

MEMORANDUM

TO: Water Right File 75-7525 and 75-7630

FROM: Daniel Nelson – Analyst 3

DATE: February 27, 2020

SUBJECT: Licensing Review of Water Right 75-7525 and 75-7630

Eastern Region staff performed the field examinations for these permits on March 21, 1996, the field reports were completed and signed on February 6, 2007. The field report for 75-7525 recommended 0.04 cfs and 8.4 af for the irrigation of 2.4 acres, 0.30 af for irrigation storage, and 0.3 af for irrigation from storage for the 2.4 acres for a total of 0.04 cfs and 8.7 af from ground water and spring sources. The field report for 75-7630 recommended that this permit be voided.

Cherie Palmer and Sandy Thiel have attempted to license or void these permits. Evidence has been provided to confirm that 75-7630 was in place and being used during the development period. Ms. Theil performed a second field visit. Ms. Theil was unable to complete the file, so I am using Ms. Theil's notes and the field examinations to determine the best method for moving forward with the licensing of these two permits.

It should also be noted that permit 75-7525 was permitted for 0.06 cfs, 0.3 af, for the irrigation of 3 acres, and 75-7630 was permitted for 0.50 cfs for recreational use. The recreational use was flow through an existing fishing pond filled with spring or shallow ground water.

General Discussion:

These two water rights are owned by the same person, and have a long history. Both of these water rights should be processed together, since they are for the same property, but there are number of issues that needs to be addressed separately. I will discuss each right separately, and I will discuss a couple of similar issues that need to be addressed after I discuss each right. Due to the issues involved, I feel it is necessary to have a single memorandum for both of these rights.

75-7525:

The permit was issued for 0.06 cfs, 0.3 af, and 3 acres of irrigation from a spring. The maps included with the application shows the pond, and the marks the pumps diverting water out of the pond. The application for this permit states that this permit is for 3 acres of irrigation. The description of the system states the following:

Water from spring drains into pond. A 2 Hp centrifugal electric pump will divert water from pond to place of use. Approximately 10 sprinkler heads.

The application for permit is rather confusing on where the water will be diverted and where the acres irrigated are located. The application for permit map shows the springs to the south and east of the pond. This is consistent with Ms. Theil's field exam that shows a French Drain being used to collect spring water on the south side of the pond and run through a ditch on the east side of the pond to be injected into Carmen Creek. The maps suggests that the irrigation use is located around the home at the same location as 75-7425. Probably the most convincing information is in the Request for Extension of Time form submitted on September 9, 1991, that states the following:

Pipe and electric conduit that crosses Carmen Creek not complete, because flood damage to bridge.

The above statement suggests to me that at the time of the extension, they were going to pipe the water across Carmen Creek to irrigate the lands north of Carmen Creek.

Ms. Theil's notes describe the spring diversion as the French Drain that empties into a ditch that is measured by a V-Notched weir and flowing through a ditch into Carmen Creek. Ms. Theil's description doesn't show any diversion from the spring into the pond. Ms. Thiel did find a pump in the pond, and the permit holder tried to justify the use of the water in the pond as spring water, since Carmen Creek water was being diverted into the pond. However, Carmen Creek water is being diverted into the pond upstream of the point where the spring water is being injected into Carmen Creek, so there is no way that the spring water could reach the pond.

The permit conditions do require a measurement device, and the water being diverted from the springs is being measured with a V-Notched weir. The water diverted from the pond is not being measured, and the water from Carmen Creek is also not being measured.

Based on the information available, I have determined that the source of water should be the spring water collected by the French Drain, and not include the water being diverted from the pond. The irrigation around the pond cannot be covered by this permit, since the spring water doesn't have the means to flow directly into the pond after it is measured through the V-Notched weir. The only irrigation that can occur from the water from the spring is to be injected into Carmen Creek where it flows down to the Bridge Pump where it is rediverted to irrigate the lands on the north side of Carmen Creek. Water right 75-7425 is also diverted from Carmen Creek to irrigate 0.5 acres of the 1.2 acres of lawn area around the home.

