

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 36-16965
Exam Date: 6/26/2019

1. Current Owner:
ROBIN T HART & ROBERT M HART REVOCABLE TRUST
300 STATE PARK DR STE 1
APTOS CA 95003-4474

2. Accompanied by:
Robert Hart, permit holder
Frank Erwin, water master

3. **SOURCE:**
LOWER TUCKER SPRING
UPPER TUCKER SPRING

Tributary
RILEY CREEK
RILEY CREEK

B. OVERLAP REVIEW

1. Other water rights with the same place of use:

Water Right No.	Source	Purpose of Use	Basis
36-3E	Billingsley Creek	Irrigation / Stockwater	Decreed
36-10125	Ground water	Domestic / Stockwater	Decreed
36-16740	Upper & Lower Tucker Springs	Diversion to Storage Recreation Recreation Storage Stockwater Storage	License

Comments: The place of use of this permit is within the service area of Big Bend Irrigation & Mining Co (rights 36-133, 36-192).

2. Other water rights with the same point-of-diversion: This permit is delivered through the Big Bend Ditch which also delivers many other rights that are diverted from the same points of diversion: 36-133, 36-192, 36-2056, 36-4142, 36-7228, 36-7237, 36-7762, 36-7865, 36-8317, 36-8318, 36-8377, 36-8567, 36-8571, 36-8752, 36-16126, 36-16740

C. DIVERSION AND DELIVERY SYSTEM1. **LOCATION OF POINT(S) OF DIVERSION:**

UPPER TUCKER SPRING NW¼ SE¼ SE¼, Sec. 36, Twp 07S, Rge 13E, B.M. GOODING County
LOWER TUCKER SPRING SE¼ NW¼ SE¼, Sec. 36, Twp 07S, Rge 13E, B.M. GOODING County

Method of Determination: Aerial imagery in ArcMap

2. **PLACE OF USE: RECREATION STORAGE**

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
07S	13E	23							X										

Method of Determination: Aerial imagery in ArcMap, Sentinel satellite imagery in ArcMap (Nov. 2017)

3. **ATTACHMENTS**

☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.

☒ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.

☒ Aerial Photo Attached (required for irrigation of 10+ acres).

☒ Photo of Diversion and System Attached

4. WELL INFORMATION

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
N/A					

D. FLOW MEASUREMENTS

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
N/A						

Measurements: This permit authorizes storage water only; there is no diversion rate.

E. FLOW CALCULATIONS

_____ Additional Computation Sheets Attached

Measured Method: N/A

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation: N/A

$$V_{I.R} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

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

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

2. Volume Calculations for Other Uses: Recreation Storage

The 2013 field exam for overlapping water right 36-16740 determined the area of the pond as 0.5 acre. Seven pond depth measurements were taken around the pond, averaging 1.39 feet in depth. This equates to a storage volume of 0.7 ac-ft. Water right 36-16740 authorizes 0.2 ac-ft, so the additional amount of storage developed under this permit is 0.5 ac-ft.

The permit holder indicated that there is a clay layer under the pond which prevents seepage loss. Therefore, the only other consumptive use would be evaporation from the pond surface.

Data from ET Idaho for shallow open water systems near Hagerman were used to analyze the evaporation from the pond (see attached). The permit holder indicated that the pond is used during the winter months. The diversion to storage and recreation uses on overlapping right 36-16740 begin 10/16 and end 1/31. I calculated cumulative evaporation for half of October and November as 0.08 AF. Evaporation can be considered negligible during December and January when the precipitation deficit is negative. If the pond was full on February 1 when diversion ceased, and assuming seepage losses are negligible, then the maximum amount of water that could evaporate would be the pond volume, or 0.7 AF. Therefore, the maximum amount of evaporation would be approximately 0.78 AF. Based on discussion with the permit holder and a review of satellite imagery available to the Department, it appears that water is not usually diverted to the pond until late November or December. This would indicate that the actual evaporation from the pond is likely not more than the amount of water stored in the pond, 0.7 AF.

