State of Idaho
DEPARTMENT OF WATER RESOURCES
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Website: idwr.idaho.gov • Email: idwrinfo@idwr.idaho.gov

BRAD LITTLE
Governor

GARY SPACKMAN
Director

November 13, 2019

BROCKWAY ENGINEERING
ATTN G ERICK POWELL
2016 N WASHINGTON STREET SUITE 4
TWIN FALLS ID 83301

RE: Field exam report for water right permit 37-22769

Dear Mr. Powell;

On November 12, 2019, I sent an email requesting you submit a volume for the wildlife, recreation, and aesthetic uses. I also informed you that I had just started my analysis of this field report, and I wanted to give you the chance to supply the volumes while I was reviewing your field report.

During my review of this field report, I found some additional issues that will limit what I can recommend be licensed based on the information you have provided. I have listed the issues below:

**Volume for Wildlife, Recreation, and Aesthetic Uses:**

I received your email dated November 12, 2019, and I agree with the calculations you used to determine the volumes for the wildlife, recreation, and aesthetic uses.

**Pond Evaporation:**

I was able to recreate the pond surface area, so I am in complete agreement with the surface area and pond capacity that you calculated. In your pond evaporation analysis, you used the Hailey Ranger Station's site to perform the analysis for the pond evaporation. When I did my analysis, I used the Ketchum RS (NWS – USC00104845) station, and this station provides a bit more volume for evaporation. I have attached my pond analysis sheet with this letter that shows an evaporation rate of 0.6 af which would bring the total storage volume up to 2.1 af. All I need from you is an acknowledgement requesting to use the volume I calculated, or a request to continue to use the volume you calculated. We can use either station, but the Ketchum Station would ensure that the evaporation rate is completely covered. If you would like to use our pond spreadsheet, you have access to this spreadsheet on our website at https://idwr.idaho.gov/forms/water-rights.html -- Storage: Pond Loss Calculation.

**Irrigation Use:**

The Department assumes irrigation is applying water to land to grow plants for a useful purpose. This is typically found for plants requiring water in excess of natural precipitation in order to provide the useful purpose – crops, lawns, orchards, landscaping plants etc. The Department generally does not recognize watering natural/native vegetation as an irrigation beneficial use when approving new water rights, issuing licenses, and so forth.

Your photos show that a portable water system was developed and ran in 2016. However, the photos also show that the permit holder was irrigating the natural vegetation with a portable and/or temporary system. Furthermore, in reviewing the plant growth from the 2014 to the 2017 aerial imager in Google Earth, it doesn't show any sign of cultivation or increase in growth rate of the vegetation in the irrigated area. The 2015 and 2017 aerial imagery available to the Department also didn't show any sign of cultivation or plant growth. I review our 2016 Sentinel Satellite imagery to see if I could see actual irrigation occurring during the 2016 season, but the imagery didn't provide the definition needed to make a determination of irrigation during the 2016 season. I reviewed this imagery with my supervisor, and we both concluded that this area didn't look to be irrigated all season long and that the area didn't look cultivated or planted in any type of crop or grass.

Unless you or the permit holder can provide something that shows actual irrigation took place during the 2016 irrigation season for a useful purpose, we cannot license the irrigation portion. Just having a system installed and usable doesn't constitute a beneficial use.

**Conclusion:**

At this point we can license this permit for the wildlife, recreation, and aesthetic uses and the storage uses for the ponds. If this is satisfactory to you and the permit holder, please let me know, and I will move forward with licensing the permit in this manner. If you chose to move forward without the irrigation use, I can adjust the volume on the wildlife, recreation, and aesthetic uses to include the volume you removed in your email for irrigation. I will need you to inform me if you wish to use the evaporation data from the Ketchum station or continue forward with the calculations that you made.

We are willing to review and consider any additional information you wish to supply. A few thing we could consider would include pictures of ground being cleared and planted in a standard crop or grasses. You could also include any aerial photos or pictures showing that plant growth increased during the 2016 irrigation season. Anything that you can provide that shows a beneficial use of the irrigation component was accomplished in 2016.

