

3. Attachments:

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

X 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

X 1:24,000 or greater.

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

X Photo of Diversion and System Attached

4. Diversion Works Information:

Well or ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No.

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

D. FLOW MEASUREMENTS

1. Device Information:

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

2. Measurement Technique Description:

We employed two measurement techniques in order to calculate the flow of water into the reservoir to establish the correct rate for the "diversion to storage" beneficial use. First we conducted a "bucket test". This involved holding a bucket under the outlet pipe to collect all the water exiting the reservoir. By measuring the amount of water collected and the time during which water was collected the rate of flow can be calculated. The rate of water exiting the reservoir is equal to the rate at that water is entering the reservoir assuming the system is at equilibrium. The second method, the "apricot test", involved recording the time it took an apricot to travel the length of the outlet pipe, calculating the cross-sectional area of water in the pipe, and then calculating the flow rate. See the attached sheet for measurement data and the calculations.

E. FLOW CALCULATIONS

1. Diversion to Storage:

X Additional Computation Sheets Attached

Dam Safety Trip Report 12/17/2013 indicated the water was exiting the reservoir at a rate of 26 gallons per minute or 0.06 cfs. See the attached sheet for calculations from two additional measurement methods.

2. Wildlife and Aesthetic Flow Through:

Water is diverted continuously from Escott Drain by means of an open ended pipe at the point of diversion. Once the reservoir is full all the water diverted from Escott Drain into the reservoir leaves the reservoir at the same rate. For this reason the rate of flow for the beneficial uses "wildlife" and "aesthetic" should be the same rate calculated for "diversion to storage". See the following section for the volume calculations and discussion.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

Not applicable.

2. Volume Calculations for Wildlife Storage and Aesthetic Storage:

IDWR Dam Safety staff members conducted a field examination of the reservoir on 12/17/2013 and used GPS survey equipment to measure the constructed dam and reservoir. The field report indicates the embankment is 16 feet high measured from toe to dam crest and a hydraulic head of 15 feet as measured from dam top to maximum water level. The impoundment area of the dam measured 0.209 acres with an estimated storage capacity of 1.25 ac-ft of water." Another hazard evaluation of the dam occurred on 10/03/2014 by IDWR Dam Safety staff. The trip report (dated 10/03/2014) detailing the evaluation reported the barrier height to be 15 feet, the surface area to be 0.2 acres, and the capacity to be "1.5 acre-feet or less." Application Processing Memorandum No. 76 establishes guidelines for evaluating reservoirs and reservoirs. The attached spreadsheets show the calculations used to determine the loss of water from the reservoir due to seepage and evaporation, these losses should be added to the capacity to determine

the total amount of water diverted annually. The spreadsheets also contain a calculation of the reservoir capacity (1.08 ac-ft) made by multiplying the surface area by the average reservoir depth. The following additional volume calculation was made based on the Attached Reservoir Capacity Determination methods for freeform polygons with vertical sides.

Measurements:

Surface Area (SA) = 0.27 acres

measured using ArcMap

Max Depth (Md) = 15 feet

from dam safety trip reports

Average Depth (Ad) = 4 feet

from the system description on the application

$$\text{FFPvs Volume (ac-ft)} = \text{SA} * \text{Md} = 0.27 * 15 = 4.05$$

3. Volume Calculations for Wildlife and Aesthetic (Flow Through):

Using a diversion rate of 0.2 cfs and assuming that rate is diverted for 365 days (season of use is 1/1 – 12/31) then the total volume diverted for wildlife and aesthetics would be as follows:

$$\text{Volume (ac-ft annually)} = 0.2 \text{ cfs} * (31536000 \text{ sec/year}) (1 \text{ af}/4350 \text{ cf}) = 144.8 \text{ afa}$$

