

State of Idaho
Department of Water Resources
Water Right License
WATER RIGHT NO. 45-07608

PRIORITY: February 26, 1987

Maximum Diversion Volume: 15.0 AF

It is hereby certified that:

BENNIE SMYER PO BOX 464 ALBION ID 83311

has complied with the terms and conditions of the permit, issued pursuant to Application for Permit dated February 26, 1987, and has submitted Proof of Beneficial Use on June 02, 1989. An examination confirms water is diverted from:

SOURCE: SPRING

TRIBUTARY: SUMMIT CREEK

and a water right has been established as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>ANNUAL DIVERSION VOLUME</u>
WILDLIFE STORAGE	01/01 to 12/31	15.0 AF
RECREATION STORAGE	01/01 to 12/31	15.0 AF
STOCKWATER STORAGE	01/01 to 12/31	15.0 AF

LOCATION OF POINT(S) OF DIVERSION:

UNNAMED STREAM NW¼SW¼ Sec. 15, Twp 12S, Rge 25E, B.M. CASSIA County

UNNAMED STREAM NW¼SW¼ Sec. 15, Twp 12S, Rge 25E, B.M. CASSIA County

SPRING SE¼NW¼SW¼ Sec. 15, Twp 12S, Rge 25E, B.M. CASSIA County

SPRING SE¼NW¼SW¼ Sec. 15, Twp 12S, Rge 25E, B.M. CASSIA County

PLACE OF USE: RECREATION STORAGE, WILDLIFE STORAGE, AND STOCKWATER STORAGE

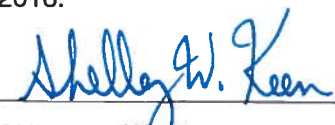
Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
12S	25E	15										X	X						

CONDITIONS OF APPROVAL

1. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 45F.
2. The 4 ponds established by the storage of water under this right shall not exceed a total capacity of 13.9 acre-feet or a total surface area of 3.4 acres.
3. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.

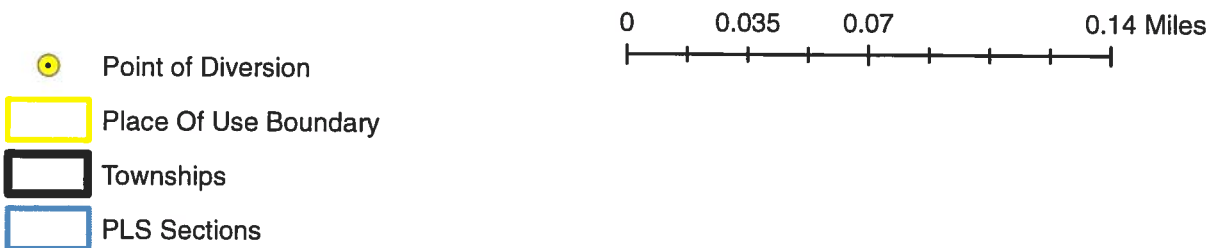
This license is issued pursuant to the provisions of Section 42-219, Idaho Code. The water right confirmed by this license is subject to all prior water rights and shall be used in accordance with Idaho law and applicable rules of the Department of Water Resources.

Signed this 18th day of March, 2016.


SHELLEY W. KEEN
Water Rights Section Manager

State of Idaho
Department of Water Resources
Attachment to Water Right License
45-7608

This map depicts the STOCKWATER STORAGE, RECREATION STORAGE
AND 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.
25E





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 • Website: www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

March 18, 2016

BENNIE SMYER
PO BOX 464
ALBION ID 83311

RE: License No. 45-7608

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. Also enclosed is a copy of the approved application for amendment.

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 208-287-4951.

Sincerely,

A handwritten signature in blue ink that reads "Pamela Skaggs".

Pamela Skaggs
Water Rights Supervisor

Enclosure(s)

c: WATER DISTRICT #45F

CERTIFICATE OF SERVICE

I hereby certify that on March 21, 2016, 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.

45-7608

**BENNIE SMYER
PO BOX 464
ALBION ID 83311**

**WATER DISTRICT #45F
DONALD G GUNDERSON
1047 E 1000 S
ALBION ID 83311-0125**



**Darla Block
Technical Records Specialist**

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.

RECEIVED

MAR 14 2016

DEPARTMENT OF
WATER RESOURCES

Page 1

State of Idaho
Department of Water Resources
APPLICATION FOR AMENDMENT

(For Licensing Purposes)

WATER RIGHT NO. 45-07608

Date of Priority: February 26, 1987

Maximum Diversion Volume: 15.0 AF

Comes now BENNIE SMYER
PO BOX 464

ALBION ID 83311 and represents to the Director of the Idaho Department of Water Resources that he is the owner and holder of Permit to Appropriate the Public Waters of the State of Idaho No. 45-07608, and requests that the permit be changed as follows:

Source: SPRING

Tributary: SUMMIT CREEK

UNNAMED STREAM

SUMMIT CREEK

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>RATE OF DIVERSION</u>	<u>ANNUAL VOLUME</u>
WILDLIFE STORAGE	01/01 to 12/31		15.0 AF
RECREATION STORAGE	01/01 to 12/31		15.0 AF
STOCKWATER STORAGE	01/01 to 12/31		15.0 AF

LOCATION OF POINT(S) OF DIVERSION:

UNNAMED STREAM	NW1/4SW1/4	Sec. 15,	Twp 12S,	Rge 25E, B.M.	CASSIA County
SPRING	SE1/4NW1/4SW1/4	Sec. 15,	Twp 12S,	Rge 25E, B.M.	CASSIA County
UNNAMED STREAM	NW1/4SW1/4	Sec. 15,	Twp 12S,	Rge 25E, B.M.	CASSIA County
SPRING	SE1/4NW1/4SW1/4	Sec. 15,	Twp 12S,	Rge 25E, B.M.	CASSIA County

PLACE OF USE: WILDLIFE STORAGE, RECREATION STORAGE, AND STOCKWATER STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
12S	25E	15										X	X						

Permit holder asserts that no one will be injured by such change and that such change will be made at permit holder's own risk. Signed this 10th day of March, 20016

Bennie Smyer
(Signature)

State of Idaho
Department of Water Resources
APPLICATION FOR AMENDMENT

(For Licensing Purposes)
WATER RIGHT NO. 45-07608

FOR DEPARTMENT USE ONLY

Preliminary check by _____ Fee = \$100⁰⁰ Receipted by dj # C101645 Date 3/14/2016

ACTION OF THE DEPARTMENT OF WATER RESOURCES

I, GARY SPACKMAN, of the Department of Water Resources hereby approve the
above Application for Amendment for Permit No. 45-07608 with the following:

CONDITIONS OF APPROVAL

1. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 45F.
2. The 4 ponds established by the storage of water under this right shall not exceed a total capacity of 13.9 acre-feet or a total surface area of 3.4 acres.
3. After specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to use power records to determine the amount of water diverted and shall annually report the information to the Department.