I consulted Department staff to ensure my conclusions concerning this permit were reasonable. After discussing this file with administrative staff, it was determined that we should only consider the water being diverted from the spring, and being injected into Carmen Creek and then being rediverted from Carmen Creek at the Bridge Pump. An amendment will be needed to add the point of injection and the point of rediversion to the permit.

The field examiner also found 2.4 acres of irrigation, but there really isn't much in the field report to show how he came up with that number. I worked with Ms. Thiel's notes and determined that there was 1.2 acres of irrigation north of Carmen Creek, and 0.3 acres of irrigation around the pond south of Carmen Creek. As discussed above, we cannot consider the 0.3 acres around the pond. The acres being irrigated north of the Carmen Creek are covered by water right 75-7425 from Carmen Creek for 0.5 acres, and another 0.5 acres authorized from a well by domestic right 75-10896. This would leave approximately 0.2 acres of the 1.2 acres irrigated that are not covered by a water right. All of the overlapping water rights are from a different source than this permit, so we can consider the entire 1.2 acres when licensing this permit.

75-7630:

Water right 75-7630 is a recreational use water right the supplies flow through water for the pond. According to the application for permit, the pond is filled with shallow ground water or spring water. Originally, the permit holder tried to raise fish in the pond, but the poor quality of water from the spring or shallow ground water caused issues with the fish. This does sound reasonable, because it appears as though most of the water in the spring/boggy bottom of the creek path is the result of irrigation of lands on the plateau above the channel. Any fertilizers or other chemicals used on the fields above would be quickly transported through the springs/shallow ground water system. Permit 75-7630 was filed to improve the quality of the water of the pond, but was never filed to provide fill or maintain the pond levels. It was only filed to improve the quality of the water.

Additional Discussion:

Originally, there was an attempt to include the point of diversion for permit 75-7630 as point of rediversion for 75-7525 to cover the water being used for irrigation from the pond, but this point of diversion is upstream of the injection site. As discussed above, we cannot consider a point of diversion upstream of the injection site until after the permit is licensed, because the spring water cannot physically reach the upstream point of diversion. The water user can file a water right exchange after the permit is licensed if they are willing to dry up some acres around the home. If they are not willing to dry up acres around the home, they would need to file a new application for permit to cover the irrigation around the pond.

The application for permit for 75-7525 stated that the pond was constructed in 1971 and was used as a private fish pond. In determining the source of water for this permit Ms. Thiel determined that the pond was constructed sometime between 1980 and 1987. You can't see the pond in the 1980 to 1987 aerial imagery available to the Department, but the pond does seem to be there in the 1987 aerial imagery, and it is definitely there in the 1992 to 2000 aerial imagery. I agree with Ms. Thiel's determination that pond wasn't actually constructed until the 1980's.

The pond has a surface area of approximately 0.3 acres and a depth of approximately 20 feet. The field examiner stated that the pond depth was 20 feet and Ms. Thiel stated the average pond depth was 7 feet. I am assuming that the 20 foot depth is the maximum depth, so the pond would have an average depth of 8 feet ($20 \text{ ft max depth} \times 0.4 = 8 \text{ ft}$). With an average depth of 8 feet, the capacity of the pond would be 2.4 af ($8 \text{ ft ave depth} \times 0.3 \text{ acres surface area} = 2.4 \text{ af}$). The field examiner also states that the pond is 20 feet deep and has a $\frac{1}{2}$ acre surface area, and a pond volume of 0.3 af. Using the field examiner's information, the pond volume would be 10 af instead of the 0.3 af he claimed. The field examiner didn't provide any pond volume calculations, so I am not confident at all in the field examiner's calculations. I feel a more reasonable estimation of pond volume is 2.4 af calculated above.

Based on the evaporation rate for a small pond from the Salmon (NWS—USC00108076) ETIdaho site, I also determined that there would be approximately 0.9 af of evaporation, which would bring the total storage needed to 3.3 af. No seepage is occurring, because the pond intercepts shallow ground water / spring water.