G. NARRATIVE/REMARKS/COMMENTS

The permit was issued with the point of diversion being described using the 10-ac tract (NESWNE). Since the diversion is from a drain and not a spring and the actual point of diversion can be anywhere within the SWNE then the 10-ac tract should be removed from the license. Another difference between the permit and the license is with the conditions. The permit was approved with condition 259 to describe the details of the reservoir. However, under current department policy that condition is used to describe storage systems that allow for beneficial uses from storage. Instead the license should be approved with condition 219 to describe the details of the storage system, and condition 220 should be added to limit the size of the size of the reservoir. The field examination and subsequent review (see calculation) shows the storage capacity of the reservoir is less than the capacity listed in condition 259 of the permit but the losses due to seepage and evaporation are more than what was anticipated on the application. The reduction in capacity actually balances the increase in losses so that the annual volume diverted for storage should be the same as what was approved on the permit. Additionally, the permit contains some text conditions and a condition X01 that describe the use of water for flow through. Condition X01 is now used for domestic uses so this condition should remain but as a text condition without a numerical code. The other text conditions are related and complimentary so they were combined into one condition for the license approval. There are no issues with ownership so condition 004 can be removed.

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>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
AESTHETIC	01/01 to 12/31	0.20 CFS	144.8 AF
WILDLIFE	01/01 to 12/31	0.20 CFS	144.8 AF
AESTHETIC STORAGE	01/01 to 12/31		2.5 AF
WILDLIFE STORAGE	01/01 to 12/31		2.5 AF
DIVERSION TO STORAGE	01/01 to 12/31	0.20 CFS	
	<u>Totals:</u>	0.200 CFS	144.8 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

Field Examiner's Name P. H.

Date 10/30/17

Reviewer _____

Date _____

Rate Calculations

Bucket Test

Time (sec) to Fill 4.7 gal		Bucket Measurements	Calculations	
1.80		d = 11.25 in	SA (sqft) = $3.14 * (.47)^2 =$	0.69
1.60		d = 0.94 ft	V (ft ³) = $0.62 * 0.69 =$	0.43
1.73		r = 5.63 in	cfs = $V/s = 0.43/1.73 =$	0.25
1.60	foot slipped	r = 0.47 ft		
1.40	outlier	h (of water) = 7.44 in		
1.60		h (of water) = 0.62 ft		
1.80		SA = $\pi * r^2$		
1.63		V = h*SA		
1.83				
1.69				
1.80				
1.43	outlier			
1.78				
17.26	Total			
1.73	Average			

Apricot Test

Time (sec) to Travel Outlet		Outlet Measurements	Calculations	
8.83		depth of water = 3.72 in	WP (ft) = see attached	1.07
8.33		depth of water = 0.31 ft	Cross Sectional Area, XSA (ft ²) =	0.18
8.86		length of pipe = 35.9 ft	cfs = $(XSA * L)/s = (0.18 * 35.9)/8.64 =$	0.75
8.55		d of water = 9.48 in		
34.57	Total	d of water = 0.79 ft		
8.64	Average	r of water = 4.74 in		
		r of water = 0.40 ft		

Storage Volume Calculations

Pond Measurements

SA (from ArcMap) = 0.27 acres

depth (max) = 15 ft

depth (avg) = 4 ft

Free Form Polygon (ac-ft) $V = SA * (2/5) * d =$

max depth	$0.27 * 0.4 * 15 =$	1.2
avg depth	$0.27 * 0.4 * 4 =$	0.4

Dam Safety Trip Report

Pond Capacity from Memo 76 (avg depth)	1.1
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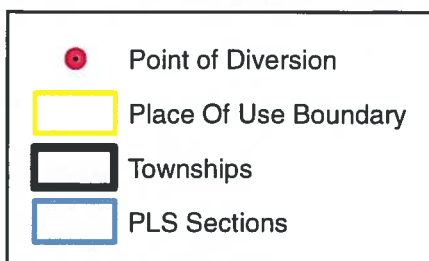
Flow Through Volume Calculations

$V \text{ (afa)} = \text{cfs} \rightarrow \text{afa} = 0.2 \text{ cf/s} * (31536000 \text{ s/1 yr}) * (1 \text{ af}/43560 \text{ cf}) =$	144.8
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Water Right No.63-33898



The USDA-FSA Aerial Photography Field office asks to be credited in derived products.



