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ATTORNEYS FOR THE IDAHO GROUND WATER APPROPRIATORS

BEFORE DEPARTMENT OF WATER RESOURCES

STATE OF IDAHO

IN THE MATTER OF DISTRIBUTION OF WATER TO VARIOUS WATER RIGHTS HELD BY OR FOR THE BENEFIT OF A&B IRRIGATION DISTRICT, AMERICAN FALLS RESERVOIR DISTRICT #2, BURLEY IRRIGATION DISTRICT, MILNER IRRIGATION DISTRICT, MINIDOKA IRRIGATION DISTRICT, NORTH SIDE CANAL COMPANY, AND TWIN FALLS CANAL COMPANY	**Docket No. CM-DC-2010-001** **AFFIDAVIT OF CHARLES BRENDECKE**

STATE OF COLORADO)
ss:
County of Boulder)

I, Charles M. Brendecke, have been first duly sworn under oath and do hereby depose and state as follows:

1. I am employed by AMEC, 1002 Walnut, Suite 200, Boulder, Colorado 80302. I am a Licensed Professional Engineer in Idaho, Colorado, Wyoming and Texas. I have a

Bachelor of Science degree in Civil Engineering from the University of Colorado, and Master of Science and Doctor of Philosophy Degrees in Civil Engineering from Stanford University. My education and professional experience are set forth in greater detail in the *Affidavit of Charles M. Brendecke* filed with the Department in the Matter of the Surface Water Coalition Delivery Call and is included in my prefiled direct testimony filed both in the Surface Water Coalition and the Blue Lakes and Clear Springs delivery call matters. I have been for the past several years and continue to be the lead engineer and technical consultant to IGWA and its Ground Water District Members.

2. I have reviewed the Idaho Department of Water Resource's ("Department") *Final Order Regarding Methodology for Determining Material Injury to Reasonable In-Season Demand and Reasonable Carry-Over* ("Methodology Order"), the Department's letter of April 14th, 2010, describing the projected 2010 shortfall to members of the Surface Water Coalition ("April 14th letter"), and the Department's *Order Regarding April 2010 Forecast Supply Methodology Steps 3 and 4* ("As-Applied Order") and am familiar with their contents. I have also received information provided by the Department on the data and calculations allegedly underlying these Orders, however, that information is incomplete and I cannot draw complete conclusions therefrom.

3. The As-Applied Order predicts a 2010 irrigation season water supply shortfall to American Falls Reservoir District #2 ("AFRD#2) of 27,400 acre-feet and to Twin Falls Canal Company ("TFCC") of 56,900 acre-feet. The As-Applied Order requires junior groundwater users to secure the entire amount of these predicted shortfalls, or 84,300 acre-feet, by May 13, 2010, to avoid curtailment.

4. The Department has used the Eastern Snake Plain Aquifer Model ("ESPAM") to calculate the extent of curtailment of junior groundwater irrigation use necessary to generate a volume of water equal to the predicted shortfall of 84,300 acre-feet in the near-Blackfoot to Minidoka reach of the Snake River from which members of the Surface Water Coalition ("SWC") divert water into their canal systems. The Department's modeling calculation determined that curtailment to a priority date of April 5, 1982, would generate, over time, increased reach gains of 84,361 acre-feet to the near-Blackfoot to Minidoka reach.

5. Some of the groundwater irrigation rights that would be curtailed using the April 5, 1982, priority date are outside the area of common groundwater supply defined in IDAPA 37.03.11.050.01, though they lie within the domain of the ESPAM. The Department has determined that April 5, 1982, curtailment applied only within the area of common groundwater supply would generate a volume of 77,985 acre-feet to the near-Blackfoot to Minidoka reach. Nevertheless, the 2010 Order requires junior groundwater users to provide mitigation in the amount of 84,300 acre-feet, an amount approximately 6,300 acre-feet greater than could be provided by authorized curtailment.

6. **Exhibit A** contains modeling results for the April 5, 1982, curtailment distributed by the Department. The results are shown for each Ground Water District being asked to provide mitigation. The sum of reach gains produced by curtailment in each of the Districts is 70,009 acre-feet. Nevertheless, the As-Applied Order requires junior groundwater users to provide mitigation in the amount of 84,300 acre-feet, an amount approximately 14,300 acre-feet greater than could be provided by curtailment within the Districts.

7. Based on my experience using the ESPAM and on modeling results prepared by the Department for previous orders in connection with the delivery call by the Surface Water Coalition, it is my opinion that less than 25% of the increase in reach gain that is predicted to occur from the proposed curtailment would be available for diversion by AFRD#2 and TFCC within the 2010 irrigation season. If 25% of the predicted reach gain increase were to occur within the irrigation season, the curtailment would make available approximately 20,000 acre-feet of natural flow to members of the SWC, which includes AFRD#2 and TFCC. Nevertheless, the As-Applied Order requires junior groundwater users to provide mitigation in the amount of 84,300 acre-feet, an amount approximately 64,300 acre-feet greater than would actually be made available by the curtailment.
8. The shortfall calculated in the As-Applied Order is determined without regard to the impacts of groundwater use on the water supplies of AFRD#2 and TFCC. The calculation relies solely on historical diversion records of the SWC entities and predictions of natural runoff contained in the Joint Forecast prepared by the Bureau of Reclamation and the Corps of Engineers. Depletions of Snake River flows resulting from consumption of hydraulically-connected groundwater are not used in the calculation of shortfall.
9. The shortfall calculated in the As-Applied Order does not appear to consider the beneficial effects to the water supplies of the SWC entities afforded by other, ongoing mitigation activities of groundwater users. These ongoing activities include CREP, conversions of land from groundwater to surface water supply, and managed recharge. Nor does the As-Applied Order appear to consider the beneficial effects to the water

supplies of the SWC entities resulting from extensive managed recharge undertaken in 2009 by the Idaho Water Resource Board and cooperating entities.

10. The natural flow supplies for the SWC entities derive from natural Snake River flows passing Blackfoot and from reach gains to the Snake River in the near-Blackfoot to Minidoka reach. In average and drier years there is little or no natural flow passing Blackfoot except at the peak of runoff because it is all diverted by more senior water rights above Blackfoot. At such times, only the reach gains below Blackfoot contribute natural flow to the river and to the head-gates of the SWC entities. Groundwater pumping can affect these reach gains, but cannot materially affect the natural flow passing Blackfoot during peak runoff.

11. **Exhibit B** (Hearing Exhibit 4118) shows the average monthly reach gains between Blackfoot and Neeley (these are approximately 95% of the gains to the near-Blackfoot to Minidoka reach) for the period 1912-1948 prior to the advent of groundwater development on the Eastern Snake River Plain. The peak monthly reach gain in this period averaged approximately 2,725 cubic feet per second.

