

PLACE OF USE: STOCKWATER STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
03S	01W	15	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
											X								

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
03S	01W	15	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
											.6			7.3			.4		8.3

Total Acres: 8.3

PLACE OF USE: RECREATION STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
03S	01W	15	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
											X								

PLACE OF USE: AESTHETIC STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
03S	01W	15	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
											X								

Method of Determination: GIS and visual inspection.

3. YES Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- YES Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- YES Aerial Photo Attached (required for irrigation of 10+ acres).
- YES Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Theoretical						

2. Measurements: Flow in/out of the pond was insufficient to give a reading using the FlowTracker. We used the "float method" to determine a theoretical flow. A distance of 20 feet was measured out on the straightest part of the creek directly below the pond. A small twig was floated along the 20' and timed with a stopwatch. The average time measured for 20' was 9.33 seconds. Next we measured the width and depth of the channel in two places. The top measurement was 1' wide with a depth of 0.25', 0.25' and 0.15' across at a 3" interval. The lower measurement was 1.25' wide with a depth of 0.15', 0.18' and 0.15'. The average cross section on the channel was 0.2125 sq. ft.

E. FLOW CALCULATIONSX Additional Computation Sheets Attached

Measured Method: See Open Channel Discharge Measurement using Float Method worksheet. Adjusted flow from pond = 0.30 cfs.

Measurement = 0.30 cfs

Permit Allows = 0.24 cfs

.02 cfs/af x 8.3 acres = 0.17 cfs

Recommend diversion rate of 0.17 cfs.

Irrigation Flow: Based on www.flexpvc.com, gravity flow in a 6" pipe would yield around 550 gpm. Head pressure based on 100 ft elevation over 1075 ft, head pressure would be 100 ft x .433 psi = 43 psi. not accounting for friction. (550 gpm ÷ 448 = 1.2 cfs).

Head pressure: 100 ft x .433 = 43 psi

Flow rate: 550 gpm ÷ 448 = 1.2 cfs.

Flow rate @ 43 psi: 816 gpm (based on Table 7 from Field Exam Handbook, 6" pipe w/ 5" orifice)

816 gpm ÷ 448 = 1.8 cfs.

Permit allows 0.17 cfs and measured rate from pond is 0.30 cfs.

Recommend diversion rate of 0.17 cfs.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 8.3 \times 4.5 = \mathbf{37.3 \text{ AF}}$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = .17 \times 260 \times 1.9835 = \mathbf{87.7 \text{ AF}}$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = \mathbf{37.3 \text{ AF}}$$

2. Volume Calculations for Cattle:

$$200 \text{ head range cattle} \times 12 \text{ gpd} \times 365 \text{ days} = 876,000 \text{ gpd}$$

$$876,000 \div 325,850 = \mathbf{2.7 \text{ AF}}$$

3. Volume Calculations for Pond:

$$0.1 \text{ AF} \times 5 \text{ ft depth} = \mathbf{0.5 \text{ AF}}$$

Seepage and ET – See Pond Seepage/ET spreadsheets

$$\text{Seepage} = \mathbf{7.3 \text{ AF}} \text{ (See worksheet)}$$

$$\text{Evaporation} = \mathbf{0.3 \text{ AF}} \text{ (See worksheet)}$$

$$\text{Total} = \mathbf{8.1 \text{ AF}}$$

$$\text{Permit allows} = \mathbf{10.0 \text{ AF}}$$

$$\text{Recommend storage volume} = \mathbf{8.1 \text{ AF}}$$

Storage volume = ~~10.0 AF~~ **8.1**

Stockwater volume = 2.7 AF

Irrigation volume = 37.3 AF

Total recommended volume = ~~50 AF~~ **48.1**

G. NARRATIVE/REMARKS/COMMENTS

The stream for this water right is located on BLM land above the place of use. A signed BLM waiver is in the file, authorizing the owner to divert water. According to the owner, the stream only flows when water is applied to land on the flats just north of the stream. According to 2011 aerial photos, there is land up-grade of the stream being irrigated. The distance from the nearest irrigated land to the head of vegetation is about ¼ mile.

The owner raises about 200 head of cattle in the area but indicated he only had 15 head currently at the POU. The rest of the cattle were moved to range land for the summer. In the fall, the owner moves the cattle down and grazes them on the land below the pond. Water for the cattle is supplied in the pond. There were fish in the pond at the time of the field exam as well as birds and wildlife around the pond.