Considering the size of the pond and the analysis of evaporation losses, that would result in maximum beneficial use under this permit of 0.5 AF + 0.78 AF = 1.28 AF. The permit allows for 1.2 AF, which seems reasonable considering how the pond is used.

G. NARRATIVE/REMARKS/COMMENTS

For additional description of the diversion works and place of use, see the field examination report for water right 36-16740. During the licensing of that right, the field examiner identified that the beneficial use exceeded the permitted amount. Right 36-16740 includes diversion to storage, stockwater storage, recreation, and recreation storage uses. This permit, 36-16965, is for the additional storage volume and evaporation losses.

The points of diversion are at Upper and Lower Tucker Springs. Water is delivered from the PODs through the Big Bend Ditch to the place of use, which is a pond adjacent to the Big Bend Ditch. There is a lockable headgate diverting

out of the ditch through a buried PVC inlet pipe (approx. 8" diameter) which flows into the pond. At the lower end of the pond is a buried corrugated metal pipe (approx. 8" diameter) which flows back in to the Big Bend Ditch. It is also controlled with a lockable headgate. Both gates were closed and there was no water in the pond on the day of the exam. The pond area was planted in corn. Note that the season of use for the diversion to storage and recreation uses on right 36-16740 are from 10/16-1/31 while the storage uses are year-round.

During the field exam for this permit, the permit holder explained that the pond size was slightly reduced from the original size. Based on aerial imagery in ArcMap, I identified the pond surface area as approximately 0.45 acre rather than 0.5 acre as previously identified. Considering the Department's guidelines for rounding, I believe this should still round to 0.5 acre for administrative purposes.

The permit holder explained that the pond is used for recreational purposes, primarily for duck hunting. The pond has not been used for livestock, so I recommend removing the stockwater storage use at licensing. The permit holder indicated that there is a clay layer under the pond, which is another condition on the permit.

The permit includes condition R43 which requires a measuring device. There are measuring devices at the points of diversion where the springs flow into the Big Bend Ditch. This permit is for trust water, so the trust water condition will remain on the license.

Have conditions of permit approval been met? X Yes No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>	<u>Annual Volume</u>
RECREATION STORAGE	01/01 to 12/31		1.2 AF

Totals:

1.2 AF

2. Recommended Amendments

_____ Change P.D. as reflected above _____ Add P.D. as reflected above x None

Change P.U. as reflected above	Add P.U. as reflected above	x	None
--------------------------------	-----------------------------	---	------