12. **Exhibit C** (Hearing Exhibit 4119) shows the cumulative natural flow rights of the SWC entities. **Exhibit C** indicates that the October 11, 1900, natural flow rights of TFCC and North Side Canal Company (totaling 3,400 cfs) are sufficient to command the entire reach gain below Blackfoot. The natural flow below Blackfoot would have to be in excess of 11,000 cfs before the March 30, 1921, natural flow right of AFRD#2 would yield water.

13. **Exhibit D** (Hearing Exhibit 4161) is a planning report prepared at the time of construction of ARFD#2, then known as the "Gooding Project" or the "Gravity Extension

Division." In **Exhibit D** the authors describe (p. 25) that the project users should expect that, due to its junior natural flow priority, the project would have no natural flow in dry years and that the entire water supply of the project would be derived from storage.

14. The Joint Forecast for 2010 is for an April-July natural flow at Heise of 1.94 million acre-feet. This forecasted flow is in the bottom 7% of recorded years for April-July natural flow at Heise for the period 1911-2009. **Exhibit E** compares the 2010 Joint Forecast to the historical April-July natural flows at Heise for the period 1911-2009. Notably, the 2010 forecast is for lower natural flow than occurred in the years 1919 and 1924 cited by the authors of **Exhibit D** as years when AFRD#2 would have received little or no natural flow. Based on the foregoing facts it is my opinion that AFRD#2 would obtain no yield from its natural flow rights in 2010 regardless of the presence or absence of groundwater pumping.

15. The As-Applied Order calculates a shortfall to AFRD#2 of 27,400 acre-feet. This is predicted to occur despite the fact that the entire storage space owned by AFRD#2 (393,550 acre-feet in American Falls Reservoir) is projected to fill. The As-Applied Order essentially requires junior groundwater users to provide natural flow to AFRD#2 under conditions in which it was never expected to have natural flow and in which its water supply is unaffected by groundwater pumping.

16. The As-Applied Order calculates the shortfall to AFRD#2 and TFCC by subtracting their respective Baseline Demands (essentially historical diversions) from their predicted total supply. In this calculation the predicted total supply is net of the evaporation allocation that is assigned to storage water users in the Water District 1 water right accounting procedure. The evaporation allocation is essentially a "set aside" taken from each storage

account to cover the evaporative losses from reservoirs. Because this allocation is subtracted from the full storage account contents before determining shortfall, the methodology in the As-Applied Order essentially causes groundwater users to mitigate for the evaporation allocation. Groundwater use does not effect reservoir evaporation, and the methodology should consider the full storage account volume in the calculation of total supply available to AFRD#2 and TFCC.

Further, your Affiant saith not.

Dated: May 6, 2010.

CHARLES M. BRENDECKE

Subscribed to and sworn to before me, a Notary Public, this 6th day of May, 2010.

Notary Public for State of Colorado
Residing at 7988 Marshall St., Arvada
My commission expires 12/2/2012

CERTIFICATE OF SERVICE

I hereby certify that on this 6th day of May, 2010, I served a true and correct copy of the foregoing by delivering it to the following individuals by the method indicated below, addressed as stated:

Gary Spackman, Interim Director Idaho Department of Water Resources P.O. Box 83720 Boise, Idaho 83720-0098 Fax: 208-287-6700 gary.spackman@idwr.idaho.gov garrick.baxter@idwr.idaho.gov chris.bromley@idwr.idaho.gov	[ ] U.S. Mail [ ] Facsimile [ ] Overnight Mail [✓] Hand Delivery [✓] Email
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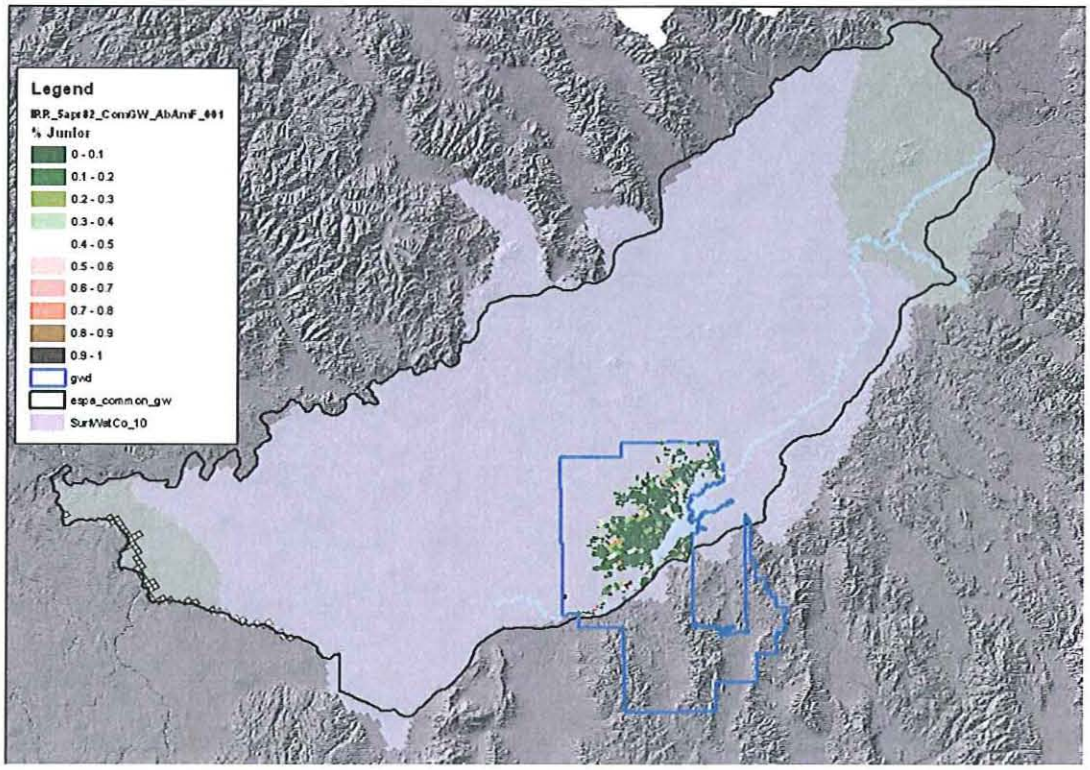
Candice Myer

EXHIBIT A

10% clip for nr Blackfoot-Minidoka, common groundwater, Abredeen-AmF GW Dist
4/5/1982