There is one POD and two POU's for this application. Water flows from the stream down along the creek bed into the pond. Using AreMap, the surface of the pond is measured at 0.1 acres. There is also a 6" buried pipe from the stream head down along the creek bed past the pond and then turns eastward along the irrigated property. Risers are placed along the pipe to allow for sprinkler lines. There were no sprinkler lines placed at the time of the field exam. The size of the irrigated field is 8.3 acres.

Irrigation is supplied from the stream (when it is flowing) via a buried 6" pipe. The distance from the POD to the first riser is 1075 feet with 100 feet in elevation drop. The farmer indicated the system fills with sand each spring and must be cleaned out prior to irrigation.

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
STOCKWATER	01/01 to 12/31	0.050 CFS	2.70 AF
STOCKWATER STORAGE	01/01 to 12/31		2.70 AF
IRRIGATION	03/01 to 11/15	0.170 CFS	37.30 AF
RECREATION STORAGE	01/01 to 12/31		~~8.1~~ 10.00 AF
AESTHETIC STORAGE	01/01 to 12/31		~~8.1~~ 10.00 AF
<u>Totals:</u>		0.220 CFS	~~48.1~~ 50.00 AF

2. Recommended Amendments

___ Change P.D. as reflected above ___ Add P.D. as reflected above ___ None

___ Change P.U. as reflected above ___ Add P.U. as reflected above ___ Other

I. AUTHENTICATION

Field Examiner's Name Glen Gardner Date July 24, 2012

Reviewer _____ Date _____

State of Idaho
Department of Water Resources
Water Right License

57-11620

Water Service Area Boundary for John D Edwards

R01W



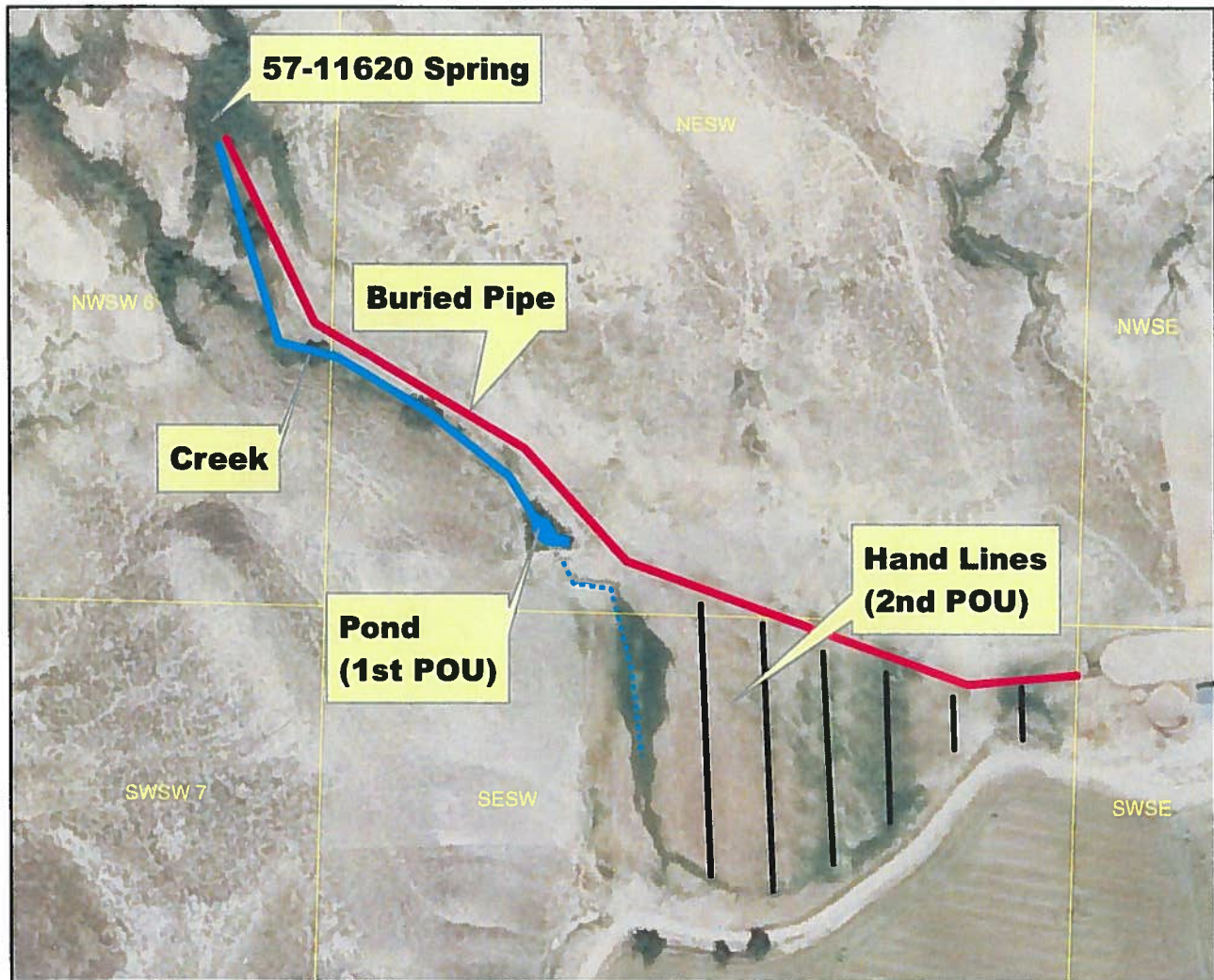
0 0.0475 0.095 0.19 Miles

- Point of Diversion
- Place Of Use Boundary
- Townships
- PLS Sections
- Quarter Quarters



Field Exam Map for 57-11620

System Diagram



There is one POD and two POU's for this application. Water flows from the spring down along the creek bed into the pond (1st POU). Using AreMap, the surface of the pond is measured at 0.1 acres. There is also a 6" buried pipe from the spring head down along the creek bed to the pond and then turns eastward along the irrigated property (2nd POU). Risers are placed along the pipe to allow for sprinkler lines. There were no sprinkler lines placed at the time of the field exam. The irrigated field is 8.3 acres in size.

