

MEMO

TO: File 98-7829

FROM: CPadilla

DATE: November 1, 2010

RE: Licensing Review Memo

Time Line:

Application for Permit Received: 10/11/2002

Permit Approved: 5/13/2004

Proof of Beneficial Use Received: 3/9/2005

Field Exam Conducted: 7/25/2005

POU Overlap Analysis:

<i>Right</i>	<i>Status</i>	<i>Diversion Rate</i>	<i>Volume</i>	<i>Source</i>	<i>Priority</i>
98-4113	Statutory Claim	4.70	NA	Kootenai River	7/25/1968
98-7366*	License	2.29	1657.90	Kootenai River	3/9/81
98-7829	Permit	3.01	850	Kootenai River	10/11/2002

*Wildlife use only (flow through)—not sure of the validity since the refuge doesn't seem to be designed for flow through

Conditioning

Comment	Water Permit Condition Report 98-7829
Carry to license	1. 004 This right does not grant any right-of-way or easement across the land of another.
Confirmed at field exam—remains on license	2. X36 Rights 98-07829, 98-07366 and 98-07771 are also diverted through the point of diversion described above.
Carry to license	3. 01M After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to determine the amount of water diverted from power records and shall annually report the information to the Department.
According to a sketch of the system for 98-7366, there is gravity flow to the pump which should satisfy this condition	4. X16 The approach velocity at the point of diversion shall not exceed 0.5 feet per second.
Use confirmed—carry to license	5. Wildlife storage is for wetland habitat enhancement. (NO FLOW THROUGH)
There is a fish screen in place, see attached diagram	6. X15 A fish screen of 1/4 inch or smaller mesh shall be installed and maintained at the point of diversion.

1/31/11 : I spoke w/ Gary Ball to confirm that there is no flow thru the refuge. He said anything that is lost is due to seepage. There is no discharge point back to the river

PD Summary and Overlap Analysis of the PD: An overlap condition will be added to this right to limit the diversion rate to the total capacity of 8.7 cfs. I spoke with Gary Ball of FWS to ascertain the volume used under this right during the development period. Even though the development period was less than 1 year, I believe that collecting a couple years of volume data for comparison purposes.

Tag #	Location	Rights that Use PD	Uses
NONE	SENW Sec 18 62N 1E	98-7366*, 98-7829, 98-7771	Wildlife storage, diversion to storage

*This right covers Wildlife uses only

Right	Priority	Development Period	Rate	Volume
98-7366	1981	April 23, 1981-July 8, 1982	2.29	1,657.9
98-7771	1996	May 6, 1996-May 8, 2002	6.69	444.0
98-7829	2002	October 11, 2002-March 9, 2005	3.01	850.0
Total			8.70 cfs	NA

There are two pumps on this system. The pumps operate independently of one another so the volume measured for each pump will be additive. Here are the totals:

TIME	PUMP 1 (Old) TOTALIZER	TOTAL	PUMP 2 (New) TOTALIZER	TOTAL
5/2004- 5/2005	1491.99-2229.91	737.92 af	4474.28-6940.13	2465.85 af
5/2005- 5/2006	2229.91-3378.44	1,148.53 af	6940.13-9326.22	2,386.09 af
TOTAL		1,886.45 af		4851.94 af
				6738.39 af

The average per year is 3,370.2 af. It should be noted that there are different areas within the wetland refuge that this water is delivered. The volume moving through the point of diversion obviously does not get delivered to the POU for this right only. However, right 98-7366 is limited to 1,657.9 af and 98-7771 is limited to a volume of 444 af or a total of 2,101.9 af. This leaves plenty of room for the volume limited by this right, 850 af.

Volume and Diversion Rate: The field examiner recommended the full permitted rate of 3.01 cfs and I agree with his findings, see below. The field examiner recommended a volume of 480 af. This was simply based on the area of the wetland. I recommend that we license this right for the full permitted amount of 850 af. The justification is as follows:

480 afa for the filling of the wetland area
 287 afa for evaporation (see below and attachments)
 504 afa for seepage (see below)
 1271 afa total volume required

$3.01 \text{ cfs} \times 1.9835 \times 150 \text{ days}^1 = 895.6 \text{ afa}$ (volume historically delivered under this right)

¹ The attached pump records show that the pumps are on for ~150 days a year.

