

State of Idaho  
Department of Water Resources  
**Water Right License**

WATER RIGHT NO.      55-13853

Priority:    May 01, 2005

Maximum Diversion Volume:      1.0 AF

It is hereby certified that UNITED STATES OF AMERICA ACTING THROUGH  
USDI BUREAU OF LAND MANAGEMENT  
IDAHO STATE OFFICE  
1387 S VINNELL WAY  
BOISE ID 83709-1657      has complied with the terms and conditions of the  
permit, issued pursuant to Application for Permit dated April 18, 2005; and has submitted Proof of  
Beneficial Use on February 14, 2008. An examination confirms water is diverted from:

**SOURCE**

UNNAMED STREAM

**Tributary:** TROUT CREEK

and a water right has been established as follows:

| <b><u>BENEFICIAL USE</u></b> | <b><u>PERIOD OF USE</u></b> | <b><u>ANNUAL<br/>DIVERSION VOLUME</u></b> |
|------------------------------|-----------------------------|-------------------------------------------|
| STOCKWATER STORAGE           | 01/01 to 12/31              | 1.0 AF                                    |
| WILDLIFE STORAGE             | 01/01 to 12/31              | 1.0 AF                                    |

**LOCATION OF POINT(S) OF DIVERSION:**

UNNAMED STREAM    NW1/4SE1/4    Sec. 28,    Twp 05S,    Rge 05W, B.M.    OWYHEE County

**PLACE OF USE:**    STOCKWATER STORAGE AND WILDLIFE STORAGE

| Twp | Rge | Sec | NE |    |    |    | NW |    |    |    | SW |    |    |    | SE |    |    |    |        |
|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------|
|     |     |     | NE | NW | SW | SE | NE | NW | SW | SE | NE | NW | SW | SE | NE | NW | SW | SE | Totals |
| 05S | 05W | 28  |    |    |    |    |    |    |    |    |    |    |    |    |    | X  |    |    |        |

**CONDITIONS OF APPROVAL**

1. This development is known as Cottonwood Reservoir, Gusman Allotment; Project #09643.
2. This right, when considered with all other rights common to the same grazing allotment, is limited to the quantity of water beneficially used by the number of stock within the allotment.
3. When ordered by the Director, the right holder shall provide mitigation acceptable to the Director to offset depletion of lower Snake River flows needed for migrating anadromous fish. The amount of water required for mitigation, which is to be released into the Snake River or a tributary for this purpose, will be determined by the Director based upon the reduction in flow caused by the use of water pursuant to this right. Any order of the Director issued in accordance with this paragraph shall be in conformance with applicable rules allowing the right holder due process as the need for mitigation and the amount of mitigation are determined.
4. Rights 55-13853 and 55-7216 authorize the diversion of a combined annual total of 1.5 AF to be used for the initial filling of the reservoir.

