

Licensing Review For Permit No: 65-13575

Date: 06/29/15

A. GENERAL INFORMATION

1. Field Exam Date: 12/16/97
2. Current Owner: Name: BOR
Owner of Record Correct? X Y N
Address of Record Correct? X Y N
If No: Address
3. Beneficial Use Fees have been paid: X Y N Receipt No: C037669
4. SOURCE TRIBUTARY
Willow Creek Cascade Res.
Method of Determination: Field Exam dated 12/16/97
Change in Source: Y X N

B. OVERLAP REVIEW

1. Other water rights with the same place of use: X NO Overlap

Water Right No.	Source	Purpose of Use	Basis

Comments: No POD overlap

2. Other water rights with the same point of diversion: X NO Overlap

Water Right No.	Source	Purpose of Use	Basis

Comments: 65-3108X, 65-3110, 65-11232 for EK Allen Ranch – west half of QQ. PIN RP13N03E110825. 65-13575 is for irrigation use.

C. DIVERSION AND DELIVERY SYSTEM

1. LOCATION OF POINT(S) OF DIVERSION:

[illegible]

Method of Determination: Per Field Exam dated 12/16/97 Cannot see ponds on GIS imagery. Per instruction from Administration, POD GIS shape a basic location on stream in area of ponds based on field exam.

Change in POD? Y X N Amendment Required? Y X N

2. **PLACE OF USE:** Use: Wildlife & Wildlife Storage, Water Quality Improvement & Water Quality Improvement Storage

[illegible]

Method of Determination: Field Exam dated 12/16/97. Cannot see ponds on GIS imagery. Per instruction from Administration, POU GIS shape a basic rectangle of area of ponds based on field exam.

Change in POU? ____Y ____X ____N Amendment Required? ____Y ____X ____N

____ 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: See calculations on Field Exam dated 12/15/97

E. FLOW CALCULATIONS

____ Additional Computation Sheets Attached

Measured Method: See wier table in Field Exam dated 12/16/97. PODs capable of delivering 2.00 cfs on permit.

Pipe diameter = 12". Per field examiners hand book, pipe flow for a 12" pipe is 3.93 cfs.

Permit allowed = 2.00 cfs wildlife and water quality

License recommend 0 cfs. – Instream diversions – no flow needed.

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:

Per Field Exam dated 12/16/97, recommend 2.0 afa.

Per Field Exam dated 12/16/97, 3 ponds a total of 0.22 acres (0.04 + 0.1 + 0.08) in size. All 3 ponds are ave. depth of 5 ft.

See pond Spreadsheet: Seepage = 3.1 afa, evaporation = 0.4 afa. Total Volume 3.1 afa.

No evidence in field exam that Water Quality Improvement and Wildlife Storage uses are additive. Total afa limited to same single use as recommended in field exam.

- Permit limited to 15.0 afa
- **License recommend for 3.1 afa**

G. PURPOSE OF USE

Irrigation N # Stock Domestic # of Homes
 Other: Wildlife Storage, Wildlife, Water Quality Improvement & Water Quality Improvement Storage

Change in Purpose of Use? X Y N

If Yes: From Use To Use Amount CFS AFA

Method of Determination:

Field Exam dated 12/16/97 indicate that ponds were constructed by using logs in stream channel. No actual diversion structure – instream diversions. Removed Wildlife and Water Quality Improvement Uses after receiving direction from Administration.

Field Exam dated 12/16/97, Section E 1. Three ponds were constructed to benefit wildlife and to improve water quality in Cascade Res. By trapping sediments and cattle waste.

H. NARRATIVE/REMARKS/COMMENTS

Season of Use: 04/15 to 10/31 Headgate: 3 Cons. Use: 2
 Water District – Water District 65
 Ground Water District - None

Field Exam dated 12/16/97 indicate that ponds were constructed by using logs in stream channel. No actual diversion structure – instream diversions. Removed Wildlife and Water Quality Improvement Uses after receiving direction from Administration.

Conditions:

Condition regarding stream alteration permit

Use of water under this right is subject to control by the watermaster of State Water District No. 65

- Need to update condition

Wildlife use is for habitat ponds.

Water Quality Improvement is for Cascade Reservoir water quality improvement project via settling ponds.

Instream use of water under this right for wildlife and water quality improvement purposes is subordinated to future diversion of water either upstream or downstream for irrigation or other consumptive use.