Evaporation Transpiration

Query from <http://www.kimberly.uidaho.edu/ETIdaho/> for Bonners Ferry station (attached). The mean annual evaporation for small stand wetlands is 546 mm.

$$(546\text{mm}/25.4)/12 = 1.79 \text{ af/acre} \times 160 = 286.6 \text{ afa}$$

Seepage

There is a water balance that can be expressed as:

$$\Delta s = Q_{in} + P - ET - S$$

Where

Δs = Change in storage

Q_{in} = Flow going into the pond

P = precipitation

ET = find what best characterizes the area you are working with from ET Idaho

S = seepage (this can be solved for since seepage is unknown)

$$S = Q_{in} + P - ET - \Delta s$$

$S = Q_{in} + P - ET$ (there is no change in storage—no outflow)

$$= (3.01 \text{ cfs})(1.296 \times 10^7 \text{ s/year})(1/43560) + (546 \text{ mm/year})(1\text{ft}/304.8\text{mm})(160 \text{ acres}) - (1292 \text{ mm/year})(1\text{ft}/304.8 \text{ mm})(160 \text{ acres})$$

$$= (895.5 \text{ afa}) + (286.6 \text{ afa}) - (678.2 \text{ afa})$$

$$S = 503.9 \text{ afa}$$

***This number comes from the number of days in the season and converted to seconds in a season: $(150 \text{ days} \times 86400) = 12,960,000$**

To convert mm to feet divide mm by 304.8

Amendment Needed?: Yes. The place of use has been modified as permitted.

RECEIVED

IDWR SUPPLEMENTAL FIELD REPORT
FOR ANNUBAR MEASUREMENT

OCT 21 1982
Department of Water Resources

Measured by: JK Date: 9-8-82
Owner: USDI - Fish & Wildlife Permit No. 98-7366

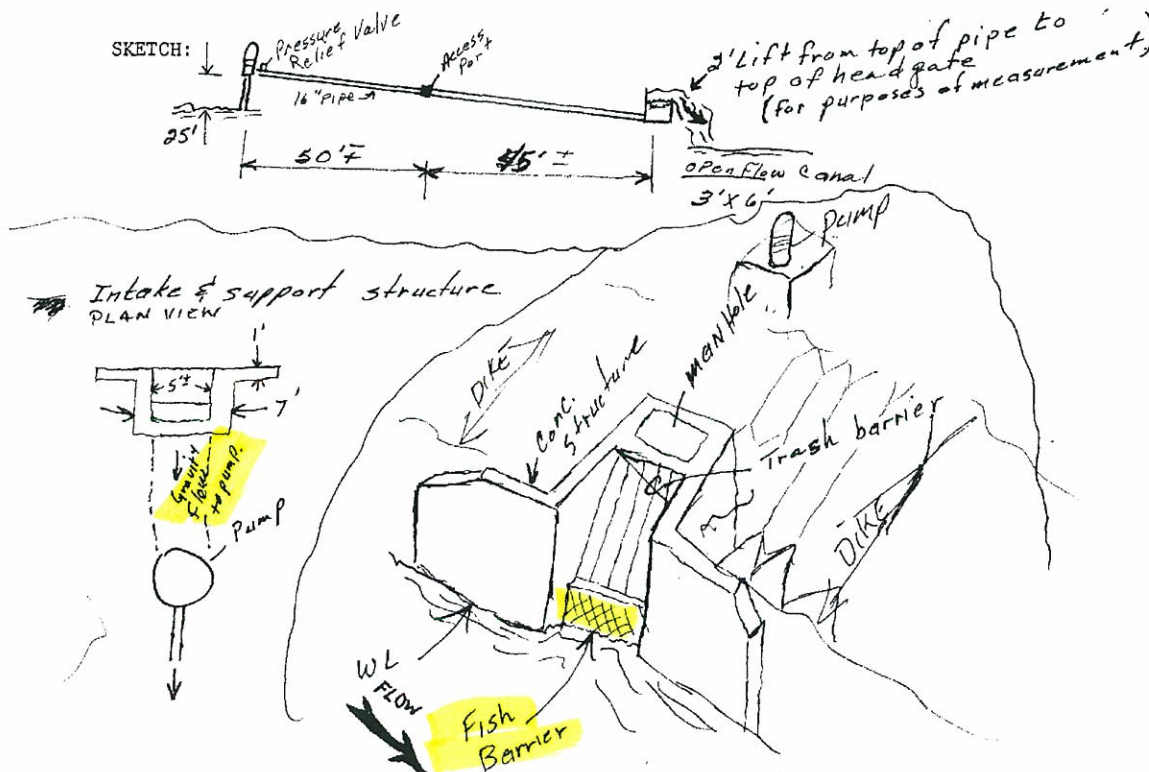
Description of well &/or measuring site (give distance to restrictions upstream and downstream): Access port approx 50' downstream
of 30HP and approx 30' upstream from Headgate
Headgate used to regulate flow in pipe - partially
closed to fill pipe