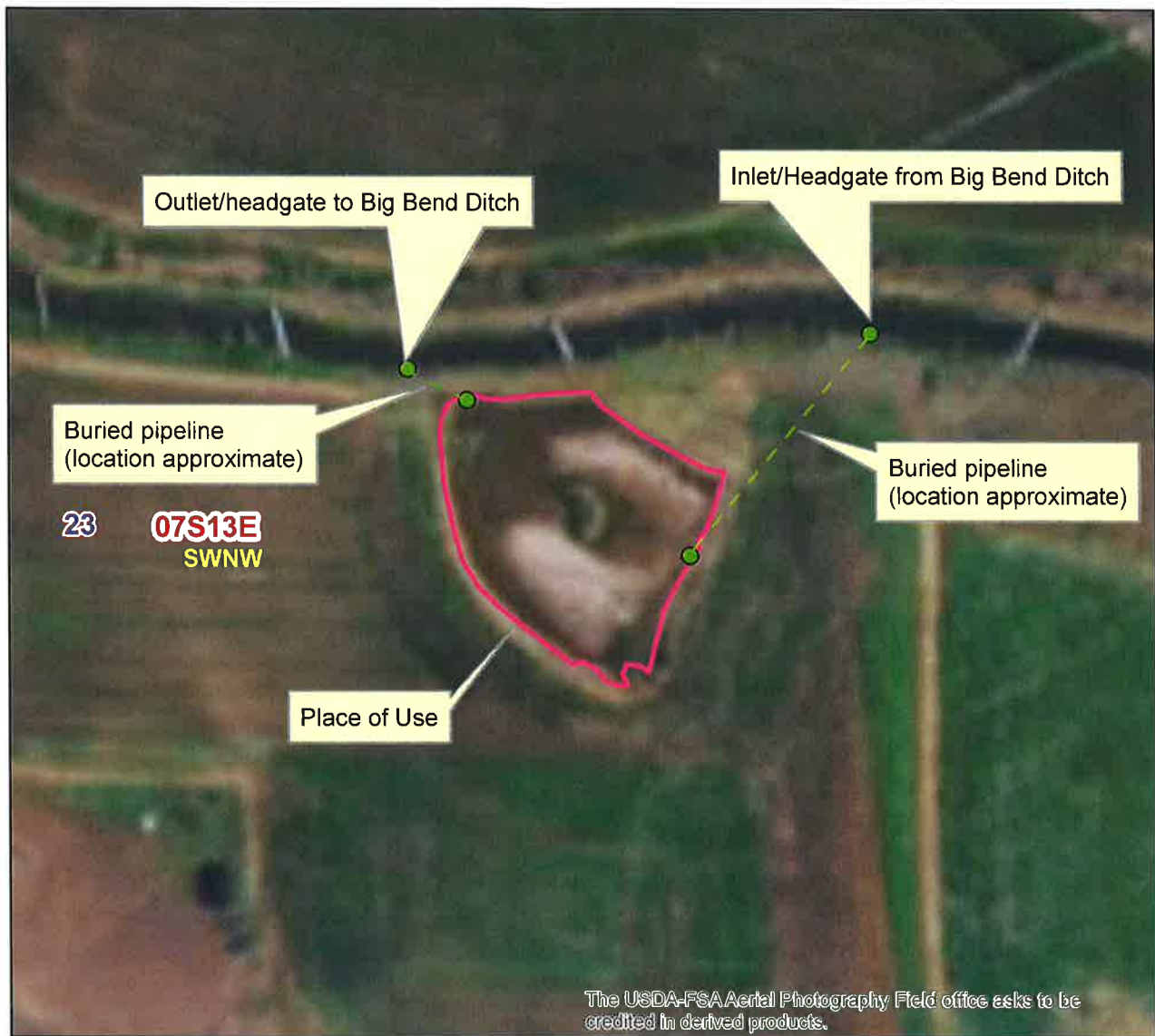
I. AUTHENTICATION

Allison Inouye - Water Resource Agent, Senior

Field Examiner's Name Alison Hux Date 6/27/2019

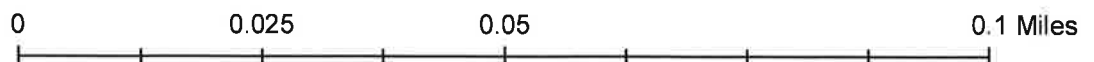
