

State of Idaho
Department of Water Resources
Water Right License

WATER RIGHT NO. 37-20628

Priority: October 15, 2001

Maximum Diversion Rate: 4.00 CFS
Maximum Diversion Volume: 652.0 AF

It is hereby certified that WILLIAM FRUEHLING
PO BOX 4508
KETCHUM ID 83340 has complied with the terms and
conditions of the permit, issued pursuant to Application for Permit dated October 15, 2001; and has
submitted Proof of Beneficial Use on May 21, 2007. An examination confirms water is diverted from:

SOURCE

GROUND WATER

and a water right has been established as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL DIVERSION VOLUME</u>
WILDLIFE STORAGE	04/01 to 10/31		25.5 AF
RECREATION STORAGE	04/01 to 10/31		25.5 AF
AESTHETIC STORAGE	04/01 to 10/31		25.5 AF
WILDLIFE	04/01 to 10/31	4.00 CFS	652.0 AF
RECREATION	04/01 to 10/31	4.00 CFS	652.0 AF
AESTHETIC	04/01 to 10/31	4.00 CFS	652.0 AF
DIVERSION TO STORAGE	04/01 to 10/31	4.00 CFS	

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER NE¼SW¼ Sec. 10, Twp 01S, Rge 15E, B.M. CAMAS County

PLACE OF USE: WILDLIFE AND WILDLIFE STORAGE, RECREATION AND RECREATION
STORAGE, and AESTHETIC AND AESTHETIC 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
01S 15E 10									X	X		X					

CONDITIONS OF APPROVAL

1. The issuance of this right does not grant any right-of-way or easement across the land of another.
2. Uses of water described in this right are for a waterfowl habitat project.
3. The diversion and use of water described in this right may be subject to additional conditions and limitations agreed to by the protestant and the right holder under a separate agreement to which the Department is not a party. Because the Department is not a party, the Department is not responsible for enforcement of any aspect of the agreement not specifically addressed in other conditions herein. Enforcement of those portions of the agreement not specifically addressed in other conditions shall be the responsibility of the protestant and the water right holder.

State of Idaho
Department of Water Resources
Water Right License

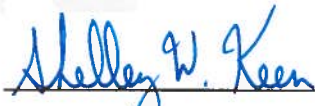
WATER RIGHT NO. 37-20628

CONDITIONS OF APPROVAL CONTINUED

4. Evaporative losses under this right shall be mitigated by the reduction of irrigation under Rights 37-7282B and 37-7333B as approved in Transfer No. 69650. All water diverted under Rights 37-7282B, 37-7333B and 37-20628 shall be maintained on the property for the beneficial uses associated with these rights and/or allowed to recharge back to ground water and shall not be allowed to leave the property as runoff.
5. 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 determine the amount of water diverted from power records and shall annually report the information to the Department.
7. 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. 37B.
6. The following rights are diverted through the point of diversion described above: 37-20628, 37-7282B, 37-7333B and 37-13251.
8. Rights 37-7282B, 37-7333B, and 37-20628 when combined shall not exceed a total diversion rate of 4.17 cfs.
9. Rights 37-7282B, 37-7333B, 37-13251 and 37-20628 when combined shall not exceed a total diversion rate of 6.52 cfs.

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 and sealed this 27th day of January, 2014.


for GARY SPACKMAN
Director

State of Idaho
Department of Water Resources

Attachment To Water Right License

37-20628

This map depicts the WILDLIFE STORAGE, RECREATION STORAGE, AESTHETIC STORAGE, AESTHETIC, WILDLIFE and RECREATION 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.

15E



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

0 0.05 0.1 0.2 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 • Website: www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

January 28, 2014

WILLIAM FRUEHLING
PO BOX 4508
KETCHUM ID 83340

RE: License No. 37-20628

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 L. Saxton

Water Rights Supervisor

Enclosure(s)

cc: JAMES P SPECK
BROCKWAY ENGINEERING PLLC
GORDON & DOROTHY SCHMIDT

CERTIFICATE OF SERVICE

I hereby certify that on January 30, 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.

37-20628

**JAMES P SPECK
PO BOX 987
KETCHUM ID 83340**

**WILLIAM FRUEHLING
PO BOX 4508
KETCHUM ID 83340**

**BROCKWAY ENGINEERING PLLC
C/O CHARLES G BROCKWAY
2016 N WASHINGTON ST STE 4
TWIN FALLS ID 83301**

**GORDON & DOROTHY SCHMIDT
630 E HWY 20
FAIRFILED ID 83327**



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.

S. Keen

1/27/2014

37-20628

- ① Rights 37-20628, 37-7282B, and 37-7333B share a ground water POD: NESW, S10, T1S, R15E. The capacity of this shared POD is 4.17 cfs. Therefore, these three rights must be limited to a combined total of 4.17 cfs. ($1.52 \text{ cfs} + 4.00 \text{ cfs}$ exceeds 4.17 cfs)
- ② Rights 37-7282B and 37-7333B are limited to a total combined volume of 324 AF annually. Right 37-20628 is for 652 AF annually. All of this volume must be supplied from the shared well pumping 4.17 cfs. Since 4.17 cfs will produce 1767 AF over the authorized season for all three rights (4/1 to 10/31), there is no need for a combined volume limit for the three rights. ($1767 > 324 + 652$)
- ③ Right 37-13251 shares the point of diversion described above with rights 37-20628, 37-7282B, and 37-7333B. It also has a second point of diversion at SESW, S10, T1S, R15E. The capacity of this second POD is 2.35 cfs. Therefore, when all four rights are on, the total combined limit is $(4.17 + 2.35 =) 6.52 \text{ cfs}$. ($4.17 + 4.88 > 6.52$)
- ④ Since 6.52 cfs over 214 days (4/1 to 10/31) is 2768 AF, which exceeds the volume total for all four rights ($324 + 652 + 1753.5 = 2729.5$), there is no need for a combined volume limit among all four rights.

