

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 93-7177

Exam Date: 5/22/2013

1. Current Owner: EARL L. LANNING
120 MOSES MTN LN
TENSED ID 83870
(208)274-3722
2. Accompanied by: Earl L. Lanning
Phone No: Same as Above
Address: Same as Above
Relationship to Permit Holder: Owner

3. **SOURCE**

SPRING
UNNAMED STREAM

TRIBUTARY

UNNAMED STREAM

B. OVERLAP REVIEW

1. Other water rights with the same place of use: None
2. Other water rights with the same point of diversion: None

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

UNNAMED STREAM	NE1/4SW1/4	Sec. 23,	Twp 44N,	Rge 04W, B.M.	BENEWAH County
SPRING	NE1/4NE1/4SW1/4	Sec. 23,	Twp 44N,	Rge 04W, B.M.	BENEWAH County
SPRING	NE1/4SE1/4SW1/4	Sec. 23,	Twp 44N,	Rge 04W, B.M.	BENEWAH County
SPRING	SW1/4SE1/4SW1/4	Sec. 23,	Twp 44N,	Rge 04W, B.M.	BENEWAH County

Method of Determination: GPS and Visual Inspection

2.

PLACE OF USE: DOMESTIC AND STOCKWATER

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
44N	04W	23												X					

PLACE OF USE: STOCKWATER STORAGE AND RECREATION STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
44N	04W	23									X				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 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
House Pump	Flotec	0.75	C48J3E01103	Unknown	1 inch

*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
NONE						

2. Measurements: The pump wasn't operational at the time, so a theoretical calculation was used. The pump had a pressure gauge that gave a good pressure calculation.

E. FLOW CALCULATIONS

X Additional Computation Sheets Attached

Measured Method:

Measurement = 0.04 cfs (See Theoretical Calculation Sheet)

Stockwater allows = 0.02 cfs (Per Permit and standard 26 head of stock- see attached sheet)

Permit allowed = 0.06 cfs (0.02 cfs was allowed for the stockwater, 0.04 cfs for domestic, and 0.06 cfs was allowed for diversion to storage—the stockwater and domestic uses are standard diversion rates and there is no diversion to storage.)

License recommend for 0.02 cfs for stockwater and 0.04 cfs for domestic use. No diversion to storage was found, so diversion to storage was removed. Total diversion rate allowed = 0.04 cfs which is the capacity of the pump.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = \underline{\hspace{2cm}}$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = \underline{\hspace{2cm}}$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = \underline{\hspace{2cm}}$$

2. Volume Calculations for Other Uses:

The capacity for the 3 ponds were calculated at 1.6 acre feet of volume for one time fill with 0.3 acre feet for evaporation for a total of 2.2 acre feet of storage. There is no seepage, since this is an on-stream pond. An additional 0.3 acre feet was added to cover the amount of water being consumed from the pond by livestock. Therefore, the total recommended volume for this water right is 2.2 acre feet.

Domestic volume = 1.2 af per Administrator's Permitting Memo #22

Stockwater volume = 0.3 af (see attached sheet).

Total Volume = 1.9 af pond capacity and evaporation + 1.2 af domestic + 0.3 af stockwater = 3.4 af total volume

G. NARRATIVE/REMARKS/COMMENTS

There are three ponds that are not connected to each other. Pond #1 (northern most pond) and Pond #3 (southern most pond) were developed over the top of spring/boggy areas supplying water for these two ponds. Pond #2 (the middle pond) is on a small unnamed stream and captures that water. Pond #2 catches the excess water from a pond/spring on the other side of the road that flows under the road and into the pond, therefore the channel Pond #2 is on is actually an unnamed stream. The domestic system pulls water from a third spring that is delivered to a pump house that has a ¾ Hp pump that delivers the water to a small garden, the home, and stock tanks in the barns and corrals. The domestic use includes irrigation of the small garden and yard around the home. I checked the irrigated area and it was approximately 0.3 acres of ground being irrigated.

The only overlapping water right is adjudication claim 93-7255, but the holder of this claim doesn't own any water rights in this section. The legal description for 93-7255 must be incorrect. The owner of this water right was the owner of this property before water right 93-7255 was filed in the North Idaho Adjudication.