Reviewer _____ Date _____

Attachment to 36-16965 Beneficial Use Field Report: System Diagram

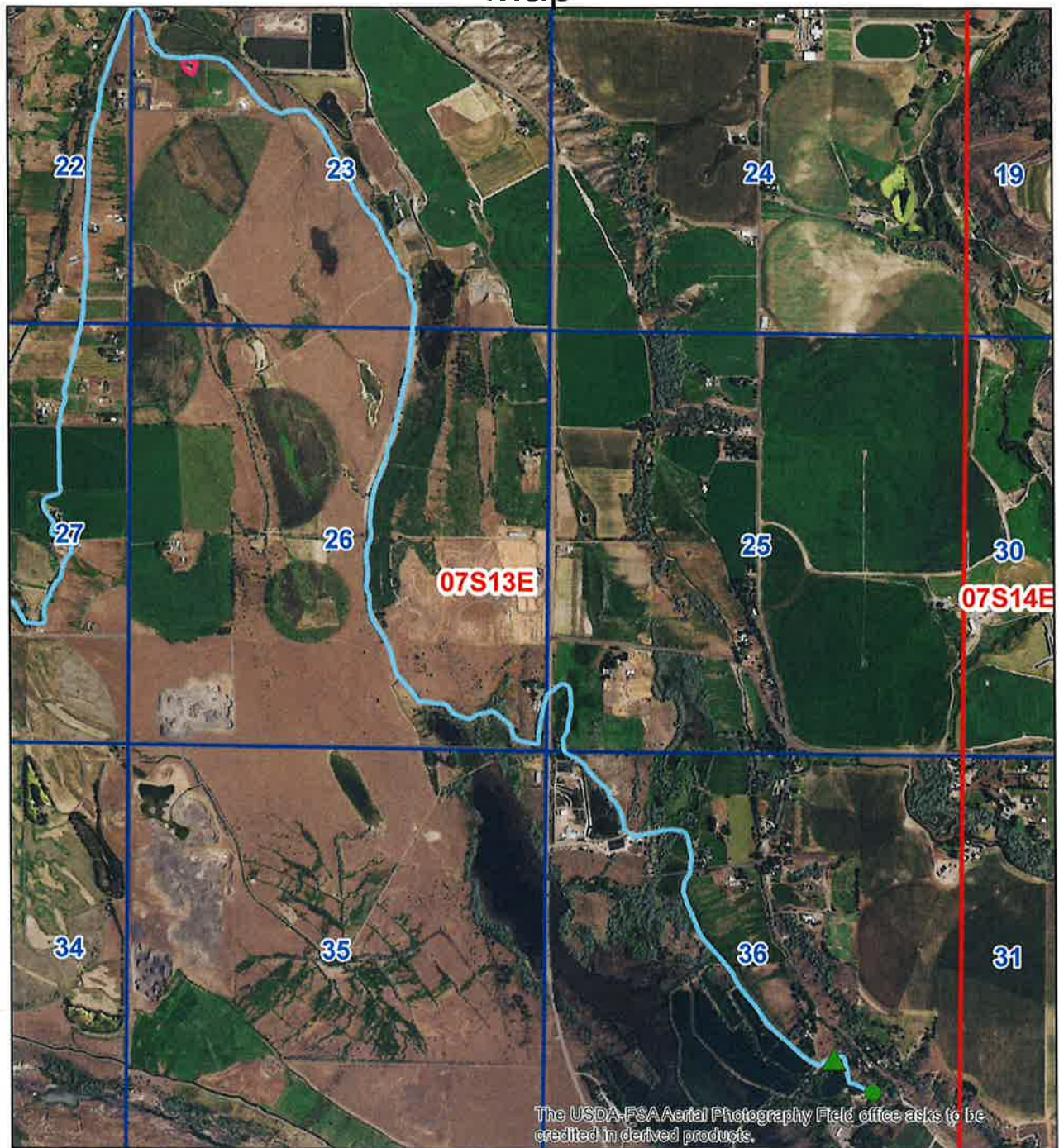


Legend

- Township/Range
- Sections