There is not water right for this pond, but it may fit under the domestic exemption as described in Administrative Processing Memorandum #67. There would be no seepage loss, since the pond is filled with shallow ground water / spring water. The needed to cover the 0.9 af of evaporation losses would average out to approximately 0.005384 af or 1,754 gallons per day. Add the maintenance volume into the in-house domestic use of 200 to 500 gallons per day and the water user could irrigate their yard from their well for approximately 10 hours a day at a diversion rate of 0.04 cfs or 18 gpm ($[13,000 \text{ gpd} - 1,754 \text{ gpd} - 500 \text{ gpd}] / 18 \text{ gpm} = 597 \text{ minutes of use} / 60 \text{ minute/ hour} = 9.95 \text{ hours of irrigation}$). It could be argued that domestic in-house use, yard irrigation, and the pond use could be under the 13,000 gallon per day exemption for filing a water right per Administrative Processing Memorandum # 67.

Permit 75-7630 doesn't have any conditions that require the diversions from Carmen Creek to be totally non-consumptive, so a portion of the diversion of water for recreational purposes through the pond from Carmen Creek authorized by water right 75-7630 could also be considered to offset some of the consumptive value of the pond.

As stated above, there is approximately 0.3 acres of irrigation around the pond. As discussed above, we can't count the irrigation around the pond, because water used to irrigate those acres are out of the pond.

Due to the pond not having a water right to cover the water use from the shallow ground water / spring water, and the 0.3 acres irrigated around the pond that can't be covered by water right 75-7525. I would recommend that the new property owner file a new application for permit to cover the pond use and the irrigation around the pond. He may also want to file another permit to request additional diversion rate and volume for acres irrigated north of Carmen Creek.

Diversion Rate:

75-7525:

The flow measured by Ms. Thiel for water right 75-7525 was 2 inches or 0.16 feet of water flowing over the V-Notch Weir. Using the University of Idaho Water Measurement Manual, this equates to 0.026 cfs. The field examiner determined a flow rate of 0.036 cfs, but I am a bit confused at how he actually did his measurements. Considering the information available for this spring, I recommend that we limit the irrigation use from the spring to 0.03 cfs.

Ms. Thiel's notes show that the sprinklers are capable of diverting 45 gpm or 0.10 cfs (10 sprinklers at 4.5 gpm/sprinkler). The theoretical calculations on the pumps confirm that Bridge Pump can divert approximately 0.10 cfs, which is greater than the 0.03 cfs we can authorize from the spring, and the 0.02 cfs of Carmen Creek water authorized by water right 75-7425. The permit holder will have to valve back his pump or install a smaller pump to reduce the diversion rate to 0.05 cfs (22 gpm or about 5 sprinklers).

75-7630:

The Carmen Creek Diversion has a 24 inch rectangular weir installed in the cement vault. The photos of the weir show approximately 0.18 feet of head over the weir. According to the University of Idaho Water Measurement Manual, a 2 foot contracted rectangular weir with 0.18 ft of head is flowing approximately 0.504 cfs. Therefore, I can recommend 0.50 cfs of this permit.

Diversion Volume:

75-7525:

I found 1.2 acres irrigated north of Carmen Creek. The domestic well can irrigate 0.5 acres and water right 75-7425 can irrigate 0.5 acres from Carmen Creek. This permit is from a different water source, so it can actually be used on the entire 1.2 acres. At a maximum diversion rate of 0.03 cfs the maximum volume capacity of the spring is 12.7 af ($0.03 \text{ cfs} \times 1.9835 \times 214 \text{ days} = 12.7 \text{ af}$). The maximum volume per acre is based on the head gate requirement of 3.5 af/ac for 1.2 acres would be 5.4 af ($1.2 \text{ af} \times 3.5 \text{ af/ac} = 5.4 \text{ af}$). The permit limits the total volume for irrigation use to 0.3 af, so we cannot exceed this amount.