0 0.03 0.06 0.12 Miles



TRS	Process	Basin Sequence	Owner	Source	POD POU	Use	NENE	NWNE	SWNE	SENE	NENW	NWNW	SWNW	SENW	NESW	NWSW	SWSW	SESW	NESE	NWSE	SWSE	SESE	Total Acres
03N04W15	Water Permit	63-33898	SYMMES, RICHARD A	ESCOTT DRAIN	POD				X														
03N04W15	Water Permit	63-34285	DE SEELHORST, SCOTT A; DE SEELHORST, SUSAN M	GROUND WATER	POD		X																
03N04W15	Water Right	63-10600	CORP OF THE PRESIDING BISHOP OF THE CHURCH OF	GROUND WATER	POD															X			
03N04W15	Water Right	63-11147	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POD					X													
03N04W15	Water Right	63-11179	PLASCENCIA, JAIME; PLASCENCIA, NICOLAS	GROUND WATER	POD																X		
03N04W15	Water Right	63-11550	ANDERSON, MARGARET; ANDERSON, ROBERT	SPRING	POD							X											
03N04W15	Water Right	63-11660	ROBISON, S RICHARD	GROUND WATER	POD					X													
03N04W15	Water Right	63-21071	JAMES, EDNA L; JAMES, HENRY	GROUND WATER	POD														X				
03N04W15	Water Right	63-21072	JAMES, EDNA L; JAMES, HENRY M	SPRINGS	POD														X				
03N04W15	Water Right	63-22151	BARROSO, ISABEL O; BARROSO, JOSE MANUEL	GROUND WATER	POD																X		
03N04W15	Water Right	63-23231	BURRIS, EMMA V PETERSON	GROUND WATER	POD																	X	
03N04W15	Water Right	63-23945	WILLIAMS, THOMAS A	GROUND WATER	POD												X						
03N04W15	Water Right	63-25942	PLASCENCIA, NICOLAS	GROUND WATER	POD																X		
03N04W15	Water Right	63-26002	BEVRY, SYGURD E	GROUND WATER	POD			X															
03N04W15	Water Right	63-26209	PARDO, JESUS M	GROUND WATER	POD																	X	
03N04W15	Water Right	63-26618	SMITH, MARGARET A	GROUND WATER	POD																	X	
03N04W15	Water Right	63-26923	AGUILAR SR, AMADOR G	GROUND WATER	POD												X						
03N04W15	Water Right	63-27306	LANDA, SABINO; LANDA, SIMON	SPRING	POD							X											
03N04W15	Water Right	63-27892	GARZA, ANDRES; GARZA, JUANITA	GROUND WATER	POD																X		
03N04W15	Water Right	63-27900	GRIMM, FRED	GROUND WATER	POD																X		
03N04W15	Water Right	63-28206	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	GROUND WATER	POD															X			
03N04W15	Water Right	63-28238	KINCHELOE, RICHARD L; KINCHELOE, STEPHANIE R	GROUND WATER	POD										X								
03N04W15	Water Right	63-28239	KINCHELOE, RICHARD L; KINCHELOE, STEPHANIE R	GROUND WATER	POD										X								
03N04W15	Water Right	63-28577	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POD					X													
03N04W15	Water Right	63-28580	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POD									X									
03N04W15	Water Right	63-28924	SYMMES, RICHARD A	GROUND WATER	POD			X															
03N04W15	Water Right	63-30313	JORDON, PAMELA	GROUND WATER	POD															X			
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POD					X													
03N04W15	Water Right	63-32321	SCOTT, BEN; SCOTT, JAIME	GROUND WATER	POD																X		
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POD					X													
03N04W15	Water Right	63-4234	ROBISON FRUIT RANCH INC; ROBISON, ORPHENA E;	GROUND WATER	POD								X										
03N04W15	Water Right	63-8428	CORP OF THE PRESIDING BISHOP OF THE CHURCH OF	GROUND WATER	POD						X												

