BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF THE PETITION FOR DELIVERY CALL OF A&B IRRIGATION DISTRICT FOR THE DELIVERY OF GROUND WATER AND FOR THE CREATION OF A GROUND WATER MANAGEMENT AREA	))))))	**ORDER**

This matter originally came before the Director of the Department of Water Resources ("Director" or "Department") on July 26, 1994 when the A&B Irrigation District ("A&B" or "District") filed a petition for delivery call, which sought administration of junior priority ground water rights diverting from the Eastern Snake Plain Aquifer ("ESPA"), as well as the designation of the ESPA as a ground water management area.

On May 1, 1995, A&B, the Department, and other participants entered into an agreement that stayed the petition for delivery call until such time as a motion to proceed was filed with the Director. On March 16, 2007, A&B filed a motion to proceed seeking the administration of junior priority ground water rights, as well as the designation of the ESPA as a ground water management area.

Based upon the Director's consideration of the available information and documents filed herein, the Director enters the following Findings of Fact, Conclusions of Law, and Order.

FINDINGS OF FACT

Procedural History

1. On July 26, 1994, A&B filed a Petition for Delivery Call ("Petition") with the Department. The boundary of the A&B Irrigation District is depicted in Attachment A. According to the Petition, A&B "is the beneficial owner of Water License No. 20736, now known as A-36-02080, which entitles the Irrigation District to divert eleven hundred (1100) cfs from one hundred seventy-seven (177) wells for the irrigation of sixty-two thousand six hundred four and three tenths (62,604.3) acres within the irrigation district, with a priority of September 9, 1948." *Petition* at 1, ¶ 2. "That said water right is held in trust by the United States, for the benefit of the owners of said 62,604.3 acres, all of whom are landowners within and are included within A&B Irrigation District." *Id.* at 1, ¶ 3. Additionally, the Petition stated that due to diversions from the ESPA by junior priority ground water users, A&B "is suffering material injury as a result of the lowering of the ground water pumping level within the E[SPA] by an

average of twenty (20) feet since 1959, with some areas of the Aquifer lowered in excess of forty (40) feet since 1959, reducing the diversions of A &B . . . to nine hundred seventy-four (974) cfs . . . ." *Id.* at 2, ¶ 6. The "reduction in diversion rate as a result of the reduction in the ground water tables has reduced the diversions from forty (40) wells serving approximately twenty-one thousand (21,000) acres to a diversion rate which is less than is required for the proper irrigation of lands served by the said wells." *Id.* at 2, ¶ 7. Lastly, the Petition requested that the Director "designate the E[SPA] as a ground water management area as provided by Section 42-233b, Idaho Code . . . ." *Id.* at 3.

2. On November 16, 1994, a pre-hearing conference was held at the Minidoka County High School at which "the attorney for A&B presented the outline of a proposed stipulation by the parties which would allow the matter of the contested case to be held in abeyance for a time." *Pre-Hearing Conference Order* at 2 (May 1, 1995). On May 1, 1995, A&B, the Department, and other participants entered into an agreement, which, among other things, stated that "IDWR retains jurisdiction of the petition for the purpose of continued review of information concerning water supply," and that "action on the Petition is hereby stayed until further notice to the parties. Any party may file a Motion to Proceed at any time to request the stay be lifted." *Id.* at 8.

3. On March 16, 2007, A&B filed a Motion to Proceed with the Department, "mov[ing] the Director to lift the stay agreed to by the parties . . . in such a manner as to provide ground water to A&B under its ground water rights that are being interfered with and materially injured by junior ground water appropriators in the ESPA. . . ." *Motion to Proceed* at 1. The Motion to Proceed also sought the designation of the ESPA as a ground water management area.

4. Following a September 20, 2007 status conference on the Motion, the Director issued an order advising parties to the Petition, or their successors-in-interest, that A&B had filed a Motion to Proceed and that the Director was lifting the stay governing the Petition. "The delivery call shall proceed under IDWR's Rules for Conjunctive Management of Surface and Ground Water Resources." *Notice of Motion to Proceed Filed by A&B Irrigation District; and Order Lifting Stay, Setting Hearing Schedule, and Appointing Independent Hearing Officer* at 1. Gerald F. Schroeder was "appointed to serve as hearing officer . . . to conduct a hearing and issue a recommended order pursuant to IDAPA Rule 37.01.01.410 and -413 and the provisions of chapter 52, title 67, Idaho Code." *Id.* at 2.

5. Due to the passage of time between the filing of the Petition and Motion to Proceed, the Hearing Officer requested that all parties to the Petition that wished to remain a party following the subsequent filing of the Motion to Proceed must affirmatively respond in writing of their intent to do so. *Order Regarding Preliminary Findings of Fact and Intent to Remain a Party* (October 26, 2007). The Department has compiled an updated service list based on the requirement of the October 26, 2007 order.

6. On October 29, 2007, the Honorable John K. Butler, in and for the County of Minidoka, ordered the Director "to make a determination of material injury, if any, in accordance with Rule 42 of the Conjunctive Management Rules on or before January 15, 2008." *Memorandum Decision Re: Respondent's Motion to Dismiss* at 15 (Case No. CV-2007-665,

Minidoka County, October 29, 2007).

7. On November 16, 2007, the Director issued an *Order Requesting Information*, in accordance with Rule 42 of the Conjunctive Management Rules, IDAPA 37.03.11.042, requesting that A&B provide the Department with specifically identified information that the Director deemed relevant to making his determination of material injury. "[B]ased upon allegation in A&B's . . . Petition . . . that A&B has suffered material injury as a result of lowering ground water levels in the E[SPA] since 1959," the Director requested that A&B provide information since that time. *Order Requesting Information* at 1. Other parties to the proceeding were instructed that they could submit relevant information to the Director.

8. On December 14, 2007, A&B provided information to the Director regarding his *Order Requesting Information.*

9. On January 11, 2008, Judge Butler granted a *Motion and Order to Amend Peremptory Writ of Mandate*, which allowed the Director a two-week extension to issue his order regarding material injury. Therefore, the order regarding material injury was required to be issued on or before January 29, 2008.

The Eastern Snake Plain Aquifer

10. The ESPA is defined as the aquifer underlying an area of the Eastern Snake River Plain that is about 170 miles long and 60 miles wide as delineated in the report "Hydrology and Digital Simulation of the Regional Aquifer System, Eastern Snake River Plain, Idaho," U. S. Geological Survey ("USGS") Professional Paper 1408-F, 1992, excluding areas lying both south of the Snake River and west of the line separating Sections 34 and 35, Township 10 South, Range 20 East, Boise Meridian. The ESPA is also defined as an area having a common ground water supply. *See* IDAPA 37.03.11.050.

11. The ESPA is predominately fractured Quaternary basalt having an aggregate thickness that may, at some locations, exceed several thousand feet, decreasing to shallow depths in the Thousand Springs area. The ESPA fractured basalt is characterized by high hydraulic conductivities, typically 1,000 feet/day but ranging from 0.1 feet/day to 100,000 feet/day.

12. Based on averages for the time period from May of 1980 through April of 2002, the ESPA receives approximately 7.5 million acre-feet of recharge on an average annual basis from the following: incidental recharge associated with surface water irrigation on the plain (3.4 million acre-feet); precipitation (2.2 million acre-feet); underflow from tributary drainage basins (1.0 million acre-feet); and losses from the Snake River and tributaries (0.9 million acre-feet).

13. Based on averages for the time period from May of 1980 through April of 2002, the ESPA also discharges approximately 7.5 million acre-feet on an average annual basis through sources including the complex of springs in the Thousand Springs area, springs in and near American Falls Reservoir, and the discharge of nearly 2.0 million acre-feet annually in the form of depletions from ground water withdrawals.

14. Beginning in about the 1960s to 1970s time period through the most recent years, the total combined diversions of natural flow and storage releases above Milner Dam for irrigation using surface water supplies have declined from an average of nearly 9 million acre-feet annually to less than 8 million acre-feet annually, notwithstanding years of drought, because of conversions from gravity flood/furrow irrigation to sprinkler irrigation in surface water irrigation systems and other efficiencies implemented by surface water delivery entities (Figure 1).

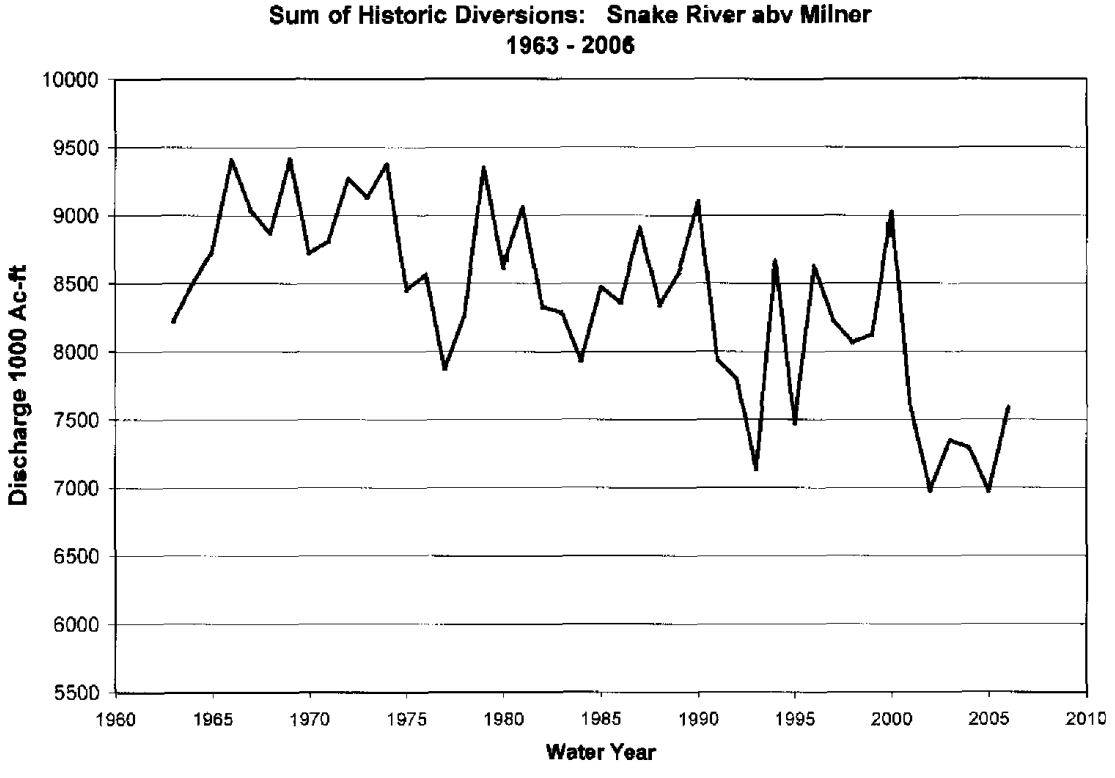


Figure 1: Sum of irrigation diversions above Milner Dam from 1963 through 2006.

15. The measured decrease in cumulative surface water diversions above Milner Dam for irrigation reflects the fact that less water is generally needed in the present time to fully irrigate lands authorized for irrigation with a certain crop mix under certain climatic growing conditions than was needed in the 1960s to 1970s for the same lands, crop mix, and climatic growing conditions.

16. With parallel appropriations of ground water, which dramatically increased beginning in about 1950, ground water levels across the ESPA have responded by declining at most locations where levels had previously risen, exacerbated by the worst consecutive period of drought years on record for the upper Snake River Basin. As a result, water levels throughout the ESPA have declined as shown in Figure 2.

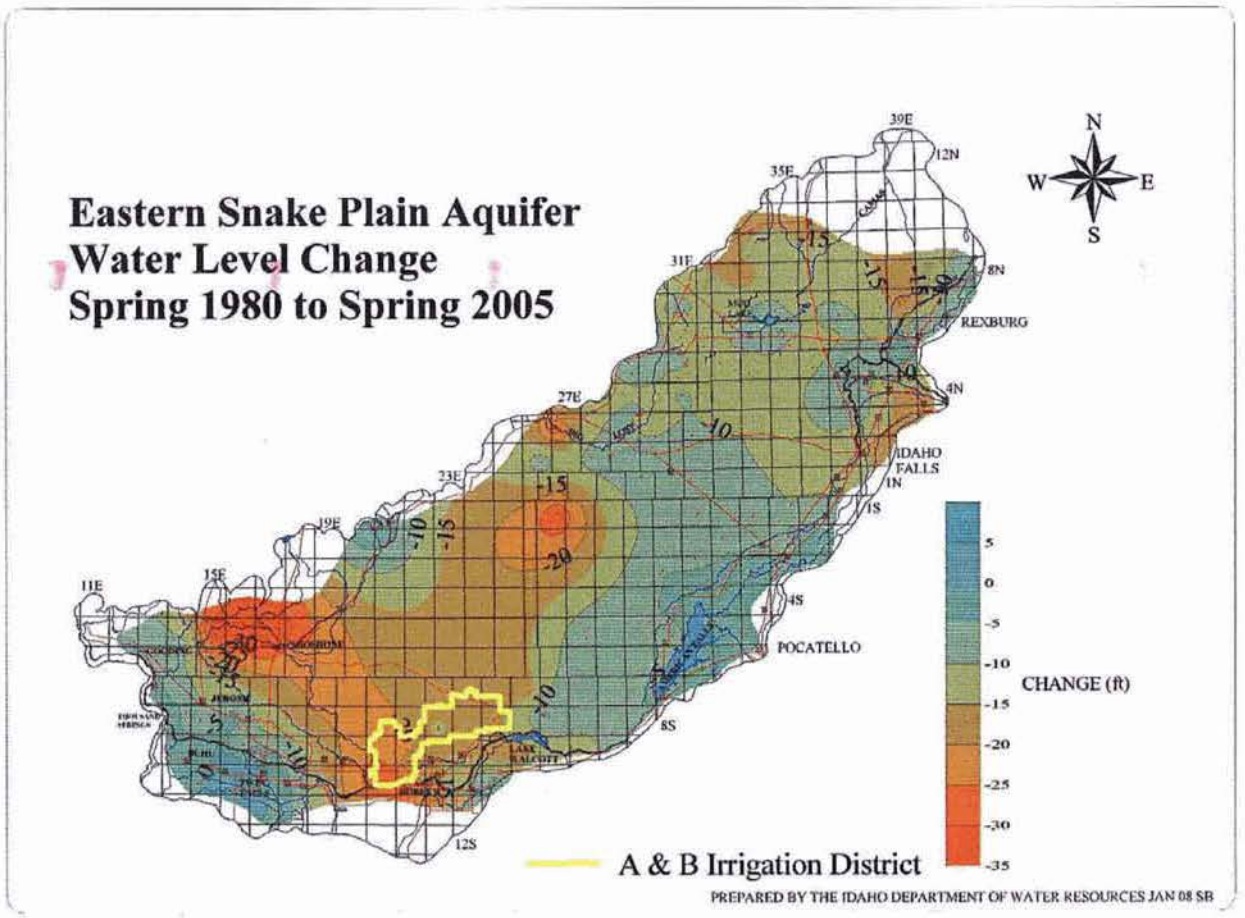


Figure 2: Water level change map spring, 1980 to spring, 2002 (from IWRRI, 2006).

17. When water is pumped from a well in the ESPA, a cone of depression drained of ground water is formed around the well. This causes surrounding ground water to flow into the cone of depression from all sides, lowering ground water levels more distant from the well. These depletionary effects propagate away from the well, eventually reaching one or more hydraulically-connected reaches of the Snake River and its tributaries.

18. Although ground water levels throughout the ESPA have declined from their highest levels reached in the 1950s, ground water levels generally remain above pre-irrigation development levels. There is no indication that ground water levels in the ESPA exceed reasonable ground water pumping levels required to be protected under the provisions of Idaho Code s 42-226. A&B asserts in its Petition that ground water levels within the ESPA have lowered "by an average of twenty (20) feet since 1959, with some areas of the Aquifer lowered in excess of forty (40) feet since 1959 . . . ." *Petition* at 2, ¶ 6.

Creation and Operation of Water District Nos. 100, 110, 120, 130, and 140

19. Between February 19, 2002 and December 20, 2006, Water District Nos. 100, 110, 120, 130, and 140 were either created or the respective boundaries revised to provide for the

administration of water rights diverting from the ESPA, pursuant to chapter 6, title 42, Idaho Code, for the protection of prior surface and ground water rights. As a result, the watermasters for Water District Nos. 100, 110, 120, 130, and 140 were given the following duties to be performed in accordance with guidelines, direction, and supervision provided by the Director:

a. Curtail illegal diversions (i.e., any diversion without a water right or in excess of the elements or conditions of a water right);

b. Measure and report the diversions under water rights;

c. Enforce the provisions of any stipulated agreement; and

d. Curtail out-of-priority diversions determined by the Director to be causing injury to senior priority water rights that are not covered by a stipulated agreement or a mitigation plan approved by the Director.

20. Following the creation of water districts in accordance with chapter 6, title 42, Idaho Code, the Director rescinded, in whole or in part, his orders that created the American Falls and Thousand Springs Ground Water Management Areas. The Director determined that preserving the ground water management areas was no longer necessary to administer water rights for the protection of senior surface and ground water rights because administration of such rights is now accomplished through the operation of water districts.

21. The general location and existing boundaries for Water District Nos. 100, 110, 120, 130, and 140 are shown in Attachment B.

Conjunctive Management Rules

22. Idaho Code § 42-603 authorizes the Director "to adopt rules and regulations for the distribution of water from the streams, rivers, lakes, ground water and other natural water sources as shall be necessary to carry out the laws in accordance with the priorities of the rights of the users thereof." Promulgation of such rules and regulations must be in accordance with the procedures of chapter 52, title 67, Idaho Code.

23. On October 7, 1994, the Director issued *Order Adopting Final Rules*; the *Rules for Conjunctive Management of Surface and Ground Water Resources* (IDAPA 37.03.11) ("CM Rules"), promulgated pursuant to chapter 52, title 67, Idaho Code, and Idaho Code § 42-603.

24. Pursuant to Idaho Code § 67-5291, the CM Rules were submitted to the 1st Regular Session of the 53rd Idaho Legislature (1995 session). During no legislative session, beginning with the 1st Regular Session of the 53rd Idaho Legislature, have the CM Rules been rejected, amended, or modified by the Idaho Legislature. Therefore, the CM Rules are final and effective. The CM Rules have been ruled facially constitutional by the Idaho Supreme Court. *American Falls Res. Dist. No. 2 v. Idaho Dept. of Water Resources*, 143 Idaho 862, 154 P.3d 433 (2007).

25. The CM Rules "apply to all situations in the state where the diversion and use of water under junior-priority ground water rights either individually or collectively causes material injury to uses of water under senior-priority water rights. The rules govern the distribution of water from ground water sources and areas having a common ground water supply." IDAPA 37.03.11.020.01.

26. The CM Rules "acknowledge all elements of the prior appropriation doctrine as established by Idaho law." IDAPA 37.03.11.020.02.

The A&B Irrigation District

27. The Minidoka Project North Side Pumping Division project was initiated by the United States Bureau of Reclamation ("USBR") to develop irrigable land on the southern portion of the eastern Snake River Plain in south central Idaho. The project was constructed in the 1950s and irrigates approximately 78,000 acres of land. Of those acres, approximately 15,000 acres are designated Unit A and are served from surface water diverted from the Snake River at Milner Dam. Approximately 62,604 acres are supplied by ground water pumping in Jerome and Minidoka counties and are designated Unit B. A&B operates and manages the project. The Petition and Motion to Proceed filed by A&B were in reference to its Unit B ground water right, number 36-2080.

28. The USBR requested the Division of Ground Water, USGS, to make an investigation of the Unit B area to evaluate ground water resources for potential development and to prepare recommendations for exploratory drilling and testing of wells. Investigations began in 1947, and drilling and test pumping were completed by April 1948.

29. The first irrigation well was pumped in the spring of 1949 by equipping one well with a diesel-driven pump. A lateral system was constructed to irrigate 504 acres, and the land was leased to six operators.

30. Unit B was the first large scale ground water development project on the eastern Snake River Plain. By the mid-1960s, 177 deep wells provided the source of irrigation water for approximately 62,604 acres of farm land. A distribution system consisting mainly of unlined ditches was originally used to distribute water. Most irrigators, however, have since converted to sprinklers, using pressurized pipe systems to convey water.

31. Unit B is located in the southern portion of Minidoka County and the southeast part of Jerome County. The north/south line separating Ranges 21 East and 22 East is the boundary between southeastern Jerome County and western Minidoka County. *See* Attachment A.

