

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
IN-OFFICE REVIEW/BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 65-22844

Exam Date: 3/24/2014

1. Does this qualify for an in-office field exam (IDAPA 035.02.r)? ☒ Yes ☐ No
- a. Irrigation of 5 acres or less
- b. Storage of up to 14.6 AF for stockwater purposes only
- c. Any use other than irrigation or storage, if the combined diversion rate is 0.24 cfs or less
- d. Other < >

2. Current Owner: Name: Charles & Sheryl Lambert
- Owner of Record Correct? ☐ Yes ☒ No
- Address of Record Correct? ☐ Yes ☒ No
- If No: Address:
Wilderness Spirit Trust, 4925 Curtis Rd., Payton, CO 80831

3. Beneficial Use Fees have been paid: ☒ Yes ☐ No Receipt No: CO98219

4. SOURCE**TRIBUTARY**

Unnamed Spring

Sinks

Method of Determination: Applicant submitted an aerial photo map that outlined POD & POU.

Change in Source: ☐ Yes ☒ No**B. OVERLAP REVIEW**

1. Other water rights with the same place of use: Overlap? ☐ Yes ☒ No

Water Right No.	Source	Purpose of Use	Basis

Comments: Water right 65-18195 is a stockwater use owned by the Lamberts.

2. Other water rights with the same point of diversion: Overlap? ☐ Yes ☒ No

Water Right No.	Source	Purpose of Use	Basis

Comments: There are no other water rights that share POD.

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

Source	Govt. Lot	¼	¼	¼	Sec.	Twp.	Rge.		County
Unnamed Spring		NW	SE	NW	30	12N	04E		Valley

Method of Determination: Legal Description in permit validated by PLS data and mapping.

Change in POD? ☐ Yes ☒ NoAmendment Required? ☐ Yes ☒ No

2. **PLACE OF USE:** Use: Irrigation, Irrigation Storage, Domestic, Fire Protection,

TWP	RGE	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
12N	04E	30								X									
										4.6									

Method of Determination: Map of property submitted by land owner identifies POU clearly. PLSS data through ArcMap match.

Change in POU? ☐ Yes ☒ No Amendment Required? ☐ Yes ☒ No

☐ Delivery System Diagram Attached (required). Indicate all major components and distances between components.

Indicate weir size/pipe as applicable.

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

☐ 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

2. Measurements: In-office field exam so theoretical not applicable.

E. FLOW CALCULATIONS

☒ Additional Computation Sheets Attached

Measured Method:

According to administrator memo #22, domestic use for 1 home is allowed a flow rate up to 0.04 cfs.

Administrator Memo #17 authorizes an irrigation flow rate of 0.03 cfs per acre for up to 5 acres. The permit is for 5.0 acres so a flow rate of 0.15 cfs would be acceptable.

Theoretical flow rate of 0.05 cfs was found using Manning's Equation from conduit.

Measurement = 0.05 cfs

Permit allowed = Domestic 0.02 cfs, Irrigation 0.15 cfs, Fire Protection 0.20 cfs, Diversion to Storage 0.20 cfs

License recommend for Domestic 0.02 cfs, Irrigation 0.05 cfs, Fire Protection 0.05 cfs, Diversion to Storage 0.05 cfs

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: Not used when source is from surface water.

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 4.6 \times 3.0 = 13.8$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = 0.05 \times 200 \times 1.9835 = 19.8$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = 13.8 \text{ af}$$

2. Volume Calculations for Other Uses:

Pond storage is 0.6 af based on attached theoretical report.

According to administrator memo #22, domestic use for 1 home is authorized 0.6 af for in home use only.

G. PURPOSE OF USE

Irrigation ☒ Yes ☐ No # Stock 0 Domestic # of Homes 1

Other: < >

Change in Purpose of Use? ☐ Yes ☒ No

Method of Determination: Aerial photography supported development and uses that were described in application for permit.