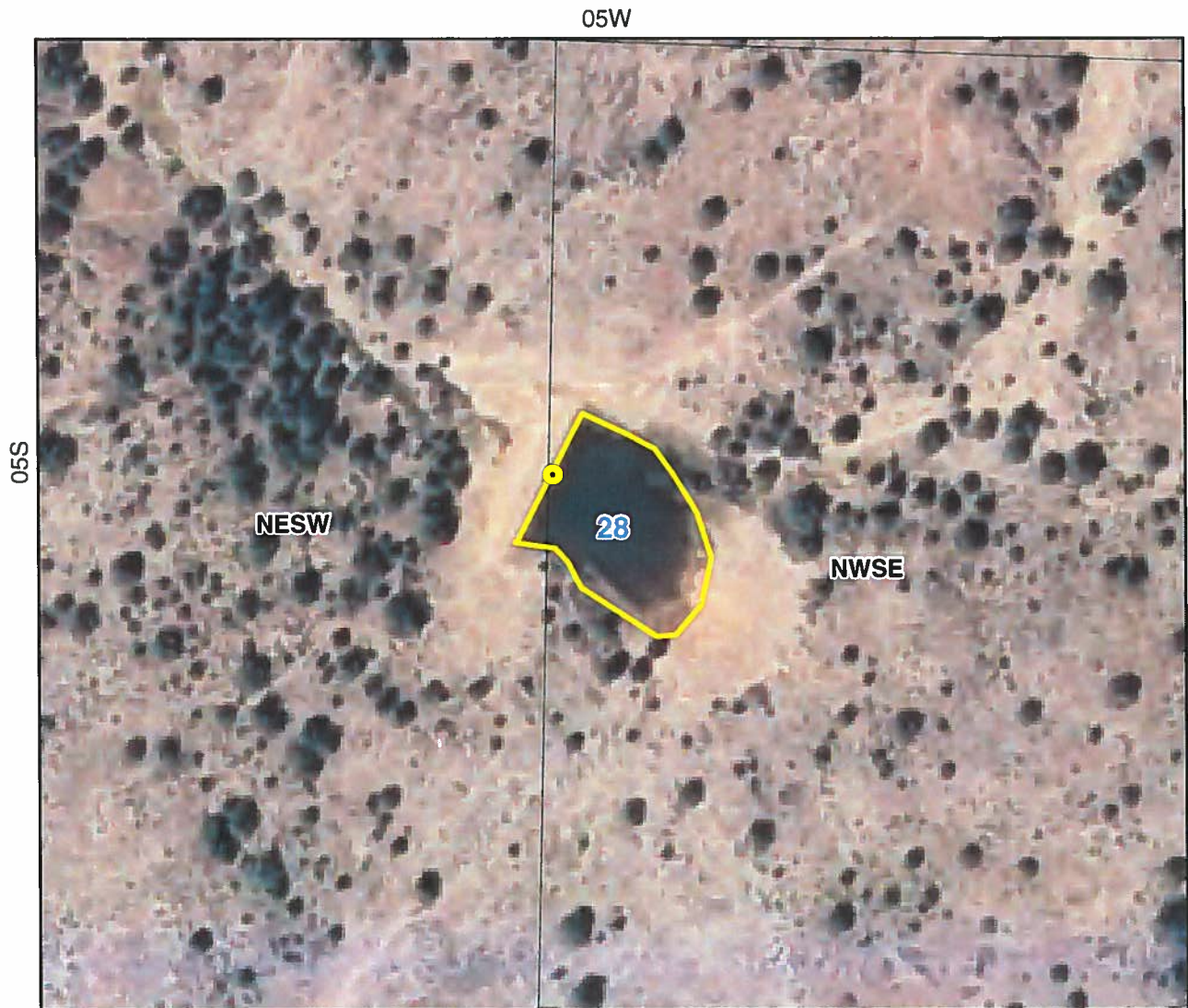
This license is issued pursuant to the provisions of Section 42-219, Idaho Code. The water right confirmed by this license is subject to all prior water rights and shall be used in accordance with Idaho law and applicable rules of the Department of Water Resources.

Signed this 6<sup>th</sup> day of May, 2014.

  
for **GARY SPACKMAN**  
Director

State of Idaho  
Department of Water Resources  
**Attachment To Water Right License**  
55-13853

This map depicts the STOCKWATER STORAGE & WILDLIFE 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.



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

0 0.02 0.04 0.08 Miles





State of Idaho

## DEPARTMENT OF WATER RESOURCES

322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098

Phone: (208) 287-4800 • Fax: (208) 287-6700 • Web Site: [www.idwr.idaho.gov](http://www.idwr.idaho.gov)

GARY SPACKMAN  
Director

C.L. "BUTCH" OTTER  
Governor

May 13, 2014

UNITED STATES OF AMERICA ACTING THROUGH  
USDI BUREAU OF LAND MANAGEMENT  
IDAHO STATE OFFICE  
1387 S VINNELL WAY  
BOISE ID 83709-1657

RE: License No. 55-13827 and 55-13853

### Issuance of License

Dear Water Right Holder(s):

The Department of Water Resources has issued the enclosed Water Right License confirming that a water right has been established in accordance with your permit. Please be sure to thoroughly review the conditions of approval and remarks listed on your license.

The license is a PRELIMINARY ORDER issued by the Department pursuant to section 67-5243, Idaho Code. It can and will become a final order without further action by the Department unless a party petitions for reconsideration or files an exception and/or brief within fourteen (14) days of the service date as described in the enclosed information sheet.

Please note that water right owners are required to report any change of water right ownership and/or mailing address to the Department within 120 days of the change. Failure to report these changes could result in a \$100 late filing fee. Contact any office of the Department or visit the Department's homepage on the Internet to obtain the proper forms and instructions.