Water Rights Held by or for the Benefit of A&B

32. The water right under which A&B seeks administration is held by the USBR, for the benefit of A&B. Water right number 36-2080 has been partially decreed in the SRBA and is summarized as follows:

Water Right No.:	36-2080
Priority Date:	September 9, 1948
Diversion Rate:	1,100 cfs; 250,417.20 acre-feet
Beneficial Use:	Irrigation
Place of Use:	62,604.3 acres

33. Only water right number 36-2080 is the subject of its delivery call; however, according to information provided by A&B and Department records, A&B possesses the following surface and ground water rights:

Acres Irrigated with Surface Water (Unit A)

Water Right No.	Type	Acres	Priority	Rate of Flow (cfs)
01-00014	Decree	14,637.0	4/1/1939	267.00
01-10225	Enlargement	1,120.7	4/1/1984	22.41
01-10237	Beneficial Use	910.0	7/11/1968	0.19
01-10238	Beneficial Use	30.9	7/11/1968	0.62
01-10239	Beneficial Use	11.9	7/11/1968	0.24
01-10240	Beneficial Use	59.2	7/11/1968	1.18
01-10241	Enlargement	54.5	4/1/1978	1.09
Total Surface Water Acres:		15,923.9		

Acres Irrigated with Ground Water including Enlargements (Unit B)

Water Right No.	Type	Acres	Priority	Rate of Flow (cfs)
36-02080	Decree	62,604.3	9/9/1948	1100.00
36-15127A	Beneficial Use	1,886.4	4/1/1962	31.12
36-15127B	Enlargement	1,751.5	4/1/1984	28.89
36-15192	Beneficial Use	36.3	4/1/1962	0.60
36-15193A	Beneficial Use	12.5	4/1/1962	0.21
36-15193B	Enlargement	18.9	4/1/1965	0.31
36-15194A	Beneficial Use	13.7	4/1/1962	0.23
36-15194B	Enlargement	152.4	4/1/1968	2.51
36-15195A	Beneficial Use	52.5	4/1/1962	0.87
36-15195B	Enlargement	135.6	4/1/1978	2.24
36-15196A	Beneficial Use	17.4	4/1/1962	0.29
36-15196B	Enlargement	4.7	4/1/1981	0.08
Total Ground Water Acres:		66,686.2		

Total Acres (Unit A + Unit B): 82,610.1

34. A&B filed with the Department an Application for Transfer to ensure that many or all of the points of diversion within A&B apply to all of the ground water rights identified in the above Finding. The Department approved the transfer on March 16, 2006. A copy of the approved document is available on the Department website.

Analysis Of Diversions

35. The information provided by A&B on December 14, 2007 in response to the Director's *Order Requesting Information* includes records of total annual ground water volume pumped between 1960 through 2007 from approximately 177 wells that are authorized to irrigate 62,604 acres under water right no. 36-2080. The records also include total ground water pumped by month for each year (annual use data do not exist for years 1974–1975, and 1978–1979).

36. Ground water use in Unit B authorized by right 36-2080 was fully developed by 1963. Conversation with A&B representatives, January 4, 2008.

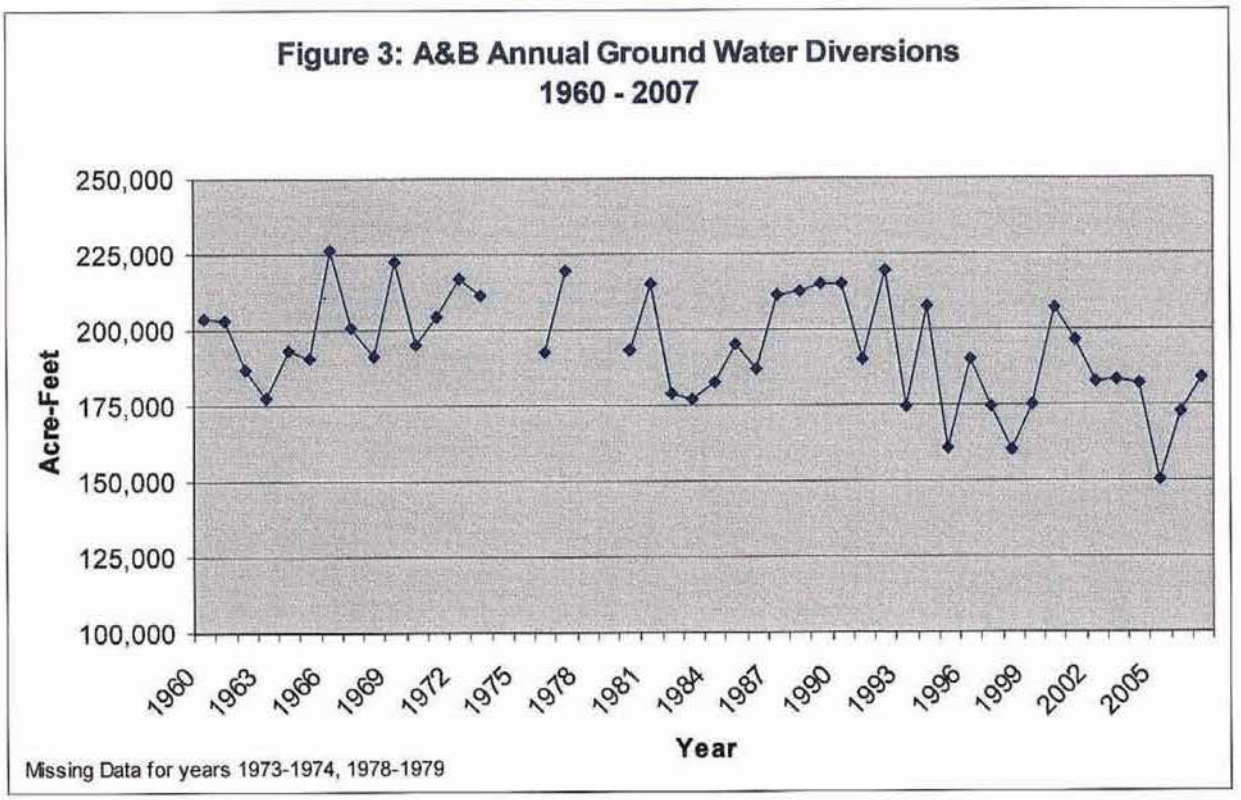
37. The average annual amount of ground water pumped by A&B from 1963 through 1972 was 201,831 acre-feet, or 3.22 acre-feet per acre per year for 62,604 acres. The mean annual amount of ground water pumped from 1963 through 1982 was 201,736 acre-feet and 3.22 acre-feet per acre per year for 62,604 acres.

38. The mean annual amount of ground water pumped by A&B from 1994 through 2007 was 180,095 acre-feet, or 2.88 acre-feet per acre per year for 62,604 acres. Average ground water use for the 62,604 acres in 2006 and 2007 was 2.76 and 2.94 acre-feet per acre, respectively.

39. The Preliminary Report of C.E. Brockway, entitled A&B Irrigation District—Use of Drain Water In Re: SRBA Case No. 39576, dated August 2, 2000, states that, "elimination of all drainage wells and pumping back surface runoff to existing irrigated lands allows reduction of pumped ground water, reduction in retention pond size, and increased project irrigation efficiency . . . the amount of water pumped from the aquifer can be reduced by 21,920 acre-feet per year."

40. A&B's response to the *Order Requesting Information* indicates that the District is now irrigating approximately 1,323 acres of Unit B land with Unit A surface water. Department analysis of the shapefile, *B_Land_Temp_Served_by_A*, provided by A&B, indicates that the total conversion acreage is 1,447 acres, which is approximately 2.3% of the 62,604 acres that are the subject of A&B's delivery call under water right no. 36-2080.

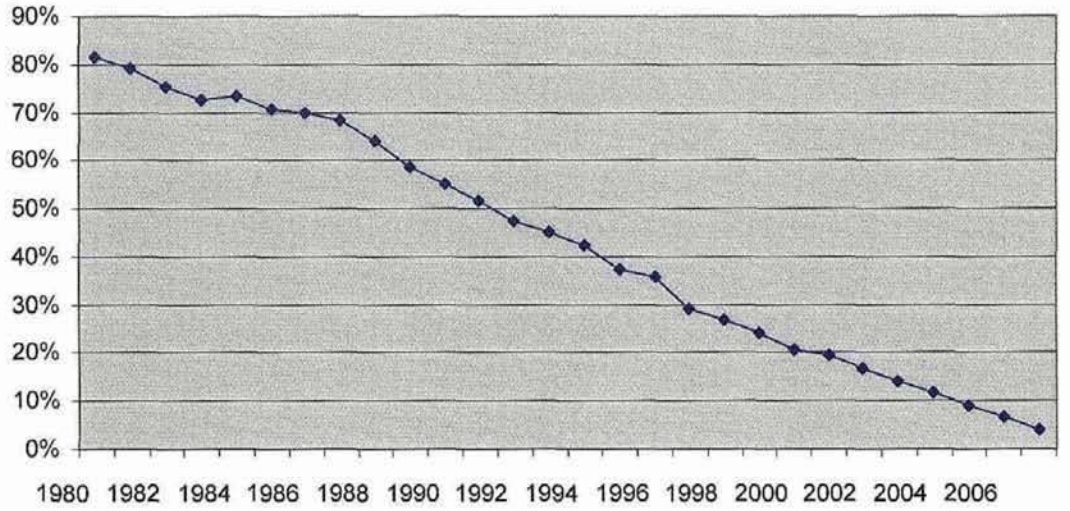
41. Historic annual ground water diversions by A&B are depicted below in Figure 3.



42. The declining trend in Snake River surface water diversions during the 1980s and 1990s is due in part to conversion from gravity or flood irrigation methods to more efficient sprinkler irrigation systems. Historic declines in A&B ground water use is also attributable in part to conversion from gravity to sprinkler irrigation. *See also* Figure 1.

43. According to the data submitted to the Department by A&B on December 14, 25 percent of the 62,604 Unit B acres in 1982 were irrigated by sprinklers; by 1994, 58 percent of the unit B lands were irrigated by sprinklers; and by 2007, 96 percent of the 62,604 Unit B acres were irrigated by sprinklers. As shown below in Figure 4, which may be seen on the following page, since 1980, the percentage of lands in Unit B that are gravity-irrigated have steadily declined.

Figure 4: Percent of Acres Gravity-Irrigated by Year



44. The USBR reported that the historic average on-farm delivery for Units A and B of the A&B Irrigation District from 1963 through 1982 was 3.06 acre-feet per acre, and that the average annual weighted crop irrigation requirement (evapotranspiration minus effective precipitation) for the period 1965 through 1982 was 1.72 acre-feet per acre. Assuming an average annual consumptive irrigation requirement of 1.72 acre-feet per acre, the average on-farm irrigation efficiency for the period 1965 through 1982 would be 56 percent. *See* Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension, Hydrology Appendix, pages 54-55 (USBR 1985).

45. The above-cited 1985 USBR report recommended that the diversion requirements for irrigation of the "Extension lands" served by ground water from Unit B would be 2.59 acre-feet per acre. This requirement assumed an average annual consumptive irrigation requirement of 1.72 acre-feet per acre, a 70 percent on-farm application efficiency using sprinkler irrigation systems, and a conveyance loss of 5 percent. The on-farm delivery requirement was 2.46 acre-feet per acre. *Id.* at 59.

46. Comparison of the historic and projected on-farm delivery requirements suggests that the use of sprinkler irrigation systems was expected to reduce the per acre water requirement by 19.6 percent.

47. Reported application efficiencies for various sprinkler irrigation systems are as follows:

Sprinkler System	Application Efficiency
stationary lateral (wheel or hand move)	60 – 75%
solid set lateral	60 – 85%
center pivot lateral	75 – 85%

Idaho Irrigation Water Conservation Task Force, 1994, p.38, and Report Regarding Evaluation of Irrigation Diversion Rates, Report to the SRBA District Court Prepared by the Idaho Department of Water Resources, January 14, 1999, p. 38.

48. Most of the lands within A&B are irrigated using center pivot, or lateral wheel or hand move sprinkler systems.

49. Based on review of delivery records provided by A&B, the conveyance loss associated with delivery of ground water in Unit B was about 3.1 percent in 2006. This is down from a reported 8 percent average conveyance loss for the period 1963 through 1982. *Id.* at 58.

50. Given the current minimal conveyance losses in Unit B and the large number of center pivot irrigation systems used in the District, an overall irrigation application and conveyance efficiency of 75 percent is reasonable for determining a total irrigation diversion requirement. Current overall efficiency may in fact be closer to 80 percent.

51. Using a University of Idaho publication regarding evapotranspiration ("ET") and consumptive use irrigation requirements for the state of Idaho, the Department computed a mean weighted consumptive irrigation requirement of 2.17 acre-feet per acre using crop report data provided by A&B for the period 1990 through 2002. Evapotranspiration and Consumptive Irrigation Requirements for Idaho, University of Idaho, 2007, *see* www.kimberly.uidaho.edu/ETIdaho. A&B did not have crop report data for years 1998-2000 and 2003-2007. Data provided were for the entire A&B project, both Units A and B.

52. Given a weighted consumptive irrigation requirement of 2.17 acre-feet per acre, and assuming an overall irrigation efficiency of 75 percent (including on-farm irrigation efficiency and conveyance losses), the total average ground water diversion requirement for lands in Unit B would be 2.89 acre-feet per acre. This is equivalent to the 2.88 acre-feet per acre average annual water use between 1994 and 2007 for the 62,604 acres in Unit B, as referenced above in Finding 38.

53. Annual ground water diversion duties between 1960 and 2007 for the 62,604 Unit B acres are shown below in Figure 5, along with the 2.89 and 2.59 acre-feet per acre ground water requirements computed respectively by the Department and the USBR.

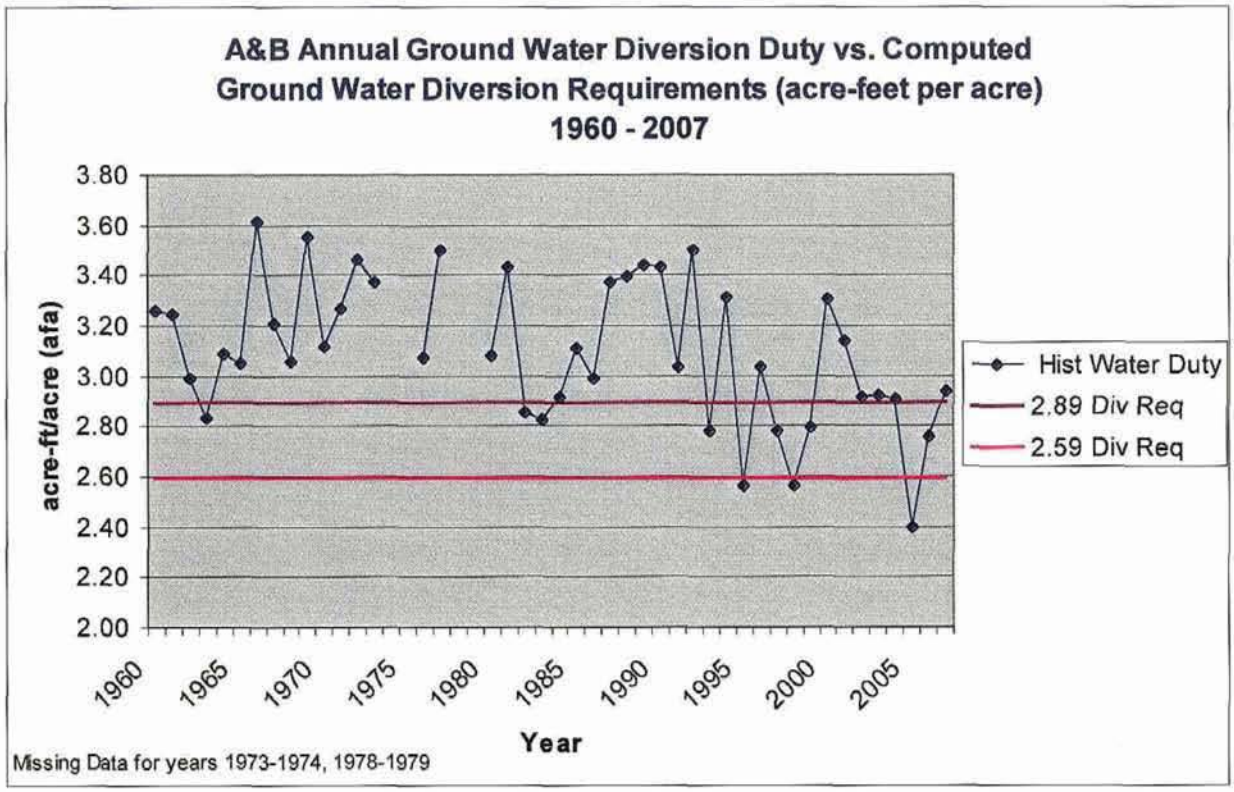


Figure 5: A&B Irrigation District Annual Ground Water Diversion Duties vs. Computed Ground Water Diversion Requirements in A&B Irrigation District.

54. The annual Unit B water duties in the previous finding exceed the 2.59 acre-feet per acre water diversion requirement recommended by the USBR in all but three years: 1995, 1998, and 2005. Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension, Hydrology Appendix (USBR 1985). These are the three lowest years on record for diversion of ground water by A&B.

55. In 1998, the Department published a report that summarized the ESPA Water Measurement Program in Administrative Basin 36. Eastern Snake Plain Aquifer Water Measurement Program, A Summary of Measurement Activity and Results from Basin 36 Project Area, 1995-1996, and a Review of Program Expansion in 1997 (Idaho Department of Water Resources, May 1998). A portion of that report compared estimates of irrigation ground water use using 1996 ET and reported crop data against estimates of ground water use based on 1995-1996 well discharge measurements and 1996 power consumption records for 227 irrigation wells. The resulting 1996 water duty estimates ranged from 2.26 acre-feet per acre based on well discharge and power consumption records, to 2.86 acre-feet per acre using USBR AgriMet ET station data from 1996. The AgriMet ET estimate was adjusted for effective precipitation and included an irrigation application efficiency of 75 percent. The 2.26 acre-feet per acre estimated water duty identified in the finding above may be low because some of the 227 ground water wells in the analysis were used as a supplemental supply to lands irrigated by surface water sources.

56. Based on well discharge measurements and annual water use estimates reported to the Department by the Magic Valley Ground Water District between 2004 and 2006, annual average water duty estimates from some privately owned non-supplemental ground water wells located near the A&B boundary were found to range between 1.75 and 2.12 acre-feet per acre. The average annual water duty estimate for this sample of privately owned ground water wells for the period 2004 through 2006 was 2.01 acre-feet per acre.

57. Based on ground water delivery records provided by A&B, the mean peak monthly water use from 1963 through 1982 was 54,468 acre-feet. The mean peak monthly water use from 1994 through 2007 was 50,262 acre-feet, a total average decrease of 4,206 acre-feet from the period 1963 through 1982, or 7.7 percent.

58. The total average decrease in peak monthly well production of 4,206 acre-feet between the periods 1963-1982 and 1994-2007, or a 7.7 percent decrease, is not unreasonable given the increased irrigation system efficiencies described in prior findings and the fact that A&B added nearly 4,100 acres of irrigation development beyond the 62,604 acres licensed under its calling water right, 36-2080. It is notable that there are 1,751 acres represented by an enlargement right bearing an April 1, 1984 priority date.

59. Based on the described historical irrigation enlargements and increased irrigation efficiencies, it is reasonable to conclude that had A&B limited its ground water use to irrigation of the 62,604 acres under water right no. 36-2080, or if it had at least not developed the nearly 4,100 acres junior to those developed under water right no. 36-2080, mean annual ground water use between 1982 and 2007 would be lower than the mean annual use actually recorded for that period.

60. In paragraph 6 of its Petition, A&B stated that it "is suffering material injury as the result of the lowering of the ground water pumping level" thereby "reducing the diversions of A&B Irrigation District to nine hundred seventy-four (974) cfs." It was additionally stated in paragraph 11.a. of the Motion to Proceed that "Deepening of wells with declining well yield problems (caused by falling ground water levels) has not provided an appreciable rectification of declining well yield, and since 1994 the total water supply from the A&B wells has declined to 970 cfs." Comparison of these two statements indicates a 4 cfs (0.4%) decline in total diversions since 1994.

61. According to A&B's 2006 Annual Report, Part 2, the above-referenced 970 cfs total water supply was computed as the sum of the lowest recorded well discharge measurements made during the peak of the 2006 irrigation season. Peak season or "low flow" well discharge measurements are reported annually by A&B. A total "low flow" calculation from all wells can be derived from A&B annual reports provided to the Department in electronic format for years 1989 through 2007. The total "low flow" from all A&B production wells in 1994 was 956 cfs. Therefore, based on A&B's method of calculating total water supply, the 2006 supply actually increased from 1994 by about 14 cfs.

62. Annual reports provided by A&B show that the sum of the peak season "low flows" from A&B production wells was 1,007 cfs in 1963 and 1,034 cfs in 1982.

63. Paragraph 11.d. of the Motion to Proceed asserts that "A&B is unable to divert an average of 0.75 of a miner's inch per acre which is the minimum amount necessary to irrigate lands within A&B during the peek [sic] periods when irrigation water is most needed." However, page 43 of the USBR's 1985 Hydrology Appendix to the North Side Pumping Division Extension report indicates as follows: "In a letter to the Bureau of Reclamation dated May 24, 1984, the district states that they cannot support a peak net farm delivery in excess of 0.357 inch per day [0.75 miner's inch], which is the rate at which the current project is designed and operated." In other words, 0.75 miner's inch represents the maximum rate of delivery, not the minimum as represented in the Motion to Proceed.

64. The indicated current total water supply of 970 cfs equates to 0.77 miner's inch per acre for the 62,604.3 ground water irrigated acres in the delivery call. Assuming a conveyance loss of 5%, the net farm delivery for the acreage in the delivery call is 0.74 miner's inch per acre, which is more than 98% of the stated farm delivery capacity of 0.75 miner's inch.