If Yes: From Use _____ To Use _____ Amount _____ CFS _____ AFA _____

H. NARRATIVE/REMARKS/COMMENTS

Permit 65-22844 authorized the use of 0.02-0.20 cfs from a stream for domestic, irrigation, fire protection and storage water purposes. Based on the information provided in the water right file, this qualifies for an in-office field exam.

The pond and places of use were described in the application. Aerial photography of the property clearly showed that a storage pond exists and development of the domestic structure had been constructed since 2004. Ownership of the application to permit process has remained the same. However taxlot information shows a different owner and address for the property. I will be recommending a change of ownership be sent with license to the current property owner.

Contact with Mr. Lambert was made on March 27, 2014 to discuss the irrigation component of the water right. It was difficult to identify what had exactly been irrigated. Conversation with Mr. Lambert confirmed that there are ditches that run water to the property where I have outlined in the Attachment to Water Right License map.

Theoretical calculations were used to estimate diversion rate, pond volumes and evaporation rates. Data was collected for these calculations from Idaho evapotranspiration stations which record local rates. These results have been included in the field report. From this information, total storage for the pond on the property is 0.6 af. Flow rate from the pond to the place of use was measured through Manning's equation spreadsheet. Rise and run were estimated by ArcMap tools and DRG topographic maps. Pipe diameter and material was not specified in water right file and I assumed common system measurements. The maximum theoretical flow rate is 0.05 cfs using Manning's Equation from conduit. This limits the irrigation and fire protection rate to the maximum the system may produce.

Theoretical calculations for flow were done to verify the ability to supply the water rate/volume authorized by permit. There were no issues or reasons to request further information.

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

I. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
Irrigation	04/15-10/31	0.05	
Irrigation Storage	01/01-12/31		0.6
Irrigation From Storage	04/15-10/31		0.6
Domestic	01/01-12/31	0.02	0.6
Fire Protection	01/01-12/31	0.05	
Fire Protection From Storage	01/01-12/31		0.6
Fire Protection Storage	01/01-12/31		0.6
Diversion To Storage	01/01-12/31	0.05	
	<u>Totals</u>	0.05 cfs	3.0 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 ☒ None