If you have any questions, please contact me at 208-287-4916.

Sincerely,

 Craig Saxton  
Water Rights Supervisor

Enclosure(s)

## **CERTIFICATE OF SERVICE**

I hereby certify that on May 14, 2014 I mailed a true and correct copy, postage prepaid, of the foregoing PRELIMINARY ORDER(Approved License) to the person(s) listed below:

**RE: WATER RIGHT NO.                      55-13827                      55-13853**

**UNITED STATES OF AMERICA ACTING THROUGH  
USDI BUREAU OF LAND MANAGEMENT  
IDAHO STATE OFFICE 1387 S VINNELL WAY  
BOISE ID 83709-1657**

A handwritten signature in cursive script, reading "Jean Hersley", is written over a horizontal line. The signature is in black ink and is positioned above the printed name and title.

**Jean Hersley  
Technical Records Specialist II**

## **EXPLANATORY INFORMATION TO ACCOMPANY A PRELIMINARY ORDER**

(To be used in connection with actions when a hearing was **not** held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "**Preliminary Order**" issued by the department pursuant to section 67-5243, Idaho Code. **It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:**

### **PETITION FOR RECONSIDERATION**

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. **Note: the petition must be received by the department within this fourteen (14) day period.** The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

### **EXCEPTIONS AND BRIEFS**

Within fourteen (14) days after: (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

### **REQUEST FOR HEARING**

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

### **ORAL ARGUMENT**

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

## **CERTIFICATE OF SERVICE**

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

## **FINAL ORDER**

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

Unless a different date is stated in a final order, the order is effective fourteen (14) days after its service date if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:

- (a) The petition for reconsideration is disposed of; or
- (b) The petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

## **APPEAL OF FINAL ORDER TO DISTRICT COURT**

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

- i. A hearing was held,
- ii. The final agency action was taken,
- iii. The party seeking review of the order resides, or
- iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.

**Nelson, Dan**

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**From:** Favreau, Danielle  
**Sent:** Monday, May 05, 2014 4:06 PM  
**To:** Nelson, Dan  
**Subject:** FW: Quantity for Cottonwood Trail Pond Project #6496  
**Attachments:** Cottonwood reservoir app for permit as filed.pdf; Cottowood Trail App for permit as filed.pdf

FYI

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**From:** Price, Fredric [mailto:fwprice@blm.gov]  
**Sent:** Monday, May 05, 2014 4:01 PM  
**To:** Favreau, Danielle  
**Cc:** James Tarter; Gary Madenford  
**Subject:** Fwd: Quantity for Cottonwood Trail Pond Project #6496

Danielle,

We filed two Applications for Permit today: (1) a supplemental right to bring us up to capacity for Cottonwood Reservoir Project #9643 (used in conjunction with 55-07216 and 55-13853); and (2) a solo right on Cottonwood Trail Reservoir Project #6496.

Fred

----- Forwarded message -----

**From:** Price, Fredric <fwprice@blm.gov>  
**Date:** Thu, May 1, 2014 at 11:33 AM  
**Subject:** Quantity for Cottonwood Trail Pond Project #6496  
**To:** Derek Eichelberger <deichelberger@blm.gov>, Jordan Crane <jcrane@blm.gov>  
**Cc:** Gary Madenford <gmadenford@blm.gov>

RE: Quantity for Cottonwood Trail Pond Project #6496

0.14 acre surface area x 2' deep = 0.28 acre-feet + 0.14 AF (1/2 of capacity for seepage & evaporation) = 0.42 AFY

Let's claim 0.50 AFY for Stock & Wildlife Storage yearround

----- Forwarded message -----

**From:** Favreau, Danielle <Danielle.Favreau@idwr.idaho.gov>  
**Date:** Wed, Apr 30, 2014 at 5:26 PM  
**Subject:** RE: 55-13827 (Ashby Spring #09620): Application for Amendment Filed and questions regarding 55-13853  
**To:** "Price, Fredric" <fwprice@blm.gov>

Hi Fred!

Fantastic!! I will get 55-13827 processed tomorrow.

Regarding 55-13853, I will need Dan to verify.