MEMORANDUM

Date: January 21, 2014
To: Water Right File 37-20628
From: shemenway
Re: Additional Information, and Combined Limits

On 10/17/2013, the well/POD (north well/POD) that discharges into the Fruehling ponds (37-20628) was measured, indicating a system capacity of 4.17 cfs. The license for 37-20628 will be recommended at a total diversion rate of 4.0 cfs (as permitted) for Wildlife, Recreation, Aesthetic, and Diversion to Storage. This POD is shared with water right 37-13251 (Gordon Schmidt), and two other water rights owned by Fruehling: 37-7282B and 37-7333B. Gordon Schmidt's water right has 2 POD's, but only north POD is shared. The other POD is located to the south (south well/POD)

Additional information was requested from Brockway Engineering, and on 12/16/2013 an analysis was submitted describing monthly flow rate requirements for the months of April through October, and calculations confirming the actual size of the individual ponds (storage volume). For water right 37-20628 it will be licensed for a storage volume of 25.5 af (calculated volume from the 11/6/2013 Calculation of As-Built Pond Volume spreadsheet); a peak flow rate of 4.0 cfs and an annual diversion volume of 652.0 af.

In a phone conversation 1/16/2013 with Gordon Schmidt (208)764-2534, he stated that he shares the north well with 37-20628 Fruehling, but that he has had the acreage involved with both wells in the CRP for more than 20 years now, and plans to keep it in there as long as he can. He stated that when he did irrigate the acres that it required both wells to run his wheel line, but that if the system was switched over to pivots that it could probably run the irrigation system off of just his south well, but he was not sure.

In a phone conversation on 1/21/2014 with Gordon, he stated that the lower well (the one not shared with Fruehling, but Decreed under water right 37-13251) is a 75 Hp turbine, the well is 12 - 14 ft static, the system runs at 78-80 psi, and when he ran both wells at the same time he could run 4 (1/2) mile lines at one time. The theoretical for the south well would be:
 $(8.8 \times 75 \text{ Hp} \times 0.7 \text{ eff}) / [14 \text{ ft} + (79 \text{ psi average} \times 2.31)] = 2.35 \text{ cfs.}$

CFS:

4.17 cfs System Capacity for the North Well (measured)

2.35 cfs System Capacity for the South Well (theoretical shown above)

6.52 cfs Total System Capacity Combined Limit for 37-7282B, 37-7333B, 37-13251 and 37-20628

Volume:

$V_{dr} = (6.52 \text{ cfs for combined limit} \times 214 \text{ days} \times 1.9835) + (4.88 \text{ cfs} \times 1 \text{ day add'l } 37-13251 \times 1.9835) = 2777.2 \text{ af}$

Brockway calculation 652.0 af + water right 37-13251 (1753.5 af) = 2405.5 af Combined Limit for 37-7282B, 37-7333B, 37-13251 and 37-20628

RECOMMEND:

4.0 cfs and 652.0 af for 37-20628

6.52 cfs Total System Capacity Combined Limit for 37-7282B, 37-7333B, 37-13251 and 37-20628

2405.5 af Combined Limit for 37-7282B, 37-7333B, 37-13251 and 37-20628

Hemenway, Sandy

From: Keen, Shelley
Sent: Tuesday, December 24, 2013 9:10 AM
To: Hemenway, Sandy
Subject: FW: Pond Volumes

Sandy,

See below for my exchange with Chuck Brockway regarding pond volumes.

Shelley

From: charles.g.brockway@brockwayeng.com [<mailto:charles.g.brockway@brockwayeng.com>]
Sent: Tuesday, December 24, 2013 8:48 AM
To: Keen, Shelley
Subject: Re: Pond Volumes

Shelley,

Thank you for your thoughts on this. For many pond systems (especially lined ones), flow for water quality maintenance is the dominant component of the water requirement, so I think it would make sense to include it in cases where it is warranted.

Have a Merry Christmas!

Chuck

Charles G. Brockway, Ph.D., P. E.
Brockway Engineering, PLLC
2016 Washington St. North, #4
Twin Falls, ID 83301
(208) 736-8543

----- Reply message -----

From: "Keen, Shelley" <Shelley.Keen@idwr.idaho.gov>
To: <charles.g.brockway@brockwayeng.com>
Cc: "Merritt, Allen" <Allen.Merritt@idwr.idaho.gov>, "Peppersack, Jeff" <Jeff.Peppersack@idwr.idaho.gov>
Subject: Pond Volumes
Date: Fri, Dec 20, 2013 2:16 PM

Chuck,

I just read your letter to Sandy Hemenway about the volume recommendation for Permit 37-20628. I appreciate your response, especially your suggestion that IDWR adopt a uniform procedure for calculating pond water requirements. Last summer we made good progress on just such a policy, but we got overrun by hearings and other priorities and have not been able to finish it yet. Our aim has been to see that all our offices address seepage losses and evaporation losses the same way. We didn't consider the need for inputs to maintain a temperature range, but I can see where there could be some value in doing so. At this point, I'm hoping we can work on the policy again in February or March. When we have a comprehensive draft, I may take you up on your offer to assist by seeking your comments.

I also appreciated your point about determining an annual volume for a water right when proof of beneficial use is submitted a short time (days or weeks) after beneficial use commences, as opposed to at least a year after beneficial use commences. Determination of the annual volume in those cases has often been difficult for us. Our directive in Idaho Code § 42-291(1) is that the quantity in the license "in no case shall be an amount in excess of the amount that **has been** beneficially applied." (Emphasis mine.) The easiest interpretation of that directive has been to look backward in time to what was diverted and used, but you rightly point out that for very practical reasons IDWR makes exceptions for irrigation, domestic stub-outs, etc. In fact, in our 2012 updates to the Beneficial Use Examination Rules we allow for the annual volumes for heating and cooling uses to be adjusted for weather conditions outside the period of use. I'm not sure if there is a perfect solution that fits all beneficial uses. One might be to require one year of beneficial use before proof can be submitted. Another might be some rule changes like we implemented for heating and cooling. Meanwhile, we'll probably have to work through each one on a case-by-case basis.