Examination of Polygon Information

65. In December 2007, A&B provided the Department with a list of 39 individual wells that A&B indicates do not currently meet irrigation requirements. A&B provided the identification numbers for the wells in question, as well as a separate list called "Well System Delivery Shortages by Year" that summarizes the amount of water that is calculated to be delivered at the headgate for each well system for years when wells were not able to meet the irrigation diversion requirement due to falling ground water levels." Some of the 39 individual wells have been consolidated as one-pump systems for purposes of summarizing water shortages.

66. Additionally, A&B provided the Department with Geographic Information System ("GIS") shapefiles and tables that locate the wells and lands for which the diversion rate is said to be less than the minimum required for proper irrigation (i.e., water-short).

67. The total acres for all 39 wells that A&B identify as water-short are 18,525 as per the reported "acreage per system" provided in A&B records submitted to the Department. The total acreage identified in the A&B GIS table for the lands associated with the same 39 wells is 22,663 acres. As a result, there is a discrepancy of 4,138 acres in the data submitted by A&B.

68. In a conversation with Department staff on January 4, 2008, representatives of A&B stated that the "acreage per system" values included in A&B's records are lands in the project originally classified as irrigated lands, and are not necessarily representative of the actual acres currently irrigated by the well systems. Nonetheless, A&B uses the "acreage per system" values in calculating a water delivery rate per acre at the field headgate. Given these concerns and observations regarding "acreage per system," the Department finds that A&B's method of determining well shortages based on a 0.75 miner's inches field headgate requirement is not appropriate for determining injury under the CM Rules.

69. At least five of the 39 wells that A&B claims do not provide the minimum irrigation requirement are used on lands that are also irrigated by private ground water rights and wells. The annual volumes pumped from these private wells were not provided by A&B and are not included in any A&B annual or monthly water use summaries. The A&B wells or pump systems that serve lands with appurtenant private ground water rights are 1A921, 19A922, 23AB825, 31A725, and 6AB825. Water measurement records on file at the Department show that the privately owned wells that are appurtenant to lands served by these A&B wells were used in the last four years, with the exception of one well that is appurtenant to lands also served by 23AB825. In that case, there was no use from the private well in 2006. The Department does not have records to confirm if there was any use from the same associated private well in 2007.

70. In response to the *Order Requesting Information*, A&B identified 160 polygons in the shapefile "Item-g-lands" as acreage from which the diversion rate is said to be less than the minimum required for the proper irrigation of these acres. Forty-nine of those polygons cut off parts of irrigated fields, as illustrated below in Figure 6. One half of the field irrigated by a center pivot is water-short according to A&B. On January 4, 2008, A&B representatives explained to Department staff that the well that supplies the polygon marked as "A" does not provide sufficient water to meet demands, but that the landowner compensates by watering the center pivot with a private well. Thus, part of polygon A, which has been defined as water-short, and may be seen on the following page, is supplemented by private irrigation water.

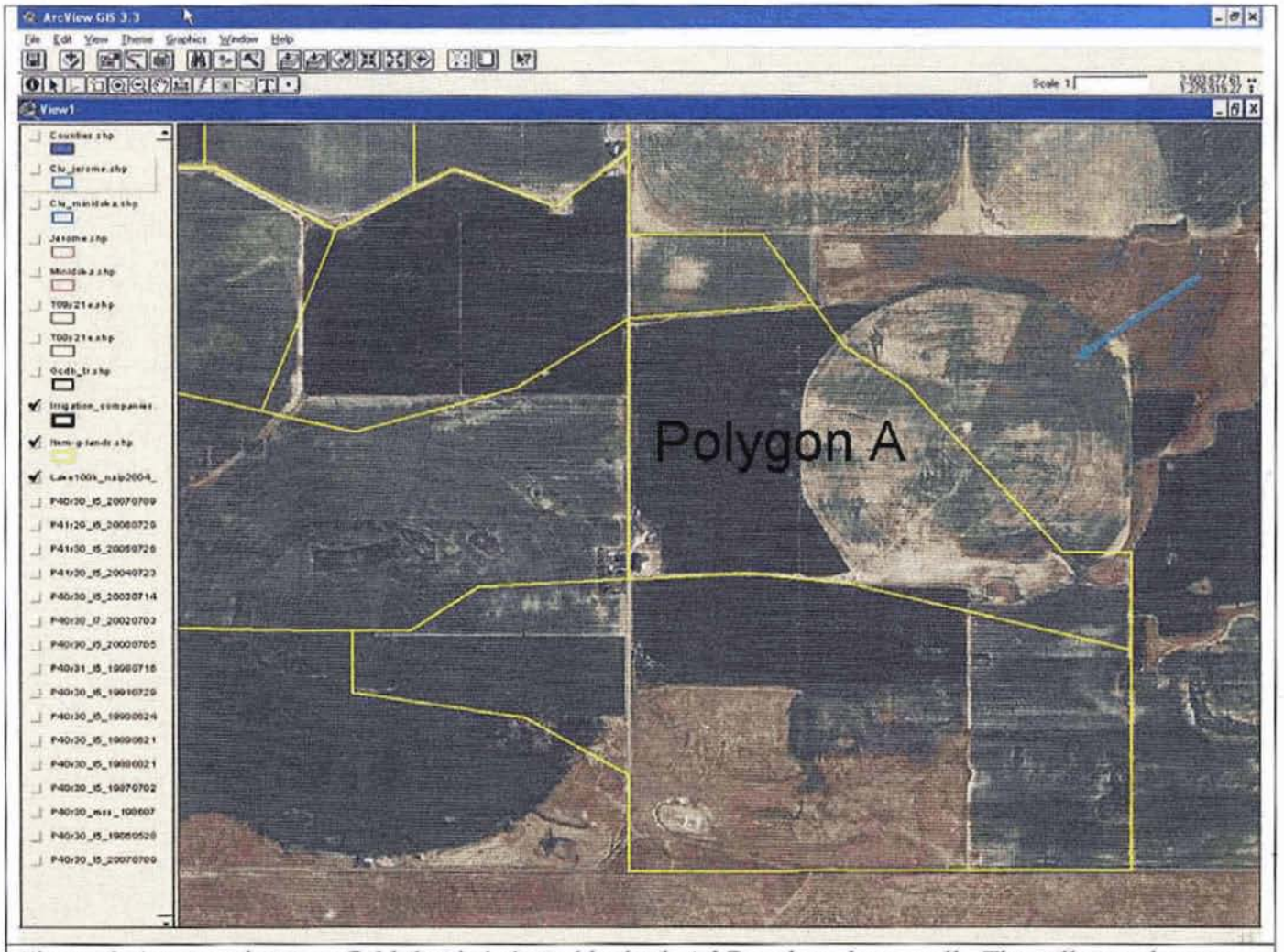


Figure 6: Arrow points to a field that is irrigated by both A&B and a private well. The yellow polygons delineate "Item-g-lands" that the District identified as being water-short.

71. In response to paragraph q. of the *Order Requesting Information*, A&B provided the shapefile "Pou-a-b-id," which defines the land to which A&B delivers water.

72. As illustrated below in Figure 7, the Pou-a-b-id shapefile (outlined by the thin black lines) shows that A&B delivers water to parts of fields identified as water-short, but not to other parts of those same fields. Thus, areas identified by A&B as being water-short are not entirely irrigated by A&B and receive water from other sources.

73. A review of water rights indicates there are 135 private wells irrigating 27,235 acres within the A&B boundary.

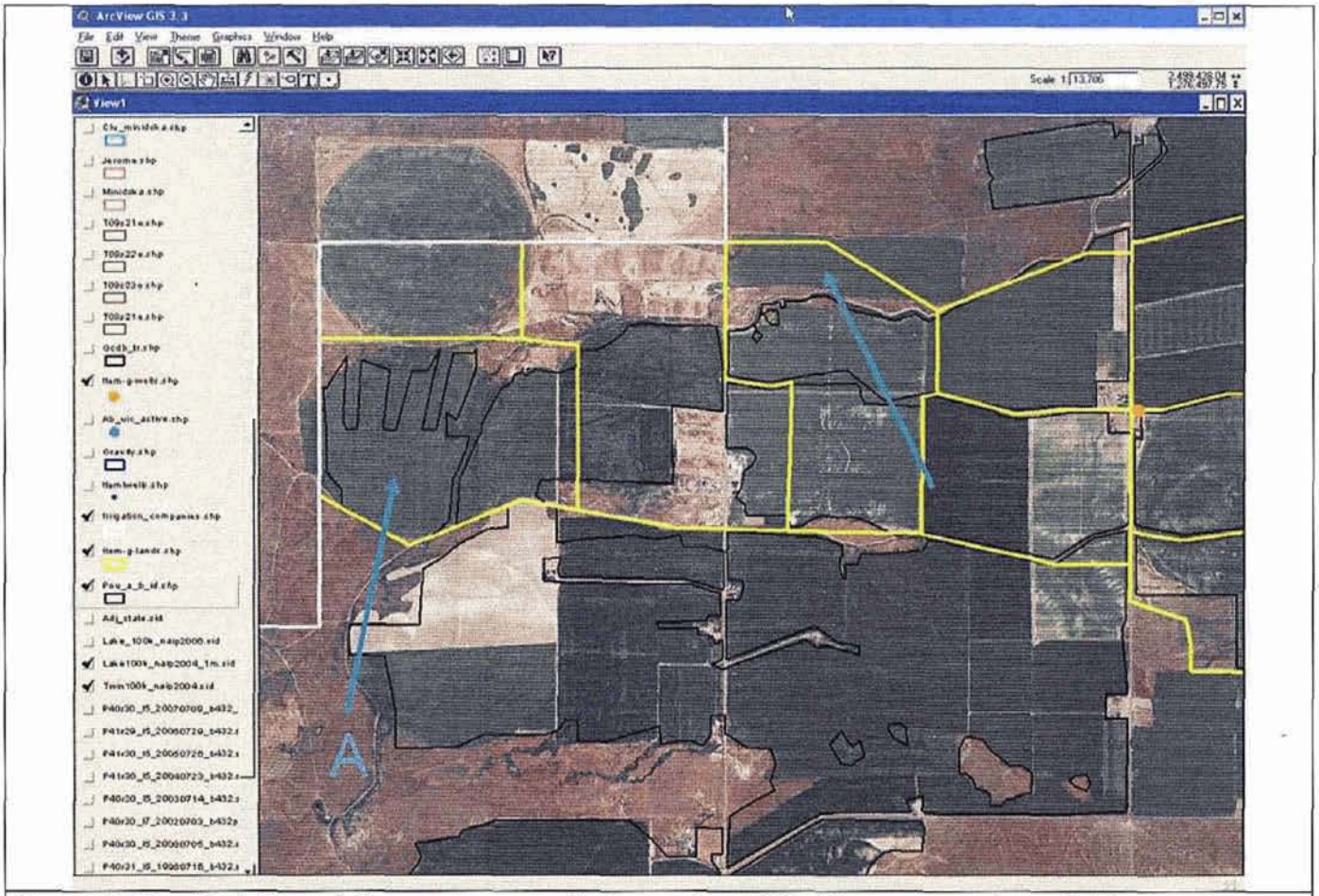


Figure 7: The black lines delineate areas supplied water by A&B. The arrows point to fields that are claimed by A&B to suffer water supply shortages during peak demand periods (i.e., within yellow polygons used to identify "Item-g-lands"), but are supplied partially by A&B and partially by other sources.

74. The Department identified several areas that appear to show irrigation on federal land associated with "Item-g-land" polygons, as illustrated by Figure 8 on the following page.

75. According to the Minidoka North Side Resource Management Plan, January 2005, U.S. Department of the Interior, Pacific Northwest Region, Snake River Area Office, "the most common unauthorized land use occurring on USBR land is agricultural encroachment by neighboring farms . . . . In total, agricultural encroachments are estimated to use 394.2 acres of Reclamation land."

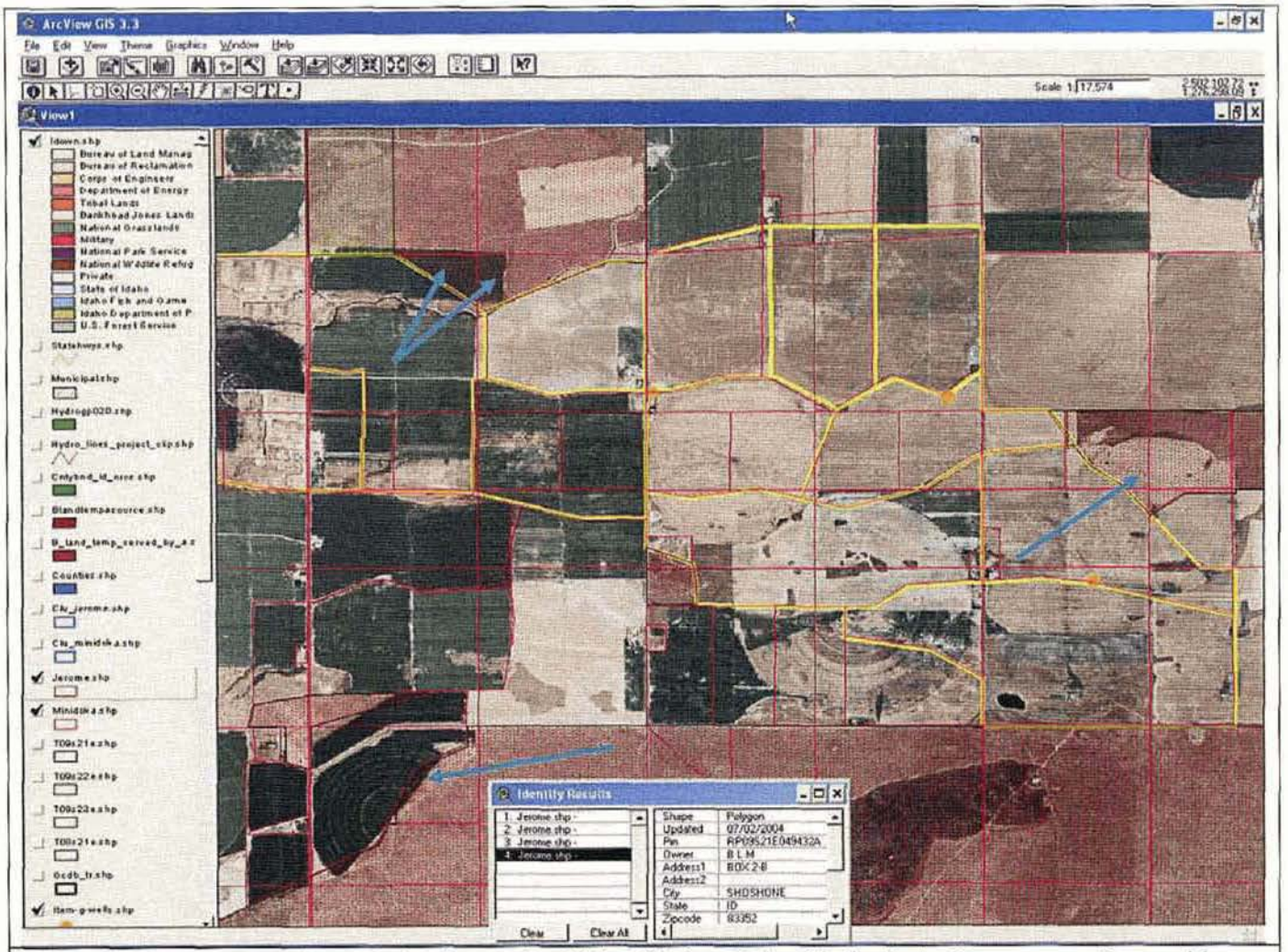


Figure 8: The arrows point to irrigation on land identified as federal in both the Department State-wide Land Management shapefiles and in Minidoka County Tax Parcel data. The yellow polygons are Item-g-lands, which are water-short as identified by A&B.

Examination Of Evapotranspiration Data

76. The Department performed an analysis of data produced using the METRIC evapotranspiration model and digital data collected by the Landsat satellite system. Landsat is a joint USGS and National Aeronautics and Space Administration satellite that collects images of the earth on a 16-day cycle. Landsat is used by the Department to identify irrigated land and to compute and map ET, evapotranspiration representative fraction ("ETrF"), and normalized difference vegetation index ("NDVI") data. ET data shows the amount of consumptive use by crops, and NDVI shows the relative amount of biomass of crops. Areas of cropland that receive water below their minimum requirements would show lower ET, ETrF, and NDVI values than areas of cropland that are receiving an adequate supply of water.

77. Using 2006 data, IDWR analyzed patterns of ET to compare lands identified by A&B as water-short with croplands in the surrounding area.

78. The Department used existing data to develop Figure 9, which shows areas of cropland and their water source (ground water or surface water). These areas are north of A&B (ground water), south of A&B (surface water), west of A&B (ground water), west of A&B (surface water), and northwest of A&B (both ground water and surface water).

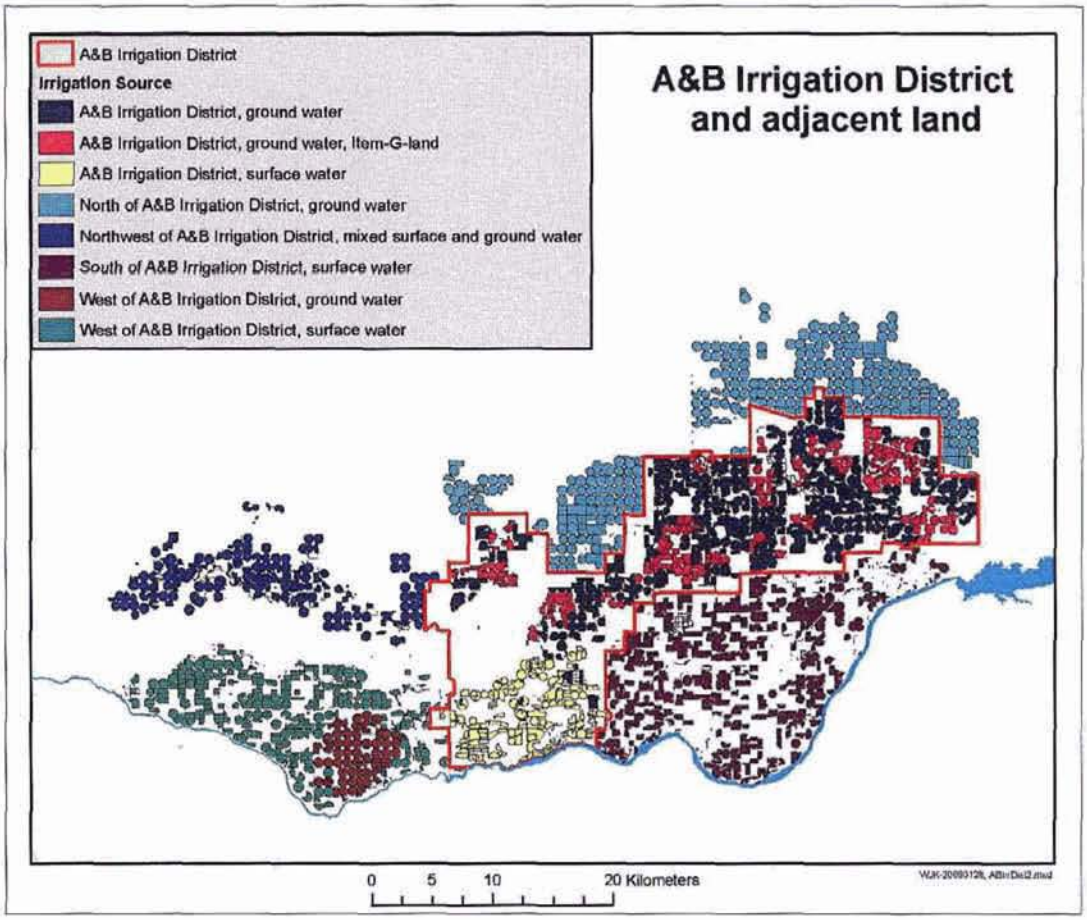


Figure 9: A&B Irrigation District and adjacent land.

79. The Department has spatial data for ET, ETrF, and NDVI on June 20, July 22, and August 7 in 2006. GIS was used to overlay the shapefile of irrigated areas and their water source (ground water or surface water) with the ET, ETrF, and NDVI data to compute the mean ET, mean ETrF, and mean NDVI values for each area. The ratio of mean ETrF and mean NDVI was also computed to show the relative amount of ET per amount of vegetation. Definitions:

> ET – Evapotranspiration, which is water evaporated from the ground or from irrigation, or transpired from vegetation.
>
> ETr – Reference ET, which is the amount of evapotranspiration from a full-canopy crop of well-watered alfalfa.

ETrF – Reference ET Fraction, which is the ET computed by the METRIC evapotranspiration model divided by Reference ET.

NDVI – Normalized Difference Vegetation Index, which is a linear combination of red and near-infrared spectral bands of the Landsat satellite. The NDVI is very highly correlated to several biophysical variables, including the weight of standing, green biomass.

