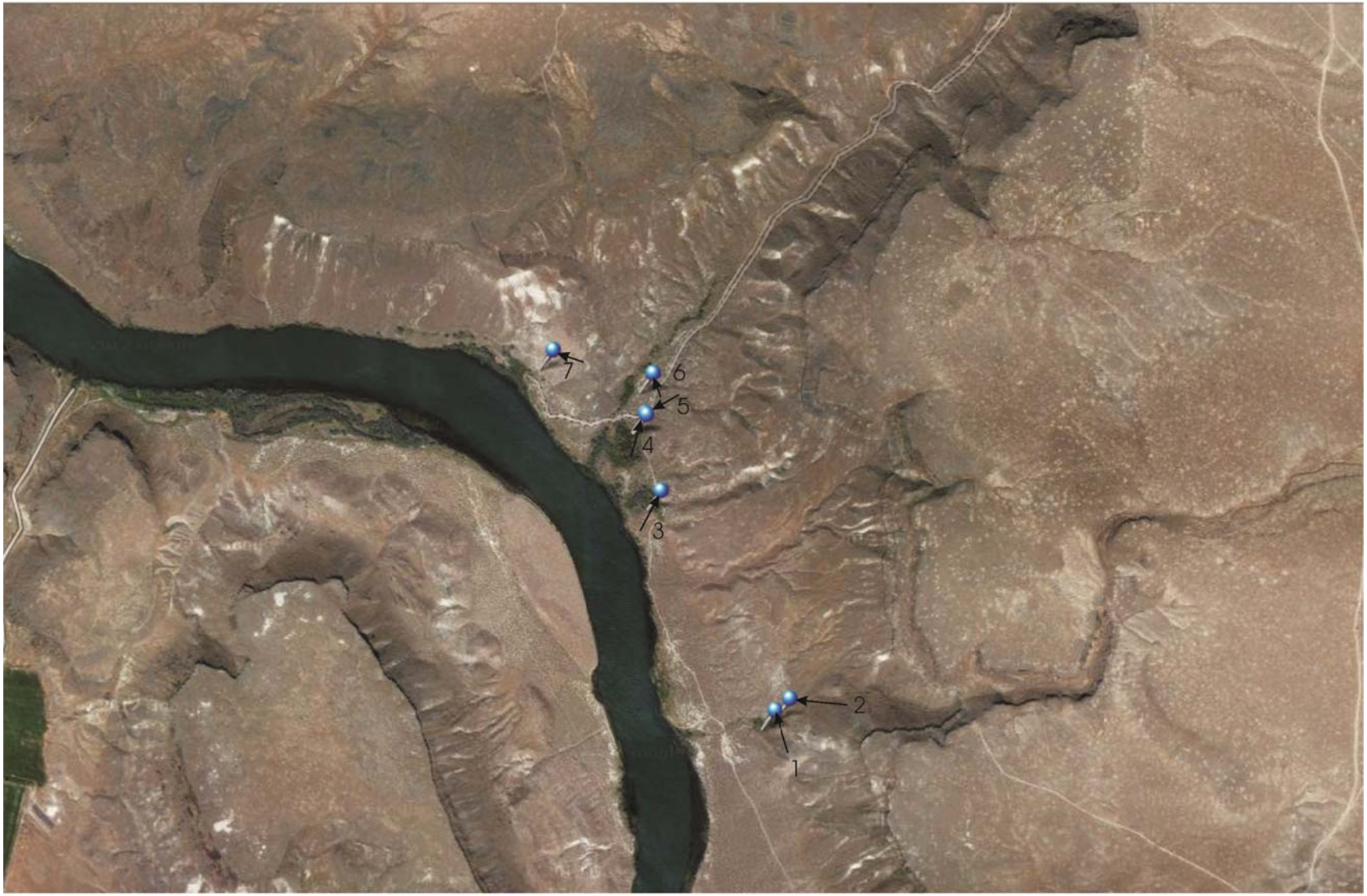


Figure A-1

Photo 1

3-A

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Figure A-2 shows the location of photos taken in the vicinity of Rabbit Creek which is tributary to the north side of the Snake River between Swan Falls and CJ Strike. Again the blue map pins show the locations of the photos taken in this area. The numbers and arrows are as described above. These photos were taken from about 9:00 a.m. to about 12:15 p.m. on June 22, 2012.