- Per Shelly Keen Memo dated 02/21/1995

Have conditions of permit approval been met? X Yes No

I. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
Wildlife Storage	01/01 to 12/31	N/A CFS	3.1 AFA
Water Quality Impr. Storage	01/01 to 12/31	N/A CFS	3.1 AFA
<u>Totals:</u>		N/A CFS	3.1 AFA

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

Other:

J. AUTHENTICATION

Field Examiner's Name Danille Starn Date 07/10/11

Reviewer Daniel A. Nelson Date 7-13-15

Total Storage Calculations

FILE NUMBER	65-13515
REVIEWER	D. Favreau
DATE	7/10/2015

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.)	0.22	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	5	"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)	1.1	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 from storage component if the from storage 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)	1.6	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	0.4	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	3.1	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 (CFS)	1.00	The "Flow Rate into Pond" depicts the actual flow, either measured or estimated, into the pond. For offstream facilities, this will be equivalent to "diversion to storage" rate.
Highest Daily Evaporation Rate From Evaporation Tab. (mm/Day)	4.28	This number is carried over from the "Evaporation Loss" sheet. It is the highest recorded number in the "Precipitation Deficit Table".
Required Daily Maintenance Volume (AF/Day)	0.01	"Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year to maintain pond volume. It 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 (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	1	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. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond.
Days Required to Fill the Pond at 13,000 Gallons per Day	34	Some water users may want to fill a pond under the 13,000 gallons per day domestic exemption. The "Days Required to Fill the Pond at 13,000 Gallons per Day" is calculated by converting the "Pond Capacity" and the "Required Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Required Daily Maintenance Volume" in gallons to determine the number of days to fill pond. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond. Negative values indicate that the supply of 13,000 gallons per day is not enough volume to overcome the required daily maintenance volume; the pond will never fill.

Evaporation Loss Calculations

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

FILE NUMBER	65-13515
REVIEWER	D. Favreau
DATE	7/10/2015

User Input
Calculated value
Formula Explanations

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 negative precipitation deficit values.

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

Precipitation Deficit

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

Month	mm/day ¹	Days per month	mm/Month
Jan	-1.61	31	0.00
Feb	-1.19	28	0.00
March	-0.44	31	0.00
April	0.87	30	26.10
May	1.85	31	57.35
June	2.90	30	87.00
July	4.28	31	132.68
August	3.71	31	115.01
September	2.29	30	68.70
October	0.37	31	11.47
November	-1.85	30	0.00
December	-2.51	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 = 498.31

$$((498.31 \text{ mm/yr}) \div (\text{convert to feet})) \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

(498.31 ÷ 304.8) X 0.22 = 0.4 AFA

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

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	65-13515
REVIEWER	D. Favreau
DATE	7/10/2015

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.22	AC.
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Pond Surface Area (SQ. FT.)	9583	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	ML	
Suggested Seepage Rate (FT./DAY)	0.0200	FT./DAY

Formula: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss
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Convert to GPD	1434	GPD
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Total Seepage Loss (AFA)	1.6	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.

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 - small stock ponds															
Precipitation Deficit (Click here for a graph)															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual
Mean ^j	mm/day												mm		
Monthly ^c	-1.61	-1.19	-0.44	0.87	1.85	2.90	4.28	3.71	2.29	0.37	-1.85	-2.51	266	0	266
15-Day Moving Average ^d	-1.50	-1.52	-0.38	0.87	1.89	2.97	4.38	3.67	2.18	0.40	-1.94	-2.26			
7-Day Moving Average ^e	-1.57	-1.39	-0.43	0.84	1.88	2.94	4.35	3.68	2.23	0.39	-1.94	-2.34			
3-Day Moving Average ^f	-1.60	-1.25	-0.46	0.89	1.83	2.92	4.31	3.71	2.28	0.36	-1.86	-2.45			
Standard Deviation ^k	mm/day												mm		
Monthly ^c	1.58	1.35	1.73	0.95	1.55	1.13	0.85	0.94	1.08	1.46	1.36	2.55	153	0	153
15-Day Moving Average ^d	1.65	1.81	1.55	1.29	1.74	1.43	0.78	1.03	1.44	1.50	1.89	1.84			
7-Day Moving Average ^e	2.29	2.47	2.02	1.87	2.33	2.11	1.07	1.43	1.78	2.07	2.52	2.86			
3-Day Moving Average ^f	2.94	3.12	2.80	2.64	3.13	2.90	1.58	1.82	2.15	2.89	3.39	4.01			
20% Exceedance ^l	mm/day												mm		
Monthly ^c	-0.56	0.06	0.38	1.64	2.81	3.94	4.77	4.27	3.28	1.18	-0.58	-1.35	389	0	389
15-Day Moving Average ^d	0.22	0.61	1.44	2.66	4.43	4.92	5.28	4.73	3.68	2.26	0.22	0.02			
7-Day Moving Average ^e	0.43	1.07	1.82	3.59	5.01	5.50	5.48	5.05	3.96	2.72	0.68	0.29			
3-Day Moving Average ^f	0.54	1.27	2.27	4.09	5.53	5.88	5.92	5.34	4.27	2.96	1.02	0.34			
	mm/day												mm		