Witness my hand this 18th day of March, 2016.



SHELLEY KEEN, Manager
Water Rights Section



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 • Website: www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

February 17, 2016

BENNIE SMYER
PO BOX 464
ALBION ID 83311

RE: Water Right Permit No. 45-7608

Dear Mr. Smyer:

The Department of Water Resources (Department) is reviewing the permit referenced above prior to issuing a water right license. By issuing a license, the Department confirms the extent of development that has been established in compliance with the terms of the permit. The examiner who verified your water use reported that certain elements of the permit have been developed differently than described on your permit. Changes that do not increase the authorized use of water under the permit can be requested and approved in accordance with Section 42-211, Idaho Code. Before a license can be issued, your permit must be amended to depict your water use as it was actually developed.

The field examination done on your 4 ponds was performed several years ago, and the report was prepared and sent to the Department's state office for licensing in 2005. In 2011, Sandy Hemenway contacted you concerning the measurement device requirement on your permit. You sent a formal request to waive the measurement device from your permit. Ms. Hemenway subsequently retired from the Department without completing the licensing process on your permit. I been asked to complete the licensing process for this permit.

Your original permit filed to construct a single pond with a maximum capacity of 15 acre feet. That pond is depicted in your original permit is shown as Pond #4 on the enclosed map. The field examiner recommended that we include all of the four ponds on this permit to allow all of them to be covered under a valid water right. The combined capacity of all four ponds is less than the amount of storage you originally applied for under your original permit. Therefore, we can allow you to amend your permit to include all four ponds if you wish.

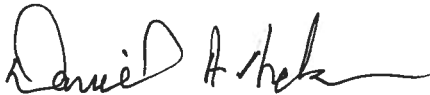
If you do not amend your permit, we will only be able to license this water right for Pond #4 shown on the enclosed map. This could result in a reduction of the volume listed on your water right to match the amount of water being diverted for Pond #4. By not filing the amendment, the other 3 remaining ponds would not be covered by a water right, and could be subject to review from our Water Compliance Bureau.

I also wanted to bring to your attention that the measurement requirement listed on the water right permit has been changed. The new condition doesn't require the immediate installation of a measurement device, but it does allow the Department to require a measurement device in the future if necessary. The issuance of the license will formally waive the measurement requirement for these ponds. However, if it is determined to be needed in the future, the Department can still require that you install a measurement device on the ponds.

The enclosed Application for Amendment form depicts the elements of the water right as they will appear on the license when it is issued. Please review the amendment form carefully. **If you concur with the information presented, please sign the form and return it with the \$100.00 filing fee by March 3, 2016.** As stated above, failure to return the amendment could result in the license being issued only for Pond #4 on the enclosed map.

If you have any questions, please don't hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel A. Nelson", with a long horizontal flourish extending to the right.

Daniel A. Nelson
Staff Hydrologist
Planning Bureau
Idaho Department of Water Resources
Telephone # (208) 287-4856
Email – dan.nelson@idwr.idaho.gov

Enclosures: Map showing and numbering the 4 ponds
Amendment of permit with amendment map attachment.

MEMORANDUM

TO: File 45-7608

FROM: Daniel Nelson – Staff Hydrologist

DATE: February 16, 2016

SUBJECT: Licensing Review for 45-7608

This is the licensing review of the field exam submitted by Corey Skinner of southern region office. Sandy Hemenway also worked on this file for some time, but never completed the licensing of the permit.

History:

This permit was originally filed for 15 acre-feet of stockwater, wildlife, and recreational storage and 0.20 cfs for diversion to storage. The permit only described a single pond with a capacity of 15 acre-feet. No water was allocated for seepage and evaporation losses. This permit was issued in 1987, when the seepage and evaporation losses were not included as part of the storage component. They only concern at that time was the capacity of the pond.

The source was unnamed stream and spring. The unnamed stream was runoff from Pine and Antone Creeks, and the pond was to be constructed in a boggy area that would naturally fill the pond from ground water. The diversion to storage was actually supposed to be a diversion from nearby creek channels that were never allowed, because the diversion would injure downstream water users. Therefore, the storage associated with this water right is for on-stream and on-spring storage. The diversion to storage component was removed.

Mr Skinner performed the field examination on this permit on 8/14/1991, and completed the report on June 13, 2005. The file was then sent to the state office for licensing of the permit. Mr. Skinner found that the large pond that was proposed in the original permit was not constructed, but 4 smaller ponds were constructed instead. Mr. Skinner determined that the combined volume of the 4 ponds was less than the original 15 acre-feet requested in the original permit. Mr. Skinner requested that all 4 ponds be included in the license, since the total volume had not been exceeded. Mr. Skinner also reported that the measurement devices required by the permit were not installed.

Ms. Hemenway took over the licensing of this permit at the state office. In November of 2011, Ms. Hemenway contacted the permit holder and the watermaster to request information concerning the measurement devices. The permit holder subsequently submitted a request to waive the measurement device requirement and the watermaster requested that the measurement device requirement be carried forward to the licensing. No further work was done on the licensing of this permit after 2011.

