STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 65-23690
Exam Date: 9/23/20

1. Current Owner:
PATRICK HILL PO BOX 4529 MCCALL ID 83638

3. **SOURCE:** UNNAMED STREAM
Tributary NORTH FORK PAYETTE RIVER

Method of Determination: Determined groundwater source by field exam, well on site, and well log.

B. OVERLAP REVIEW

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

Water Right No.	Source	Purpose of Use	Basis
65-6917	Payette River	Recreation	Decreed
City of McCall	Payette River	Municipal	Decreed

Comments: Storage right 65-6917 adjacent to wildlife pond used for recreation.

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

Water Right No.	Source	Purpose of Use	Basis
N/A			

Comments: No POD overlap.

C. DIVERSION AND DELIVERY SYSTEM

1. **LOCATION OF POINT(S) OF DIVERSION:**
UNNAMED STREAM L8 (SW¼ SE¼), Sec. 8, Twp 18N, Rge 03E, B.M. VALLEY County

Method of Determination: Field exam, PLSS digital map using ArcMap and aerial imagery.

PLACE OF USE: WILDLIFE STORAGE

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
18N	03E	17		X L3															

Method of Determination: Field exam, PLSS digital map using ArcMap and aerial imagery.

3.

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

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

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

__X__ Photo of Diversion and System Attached

4.

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

D. FLOW MEASUREMENTS

No flow measurements taken

E. FLOW CALCULATIONS

Rectangular Contracted Weir

$$Q = 3.247 \cdot L \cdot H^{1.48} - \frac{0.566L^{1.9}}{1 + 2 \cdot L^{1.87}} \cdot H^{1.9}$$

Length: 8 inches
Height: 0.5 feet

Flow Rate= 0.74 cfs

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation:

$V_{I.R.}$ = (Acres Irrigated) x (Irrigation Requirement) = N/A
$V_{D.R.}$ = [Diversion Rate (cfs)] x (Days in Irrigation season) x 1.9835 = N/A
V = Smaller of $V_{I.R.}$ and $V_{D.R.}$ = N/A

2. Volume Calculations for Other Uses:

Wildlife Pond Analysis:

Surface area (GIS): 0.1 acres
Average pond depth:1.2 feet

Pond Capacity (Spreadsheet): 0.12 AF
Total Volume: 0.2 AF

Live Water

CFS =	0.74	→	gpd	478,272.90
AF=	0.5	→	gallons	162,920

G. NARRATIVE/REMARKS/COMMENTS

The permit was assigned to Patrick Hill April 26, 2017. The proof of beneficial use was submitted August 3, 2020. Current Valley county taxlot data represent Patrick Hill as the owner of the land pertinent to the place of use and point of diversion. Overlap review found no additional existing water rights for the place of use nor the point of diversion.

The original permit allowed for the irrigation storage and irrigation from storage of up to 2.5 AF, 8.9 AF for Wildlife storage, and 8.9 AF for Recreation storage. A review of satellite photos of the property from 2009 to 2017 did not show any evidence of pond development. Water Resource Agent Kate Huelse met Patrick Hill to conduct a field exam September 18th, 2020.

It was verified that Mr. Hill developed 0.1 acre foot pond. The water comes from a recreational pond west of Mr. Hills wildlife pond through a rectangular weir into an unnamed stream into the wildlife pond. Once the pond is full, water overflows back into the unnamed stream on the east side of the pond. Flow was calculated using the rectangular contracted weir, the height of the water was read at 0.5 feet and the width of the weir was 8 inches. The calculated flow rate is 0.74 cfs. The pond is developed as on-stream storage. As such, no consumptive losses are considered for licesne.

The site reconnaissance revealed that the pond used for wildlife was located in 18N 03E Sec 8 SW ¼ SE ¼ , local animals such as bear, moose, deer and elk drink directly from the pond. The pond requires a total volume of 0.2 AF based on the capacity.

Have conditions of permit approval been met? __X__ Yes _____ No

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use	Annual Volume
WILDLIFE STORAGE	01/01 to 12/31	0.2 AF