Measured inside diameter of pipe in inches (A) 15.375
Size of Annubar used in test 15.250
State ID# of Annubar Meter used 091444
Size Eagle Eye Meter used 80"
State ID# of Meter used 091479
Date of Last Calibration of Meter 6-1-82

Observed inches of H2O read on Meter 16
Adjusted inches of H2O from Last Calibration (B) 14.416

CALCULATION: $\frac{(3.85) \times (A)^2 \times (B)}{448.8} = \frac{3.85 \times (15.375)^2 \times 14.416}{448.8} = 3157.34$ cfs measured 6.99
capacity

Where A and B are measured in inches and 3.85 is a constant for the model 75 Annubar.



SITE NUMBER: 458003

TYPE OF METER:

DATE (1)	TIME (2000) (2)	WATER READING (3)	(4)	(5)	(6)	(7)
10/05	13:02	3188.59	TO Jones Pond			1
10/5/05	10:00	—	TO Greenhard marsh			2
10/7	8:40	3207.45	TO River Bend unit			3
10/15	07:40	—	Clear stream			4
10/15	08:25	3253.10	" "			5
11/10/05	11:30	3321.10	" "			6
11/6/5	11:30	3321.10				7
11/4/5	08:15	3340.45	" "			8
11-7-05	08:52	3348.25	Found all			9
11-20-05	08:51	3361.65	OFF for weekend			10
11-24-05	09:00	3361.65	ON to Greenhard marsh			11
11-16-05	16:30	3378.99	OFF			12
12-2-05	14:10		OFF			13
2-1-06			NO USE			14
6-1-06	NO USE		NO USE			15
8-3-06	0605	3378.98	OFF NO USE - NO Authorization to operate			16
						17
						18
						19
						20
						21
						22
						23
						24
						25
						26
						27
						28
						29
						30
						31
						32
						33
						34
						35
						36

	DATE	TIME	REMARKS	GPS
	(8)	(9)		(10)
1				
2				
3				
4				
5			Green head moush	
6				
7				
8			Went	
9				
10				
11				
12				
13				
14				
15			Property Of:	
16			U.S. Fish And Wildlife Service	
17			Kootenai National Wildlife Refuge	
18			HCF 60 Box 263	
19			Bonners Ferry, Idaho 83805	
20			208-267-5888	
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				

SITE NUMBER: 458002

Checked by:

[illegible]

SITE NAME: Tachine Kaderani River Pump

SITE NUMBER: 458902

DATE	TIME	DRIVE READING (0.1 mil)	WATER GAGE READING (0.001 mil)	FROM WATER GAGE (0.1 mil)	TOTAL READING (0.1 mil)	COLLING SUMP READING (0.1 mil)
12/9/04	10:01	6498.14				
12/9/04	07:36	6632.10				
12/9/04	10:07	6676.78	OFF			
11/3/04	9:34	6720.83	ON			
11/4/04	13:30	6740.05	ON			
11/11/04	14:00		OFF			
11/24/04	11:57	6869.00	ON			
11/19/04	14:00	6940.13	OFF			
12/1/05	13:00	No VAC	"			
12/1/05	09:00	"	"	Reset too low		
12/1/05	8:00	"	"	"		
5/3/05	7:30	"	"	"		
5/11/05	15:30	6940.13	ON	To Everland		
5/16	07:04	7006.77	OFF/ON	"		
5/23	08:27	7114.95	ON	"		
5/29	11:15	7163.03	OFF/ON	"		
5/31	11:00	7200.02	ON	"		
6-1-05	11:58	7219.28	ON	"		
6-6-05	14:15	7280.63	OFF/ON	Found pump up - restarted		
7-1-05	11:56	7416.05	ON	No PWR - Pump, Culligan Plant		
7-11-05	16:48	7534.55	OFF	"		
7-25-05	08:00	7834.55	ON	"		
8-8-05	12:32	8041.00	OFF/ON	Found pump up - auto started		
8-26-05	11:40	8263.77	ON	Reset Planted Rediscovers		
9-1-05	06:15	8426.53	ON	"		
9-9-05	10:04	8571.04	ON	To Jones's Pond		
12-2-05	12:06	8603.84	OFF/ON	Found pump up - auto started		