Other: < >

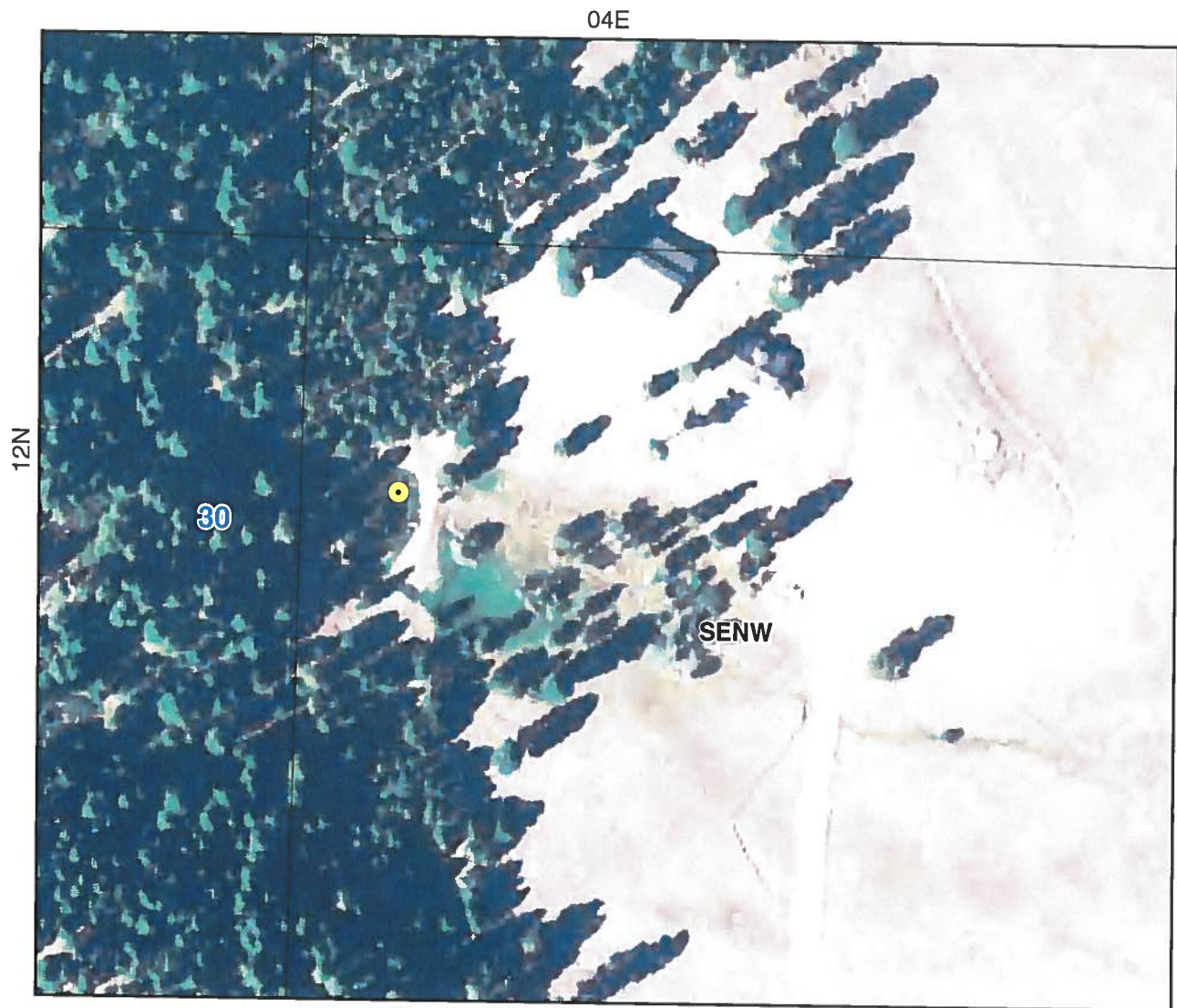
J. AUTHENTICATION

Field Examiner's Name Patricia Wiley Date 03/28/14

Reviewer Daniel A. Miller Date 4-8-14

State of Idaho
Department of Water Resources
Field Exam Map
65-22844

This map depicts the places of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



-  Point of Diversion
-  Townships
-  PLS Sections
-  Quarter Quarters

0 0.02 0.04 0.08 Miles



TOTAL STORAGE

FILE NUMBER	65-22844
REVIEWER	Patrick Kelly
DATE	3/24/2014

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond

Surface Area (In Acres)	0.1	"Surface Area" is automatically carried over from the "Seepage Loss Sheet"
Average Pond Depth (In feet)	4	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated. Note: If you know the maximum depth and not the average depth, the field examiner's handbook suggest multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that
Pond Capacity (In acre feet)	0.4	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth. If you know the capacity, divide the capacity by surface area and enter the average pond depth in the

Volume Needed Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (In acre feet)	0	The "Volume Needed Above Initial Fill" is the acre-feet of water required to meet a <i>from storage</i> component if the <i>from storage</i> component exceeds a one time fill. This section should not include the amount of water needed to fill the pond initially or the amount of water needed to maintain the pond level due to evaporation or seepage. For example: if a pond has a capacity of 5 acre feet and 2.5 acre feet of seepage and evaporation, but the pond is used for irrigation that requires 10 acre feet of from storage for the irrigation use, then you would insert 5 acre feet into this location (10 acre feet needed - 5 acre feet from the initial fill = 5 acre feet of additional storage needed). PLEASE NOTE: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.
Estimated Seepage Loss (In acre feet)	0.1	The "Estimated Seepage Loss" is automatically carried over from the Seepage Loss Sheet
Estimated Evaporation Loss (In acre feet)	0.1	The "Estimated Evaporation Loss" is automatically carried over from the Evaporation Loss Sheet
Total Volume Required (In acre feet)	0.6	"The Total Volume Required" is calculated by adding the Pond Capacity, Multiple Fills, Seepage Loss, and Evaporation Loss amounts to determine the total amount of storage required.