ground water

TR5	Process	Basin Sequence	Owner	Source	POD POU	Use	NENE	NWNE	SWNE	SENE	NENW	NWNW	SWNW	SENW	NESW	NWSW	SWSW	SESW	NESE	NWSE	SWSE	SESE	Total Acres
03N04W15	Water Permit	63-33898	SYMMS, RICHARD A	ESCOTT DRAIN	POU	AESTHETIC			X														
03N04W15	Water Right	63-21072	JAMES, EDNA L; JAMES, HENRY M	SPRINGS	POU	AESTHETIC													X				
03N04W15	Water Permit	63-33898	SYMMS, RICHARD A	ESCOTT DRAIN	POU	AESTHETIC STORAGE			X														
03N04W15	Water Permit	63-34285	DE SEELHORST, SCOTT A; DE SEELHORST, SUSAN M	GROUND WATER	POU	COMMERCIAL	X																
03N04W15	Water Right	63-28580	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POU	COMMERCIAL								X									
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	DIVERSION TO STORAGE														X			
03N04W15	Water Permit	63-34285	DE SEELHORST, SCOTT A; DE SEELHORST, SUSAN M	GROUND WATER	POU	DOMESTIC	X																
03N04W15	Water Right	63-11179	PLASCENCIA, JAIME; PLASCENCIA, NICOLAS	GROUND WATER	POU	DOMESTIC															X		
03N04W15	Water Right	63-21071	JAMES, EDNA L; JAMES, HENRY	GROUND WATER	POU	DOMESTIC													X				
03N04W15	Water Right	63-22151	BARROSO, ISABEL O; BARROSO, JOSE MANUEL	GROUND WATER	POU	DOMESTIC															X		
03N04W15	Water Right	63-23231	BURRIS, EMMA V PETERSON	GROUND WATER	POU	DOMESTIC																X	
03N04W15	Water Right	63-23945	WILLIAMS, THOMAS A	GROUND WATER	POU	DOMESTIC											X						
03N04W15	Water Right	63-25942	PLASCENCIA, NICOLAS	GROUND WATER	POU	DOMESTIC															X		
03N04W15	Water Right	63-26002	BEVRY, SYGURD E	GROUND WATER	POU	DOMESTIC		X															
03N04W15	Water Right	63-26209	PARDQ, JESUS M	GROUND WATER	POU	DOMESTIC																X	
03N04W15	Water Right	63-26618	SMITH, MARGARET A	GROUND WATER	POU	DOMESTIC																X	
03N04W15	Water Right	63-26923	AGUILAR SR, AMADOR G	GROUND WATER	POU	DOMESTIC											X						
03N04W15	Water Right	63-27892	GARZA, ANDRES; GARZA, JUANITA	GROUND WATER	POU	DOMESTIC															X		
03N04W15	Water Right	63-27900	GRIMM, FRED	GROUND WATER	POU	DOMESTIC															X		
03N04W15	Water Right	63-28206	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	GROUND WATER	POU	DOMESTIC														X			
03N04W15	Water Right	63-28238	KINCHELOE, RICHARD L; KINCHELOE, STEPHANIE R	GROUND WATER	POU	DOMESTIC									X								
03N04W15	Water Right	63-28239	KINCHELOE, RICHARD L; KINCHELOE, STEPHANIE R	GROUND WATER	POU	DOMESTIC									X								
03N04W15	Water Right	63-28577	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POU	DOMESTIC				X													
03N04W15	Water Right	63-28580	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POU	DOMESTIC								X									
03N04W15	Water Right	63-28924	SYMMS, RICHARD A	GROUND WATER	POU	DOMESTIC			X														
03N04W15	Water Right	63-30313	JORDON, PAMELA	GROUND WATER	POU	DOMESTIC													X				
03N04W15	Water Right	63-32321	SCOTT, BEN; SCOTT, JAIME	GROUND WATER	POU	DOMESTIC															X		
03N04W15	Water Right	63-4234	ROBISON FRUIT RANCH INC; ROBISON, ORPHENA E;	GROUND WATER	POU	DOMESTIC							X										
03N04W15	Water Permit	63-34285	DE SEELHORST, SCOTT A; DE SEELHORST, SUSAN M	GROUND WATER	POU	IRRIGATION	11																11
03N04W15	Water Right	63-10600	CORP OF THE PRESIDING BISHOP OF THE CHURCH OF	GROUND WATER	POU	IRRIGATION					10	40					30	5	10	30	15		140
03N04W15	Water Right	63-11147	ROBISON, ORPHENA E; ROBISON, STANLEY S	GROUND WATER	POU	IRRIGATION				2													2
03N04W15	Water Right	63-11179	PLASCENCIA, JAIME; PLASCENCIA, NICOLAS	GROUND WATER	POU	IRRIGATION															1		1
03N04W15	Water Right	63-11660	ROBISON, S RICHARD	GROUND WATER	POU	IRRIGATION		23		22													45