TYPE OF METER:

Checked by:

DATE	DESCRIPTION	AMOUNT	BALANCE
	To Michael & Denise Fund	1000	
	General fund off - received DEF	1000	
	General fund off	100	
	To: Michael & Denise	100	
	To Greenfield School	100	
		100	
	give 2000 to OK	2000	
		2000	
	Give fund, school	100	
		100	
	Give fund, school	200	
	Give fund, school	200	
	To Riverhead	100	
	distributed to Riverhead	100	
	To: Denise Fund	100	

ET_{Idaho} 2009: Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to robison@kimberly.uidaho.edu Copyright 2010, University of Idaho.

Bonnerr Ferry (NWS --101079)

Statistics based on thirty

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Gross Precipitation															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean	mm/day												mm		
Monthly ^c	2.14	1.55	1.20	1.31	1.38	1.43	0.73	0.74	1.01	1.43	2.40	2.60	0	546	546
15-Day Moving Average ^d	2.29	1.75	1.14	1.33	1.44	1.47	0.70	0.71	1.08	1.33	2.36	2.54			
7-Day Moving Average ^e	2.23	1.64	1.17	1.33	1.40	1.48	0.73	0.72	1.05	1.40	2.34	2.56			
3-Day Moving Average ^f	2.15	1.57	1.18	1.31	1.39	1.45	0.74	0.73	1.03	1.42	2.34	2.60			
Standard Deviation	mm/day												mm		
Monthly	1.55	0.99	0.97	0.68	1.21	0.67	0.77	0.83	0.58	1.07	1.55	1.82	0	122	122
15-Day Moving Average	1.63	1.44	0.92	0.90	1.33	1.01	0.66	0.82	0.87	0.97	2.00	1.75			
7-Day Moving Average	2.28	1.95	1.33	1.43	1.80	1.52	0.95	1.10	1.26	1.51	2.46	2.54			
3-Day Moving Average	3.21	2.56	1.96	2.13	2.43	2.26	1.39	1.67	1.76	2.11	3.25	3.52			
20% Exceedance	mm/day												mm		
Monthly	3.01	2.36	1.63	1.85	2.00	1.95	1.14	0.89	1.43	1.92	3.24	3.36	0	631	631
15-Day Moving Average	4.97	3.63	2.57	2.93	2.87	3.17	1.51	1.89	2.43	3.14	4.93	6.03			
7-Day Moving Average	8.36	5.27	3.89	4.93	4.24	5.23	2.66	3.30	4.49	5.36	7.31	8.61			
3-Day Moving Average	13.13	10.57	6.87	9.23	7.73	8.80	5.00	7.03	6.80	7.73	13.03	13.53			
80% Exceedance	mm/day												mm		

Monthly	0.82	0.77	0.49	0.75	0.59	0.77	0.25	0.28	0.31	0.75	1.14	1.47	0	443	443
15-Day Moving Average	0.21	0.19	0.09	0.16	0.05	0.11	0.00	0.02	0.00	0.02	0.46	0.30			
7-Day Moving Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
3-Day Moving Average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Ave Highest	mm/day												--		
15-Day Moving Average ^g	3.46	2.37	1.96	2.06	2.30	2.24	1.15	1.37	1.63	2.33	3.46	4.10			
7-Day Moving Average ^h	5.57	3.94	3.15	3.46	3.77	3.68	2.01	2.27	2.75	3.88	5.29	6.69			
3-Day Moving Average ⁱ	9.65	6.81	5.67	6.19	6.75	6.63	3.61	4.53	4.90	6.31	9.23	10.85			
Ave Lowest	mm/day												--		
15-Day Moving Average ^g	0.91	1.01	0.46	0.57	0.52	0.68	0.29	0.30	0.42	0.48	1.23	1.06			
7-Day Moving Average ^h	0.21	0.16	0.04	0.05	0.07	0.15	0.05	0.02	0.01	0.08	0.25	0.23			
3-Day Moving Average ⁱ	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.01			
Special normal distribution parameters for monthly, seasonal, and annual intervals													--		
Skew	0.01	1.21	0.30	0.11	0.51	0.84	0.33	0.52	0.43	0.14	1.49	0.22	0.00	0.55	0.55
Kurtosis	0.56	4.84	0.79	2.29	1.29	3.69	0.78	1.31	3.03	0.76	5.61	0.71	0.00	3.04	3.04