This raises a question as to whether or not 0.3 af is a useful irrigation amount. When you add this volume to the two existing water rights, this permit would really only be irrigating approximately 0.2 acre, which would require a headgate volume of about 0.7 af. This permit is really only provides about $\frac{1}{2}$ of what is actually needed to irrigate this ground. This is a very boggy/springy area, so it has a fairly high water table. There may not be a need for as much irrigation in this area as there would be on the plateau above the creek channel. I feel it is reasonable to allow this diversion volume, since it was originally approved in the permit.

75-7630:

This is a flow through water right, so it could be run year round. I do believe that the water in the creek and the pipeline to the pond would probably freeze during most years, but there would be years that the temperature would be mild enough to allow the water to flow through the buried pipelines all year. At a diversion rate of 0.50 cfs for year round use, the volume that should be assigned to this permit is 362 af ($0.50 \text{ cfs} \times 1.9835 \times 365 \text{ days} = 361.989 \text{ af}$).

Conditions:

All of the conditions will need to be replaced on these two permits, since they are so old. Conditions R04 and R43 will be needed for each right. Condition R67 will need to be added to right 75-7525. The descriptive condition for right 75-7630 should be altered to say that the recreational use is to provide for flow through water for a pond.

Total Storage Calculations

FILE NUMBER	75-7525 AND 75-756
REVIEWER	Dan Nelson
DATE	11/3/2020

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.)	0.3	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	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 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)	2.4	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth. If you know the capacity, divide the capacity by surface area and enter the average pond depth in the 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)	5	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)	0.0	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	0.9	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	8.3	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 (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)	5.47	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)	0.005384	"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 <i>approximately 6 months (180 days) or more</i> , 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	70	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 <i>approximately 6 months (180 days) or more</i> , 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	63-12601
REVIEWER	Dan Nelson
DATE	5/9/2018

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	0.27	31	8.37
Feb	0.80	28	22.40
March	1.92	31	59.52
April	3.12	30	93.60
May	3.87	31	119.97
June	4.49	30	134.70
July	5.47	31	169.57
August	4.74	31	146.94
September	3.37	30	101.10
October	1.95	31	60.45
November	0.75	30	22.50
December	0.19	31	5.89

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 = 945.01

$$[(945.01 \text{ mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

$$(945.01 \div 304.8) \times 0.30 = 0.9 \text{ AFA}$$

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	75-7525 AND 75-75630
REVIEWER	Dan Nelson
DATE	11/3/2020

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.3	AC.
-------------------------	-----	-----

Pond Surface Area (SQ. FT.)	13068	SQ. FT.
-----------------------------	-------	---------

I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	GrndWtr	
Suggested Seepage Rate (FT./DAY)	0.0000	FT./DAY

Formula: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss
--

Convert to GPD	0	GPD
----------------	---	-----

Total Seepage Loss (AFA)	0.0	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.



University of Idaho

Kimberly Research
and Extension Center

[Water Resources Program](#)

ETIdaho 2017

[Evapotranspiration and Consumptive
Irrigation Water Requirements
for Idaho](#)

Please send suggestions for
improving this site to robison at
uidaho dot edu

2020-11-03 13:45

*Copyright 2018, University of
Idaho.*

[Salmon \(NWS -- USC00108076\)](#)

Statistics based on thirty year normal spans 1983 to 2016 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	0.27	0.80	1.92	3.12	3.87	4.49	5.47	4.74	3.37	1.95	0.75	0.19	945	0	945
15-Day Moving Average ^d	0.27	0.78	1.95	3.14	3.88	4.39	5.49	4.77	3.35	1.96	0.74	0.18			
7-Day Moving Average ^e	0.27	0.79	1.92	3.13	3.87	4.43	5.48	4.75	3.34	1.96	0.75	0.18			
3-Day Moving Average ^f	0.27	0.79	1.92	3.11	3.87	4.46	5.48	4.74	3.36	1.94	0.75	0.19			