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>
STOCKWATER	01/01 to 12/31	0.020 CFS	0.30 AF
STOCKWATER STORAGE	01/01 to 12/31		0.30 AF
RECREATION STORAGE	01/01 to 12/31		1.90 AF
DOMESTIC	01/01 to 12/31	0.040 CFS	1.20 AF
<u>Totals:</u>		0.040 CFS	3.40 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 Daniel A. Nelson – Staff Hydrologist

Field Examiner's Name Daniel A. Nelson Date 10-23-2017

Reviewer _____ Date _____

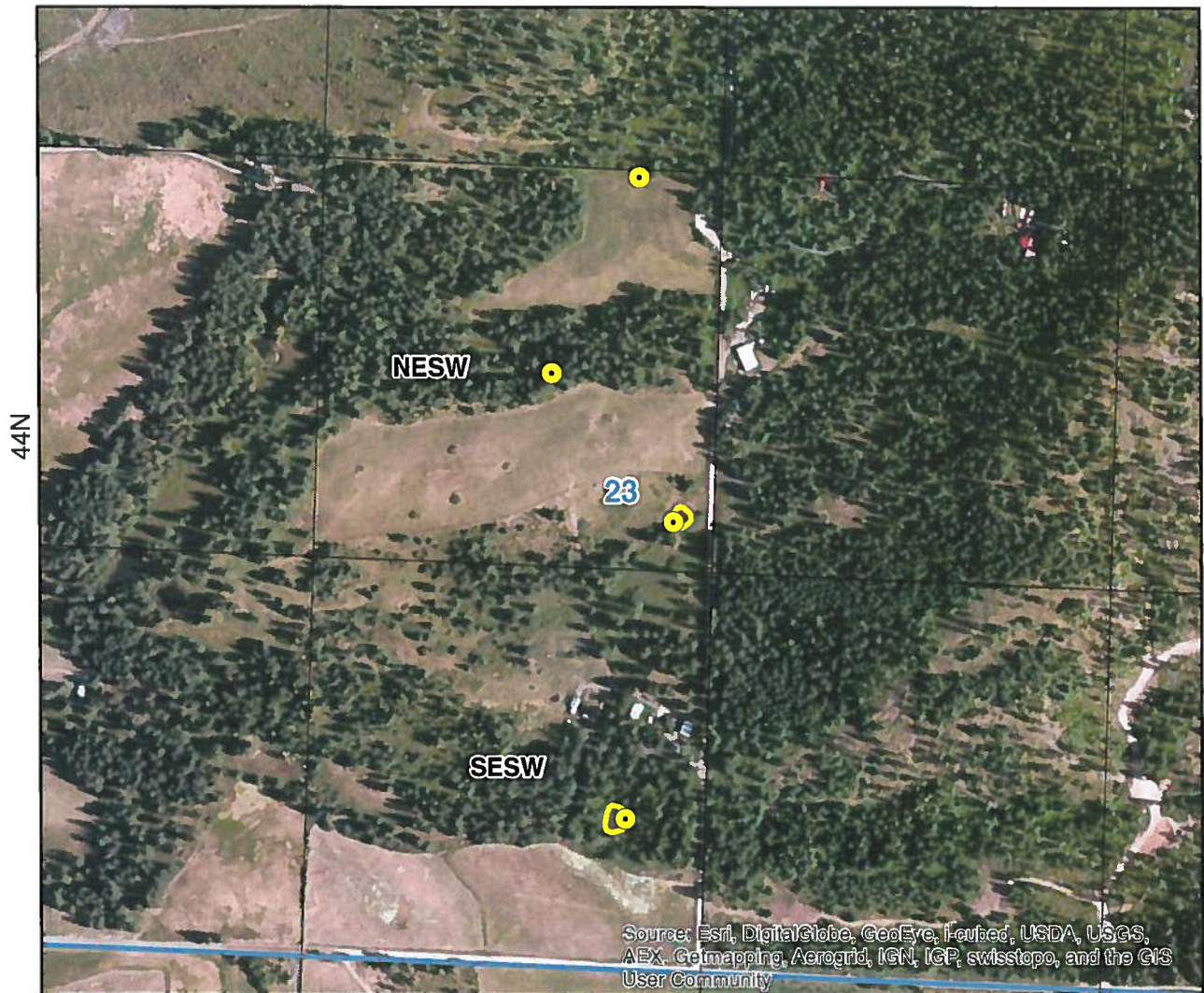
State of Idaho
Department of Water Resources

Field Exam

93-7177

This map depicts the STOCKWATER AND RECREATIONAL STORAGE place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.