Flow Rate into Pond (In cfs)	1.00	The "Flow Rate" into the Pond depicts the actual flow either measured or estimated into the pond.
Highest Daily Evaporation Rate From Evaporation Tab. (In mm/day)	3.59	This number is automatically selected by picking the highest recorded number in the "Precipitation Deficit Table".
Maximum Required Daily Maintenance Volume (In acre feet per day)	0.00	"Maximum Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year, and is calculated by adding the highest daily evaporation loss to the average daily seepage loss in acre feet. The average daily seepage loss is calculated by dividing the "Estimated Seepage Loss" by 365 days. This is acceptable, since the seepage rate shouldn't vary throughout the season unless the pond completely freezes over during the winter months. The highest daily evaporation loss is calculated by dividing the Highest Daily Evaporation Rate by the 304.8 conversion factor and multiplying this number by the pond surface area to attain a combined daily acre feet requirement.
Minimum Maintenance Flow (In cfs)	0.00	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determine by dividing the "Maximum Required Daily Maintenance Volume" by 1.9835. This flow can be used to determine if the flow rate into the pond is adequate to maintain the pond level.
Days Required to Fill the Pond	0	The "Days Required to Fill the Pond" is calculated by dividing the "Pond Capacity" by the "Flow Rate" minus "Minimum Maintenance Flow" multiplied by 1.9835. This section will assist you in determining if the flow rate being diverted to the pond is adequate to fill the pond while maintaining the pond level. The length of time to fill the pond will help determine if the flow rate is adequate for the size of pond being proposed. This number should be between 1 and 365 days for a project to be successful.
Days Required to Fill the Pond at 13,000 gallons per day	10	The "Days Required to Fill the Pond at 13,000 gallons per day" is calculated converting the "Pond Capacity" and the "Maximum Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Maximum Daily Maintenance Volume" in gallons to determine the number of days to fill pond. This number should be between 1 and 365 if this pond is to described as a domestic use.

User Input
Calculated value
Formula Explanations

SEEPAGE CALCULATIONS

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total annual seepage losses from a pond.

FILE NUMBER	65-22844
REVIEWER	Patrick Kelly
DATE	3/24/2014

User Input
Calculated value
Formula Explanations

INPUTS

SQ. FT. Calculator Pond Surface area in acres
0.1

POND SURFACE AREA (SQ. FT.)	4356
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SUGGESTED SEEPAGE RATE (FT/DAY)	0.0030
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Use the table below to find the "SUGGESTED SEEPAGE RATES".

FORMULA: (Surface Area X Seepage Rate) / 7.48 = Gallons Per Day loss

CONVERT TO GPD	98	GPD
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TOTAL SEEPAGE LOSS (AFA)	0.1	AFA
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SUGGESTED SEEPAGE RATES FOR DIFFERENT SOIL TYPES:
GW, GP, GM, GC, SW, SP and SM (silty sand, sand silt mixtures and gravel mixtures) = 0.20 ft per day
OL and ML (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.016 ft per day
SC (clayey sands, sand clay mixtures) = 0.007 ft per day
CL (Low to medium plasticity clays) = 0.003 ft per day
MH, OH, PT and CH (high plasticity clays) = 0.0003 ft per day
LINED PONDS (liners can be chemical, fabric, or bentonite) = 0 ft per day
Ponds Intercepting Groundwater (excavated ponds filled with shallow Ground Water) = 0 ft per day

PLEASE NOTE: The initial basis for the Suggested Seepage Rates in the table above is found on Page 16 of Seepage from Fish Ponds, Bulletin 599, August 1989 Alabama Agricultural experiment Station, Auburn University, Auburn University Alabama. If you don't know the soil type, please refer to the map provided at X:\Spatial\Soils\USCS\PondSoils.lyr. Use "0" if the ponds intersect the water table.