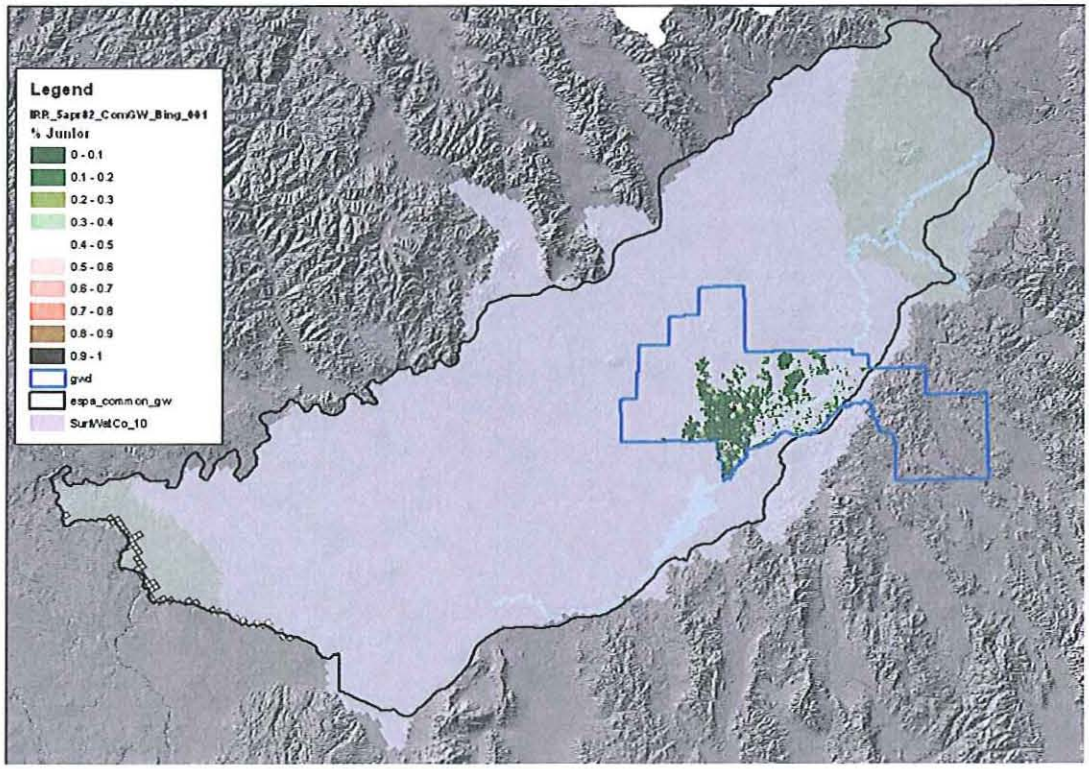


irr_area		Depletions		ft/ac/yr
79,906,681	m^2	4,709,472	ft^3/d	2.000
19,745	ac	39,489	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	955.1227	0.0	8
MLD	25003.57	0.3	210
KSP-MLD	2902.067	0.0	24
KSP	26388.43	0.3	221
BUL-KSP	41619.3	0.5	349
DWB-BUL	108011.3	1.3	906
A-R	70509.69	0.8	591
H-S	83873.1	1.0	703
S-B	698985.4	8.1	5,861
N-M	562673.8	6.5	4,718
B-N	3088550	35.7	25,897
Sum	**4,709,472**	**55**	**39,489**

Sum of N-M, B-N
30,615

10% clip for nr Blackfoot-Minidoka, common groundwater, Bingham GW Dist
4/5/1982

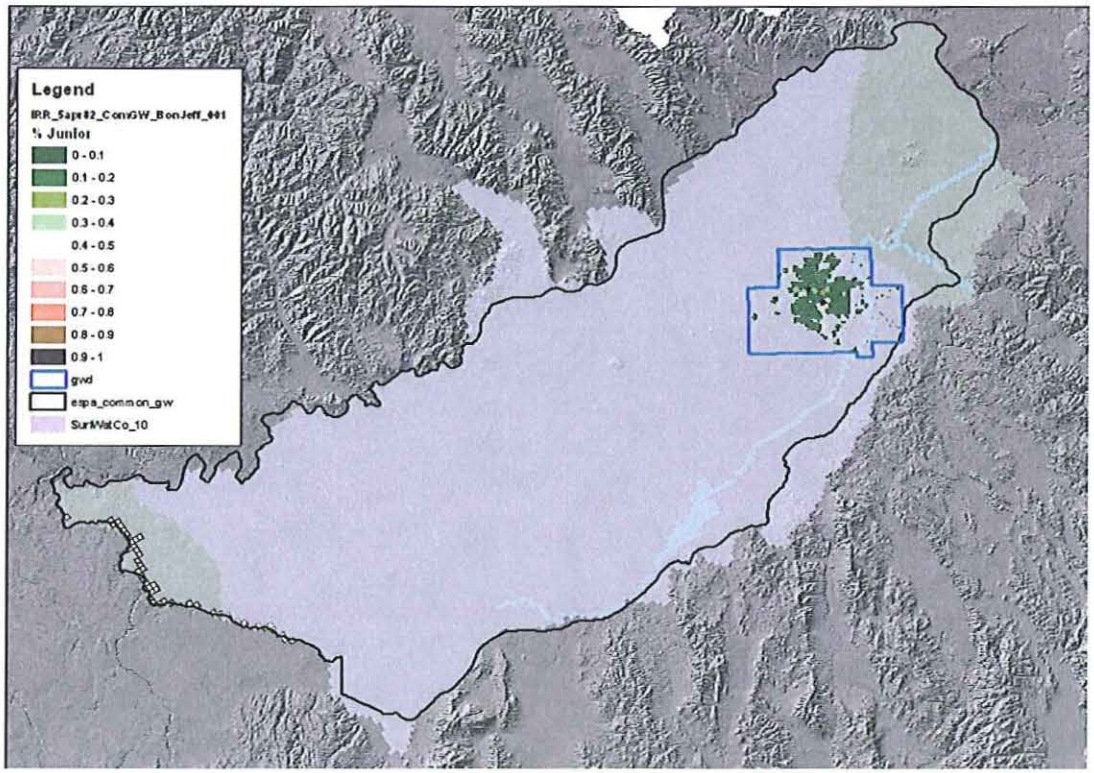


irr_area		Depletions		ft/ac/yr
38,475,906	m^2	2,300,032	ft^3/d	2.028
9,508	ac	19,286	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	248.7915	0.0	2
MLD	6512.844	0.1	55
KSP-MLD	755.7859	0.0	6
KSP	6871.536	0.1	58
BUL-KSP	10836.78	0.1	91
DWB-BUL	28107.62	0.3	236
A-R	68852.03	0.8	577
H-S	85958.44	1.0	721
S-B	809917	9.4	6,791
N-M	28605.4	0.3	240
B-N	1253366	14.5	10,509
Sum	**2,300,032**	**27**	**19,286**

Sum of N-M, B-N
10,749

10% clip for nr Blackfoot-Minidoka, common groundwater, Bonniville-Jefferson GW Dist
4/5/1982