04W



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

0 0.075 0.15 0.3 Miles



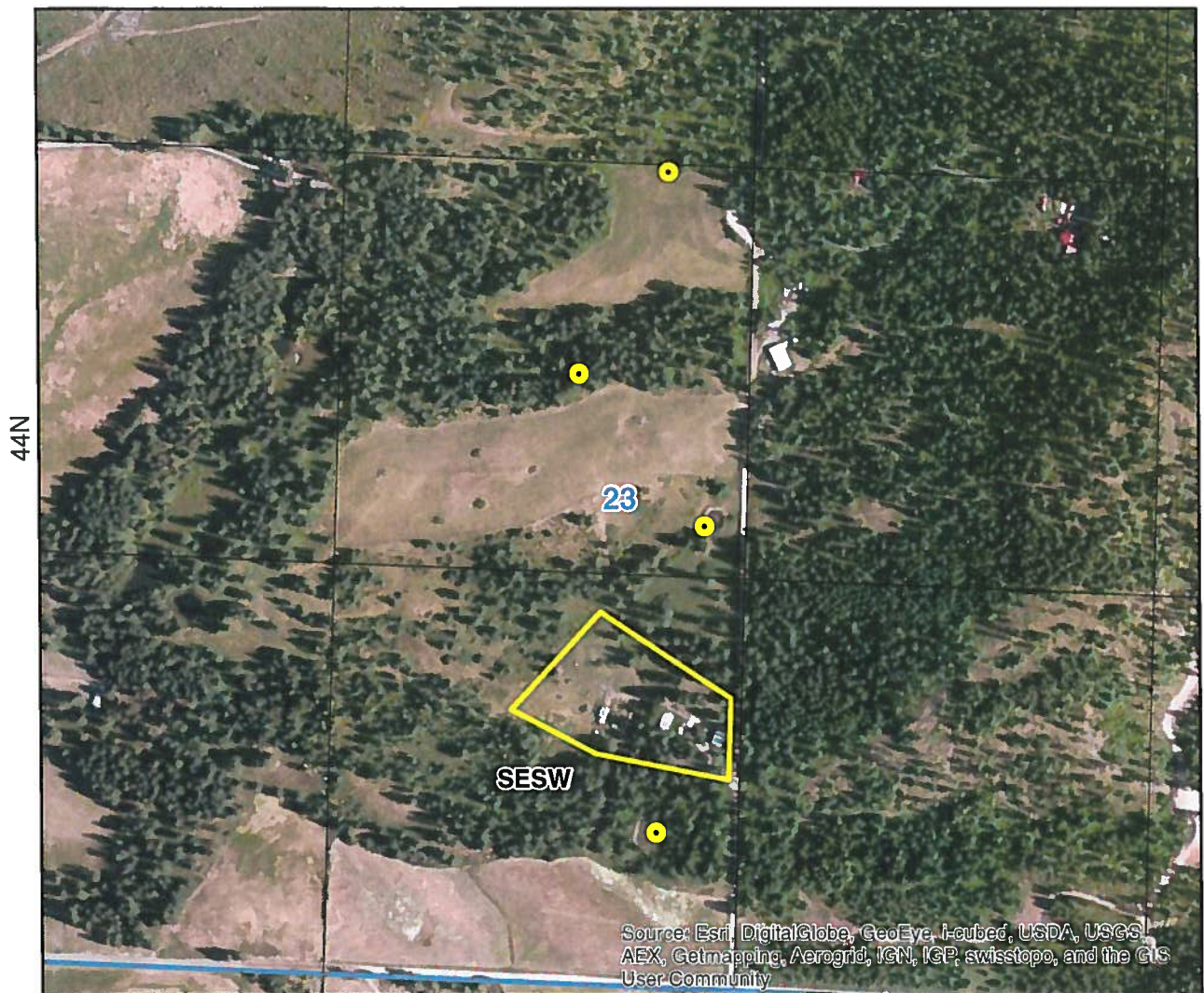
State of Idaho
Department of Water Resources