80. Charts were developed for the mean ET, mean ETrF, mean NDVI, and ratio of mean ETrF and mean NDVI values for each of the areas for the three dates in 2006. Figures 10 and 11 show that the mean 24-hour ET and the mean ETrF for the Item-G area falls in the middle or above other areas indicating that the Item-G area is not short of water. Figure 12 shows that the NDVI for the Item-G area is close to the middle of all the areas on June 20 and August 7, and highest on July 22, indicating that the amount of vegetation is similar to or greater than surrounding areas. Figure 13 shows that the ratio of ETrF and NDVI (the ET per amount of vegetation) for the Item-G area is highest of all the areas on June 20 and August 7, and near the middle of all the areas on July 22, indicating that the Item-G area is not short of water.

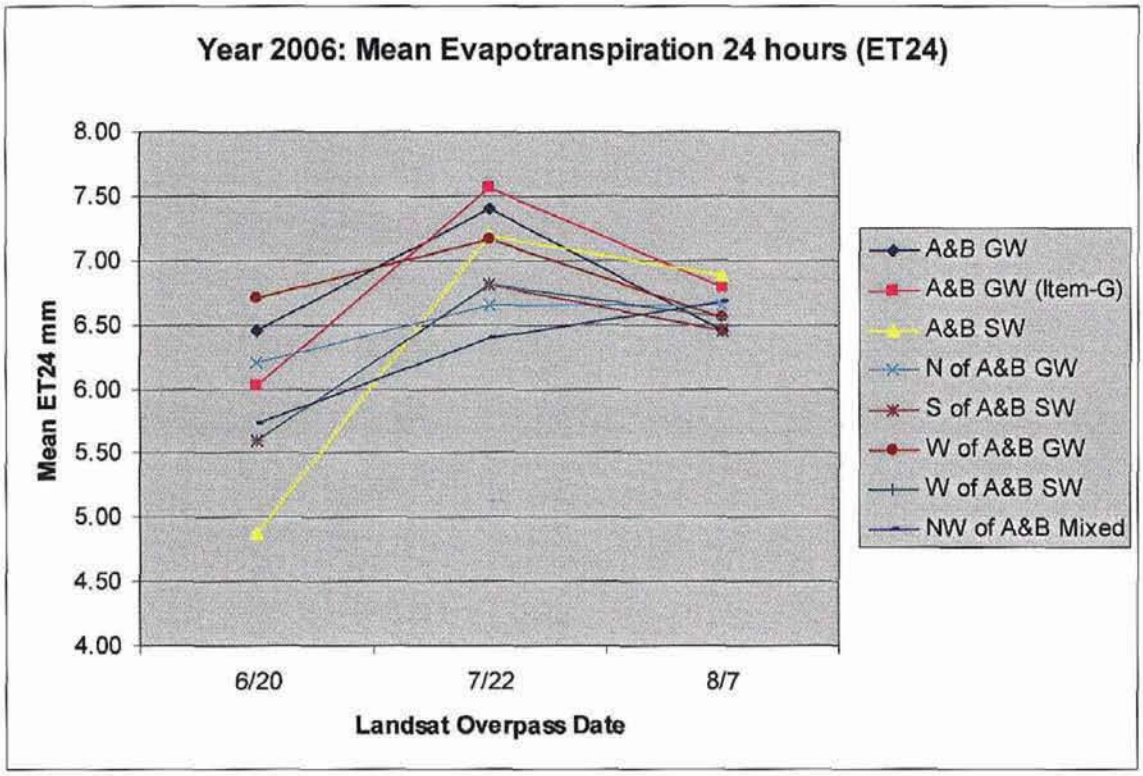


Figure 10. Year 2006: Mean Evapotranspiration 24 hours

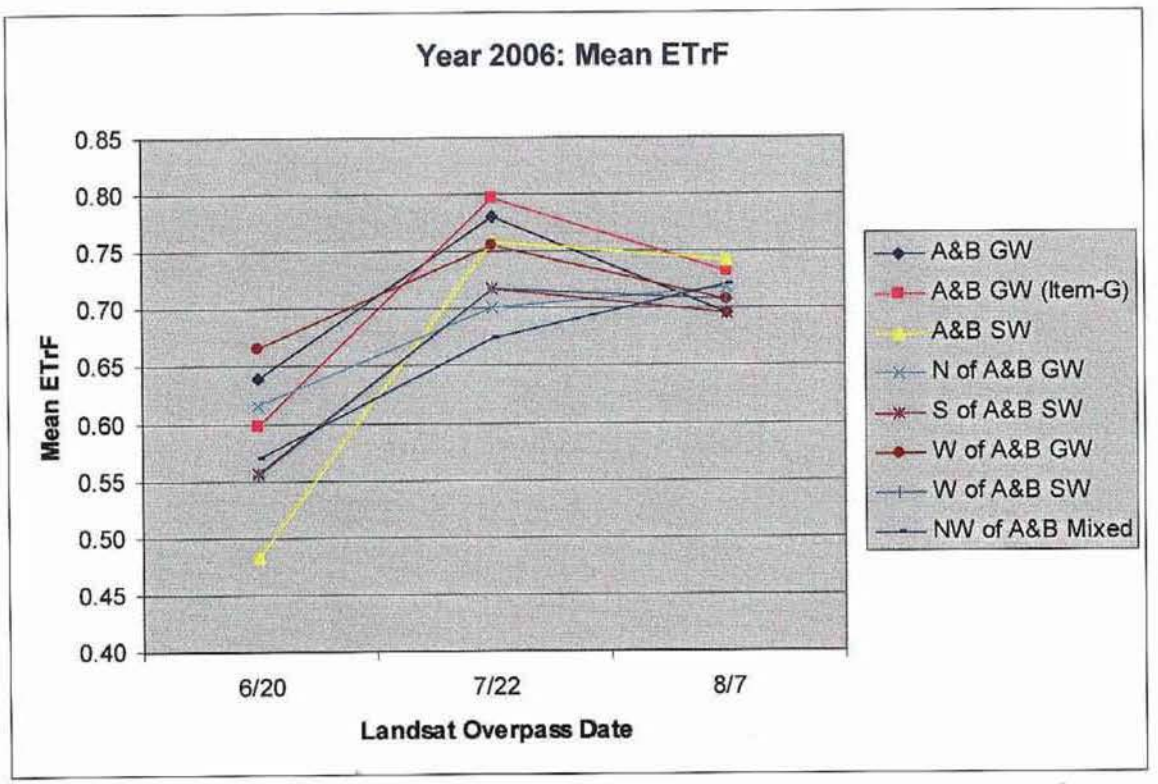


Figure 11. Year 2006: Mean Evapotranspiration Representative Fraction.

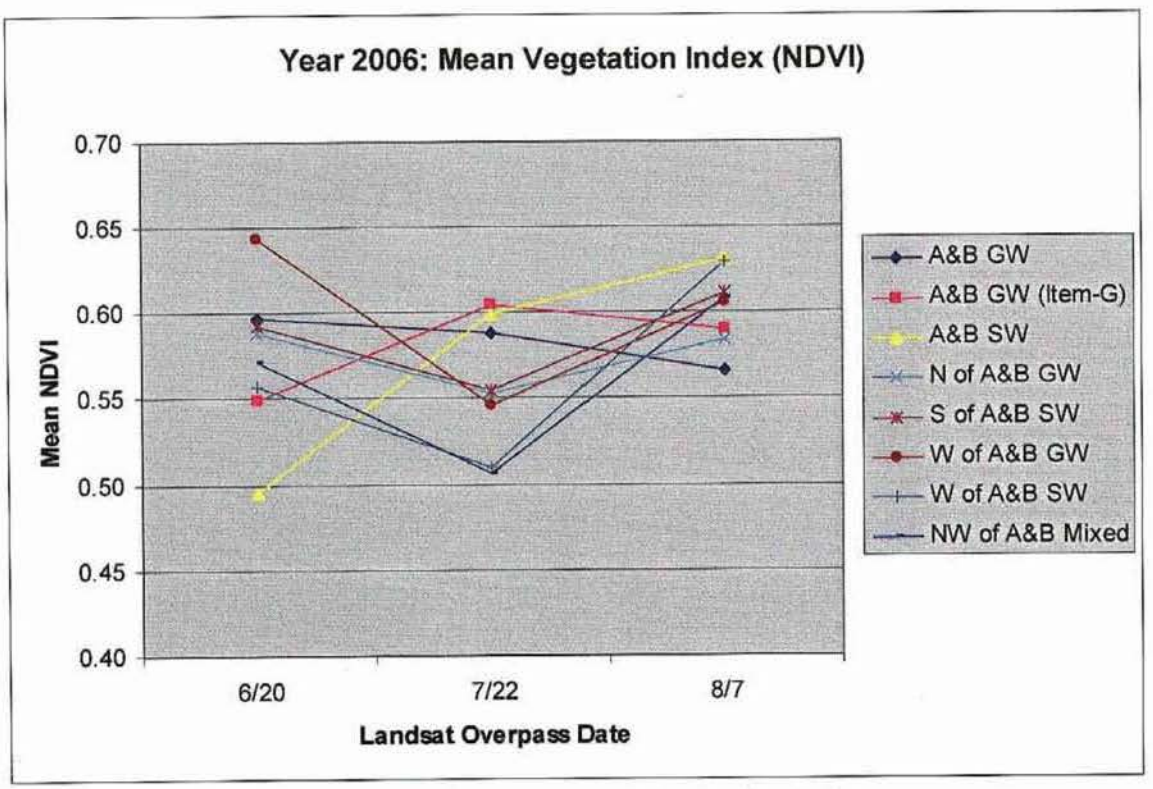


Figure 12. Year 2006: Mean Vegetation Index.

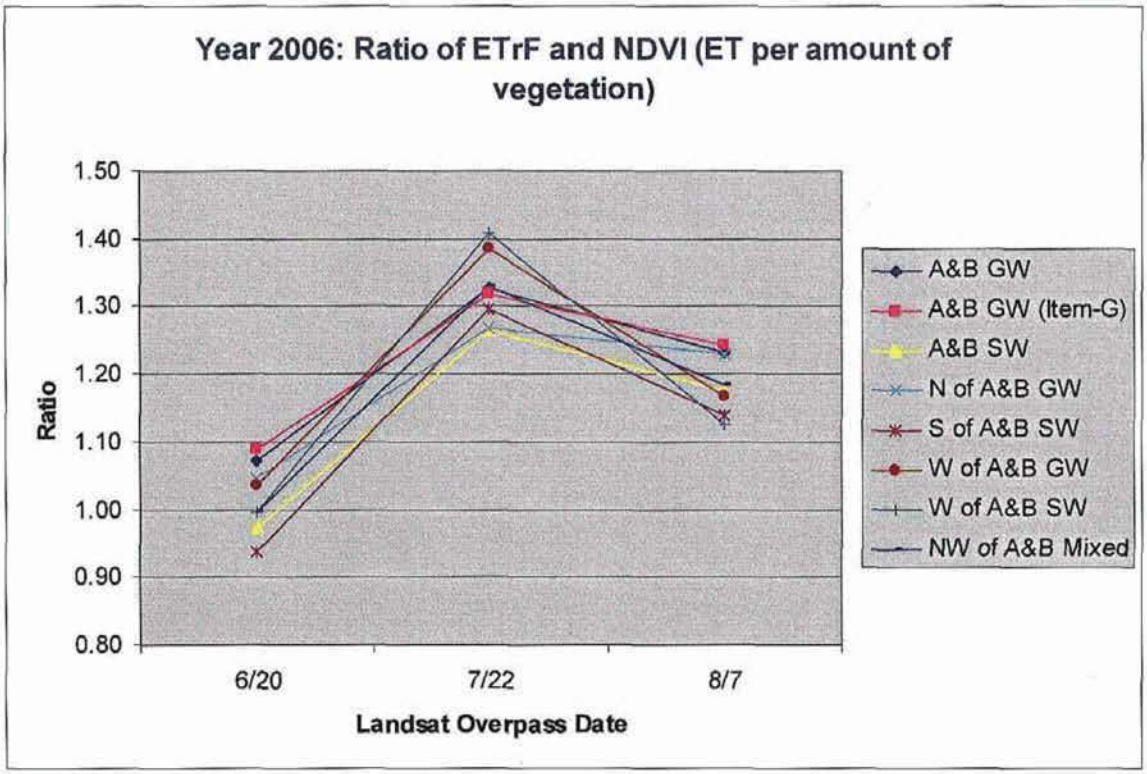


Figure 13. Year 2006: Ratio of mean ETrF and mean NDVI.

Hydrogeology

81. Driller's logs for project irrigation wells in the northern part of the District and private wells in adjacent areas east and north of Unit B show a stratigraphy dominated by basalt with minor sedimentary interbeds of sand, silt, and clay. South of the District at Burley and Declo, the upper 400 to 500 feet of the subsurface is mostly clastic sediments, which are underlain by basalt to an unknown depth. City of Burley Well #2 produces 3,500 gallons per minute from the deep basalt zone. Yields from area wells that produce exclusively from the deep basalt zone generally are less, however. City of Rupert Well #2, for example, yields 1,400 gallons per minute from the basalt interval between 497 and 557 feet deep. In between the south and north areas of the District is a transition zone in which the upper 500 feet are characterized by basalt intercalated with clastic sediments with a ratio of approximately 50% sediments and 50% basalt. Based on evaluation of available geologic and hydrogeologic data, the southwest portion of Unit B is located at this geologic transition zone. Geologic cross-sections prepared by the Department can be found at: http://www.idwr.idaho.gov/Calls/A&B_Irrigation_Call/A&B_BackgroundInfo/.

82. As described on page 7 by E.G. Crosthwaite and R.C. Scott in their report prepared on behalf of the USBR, and in cooperation with the Idaho State Department of Reclamation, entitled Ground Water in the North Side Pumping Division Minidoka Project, Minidoka County, Idaho (1956), "The geologic formations in the area differ markedly in their

water bearing properties. The materials range from highly permeable to nearly impermeable. Permeability influences the rate at which the materials accept recharge, transmit water, and yield water to wells." The authors go on to explain on page 9 that, "In Minidoka County and most other parts of the Snake River Plain the Snake River basalt is the principal water-bearing formation and it yields water copiously to wells. Inter-tongued sedimentary beds are saturated below the water table but yield little or no water to wells."

83. As explained by Raymond L. Nace on page 12 of his preliminary report prepared in cooperation with the Idaho Department of Reclamation and the USBR, entitled Ground Water in Minidoka County, Idaho, with Special Reference to the North Side Pumping Division of the Minidoka Project (1948), "The term Burley lake beds was proposed for a sequence of sediments, predominantly of lacustrine origin, that occur beneath the surface in Cassia and Minidoka Counties . . . . The Burley lake beds consist of clay, mud, silt, sand, and fine gravel. Some of the beds are well consolidated; others are soft and unstable and, when saturated with water, are highly mobile and troublesome during drilling operations. Below the Burley lake beds there are similar clastic sediments and intercalated basaltic lavas to a known depth of more than 1,100 feet at Burley and 600 feet at Rupert." On page 16, Nace further explained that he does not make distinctions between the two sediment sequences because "The Burley lake beds are not readily differentiated from the older pre-Burley beds."

84. In discussing the water-bearing properties of the Burley lake beds and older sediments, Nace reported on page 16 that the sediments provide "only moderate yields" to wells and "are for the most part too fine to provide a natural gravel pack, and artificial gravel packing of deep wells has not been practiced in this area." He also reported, "The wells commonly yield large quantities of fine sand when they are developed" and "The most successful of the existing wells in these beds are cased throughout their depth and are perforated at the levels of the lava layers and coarser sands." Finally, he suggested, "Different well-construction and well-development methods would probably permit larger production from wells in the Burley lake beds and older sediments."

85. On page 38, Nace reported, "Ground water conditions in the part of Unit B that extends westward into southeastern Jerome County were not studied in the field because the development of ground water or irrigation in that area was not anticipated in 1947." This statement suggests that the subsurface in the southwest part of Unit B were not well characterized prior to project development. On pages 39-40, Nace recommended that four test wells "be sited so as to test further the elevation and configuration of the water table and to determine whether or not the Burley lake beds or older sediments extend northward into Unit B. The latter possibility is unlikely, but the facts should be determined definitely as the presence of fine-grained sedimentary aquifers will materially affect the yield and type of construction of wells." One of the four recommended test well sites was the north-central part of T9S/R21E. He further stated, "If wells along the southern boundary of the area encounter sedimentary aquifers, however, it may be advisable to sink small test wells to determine the depths and thicknesses of the most permeable zones and to forecast the size and amount of casing required."

86. Crosthwaite and Scott reported, "The gradient of the water table averages about 3 feet per mile beneath most of Unit B Pumping Division, but under the western part of the

Division the gradient steepens to about 12 feet or more per mile." (See Figure 14.) The authors added, "differences in the gradient probably are caused by differences in the permeability of the basalt and by the presence of nonpermeable fine-grained sediments intercalated with the basalt."

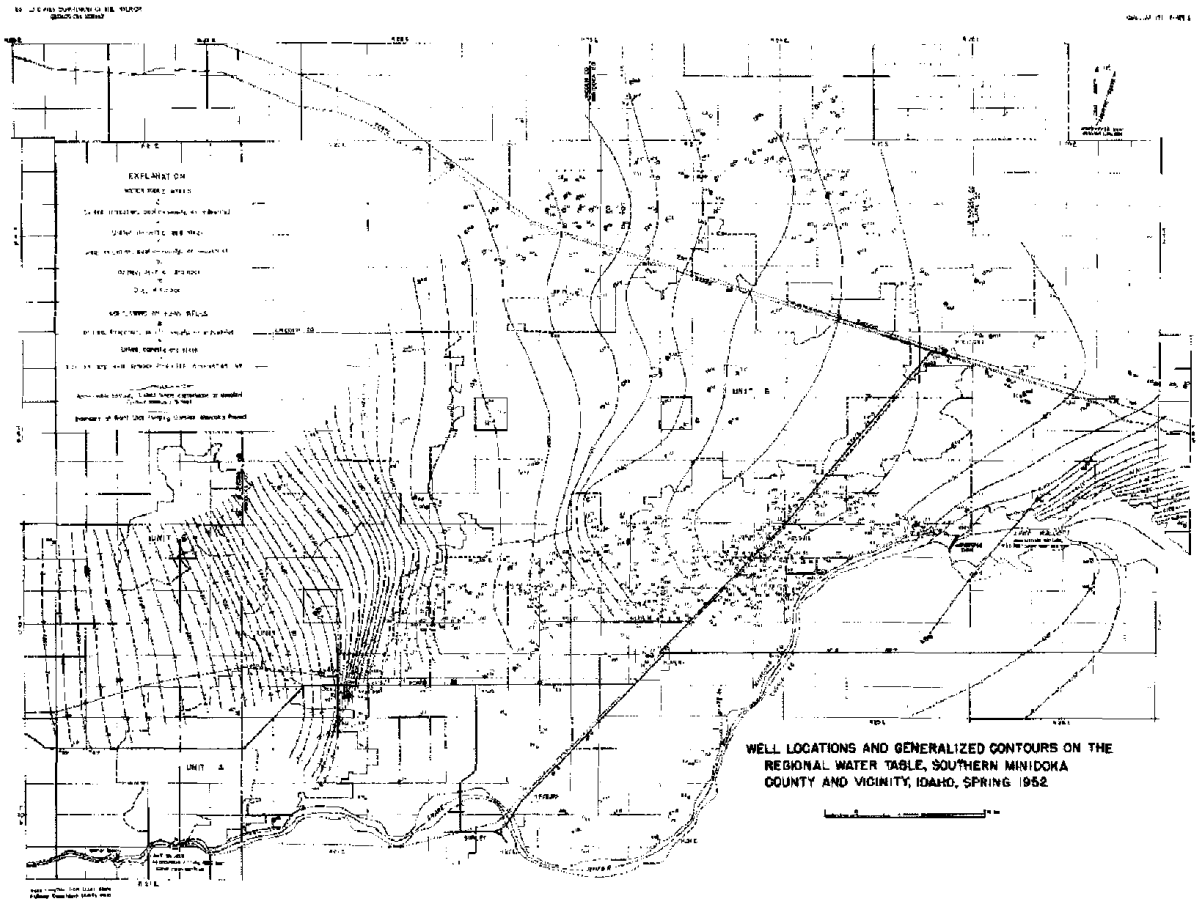


Figure 14: Spring 1952 water table contour map. Decreased spacing between contour lines indicates higher hydraulic gradient. Contour intervals equal ten (10) feet. Figure 14 is reproduced from Crosthwaite and Scott (1956).

87. As stated in the Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, p. 15), "Nearly all the area beneath the North Side Pumping Division Unit B is made up of basalt with few to minor amounts of sediment. The subsurface beneath tract 4 is composed of basalt innerbedded [sic] with substantial amounts of mostly fine-grained sediment."

88. According to the Proposed Land Uses Map in the above-cited report, tract 4 of the North Side Pumping Division is located in the central part of T9S/R22E, which is in the southwest part of Unit B.

89. Sediment intervals, where they occur, reduce the well yields, particularly in the southwest part of Unit B. As explained on page 19 of the above-cited report, "Where the flow sheets are made up of dense, and massive basalt and/or covered, penetrated, or innerbedded [sic]

with fine sediment, the water yield is small to moderate. One such area is in the southwest part of Unit B located mostly in T9S/R22E where several low yielding wells are found. Here the aquifer is comprised of basalt innerbedded [sic] with substantial amounts of fine sediment."