Just a summary based on your email below:

BLM Action Item 1: The BLM is planning to keep 55-7216 at the current licensed POU, NWSE of Sec. 28 T05S05W. "Cottonwood Reservoir" is located in NWSE of Sec. 28 T05S05W. The BLM will petition the department to have the "Also Known As" Condition on 55-7216 changed from "Cottonwood Trail Pond" to "Cottonwood Reservoir".

A) Due to the IDWR exam, Cottonwood Reservoir is storing 4.9 AF (with evap. Loss and seepage). 55-7216 is licensed for 0.5 AF. 55-13853 is permitted for 1.0 AF.

BLM Action Item 2: The BLM will file an additional application for permit for the additional 3.4 AF for "Cottonwood Reservoir"

DAN, PLEASE VERIFY: I do not believe an amendment for permit is needed for the Allotment and Project Number Change. That can be verified and corrected during the Exam process.

BLM Action Item 3: The BLM will file for an application for permit for "Cottonwood Trail Pond" in the SESW of Sec. T05S05W.

How much water should be applied for?

B) I cannot tell the BLM what to do. Just remember, A field examiner can recommend less than permitted be licensed, but not more.

A guess without doing the pond spreadsheet or a full analysis – Per NHD Waterbody shape: the pond is about 0.14 acres. Per info. from Raul: the pond is 2 ft deep. Since the pond about half the size of the reservoir and they are close by, based on half the seepage and evaporation from the reservoir, an additional 1.4 AF for seepage and evaporation.

Happy May Day!!

Danielle

Danielle Bruno-Favreau, GISP  
GIS Analyst  
Idaho Dept. of Water Resources  
322 East Front St.  
PO Box 83720  
Boise, ID 83720-0098

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**From:** Price, Fredric [mailto:[fwprice@blm.gov](mailto:fwprice@blm.gov)]  
**Sent:** Wednesday, April 30, 2014 4:01 PM  
**To:** Favreau, Danielle  
**Subject:** Fwd: 55-13827 (Ashby Spring #09620): Application for Amendment Filed

A present for May Day! We got 55-13827 filed today!

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**From:** Price, Fredric [mailto:[fwprice@blm.gov](mailto:fwprice@blm.gov)]  
**Sent:** Wednesday, April 30, 2014 4:00 PM  
**To:** Favreau, Danielle  
**Cc:** Raul Trevino Jr; Nelson, Dan  
**Subject:** Re: input needed regarding permit 55-13853

Danielle,

RE: 55-07216, 55-13853

After looking through everything, I believe it would be best to leave both water rights (55-07216 and 55-13853) at their declared location of NWSE, S28, T05S, R05W (Cottonwood Reservoir Project #9643); and to then file a supplemental application for permit for 3.6 AFY to bring us up to the 4.9 AFY needed (0.3 AFY (55-07216) + 1.0 AFY (55-13853) = 1.3 AFY). All 3 rights would then be cumulative to achieve the total ben use.

We would then have to file a new application for permit on the reservoir (Cottonwood Trail Pond Project #6496) that is located in the SESW, S28, T05S, R05W. How much water do we need to ask for to cover this smaller reservoir?

#### PETITION:

I need to file a petition in order to change a locally known source name for 55-07216? Ok, I can do that.

I notice that the Approved Permit for 55-13853 contains a condition that states: "This development is known as Flint Creek Allotment; Project #9883." Both of the "Cottonwood" something reservoirs reside within Gusman #03 Pasture of the Gusman Allotment #0554. The Flint Creek Allotment is at least 7 miles to the east of the Gusman Allotment.

If I have to file a Petition to fix the project reference in 55-07216, then do we also need to Amend the Permit for 55-13853 to change the references to Allotment Name (i.e. change from Flint Creek to Gusman) and the Project Number (i.e. change from #9883 to #9643)?

Fred

On Mon, Nov 25, 2013 at 4:59 PM, Favreau, Danielle <[Danielle.Favreau@idwr.idaho.gov](mailto:Danielle.Favreau@idwr.idaho.gov)> wrote:

Hi Fred,

While reviewing permit 55-13853 for licensing, an interesting situation was revealed.