Field Exam

93-7177

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

04W



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

0 0.05 0.1 0.2 Miles



NWNW

NENW

NWNE

NEE

SWNW

SENW

SWNE

SENE

System Diagram – 93-7177 – by Dan Nelson

There are three ponds that are not connected to each other. Pond #1 and Pond #3 are on spring areas that capture springs. Pond #2 is on a small unnamed stream and captures that water. Pond #2 catches the excess water from a pond on the other side of the road that flows under the road and into the pond. The domestic system pulls water from a third spring that is delivered to a pump house that has a $\frac{3}{4}$ Hp pump that delivers the water to a small garden, the home, and stock tanks in the barns and corrals.

23

Spring Headbox (Culvert)

NWSW

NESW

Pump House

Pipeline from spring box
and pump house to home,
garden, and stock tanks.

Garden Area

Domestic Use Area -
House, Shops and Barnes
Stockwater uses this
same place of use.

SWSW

SESW

NWSE

Pond #2
0.1 acre - surface area
6 feet deep

Spring that provides
water for pond #2

SWSE

Pond #3
0.1 acre - surface area
8 feet deep

SESE

NWNW

NENW

26

NWNE

NENE

THEORETICAL HORSEPOWER EQUATION WORKSHEET (cjh 1/92)

6

Water Right No.: 93-7177
 Examiner: Dan Nelson
 Date of Field Exam: 5/22/2013

P/D No.:	Option 1	OPTION 2	OPTION 3	
PUMP HORSEPOWER	0.75	0.75	0.75	
BOOSTER HORSEPOWER	0	0	0	
PUMPING LEVEL	20	20	20	
DISCHARGE PRESSURE	30	40	50	
FRICTION	0	8	8	
RATE OF FLOW (cfs)	0.05	0.04	0.03	AVE
(gpm)	23.2	17.2	14.5	0.04 18.3

The above calculates the formula =

$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * (\text{psi}) + \text{friction}}$$

Assumptions: %70 efficiency.

Examiners Notes:

The lift was estimated at 20 feet per field visit. The pressure gauge at the site showed 40 psi, so I am recommending 0.04 cfs as the capacity of this pump.

TABLE 1, RECOMMENDED DIVERSION RATES FOR STOCKWATER

In cubic feet per second (cfs)

<u>No. of head</u>	<u>Dairy cows</u>	<u>Other cattle, horses & mules</u>	<u>Hogs</u>	<u>Sheep & goats</u>
0 - 25	0.02	0.02	0.02	0.02
26 - 50	0.04	0.02	0.02	0.02
51 - 100	0.07	0.03	0.02	0.02
101 - 200	0.13	0.05	0.02	0.02
201 - 300	0.20	0.07	0.02	0.02
301 - 400	0.26	0.09	0.03	0.02
401 - 500	0.33	0.12	0.04	0.02
501 - 600	0.39	0.14	0.05	0.03
601 - 700	0.46	0.16	0.05	0.03
701 - 800	0.52	0.19	0.06	0.03
801 - 900	0.58	0.20	0.07	0.04
901 - 1000	0.65	0.23	0.08	0.04

For chickens, round to the next highest 100 and multiply this number by 0.0000018.

For turkeys, round to the next highest 100 and multiply this number by 0.0000033.

If you have more than 1000 head of stock (other than poultry), round the number of head to the next highest 100, and multiply this number by one of the following factors:

For dairy cows, multiply by 0.00065

For other cattle, horses, or mules, multiply by 0.00022

For hogs, multiply by 0.000074

For sheep or goats, multiply by 0.000037

Round the amount you calculate to the nearest 0.01 cfs and enter this amount in the appropriate space on your claim. You may claim 0.01 cfs even if your calculated amount is less than 0.01 cfs.