Waiver of the Measurement Conditions:

The permit holder requested a waiver of the measurement conditions, since the ponds were mainly filled with spring water and early runoff/wastewater. The watermaster was concerned about downstream water users, having had trouble with the permit holder on another pond to the east without a water right. After speaking with southern region staff including Mr. Skinner and Cindy Yenter of water distribution bureau, it was determined that the water being stored in the ponds would not adversely affect the downstream water users, since the ponds were not on a main creek channel, and that water that was being stored probably never did make it down to downstream users after spring runoff.

It was determined that the ponds would not cause any significant injury to downstream water users during the irrigation season, therefore, it was agreed to waive the measurement device requirement. The measurement device requirement will be changed at licensing to condition 01M that states that upon Department request the water user will be required to install a measurement device. This will allow the Department and the watermaster the means to require a measurement device if the need ever arises.

4 Ponds vs. 1 Pond – Pond Volume:

The field examiner found that the permit holder constructed 4 ponds instead of the single pond allowed by the permit. The permit was approved for a single pond with a capacity of 15 acre-feet. The 4 ponds when combined have a capacity of 13.9 acre-feet. There is concern that one of the Pond #3 was not constructed until sometime in the 1990's per aerial photos.

However, the permit holder was required to reduce the size of the spillway for Pond #4 in 1998. Pond #4 had a capacity of around 13.07 to 13.55 acre-feet, and after the spillway reduction, the pond size was reduced to 8.8 acre-feet. Around the time the spillway was lowered, Pond #3 was constructed. It is my assumption that the Pond #3 was constructed to cover the capacity lost by lowering the spillway for pond #4. If you remove Pond #3 from the volume amounts and add in the 13.07 acre-feet originally developed for Pond #4 the total combined capacity would have been 16.97 acre-feet. Therefore, the current combined capacity for the 4 ponds is still below what was originally developed for the 3 ponds before the lowering of the spillway.

Since the ponds are all on-stream and on-spring, there is very little if any seepage from the ponds. There should be no seepage loss counted towards the volume of the ponds. The total evaporative losses from the 4 ponds are approximately 9.6 acre-feet. When the evaporative losses and the pond capacities are combined the total volume required is 23.5 acre-feet. A review of aerial photos of these ponds, suggests that the all 4 ponds don't normally fill every year, so 15 acre-feet may be sufficient to operate the ponds in most years. With the original pond capacity being over 15 acre-feet, and the current capacity and evaporation when combined being over 15 acre-feet, this permit should be licensed for 15 acre-feet with a maximum pond capacity of 13.9 acre-feet.

Diversion Rate:

The diversion to storage for this permit was never realized, so there will be no diversion to storage component on the license. Therefore, there will also not be any diversion rate required on a license for this permit.

Source:

The source for these ponds is listed as springs and unnamed stream. According to the field report, the area where the ponds are built is a boggy area that has a runoff/wastewater stream that runs through the middle of the bog. In the aerial photos, you can see a boggy area where Pond #1 and Pond #2 are built. These two ponds are generally full in the review of past aerial photos. The aerial photos suggest that Pond #3 and Pond #4 appear to be dependent on the flow through the creek that flows through the bog more than the springs themselves. Ponds #3 and #4 don't fill every year, so it safe to assume that they don't directly intercept the spring water. Both Pond #3 and Pond #4 appear to have a dam constructed on the stream channel to create the pond.

The unnamed stream appears to collect some wastewater from the properties west of the highway, but runoff water from the hills to the south of property also appear to contribute to the water flowing in the unnamed stream during early spring.

Point of Diversion:

The permit only lists a single point of diversion for a single pond. The permit holder developed 4 ponds instead of 1, so an amendment will be needed to include a point of diversion for all 4 ponds on the permit. If the permit holder doesn't return the amendment, then Pond #4 is the only pond that we can license.

The points of diversion for Pond #1 and Pond #2 could be placed in the center of the pond, since these ponds were constructed on the springs. All of the ponds appear to have a dam or berm construction on the downstream side of the permit, so I will place the points of diversion at the dam location instead of the center of the ponds as is normal for ponds built over the top of a spring.

Overlap:

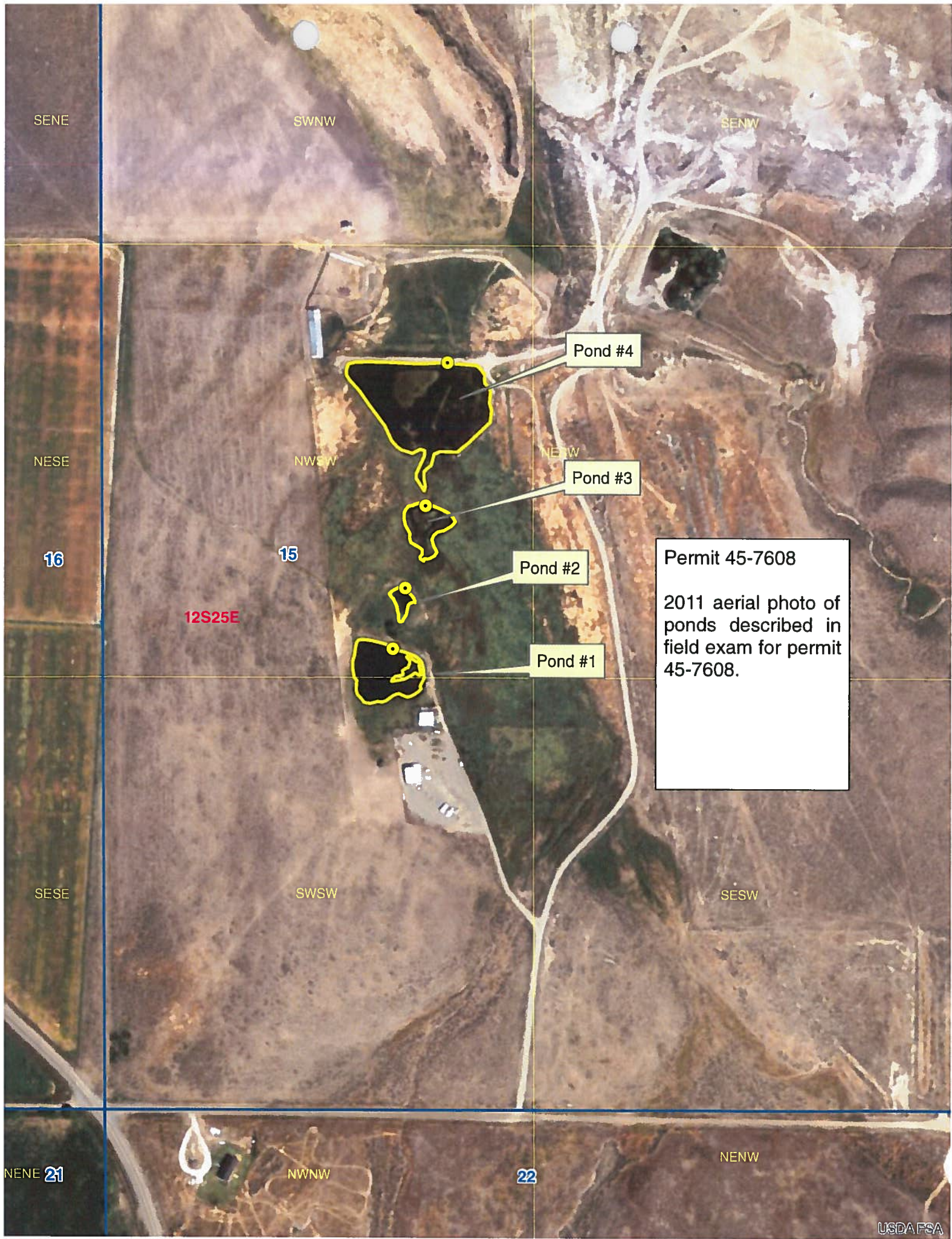
There are no storage water rights that directly overlap this place of use, however, there are several water rights that need to be discussed. There are two applications for permit currently on moratorium hold for Mr. Smyer. Application 45-7605 was originally filed to cover the east pond and Pond #1 and Pond #2. Both ponds existed prior to 1987, and permit 45-7608 was filed in 1987. Application for permit 45-7663 was filed to divert ground water into the ponds to be used for irrigation.

Decreed water right 45-4158 is from a spring at the same location as pond #1 for stockwater and irrigation. The pond shows up in the adjudication maps. Decreed water rights 45-13751 and 45-13752 are water rights from wastewater and Howell Creek. It doesn't appear as though any of the water from these sources goes into the ponds, but there is a combined limitation condition that when water rights 45-293, 45-4158, 45-13751 and 45-13752 are combined, they are limited to 54.5 acres of irrigation Decreed water right 45-293 is diverted upstream of ponds, but it appears to go through the same ditch system as 45-13751 and 45-13752.

Other than the two applications for permit, only water right 45-4158 appears to use the same spring as Pond #1. The other 3 ponds don't have any water rights overlapping them. The stockwater use and the irrigation use under decreed water right 45-4158 shouldn't affect the storage requirements being addressed in this permit.

Conditions:

Condition 1 (18A) will be changed to 01M per the determination that the measurement condition could be waived for this permit. Conditions 2 (18B) will be removed at licensing, since these ponds are no longer under the regulation of our Dam Safety Bureau. Condition 3 (026) will be removed as is standard. Condition 4 (005) will be changed to condition R05 as is standard. Condition 5 will be removed, since it doesn't supply any reasonable additional information. Condition 220 will be added to limit the pond capacity to 13.9 acre-feet and a surface area of 3.4 acres.



SENE

SWNW

SENW

NESE

NWSW

NEW

16

15

12S25E

SESE

SWSW

SESW

NENE 21

NWNW

22

NENW

Pond #4

Pond #3

Pond #2

Pond #1

Permit 45-7608

2011 aerial photo of ponds described in field exam for permit 45-7608.

Permit 45-7608 Pond Calculations for all 4 ponds.

Pond	Capacity	Cumulative Capacity	Evaporation	Cumulative Evaporation	Total Volume	Cumulative Total Volume	Total Surface Area
Pond 1	3.5	3.5	2	2	5.5	5.5	0.7
Pond 2	0.4	3.9	0.3	2.3	0.7	6.2	0.1
Pond 3	1.2	5.1	1.1	3.4	2.3	8.5	0.4
Pond 4	8.8	13.9	6.2	9.6	15	23.5	2.2
							3.4

Year of Aerial Photo	Amount of fill of Pond #1	Amount of fill of Pond #2	Amount of fill of Pond #3	Amount of fill of Pond #4
2004	Filled	Filled	Filled	1/4 Filled
2006	Filled	Filled	Filled	3/4 Filled
2009	Filled	Filled	Filled	Filled
2011	Filled	Filled	Filled	Filled
2013	Filled	Filled	1/10th Filled	2/3 filled
2015	Filled	Filled	Filled	1/4 Filled

A review of the aerial photos suggest that all 4 ponds don't always fill every year. When all 4 ponds are full, the cumulative volume is approximately 23.5 af including evaporation. When Pond #4 or Pond #3 are not filled, the cumulative volume is closer to 12.3 to 16.4 acre feet of cumulative volume. All 4 reservoirs only filled twice in the 6 years of aerial photos available to the Department. The 15 acre feet of storage requested by the permit can be licensed, but the owner may want to file an additional water right to cover the remaining 8.5 af needed to cover the systems capacity and evaporation.

Total Storage Calculations

FILE NUMBER	45-7608 Pond 1
REVIEWER	Dan Nelson
DATE	2/9/2016

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.)	0.7	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	5	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated. Note: If you know the maximum depth and not the average depth, the Field Examiner's Handbook suggests multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that seems reasonable to attain average depth.
Pond Capacity (AF)	3.5	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 <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 " <u>From Storage</u> " 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)	2.0	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	5.5	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.