The Bureau of Land Management (BLM) representative informed IDWR that the Cottonwood Reservoir has an average depth of 5 feet and our GIS information shows the pond at 0.5 acres of surface area. With this information the pond capacity is 2.5 acre feet, and the evaporation and seepage for this pond is 2.4 acre feet for a total of 4.9 acre feet of total storage requirement needed. This is an on-stream pond, but it appears from the aerial photos that this is an intermittent stream.

Water right permit 55-13853 allows a total storage volume of 1 acre feet. This is 1.5 acre feet of meeting the reservoir's capacity and 3.9 acre feet from meeting the evaporation and seepage loss needs to maintain the pond year round.

Water right decree 55-7216 shows Cottonwood Reservoir as its place of use, however, there is a condition on this decree that states that water right 55-7216 is for Cottonwood Trail Pond. Cottonwood Trail Pond is a smaller pond approximately ¼ mile south of Cottonwood Reservoir. Water right decree 55-7216 allow for the storage of 0.5 acre feet of water. Based on the calculations described above, Cottonwood Reservoir has a storage capacity of 2.5 acre feet with 2.4 acre feet of evaporation and seepage for a total of 4.9 acre feet requirement.

This creates an interesting situation. BLM can do one of the following things:

- 1.) File a water right transfer on water right 55-7216 to move the place of use for this water right to the correct location for Cottonwood Trail Pond, and file a new water right application to cover the additional water needed to fill Cottonwood Reservoir and supply the water needed to maintain the reservoir year round.

- 2.) Leave water right decree 55-7216 at the Cottonwood Reservoir location, and petition the Department to change the condition to read Cottonwood Reservoir instead of Cottonwood Trail Pond. With both water rights on this reservoir, it would bring the amount that can be stored up to 1.5 acre feet, which is still less than the capacity of the reservoir and the additional water it would take to maintain the reservoir for evaporation and seepage. Then BLM would need to file a new water right application to fill and maintain Cottonwood Reservoir, and file a second new water right application to cover the water use at Cottonwood Trail Pond.

IDWR cannot make this decision for the BLM, and it is up to the BLM to determine what they want to do before we can license water right permit 55-13853. IDWR will need the transfer or the petition and new applications on file before we can license this permit.

If you and/or Raul would like to meet with Dan Nelson and myself to discuss these options further, please give me a call at 208-287-4938 and I can set up a meeting room here at IDWR.

Please let me know what BLM would like to do.

Thanks,

Danielle

Danielle Bruno-Favreau, GISP  
GIS Analyst  
Idaho Dept. of Water Resources  
322 East Front St.  
PO Box 83720  
Boise, ID 83720-0098

## MEMORANDUM

TO: Danielle Favreau

FROM: Daniel Nelson – Staff Hydrologist

DATE: November 25, 2013, 2013

SUBJECT: Licensing Review of Water Right 55-13853

I was asked to run the Department's Pond Spreadsheet on this pond. The Bureau of Land Management (BLM) representative informed us that the Cottonwood Reservoir has an average depth of 5 feet and our GIS information shows the pond at 0.5 acres of surface area. With this information the pond capacity is 2.5 acre feet, and the evaporation and seepage for this pond is 2.4 acre feet for a total of 4.9 acre feet of total storage requirement needed. This is an on-stream pond, but it appears from the aerial photos that this is an intermittent stream.

Water right permit 55-13853 allows a total storage volume of 1 acre feet. This is 1.5 acre feet of meeting the reservoir's capacity and 3.9 acre feet from meeting the evaporation and seepage loss needs to maintain the pond year round.

Water right decree 55-7216 shows Cottonwood Reservoir as its place of use, however, there is a condition on this decree that states that water right 55-7216 is for Cottonwood Trail Pond. Cottonwood Trail Pond is a smaller pond approximately ¼ mile south of Cottonwood Reservoir. Water right decree 55-7216 allow for the storage of 0.5 acre feet of water. As you can see above, Cottonwood Reservoir has a storage capacity of 2.5 acre feet with 2.4 acre feet of evaporation and seepage for a total of 4.9 acre feet requirement.