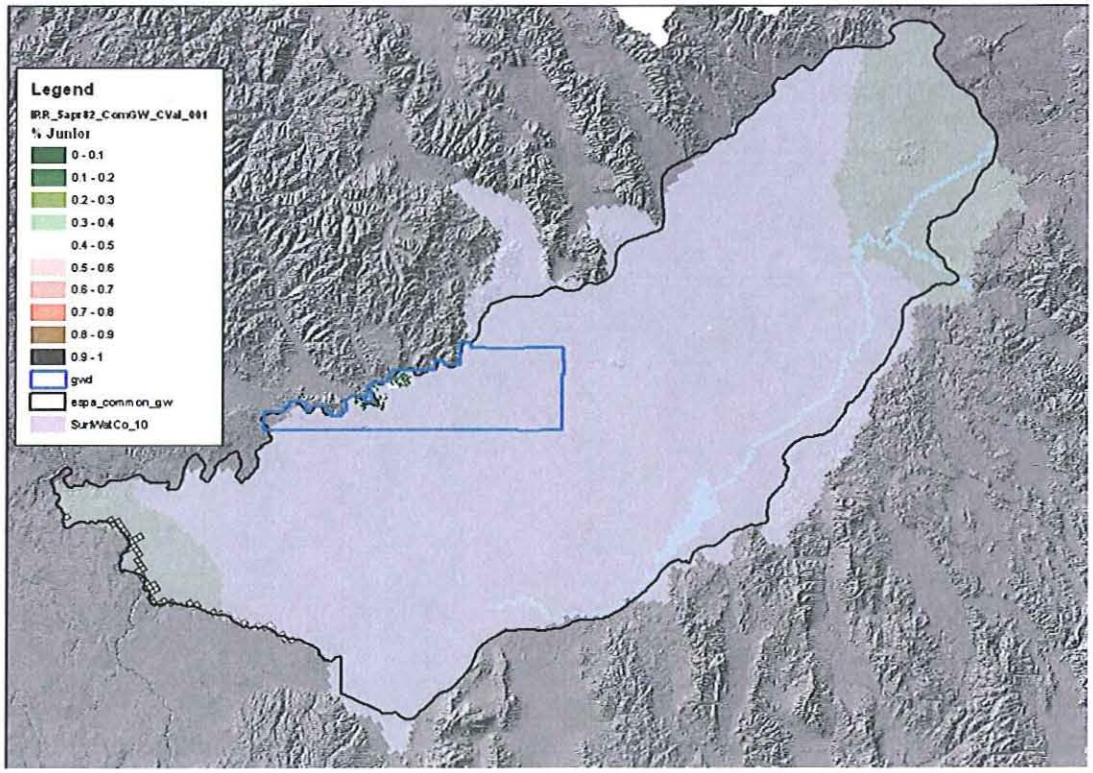


irr_area		Depletions		ft/ac/yr
20,745,193	m^2	1,076,500	ft^3/d	1.761
5,126	ac	9,026	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	106.8209	0.0	1
MLD	2796.347	0.0	23
KSP-MLD	324.5014	0.0	3
KSP	2950.325	0.0	25
BUL-KSP	4652.808	0.1	39
DWB-BUL	12067.87	0.1	101
A-R	85114.46	1.0	714
H-S	130535.1	1.5	1,095
S-B	343724	4.0	2,882
N-M	11715.27	0.1	98
B-N	482512.3	5.6	4,046
Sum	**1,076,500**	**12**	**9,026**

Sum of N-M, B-N
4,144

10% clip for nr Blackfoot-Minidoka, common groundwater, Cary Valley GW Dist
4/5/1982



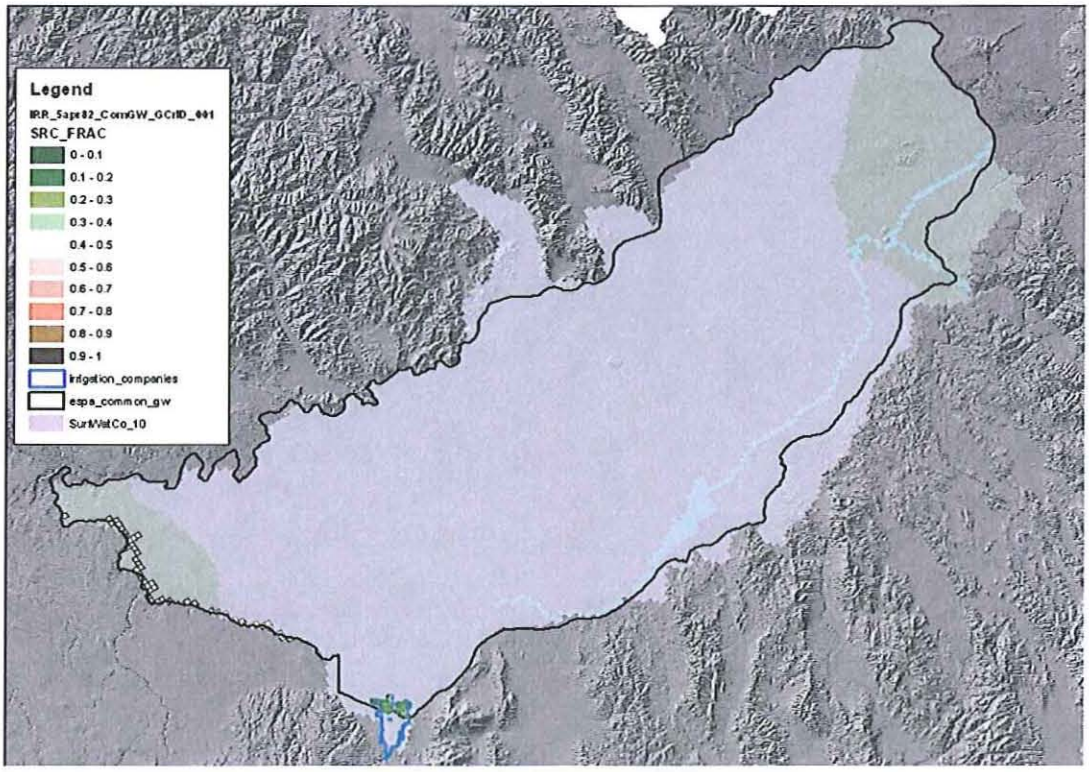
irr_area		Depletions		ft/ac/yr
2,713,985	m^2	143,310	ft^3/d	1.792
671	ac	1,202	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	249.5694	0.0	2
MLD	6529.152	0.1	55
KSP-MLD	753.8112	0.0	6
KSP	6831.15	0.1	57
BUL-KSP	10750.54	0.1	90
DWB-BUL	27606.8	0.3	231
A-R	1953.241	0.0	16
H-S	2228.729	0.0	19
S-B	16406.17	0.2	138
N-M	13643.23	0.2	114
B-N	56357.81	0.7	473
Sum	**143,310**	**2**	**1,202**