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	45-7608 Pond 1
REVIEWER	Dan Nelson
DATE	2/9/2016

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	0.30	31	9.30
Feb	0.79	28	22.12
March	1.48	31	45.88
April	1.96	30	58.80
May	2.67	31	82.77
June	4.05	30	121.50
July	5.61	31	173.91
August	4.99	31	154.69
September	3.73	30	111.90
October	1.78	31	55.18
November	0.70	30	21.00
December	-0.10	31	0.00

Total mm/year = 857.05

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.

$$((857.05 \text{ mm/yr}) \div (\text{convert to feet})) \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

(857.05 ÷ 304.8) X 0.70 = 2.0 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	45-7608 Pond 1
REVIEWER	Dan Nelson
DATE	2/9/2016

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.7	AC.
-------------------------	-----	-----

Pond Surface Area (SQ. FT.)	30492	SQ. FT.
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I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	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.

Total Storage Calculations

FILE NUMBER	45-7608 Pond 2
REVIEWER	Dan Nelson
DATE	2/9/2016

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.)	4	"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)	0.4	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)	0	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)	0.3	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	0.7	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	45-7608 Pond 2
REVIEWER	Dan Nelson
DATE	2/9/2016

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	0.30	31	9.30
Feb	0.79	28	22.12
March	1.48	31	45.88
April	1.96	30	58.80
May	2.67	31	82.77
June	4.05	30	121.50
July	5.61	31	173.91
August	4.99	31	154.69
September	3.73	30	111.90
October	1.78	31	55.18
November	0.70	30	21.00
December	-0.10	31	0.00

Total mm/year = 857.05

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.

$$[(857.05 \text{ mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

$$(857.05 \div 304.8) \times 0.10 = 0.3 \text{ AFA}$$

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	45-7608 Pond 2
REVIEWER	Dan Nelson
DATE	2/9/2016

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.1	AC.
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Pond Surface Area (SQ. FT.)	4356	SQ. FT.
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I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	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.

Total Storage Calculations

FILE NUMBER	45-7608 Pond 3
REVIEWER	Dan Nelson
DATE	2/9/2016

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.)	0.4	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	3	"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)	1.2	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. <i>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.</i>

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 <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). <i>Note: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.</i>
Estimated Seepage Loss (AF)	0.0	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	1.1	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	2.3	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.

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	45-7608 Pond 3
REVIEWER	Dan Nelson
DATE	2/9/2016

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	0.30	31	9.30
Feb	0.79	28	22.12
March	1.48	31	45.88
April	1.96	30	58.80
May	2.67	31	82.77
June	4.05	30	121.50
July	5.61	31	173.91
August	4.99	31	154.69
September	3.73	30	111.90
October	1.78	31	55.18
November	0.70	30	21.00
December	-0.10	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 857.05

$$\left(\frac{857.05}{304.8} \right) \times 0.40 = 1.1 \text{ AFA}$$

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	45-7608 Pond 3
REVIEWER	Dan Nelson
DATE	2/9/2016

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	0.4	AC.
-------------------------	-----	-----

Pond Surface Area (SQ. FT.)	17424	SQ. FT.
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I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	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.

Total Storage Calculations

FILE NUMBER	45-7608 Pond 4
REVIEWER	Dan Nelson
DATE	2/9/2016

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.)	2.2	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	4	"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)	8.8	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 <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)	6.2	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	15.0	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	45-7608 Pond 4
REVIEWER	Dan Nelson
DATE	2/9/2016

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	0.30	31	9.30
Feb	0.79	28	22.12
March	1.48	31	45.88
April	1.96	30	58.80
May	2.67	31	82.77
June	4.05	30	121.50
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September	3.73	30	111.90
October	1.78	31	55.18
November	0.70	30	21.00
December	-0.10	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = **857.05**

$$[(857.05 \text{ mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

(**857.05** ÷ **304.8**) × **2.20** = **6.2 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	45-7608 Pond 4
REVIEWER	Dan Nelson
DATE	2/9/2016

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	2.2	AC.
-------------------------	-----	-----

Pond Surface Area (SQ. FT.)	95832	SQ. FT.
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I used the following method to obtain my Soil Classification information:	NRCS Web Soil Survey	
My Soil Classification is	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.

Marsh Creek Water

Don G. Gunderson, Watermaster
1047 East 1000 South

Albion, Idaho 83311-9801

Tele: (208) 673-5359 * E-mail gundy@safelink.net

Fax: 208-673-6745

-----*

Water Board: Pat McCammon / Leroy Robinson / Jeff Chatburn

November 30, 2011

FAX COVER SHEET

Fax Number: 1-208-287-6700

Send To: State of Idaho
Department of Water Resources
322 East Front Street
P.O. Box 83720
Boise, Idaho 83720-0098

Attention: **Sandy Hemenway**
Sr. Water Resource Agent

Subject Ref: MCWD45F Review for Licensing Permit 45-7608 Smyer

Remarks: *Dear Sandy,*
Per our conversation this morning I hope you find these documents satisfactory per the request. I have not been able to e-mail these documents due to IDWR Failure to receive five different times.

- *Attachment's that are included in this fax are:*
 - *Signed Wavier document*
 - *CFS Consolidated Summary Report 2011*
 - *CFS Consolidated History 2002-2010*
 - *IDWR Ltr.*
 - *Arc-Map 2009*
 - *Aerial Map 2011*

Note: Any questions, please contact me at 673-5359 or 312-5359 or gundy@safelink.net
Thank you;

Don G. Gunderson, Watermaster
Marsh Creek Water District 45F
Albion, Idaho 83311

No. of Sheets Sent: 9

Time sent: _____

Marsh Creek Water District 45F

1047 E 1000 S

Albion, Idaho 83311

Don G. Gunderson, Watermaster

Water Board: Pat McCammon/Leroy Robinson/Jeff Chatburn
208.673.5359 / 312.5359

November 28, 2011

Sandy Hemenway
Sr. Water Resource Agent
IDWR/State Office
PO Box 83720 or 322 E. Front St.
Boise, ID 83720-0098

Subject: Marsh Creek Water District 45F Watermaster's
Review for Licensing Permit 45-7608 Smyer

Dear Sandy:

In looking at the documents you sent and my conversation with Cory Skinner and the area that's being reviewed for Condition 18A to be waived. I disagree I feel that with the attached history of the upper areas with Decreed Water Rights 45-256A and B with a total CFS decreed 8.05 of the Antone / Pine Creek.