90. Ground water generally flows in an east to west/southwest direction across Unit B. Map 3 in the above-cited report shows that water level contours are more tightly spaced in the southwest part of the project area suggesting a decrease in transmissivity. The map indicates a hydraulic gradient of approximately 2.5 feet per mile from the east side of T8S/R25E to the west side of T8S/R23E. The hydraulic gradient is roughly 16 feet per mile when measured from the northeast corner of T9S/R22E to the southwest corner of T9S/R21E. These values for the water table configuration in the early 1980s are consistent with those reported in Crosthwaite and Scott for the early 1950s. *See* Figure 14.

91. Inspection of the specific capacity map in the same document (Map 2) supports the conclusion that transmissivity typically is lower in the southwest part of Unit B. Specific capacities measured upon completion of A&B irrigation wells range from 7 to more than 20,000 gallons per minute per foot (gpm/ft) of drawdown. All of the irrigation well specific capacities that are less than 100 gpm/feet are for wells in the southwest project townships (T8S/R21E, T9S/R21E, T9S/R22E, T9S/R23E, and T10S/R22E). None of the irrigation well specific capacities that are less than 100 gpm/ft are for irrigation wells in the northeast project townships (T8S/R23E, T8S/R24E, T8S/R25E, T7S/R23E, T7S/R24E, and T7S/R25E).

92. Depth to water also is greater in the townships in the southwest part of Unit B. Based on review of Map 2, the depth to water in the middle of T9S/R21E was more than 300 feet versus approximately 145 feet in the middle of T8S/R24E, and 160 feet in the middle of T8S/R25E. The greater depth to water in the southwest part of the District results in higher pumping lifts and contributes to more expensive drilling costs on a per well basis. District data indicate that the average initial total depth for original project irrigation wells in Ranges 21E and 22E was 378 feet versus 265.5 feet for project wells located in Ranges 23E, 24E, and 25E.

93. A Department report entitled Hydrogeologic Analysis of the A and B Irrigation District Area was completed in January of 2008. The report stated that "Wells in sections 9 and 10 of T9S R22E penetrate multiple sedimentary interbeds. About 50 percent of the saturated thickness (water level elevation minus the bottom hole elevation) is composed of sediment in a well in section 9. About 38 percent of the saturated thickness of a well in section 10 is composed of sediment." The report added that "The geologic data from wells supports the general geologic description presented by Crosthwaite and Scott (1956). The percentage of sedimentary interbeds in the subsurface below the water table increases to the south with thicker and more laterally extensive clay units. The number and thickness of clay units interbedded with the basalt below the water table in the northern portion of the project area are small."

94. In response to the *Order Requesting Information*, A&B provided discharge data for individual wells. The dataset includes high and low discharge rates for the years between 1989 and 2007. Expanding on an approach used in the January 2008 Department report, Department staff compiled the discharge data for each of the townships in which A&B has irrigation wells. The number of wells per township varies from T8S/R23E with fifty to

T10S/R21E with only one well. Attachment C contains graphs showing the trends for the high and low pumping rates for each of the townships containing at least four wells. Regression analysis indicates that the average change in the low pumping rate (-8.7 percent) is greater than the average change in the high pumping rate (-4.6 percent) but both high and low rates have declined on average since 1989. Overall decreases of more than 10 percent occurred for the high pumping rate in T9S/R22E and for the low pumping rates in T7S/R25E, T8S/R21E, T9S/R21E, and T9S/R22E. T9S/R21E was unique in that the high pumping rate increased by 4.8 percent, the most for any township, while the low pumping rate decreased by 22 percent over the same time period.

95. The discharge data described above were provided to the Department in the form of Excel spreadsheets. The Department noted several instances where a different discharge rate was recorded in different spreadsheets for the exact same well and date.

Well Design, Drilling, Construction And Abandonment

96. Paragraph 11.a. of the Motion to Proceed indicates, "7 wells have been abandoned because they no longer provide adequate water." Six of these are located in the southwest part of the District where the presence of fine-grained sediments in the subsurface causes a reduction in the aquifer transmissivity and appears to have contributed to well maintenance problems associated with sand pumping. According to A&B records, the seventh abandoned well (15B825) was replaced because it had a crooked borehole.

97. In response to the *Order Requesting Information*, A&B provided a map showing the locations of seven wells that did not yield additional water despite having been deepened. All seven are located in the southwest part of Unit B. Two of these wells (3B921 and 3C921) are located in southeastern Jerome County in the north-central part of T9S/R21E, which is one of four locations where Nace recommended that a test well be drilled. Sediment intervals are noted on the driller's logs for both wells but especially at depth on the log for 3C921, which indicates intervals of sand, clay, and "basalt and clay caving." The reason for abandoning well 3C921 is not clear based on District records, which indicate that a new set of bowls was installed in the 700-foot deep well in 2006 and the pumping depth to water was 356.5 feet on July 19, 2007. The maintenance record for 3B921 also documents problems with material caving into the well and causing damage to the pump, as well as the pump "getting to be very tight on the last 10' going into the hole." Attempts to deepen a third well (1A921) ended when a sandy clay formation was encountered that could not be kept from caving into the borehole. A fourth well (10A922), which is located in a section adjacent to tract 4, was abandoned after an attempt to deepen it failed because the driller was unable to dislodge a liner that was installed to prevent a 46-foot thick clay interval from caving. The maintenance log for this well includes a notation: "Looking at the surrounding area with wells up to 1,000' deep it would be futile to spend any more time or money on this well." The fifth of the six southwest wells (9A922) was pumping sand, and because a liner was lodged in the borehole, the pump could not be lowered and the borehole could not be deepened. The driller's log for the sixth well (9C922) indicates that several significant clay intervals were penetrated, and the bottom of the well was filled in with 60 feet of sand. The last well that was unsuccessfully deepened (20A922) is located within tract 4. As

stated on page 15 of the Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985), "The subsurface beneath tract 4 is composed of basalt innerbedded [sic] with substantial amounts of mostly fine-grained sediment."

98. Paragraph 11.a. of the Motion to Proceed states that since 1980, "A&B drilled 8 new wells to replace wells that would no longer provide an adequate water supply as the result of the lower ground water tables." However, the inset on the map entitled "A&B Irrigation District Impacted Ground Water Wells & Irrigated Land" that was sent in response to the Director's *Order Requesting Information* indicates that only five wells have been replaced since 1980. As mentioned above, one of the five replacement wells (15C825) was installed to replace a well that had a crooked borehole (15B825). The other four replacement wells (9A921, 3C922, 3D922, and 9C922) are located in the southwest part of Unit B. The maintenance log for 9A921 indicates that the well was not drilled to replace a well, but rather was "acquired to supplement 3C921" in November of 2004. District records indicate that the average yield for 3C921 during the period that includes the "peak demand" (i.e., mid-June through mid-September) was 3.4 cfs in 2004 and 4.4 cfs in 2005.

99. In paragraph 11.a. of the Motion to Proceed, A&B states, "Since 1980, and primarily since 1994, A&B has made numerous attempts to solve the reduction in ground water irrigation supply caused by declining well yields. A&B drilled 8 new wells to replace wells that would no longer provide an adequate water supply as the result of the lower ground water tables, has deepened 47 wells, has replaced the bowls on 109 pumps in wells that are now pumping from substantially lower water levels, 137 pumps have been lowered to increase their capacity as a result of declining ground water tables, and 7 wells have been abandoned because they no longer provide adequate water." The need for well deepening, well replacement, pump lowering, and pump bowl replacement, however, is not a recent development and is attributable, in part, to substandard original well construction, routine operation and maintenance, extraordinary operation and maintenance caused by sand pumping, and a variety of other causes. With reference to four production wells that were installed at project onset but were never used, USBR's own experts concluded in 1985 that, "some or all of these wells may need renovation to bring them up to current Reclamation standards." Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, p. 31). The database provided by A&B indicates that 80 irrigation wells had been deepened by 1965.

100. Five of the original 177 production wells were never used and one of these five (33A824) was sold to the City of Rupert. There is a sixth well that apparently also was never used (22B922) despite a notation on the driller's log indicating that the "hole will furnish water to the biggest pump that will go in the hole."

101. According to the Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, p. 28),

> Since construction of the pumping division in the 1950's, *well construction methods have changed*, especially construction specifications written by Reclamation planners. The original

> 177 project production wells were drilled by drilling contractors using cable drills, and were completed using the usual completion methods at that time. Drilling was continued below the water table until the drill cuttings were "lost," which was apparently an indication of good yield. Construction completion usually consisted of installing surface casing with the balance of the well left "open hole." When caving conditions were encountered during the drilling, a casing liner was installed, generally just through the caving interval. The liner would be perforated when the caving interval was located within the "good" aquifer section of the well. After the well was completed, a pump test was run to determine the yield. If the yield was insufficient, the well would be deepened in hopes of encountering additional water.

Emphasis added.

102. The Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, p. 28) further states:

> These methods were workable, but generally *did not allow for much lowering of the pump if the water level declined.* The project was begun about the water level peak period and was completed during a water level decline period. More than one-half of the wells had less than 100 feet of saturated well bore; therefore, as the water levels declined, drawdown increased, the thickness of the saturated well bore thinned, and yield decreased. *Deepening of many of the wells was undertaken before the project was completed.* About one-half of the wells have been deepened to date (1984) and about one-half of the wells still have less than 100 feet of exposed aquifer.

Emphasis added.

103. Using data provided by A&B, the average initial saturated interval (total depth minus the initial depth to water) for the original production wells (90.3 feet) is considerably lower than for the seventeen planned wells (182.5 feet) that were characterized in 1985 as "up to current Reclamation standards." Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, p. 31). The initial saturated interval for the original wells that had to be deepened (67.0 feet) is considerably less than the initial saturated interval for the sixty-nine original wells that have not had to be deepened (127.5 feet).

104. Analysis of the pump and well summary database provided by the District and well and pump data contained in the 2007 Annual Pump Report – Part 3 Physical Data on Individual Wells/Pumps reveals the following average statistics:

Area	Pump Setting (ft)	Depth to Bottom of Screen (ft)	Pump Motor Horsepower	Min. Well Diameter (in)	Initial Saturated Interval (ft)
Southwest (Ranges 21E and 22E)	328.96	344.23	244.29	17.50	81.3
Northeast (Ranges 23E, 24E, and 25E)	232.00	246.79	198.00	19.85	55.3
Difference	96.96	97.44	46.29	-2.35	26.0

105. The average pump setting is lower in the southwest portion of A&B because the depth to water is greater and the well yields are lower. The average initial saturated thickness is greater in the southwest portion of A&B reflecting the need for more available drawdown to compensate for the lower specific capacity in this area. Although the pumps on average are set about 97 feet deeper, the initial saturated interval was only 26 feet more when the wells were initially installed.

106. The average minimum well diameter is more than 2 inches less in the southwest portion of Unit B, reflecting the need to periodically set casing in order to stabilize sedimentary interbeds that are more common in this area. Under ideal conditions, wells with more lift would have larger minimum casing diameter in order to accommodate larger diameter bowls. Wells in the southwest part of Unit B likely cannot accommodate larger bowls, however, because the well diameters are smaller on average.

107. There is a reduction of well diameter every time a cased well is deepened or a string of casing is installed to hold back sediment. Because of this, previous well deepenings may be limiting the extent to which the existing wells can further be deepened, particularly in the southwest part of Unit B.

108. The January 2008 Department report indicated that "Well deepening may not be possible in some circumstances because of casing configurations, well alignment or penetration of unstable formational material. In this case a replacement well may need to be drilled." In discussing the depth limitations of the aquifer, it is stated that "The first step in the analysis of well deepening potential is to examine the subsurface stratigraphy. Water producing zones are not present in most of the sedimentary interbeds because they are composed predominantly of clay. Thus, the presence of a clay interbed that extends hundreds of feet below the present depth of a well makes the probability of successful well deepening very low. Conversely, the presence of basalt (absence of clay interbeds) in the depth interval below the bottom of a well means that there is a reasonable chance that well deepening can be successful . . . . Thick clay units that are probably Burley Lake Beds are present in the southern portion of the district. The potential for

successful well deepening is high in the northern portion of the project and relatively low in the southern portion of the project area."

Water Level Declines, the ESPA Ground Water Model, and the A&B Scenario

109. Since the 1950s, ground water levels in the ESPA have declined in response to three primary factors: reduced incidental recharge to the aquifer caused by conversions from flood/furrow irrigation systems to more efficient sprinkler irrigation systems, drought, and ground water pumping.

110. In 1985, the USBR offered the following observations about water level declines in the A&B District:

> The major influence upon ground-water level declines and recoveries is climate.
>
> . . . .
>
> Additional ground-water pumping has slowed on the Snake Plain because of water rights controversy and because most potential irrigable land is in production. The portion of the decline caused by pumping has slowed and may have stabilized.
>
> . . . .
>
> The current decline problem like the previous one was mostly related to a drier climate trend, but also aggravated by changes in irrigation practices, such as reduced irrigation diversions, throughout the Snake Plain aquifer area.

Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, pp. 14, 26, and 27).

111. In paragraph 11.b. of the Motion to Proceed it is alleged that, "From the annual measurement by A&B of approximately 150 of the 177 wells which divert water under Water Right No. 36-02080, it has been determined that there has been a decline since 1999 of over 12 feet in ground water levels over the district, on the average, and a decline of over 22 feet on the average since 1987. Total ground water declines within the district boundaries since the early 1960s generally range *between 25 to 50 feet*. The trend in ground water declines has become stronger and more pronounced which indicates that the declining ground water level problem is worsening." Emphasis added.

112. The average water level decline for original (i.e., pre-1965) production wells is 25.2 feet based on the spreadsheet A&B Groundwater Data.xls that was provided to the Department by the District in response to the *Order Requesting Information*. Based on the most recent available data, the total water level decline since the wells were installed ranges from 8.5 feet to 46.4 feet. The average decline for the period 1999 to 2006 is 12.6 feet.

113. The average decline of 25.2 feet is 38 percent of the average initial saturated interval for the original wells that had to be deepened (67.0 feet), 20 percent of the initial saturated interval for the original wells that have not had to be deepened (127.5 feet), and 14 percent for the seventeen planned wells (182.5 ft) that were characterized in 1985 as "up to current Reclamation standards." Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985, p. 31).

114. Seventeen of the eighteen highest total water level declines occurred in wells located in the southwest part of Unit B (i.e., wells in ranges 21E and 22E). The average decline for the 35 remaining original wells in the southwest part of Unit B is 30.3 feet versus 23.8 feet on average for the 135 original wells in the northeast part of Unit B (i.e., wells in ranges 23E, 24E, and 25E).

115. In response to the Director's *Order Requesting Information*, A&B indicated "The District does not have geophysical logs" and also, with regard to the saturated thickness of the basalt aquifer, "the District does not have this information." The Department's preliminary review of USBR files, however, indicates that borehole geophysical logging was, in fact, performed on at least 25 production wells. It is not clear from the Department's review of this information whether a determination of saturated thickness can be made using this information in combination with other available data. It can be concluded, however, that in the absence of information relative to aquifer thickness, it is difficult to assess how serious a problem is posed by potential future water level declines.

116. In 2004, the Eastern Snake Hydrologic Modeling Committee ("ESHMC"), (consisting of Idaho Water Resources Research Institute, University of Idaho, USBR, USGS, Idaho Power Company, consultants representing various entities, including A&B and the Department), completed reformulation of the ground water model used by the Department to simulate effects of ground water diversions and surface water uses on the ESPA and hydraulically-connected reaches of the Snake River and its tributaries. This effort was funded in part by the Idaho Legislature and included significant data collection and model calibration intended to reduce uncertainty in the results from model simulations.

117. The reformulated ground water model for the ESPA was calibrated to recorded ground water levels in the ESPA, spring discharge, and reach gains or losses to Snake River flows, determined from stream gages together with other stream flow measurements, for the period May 1, 1980 to April 30, 2002. The calibration targets, consisting of measured ground water levels, reach gains and losses, and discharges from springs, have inherent uncertainty resulting from limitations on the accuracy of the measurements. The uncertainty in results predicted by the ESPA ground water model is related to the uncertainty of the calibration targets. The calibration targets having the maximum uncertainty are the reach gains or losses determined from stream gages, which although rated "good" by the USGS, have uncertainties of up to 10 percent.

118. The Department uses a calibrated ground water model to determine the effects on the ESPA and hydraulically-connected reaches of the Snake River and its tributaries from pumping a single well in the ESPA, from pumping selected groups of wells, and from surface

water uses on lands above the ESPA.

119. The Department's ground water model represents the best available science for determining regional effects of ground water diversions and surface water uses on the ESPA. However, the Department's ground water model does not properly account for local hydrogeologic features within the aquifer or local pumping effects and thus, should not be used to evaluate impacts of one well on another.

120. The ESHMC conducted several scenarios using the Department's ground water model to evaluate the impact of various activities and to demonstrate how the model could be used. The "No Changes to Surface Water Practices Scenario" was conducted to determine how spring discharges and river gains would be affected if there was no conversion to sprinkler irrigation. The "Managed Recharge Scenario" was conducted to determine how spring discharges and river gains would be affected if managed recharge were aggressively pursued. The "Curtailment Scenario" was conducted to determine how spring discharges and river gains would be affected if all ground water rights junior to a set of specified dates were curtailed.

121. Using the Department's ground water model, the ESHMC also simulated the effects of curtailing all ground water diversions other than those by A&B and simulated the effects of curtailing only ground water diversions by A&B (the "A&B Scenario" http://www.if.uidaho.edu/~johnson/ifiwrri/projects.html). The simulated ground water declines at A&B represent the impact from A&B and also from all other ground water pumping on the ESPA in isolation from all other activities.

122. The ESHMC scenarios, such as the A&B Scenario, are not intended for use in administering the state of Idaho's water. Page 2, paragraph 2 of the A&B Scenario states that "The purpose of these scenario evaluations (i.e. the model runs conducted as part of the A&B Scenario) is to determine whether or not ground water diversions within the A&B service area or other ground water diversions are contributing more to the ground water declines at A&B." No mention is made of any intended administrative action. The A&B Scenario did not fully examine the relationship between wells owned and operated by A&B, and the privately owned wells within the boundaries of A&B. Furthermore, the A&B Scenario did not consider uncertainty associated with use of the model in administration of junior-priority ground water rights.

Well Rectification and Re-Direction of Waste Water

123. In paragraph 11.a. of its Motion to Proceed, A&B states that "during 1995 through 2006, A&B has expended approximately $152,000 per year for well rectification efforts to divert water from the declining aquifer, and has expended in the years 2002 through 2005, approximately $388,205 per year in drain well rectification, and reductions in operational waste to increase water supplies to meet a part of the shortages occurring as the result of declining ground water tables." The record indicates that the rectification and re-direction of waste water were in response to water quality issues.

124. The Minidoka Project, ID-WY, North Side Pumping Division, Definite Plan Report, Volume 1, General Plan, February 1955 describes drainage facilities, including inverted drainage wells (injection wells), required to convey and dispose of runoff and irrigation waste from Units A and B of the North Side Pumping Division. It was additionally estimated that a maximum of 79 inverted drainage wells would be required.

125. According to the Minidoka North Side Resource Management Plan, January 2005, U.S. Department of the Interior, Pacific Northwest Region, Snake River Area Office, the lack of natural surface drainage outlets to the Snake River and constraints associated with drainage into the southern portions of the Minidoka Irrigation District, resulted in most drainage return flows and storm water from Unit B to be disposed of through 78 drainage wells that pass water directly into the underlying shallow ground water aquifer.

126. In the Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USBR 1985), it was stated that irrigation return flows entering drainage wells on the North Side Pumping Division do not consistently comply with Idaho standards for injected waters. In addition, irrigation return flows generally contain fecal coliform bacteria in excess of Idaho drinking water standards and have been linked to contamination of domestic wells in the area. The report goes on to say, "Bacterial contamination of domestic wells in the Snake Plain aquifer is expected to decline in the future as problem disposal wells are identified, pollution sources cleaned up, and alternatives to present wastewater injection practices implemented *as required by Idaho regulations* governing use of disposal wells." Emphasis added.

127. The United States Environmental Protection Agency designated the ESPA a sole source of drinking water under provisions of the Safe Drinking Water Act in October 1991.

128. The Final Environmental Report North Side Drainwater Management Plan, U.S. Department of the Interior, Bureau of Reclamation Pacific Northwest Region, Boise, Idaho, October 12, 1993, indicates that because of the generally poor biological and physical quality of irrigation return flows, continued injection of untreated waste water has the potential to impact points of diversion for domestic use in the project area and could contribute to contamination of the ESPA.

129. The above-cited report also indicates that the state of Idaho ordered the closure of individual drainage wells where operations were shown to result in bacteriological or chemical contamination of domestic water supplies. The report adds that long-term modifications to current drainwater disposal practices are needed to reduce the potential for contamination of the aquifer and to conform to compliance requirements imposed by the state of Idaho and EPA.