diff use

same owner

TRS	Process	Basin Sequence	Owner	Source	POD POU	Use	NENE	NWNE	SWNE	SENE	NENW	NWNW	SWNW	SENW	NESW	NWSW	SWSW	SESW	NESE	NWSE	SWSE	SESE	Total Acres
03N04W15	Water Right	63-136	BARKER ROSHOLT & SIMPSON LLP; BOISE	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-137B	BARKER ROSHOLT & SIMPSON LLP; BOISE	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-200A	BARKER ROSHOLT & SIMPSON LLP; BOISE	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-2106	UNITED STATES OF AMERICA ACTING THROUGH	FIVEMILE CREEK	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-21072	JAMES, EDNA L; JAMES, HENRY M	SPRINGS	POU	IRRIGATION													7.1				7.1
03N04W15	Water Right	63-233K	AMERICAN DITCH CO; BARKER ROSHOLT &	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-2388A	UNITED STATES OF AMERICA ACTING THROUGH	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-2392F	BOISE PROJECT BOARD OF CONTROL	WASTE WATER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-251A	UNITED STATES OF AMERICA ACTING THROUGH	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-301A	UNITED STATES OF AMERICA ACTING THROUGH	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-302A	UNITED STATES OF AMERICA ACTING THROUGH	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	IRRIGATION														7.7			7.7
03N04W15	Water Right	63-33060	CDOR INC; FARM CREDIT BANK OF SPOKANE; J & R	GROUND WATER	POU	IRRIGATION											38.5						38.5
03N04W15	Water Right	63-33251	BOISE PROJECT BOARD OF CONTROL	INDIAN CREEK	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-33253	BOISE PROJECT BOARD OF CONTROL	TENMILE CREEK	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	IRRIGATION														2.3			2.3
03N04W15	Water Right	63-373A	UNITED STATES OF AMERICA ACTING THROUGH	BOISE RIVER	POU	IRRIGATION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03N04W15	Water Right	63-8428	CORP OF THE PRESIDING BISHOP OF THE CHURCH OF	GROUND WATER	POU	IRRIGATION					12		24	38	35								109
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	IRRIGATION FROM STORAGE														7.7			7.7
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	IRRIGATION FROM STORAGE														1.9			1.9
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	IRRIGATION STORAGE														X			
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	IRRIGATION STORAGE														X			
03N04W15	Water Right	63-21072	JAMES, EDNA L; JAMES, HENRY M	SPRINGS	POU	STOCKWATER													X				
03N04W15	Water Right	63-23945	WILLIAMS, THOMAS A	GROUND WATER	POU	STOCKWATER												X					
03N04W15	Water Right	63-25942	PLASCENCIA, NICOLAS	GROUND WATER	POU	STOCKWATER															X		
03N04W15	Water Right	63-26618	SMITH, MARGARET A	GROUND WATER	POU	STOCKWATER																X	
03N04W15	Water Right	63-28924	SYMMS, RICHARD A	GROUND WATER	POU	STOCKWATER			X														
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	STOCKWATER														X			
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	STOCKWATER														X			
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	STOCKWATER STORAGE														X			
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	STOCKWATER STORAGE														X			
03N04W15	Water Permit	63-33898	SYMMS, RICHARD A	ESCOTT DRAIN	POU	WILDLIFE			X														

TRS	Process	Basin Sequence	Owner	Source	POD POU	Use	NENE	NWNE	SWNE	SENE	NENW	NWNW	SWNW	SENW	NESW	NWSW	SWSW	SESW	NESE	NWSE	SWSE	SESE	Total Acres
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	WILDLIFE														X			
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	WILDLIFE														X			
03N04W15	Water Permit	63-33898	SYMMES, RICHARD A	ESCOTT DRAIN	POU	WILDLIFE STORAGE			X														
03N04W15	Water Right	63-32320	HELLWEGE, MERRY M; HELLWEGE, RICHARD H	SPRING	POU	WILDLIFE STORAGE														X			
03N04W15	Water Right	63-33648	GARVIN, CHRISTOPHER D; GARVIN, TERI J; HELLWEGE,	SPRING	POU	WILDLIFE STORAGE														X			