- QQ

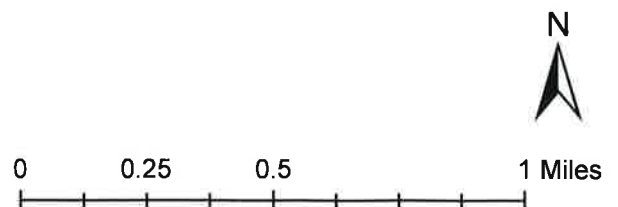


Attachment to 36-16965 Beneficial Use Field Report: Map

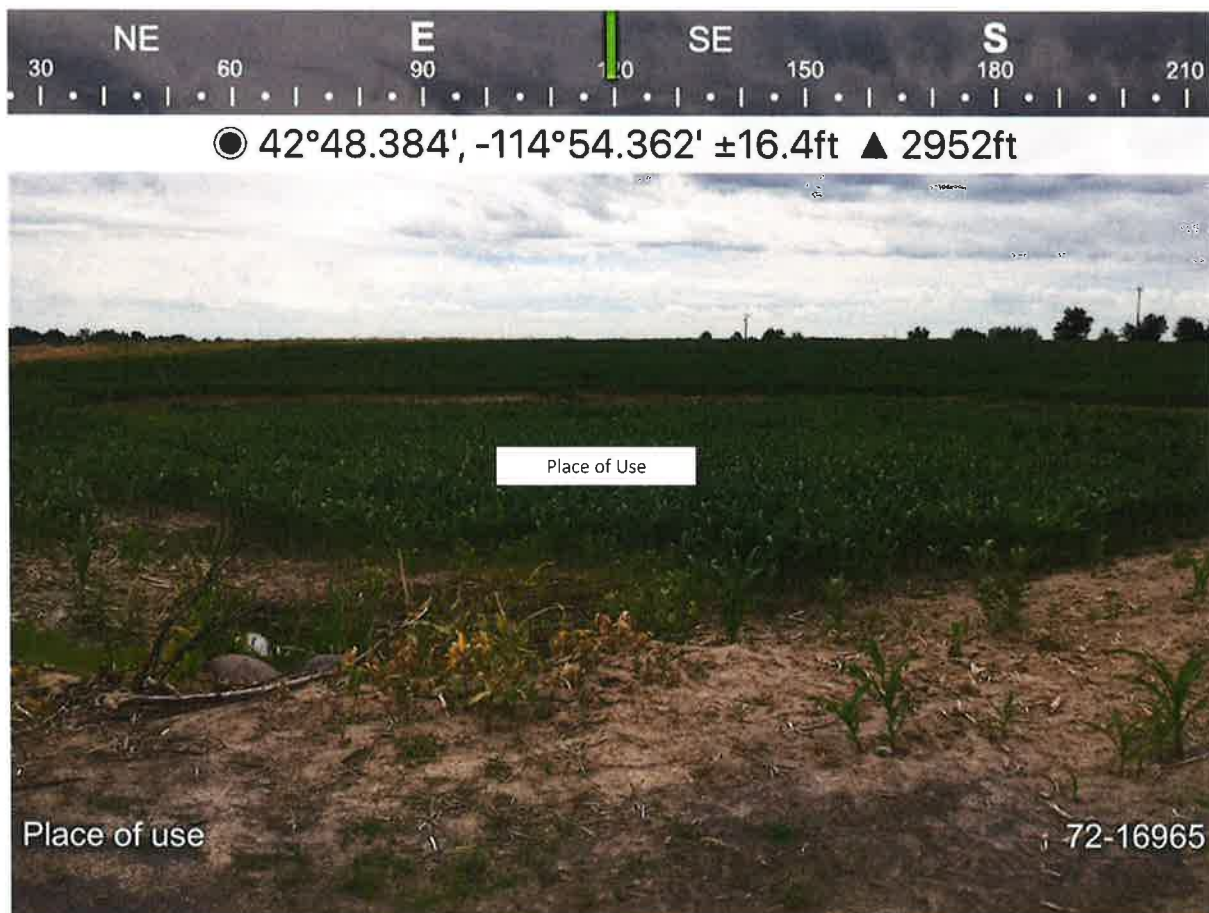
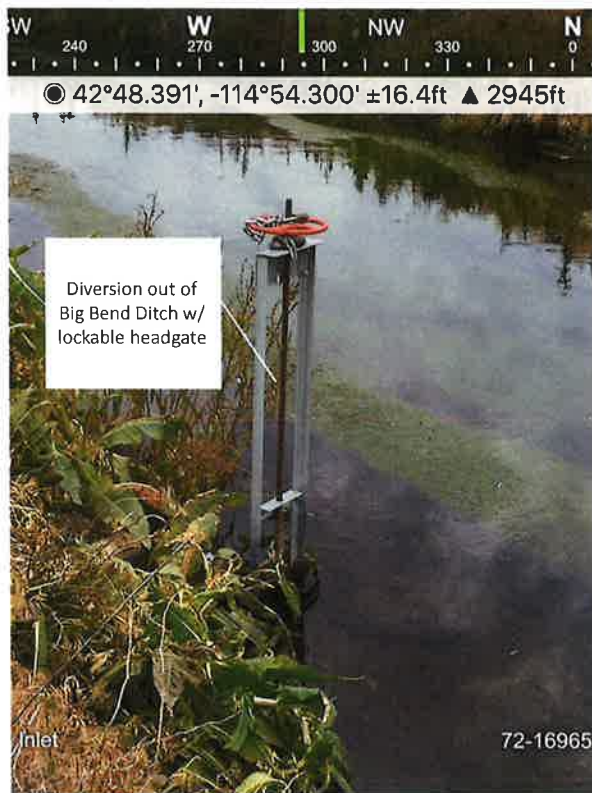