^a Growing Season: This is usually the time from green up or planting in the spring to a killing frost or harvest in the fall. It is not applicable for entries without a growing season and will be blank.

^b Nongrowing Season: This is usually the time from a killing frost or harvest in the fall to the of green up in the spring. It is not applicable for entries without a growing season.

^c Mean of the average daily value for month

^d Mean of the fourteen 15-day period averages contained in the month

^e Mean of the twenty three 7-day period averages contained in the month

^f Mean of the twenty seven 3-day period averages contained in the month

^g Mean of the highest/lowest 15-day period average in month

^h Mean of the highest/lowest 7-day period average in month

ⁱ Mean of the highest/lowest 3-day period average in month

This work and report were prepared by the University of Idaho Research and Extension Center at Kimberly, Idaho under contract with the

Idaho Department of Water Resources. Work was supported by funding from IDWR and the Idaho Agricultural Experiment Station and Idaho Engineering Experiment Station. The authors gratefully acknowledge the long-term evapotranspiration data collection and long-standing advice provided by Dr. James L. Wright, USDA-ARS Kimberly (ret.), the more than two decades of high quality agricultural weather data collection by the U.S. Bureau of Reclamation AgriMet system, and the very long-standing, routine data collection by the hundreds of cooperative weather station volunteers across the state who, for more than one-hundred years, have faithfully observed daily air temperature and precipitation.

The citation for the evapotranspiration data used from this site should be: *Allen, Richard G. and Clarence W. Robison, 2009. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplement updating the Time Series through December 2008, Research Technical Completion Report, Kimberly Research and Extension Center, University of Idaho, Moscow, ID.*

Questions regarding the data should be addressed to [Clarence W. Robison](#) or [Richard G. Allen](#), University of Idaho, Kimberly Research and Extension Center, 3793 North 3600 East, Kimberly, ID 83341. Telephone (208)-423-6610



ET_{Idaho} 2009: Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to robison@kimberly.uidaho.edu Copyright 2010, University of Idaho.

Bonnerr's Ferry (NWS --101079)

Statistics based on thirty

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Wetlands - narrow stands															
Actual Evapotranspiration (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean	mm/day												mm		
Monthly ^c	0.18	0.46	0.90	1.28	2.25	7.14	11.15	10.68	6.45	1.30	0.38	0.13	1146	150	1292
15-Day Moving Average ^d	0.18	0.46	0.89	1.31	2.16	7.15	11.25	10.72	6.53	1.19	0.38	0.13			
7-Day Moving Average ^e	0.18	0.46	0.90	1.29	2.20	7.16	11.22	10.73	6.50	1.23	0.37	0.13			
3-Day Moving Average ^f	0.18	0.46	0.90	1.29	2.23	7.15	11.16	10.70	6.47	1.28	0.38	0.13			
Standard Deviation	mm/day												mm		
Monthly	0.07	0.13	0.23	0.30	1.10	1.81	1.43	1.40	1.62	1.17	0.08	0.07	148	29	135
15-Day Moving Average	0.07	0.16	0.23	0.37	1.07	2.19	1.24	1.33	2.11	1.01	0.11	0.06			
7-Day Moving Average	0.08	0.20	0.32	0.52	1.31	2.57	1.61	1.73	2.65	1.29	0.14	0.07			
3-Day Moving Average	0.11	0.25	0.40	0.67	1.49	2.88	2.15	2.17	2.97	1.45	0.18	0.10			
20% Exceedance	mm/day												mm		
Monthly	0.22	0.56	1.05	1.50	3.09	9.08	11.65	11.53	8.13	2.09	0.43	0.17	1306	173	1421
15-Day Moving Average	0.27	0.72	1.28	1.89	4.30	10.87	13.06	12.72	9.38	3.48	0.55	0.22			
7-Day Moving Average	0.36	0.94	1.59	2.51	4.98	12.01	13.92	13.57	10.62	3.94	0.63	0.27			
3-Day Moving Average	0.45	1.25	1.88	3.22	5.67	13.14	14.67	14.50	11.38	5.58	0.79	0.43			