The Idaho Beneficial Use Examination Rules 37.03.02.035.02.c states that we can give a certified water right examiner an additional 30 days to supply additional information to clarify the field exam report as stated below.

> If the Director determines that a field report prepared by a certified water right examiner is acceptable but that additional information is needed to clarify the field report, he will notify the examiner in writing of the information required. If the additional information is not submitted within thirty (30) days or within the time specified in the written notice, the priority date of the permit will be advanced one (1) day for each day the information submittal is late. Failure to submit the required information within one (1) year of the date of the department's request is cause for the Director to take action to cancel the permit.

Therefore, please supply the above information or inform me that you wish for me to proceed with only licensing the storage components of the ponds by December 13, 2019. If you have any questions, please don't hesitate to contact me.

Respectfully,

Daniel Nelson
Staff Hydrologist
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

Enclosure: Pond Calculation Sheet.

# Total Storage Calculations

| | |
|---|---|
| FILE NUMBER | 37-22769 |
| REVIEWER | Dan Nelson |
| DATE | 11/12/2019 |

**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.)** | 0.34 | "Surface Area" is automatically carried over from the "Seepage Loss" sheet. |
| **Average Pond Depth (FT.)** | 4.5 | "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)** | 1.53 | 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)** | 0.0 | The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet. |
| **Estimated Evaporation Loss (AF)** | 0.6 | The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet. |
| **Total Volume Required (AF)** | 2.1 | 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. |

# 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 | 37-22769 |
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| DATE | 11/12/2019 |

| |
|---|
| 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* | -1.14 | 31 | 0.00 |
| *Feb* | -0.85 | 28 | 0.00 |
| *March* | 0.10 | 31 | 3.10 |
| *April* | 1.50 | 30 | 45.00 |
| *May* | 2.16 | 31 | 66.96 |
| *June* | 3.45 | 30 | 103.50 |
| *July* | 4.20 | 31 | 130.20 |
| *August* | 3.71 | 31 | 115.01 |
| *September* | 2.19 | 30 | 65.70 |
| *October* | 0.67 | 31 | 20.77 |
| *November* | -0.75 | 30 | 0.00 |
| *December* | -1.73 | 31 | 0.00 |

| | |
|---|---|
| Total mm/year = | 550.24 |

**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**

( 550.24 ÷ 304.8 ) X 0.34 = 0.6 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 | 37-22769 |
| REVIEWER | Dan Nelson |
| DATE | 11/12/2019 |

| |
|---|
| User Input |
| Calculated value |
| Formula Explanations |

## INPUTS

| | | |
|---|---|---|
| Pond Surface Area (AC.) | 0.34 | AC. |
| Pond Surface Area (SQ. FT.) | 14810 | SQ. FT. |

| | | |
|---|---|---|
| I used the following method to obtain my Soil Classification information: | NRCS Web Soil Survey | |
| My Soil Classification is | Lined | |
| 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

*ETI*$_{daho}$ 2017

**Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho**

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

2019-11-12 11:13



## Ketchum RS (NWS -- USC00104845)

Statistics based on thirty year normal spans 1974 to 2012 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 Mircosoft 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] | -1.14 | -0.85 | 0.10 | 1.50 | 2.16 | 3.45 | 4.20 | 3.71 | 2.19 | 0.67 | -0.75 | -1.73 | 413 | 0 | 413 |
| 15-Day Moving Average[d] | -1.17 | -0.99 | 0.16 | 1.47 | 2.09 | 3.55 | 4.25 | 3.58 | 2.09 | 0.84 | -0.72 | -1.50 | | | |
| 7-Day Moving Average[e] | -1.14 | -0.86 | 0.16 | 1.47 | 2.13 | 3.48 | 4.21 | 3.66 | 2.10 | 0.75 | -0.72 | -1.58 | | | |
| 3-Day Moving Average[f] | -1.15 | -0.81 | 0.12 | 1.49 | 2.15 | 3.44 | 4.20 | 3.70 | 2.14 | 0.67 | -0.70 | -1.68 | | | |
| Standard Deviation[k] | mm/day | | | | | | | | | | | | mm | | |
| | | | | | | | | | | | | | | | |