Anyway, I just wanted to let you know that I appreciate your feedback.

Have a great holiday season!

Shelley Keen
Idaho Department of Water Resources
Shelley.Keen@idwr.idaho.gov
208-287-4947



BROCKWAY
ENGINEERING
P.L.L.C.

Hydraulics

Hydrology

Water Resources

RECEIVED

DEC 20 2013

DEPARTMENT OF
WATER RESOURCES

December 16, 2013

Idaho Department of Water Resources
322 East Front St.
P.O. Box 83720
Boise, ID 83720

Re: Licensing of permit 37-20628 / W. Fruehling

Dear Ms. Hemenway:

The ponds authorized under this permit cover a surface area of 8.4 acres and have a total volume of 25.2 acre-feet, as documented in calculations previously sent to the Department. I understand that the Department agrees with these values.

The Department has requested information concerning actual volume pumped from the well during the development period from 2002-2007, presumably as a basis to determine an appropriate annual diversion volume to place on the license. In my conversation with Allen Merritt this past Tuesday, he indicated that there needs to be some justification for the licensed volume that is based on beneficial use rather than simply the maximum diversion rate over some pumping period. I agree with this, but do not necessarily agree that the volume should be governed by actual pump-out during the development period. Would a permittee who completed his infrastructure one day before the proof date – in complete accordance with the law – be limited to one day's worth of pumping? It seems to me that the licensed annual volume for any right should properly be the maximum volume that is reasonably anticipated to be needed for the permitted beneficial use. This is how irrigation permits are licensed: regardless of how much the permittee has pumped during the development period, the Department multiplies the acres by an adopted per-acre volume, which is sufficiently large to cover the maximum-usage crop for a year with reasonably high ET. The same volume would be licensed whether the permittee had grown alfalfa or peas during the development period. Since the Department has no such set guidance for ponds, the annual volume must be justified on a case-by-case basis, but I believe the concept should be the same. There is no reason why a wildlife or aesthetic right should be relegated to second-class status.

The water requirement or beneficial use of the pond system authorized by 37-20628 is the sum of 1) flow needed to make up seepage losses, and 2) flow needed to maintain adequate water quality, i.e. sufficiently low temperatures.

CHARLES E.
BROCKWAY,
PH.D., P.E.

CHARLES G.
BROCKWAY,
PH.D., P.E.

2016 NORTH
WASHINGTON
STREET • SUITE 4

TWIN FALLS,
IDAHO 83301

208•736•8543

FAX: 736•8506

Evaporation is not a component of the beneficial use under 37-20628, since all evaporative losses were covered by the transfer of the irrigation rights.

Relative to component 1, seepage losses in the system are fairly small, but not zero. The ponds were constructed with a compacted-earth liner using native material. Native soil based on the NRCS soil survey is loam to 20 inches, clay loam from 20 to 33 inches, coarse sandy loam from 33 to 40 inches, and gravelly coarse sand from 40 to 60 inches. Based on test pits excavated for the pond design phase in 2000, this profile is generally correct although some gravel was found even in the upper strata. Controlled seepage tests were performed on two 20'x20'x4' test pits in September 2000 (see attached plots). The seepage rates were found to be 1.65 ft/day and 0.5 ft/day. Brockway Engineering estimated at that time that a reasonably achievable operational seepage rate with a compacted-earth liner was 0.25 ft/day.

No controlled seepage testing has been performed on the ponds in their as-built configuration, but anecdotally the owner indicates that the pond levels will decline rapidly when the ponds are full, with the rate of decline markedly decreasing as the levels decrease. If no water is put in the ponds, the ponds will be dry in approximately one month. Based on this information, the seepage rate for the water requirements calculation was assumed to be 3 ft/month or 0.1 ft/day. This is a reasonable rate and is certainly not an over-estimate given the results of the seepage testing.

To estimate component 2 of the water requirement, the concept of turnover time is sometimes used to calculate the peak flow required to maintain temperatures at a reasonable level, but this concept is difficult to extend to a seasonal volume analysis since it is only a rough guide and the required turnover time will vary over the season in an unknown manner depending on meteorological conditions. Therefore, component 2 was evaluated more thoroughly by performing a monthly energy balance on the pond system and determining a monthly water input needed to maintain a constant pond temperature of 70°F (21°C) or less using water from the well. This target temperature was chosen since above 20°C, algae growth is enhanced; the optimal temperature for most algae is 20 to 25°C. Another justification is maintenance of quality fish habitat, should the ponds be used for that purpose. Numerous studies have shown that rainbow trout growth rate becomes significantly inhibited beyond about 70°F (the ideal range being 55 to 60°F).

The energy balance for any open-water pond with no inflow or outflow can be written

$$E_{net} = E_{solar} - E_{lw} - E_{back} - E_{evap} \pm E_{conv} \pm E_{cond}$$

where

E_{net} = net energy flux

E_{solar} = energy input due to total net solar radiation, equal to incident radiation less reflected radiation

E_{lw} = net longwave radiation, equal to incoming radiation less reflected radiation

E_{back} = longwave back-radiation emitted by the pond

E_{evap} = energy loss due to evaporation

E_{conv} = energy exchange with the air due to convection (gain or loss)

E_{cond} = energy exchange with the soil (gain or loss)