80% Exceedance	mm/day												mm		
Monthly	0.13	0.32	0.75	1.03	1.42	5.43	10.42	9.57	4.57	0.71	0.30	0.08	999	121	1171
15-Day Moving Average	0.08	0.27	0.51	0.75	0.79	3.94	8.84	8.31	2.23	0.32	0.22	0.05			
7-Day Moving Average	0.03	0.16	0.42	0.53	0.65	3.28	7.61	7.28	0.67	0.25	0.13	0.01			
3-Day Moving Average	0.01	0.11	0.29	0.41	0.53	2.44	5.88	5.11	0.49	0.21	0.08	0.02			
Ave Highest ET _{act}	mm/day												--		
15-Day Moving Average ^g	0.22	0.57	1.11	1.60	3.16	8.83	12.14	11.75	8.23	1.98	0.48	0.17			
7-Day Moving Average ^h	0.29	0.71	1.40	2.06	3.95	10.10	13.05	12.80	9.36	2.64	0.56	0.23			
3-Day Moving Average ⁱ	0.38	0.93	1.72	2.60	4.71	11.40	14.15	13.69	10.35	3.38	0.70	0.32			
Ave Lowest ET _{act}	mm/day												--		
15-Day Moving Average ^g	0.13	0.36	0.69	1.02	1.32	5.50	10.16	9.50	4.73	0.64	0.29	0.09			
7-Day Moving Average ^h	0.07	0.27	0.52	0.71	0.88	4.58	8.96	8.40	3.53	0.43	0.22	0.05			
3-Day Moving Average ⁱ	0.02	0.19	0.38	0.52	0.68	3.75	7.21	6.79	2.72	0.33	0.14	0.01			
Special normal distribution parameters for monthly, seasonal, and annual intervals													--		
Skew	0.07	0.33	-0.04	0.58	0.09	0.14	0.09	-0.26	-0.21	0.43	0.36	0.20	0.45	0.20	0.53
Kurtosis	0.45	2.44	0.62	2.68	0.55	2.48	1.02	0.73	1.97	0.83	2.46	0.86	2.17	2.37	2.20

^a Growing Season: This is usually the time from green up or planting in the spring to a killing frost or harvest in the fall. It is not applicable for entries without a growing season and will be blank.

^b Nongrowing Season: This is usually the time from a killing frost or harvest in the fall to the of green up in the spring. It is not applicable for entries without a growing season.

^c Mean of the average daily value for month

^d Mean of the fourteen 15-day period averages contained in the month

^e Mean of the twenty three 7-day period averages contained in the month

^f Mean of the twenty seven 3-day period averages contained in the month

^g Mean of the highest/lowest 15-day period average in month

^h Mean of the highest/lowest 7-day period average in month

ⁱ Mean of the highest/lowest 3-day period average in month

This work and report were prepared by the University of Idaho Research and Extension Center at Kimberly, Idaho under contract with the Idaho Department of Water Resources. Work was supported by funding from IDWR and the Idaho Agricultural Experiment Station and Idaho Engineering Experiment Station. The authors gratefully acknowledge the long-term evapotranspiration data collection and long-standing advice provided by Dr. James L. Wright, USDA-ARS Kimberly (ret.), the more than two decades of high quality agricultural weather data collection by the U.S. Bureau of Reclamation AgriMet system, and the very long-standing, routine data collection by the hundreds of cooperative weather station volunteers across the state who, for more than one-hundred years, have faithfully observed daily air temperature and precipitation.

The citation for the evapotranspiration data used from this site should be: *Allen, Richard G. and Clarence W. Robison, 2009. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplement updating the Time Series through December 2008, Research Technical Completion Report, Kimberly Research and Extension Center, University of Idaho, Moscow, ID.*

Questions regarding the data should be addressed to [Clarence W. Robison](#) or [Richard G. Allen](#), University of Idaho, Kimberly Research and Extension Center, 3793 North 3600 East, Kimberly, ID 83341. Telephone (208)-423-6610

University of Idaho
A LEGACY OF LEADING
Copyright 2010, University of Idaho.