Photo 8 shows a flume installed in Rabbit Creek down stream from Big Foot Road that parallels the river in this reach. Stream flow at this location was measured at 5.7 gpm at about 9 a.m. on June 22, 2012. Photo location Lot 1 Sec 11 Twp 4S Rge 2E.

Photo 9 is taken a short distance up Rabbit Creek showing evidence of springs along the west side of the Rabbit Creek canyon. Photo location NW¼SW¼ Sec 11 Twp 4S Rge 2E.

Photo 10 is taken further up Rabbit Creek where the flow is measured at about 24 gpm at about 10:30 a.m. on June 22, 2012. Photo location NE¼SW¼ Sec 11 Twp 4S Rge 2E.

Photo 11 is a short distance further up Rabbit Creek where the channel is dry with no evidence of any recent water flow in the area. Photo location NE¼SW¼ Sec 11 Twp 4S Rge 2E.

Photo 12 gives prospective of the distance from near the face of the rock where Photo 10 was taken and the stream flow measurement was made to the location where this photo was taken and Rabbit Creek gained the 24 gpm that was measured. Photo location NE¼SW¼ Sec 11 Twp 4S Rge 2E.

Photo 13 is looking down the Snake River along the north canyon wall from just downstream of Rabbit Creek. The line of vegetation through the center of the photo indicates springs occurring at an elevation above the river in sufficient quantity to support water loving vegetation. The appearance of water loving vegetation above the elevation of the Snake River was common in the area visited on both June 14 and June 22, 2012. Photo location Lot 6 Sec 10 Twp 4S Rge 2E.

Photo 14 shows water at a road culvert downstream of Rabbit Creek. Photo location Lot 5 Sec 10 Twp 4S Rge 2E.

Photo 15 is looking up gradient from the location of the water in Photo 14 and shows the occurrence of springs above the elevation of the Snake River. Photo location Lot 5 Sec 10 Twp 4S Rge 2E.

Photo 16 is looking back towards the river at vegetation indicating the presence of water near the land surface in a small unnamed drainage downstream from Rabbit Creek. Photo location NW¼NE¼ Sec 10 Twp 4S Rge 2E.

Photo 17 is looking upstream from Photo 16 showing a drainage with small areas of less vegetation indicating the location of water near the surface. Photo location NW¼NE¼ Sec 10 Twp 4S Rge 2E.

Photo 18 is further upstream with tules in the right center of the photo indicating the presence of water near the surface and a willow in the left background of the photo also indicating water near the surface. The areas of wet and dry continued further up this drainage with some areas of water visible on the land surface. Photo location SW¼SE¼ Sec 3 Twp 4S Rge 2E.

Middle Reach Photo Locations

Figure A-2

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

Figure A-3 shows the location where springs historically occurred but have either ceased to flow or have limited discharge. These photos were taken from about 3:30 to 4:00 p.m. on June 14, 2012. The blue map pins, numbers and arrows are as described above.

Photo 19 is the remnants of a water trough that had been filled with spring water in the past but the spring flow is no longer sufficient. A small amount of water seeps from this location. Photo location NW¼NW¼ Sec 35 Twp 4S Rge 3E.

Photo 20 shows tree growth indicating some amount of water is still available close to the surface in the vicinity of the watering trough but water is no longer sufficient to reach the surface in this area. Photo location NW¼NW¼ Sec 35 Twp 4S Rge 3E.

Photo 21 shows the location of Jack Spring and Jack Creek as identified upon the 1948 U.S. Geological Survey 7.5 minute Dorsey Butte Quadrangle map. Photo location NE¼NE¼ Sec 12 Twp 5S Rge 3E.

Photo 22 is a closer view of the reported location of Jack Spring in the same area as Photo 21. Photo location same as Photo 21. Some of the locals attribute the loss of spring flow to the 1959 Yellowstone earthquake; however, there is significant ground water development on top of the plateau above this location on the north side of the Snake River. No measurement data have been found to date to either confirm or refute the 1959 earthquake had an effect on spring flow in this area.

These photos help illustrate the connectivity of ground water on the north side of the Snake River. The water loving vegetation on and along the north canyon of the Snake River in this reach must obtain its water supply from ground water as no other water supply exists for the period of time necessary to support the observed vegetation.

Upper Photo Locations

Figure A-3

Photo 19

Photo 20

Photo 21

Photo 22