Each component was estimated according to the methodology outlined on the attached spreadsheet. If the system is losing heat, the net flux will be negative and the cool water requirement will be zero. If the system is gaining heat, the net flux will be positive and cool water must be added to balance the net flux and maintain a constant temperature. In this latter case the required cool water is given by

$$Q = \frac{E_{net}}{224400 C_p (T_{in} - T_{pond})}$$

Where T_{in} is the cool water temperature, T_{pond} is the pond temperature, C_p is the specific heat of water (1 BTU / lb-F), and 224400 is a conversion factor to express Q in cfs. (Note that the above equation assumes the pond is in hydraulic equilibrium, where inflow from the well equals overflow plus seepage)

To determine an appropriate well water temperature, water samples on the U.S. Geological Survey database within 3 miles of the project site were consulted. The following data was obtained:

Well	Temp (°C)	No. of Rdgs
01S 15E 05DBB1	17.5	2
01S 15E 17DAD1	16.5	1
01S 15E 22ADA1	12.5	2
01S 15E 23BCB1	13.8	1
01S 15E 22DBB1	13.0	1
Average	14.9	

Based on this data, the temperature of the well water pumped to the ponds was assumed to be 58.8°F (14.9°C). This a typical value for groundwater and likely will not vary significantly.

The energy balance and flow requirement was performed on a monthly basis for April through October. Average monthly solar radiation was taken from the National Solar Radiation Database, average of the Boise and Pocatello stations. Air temperature was taken from Allen & Robison (2013) for the Fairfield station, and assumed equal to the monthly 20% exceedance value. Wind speed and relative humidity were taken from the USBR Agrimet station at Fairfield and assumed to be average values. All sources and methods for calculation of the heat balance components are described on the attached spreadsheet.

It was found that no cool water input is needed in April, May, September, or October. During these months the energy leaving the pond naturally exceeds the energy input. Cool water input is necessary in June, July, and August. The calculated flow rate requirements are 0.94 cfs in June, 4.12 cfs in July (note that the water right is limiting for this month in the calculation of volume), and 3.19 cfs in August. Seepage losses contribute about 25 ac-ft/month to the water requirement. For the 7-month period, 652 acre-feet are required.

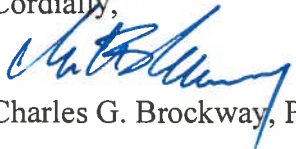
The energy balance analysis can be checked for reasonableness by looking at turnover time. The rule of thumb used frequently at Brockway Engineering is that a pond should be designed for a turnover time during the hottest month of 2 to 3 days in “hot” areas like Twin Falls, and 4 to 5 days in “cooler” areas like Hailey or Ketchum. The Fairfield area falls somewhere in between. The energy balance model predicts an average flow requirement of 4.1 cfs in July, which equates to a 3.1-day turnover time. In August, the model predicts a flow requirement of 3.2 cfs, which equates to a 4.0-day turnover time. These values are closely in line with the typical rules of thumb.

Based on this analysis, it is recommended that permit 37-20628 be licensed for a storage volume of 25.2 ac-ft, a peak flow rate of 4.0 cfs and an annual diversion volume of 652 ac-ft/year. It is also recommended that the combined volume between 37-20628 and the irrigation rights 37-7282B and 37-7333B be limited to 652 ac-ft, since the water under 37-20628 is only needed to make up the difference between the irrigation water being run through the ponds and the total water requirement of 652 ac-ft.

I appreciate the Department considering this analysis of pond water requirements. To avoid having to do this for similar permits in the future, the

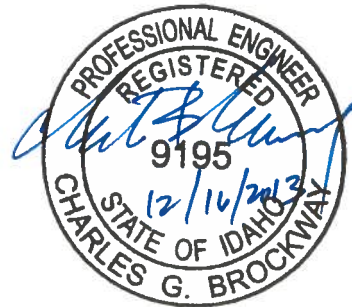
Department may wish to consider developing and adopting a uniform procedure for calculating pond water requirements for licensing or other purposes. The procedure could perhaps be modeled on the irrigation volume methodology, with pond requirements established for different zones or climatological stations based on a turnover time analysis or a more complex analysis such as presented here. I would be happy to assist with that development if it would be beneficial.

Cordially,


Charles G. Brockway, P.E.

Enc.

Cc: Allen Merritt
Shelley Keen
Bill Fruehling
James P. Speck, Atty.



POND ENERGY BALANCE CALCULATIONS

See next sheet for description of sources and methods

CGB 12/12/2013

INPUT

Surface area of ponds 8.4 acres Water sfc
 Volume of ponds 25.2 ac-ft albedo 0.07
 Seepage rate 0.100 ft/day
 Pond temperature 70 deg F = 294.1 K
 Well water temperature 58.8 deg F
 Calc. vapor pressure 0.353 psi

Month	Days	Design air temp (F)	Avg wind spd (mph)	Avg rel humid (%)	Avg solar radiation (BTU/ft2/d)
April	30	38.6	7.91	82.5	1648.4
May	31	47.8	7.29	82.1	2013.0
June	30	56.6	5.53	81.4	2250.7
July	31	63.2	4.73	67.1	2361.7
August	31	65.8	4.21	57.5	2044.7
September	30	60.9	4.77	61.6	1600.9
October	31	51.7	5.25	46.7	1093.7

CALCULATIONS & OUTPUT

Month	ha	es (psi)	Heat losses (-) or gain (+) [BTU/hr]							Well flow reqm't for heat balance		Seepage	Total reqm't
			Solar	Longwave	Lw back rad	Evap	Conv	Cond	TOTAL	(cfs)	(ac-ft)	loss (ac-ft)	(ac-ft)*
April	1.146	0.100	23372735	27733885	-49210209	-18683047	-13147715	-159289	-30093640	0.00	0	25.2	25.2
May	1.074	0.136	28541705	30337136	-49210209	-15016275	-8718293	-69897	-14135833	0.00	0	26.0	26.0
June	0.861	0.182	31912773	33351641	-49210209	-9492542	-4223616	15463	2353510	0.94	56	25.2	80.9
July	0.760	0.188	33485938	35965687	-49210209	-8084758	-1887618	79966	10349006	4.12	253	26.0	246.0
August	0.692	0.176	28991181	37078464	-49210209	-7882892	-1053150	105556	8028951	3.19	196	26.0	222.5
September	0.765	0.160	22698522	35032024	-49210209	-9528909	-2539510	57705	-3490376	0.00	0	25.2	25.2
October	0.826	0.088	15506911	31591847	-49210209	-14096383	-5544856	-32563	-21785253	0.00	0	26.0	26.0