130. On August 4, 2000, Claimant/Objector A&B Irrigation District notified the SRBA District Court that copies of the Preliminary Report of C.E. Brockway and the Bureau of Reclamation Supplement to Preliminary Report by Mark Croghan, R.D. Schmidt, Joe Spinazola, and Dave Zimmer were forwarded to the Director of IDWR, Peter J. Ampe, Jeffrey C. Fereday, and the U. S. Department of Justice. The report states that use of drainage wells, although hydraulically efficient and functional for drainage purposes, raises concerns for water quality. As

a result, the District and the USBR have a stated plan and policy to reduce or eliminate the use of drainage wells wherever possible.

131. In the Minidoka North Side Resource Management Plan, January 2005, U.S. Department of the Interior, Pacific Northwest Region, Snake River Area Office, it was noted that concerns over contamination of the shallow ground water aquifer led to efforts to close the drainage wells. The USBR and A&B constructed a series of artificial wetlands to allow and facilitate evaporation and evapotranspiration of irrigation drain water. It was also stated that the USBR intended to close all drainage wells by the end of calendar year 2006.

132. Option S-11 in the Minidoka North Side Resource Management Plan, January 2005, U.S. Department of the Interior, Pacific Northwest Region, Snake River Area Office Final Problem Statement indicates drainwater could be used more efficiently to support farm production and reduce the amount of drainwater currently being pumped to created wetlands or other management/disposal locations. The discussion also indicated that A&B, formerly the North Side Pumping Division, and Minidoka Irrigation District, formerly the Gravity Division, were working with the USBR to identify RMP tracts where drainwater re-use could be implemented if constraints associated with water rights, contract provisions, and/or limitations on the USBR's latitude in disposing of land could be resolved.

133. A current review of the Department's Resource Protection Bureau database shows eight active drainage (injection disposal) wells within Unit B lands. During a January 4, 2008 meeting with Department staff at the Department's state office in Boise, A&B representatives stated that the drainage wells are primarily used for storm water runoff disposal. It was also indicated that piping and pressurized irrigation and pump back systems for re-use on crops has nearly eliminated return flows and very little irrigation waste water has been discharged into wetlands or drainage wells in recent irrigation seasons.

Cost Issues

134. In 1955, the estimate for the average annual replacement cost for irrigation wells was $43,250 (Definite Plan Report, p. 96). Adjusted for inflation using the Consumer Price Index, $43,250 in 1955 was equivalent to approximately $246,000 in 1995 and $326,000 in 2006.

135. It is stated in paragraph 11.a. of the Motion to Proceed, "During 1995 through 2006, A&B has expended approximately $152,000 per year for well rectification efforts to divert water from the declining aquifer." The reported $152,000 annual expenditure for well rectification efforts associated with water level decline represents 47% to 62% of the original replacement cost estimate for irrigation wells after adjusting for inflation. The additional expenditure that A&B attributes to water level decline is comparable to the original cost estimate for maintaining the production wells.

136. A&B provided cost data to the Department on Wednesday, January 23, 2008 in the form of several spreadsheets. A&B indicated that the spreadsheets track expenditures which

have resulted from water level declines in the ESPA exclusive of the costs for routine operation and maintenance and power consumption. The spreadsheets include cost data for power, well and pump rehabilitation, and conveyance system efficiency improvements. Given when the document was submitted and the time constraints under which this order must be issued, the Department did not fully develop findings regarding this information.

Use of Hydrogeologic Consultants

137. In paragraph "r." of the *Order Requesting Information*, the Department requested "U.S. Bureau of Reclamation, U.S. Geological Survey, and private consulting reports dealing with the hydrogeologic setting and/or the design operation, and modification of the Unit B irrigation system." In the response, A&B provided: 1) The A&B Scenario (May 2005); 2) Crosthwaite and Scott (1956); 3) Enhanced Snake Plain Aquifer Model Final Report and Figures (July 2006); 4) Hydrology and Digital Simulation of the Regional Aquifer System, Eastern Snake River Plain, Idaho (1992); 5) Modeling the Impact of New Groundwater Pumping in Basin 36, on Groundwater Levels in the A&B Irrigation District (Draft – December, 2003); 6) Mundorff and others (1964); 7) Stearns and others (1938); 8) HDR Technical Memorandum (September 2004); and 9) A&B Irrigation District Groundwater Evaluation (May 1998).

138. The reports by Crosthwaite and Scott (1956) and the USBR Hydrology Appendix (1985) are the most recent hydrogeologic reports of significance that are site-specific to the District.

139. Since the USBR Hydrology Appendix (1985), which has been previously discussed, there has not been a comprehensive treatment of site-specific hydrogeologic conditions that incorporates the results of drilling and well pumping that could be used to better define the hydro-stratigraphic profile, presence and significance of sedimentary interbeds, and definition of water-producing zones. Further analysis of recent data could increase the detail in geologic cross sections and of aquifer properties including individual well yields. There has not been a report that discusses drilling methods in light of caving sediments and the requirement that the borehole diameter be successively reduced every time a new string of casing is emplaced to hold back the caving sediments. This information, however, should be considered when designing and planning for drilling new wells or deepening existing wells.

140. Part of the information discussed above was included in Recommended Investigation Tasks of the HDR Technical Memorandum (September 2004). Task 3 of the Memorandum states "Compile information on aquifer hydraulic properties from the A&B Irrigation District aquifer pumping tests and from nearby wells. Compile regional information on the ESRPA hydraulic properties including the effects of geologic structure on aquifer transmissivity, water use and aquifer response. Develop graphical figures showing the distribution of aquifer transmissivity for the ESRPA and the A&B District."

141. According to A&B representatives, A&B does not currently use a consultant for the design, drilling, and installation of wells. Instead, the design is a collaborative effort between

A&B and local well drilling contractors. A&B representatives also stated that well deepening efforts are focused primarily on obtaining adequate pump submergence.

142. The January 2008 Department report recommended that information is needed relative to specific water producing zones and estimated yield amounts of these zones for each production well. This information is needed for the original drilling depth and any succeeding well deepening efforts.

CONCLUSIONS OF LAW

1. All findings of fact in this order later deemed to be conclusions of law are hereby made as conclusions of law.

2. Idaho Code § 42-607 provides that the following shall apply during times of scarcity of water when it is necessary to distribute water between water rights in a water district created and operating pursuant to chapter 6, title 42, Idaho Code, in accordance with the priority of those rights:

> [A]ny person or corporation claiming the right to the use of the waters of the stream or water supply comprising a water district, but not owning or having the use of an adjudicated or decreed right therein, or right therein evidenced by permit or license issued by the department of water resources, shall, for the purposes of distribution during the scarcity of water, be held to have a right subsequent to any adjudicated, decreed, permit, or licensed right in such stream or water supply . . . .

3. Idaho Code § 42-602, addressing the authority of the Director over the supervision of water distribution within water districts, provides:

> The director of the department of water resources shall have direction and control of the distribution of water from all natural water sources within a water district to the canals, ditches, pumps and other facilities diverting therefrom. Distribution of water within water districts created pursuant to section 42-604, Idaho Code, shall be accomplished by watermasters as provided in this chapter and supervised by the director. The director of the department of water resources shall distribute water in water districts in accordance with the prior appropriation doctrine. The provisions of chapter 6, title 42, Idaho Code, shall apply only to distribution of water within a water district.

4. Idaho Code § 42-603, which grants the Director authority to adopt rules governing water distribution, provides as follows:

> The director of the department of water resources is authorized to adopt rules and regulations for the distribution of water from the streams, rivers, lakes, ground water and other natural water sources as shall be necessary to carry out the laws in accordance with the priorities of the rights of the users thereof. Promulgation of rules and regulations shall be in accordance with the procedures of chapter 52, title 67, Idaho Code.

In addition, Idaho Code § 42-1805(8) provides the Director with authority to "promulgate, adopt,

modify, repeal and enforce rules implementing or effectuating the powers and duties of the department."

5. It is the duty of a watermaster, acting under the supervision of the Director, to distribute water from the public water supplies within a water district among those holding rights to the use of the water in accordance with the prior appropriation doctrine as implemented in Idaho law, including applicable rules promulgated pursuant to the Idaho Administrative Procedure Act. *See* Idaho Code § 42-607.

6. Water District Nos. 100, 110, 120, 130, and 140 were created to provide for the administration of ground water rights in areas overlying the ESPA, pursuant to the provisions of chapter 6, title 42, Idaho Code, for the protection of prior surface and ground water rights.

7. Additionally, watermasters for those districts were appointed by the Director to perform the statutory duties of a watermaster in accordance with guidelines, direction, and supervision provided by the Director. The Director has given specific directions to the watermasters to curtail illegal diversions, measure and report diversions, and curtail out-of-priority diversions determined by the Director to be causing injury to senior priority water rights that are not covered by a stipulated agreement or a mitigation plan approved by the Director.

8. Issues relating to the administration of ground water rights diverting from a common water source on the Eastern Snake Plain area have been a continuing point of debate for more than two decades. The progress made in adjudicating the ground water rights in the Snake River Basin Adjudication and the development of the reformulated ground water model for the ESPA used by the Department to simulate the effects of ground water depletions within the ESPA and on hydraulically-connected tributaries and reaches of the Snake River now allow for the State to better address this issue.

9. Injury to senior priority water rights by diversion and use of junior priority ground water rights occurs when diversion under the junior rights intercept a sufficient quantity of water to interfere with the exercise of the senior water right for the authorized beneficial use. Because the amount of water necessary for beneficial use can be less than decreed or licensed quantities, it is possible for a senior to receive less than the decreed or licensed amount, but not suffer injury. Thus, a senior water right holder cannot demand that junior ground water right holders diverting water from a hydraulically-connected aquifer be required to make water available for diversion unless that water is necessary to accomplish an authorized beneficial use.

10. In its recent decision in *American Falls Reservoir District No. 2 v. Idaho Department of Water Resources*, the Idaho Supreme Court upheld the facial constitutionality of the Department's CM Rules. 143 Idaho 862, 884 154 P.3d 433, 455 (2007). CM Rule 20.02 and 20.03 incorporate the principles of reasonable use and optimum development of water resources established by the legislature in the Ground Water Act.

11. In *American Falls*, the Court acknowledged the complexities of conjunctive administration:

> Typically, the integration of priorities means limiting groundwater use for the benefit of surface water appropriators because surface water generally was developed before groundwater. The physical complications of integrating priorities often have parallels in the administration of solely surface water priorities. The complications are just more frequent and dramatic when groundwater is involved.
>
> . . . .
>
> When water is diverted from a surface stream, the flow is directly reduced, and the reduction is soon felt by downstream users unless the distances involved are great. When water is withdrawn from an aquifer, however, the impact elsewhere in the basin or on a hydrologically connected stream is typically much slower.

American Falls, 143 Idaho at , 154 P.3d at 448 citing Douglas L. Grant, *The Complexities of Managing Connected Surface and Ground Water Under the Appropriation Doctrine*, 22 Land & Water L.Rev. 63, 73, 74 (1987).

12. The fact that A&B's delivery call does not implicate surface water does not mean that its call is less complex. CM Rules 30 and 40 specifically group calls together that are "made by the holders of senior-priority surface or ground water rights against the holders of junior-priority ground water rights . . . ." *See also* IDAPA 37.03.11.010.03. A delivery call by the holder of a senior-priority ground water right against the holders of junior-priority ground water rights is therefore just as complex as a delivery call by the holder of a senior-priority surface water right against the holders of junior-priority ground water rights, if not more so.

13. In accordance with chapter 52, title 67, Idaho Code, the Department adopted rules regarding the conjunctive management of surface and ground water effective October 7, 1994. IDAPA 37.03.11. The CM Rules prescribe procedures for responding to a delivery call made by the holder of a senior priority surface or ground water right against junior priority ground water rights in an area having a common ground water supply. IDAPA 37.03.11.001.

14. CM Rule 10, IDAPA 37.03.11.010, contains the following pertinent definitions:

> **01. Area Having A Common Ground Water Supply**. A ground water source within which the diversion and use of ground water or changes in ground water recharge affect the flow of water in a surface water source or within which the diversion and use of water by a holder of a ground water right affects the ground water supply available to the holders of other ground water rights.
>
> **03. Conjunctive Management**. Legal and hydrologic integration of administration of the diversion and use of water under water rights from surface and ground water sources, including areas having a common ground water supply.
>
> **04. Delivery Call**. A request from the holder of a water right for administration of water rights under the prior appropriation doctrine.
>
> **14. Material Injury**. Hindrance to or impact upon the exercise of a water right caused by the use of water by another person as determined in accordance with Idaho Law, as set forth in Rule 42.

16. Person. Any individual, partnership, corporation, association, governmental subdivision or agency, or public or private organization or entity of any character.

17. Petitioner. Person who asks the Department to initiate a contested case or to otherwise take action that will result in the issuance of an order or rule.

20. Respondent. Persons against whom complaints or petitions are filed or about whom investigations are initiated.

15. As used herein, the term "injury" means "material injury" as defined by CM Rule 10.14.

16. CM Rule 20, IDAPA 37.03.11.020, contains the following pertinent statements of purpose and policies for conjunctive management:

01. Distribution Of Water Among The Holders Of Senior And Junior-Priority Rights. The rules apply to all situations in the State where the diversion and use of water under junior-priority ground water rights either individually or collectively causes material injury to uses of water under senior-priority water rights. The rules govern the distribution of water from ground water sources and areas having a common ground water supply.

02. Prior Appropriation Doctrine. These rules acknowledge all elements of the prior appropriation doctrine as established by Idaho law.

04. Delivery Calls. These rules provide the basis and procedure for responding to delivery calls made by the holder of a senior-priority surface or ground water right against the holder of a junior-priority ground water right. The principle of the futile call applies to the distribution of water under these rules. Although a call may be denied under the futile call doctrine, these rules may require mitigation or staged or phased curtailment of a junior-priority use if diversion and use of water by the holder of the junior-priority water right causes material injury, even though not immediately measurable, to the holder of a senior-priority surface or ground water right in instances where the hydrologic connection may be remote, the resource is large and no direct immediate relief would be achieved if the junior-priority water use was discontinued.

05. Exercise Of Water Rights. These rules provide the basis for determining the reasonableness of the diversion and use of water by both the holder of a senior-priority water right who requests priority delivery and the holder of a junior-priority water right against whom the call is made.

17. CM Rule 40, IDAPA 37.03.11.040, sets forth the following procedures to be followed for responses to calls for water delivery made by the holders of senior priority surface or ground water rights against the holders of junior priority ground water rights from areas having a common ground water supply in an organized water district:

01. Responding To A Delivery Call. When a delivery call is made by the holder of a senior-priority water right (petitioner) alleging that by reason of diversion of water by the holders of one or more junior-priority ground water rights (respondents) from an area having a

common ground water supply in an organized water district the petitioner is suffering material injury, and upon a finding by the Director as provided in Rule 42 that material injury is occurring, the Director, through the watermaster, shall:

a. Regulate the diversion and use of water in accordance with the priorities of rights of the various surface or ground water users whose rights are included within the district, provided, that regulation of junior-priority ground water diversion and use where the material injury is delayed or long range may, by order of the Director, be phased-in over not more than a five-year period to lessen the economic impact of immediate and complete curtailment; or

b. Allow out-of-priority diversion of water by junior-priority ground water users pursuant to a mitigation plan that has been approved by the Director.

02. Regulation Of Uses Of Water By Watermaster. The Director, through the watermaster, shall regulate use of water within the water district pursuant to Idaho law and the priorities of water rights as provided in section 42-604, Idaho Code, and under the following procedures:

a. The watermaster shall determine the quantity of surface water of any stream included within the water district which is available for diversion and shall shut the headgates of the holders of junior-priority surface water rights as necessary to assure that water is being diverted and used in accordance with the priorities of the respective water rights from the surface water source.

b. The watermaster shall regulate the diversion and use of ground water in accordance with the rights thereto, approved mitigation plans and orders issued by the Director.

c. Where a call is made by the holder of a senior-priority water right against the holder of a junior-priority ground water right in the water district the watermaster shall first determine whether a mitigation plan has been approved by the Director whereby diversion of ground water may be allowed to continue out of priority order. If the holder of a junior-priority ground water right is a participant in such approved mitigation plan, and is operating in conformance therewith, the watermaster shall allow the ground water use to continue out of priority.

d. The watermaster shall maintain records of the diversions of water by surface and ground water users within the water district and records of water provided and other compensation supplied under the approved mitigation plan which shall be compiled into the annual report which is required by section 42-606, Idaho Code.

e. Under the direction of the Department, watermasters of separate water districts shall cooperate and reciprocate in assisting each other in assuring that diversion and use of water under water rights is administered in a manner to assure protection of senior-priority water rights provided the relative priorities of the water rights within the separate water districts have been adjudicated.

03. Reasonable Exercise Of Rights. In determining whether diversion and use of water under rights will be regulated under Rules 40.01.a., or 40.01.b., the Director shall consider whether the petitioner making the delivery call is suffering material injury to a senior-priority water right and is diverting and using water efficiently and without waste, and in a manner

consistent with the goal of reasonable use of surface and ground waters as described in Rule 42. The Director will also consider whether the respondent junior-priority water right holder is using water efficiently and without waste.

04. Actions Of The Watermaster Under A Mitigation Plan. Where a mitigation plan has been approved as provided in Rule 42, the watermaster may permit the diversion and use of ground water to continue out of priority order within the water district provided the holder of the junior-priority ground water right operates in accordance with such approved mitigation plan.

18. The Petition and Motion to Proceed filed with the Director will be treated pursuant to CM Rule 40.

19. In accordance with CM Rule 40, curtailment of junior priority ground water rights may only occur if the use of water under senior priority rights is consistent with CM Rule 20.03 and injury is determined to be caused by the exercise of junior priority rights. Factors that will be considered in determining whether junior priority ground water rights are causing injury to the senior priority right held by the USBR for the benefit of A&B are set forth in CM Rule 42 as follows:

01. Factors. Factors the Director may consider in determining whether the holders of water rights are suffering material injury and using water efficiently and without waste include, but are not limited to, the following:

a. The amount of water available in the source from which the water right is diverted.

b. The effort or expense of the holder of the water right to divert water from the source.

c. Whether the exercise of junior-priority ground water rights individually or collectively affects the quantity and timing of when water is available to, and the cost of exercising, a senior-priority surface or ground water right. This may include the seasonal as well as the multi-year and cumulative impacts of all ground water withdrawals from the area having a common ground water supply.

d. If for irrigation, the rate of diversion compared to the acreage of land served, the annual volume of water diverted, the system diversion and conveyance efficiency, and the method of irrigation water application.

e. The amount of water being diverted and used compared to the water rights.

f. The existence of water measuring and recording devices.

g. The extent to which the requirements of the holder of a senior-priority water right could be met with the user's existing facilities and water supplies by employing reasonable diversion and conveyance efficiency and conservation practices; provided, however, the holder of a surface water storage right shall be entitled to maintain a reasonable amount of carry-over storage to assure water supplies for future dry years. In determining a reasonable amount of carry-over storage water, the Director shall consider the average annual rate of fill of storage reservoirs and the average annual carry-over for prior comparable water conditions and the projected water supply for the system.

h. The extent to which the requirements of the senior-priority surface water right could be met using alternate reasonable means of diversion or alternate points of diversion, including the construction of wells or the use of existing wells to divert and use water from the area having a common ground water supply under the petitioner's surface water right priority.

20. In its Petition and Motion to Proceed, A&B asserts that:

> By reason of the diversions of water by junior ground water appropriators located within the E[SPA], the Petitioner is suffering material injury as a result of the lowering of the ground water pumping level within the E[SPA] by an average of twenty (20) feet since 1959, with some areas of the Aquifer lowered in excess of forty (40) feet since 1959, reducing the diversions of A&B . . . to nine hundred seventy-four (974) cfs, a reduction of one hundred twenty-six (126) cfs from the diversion rate provided in the water right referenced above.

Petition at 2, ¶ 6.

> A&B . . . moves the Director to lift the stay agreed to by the parties . . . for the delivery of ground water . . . and that said Director proceed, without delay, in the administration of the E[SPA] in such a manner as to provide ground water to A&B under its ground water rights that are being interfered with and materially injured by junior ground water appropriators in the ESPA . . . .

Motion to Proceed at 1.

21. Contrary to the assertion of A&B, and as previously stated, depletion does not equate to material injury. Material injury is a highly fact specific inquiry that must be determined in accordance with CM Rule 42; therefore, the establishment of injury is a threshold determination that must be established by prima facie evidence.

22. Ground water declines across the ESPA and within the District boundaries have occurred because of conversion from application by gravity flood/furrow irrigation to sprinkler systems, a sequence of prolonged drought, and ground water diversions for irrigation and other consumptive purposes. According to the USBR in its report entitled Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USRB 1985), the major influence upon ground water level declines and recoveries is climate. The declines, according to the USBR, are further aggravated by changes in irrigation practices.

23. In its Motion to Proceed, A&B asserts that 0.75 of a miner's inch is "the minimum amount necessary to irrigate lands within A&B during the peek (sic) periods when irrigation water is most needed." *Motion to Proceed* at 7. However, the USBR, which developed the A&B project, stated in a 1985 report that 0.75 of a miner's inch is the maximum rate of delivery. Based on the USBR's reported maximum rate of delivery, and A&B's statement that it is pumping 970 cfs, adjusted for conveyance loss, within the District's 62,604.3 acre boundary for water right no. 36-2080, on-farm delivery is 0.74 of a miner's inch per acre. On-farm delivery of 0.74 of a miner's inch is more than 98% of the stated maximum rate of delivery

by the USBR. The difference of less than 2% is within reasonable margins of error for measurement. Because 970 cfs is near the maximum authorized rate of diversion, there is a sufficient quantity of water to irrigate its 62,604.3-acre place of use. Moreover, A&B's own data shows that its inability to irrigate some portions of that place is attributable to an inefficient well and delivery system. IDAPA 37.03.11.042.01.b, g, and h.