Antone and Pine Creek is an 1892 right and when required the creek channel heading west through Mr. Smyer's property is a direct delivery distribution system to Summit Creek to Howell Creek (below the Smyer reservoir) the channel is not an unnamed stream as it has been related to by Mr. Skinner.

The primary problem that has existed in the past is where water has been diverted to Summit Creek through the Bell property by Grant Clark, I see it changing. This last year Clark has leased his ground to another party which did not call for water till later in the season. Part of it was due to new seeding and the Hawker ground is being leased by another which I do not see irrigating under the normal rotation plan.

Mr. Clark and Mr. Hawker has been in violation of not having a proper measuring device, as was eluded to by Mr. Skinner indicating no upstream or downstream measuring devices. I do my estimated measuring at given points on the channel of both parties. I have indicated the violations each year through my annual reporting to the state.

At the present time I cannot say that Ben Smyer has utilized the water going through his property, but I do feel that a measuring device be place at the entry on the west side of 1100 S in the SWSW portion of his property. This would also catch the Water right 45-293 (3/1/1882) that he claims he has off of Howell Creek either from Diversion "HB" or from his neighboring Albion Ranch. The stream would channel under Hwy77 and down the East side of 1100 S to same channel of the Anton/Pine.

It will be noted, I have never delivered Howell Creek water to Mr. Smyer! Please contact me if there are any other questions.

Sincerely,

Don G. Gunderson, Watermaster
Marsh Creek Water District 45F
1047 E 1000 S
Albion, Idaho 83311
gundy@safelink.net

Attachments:

Waiver Document signed
CFS Consolidated Summary Report #2002-2010
Consolidate CFS History #2
IDWR Ltr
Arc-Map 2009
Aerial Map 2011

CC: Corey Skinner/Southern IDWR Region Office
MCWD Water Board Member(s)

Donald Gunderson
1047 E 1000 S
Albion, ID 833311-0125
(208) 673-5359/312-5359
Email: gundy@safelink.net

Please mark one of the boxes below:

☐ I agree that condition 18A should be waived.

☒ I disagree that condition 18A should be waived

Explain why you feel this way: See Attachment(s) and Cover Letter

Explain what type of measuring device do you feel should be installed Rectangular prism
Stop sign

Indicate on the attached map where the measuring devices should be installed my Computer
has lost its Capability of printing to your topograph -
and the topograph does not go all the way East to include
1100 S Hwy 77 - "SW SW"

Signature: [Signature] Date: Nov 28, 2011

Report # 1 Prepared by: Don Gunderson

Run Date: 3/01 thru 10/31/2011

prepDate: 11/25/2011

MARSH CREEK WATER DISTRICT 45-F

Watermaster Log by Month

2011

report #1

2011... Consolidated CFS

Other CFS

Monthly

<u>NAME:</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Months</u> <u>JaFbNvDec</u>	<u>Consid</u> <u>Totals</u>	<u>Decreed</u> <u>WtrDate</u>	<u>PLS</u>
Clark, Grant (HowCk 45-284C	0	0	0	30.16	26.12	10.46	7.6	0	0	74.34		12S25E21SENWSW
Howell Creek 45-286	0	0	0	5.14	9.6	0	0	0	0	14.74		12S25E21SENWSW
Antone/Pine Creek 45-256A	0	0	12	27.9	43.32	20.08	0	0	0	103.3	4/12/1892	Antone/Pine Crk 45-256A
										0		
Hawker, Fred, (HowCk 45-284A	0	0	0	19.01	0	0	0	0	0	19.01		12S25E21SENWSW
Hawker, Fred 45-286A	0	0	26	21.4	8.5	3	0	0	0	58.9		12S25E21SENWSW
Antone/Pine Creek 45-256B	0	0	12.5	5	2.5	0	2.5	0	0	22.5	4/12/1892	Antone/Pine Crk 45-256B
										0		
										0		
Ben Smyer Lic Permit 45-7608	9.45	40.1	9	0	0	0	0	0	0	58.55	?	
	9.45	40.1	33.5	32.9	45.82	20.08	2.5	0	0	184.35		Total CFS Delivered on
										184.35		Antone/Pine Creek

Note: Antone/Pine Creek(s) are a direct delivery distribution system to Howell Creek. They are both 1892 Decreed Rights. as indicated above, Ben received a total estimated CFS through his property prior to the call for water by Hawker and Clark. Under a normal year the water never gets to Smyer. It is called the First of March or as soon as the snow clears from the creek bed. Normally the creek has dried up by August.

The property of both Clark and Hawker is being contracted out therefore, I foresee Ben Smyer receiving water through his place in the coming years. The Map covering the Smyers property does not show the entirety of the creek channell going under the road on ____ South. As the water enters the Smyer property I would have a Retangler Weir placed and as yet I have not been too farther west point of his large pond to see where a measuring device could be placed.

2002-2010 Consolidated CFS History

Rotation 15 days, off 5 Days

Clark, Grant 45-256A

	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>ConSld</u> <u>CFS Total</u>
Antone/Pine Creek 2002	0	46.29	63.92	54.94	29.98	3.6	0	0			0		198.73
Antone/Pine Creek 2003	0	0	0	0	0	0	0	0			0		0
Antone/Pine Creek 2004	0	12.14	25.32	19.99	7.5	0	0	0			0		64.95
Antone/Pine Creek 2005	0	3.53	37.7	20.61	12.25	0.6	0	0			0		74.69
Antone/Pine Creek 2006	0	65.62	69.7	35.18	25.84	34.47	0	0			0		230.81
Antone/Pine Creek 2007	3	22.07	22	36.2	3	0	0	0			0		86.27
Antone/Pine Creek 2008	3	11.58	16.2	29.5	18.9	1.4	2.8	0			0		83.38
Antone/Pine Creek 2009	0	27.1	21.1	39.96	48.93	19.2	3.85	0			0		180.14
Antone/Pine Creek 2010	0	2.8	28.62	44.15	23.8	0	0	0			0		99.37
Total CFS Summ:	6	191.13	284.56	280.53	170.2	59.27	6.65	0			0		998.34