ha = heat loss coefficient

es = saturation vapor pressure

TOTAL 651.8

* Limited in July by 4.0 cfs water right

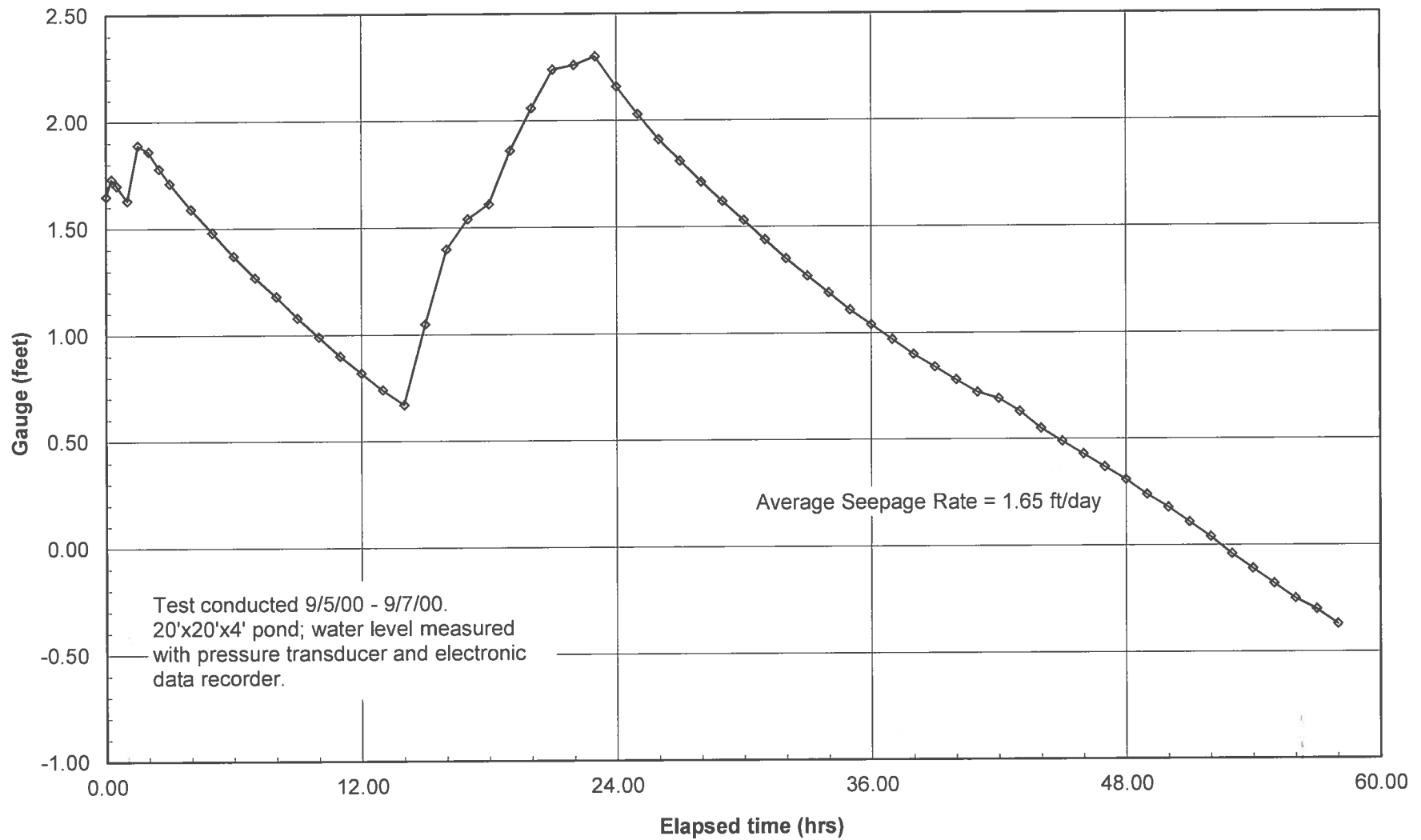
Sources and Methods for Pond Temperature Model

Surface area of ponds:	ArcMap using 2011 aerial photo (same configuration as 2007)
Volume of ponds:	3:1 sides slopes to estimate pond bottom area, then used truncated cone formula
Seepage rate:	Assumed to be 0.5 inches/day based on observed evidence.
Design air temperature:	Allen & Robison (2013), monthly average 20% exceedance
Wind speed and RH:	Fairfield Agrimet station average
Solar radiation:	National Solar Radiation Database, average of Boise and Pocatello
Water surface albedo:	Bras (1990), Figure 2.12. Albedo is 0.07 for period of interest.
Longwave radiation:	Bras (1990), Equation 2.49 with Ea estimated using Idso and Jackson method.
Pond back-radiation:	Bras (1990), Equation 2.49
Evaporation energy flux:	OIT (1989), p. 292
Convection energy flux:	OIT (1989), p. 293
Conduction energy flux:	OIT (1989), p. 293

REFERENCES

Bras, Rafael L. (1990). Hydrology. Addison-Wesley, 643 pp.
OIT Geothermal Direct Use Engineering and Design Guidebook (1989)