Seepage Loss Calculations

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

FILE NUMBER	63-33898
REVIEWER	Phill Hummer
DATE	7/20/2017

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.27	AC.
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Pond Surface Area (SQ. FT.)	11761	SQ. FT.
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I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	SC	
Suggested Seepage Rate (FT./DAY)	0.0070	FT./DAY

formula
0.007

Formula: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss
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Convert to GPD	616	GPD
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Total Seepage Loss (AFA)	0.7	AFA
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Though sand and gravel seepage rates may actually be higher, the maximum allowable rate is 0.2 ft/day, pursuant to Administrative Memo "Seepage Loss Standards for Ponds and Reservoirs."

Suggested Seepage Rates for Different Soil Types:
GW, GP, GM, GC, SW, SP and SM (silty sand, sand silt mixtures and gravel mixtures) = 0.2 ft per day
OL and ML (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.02 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 by 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 the NRCS Web Soil Survey (Tab #1), an ArcMap Soil Classification Map (Tab #1.1), or published NRCS Soil Survey (Tab #1.2). Use "0" if the pond fill relies on the water table.

Evaporation Loss Calculations

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The acronyms used on the Kimberly Research Center website are defined below:

P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface 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 throughout the state. 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>.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any

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

Precipitation Deficit

Station: Deer Flat Dam (NWS - 102444)

Month	mm/day ¹	Days per month	mm/Month
Jan	-0.53	31	0.00
Feb	0.34	28	9.52
March	1.29	31	39.99
April	2.38	30	71.40
May	3.45	31	106.95
June	3.81	30	114.30
July	4.56	31	141.36
August	3.85	31	119.35
September	3.01	30	90.30
October	1.67	31	51.77
November	-0.14	30	0.00
December	-0.58	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 744.94

$$[(\text{mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

(744.94 ÷ 304.8) X 0.27 = 0.7 AFA

Total Storage Calculations

FILE NUMBER	63-33898
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This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond.

User Input
Calculated value
Formula Explanations

Surface Area (AC.)	0.27	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	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 suggests multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that seems reasonable to attain average depth.
Pond Capacity (AF)	1.08	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 space above. Note: If pond capacity is determined using a method shown on the "Pond Capacity" sheet, the user may need to modify the value of "Pond Capacity" (cell B9) manually. Note that if the value is modified manually, the formula will be altered for future use.
Multiple Fill Volume Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (AF)	0	The "Multiple Fill Volume 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). 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 (AF)	0.7	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	0.7	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	2.4	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.

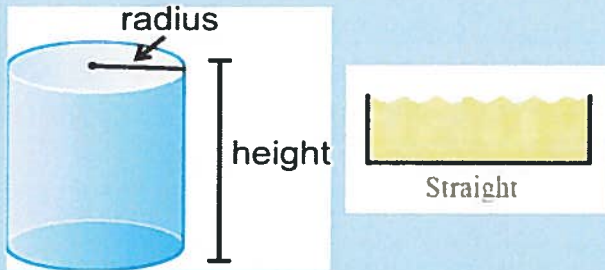
Pond Capacity Determination

Cylinder Shaped

$$\text{Volume} = \pi \cdot (\text{radius})^2 \cdot \text{height}$$

OR

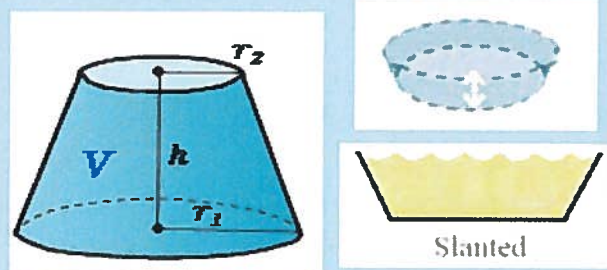
$$\text{Volume} = \text{circular surface area} \cdot \text{depth}$$