VOLUME FACTORS

<u>STOCK</u>	<u>GPD/HEAD</u>
dairy cattle	35
range cattle	12
horses	12
mules	12
hogs	4
goats & sheep	2

26 head OF Range cattle and horses =

$12 \text{ gpd/head} \times 26 \text{ hd} \times 365 / 325850 = 0.3 \text{ AF.}$

Recommendation FOR Licensing.

0.02 cfs and 0.3 AF FOR Stockwater

Sources of information for this page include SRBA Claim Instructions, revised 6/89, and Field Examiners Handbook, 1986, currently under revision.

TOTAL STORAGE

FILE NUMBER	93-7177 Pond 1
REVIEWER	Dan Nelson
DATE	5/22/2013

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)	2	"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)	0.2	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)	0.0	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)	0.3	"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)	3.24	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 determined 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	5	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

Evaporation Loss Calculation

FILE NUMBER	93-7177 Pond 1
REVIEWER	Dan Nelson
DATE	5/22/2013

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 Kimberley 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	0.33	30	9.90
May	0.78	31	24.18
June	2.20	30	66.00
July	3.24	31	100.44
August	3.14	31	97.34
September	1.61	30	48.30
October	0.00	31	0.00
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 = 346.16

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

(346.16) ÷ (304.8) X 0.10 = 0.1 AFA

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

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	93-7177 Pond 1
REVIEWER	Dan Nelson
DATE	5/22/2013

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)	0.0000
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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	0	GPD
----------------	---	-----

TOTAL SEEPAGE LOSS (AFA)	0.0	AFA
--------------------------	-----	-----

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.

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.

Potlatch 3 NNE (NWS -- 107301)

Statistics based on thirty year normal spans 1969 to 2001 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	-2.20	-1.57	-0.74	0.33	0.78	2.20	3.24	3.14	1.61	0.09	-2.26	-2.17	73	0	73
15-Day Moving Average ^d	-2.31	-1.83	-0.81	0.32	0.86	2.20	3.19	3.05	1.44	0.01	-2.29	-2.07			
7-Day Moving Average ^e	-2.26	-1.64	-0.74	0.29	0.84	2.18	3.22	3.09	1.49	0.06	-2.30	-2.18			
3-Day Moving Average ^f	-2.22	-1.54	-0.74	0.29	0.79	2.17	3.24	3.14	1.57	0.08	-2.27	-2.19			
Standard Deviation ^k	mm/day												mm		
Monthly ^c	1.96	1.16	1.42	1.07	1.92	0.90	1.42	1.62	1.16	1.77	1.31	2.04	136	0	136
15-Day Moving Average ^d	1.98	1.56	1.52	1.45	2.06	1.30	1.45	1.68	1.60	1.62	1.65	1.90			
7-Day Moving Average ^e	2.50	2.24	2.02	2.10	2.77	1.95	1.92	2.29	2.05	2.24	2.35	2.63			
3-Day Moving Average ^f	3.35	3.08	2.75	2.95	3.84	2.81	2.68	3.04	2.69	3.06	3.30	3.48			
20% Exceedance ^l	mm/day												mm		
Monthly ^c	-1.26	-0.51	-0.06	1.39	1.45	2.69	3.97	4.08	2.92	1.05	-1.20	-0.98	158	0	158
15-Day Moving Average ^d	0.05	0.20	1.06	2.37	3.56	4.02	4.94	4.58	3.39	1.99	0.00	0.04			
7-Day Moving Average ^e	0.47	0.99	2.04	3.16	4.28	4.75	5.32	5.04	3.78	2.51	0.72	0.38			
3-Day Moving Average ^f	0.61	1.26	2.60	3.77	4.77	5.18	5.54	5.51	4.03	2.87	1.01	0.61			

TOTAL STORAGE

FILE NUMBER	93-7177 Pond 2
REVIEWER	Dan Nelson
DATE	5/22/2013

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)	6	"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)	0.6	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)	0.0	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)	0.7	"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)	3.24	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	15	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

Evaporation Loss Calculation

FILE NUMBER	93-7177 Pond 2
REVIEWER	Dan Nelson
DATE	5/22/2013

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 Kimberley 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	0.33	30	9.90
May	0.78	31	24.18
June	2.20	30	66.00
July	3.24	31	100.44
August	3.14	31	97.34
September	1.61	30	48.30
October	0.00	31	0.00
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 = 346.16