MEASURED POND SEEPAGE IN SOUTH TEST PIT
William Freuhling - Fairfield Property



FREUHLING SEEPAGE TESTS - FAIRFIELD PROPERTY

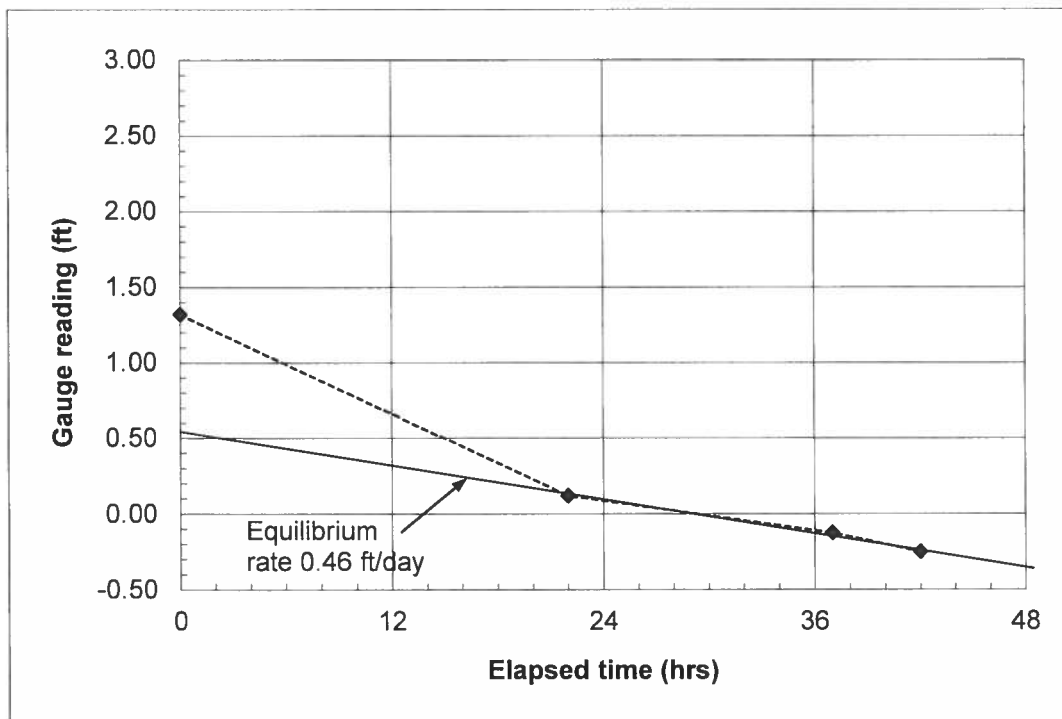
TEST #1 - NORTH PIT

Brockway Engineering, PLLC 9/20/00

Wood post with staff gauge set in bottom of 20'x20'x3.5' pit.

Zero of gauge approx. 1.0' above pond bottom.

Time/Date	Elapsed time (hrs)	Gauge (ft)	Rate (ft/day)	Remarks
8/31/2000 20:00	0	1.32		After last water truck load - read by operator
9/1/2000 18:00	22	0.12	1.31	Freuhling read gauge
9/2/2000 9:00	37	-0.13	0.39	Freuhling read gauge
9/2/2000 14:00	42	-0.25	0.60	Freuhling read gauge



Hemenway, Sandy

From: Charles G. Brockway [charles.g.brockway@brockwayeng.com]
Sent: Monday, December 16, 2013 9:45 AM
To: Hemenway, Sandy
Subject: RE: 37-20628 licensing

Sandy,

I just wanted to let you know that I am sending a letter out today which addresses your item #3. It should reach you tomorrow or the next day.

Thanks,
Chuck

Charles G. Brockway, Ph.D., P.E.
Brockway Engineering, PLLC
2016 Washington St. North, Suite 4
Twin Falls, ID 83301
(208) 736-8543
charles.g.brockway@brockwayeng.com

All information, calculations, maps, drawings, or other documents transmitted via e-mail are preliminary unless explicitly stated in the e-mail text or in the documents themselves.

From: Hemenway, Sandy [<mailto:Sandy.Hemenway@idwr.idaho.gov>]
Sent: Thursday, November 14, 2013 4:28 PM
To: Hemenway, Sandy; Charles G. Brockway
Cc: Bill Fruehling
Subject: RE: 37-20628 licensing
Importance: High

Chuck,

Allen Merritt will be contacting you in reference to the "transfer" portion of your questions we covered in our meeting today.

The "licensing" portion of the Fruehling water rights were also covered during our meeting. Attendants were Shelley Keen, Jeff Peppersack, Pam Skaggs, Craig Saxton, and myself. It was determined that:

- (1) We will accept the shapefile submitted by Brockway for the ponds (8.4 acres).
- (2) We will recalculate them at 3 ft deep, due to the additional information you submitted in your 11/6/2013 email.
- (3) To determine whether or not the well is pumped "continuously the entire season of use" as stated in your 11/6/2013 email, or intermittently during hot periods of the season as stated in the written narrative for maintaining water quality that accompanied your write-up for Transfer 69650, **we are requesting the power records for at least one year during the development period (2002 – 2007 for the months of 4/1 – 10/31).**
- (4) Please submit the requested information within 30 days.

If you have any questions, please give me a call or email.

Thanks,

Sandy Hemenway
Sr. Water Resource Agent
IDWR/State Office, Boise

(208)287-4920

Sandy.hemenway@idwr.idaho.gov

Hours the rest of this week: Thursday 11/14/2013 till 5:00 pm

Hours next week:

Monday thru Thursday 6am – 5pm

Hemenway, Sandy

From: Hemenway, Sandy
Sent: Thursday, November 14, 2013 7:26 AM
To: Hemenway, Sandy; 'Charles G. Brockway'
Cc: 'Bill Fruehling'
Subject: RE: 37-20628 licensing

Importance: High

Chuck,

Were you going to send me your shapefile, so our acres match? I still haven't received it.

Thanks,
Sandy

From: Hemenway, Sandy
Sent: Thursday, November 07, 2013 10:05 AM
To: 'Charles G. Brockway'
Cc: 'Bill Fruehling'
Subject: RE: 37-20628 licensing

Ok, so can you send me your shapefile, so I have the same shape you have drawn?