This creates an interesting situation. BLM can do one of the following things:

- 1.) File a water right transfer on water right 55-7216 to move the place of use for this water right to the correct location for Cottonwood Trail Pond, and file a new water right application to cover the water needed to fill Cottonwood Reservoir and supply the water needed to maintain the reservoir year round.
- 2.) Leave water right decree 55-7216 at the Cottonwood Reservoir location, and petition the Department to change the condition to read Cottonwood Reservoir instead of Cottonwood Trail Pond. With both water rights on this reservoir, it would bring the amount that can be stored up to 1.5 acre feet, which is still less than the capacity of the reservoir and the additional water it would take to maintain the reservoir for evaporation and seepage. Then BLM would need to file a new water right application to fill and maintain Cottonwood Reservoir, and file a second new water right application to cover the water use at Cottonwood Trail Pond.

We cannot make this decision for the BLM, and it is up to the BLM to determine what they want to do before we can license water right permit 55-13853. We will need the transfer or the petition and new applications on file before we can license this permit.

## TOTAL STORAGE

|             |            |
|-------------|------------|
| FILE NUMBER | 55-13853   |
| REVIEWER    | Dan Nelson |
| DATE        | 11/25/2013 |

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<br>(in Acres)      | 0.5 | "Surface Area" is automatically carried over from the "Seepage Loss Sheet"                                                                                                                                                                                                                                                                                                                                  |
| Average Pond Depth<br>(in feet) | 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 you know the capacity, divide the capacity by surface area and enter the average pond depth in the space above. |
| Pond Capacity<br>(in acre feet) | 2.5 |                                                                                                                                                                                                                                                                                                                                                                                                             |

|                                                                                                    |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Volume Needed Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills"<br>(in acre feet) | 0    | The "Volume Needed Above Initial Fill" is the acre-feet of water required to meet <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).<br><b>PLEASE NOTE: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.</b> |
| Estimated Seepage Loss (in acre feet)                                                              | 1.28 | The "Estimated Seepage Loss" is automatically carried over from the Seepage Loss Sheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Estimated Evaporation Loss (in acre feet)                                                          | 1.17 | The "Estimated Evaporation Loss" is automatically carried over from the Evaporation Loss Sheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Total Volume Required (in acre feet)                                                               | 4.9  | "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.<br>(in mm/day) | 4.59 | 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)    | 0.01 | "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)                                   | 0.01 | 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. 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            | 87   | 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 be described as a domestic use.                                                                                                                                                                                                                                                                                                     |

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

# Evaporation Loss Calculation

|             |            |
|-------------|------------|
| FILE NUMBER | 55-13853   |
| REVIEWER    | Dan Nelson |
| DATE        | 11/25/2013 |

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 <sub>d</sub> = Precipitation deficit                                       |
| P <sub>d</sub> =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 Kimberly 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 <sup>1</sup> | Days per month | mm/Month |
|-----------|---------------------|----------------|----------|
| Jan       | 0.00                | 31             | 0.00     |
| Feb       | 0.30                | 28             | 8.40     |
| March     | 1.09                | 31             | 33.79    |
| April     | 2.07                | 30             | 62.10    |
| May       | 2.69                | 31             | 83.39    |
| June      | 3.71                | 30             | 111.30   |
| July      | 4.59                | 31             | 142.29   |
| August    | 4.00                | 31             | 124.00   |
| September | 3.04                | 30             | 91.20    |
| October   | 1.71                | 31             | 53.01    |
| November  | 0.16                | 30             | 4.80     |
| 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 . . ."

<sup>1</sup>Negative monthly mean values should be entered in the above table as "0".

Total mm/year = **714.28**

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

( **714.28** ÷ **304.8** ) X **0.50** = **1.2 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 | 55-13853   |
| REVIEWER    | Dan Nelson |
| DATE        | 11/25/2013 |

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

### INPUTS

|                            |
|----------------------------|
| SQ. FT. Calculator         |
| Pond Surface area in acres |
| 0.5                        |

|                             |       |
|-----------------------------|-------|
| POND SURFACE AREA (SQ. FT.) | 21780 |
|-----------------------------|-------|

|                                 |        |
|---------------------------------|--------|
| SUGGESTED SEEPAGE RATE (FT/DAY) | 0.0070 |
|---------------------------------|--------|

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 | 1140 | GPD |
|----------------|------|-----|

|                          |     |     |
|--------------------------|-----|-----|
| TOTAL SEEPAGE LOSS (AFA) | 1.3 | 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<sub>Idaho</sub> 2012 -- Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to [robison@kimberly.uidaho.edu](mailto:robison@kimberly.uidaho.edu) Copyright 2012, University of Idaho.