OPEN CHANNEL DISCHARGE MEASUREMENT USING FLOAT METHOD

1. Name of stream or ditch: Unnamed Stream
 2. Location: Below pond for WR 57-11620
 3. Person conducting measure: Dan Nelson & Glen Gardiner
 4. Date and time of measure: 7/12/2012
 5. Accompanied by: Doug Hipwell - Owner

DIST FROM LEW (feet)	WIDTH (feet)	DEPTH (feet)	AREA (feet)
0.00			
0.25	0.38	0.25	0.09375
0.50	0.25	0.25	0.0625
0.75	0.38	0.15	0.05625
1.00			

Total Area = 0.2125 sq. ft

TOT WIDTH 1.00 AVERAGE DEPTH 0.22

AVERAGE VELOCITY (FT/SEC) 2.14

MEASURED TIME	DISTANCE MEASURED IN FEET
READING #1 8.68	
READING #2 9.62	20
READING #3 9.70	

AVERAGE TIME 9.33

DIVERSION RATE EQUALS (IN CFS) 0.46

0.455357143

Coefficient = 0.66

Adjusted CFS = 0.30

FILE NUMBER: 2-10327

REVIEWER: Glen Gardiner

DATE: 6/29/2012

MAXIMUM DAILY WATER USE FOR DOMESTIC PURPOSES

INPUTS

POND

SURFACE AREA (SQFT) ----- 4356

2.5 acres

SEEPAGE RATE (FT/DAY) ----- 0.20

SUGGESTED VALUES FOR DIFFERENT SOIL TYPES: CONVERT TO GPD -----

0 = NATURALLY FILLED FROM GW, OR LINED

0.5 = CLAY SOILS

1.5 = LOAMS

3.0 = GRAVELS

6517

GPD

FORMULA: SA * SEEPAGE LOSS = POND SEEPAGE (CUFT/D)

CONVERSION: 1 CUFT = 7.48 G

NOTE: ASSUMES CONTINUOUS REPLACEMENT RATE

TOTAL Seepage Loss (AFA) -----

7.3 AFA

TOTAL = FILL RATE + EVAP + SEEPAGE + FLOW THROUGH

Seepage based on pond holding water with years of silt deposition

Precipitation Loss Calculation

Date: July 12, 2012
Prepared by: Glen Gardiner
Water Right No: 57-11620

P = Precipitation
ET = Evapotranspiration
 P_d = Precipitation deficit
 $P_d = P - ET$

P_d

Found at: <http://www.kimberly.uidaho.edu/ETIdaho/>

P_d = convert to AFA: $\frac{\text{(mm/yr)}}{\text{(convert to feet)}} \times \text{\# acres} =$

937	/	304.8	x	0.1	=
(From ET Idaho)					

$P_d = 0.31$ AFA

* Use the Precipitation Deficit for 'P' value

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.

Kuna (NWS --105038)

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.