From: Charles G. Brockway [<mailto:charles.g.brockway@brockwayeng.com>]
Sent: Thursday, November 07, 2013 10:04 AM
To: Hemenway, Sandy
Cc: 'Bill Fruehling'
Subject: RE: 37-20628 licensing

It wouldn't matter which year we use, as nothing has changed since 2007. I think we're just within the margin of error between two different people drawing lines on the photo.

Chuck

Charles G. Brockway, Ph.D., P.E.
Brockway Engineering, PLLC
2016 Washington St. North, Suite 4
Twin Falls, ID 83301
(208) 736-8543
charles.g.brockway@brockwayeng.com

All information, calculations, maps, drawings, or other documents transmitted via e-mail are preliminary unless explicitly stated in the e-mail text or in the documents themselves.

From: Hemenway, Sandy [<mailto:Sandy.Hemenway@idwr.idaho.gov>]
Sent: Thursday, November 07, 2013 10:02 AM
To: Charles G. Brockway
Cc: Bill Fruehling; Hemenway, Sandy
Subject: RE: 37-20628 licensing

Chuck,

The shapefile that was used to calculate the pond area, what the shapefile that was partially decreed with water right 37-7282B (see attachment for acres calculated). **Proof of Beneficial use was received by the department on 5/21/2007**, so you will need to use a map for 2007 or earlier to calculate the area of the pond, and not ArcMap 2011 aerial photo. Please send me a shapefile for 2007 or earlier, and we will consider the difference in area for the pond (acres).

The information you submitted on elevation for pond depths will be accepted, and we will change this to 3 ft depth.

We will be talking about the annual diversion volume limit, during our meeting this afternoon. I will touch base with you following this. Don't worry, the license will not be signed until we come to a final consensus.

Sandy

From: Charles G. Brockway [<mailto:charles.g.brockway@brockwayeng.com>]
Sent: Wednesday, November 06, 2013 3:30 PM
To: Hemenway, Sandy
Cc: Bill Fruehling
Subject: 37-20628 licensing

Sandy,

Relative to pond size, I calculate a total pond area of 8.4 acres using ArcMap with the 2011 aerial photo. Additionally, we conducted an elevation survey of the ponds on August 26, 2002 shortly after they were constructed. Based on the surveyed minimum bank elevation and average pond bottom elevation, and assuming 1 foot of freeboard, the volume was calculated to be 25.5 acre-feet. The surveyed operating depths are a little over 3 feet rather than 2 feet as was originally assumed. Please see attached worksheet detailing these calculations. I believe this value is the proper amount to license for wildlife, recreation, and aesthetic storage.

In the draft license, the annual diversion volume limit of 29.1 acre-feet apparently was calculated by adding the pond volume and the annual evaporation from the ponds. However, this water right is non-consumptive with no evaporative component (see the original permit file and the file for Transfer No. 69650). All of the consumptive use was mitigated by retirement of acres on 37-7282B and 37-8333B and conversion of the flow rate applicable to those acres to wildlife/aesthetic/recreation use. The 4.0 cfs under 37-20628 is wholly non-consumptive, "pass-through" water, which will return to the aquifer. Therefore, it appears that the annual volume limit should be the 4.0 cfs run continuously for the season of use, or 1,698 ac-ft. If the diversion volume were limited to 29.1 ac-ft, the owner would be able to pump for less than 4 days before reaching the limit.

Hopefully this information is helpful. Please let me know if you have any questions.

Chuck

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(208) 736-8543
charles.g.brockway@brockwayeng.com

All information, calculations, maps, drawings, or other documents transmitted via e-mail are preliminary unless explicitly stated in the e-mail text or in the documents themselves.

Water Right 37-20628 / Bill Fruehling
Calculation of As-Built Pond Volume
 CGB 11/6/2013

Pond	Surface Area (ac)	Side Slope	Minimum Top Bank (ft)	Avg Bottom Elevation (ft)	Maximum Operating WSE (ft)	Max Depth (ft)	Calculated Bottom Area (ac)	Calculated Volume (ac-ft)
A	3.54	3	5013.01	5008.82	5012.01	3.19	3.20	10.75
B	0.82	3	5012.27	5008.05	5011.27	3.22	0.66	2.38
C	0.97	3	5011.14	5007.07	5010.14	3.07	0.80	2.72
D	3.03	3	5010.15	5005.77	5009.15	3.38	2.70	9.68
Total	8.36						Total	25.5

Hemenway, Sandy

From: Peppersack, Jeff
Sent: Wednesday, November 06, 2013 1:48 PM
To: Merritt, Allen; Skaggs, Pam; Keen, Shelley
Cc: charles.g.brockway@brockwayeng.com; Hemenway, Sandy
Subject: RE: Question about over mitigation of a permit and how to recind/transfer/water bank the excess

Allen,

Thanks for the additional information. I was wondering about the forfeiture issue. We've never partially rescinded a transfer and I don't think it would be a good practice. I agree that the decree mandates the transfer route.

Jeff

From: Merritt, Allen
Sent: Wednesday, November 06, 2013 12:55 PM
To: Merritt, Allen; Skaggs, Pam; Keen, Shelley
Cc: Peppersack, Jeff; charles.g.brockway@brockwayeng.com; Hemenway, Sandy
Subject: RE: Question about over mitigation of a permit and how to recind/transfer/water bank the excess

Looking at imagery attached it appears the irrigation shape is 97.4 acres but the right is 86.6 acres. This would support either partially recinding or transferring back some acres.

I do not think forfeiture is an issue since right decreed in 2010 but since it was decreed it may need to be transferred instead of recinded.