CFS Decreed **PINE CREEK**
3.35 12S25E27SWSWNW
 12S25E33SWNWNW
 12S25E28SESWSE
 12S25E28SENENE
 12S25E22SWNWSW
 flush to Howell Ck/Sum Ck
ANTONE CREEK
 12S25E28SENENE
 12S25E22SWNWSW
 12S25E27SWSWNE

998.34

Rotation 5 Days, off 15 Days

Hawker, Fred, 45-256B

	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>ConSld</u> <u>CFS Total</u>
Antone/Pine Creek 2002	0	4.36	17.93	33.33	5	0	0	0			0		60.62
Antone/Pine Creek 2003	0	0	0	0	0	0	0	0			0		0
Antone/Pine Creek 2004	0	3.3	6.91	9.61	11.46	0	0	0			0		31.28
Antone/Pine Creek 2005	0	1.88	8.29	12.98	2.81	0	0	0			0		25.96
Antone/Pine Creek 2006	0	7.1	11.2	24.19	6	7.25	0	0			0		55.74
Antone/Pine Creek 2007	0	0	9.4	17.55	0	0	0	0			0		26.95
Antone/Pine Creek 2008	0	0	16.65	10	16.5	7.5	4.2	0			0		54.85
Antone/Pine Creek 2009	0	4.5	9.2	9.25	16.93	6.2	1.75	0			0		47.83
Antone/Pine Creek 2010	0	0	13.15	8.8	11.1	0	0	0			0		33.05
Total CFS Summ:	0	21.14	92.73	125.71	69.8	20.95	5.95	0			0		336.28

4.7 **PINE CREEK**
 12S25E28SESWSE
 12S25E28SENENE
 12S25E33SWNWNW
 flush to Howell Ck/Sum Ck
ANTONE CREEK
 12S25E28SENENE

336.28

1334.62 Total 24hr CFS used (chg.)



SENE

SWNW

SENW

NESE

NWSW

NESW

SESE

SESW

SESW

Autone/Pine
Return to
Haverly
CR.

Summit CR.

Possible area





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

November 14, 2011

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

DONALD GUNDERSON
1047 E 1000 S
ALBION ID 83311-0125

Dear Mr. Gunderson:

RE: Review for Licensing Permit 45-7608 Smyer

I am currently reviewing permit 45-7608 (for the Smyer West Dam) for licensing purposes. In the field exam conducted by Corey Skinner, he states that: "To my knowledge there is no upstream or downstream measuring devices installed on the unnamed stream where the four embankments are located. The unnamed stream is more or less a small draw that does not really have a defined channel. It appears that the reservoirs fill primarily during high surface runoff events (spring snowmelt and rainstorms). The upper reservoir seems to have been constructed in a natural "springy" area that also may help fill the reservoirs. In addition, waste water irrigation runoff from land to the west of the reservoirs may also contribute to their storage. Examination of old photos (March 1987) in the dam safety file, prior to the embankments being constructed, do not appear to indicate the existence of any riparian vegetation in the draw below where the dams were constructed. Since 1995, I can only recall one time when I ever saw any water below the lower of the four embankments and it was after an early snow melt in February of 1997. This water may have been seepage through the foundation of the lowest embankment or just standing water from snowmelt. It does not seem practical, and I cannot think of any appropriate locations for the installation of measuring devices, above or below the four reservoirs. In summary, I think this particular condition relating to upstream and down-stream measuring devices should be waived."

Condition 18A: The right holder shall install/maintain permanent measuring devices in such a manner that the amount of water entering the reservoir and the amount of water released from the reservoir can be measured.

In reference to our phone conversation today, I have enclosed copies of a topo, and ArcMap 2009 and 2011 aerial maps indicating the location of the proposed place of use for Permit 45-7608.

Please complete and return the attached form and map indicating the location for installation of the measuring devices by November 29, 2011.

If you have any further questions about the system involved with Permit 45-7608, please give Corey Skinner a call at (208)736-3033. I spoke with Corey, and since he is very familiar with the system he will be able to answer all your questions.

Sincerely,



Sandy Hemenway
Sr. Water Resource Agent

Enclosure(s)

Cc: Corey Skinner/Southern IDWR Regional Office

WA

RECEIVED

NOV 29 2011

DEPARTMENT OF
WATER RESOURCES

Bennie Smyer
PO Box 464
Albion, ID 83311
(208)673-6727

Please mark one or more of the boxes below:

no I have already installed measuring devices at the location where the water enters the reservoir, and at the location where the water is released from the reservoir (if this has been done, mark on the attached map where these devices are located). What type of measuring device was installed: none

yes I agree that condition 18A should be waived.

Explain why you feel this way:

Dumped water is put in a pipe line and sent around Reservoir after apne 1st
I would not have to measure it

I do not agree that condition 18A should be waived.

Explain why you feel this way:

Signature:

Bennie Smyer

Date:

11-25-2010

the small ponds are out of a spring
I filed on in 83 they are less than 1000 feet

Thank
Bennie Smyer



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

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

November 15, 2011

BENNIE SMYER
PO BOX 464
ALBION ID 83311

RE: Permit 46-7608 (West Dam), Waiver for Condition 18A to Install/Maintain a Permanent Measuring Device(s) for Water Entering the Reservoir and Water Released from the Reservoir.

Dear Mr. Smyer:

I am currently reviewing the file for Permit 46-7608 for Licensing purposes. In reviewing the beneficial field examination that was conducted, the field examiner has recommended that condition 18A be waived:

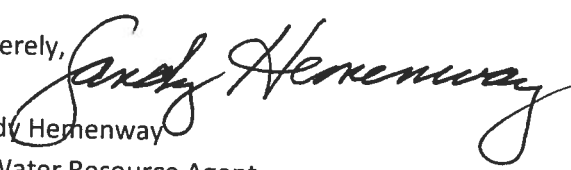
18A The right holder shall install/maintain permanent measuring devices in such a manner that the amount of water entering the reservoir and the amount of water released from the reservoir can be measured.