Open water - small stock ponds															
Precipitation Deficit (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	0.34	0.49	1.87	3.22	4.20	4.97	5.72	4.80	3.61	2.28	0.11	0.26	937	0	937
15-Day Moving Average ^d	0.38	0.39	1.88	3.27	4.25	5.09	5.79	4.72	3.52	2.23	0.03	0.29			
7-Day Moving Average ^e	0.35	0.45	1.87	3.24	4.19	4.98	5.77	4.77	3.56	2.24	0.03	0.29			
3-Day Moving Average ^f	0.34	0.48	1.87	3.23	4.20	4.96	5.73	4.80	3.59	2.27	0.08	0.27			
Standard Deviation	mm/day												mm		
Monthly	0.79	0.72	0.91	1.03	1.33	0.92	0.64	1.19	0.67	1.14	0.79	0.99	92	0	92
15-Day Moving Average	0.87	0.99	0.89	1.31	1.34	1.30	0.67	1.20	0.98	1.01	0.93	0.84			
7-Day Moving Average	1.15	1.30	1.21	1.67	1.94	1.89	0.96	1.42	1.32	1.42	1.31	1.09			
3-Day Moving Average	1.55	1.65	1.69	2.23	2.57	2.52	1.39	1.76	1.74	1.84	1.80	1.49			
20% Exceedance	mm/day												mm		
Monthly	0.08	1.08	2.28	4.06	4.82	5.82	6.02	5.42	4.14	2.94	0.80	0.32	1004	0	1004
15-Day Moving Average	0.57	1.52	3.16	4.77	6.09	6.42	6.47	5.78	4.77	3.55	1.39	0.64			
7-Day Moving Average	0.91	2.13	3.92	5.37	6.95	7.20	6.82	6.23	5.24	4.15	1.96	1.00			
3-Day Moving Average	1.12	2.81	4.84	6.30	7.60	7.86	7.40	6.64	5.73	4.72	2.59	1.24			

80% Exceedance	mm/day												mm		
Monthly	0.80	0.16	1.35	2.15	3.64	3.95	5.38	4.17	3.00	1.52	0.53	1.03	831	0	831
15-Day Moving Average	1.85	1.02	0.16	1.37	2.41	2.45	4.44	2.86	1.73	0.68	1.31	1.78			
7-Day Moving Average	3.12	2.57	-1.41	0.30	-0.32	0.20	3.64	1.38	0.17	0.85	2.74	3.15			
3-Day Moving Average	5.17	3.60	-3.27	4.56	-4.19	5.40	1.00	-1.39	2.25	4.03	5.17	5.66			
Ave Highest P_{def}	mm/day												--		
15-Day Moving Average ^g	0.32	1.03	2.65	4.10	5.27	5.99	6.24	5.36	4.32	2.99	0.81	0.38			
7-Day Moving Average ^h	0.66	1.70	3.28	4.89	6.13	6.73	6.64	5.97	4.95	3.75	1.46	0.66			
3-Day Moving Average ⁱ	0.92	2.19	4.05	5.82	7.02	7.44	7.11	6.42	5.49	4.31	2.06	0.94			
Ave Lowest P_{def}	mm/day												--		
15-Day Moving Average ^g	0.93	0.17	1.13	2.44	3.30	4.08	5.18	4.06	2.80	1.51	0.63	0.77			
7-Day Moving Average ^h	1.96	1.17	0.15	1.08	1.38	2.33	4.29	3.17	1.73	0.48	1.79	1.58			
3-Day Moving Average ⁱ	3.69	2.48	-1.44	1.12	-1.01	0.56	2.62	1.60	0.00	1.17	3.59	3.28			
Special normal distribution parameters for monthly, seasonal, and annual intervals													--		
Skew	0.17	0.43	-0.20	0.38	-0.60	0.03	0.27	-0.55	0.38	0.03	0.52	0.21	0.03	0.00	0.03
Kurtosis	0.78	3.44	0.86	3.15	1.58	2.20	1.42	1.38	3.21	0.57	4.17	0.82	2.58	0.00	2.58

^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



PHOTOGRAPHER AND DATE OF PHOTOS Glen Gardiner July 12, 2012

FILE NUMBER 57-11620



This photo shows the spring area. The area is muddy with water seeping out towards the left and down towards the pond. The irrigation pipe is buried under the cattails. The farmer indicated the pipe fills with mud and sand, needing to be cleaned out each year when flows are higher.



Panoramic View.

PHOTOGRAPHER AND DATE OF PHOTOS Glen Gardiner July 12, 2012

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This panoramic photo shows the pond looking south.



The vehicle is parked at the northwest corner of the irrigated acreage.