Evaporation Loss Calculation

FILE NUMBER	65-22844
REVIEWER	Patrick Kelly
DATE	3/24/2014

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

The acronyms used on the Kimberly Research Center website are defined below:
P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

User Input
Calculated value
Formula Explanations

USING THIS SPREADSHEET

To ascertain the evaporation from a pond, you will need to go to the Kimberly Research Center website. The link is found below. This web site provides the Precipitation Deficit for the area where the pond is located. The Precipitation Deficit is the total amount of free pan evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used, and the entire state is pretty much covered. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:\Spatial\Climate\ETIdahostations.shp.

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

Precipitation Deficit

Station: Twin Falls 2 NNE (NWS -- 109294)

Month	mm/day ¹	Days per month	mm/Month
Jan	0.00	31	0.00
Feb	0.00	28	0.00
March	0.00	31	0.00
April	0.51	30	15.30
May	1.34	31	41.54
June	2.29	30	68.70
July	3.59	31	111.29
August	3.10	31	96.10
September	1.85	30	55.50
October	0.12	31	3.72
November	0.00	30	0.00
December	0.00	31	0.00

PLEASE NOTE: We cannot use the season average, because there are several areas in Northern Idaho with a negative Precipitation Deficit. Therefore, we must enter each monthly deficit, and enter in a zero (0) for each negative month. The reason for this is that precipitation can only offset evaporation to the extent of the evaporation.

Please enter the daily average Precipitation Deficit as shown in the example below.

Although it has sometimes been useful to consider wintertime evaporation to be zero, Allen and Robison (2007, p. 169) noted, "Evaporation during nongrowing (wintertime) periods varies widely . . ."

¹Negative monthly mean values should be entered in the above table as "0".

Total mm/year = 392.15

((mm/yr) ÷ (convert to feet)) X (Surface area of pond, in acres) = Evaporation Loss in Acre Feet
(392.15 ÷ 304.8) X 0.10 = 0.1 AFA

Surface Area of Pond is automatically Carried over from the Seepage Loss Sheet.

Example Data:

ET_{Idaho} 2012 -- Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to robison@kimberly.uidaho.edu Copyright 2012 University of Idaho.

Twin Falls 2 NNE (NWS -- 109294)

Statistics based on thirty year normal spans 1943 to 1973 years

For a different land cover or crop click on the above link 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](#))

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual	
Mean ¹	mm day												mm		
Monthly ²	-0.3 ³	6.32	1.19	2.40	3.13	3.73	4.94	4.24	3.11	2.00	0.22	-0.33	751	0	751
15-Day Moving Average ⁴	-0.50	6.31	1.19	2.42	3.09	3.74	4.97	4.23	3.08	2.02	0.12	-0.32			
7-Day Moving Average ⁵	-0.41	6.32	1.19	2.40	3.10	3.73	4.96	4.25	3.12	2.02	0.16	-0.28			
3-Day Moving Average ⁶	-0.3 ⁷	6.33	1.20	2.41	3.12	3.75	4.94	4.24	3.12	2.01	0.20	-0.25			

The above table is a snap shot of the tables you find at the Kimberly Research Center Webpage. The link above will take you there. You will want to enter the numbers found in this table into the table above. You will need to enter a zero (0) for any negative number. Unfortunately, you cannot copy and paste, so you will have to hand enter the data.

ET_{Idaho} 2012 -- Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to robison at kimberly dot uidaho dot edu Copyright 2012, University of Idaho.