Sum of N-M, B-N
587

10% clip for nr Blackfoot-Minidoka, common groundwater, Goose Cr Irr Dist

4/5/1982



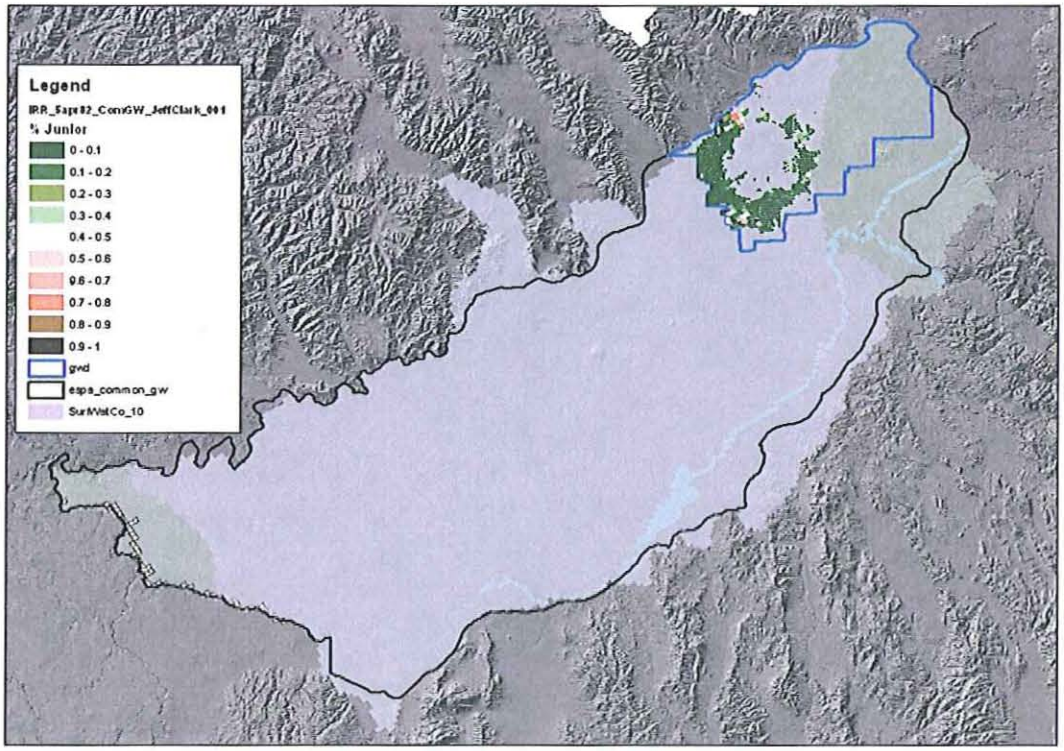
irr_area		Depletions		ft/ac/yr
4,384,295	m^2	284,432	ft^3/d	2.201
1,083	ac	2,385	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	484.5288	0.0	4
MLD	12719.01	0.1	107
KSP-MLD	1517.136	0.0	13
KSP	14041.33	0.2	118
BUL-KSP	22411.65	0.3	188
DWB-BUL	63328.45	0.7	531
A-R	3112.672	0.0	26
H-S	3570.822	0.0	30
S-B	26660.6	0.3	224
N-M	43010.16	0.5	361
B-N	93575.27	1.1	785
Sum	**284,432**	**3**	**2,385**

Sum of N-M, B-N

1,145

10% clip for nr Blackfoot-Minidoka, common groundwater, Jefferson-Clark GW Dist
4/5/1982



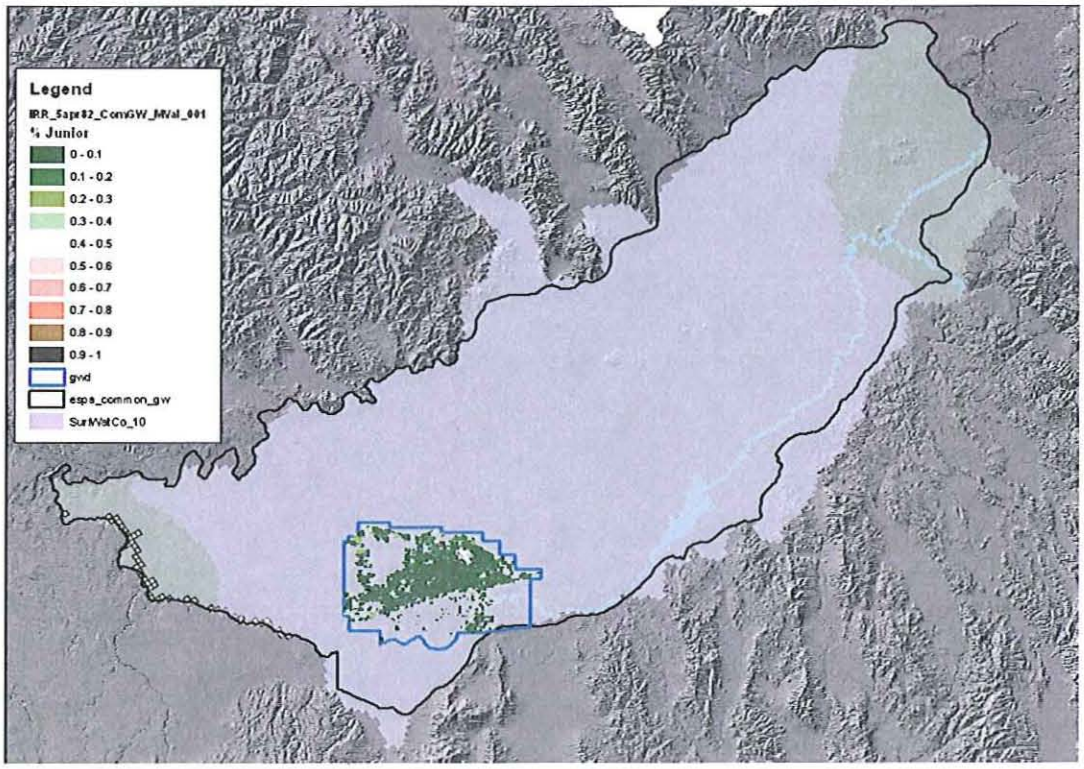
irr_area		Depletions		ft/ac/yr
52,006,307	m^2	3,032,398	ft^3/d	1.979
12,851	ac	25,427	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	162.4972	0.0	1
MLD	4253.834	0.0	36
KSP-MLD	493.6335	0.0	4
KSP	4488.042	0.1	38
BUL-KSP	7077.855	0.1	59
DWB-BUL	18357.46	0.2	154
A-R	1272904	14.7	10,673
H-S	569638.7	6.6	4,776
S-B	445640.6	5.2	3,737
N-M	17370.4	0.2	146
B-N	692010.8	8.0	5,802
Sum	**3,032,398**	**35**	**25,427**