24. A&B has successfully implemented a number of measures that have reduced the amount of water required to irrigate the 62,604.3 acres under water right no. 36-2080. These include: 1) conversion of approximately 1,400 acres from ground water irrigation to surface water irrigation; 2) reduction of conveyance losses from approximately 8 percent to approximately 3 percent; 3) conversion of 96 percent of the irrigation systems to sprinkler; and 4) near completion of a drain well elimination program which provides for re-use of storm water and waste water for the irrigation of crops. In combination, these water efficiency measures have more than compensated for the 7.7 percent decrease in peak monthly well production since 1994. IDAPA 37.03.11.042.d and e.

25. The total average decrease in peak monthly well production of 4,206 acre-feet between the periods 1963-1982 and 1994-2007 (7.7 percent) is attributable to increased irrigation system efficiencies described in prior findings and the fact that A&B added nearly 4,100 acres of irrigation development beyond the 62,604.3 acres licensed under its calling water right, 36-2080. *Id.*

26. Based on the described historical irrigation enlargements and increased irrigation efficiencies, it is reasonable to conclude that had A&B limited its ground water use to irrigation of the 62,604.3 acres under water right no. 36-2080, or if it had at least not developed nearly 4,100 additional acres of irrigation, mean annual ground water use between 1982 and 2007 would be lower than the mean annual use actually recorded for that period. *Id.*

27. The Department performed an analysis of 2006 evapotranspiration data produced during 2007 using the METRIC evapotranspiration model and digital data collected by the Landsat satellite system. Patterns of ET for acreage identified by A&B as water-short were compared to that of surrounding areas. The results show that the locations identified by A&B as being short of water were not short of water.

28. A&B has not adopted formal standards for the design and installation of wells. The information provided to the Department indicates that A&B does not use a consultant for the design and installation of wells. Instead, the design is a collaborative effort between A&B staff and whichever one of the local well drilling contractors happens to be available at the time. Because A&B has difficulty securing the same drilling contractor, the district uses approximately five or six contractors, based on availability.

29. While cable tool continues to be used for deepening many of the existing wells and drilling new wells, this technology is not well suited for use in the geological environment in the southwestern portion of the District because it requires that the borehole diameter be successively reduced every time a new string of casing is emplaced to hold back the caving sediments. Eventually, the diameter is not sufficient to emplace a large diameter pump, which is

required to have the combination of high pump lift and high pumping rate. Failure to use appropriate technology artificially limits access to available water supplies and is not consistent with the requirement for the appropriator to use reasonable access. IDAPA 37.03.11.020.03, .040.03; *Schodde v. Twin Falls Land & Water Co.*, 224 U.S. 107, 119 (1912).

30. As indicated in the Findings of Fact, failure to take geology into account is a primary contributor to A&B's reduced pumping yields, not depletions by junior-priority ground water users. Hydrogeology is critical to the siting of wells. If A&B employed appropriate well drilling techniques for the geological environment in which it is located and sited its wells based upon a comprehensive hydrogeologic study of its service area, water would be available to supply its well production and on-farm deliveries. *Id.*

31. There has not been a comprehensive evaluation of site-specific hydrogeologic conditions that incorporates the results of drilling and well pumping that could be used to better define the spatial distribution of sedimentary interbeds and water-producing zones since the efforts undertaken by the USBR in 1985 and Crosthwaite and Scott in 1956.

32. Drilling, well yield, and well rehabilitation problems experienced by A&B have largely been confined to the southwest portion of the District. This area was not characterized prior to project development because ground water irrigation development was not anticipated in that vicinity. The potential for successful well deepening is relatively low in the southwest portion of the project because of the higher proportion of sedimentary interbeds. The southwest area has been noted for its lack of productivity since 1948.

33. Using data provided by A&B, the average depth of penetration beneath the water table for the original production wells drilled in the 1950s was inadequate. Deepening of many of the wells was undertaken before the project was completed, and about one-half of the wells were deepened by 1984.

34. Well deepening efforts at A&B are focused primarily on obtaining adequate pump submergence. Not targeting interflow zones or other high productivity aquifer intervals is inconsistent with reasonable well drilling standards. IDAPA 37.03.11.042.a, b, and g.

35. The use of drainage wells raised concerns for water quality. As a result, A&B and the USBR reduced or eliminated the use of drainage wells wherever possible to reduce the potential for contamination of the aquifer and to conform to compliance requirements imposed by the state of Idaho and EPA.

36. On January 23, 2008, A&B provided the Department with cost data demonstrating expenditures that it has incurred associated with water level declines. The costs incurred by A&B are not unreasonable when compared to the original cost estimate for maintaining the production wells and the reasonable exercise of its water right. IDAPA 37.03.11.020.03, .040.03; *Schodde v. Twin Falls Land & Water Co.*, 224 U.S. 107, 119 (1912).

37. Based on the information submitted by A&B, the Department's review of that information, and independent investigation by Department staff of a wide variety of materials

and reports herein identified, it is the Director's conclusion that junior ground water right holders are not causing material injury to water right no. 36-2080.

38. Because the threshold determination of material injury has not been found under the CM Rules, it is not necessary to consider other legal issues, which include, but are not limited to application of the Ground Water Act, codified at Idaho Code §§ 42-226 through 42-237g.

Creation of a Ground Water Management Area

39. According to its Petition and Motion to Proceed, A&B requests the creation of a ground water management area:

> The ESPA is a ground water basin that is approaching, or has reached, the conditions of a critical ground water area. It is therefore required under Idaho Code § 42-233b that the ESPA, or such designated part thereof, should be designated by the Director as a "ground water management area."

Motion to Proceed at 11, ¶ 12.e. *See also Petition* at 3.

40. Idaho Code § 42-233b provides the Director with the authority to create ground water management areas:

> "Ground water management area" is defined as any ground water basin or designated part thereof which the director of the department of water resources has determined may be approaching the conditions of a critical ground water area. Upon designation of a ground water management area the director shall publish notice in two (2) consecutive weekly issues of a newspaper of general circulation in the area.
>
> When a ground water management area is designated by the director of the department of water resources, or at any time thereafter during the existence of the designation, the director may approve a ground water management plan for the area. The ground water management plan shall provide for managing the effects of ground water withdrawals on the aquifer from which withdrawals are made and on any other hydraulically connected sources of water.
>
> Applications for permits made within a ground water management area shall be approved by the director only after he has determined on an individual basis that sufficient water is available and that other prior water rights will not be injured.
>
> The director may require all water right holders within a designated water management area to report withdrawals of ground water and other necessary information for the purpose of assisting him in determining available ground water supplies and their usage.
>
> The director, upon determination that the ground water supply is insufficient to meet the demands of water rights within all or portions of a water management area, shall order those water right holders on a time priority basis, within the area determined by the director, to cease or reduce withdrawal of water until such time as the director determines there is sufficient ground water. Such order shall be given only before September 1 and shall be effective for the growing season during the year following the date the order is given.

41. Since water districts created pursuant to chapter 6, title 42, Idaho Code, are in place across all of the ESPA, no additional relief to A&B would be provided for through the creation of a ground water management area encompassing all of the ESPA. Moreover, A&B is benefited by administration of junior priority ground water rights through water districts, as opposed to a ground water management area, because the Director, to the extent that he finds material injury, may order curtailment without following the notice procedure described in Idaho Code § 42-233b: "Such order shall be given only before September 1 and shall be effective for the growing season during the year *following* the date the order is given." Idaho Code § 42-233b (emphasis added).

ORDER

The Director enters the following Order in response to the Petition and Motion to Proceed for the reasons stated in the foregoing Findings of Fact and Conclusions of Law.

IT IS HEREBY ORDERED that the delivery call made by the A&B Irrigation District through its July 26, 1994 Petition for Delivery Call and its March 16, 2007 Motion to Proceed, which lifted the May 1, 1995 stay of the Petition for Delivery Call, is hereby DENIED.

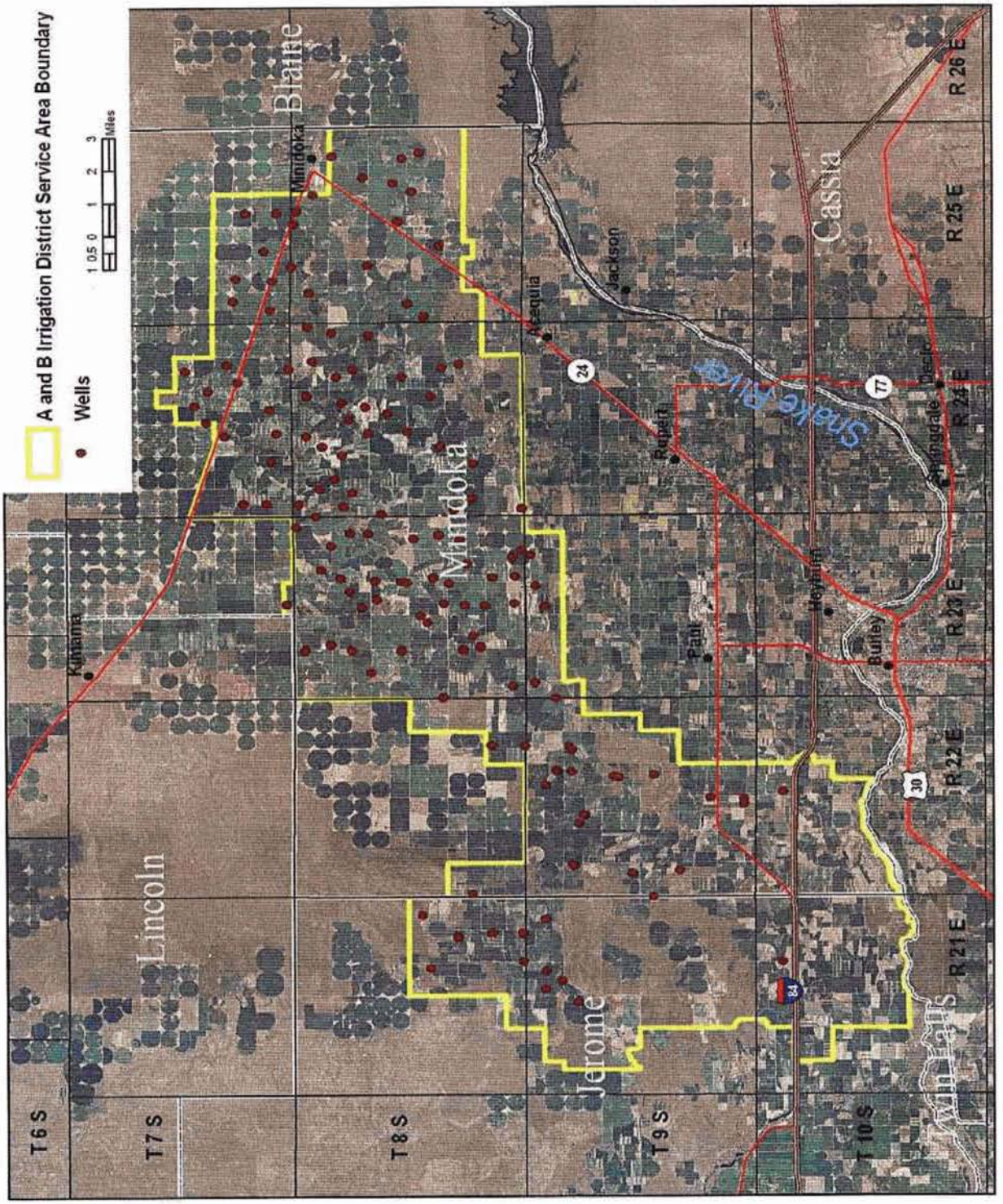
IT IS FURTHER ORDERED that the request to designate the Eastern Snake Plain Aquifer as a Ground Water Management Area is DENIED.

IT IS FURTHER ORDERED that this is a final order of the agency. Any party may file a petition for reconsideration of this final order within fourteen (14) days of the service date of this order. Any person aggrieved by this decision shall be entitled to a hearing before the Director to contest the action taken provided the person files with the Director, within fifteen (15) days after receipt of written notice of the order, or receipt of actual notice, a written petition stating the grounds for contesting the action and requesting a hearing. All requests for relief are subsumed by and will be addressed through the May 13, 2008 hearing, which shall be presided over by independent hearing officer Gerald F. Schroeder. The hearing shall be in accordance with the provisions of chapter 52, title 67, Idaho Code, and the Rules of Procedure of the Department, IDAPA 37.01.01. Judicial review of any final order of the Director issued following the hearing may be had pursuant to Idaho Code § 42-1701A(4).

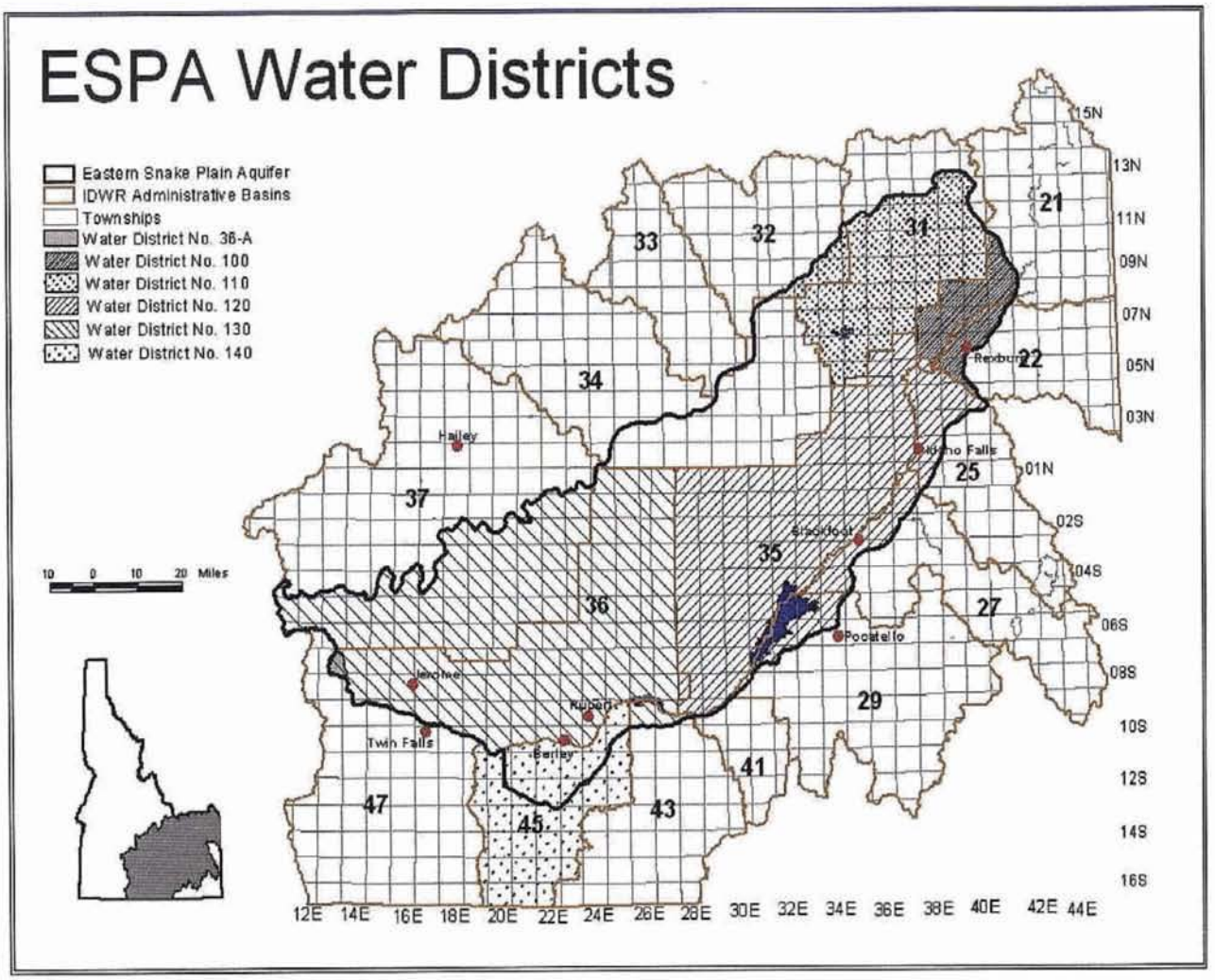
DATED this 29th day of January 2008.

DAVID R. TUTHILL, JR.
Director

ATTACHMENT A



ATTACHMENT B



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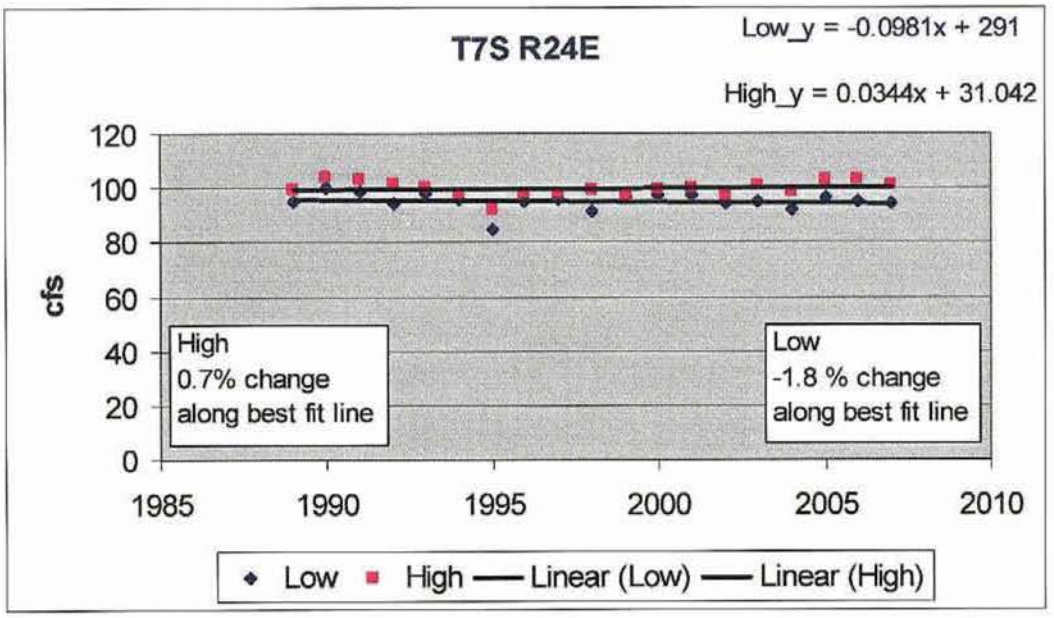