Legend

- POD Upper Tucker Springs
- ▲ POD Lower Tucker Springs
- Big Bend Ditch
- Place of Use
- Township/Range
- Sections



Attachment to 36-16965 Beneficial Use Field Report - Photographs



Attachment to 36-16965 Beneficial Use Field Report - Photographs



Permit 36-16965 Volume Calculations

Pond Volume = avg. depth * surface area

$$\begin{array}{rclcl} 1.39 \text{ ft} & \times & 0.5 \text{ ac} & = & 0.70 \text{ ac-ft} \\ & & & & \underline{0.20 \text{ ac-ft covered by right 36-16740}} \\ & & & & 0.50 \text{ ac-ft covered by this permit} \end{array}$$

Evaporation from Open Water Surface

Precipitation Deficit data from ET Idaho Hagerman site for open water-shallow systems

Constants			
1 ft	=	304.8 mm	
pond size	=	0.5 ac	

	Oct	Nov	Dec	Jan
mm/day evap	2.17	0.31	0	0
# days/mo*	16	30	31	31
mm/mo	34.72	9.3	0	0
ft/mo	0.11	0.03	0.00	0.00
ac-ft/mo	0.06	0.02	0.00	0.00

* 16 days/mo was used for October because the diversion to storage water use begins 10/16



University of Idaho

Kimberly Research
and Extension Center

[Water Resources Program](#)

ETIdaho 2017

Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for
improving this site to robison at
uidaho dot edu

2019-06-26 13:55

*Copyright 2018, University of
Idaho.*

Hagerman 2SW (NWS -- USC00103932)

Statistics based on thirty year normal spans 1986 to 2016 years

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 - shallow systems (ponds/streams)															
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 ^j	mm/day												mm		
Monthly ^c	-0.36	0.44	1.59	2.90	3.64	4.72	5.33	4.66	3.60	2.17	0.31	-0.78	862	0	862
15-Day Moving Average ^d	-0.44	0.33	1.62	2.94	3.66	4.72	5.35	4.69	3.62	2.26	0.29	-0.65			
7-Day Moving Average ^e	-0.39	0.38	1.58	2.91	3.63	4.70	5.34	4.69	3.62	2.25	0.32	-0.72			
3-Day Moving Average ^f	-0.37	0.44	1.58	2.91	3.64	4.71	5.33	4.67	3.59	2.20	0.33	-0.78			