## Reynolds (NWS -- 107648)

Statistics based on thirty year normal spans 1975 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 - shallow systems (ponds, streams)                  |        |      |      |      |      |      |      |      |      |      |      |      |                             |                                 |
|----------------------------------------------------------------|--------|------|------|------|------|------|------|------|------|------|------|------|-----------------------------|---------------------------------|
| Precipitation Deficit <a href="#">(Click here for a graph)</a> |        |      |      |      |      |      |      |      |      |      |      |      |                             |                                 |
|                                                                | Jan    | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  | Growing Season <sup>a</sup> | Non Growing Season <sup>b</sup> |
| Mean <sup>j</sup>                                              | mm/day |      |      |      |      |      |      |      |      |      |      |      | mm                          |                                 |
| Monthly <sup>c</sup>                                           | 0.22   | 0.30 | 1.09 | 2.07 | 2.69 | 3.71 | 4.59 | 4.00 | 3.04 | 1.71 | 0.16 | 0.32 | 697                         | 0                               |
| 15-Day Moving Average <sup>d</sup>                             | 0.24   | 0.19 | 1.16 | 2.12 | 2.71 | 3.69 | 4.66 | 3.98 | 2.94 | 1.78 | 0.15 | 0.22 |                             |                                 |
| 7-Day Moving Average <sup>e</sup>                              | 0.24   | 0.25 | 1.13 | 2.07 | 2.69 | 3.67 | 4.64 | 4.01 | 2.99 | 1.73 | 0.13 | 0.26 |                             |                                 |
| 3-Day Moving Average <sup>f</sup>                              | 0.23   | 0.29 | 1.09 | 2.06 | 2.68 | 3.69 | 4.60 | 4.01 | 3.03 | 1.71 | 0.15 | 0.31 |                             |                                 |
| Standard Deviation <sup>k</sup>                                | mm/day |      |      |      |      |      |      |      |      |      |      |      | mm                          |                                 |
| Monthly <sup>c</sup>                                           | 0.71   | 0.53 | 0.99 | 0.80 | 1.81 | 1.01 | 0.68 | 0.69 | 0.61 | 1.06 | 0.68 | 1.29 | 106                         | 0                               |
| 15-Day Moving Average <sup>d</sup>                             | 0.77   | 0.70 | 0.96 | 0.99 | 1.61 | 1.36 | 0.65 | 0.71 | 0.86 | 0.91 | 0.82 | 0.93 |                             |                                 |
| 7-Day Moving Average <sup>e</sup>                              | 1.05   | 1.03 | 1.22 | 1.41 | 2.12 | 1.76 | 0.88 | 0.94 | 1.13 | 1.29 | 1.12 | 1.25 |                             |                                 |
| 3-Day Moving Average <sup>f</sup>                              | 1.39   | 1.41 | 1.72 | 2.03 | 2.68 | 2.26 | 1.30 | 1.31 | 1.54 | 1.74 | 1.51 | 1.77 |                             |                                 |
| 20% Exceedance <sup>l</sup>                                    | mm/day |      |      |      |      |      |      |      |      |      |      |      | mm                          |                                 |
| Monthly <sup>c</sup>                                           | 0.20   | 0.77 | 1.58 | 2.70 | 3.64 | 4.60 | 5.05 | 4.41 | 3.57 | 2.18 | 0.87 | 0.21 | 814                         | 0                               |
| 15-Day Moving Average <sup>d</sup>                             | 0.67   | 1.06 | 2.34 | 3.50 | 4.54 | 5.22 | 5.38 | 4.78 | 3.92 | 2.88 | 1.38 | 0.59 |                             |                                 |
| 7-Day Moving Average <sup>e</sup>                              | 0.88   | 1.65 | 2.82 | 4.40 | 5.13 | 5.69 | 5.73 | 5.10 | 4.36 | 3.25 | 1.81 | 0.80 |                             |                                 |
| 3-Day Moving Average <sup>f</sup>                              | 1.14   | 1.84 | 3.45 | 5.03 | 5.85 | 6.38 | 6.14 | 5.45 | 4.82 | 3.77 | 2.17 | 1.02 |                             |                                 |