Truncated Cone Shaped

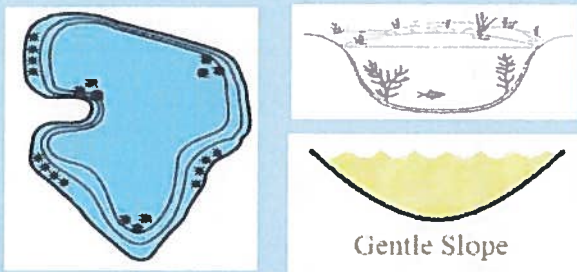
$$\text{Volume} = (1/3) \cdot \pi \cdot (r_1^2 + r_1 \cdot r_2 + r_2^2) \cdot h$$

where h = water depth
 r_1 = radius at top of basin
 r_2 = radius at bottom of basin



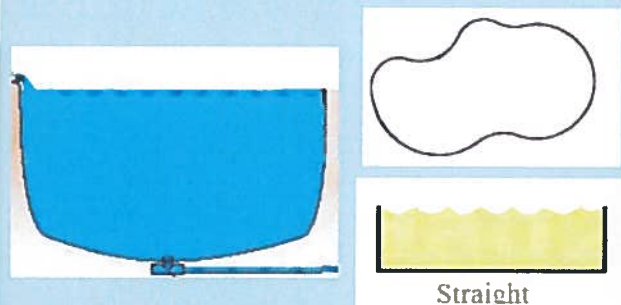
Freeform Polygon with Sloped Sides and Bottom

$$\text{Volume} = \text{surface area} \cdot (2/5) \cdot \text{maximum depth}$$



Freeform Polygon with Vertical Sides and Flat Bottom

$$\text{Volume} = \text{surface area} \cdot \text{maximum depth}$$



The surface area of a freeform polygons should be measured using aerial photography and ArcGIS.

For ponds with an unusual shape and inconsistent depth, the reviewer may be able to combine different shapes to calculate a total pond volume.



The diversion is created by a PVC pipe positioned vertically in the downpour from the culvert.



Looking northwest from the embankment across the storage pond. Water from the diversion system enters the pond near the far end of the pond.



The outlet pipe for the reservoir. There is a second outlet pipe that isn't visible, behind the bushes that serves as an emergency outlet.



State of Idaho

DEPARTMENT OF WATER RESOURCES

Western Region, 2735 Airport Way, Boise, Idaho 83705-5082

PHONE: (208) 334-2190 FAX: (208) 334-2348 www.idwr.idaho.gov

C.L. "BUTCH" OTTER,
Governor

GARY SPACKMAN
Director

05/11/2017

RICHARD A SYMMS
14068 SUNNY SLOPE RD
CALDWELL ID 83607

RE: Scheduling Field Exam for Water Permit No. 63-33898

Dear Permit Holder:

The Idaho Department of Water Resources (IDWR) is planning to conduct water right examinations in the vicinity of the above-referenced permit **during the weeks of 06/19 through 06/30**. An examination is needed to verify the water use(s) developed under the permit in order to issue a water right license.

The enclosed report of permit no. 63-33898 shows you are authorized to divert 0.20 cfs from the Escott Drain for the purposes of Wildlife and Aesthetic Storage. If you developed a beneficial use of water and still own the place of use identified on the map, please contact me at your earliest convenience to schedule an examination.

If you developed a beneficial use of water under the permit but no longer own the property show as the place of use, please fill out the enclosed Assignment of Permit Form to change the owner of the water right permit to the current owner of the property. Submit the complete form and a \$25.00 fee to this office. This will allow IDWR to work with the new permit owner for the license process. A license cannot be issued if beneficial use of water was not developed or if use was developed but abandoned. In either of those cases, please submit the enclosed Relinquishment of Permit Form.

Please contact me at 208-334-2190 within the next thirty (30) days to schedule an examination or if you have any questions. The permit will become void if this office does not receive some correspondence from you by 06/12/2017. If you no longer own that property and do not assign or relinquish the permit, IDWR will work with the current property owner to issue a license or void the permit.

Sincerely,

Phill Hummer

Water Resource Agent

Phone: (208) 334-2190

Email: phill.hummer@idwr.idaho.gov

Enclosure: Relinquishment and Assignment Forms
Proof Report and Map of Permit No. 63-33898