[(mm/yr) ÷ (convert to feet)] X (Surface area of pond, in acres) = Evaporation Loss in Acre Feet

(346.16 ÷ 304.8) X 0.10 = 0.1 AFA

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

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	93-7177 Pond 2
REVIEWER	Dan Nelson
DATE	5/22/2013

User Input
Calculated value
Formula Explanations

INPUTS

SQ. FT. Calculator Pond Surface area in acres
0.1

POND SURFACE AREA (SQ. FT.)	4356
-----------------------------	------

SUGGESTED SEEPAGE RATE (FT/DAY)	0.0000
---------------------------------	--------

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	0	GPD
----------------	---	-----

TOTAL SEEPAGE LOSS (AFA)	0.0	AFA
--------------------------	-----	-----

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.

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.

Potlatch 3 NNE (NWS -- 107301)

Statistics based on thirty year normal spans 1969 to 2001 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
Mean ^j	mm/day												mm	
Monthly ^c	-2.20	-1.57	-0.74	0.33	0.78	2.20	3.24	3.14	1.61	0.09	-2.26	-2.17	73	0
15-Day Moving Average ^d	-2.31	-1.83	-0.81	0.32	0.86	2.20	3.19	3.05	1.44	0.01	-2.29	-2.07		
7-Day Moving Average ^e	-2.26	-1.64	-0.74	0.29	0.84	2.18	3.22	3.09	1.49	0.06	-2.30	-2.18		
3-Day Moving Average ^f	-2.22	-1.54	-0.74	0.29	0.79	2.17	3.24	3.14	1.57	0.08	-2.27	-2.19		
Standard Deviation ^k	mm/day												mm	
Monthly ^c	1.96	1.16	1.42	1.07	1.92	0.90	1.42	1.62	1.16	1.77	1.31	2.04	136	0
15-Day Moving Average ^d	1.98	1.56	1.52	1.45	2.06	1.30	1.45	1.68	1.60	1.62	1.65	1.90		
7-Day Moving Average ^e	2.50	2.24	2.02	2.10	2.77	1.95	1.92	2.29	2.05	2.24	2.35	2.63		
3-Day Moving Average ^f	3.35	3.08	2.75	2.95	3.84	2.81	2.68	3.04	2.69	3.06	3.30	3.48		
20% Exceedance ^l	mm/day												mm	
Monthly ^c	-1.26	-0.51	-0.06	1.39	1.45	2.69	3.97	4.08	2.92	1.05	-1.20	-0.98	158	0
15-Day Moving Average ^d	0.05	0.20	1.06	2.37	3.56	4.02	4.94	4.58	3.39	1.99	0.00	0.04		
7-Day Moving Average ^e	0.47	0.99	2.04	3.16	4.28	4.75	5.32	5.04	3.78	2.51	0.72	0.38		
3-Day Moving Average ^f	0.61	1.26	2.60	3.77	4.77	5.18	5.54	5.51	4.03	2.87	1.01	0.61		

TOTAL STORAGE

FILE NUMBER	93-7177 Pond 3
REVIEWER	Dan Nelson
DATE	5/22/2013

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)	8	"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)	0.8	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)	0.0	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)	0.9	"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)	3.24	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	21	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

Evaporation Loss Calculation

FILE NUMBER	93-7177 Pond 3
REVIEWER	Dan Nelson
DATE	5/22/2013

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 Kimberley 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	0.33	30	9.90
May	0.78	31	24.18
June	2.20	30	66.00
July	3.24	31	100.44
August	3.14	31	97.34
September	1.61	30	48.30
October	0.00	31	0.00
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 = 346.16

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

(346.16) ÷ (304.8) X 0.10 = 0.1 AFA

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

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	93-7177 Pond 3
REVIEWER	Dan Nelson
DATE	5/22/2013

User Input
Calculated value
Formula Explanations

INPUTS

SQ. FT. Calculator
Pond Surface area in acres
0.1

POND SURFACE AREA (SQ. FT.)	4356
-----------------------------	------

SUGGESTED SEEPAGE RATE (FT/DAY)	0.0000
---------------------------------	--------

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	0	GPD
----------------	---	-----

TOTAL SEEPAGE LOSS (AFA)	0.0	AFA
--------------------------	-----	-----

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.