Standard Deviation ^k	mm/day												mm		
Monthly ^c	0.97	0.89	1.21	0.64	1.37	0.77	0.70	0.90	0.63	1.16	0.80	1.58	105	0	105
15-Day Moving Average ^d	1.08	1.17	1.14	0.82	1.40	0.96	0.63	0.69	0.70	1.00	1.08	1.25			
7-Day Moving Average ^e	1.43	1.39	1.50	1.27	1.76	1.38	0.75	0.91	1.01	1.37	1.47	1.76			
3-Day Moving Average ^f	1.88	1.73	1.97	1.81	2.22	1.82	0.96	1.28	1.57	1.86	2.00	2.57			
20% Exceedance ^l	mm/day												mm		
Monthly ^c	0.18	1.18	2.29	3.31	4.28	5.37	5.63	5.07	4.08	2.75	1.11	0.28	928	0	928
15-Day Moving Average ^d	0.71	1.53	3.05	3.97	5.30	6.02	5.96	5.42	4.48	3.52	1.82	0.80			
7-Day Moving Average ^e	1.00	2.13	3.44	4.69	6.09	6.34	6.23	5.82	4.89	3.98	2.26	1.08			
3-Day Moving Average ^f	1.33	2.39	4.03	5.89	6.51	7.06	6.66	6.14	5.39	4.36	2.66	1.35			
80% Exceedance ^m	mm/day												mm		
Monthly ^c	-1.06	-0.27	0.81	2.10	3.15	3.95	4.98	4.40	3.00	1.40	-0.57	-1.49	760	0	760
15-Day Moving Average ^d	-1.95	-1.19	-0.31	1.43	2.17	2.84	4.65	3.76	2.32	0.20	-1.86	-2.53			
7-Day Moving Average ^e	-3.67	-2.40	-2.23	-0.19	-0.19	1.79	4.13	3.13	1.34	-1.34	-3.87	-4.22			
3-Day Moving Average ^f	-5.99	-4.21	-6.25	-3.42	-4.43	0.18	3.01	1.11	-0.82	-4.79	-7.39	-9.92			
Ave Highest P _{def}	mm/day												--		
15-Day Moving Average ^g	0.44	0.94	2.39	3.69	4.63	5.48	5.68	5.10	4.15	2.98	1.15	0.41			
7-Day Moving Average ^h	0.85	1.52	2.98	4.45	5.42	6.08	6.02	5.49	4.68	3.54	1.72	0.77			
3-Day Moving Average ⁱ	1.12	1.97	3.58	5.30	6.10	6.73	6.50	5.83	5.10	4.06	2.22	1.07			
Ave Lowest P _{def}	mm/day												--		
15-Day Moving Average ^g	-1.09	-0.17	0.80	2.19	2.63	3.90	5.01	4.21	3.06	1.40	-0.51	-1.66			
	-2.15	-1.03	-0.38	0.97	1.34	2.83	4.52	3.59	2.22	0.31	-1.62	-3.13			

7-Day Moving Average ^h															
3-Day Moving Average ⁱ	-4.12	-2.58	-2.59	-1.00	-0.64	1.36	3.66	2.40	0.58	-1.93	-4.00	-6.07			
Special normal distribution parameters for monthly, seasonal, and annual intervals															
Skew ^m	-0.05	-0.88	-0.04	0.10	-0.33	-1.06	-0.38	-0.70	-0.89	-0.21	-0.10	-0.22	0.37	0.00	0.37
Kurtosis ^o	0.76	3.49	0.74	2.73	1.12	3.38	0.98	2.01	2.92	0.83	1.71	0.94	2.91	0.00	2.91

^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

^j This value represents the *mean value* for the parameter for the month over the 'normal' period of record. Generally, the 'normal' period is the last thirty years with data.

^k This value represents the *standard deviation* for the parameter for the month over the 'normal' period.

^l This value represents the *value* for the parameter that has a 20% chance of being exceeded that month during any particular year. Conversely, there is an 80% chance that the parameter value will be less than the *value* shown.

^m This value represents the *value* for the parameter that has a 80% chance of being exceeded that month during any particular year. Conversely, there is an 20% chance that the parameter value will be less than the *value* shown.

ⁿ This value represents the *skewness (asymmetry) of the distribution of the parameter values* for the month (year) over the 'normal' period. A value near zero indicates that the distribution approximates a normal (Gaussian) and

symmetrical distribution. A negative skew indicates that the parameter distribution has relatively few low values compared to high values. A positive skew indicates that the distribution has relatively few high values compared to the number of low values. A skew value near 1 indicates that the underlying distribution approximates a lognormal distribution.

° This value represents the *kurtosis* of the parameter value distribution for the month (year) over the 'normal' period. Kurtosis is a measurement of the height to width ratio of the probability distribution, or the *peakedness (slenderness)*. A normal (Gaussian) distribution has a kurtosis of 3. A high kurtosis distribution has a sharper peak and longer tails, while a low kurtosis distribution has a more rounded peak and shorter tails.

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, 2017. **Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplement updating the Time Series through December 2017**, Research Technical Completion Report, Kimberly Research and Extension Center, University of Idaho, Moscow, ID.*

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

Copyright 2018, University of Idaho.

ETIdaho web site powered by [Debian](#), [Apache](#), [Firebird DBMS](#), [Python](#)