Sum of N-M, B-N
5,948

10% clip for nr Blackfoot-Minidoka, common groundwater, Magic Valley GW Dist

4/5/1982



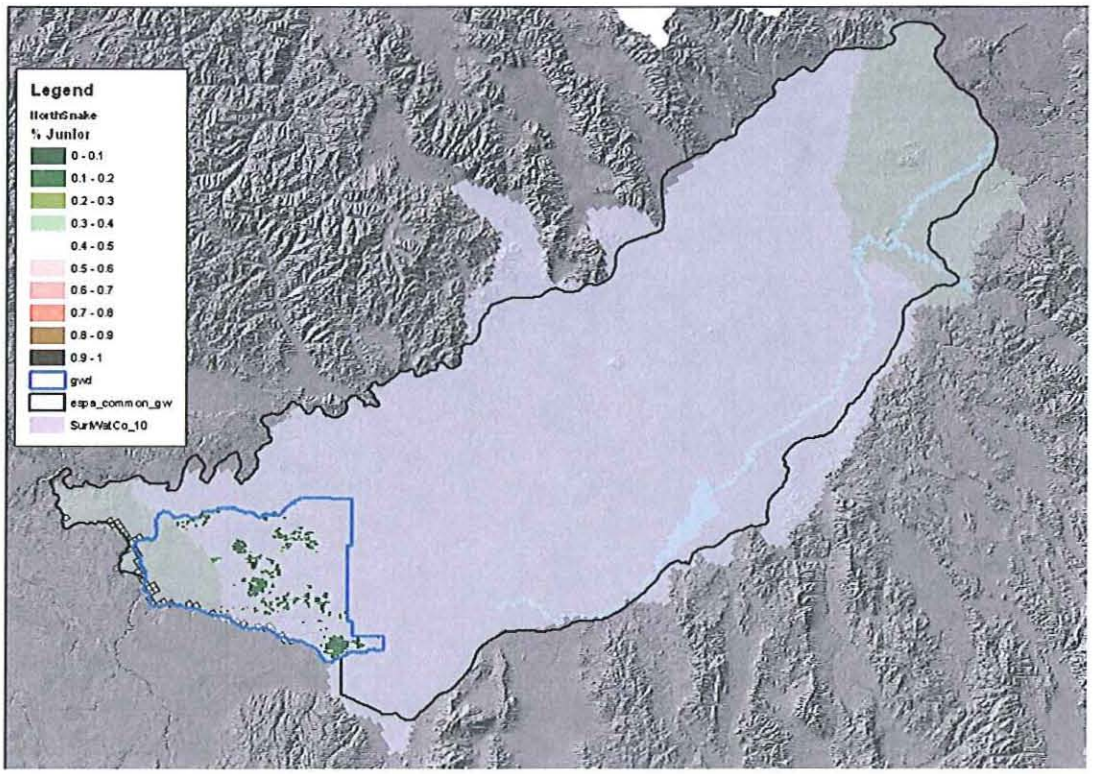
irr_area		Depletions		ft/ac/yr
41,507,530	m^2	2,717,436	ft^3/d	2.222
10,257	ac	22,786	ac-ft/y	

reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	4802.968	0.1	40
MLD	125927.8	1.5	1,056
KSP-MLD	14840.09	0.2	124
KSP	136285.1	1.6	1,143
BUL-KSP	216390.2	2.5	1,814
DWB-BUL	587672.2	6.8	4,928
A-R	32102.06	0.4	269
H-S	36819.15	0.4	309
S-B	274708.2	3.2	2,303
N-M	326371.6	3.8	2,737
B-N	961516.7	11.1	8,062
Sum	**2,717,436**	**31**	**22,786**

Sum of N-M, B-N

10,799

10% clip for nr Blackfoot-Minidoka, common groundwater, Nsnake GW Dist
4/5/1982



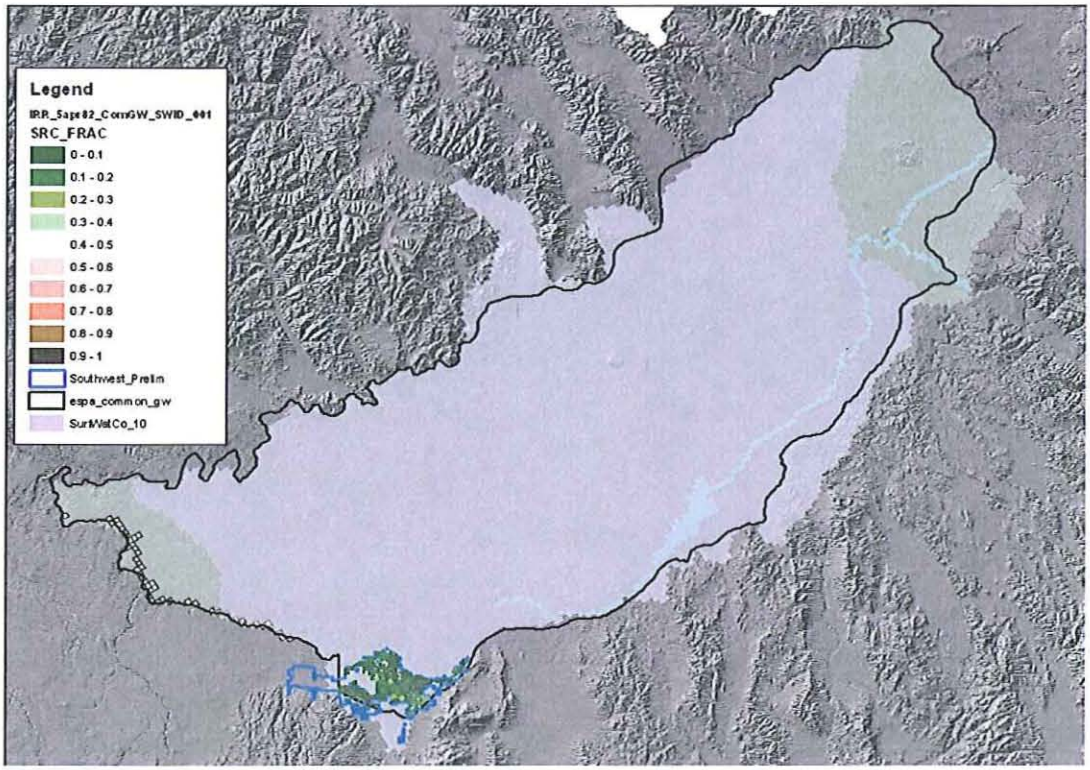
irr_area		Depletions		ft/ac/yr
9,747,210	m^2	669,114	ft^3/d	2.329
2,409	ac	5,610	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	1718.146	0.0	14
MLD	45669.75	0.5	383
KSP-MLD	5974.035	0.1	50
KSP	58300.59	0.7	489
BUL-KSP	96049.35	1.1	805
DWB-BUL	270430.3	3.1	2,268
A-R	3933.309	0.0	33
H-S	4509.434	0.1	38
S-B	33601.04	0.4	282
N-M	31871.76	0.4	267
B-N	117056.6	1.4	982
Sum	**669,114**	**8**	**5,610**