Totals: 0.2 AF

2. Recommended Amendments

_____ Change P.D. as reflected above ____ Add P.D. as reflected above __X__ None

_____ Change P.U. as reflected above ____ Add P.U. as reflected above __X__ None

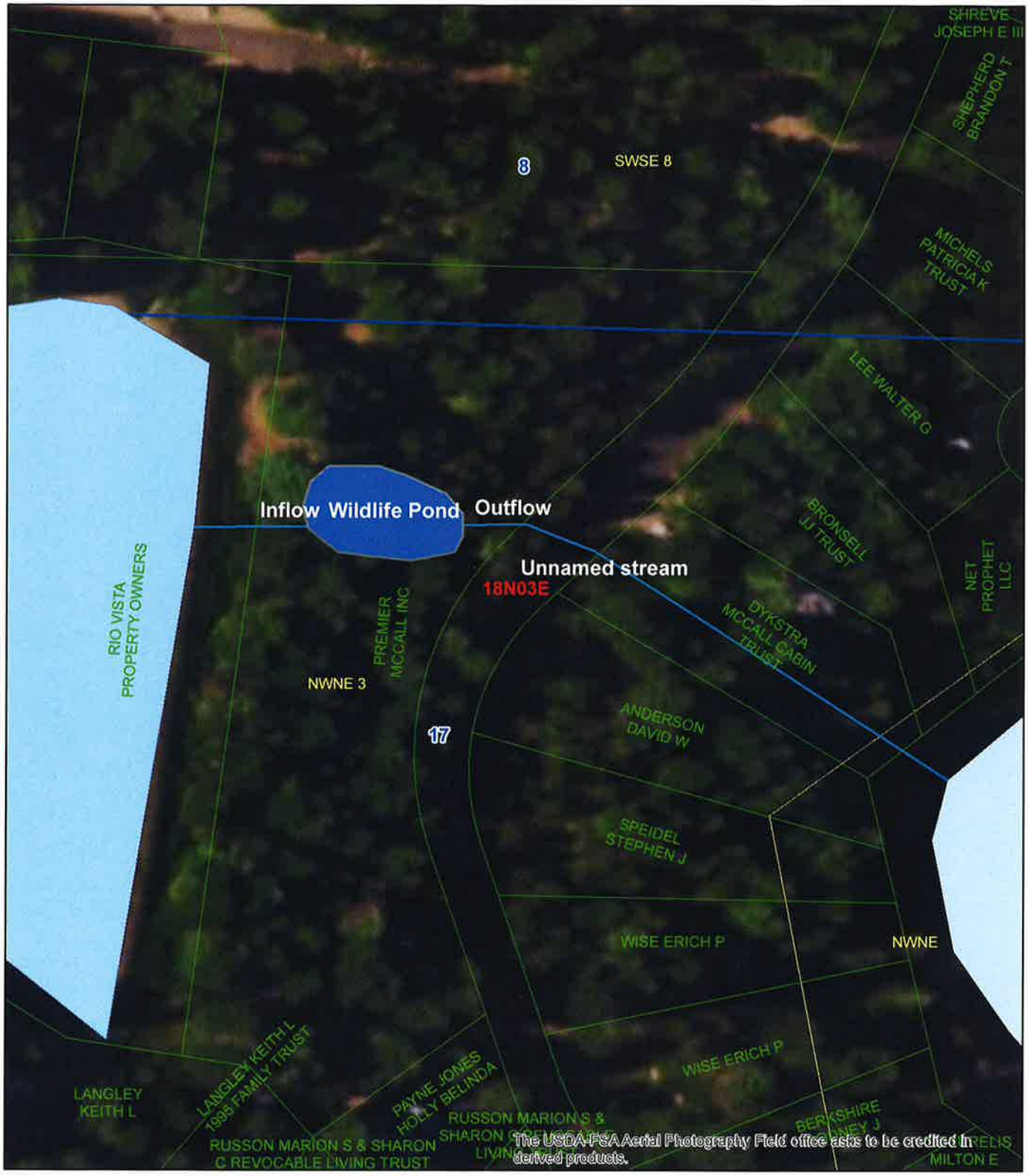
I. AUTHENTICATION

Kate Huelse - Water Resource Agent

Field Examiner's Name Kate Huelse Date 10/6/20

Reviewer Patricia Kelly Date 10-7-2020

System Diagram



Legend

- Township/Range
- Sections
- QQ

0 0.03 0.06 Miles

Total Storage Calculations

FILE NUMBER	65-23690
REVIEWER	Kate Huelse
DATE	9/18/2020

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.)	0.1	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	1.2	"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 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)	0.12	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)	0.3	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	0.1	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	0.5	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)	0.74	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)	3.57	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)	0.00	"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	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. 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	3	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	65-23690
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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: McCall (NWS -- USC00105708)

Month	mm/day[1]	*Days per month*	mm/Month
Jan	-1.98	31	0.00
Feb	-1.22	28	0.00
March	-1.12	31	0.00
April	0.41	30	12.30
May	0.97	31	30.07
June	1.79	30	53.70
July	3.57	31	110.67
August	3.07	31	95.17
September	1.73	30	51.90
October	0.13	31	4.03
November	-2.00	30	0.00
December	-2.20	31	0.00

Total mm/year =	357.84

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.

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

(357.84 ÷ 304.8) X 0.10 = 0.1 AFA

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	65-23690
REVIEWER	Patrick Hill
DATE	9/18/2020

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.1	AC.
Pond Surface Area (SQ. FT.)	4356	SQ. FT.
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: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss

Convert to GPD	228	GPD
Total Seepage Loss (AFA)	0.3	AFA

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.

Soil Classification with Published Soil Surveys

Alternative to Soil Classification with the NRCS Web Soil Survey

This spreadsheet has been designed by Idaho Department of Water Resources to determine the soil type and classification at the pond site.

FILE NUMBER	65-23690
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DATE	9/18/2020

7/7/2020

User Input
Calculated value
Formula Explanations

County:	Valley , Idaho

1. Navigate to the NRCS Soil Survey Website

NRCS Published Soil Surveys for Idaho found at: https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=ID	
Reviewer used the Survey entitled:	VALLEY COUNTY AREA

2. Use GIS and the Soil Survey to determine Soil Type

Utilize ArcGIS to Obtain the Soil Symbol (may be a number or abbreviated name) The shapefile SSURGOOnePlan is found at X:\Spatial\Soils\SSURGOOnePlan\soils.shp		
Soil Symbol (GIS field MUSYM):	59	What if my Soil Symbol is 999?* (see box)
Find the name of the soil in the Soil Legend. The Soil Legend is typically the last bookmark in the Soil Survey report.		
The Full Name of This Soil is:	McCall Complex, 5 to 50% slopes	

3. Use the Soil Survey to determine the USCS Classification

Within the county NRCS Soil Survey report, click the bookmarked link to "Tables."
Scroll down until you reach a table called "Engineering Properties and Classifications" or "Engineering Index Properties." The table is ordered by soil symbol and the soil name.
Scroll down until you reach the soil which matches your soil symbol and name.
The table lists the USCS Classification for each depth in the soil profile.
Be sure to use the predominant soil classification for the pond depth where seepage occurs.
If the pond has a greater depth than the soil survey, use data from the lowest depth reported.

Pond Depth:	3	feet	=	36	inches
The Soil Survey states the soil USCS Classification at				36	inches is SC