In order for the department to take this into consideration, we would need to receive a written request from the current owner of the permit.

Please complete and return the attached form by November 29, 2011, in order for us to continue with the licensing process.

If you have any questions, please give me a call at (208)287-4920.

Sincerely,


Sandy Hemenway

Sr. Water Resource Agent

Enclosure(s)

Bennie Smyer
PO Box 464
Albion, ID 83311
(208)673-6727

Please mark one or more of the boxes below:

_____ I have already installed measuring devices at the location where the water enters the reservoir, and at the location where the water is released from the reservoir (if this has been done, mark on the attached map where these devices are located). What type of measuring device was installed: _____

_____ I agree that condition 18A should be waived.

Explain why you feel this way: _____

_____ I do not agree that condition 18A should be waived.

Explain why you feel this way: _____

Signature: _____ Date: _____



State of Idaho

DEPARTMENT OF WATER RESOURCES

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

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November 14, 2011

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

DONALD GUNDERSON
1047 E 1000 S
ALBION ID 83311-0125

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If you have any further questions about the system involved with Permit 45-7608, please give Corey Skinner a call at (208)736-3033. I spoke with Corey, and since he is very familiar with the system he will be able to answer all your questions.

Sincerely,

A handwritten signature in black ink, reading "Sandy Hemenway". The signature is fluid and cursive, with the first name "Sandy" being more prominent and the last name "Hemenway" following in a similar style.

Sandy Hemenway
Sr. Water Resource Agent

Enclosure(s)

Cc: Corey Skinner/Southern IDWR Regional Office

Donald Gunderson
1047 E 1000 S
Albion, ID 833311-0125
(208) 673-5359/312-5359
Email: gundy@safelink.net

Please mark one of the boxes below:

_____ I agree that condition 18A should be waived.

_____ I disagree that condition 18A should be waived

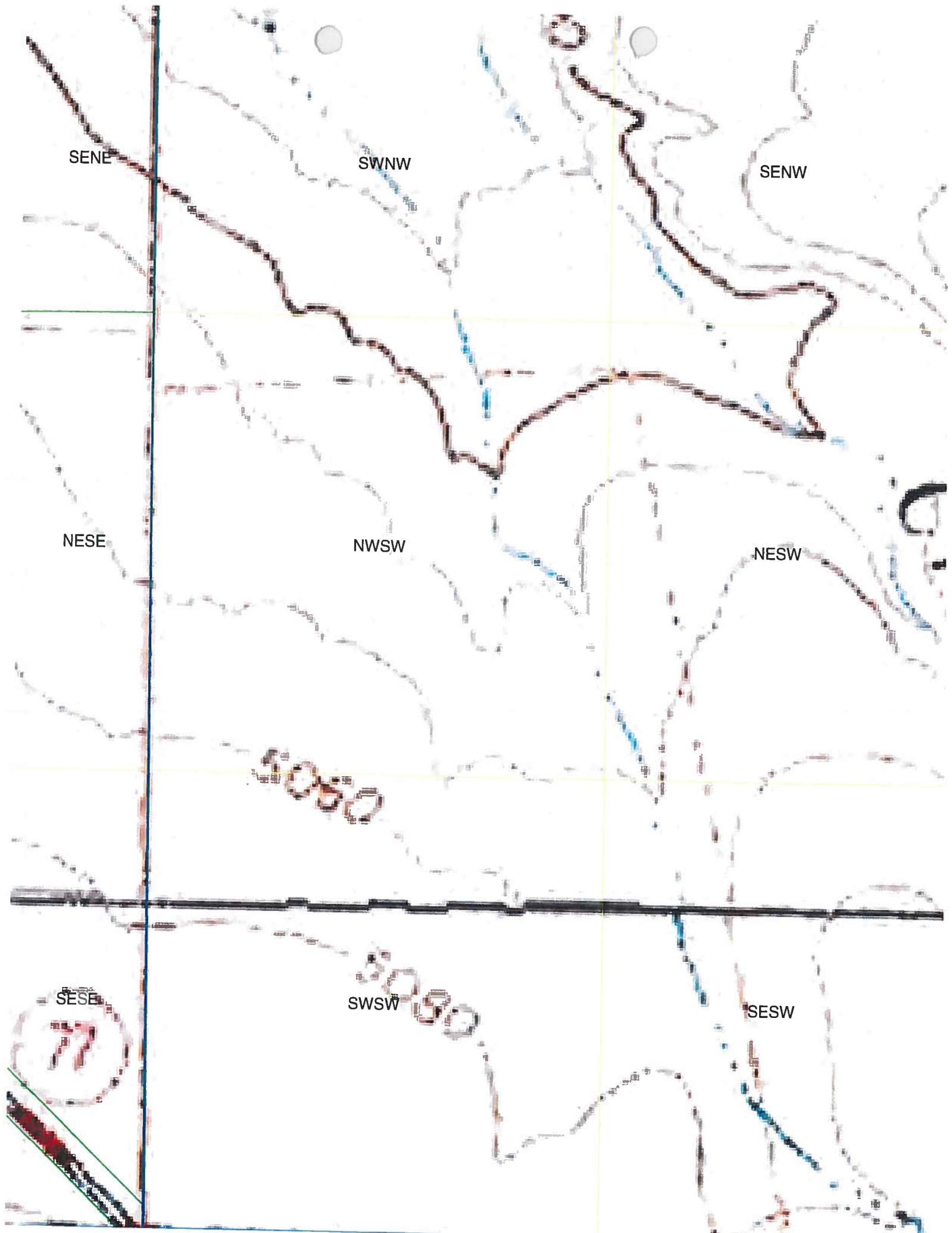
Explain why you feel this way: _____

Explain what type of measuring device do you feel should be installed _____

Indicate on the attached map where the measuring devices should be installed _____

Signature: _____ Date: _____





SENE

SWNW

SENW

NESE

NWSW

NESW

4050

3950

SESE

77

SWSW

SESW



SENE

SSWW

SENW

NESE

NWSW

NESW

SESE

SWSW

SESW