Sum of N-M, B-N
1,249

10% clip for nr Blackfoot-Minidoka, common groundwater, SWID Dist

4/5/1982



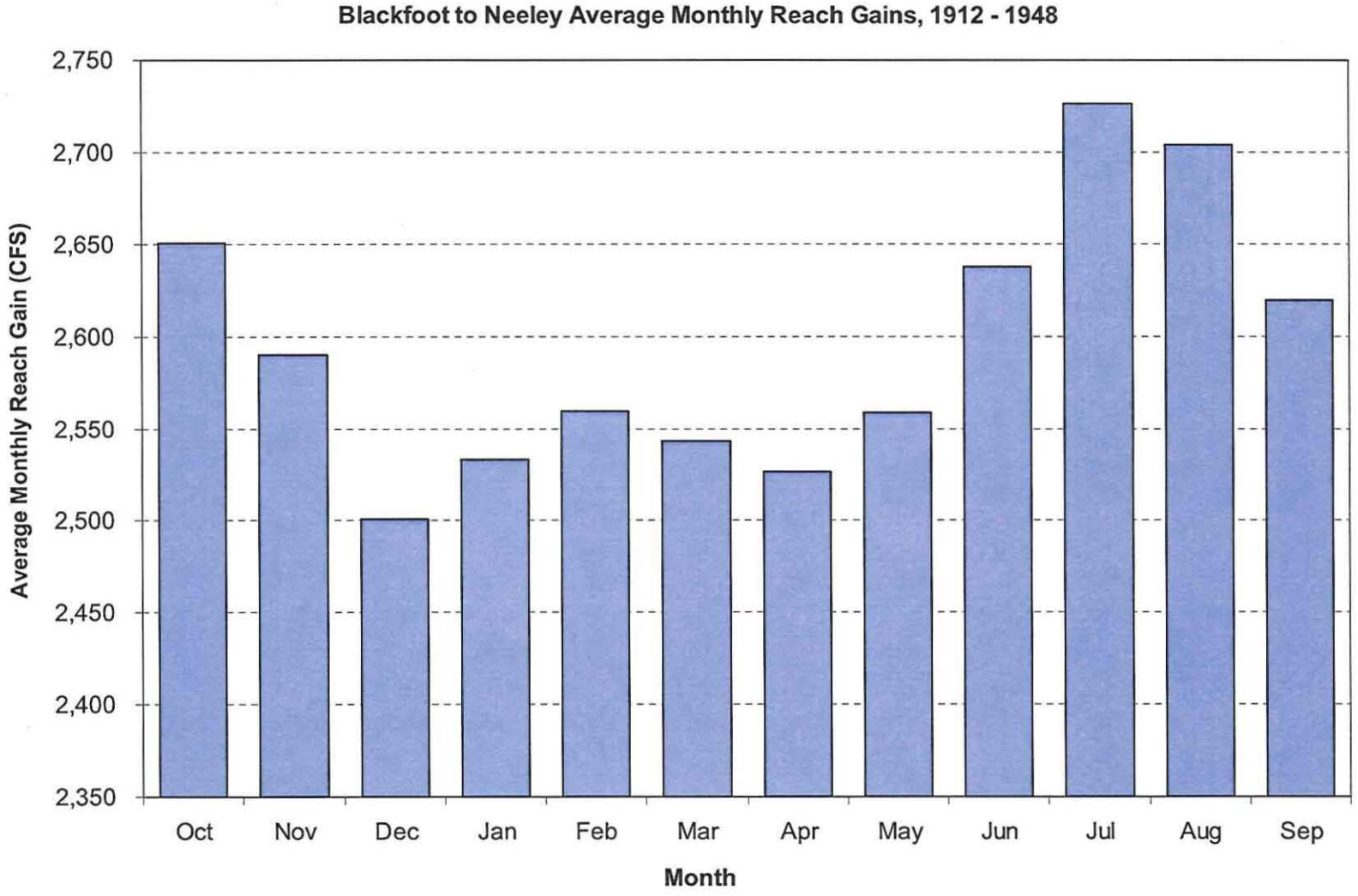
irr_area		Depletions		ft/ac/yr
19,689,640	m^2	1,275,481	ft^3/d	2.198
4,865	ac	10,695	ac-ft/y	

Reach	cf/d gain	cfs gain	ac-ft/y
MLD-BAN	2261.333	0.0	19
MLD	59426.64	0.7	498
KSP-MLD	7166.045	0.1	60
KSP	66777.32	0.8	560
BUL-KSP	107067.9	1.2	898
DWB-BUL	311960.8	3.6	2,616
A-R	13378.77	0.2	112
H-S	15346.9	0.2	129
S-B	114557.9	1.3	961
N-M	175791.3	2.0	1,474
B-N	401745.8	4.6	3,369
Sum	**1,275,481**	**15**	**10,695**

Sum of N-M, B-N

4,843

EXHIBIT B



Updated to include recent data

Source: USGS, 1938
IDWR, 2005: "blackfoot_neeley_gains.xls"
ftp://ftp.state.id.us/IDWR/Outgoing/SWCoalition/

HYDROSPHERE
Resource Consultants
December, 2005

Exhibit 4118

Monthly Average Reach Gains, Blackfoot to Neeley, 1912 - 1948

EXHIBIT C

Surface Water Coalition Natural Flow Water Rights (1,2)
Sorted by Priority Date

Canal/District	Amount(cfs)	Priority Date	Cumulative Amount (cfs)
North Side Canal Company	400	10 11 1900	400
Twin Falls Canal Company	3000	10 11 1900	3400
Minidoka Irrigation District(3)	1726	3 26 1903	5126
North Side Canal Company	2250	10 7 1905	7376
North Side Canal Company	350	6 16 1908	7726
Minidoka Irrigation District(3)	1000	8 6 1908	8726
Twin Falls Canal Company	600	12 22 1915	9326
North Side Canal Company	300	12 23 1915	9626
Milner Irrigation District	135	11 14 1916	9761
North Side Canal Company	1260	8 6 1920	11021
Am. Falls Res District #2	850	3 30 1921	11871
Am. Falls Res District #2	1700	4 1 1921	13571
Minidoka Irrigation District(3)	430	4 1 1939	14001
A&B Irrigation District	267	4 1 1939	14268
Milner Irrigation District	121	4 1 1939	14389
Twin Falls Canal Company	180	4 1 1939	14569
Milner Irrigation District	37	10 25 1939	14606

Notes: (1) For irrigation use
(2) From May 2 Order, District 01
(3) Water rights shared with Burley Irrigation District

EXHIBIT D

(27)

040.

DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION.

REPORTS ON THE GOODING IRRIGATION PROJECT IDAHO.

ENGINEERING REPORT BY
HOMER J. GAULT,
ENGINEER, U.S.B.R.

AGRICULTURAL AND ECONOMIC REPORT BY
T.H.MORRELL
and
R.B.GREENWOOD.

Denver, Colorado.
November 25, 1926.

Conn. 201.

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
WILDA BUILDING, 1441 WELTON ST.
Denver, Colo.

November 25, 1925.

From Homer J. Gault, Engineer

To Chief Engineer, Denver, Colo.

Subject: Transmitting Report on Gooding Project, Idaho.

1. In compliance with your instructions by letters dated July 8, 17, and 22, 1925, an engineering investigation has been made of the proposed Gooding irrigation project in Idaho, and the report, which has just been completed, is respectfully submitted herewith.

2. Limitations of time and funds have made this work necessarily of a preliminary nature, but the results are thought to be sufficiently accurate for present purposes. Such subjects as properly belong in the Economics report are either omitted or here discussed very briefly.

Homer J. Gault,
Engineer, U.S.B.R.

Enc.

I N D E X

I N D E X (Continued)

DRAWINGS

Map of Snake River Basin, Idaho.

196-D-10, General map of project

196-D-11, Profile main canal (part).

196-D-9, Headgate structure.

196-D-7, Turnout structure.

196-D-2, Little Wood River Crossing

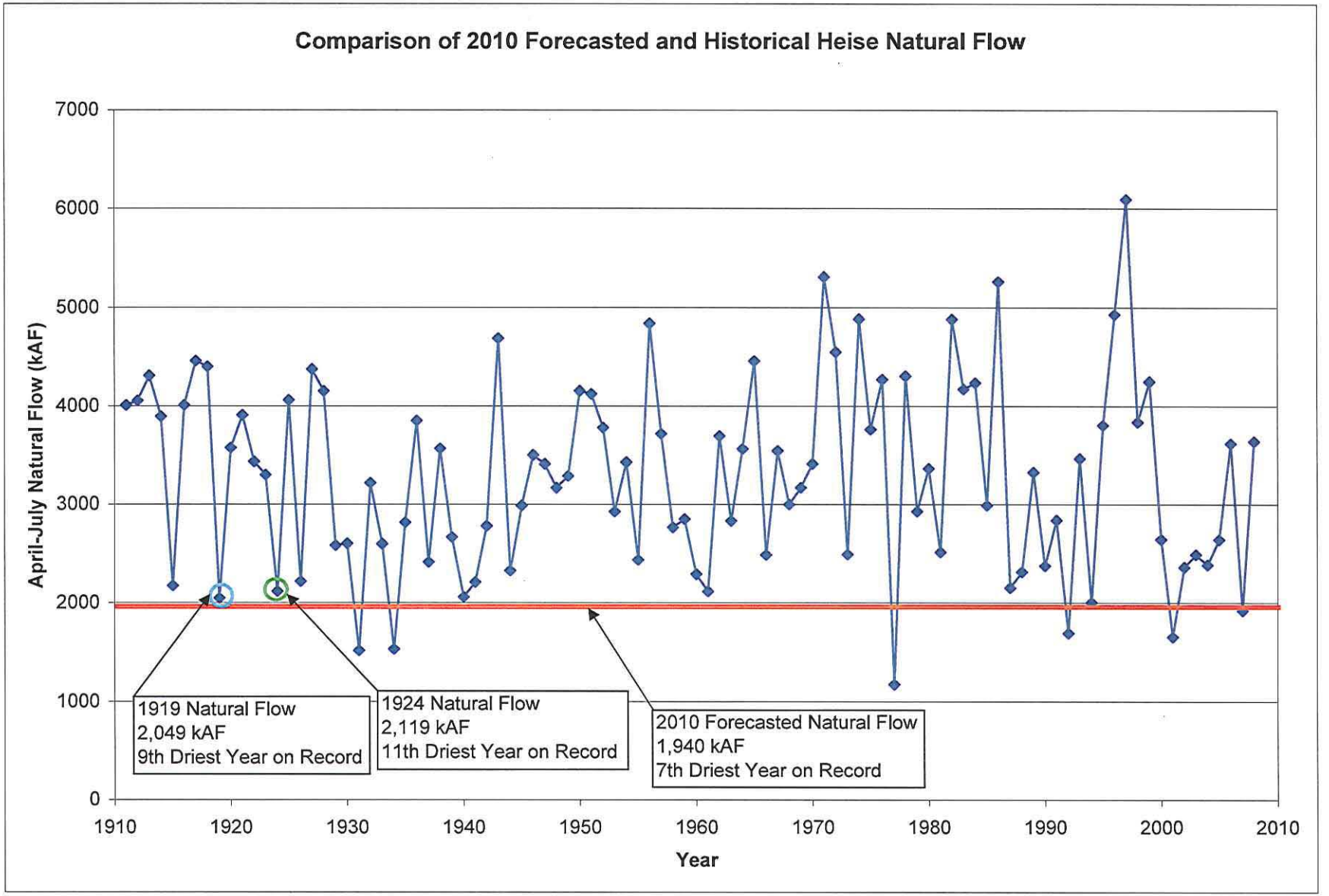
196-D-3 Big Wood River Crossing

WATER SUPPLY

31. The water supply for this project from Snake River is made possible only by the building of the American Falls Reservoir. Estimated annual requirements are given in Table No. 2, under paragraph 29. The requirements for initiated rights from Snake River, including the Minidoka Extension, will exceed the natural flow in occasional years like 1902, 1905 and 1924. In some other years, such as 1919, a small amount of natural flow would be available, while in a few years fully half of the Gooding project requirements would be available from natural flow.

32. In the case of the Minidoka Extension project 525,000 acre-feet of storage in American Falls Reservoir is being held for an area of 115,000 acres. If the same ratio of storage to area were adopted for the Gooding project it would take 380,000 acre-feet. Considering that the Gooding natural flow right would be junior to that of the Minidoka Extension, it is estimated for the purpose of this report that the entire annual diversion requirement of 401,733 acre-feet is to be derived from storage. This at $5.00 per acre-foot amounts to $2,008,665, for storage rights.

EXHIBIT E


Comparison of 2010 Forecasted and Historical Heise Natural Flow
April-July Natural Flow (kAF)
7000
6000
5000
4000
3000
2000
1000
0
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year
1919 Natural Flow
2,049 kAF
9th Driest Year on Record
1924 Natural Flow
2,119 kAF
11th Driest Year on Record
2010 Forecasted Natural Flow
1,940 kAF
7th Driest Year on Record