Cascade 1 NW (NWS -- 101514)

Statistics based on thirty year normal spans 1977 to 2010 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	-1.67	-1.30	-0.64	0.51	1.34	2.29	3.59	3.10	1.85	0.12	-1.93	-2.54	145	0	145
15-Day Moving Average ^d	-1.55	-1.63	-0.58	0.51	1.37	2.36	3.68	3.06	1.74	0.15	-2.02	-2.30			
7-Day Moving Average ^e	-1.62	-1.51	-0.63	0.47	1.36	2.33	3.66	3.07	1.79	0.14	-2.01	-2.38			
3-Day Moving Average ^f	-1.65	-1.36	-0.66	0.53	1.32	2.31	3.62	3.10	1.84	0.11	-1.94	-2.49			
Standard Deviation ^k	mm/day												mm		
Monthly ^c	1.58	1.34	1.70	0.92	1.49	1.09	0.80	0.90	1.04	1.42	1.35	2.55	150	0	150
15-Day Moving Average ^d	1.65	1.80	1.53	1.26	1.67	1.38	0.74	0.98	1.39	1.46	1.89	1.84			
7-Day Moving Average ^e	2.29	2.46	1.99	1.83	2.25	2.04	1.02	1.37	1.72	2.03	2.51	2.86			
3-Day Moving Average ^f	2.94	3.11	2.78	2.58	3.04	2.80	1.52	1.74	2.09	2.84	3.38	4.01			
20% Exceedance ^l	mm/day												mm		
Monthly ^c	-0.63	-0.05	0.20	1.23	2.30	3.30	4.09	3.65	2.79	0.91	-0.66	-1.38	268	0	268
15-Day Moving Average ^d	0.17	0.48	1.20	2.25	3.76	4.20	4.52	4.04	3.15	1.92	0.15	0.00			
7-Day Moving Average ^e	0.37	0.91	1.56	3.08	4.28	4.71	4.69	4.33	3.40	2.33	0.58	0.25			
3-Day Moving Average ^f	0.46	1.09	1.94	3.50	4.74	5.03	5.07	4.57	3.66	2.52	0.87	0.29			
	mm/day												mm		

Manning's Equation Calculator for Flow Rate in a Circular Conduit Flowing Full

READ ME

S = 0.0613 ft/ft
 n = 0.009 manning's coefficient
 d = 1.5 pipe diameter (inches)
 D = 0.13 pipe diameter (feet)
 r = 0.06 pipe radius (feet)
 A = 0.01 area (ft²)
 WP = 0.39 wetted perimeter (ft)
 R = 0.03 hydraulic radius (ft)

Q = 0.05 flow rate (CFS)

Channel Slope

Slope Options —
☐ Manual Entry ☒ Slope Calculator

Slope Calculator

Rise = 20 feet

Run = 326 feet

Slope, S = 0.0613 ft/ft

Pipe Material, (n):

plastic (pvc, abs)

Pipe Diameter (inches)

1.5 inches

Manning's Equation (1), is an empirical formula that solves for velocity (v) in a open channel under uniform flow. The continuity equation (2) when combined with equation (1) allows for the computation of the flow rate (Q) in an open channel under uniform flow.

In equations (1) and (3), n refers to Manning's Coefficient of Roughness and can be found in tabulated form for many open channel types. R is the hydraulic radius of the open channel and is equal to the area of the open channel divided by the wetted perimeter, $R = A/P$. S is the slope of the energy grade line which is often assumed to be equal to the slope of the channel.

Because Manning's Equation is empirical the units are not arbitrary. To obtain a velocity in ft/s and a flow rate in ft³/s, area must be reported in ft², hydraulic radius must be reported in ft, and S must be reported in ft/ft. Manning's Coefficient of Roughness is a unitless constant.

$$(1) \quad v = 1.49 \left(\frac{1}{n} \right) \left(R^{\frac{2}{3}} \right) \sqrt{S}$$

$$(2) \quad Q = vA$$

$$(3) \quad Q = 1.49 \left(\frac{1}{n} \right) (A) \left(R^{\frac{2}{3}} \right) \sqrt{S}$$

[illegible]