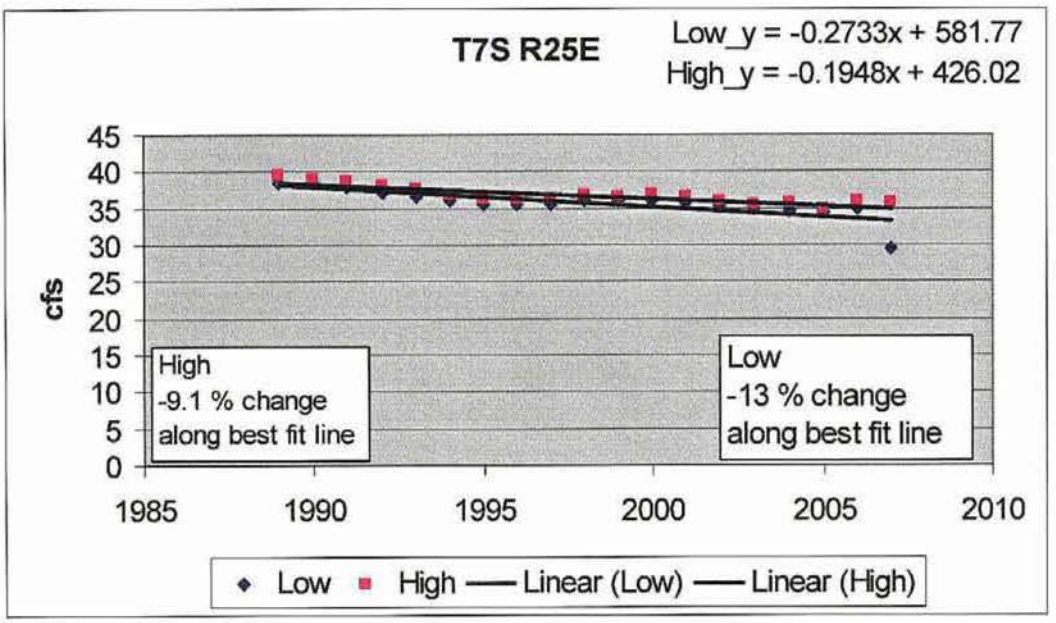

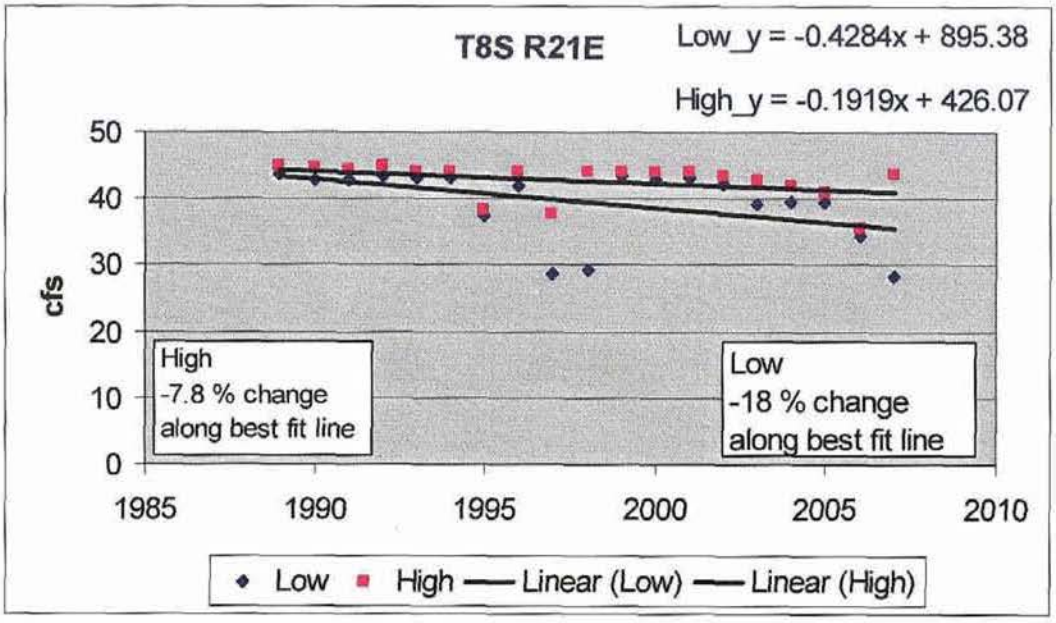
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1990
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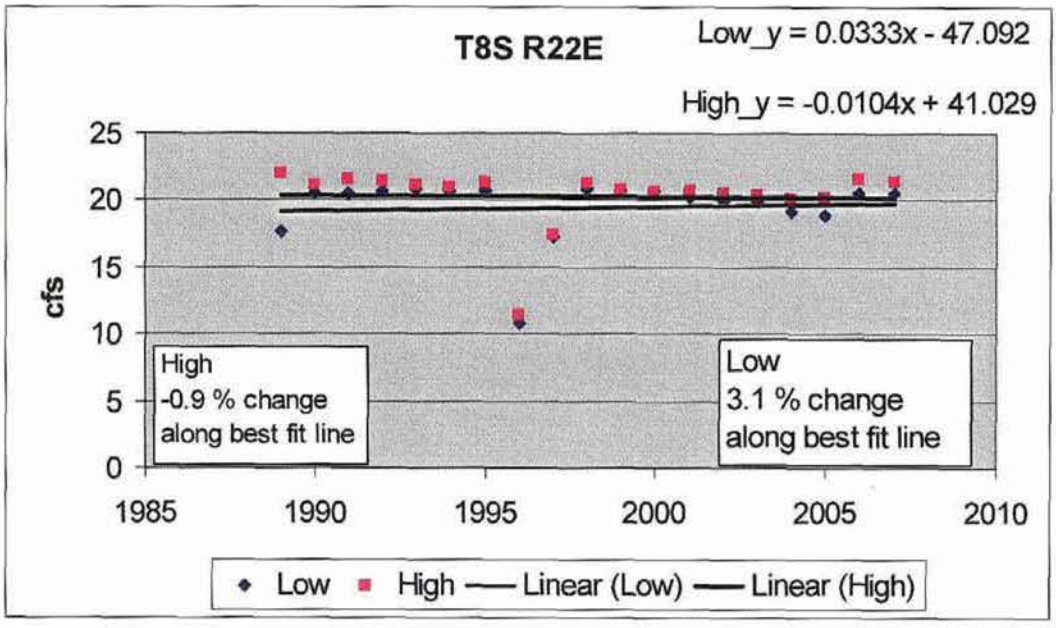
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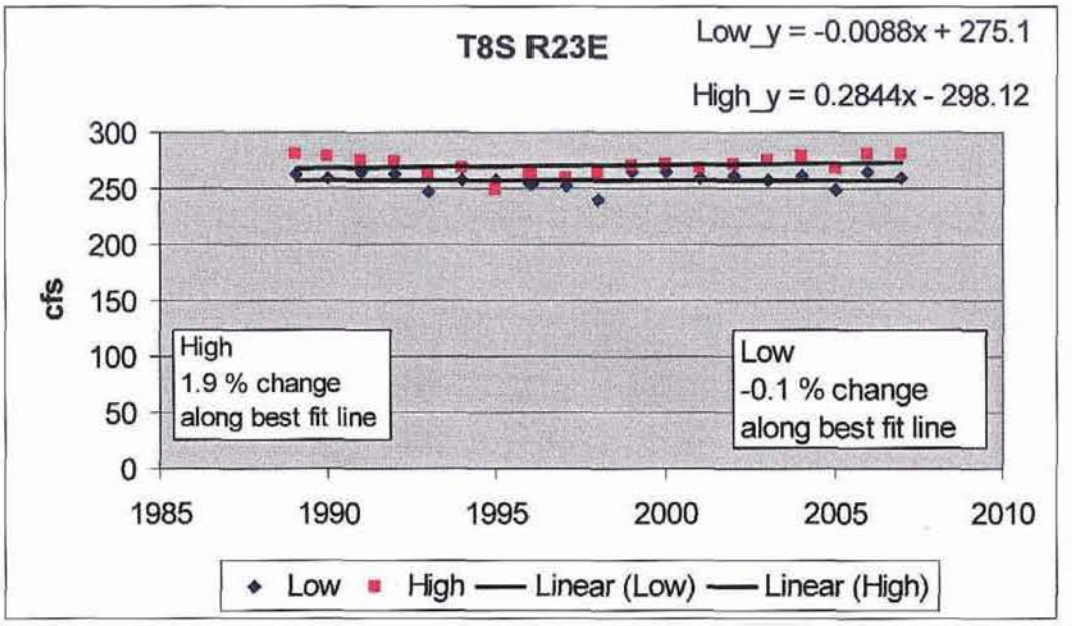
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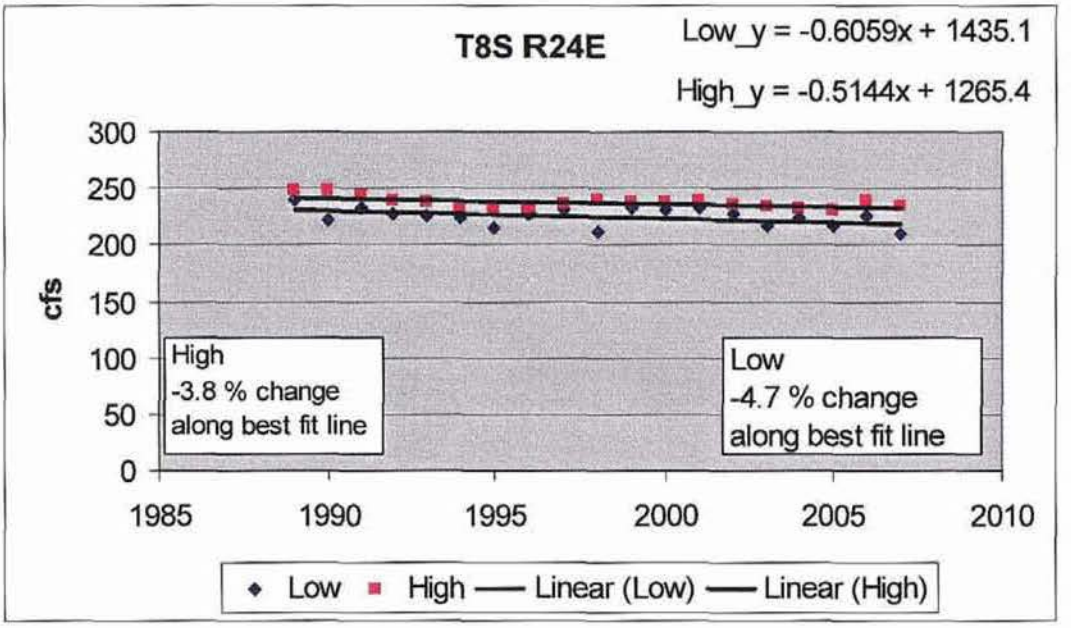
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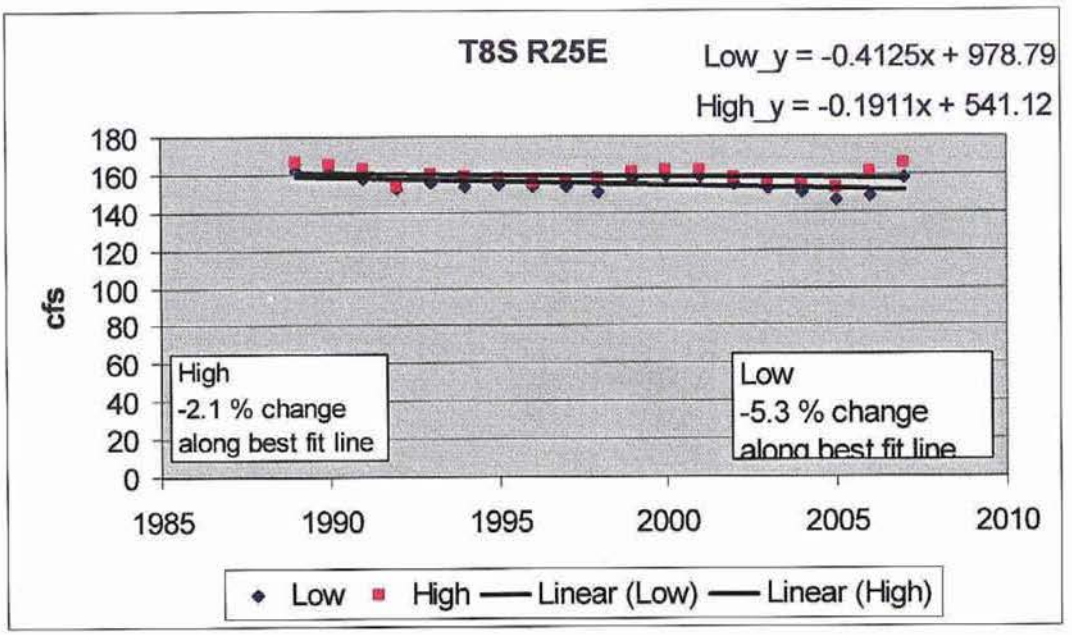
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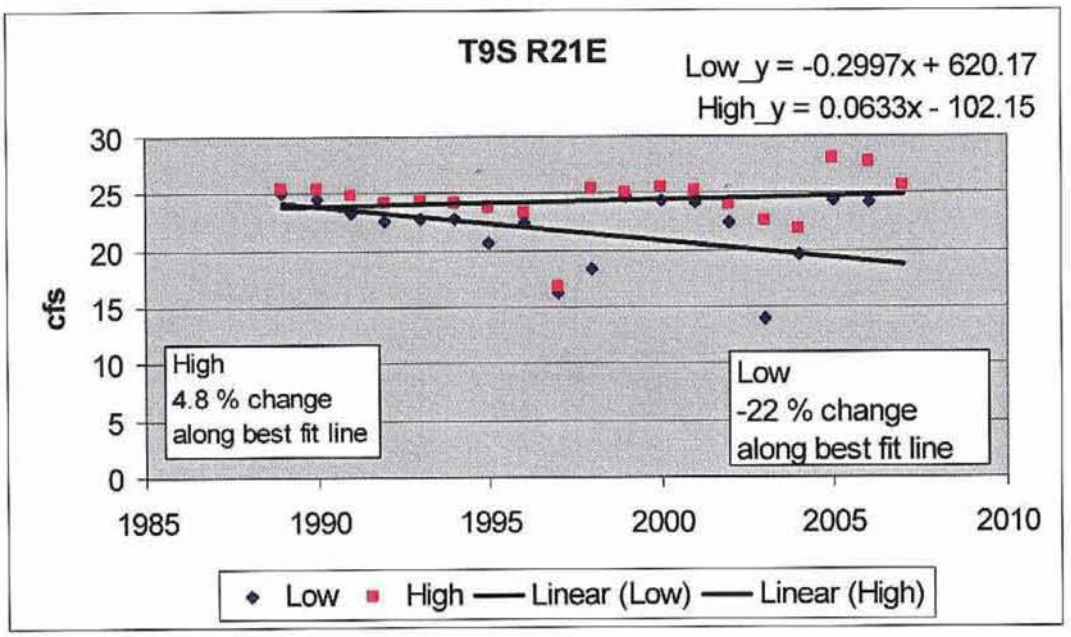
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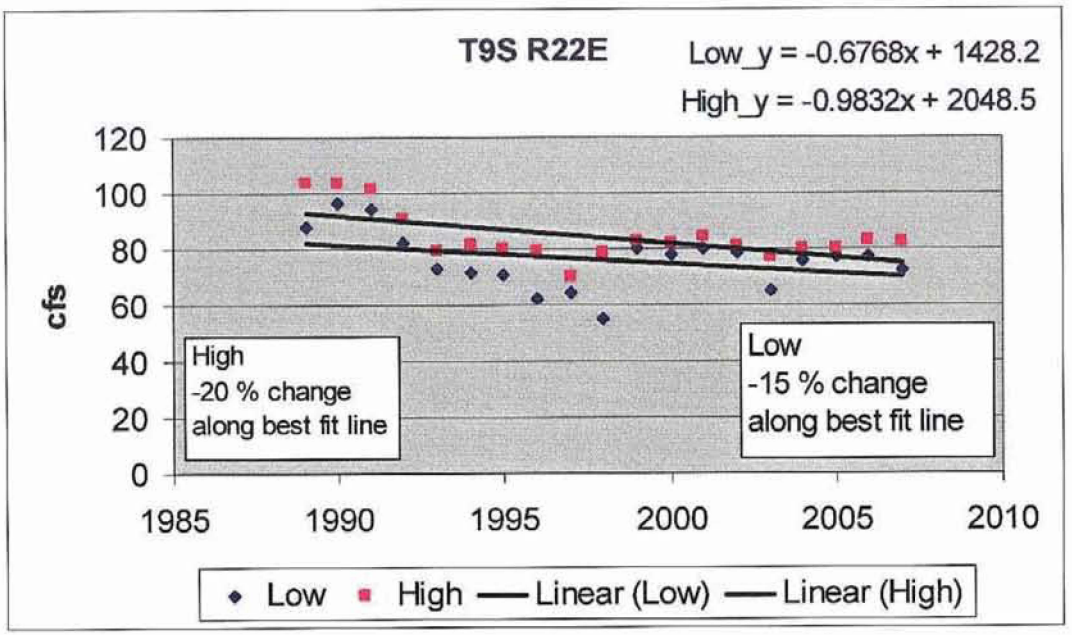
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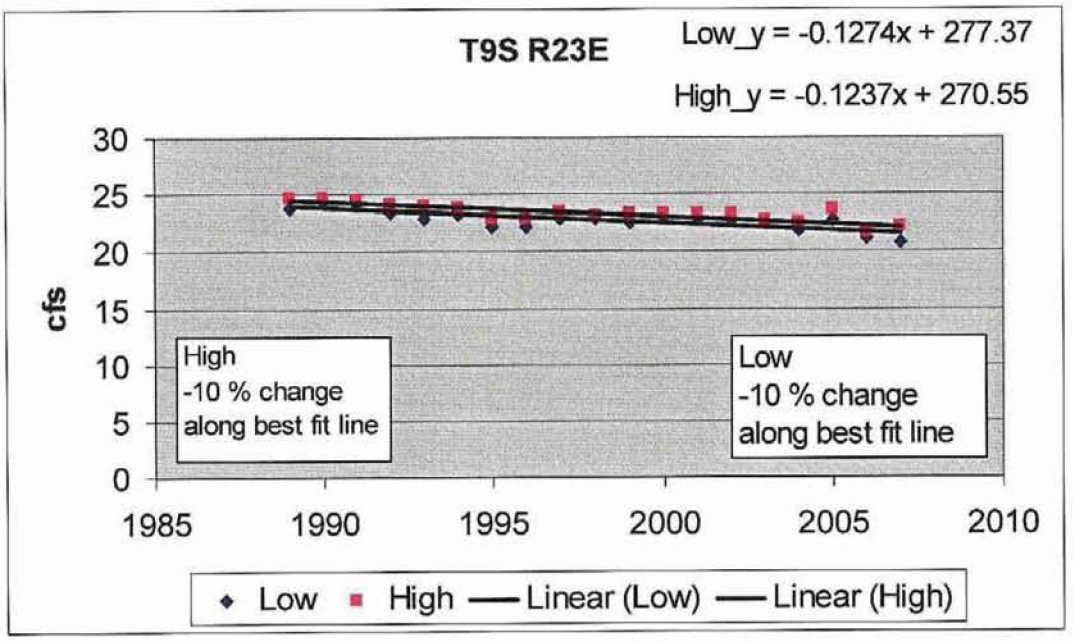
Linear (High)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High
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Linear (High)

CERTIFICATE OF SERVICE

I hereby certify that I served a true and correct copy of the following described document on the persons listed below by mailing in the United States mail, first class, with the correct postage affixed thereto on the 29 day of January 2008.

Roger D. Ling PO Box 396 Rupert, Idaho 83350	John K. Simpson Travis L. Thompson Barker Rosholt & Simpson 113 Main Avenue West, Suite 303 P.O. Box 485 Twin Falls, ID 83303-0485
Gerald F. Schroeder Hearing Officer 3216 N. Mountain View Dr. Boise, ID 83704	City of Firth Box 37 Firth, Idaho 83236
B.J. Driscoll McGrath Meacham & Smith PLLC 414 Shoup PO Box 50731 Idaho Falls ID 83405	Michael Patterson, President Desert Ridge Farms, Inc. PO Box 185 Paul ID 83347
Randall C. Budge Racine Olson Nye Budge & Bailey PO Box 1391 201 E Center Street Pocatello ID 83204-1391	Candice M. McHugh Racine Olson Nye Budge & Bailey 101 S Capitol Suite 208 Boise ID 83702
Todd Lowder 2607 W 1200 S Sterling ID 83210	Neil and Julie Morgan 762 West Hwy 39 Blackfoot ID 83221
Charlene Patterson, President Patterson Farms of Idaho 277 N 725 Lane W Paul ID 83347	William A. Parsons Parsons Smith & Stone, LLP 137 West 13th Street PO Box 910 Burley ID 83318
A. Dean Tranmer City of Pocatello Box 4169 Pocatello ID 83201	Sarah A. Klahn White & Jankowski LLP 511 Sixteenth Street Suite 500 Denver CO 80202
Winding Brook Corporation C/o Charles W. Bryan Jr. UBS Agrivest LLC PO Box 53 Nampa ID 83653	James C. Tucker Idaho Power Company 1221 West Idaho Street Boise, ID 83702-5627
James S. Lochhead Michael A. Gheleta Brownstein Hyatt Farber Schreck P.C. 410 Seventeenth Street Suite 2200 Denver, CO 80202	City of Castleford PO Box 626 300 Main Castleford, ID 83321

F. Randall Kline PO Box 397 427 North Main St Pocatello, ID 83204	Lary S. Larson Hopkins Roden Crockett Hansen & Hoopes PLLC PO Box 51219 Idaho Falls, ID 83405-1219
Josephine P. Beeman Beeman & Associates P.C. 409 West Jefferson Street Boise, ID 83702	City of Basalt PO Box 178 Basalt, Idaho 83218
M. Jay Meyers Meyers Law Office PLLC 300 North Seventh Avenue PO Box 4747 Pocatello ID 83205	John J. Hockberger Jr. Kathleen Marion Carr Office of the Field Solicitor U.S. Department of the Interior 960 Broadway Avenue, Suite 400 Boise, ID 83706
LaDell and Sherry R. Anderson 304 N 500 W Paul ID 83347	Denise Glore, Attorney Office of Chief Counsel U.S. Department of Energy 1955 Fremont Avenue MS 1209 Idaho Falls ID 83415-1510
Mary Ann Plant 480 N 150 W Blackfoot, ID 83221	O.E. Feld & Berneta Feld 1470 S 2750 W Aberdeen, ID 83210
Jeff Feld 719 Bitterroot Drive Pocatello ID 83201	Eugene Hruza PO Box 66 Minidoka ID 83343
Jerry Rigby Rigby Andrus and Moeller 25 North Second East Rexburg, ID 83440	Robert E. Williams Fredericksen Williams Meservy & Lothspeich LLP 153 East Main Street PO Box 168 Jerome ID 83338
Gregory P. Meacham McGrath Meacham & Smith PLLC 414 Shoup Idaho Falls ID 83405	Fred & Phyllis Stewart 300 Sugar Leo Road St. George, UT 84790
Richard J. Kimmel 867N 800E Shelley, ID 83274	Steve L. Stephens City of Arco 260 Grand Avenue PO Box 736 Arco, ID 83213

Karen Wood

Karen Wood
Administrative Assistant
Idaho Department of Water Resources