From: Merritt, Allen
Sent: Wednesday, November 06, 2013 12:15 PM
To: Skaggs, Pam; Keen, Shelley
Cc: Peppersack, Jeff; charles.g.brockway@brockwayeng.com; Hemenway, Sandy
Subject: Question about over mitigation of a permit and how to recind/transfer/water bank the excess

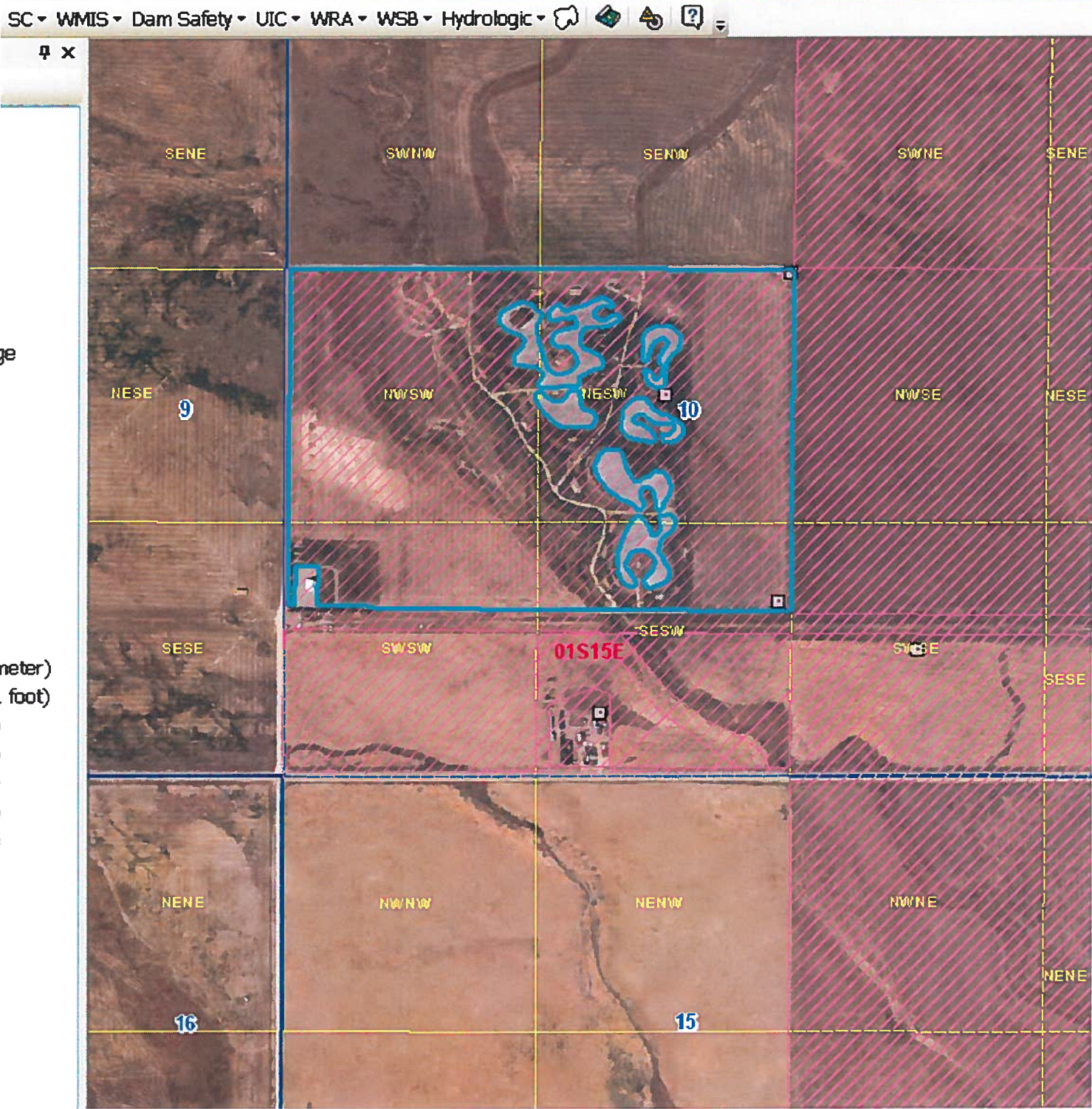
Folks,

Chuck called this morning seeking options for protection of portions of rights 37-7282B and 37-7333B that were initially modified by T69650 approved in 2002 converting irrigation of 21.4 acres to Recreation/Aesthetic/Wildlife flows (0.30 cfs and 64.2 afa) associated with development of permit 37-20628 (See attached). These rights provided the consumptive use for the ponds proposed under the permit.

A recent licensing effort found that the extent of ponds originally permitted did not get fully developed. (See attached draft license)

Chuck is seeking options of what can be done to preserve the portions originally intended to provide the consumptive use for the ponds that has not been needed.

Can a portion of the transfer be recinded? The portion of the rights not needed be can they be banked? Does there need to be a transfer filed to move them back to irrigation? What are issues needed to be considered?



Identify

Identify from: <Top-most layer>

- ☒ Water Right POU
 - 37-7282B
 - 37-7333B
 - 37-7333B
 - 37-7333B
 - 37-7333B
 - 37-7282
 - 37-7333

Location: 2,445,864.337 1,349,798.345 Meter

Field	Value
SHAPE	Polygon
WaterRightNumber	37-7333B
BasinNumber	37
SequenceNumber	7333
SplitSuffix	B
Status	Active
Basis	Decreed
PriorityDate	1/14/1974
DecreedDate	9/24/2010
Owner	FRUEHLING FAMILY
WaterUse	IRRIGATION
WaterUseCode	01
TotalAcres	108
AcreLimit	86.6
Source	GROUND WATER
SourceQualifier	<null>
TributaryOf	<null>
TributaryOfQualifier	<null>
WaterDistrictNumber	<null>
LargePOU	0
RightID	354208
PlaceOfUseID	403050
WRReport	http://www.idwr.idaho.gov/
WRDocs	http://www.idwr.idaho.gov/
GISAcres	97.4