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](mailto:robison@kimberly.uidaho.edu) Copyright 2012, University of Idaho.

Potlatch 3 NNE (NWS -- 107301)

Statistics based on thirty year normal spans 1969 to 2001 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
Mean ^j	mm/day												mm	
Monthly ^c	-2.20	-1.57	-0.74	0.33	0.78	2.20	3.24	3.14	1.61	0.09	-2.26	-2.17	73	0
15-Day Moving Average ^d	-2.31	-1.83	-0.81	0.32	0.86	2.20	3.19	3.05	1.44	0.01	-2.29	-2.07		
7-Day Moving Average ^e	-2.26	-1.64	-0.74	0.29	0.84	2.18	3.22	3.09	1.49	0.06	-2.30	-2.18		
3-Day Moving Average ^f	-2.22	-1.54	-0.74	0.29	0.79	2.17	3.24	3.14	1.57	0.08	-2.27	-2.19		
Standard Deviation ^k	mm/day												mm	
Monthly ^c	1.96	1.16	1.42	1.07	1.92	0.90	1.42	1.62	1.16	1.77	1.31	2.04	136	0
15-Day Moving Average ^d	1.98	1.56	1.52	1.45	2.06	1.30	1.45	1.68	1.60	1.62	1.65	1.90		
7-Day Moving Average ^e	2.50	2.24	2.02	2.10	2.77	1.95	1.92	2.29	2.05	2.24	2.35	2.63		
3-Day Moving Average ^f	3.35	3.08	2.75	2.95	3.84	2.81	2.68	3.04	2.69	3.06	3.30	3.48		
20% Exceedance ^l	mm/day												mm	
Monthly ^c	-1.26	-0.51	-0.06	1.39	1.45	2.69	3.97	4.08	2.92	1.05	-1.20	-0.98	158	0
15-Day Moving Average ^d	0.05	0.20	1.06	2.37	3.56	4.02	4.94	4.58	3.39	1.99	0.00	0.04		
7-Day Moving Average ^e	0.47	0.99	2.04	3.16	4.28	4.75	5.32	5.04	3.78	2.51	0.72	0.38		
3-Day Moving Average ^f	0.61	1.26	2.60	3.77	4.77	5.18	5.54	5.51	4.03	2.87	1.01	0.61		

PHOTOGRAPHER AND DATE OF PHOTOS DANIEL A NELSON 5/22/2013

FILE NUMBER 93-7177



The first picture (upper left) shows the spring box for the domestic use. This spring box is a perforated culvert collecting water from the spring. The pump house is approximately 60 feet up hill. There is approximately 20 feet of lift from the spring to the pump house. The next 3 photos show the inside of the pump house with a small pressure tank, a $\frac{3}{4}$ Hp pump running operating the domestic system at 40 psi on the pressure gauge.



The photo to the left shows the house in the background and the bottom picture shows the garden area. The garden area and a small yard around the house are the only areas irrigated and are approximately 0.3 acres, which is well within the 0.5 acre domestic limitation.



PHOTOGRAPHER AND DATE OF PHOTOS DANIEL A NELSON 5/22/2013

FILE NUMBER 93-7177



The photo above shows Pond #1 or the northern most pond. This pond is fairly shallow and is a developed spring or bog.



The pond above is Pond #3, and is the southern pond or the pond closest to the house. This pond is in a boggy area that collects spring water. There is a small unnamed stream to the right of this pond or north, but they are not connected. The overflow from the pond does go into this unnamed stream, but the stream doesn't contribute any water to the pond.

PHOTOGRAPHER AND DATE OF PHOTOS DANIEL A NELSON 5/22/2013

FILE NUMBER 93-7177



The photos above show Pond # 2 or the middle pond. This pond collects water from a spring that is located on the other side of the road. The photo below shows the spring area and the channel (unnamed stream) that flows over to this pond.

