

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 63-12443

Exam Date: 04/29/2014

1. Current Owner: TFI LTD PARTNERSHIP
PO BOX 690
MERIDIAN ID 83680-0690
(208)888-1593
2. Accompanied by: Scott Nicholson
Phone No: (208)890-2792
Address:
Relationship to Permit Holder: Land Owner

3. SOURCE

UNNAMED STREAM

TRIBUTARY

WARM SPRINGS CREEK

B. OVERLAP REVIEW

1. Other water rights with the same place of use: Irrigation water rights not pertinent to the POU. See narrative remarks.
2. Other water rights with the same point of diversion: None.

C. DIVERSION AND DELIVERY SYSTEM1. LOCATION OF POINT(S) OF DIVERSION:

UNNAMED STREAM NW1/4NW1/4 Sec. 10,Twp 01S, Rge 02W, B.M. CANYON County

Method of Determination: GPS and Visual Inspection

2.

PLACE OF USE: WILDLIFE STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>Totals</u>
01S	02W	10							X										

RECREATION same as WILDLIFE STORAGEAESTHETIC STORAGE same as WILDLIFE STORAGEAESTHETIC same as WILDLIFE STORAGERECREATION STORAGE same as WILDLIFE STORAGEMethod of Determination: GPS and Visual Inspection

3. YES Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
YES Aerial Photo Attached (required for irrigation of 10+ acres).
YES Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
POD	Marathon	15	2454JP	Berkley	B6606

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
	Polysonic	Thyme Flight	NA	State Office #1	NA	03/20/2014

2. Measurements: Flow measurement of diversion taken on site during field exam.**E. FLOW CALCULATIONS** X Additional Computation Sheets Attached

Measured Method:

See the thyme flyte measurement sheet for diversion rate measurement.

Measurement = 1.74 cfs**Permit allowed = 5.00 cfs****License recommend for 1.74 cfs.****F. VOLUME CALCULATIONS**

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = \underline{\hspace{2cm}}$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = \underline{\hspace{2cm}}$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} = \underline{\hspace{2cm}}$$

2. Volume Calculations for Other Uses:

Storage capacity: 20.4 af

Pond Capacity + Seepage Loss + Evaporation Loss = 20.4 af + 279.2 af + 15.2 af = **314.8 af**Annual diversion: 1.74 cf/s * 86,400 s/d * 365 d/yr 1/43,560 af/cf = **1,259.7 af**Water passing through: (Annual Diversion) – (Capacity+Losses) = 1,259.7 af – 314.8 af = **942.9 af**

G. NARRATIVE/REMARKS/COMMENTS

This field exam was conducted April 29, 2014 by Patrick Kelly accompanied by Dan Nelson. Permit 63-12443 authorized a diversion of 5.00 cfs from an unnamed stream for a number of storage uses. Proof of beneficial use was filed on 8/19/2003.

Scott Nicholson was the contact for the field exam and directed us to the point of diversion, inlets and outlets. Mr. Nicholson has constructed a 3 pond system connected by 2' culverts. Diversion comes out of an unnamed drain north of the ponds via a 15 hp pump. A one foot well inside the drain has been screened for the pump and this water is pumped at the same rate year round.

From the ditch, water is pumped to 2 outlets on the eastern boundary of the ponds. Mr. Nelson and I attempted to use a flow tracker at these inlets but could not record consistent readings. The 8" inlet pipes did not make for optimal conditions for measurement. For this reason, Mr. Nelson and I returned the following day on April 30 with thyme flight equipment to do a flow measurement through the inlet pipe at the pump. Data results from this measurement are included in this report. An average flow rate of 780 gallons per minute, OR 1.74 cfs was found.

The flow tracker was used at the outlet and we were able to get much better results in the 2' culvert. Readings were very consistent and showed an average flow of 1.33 cfs.

The loss of water in the system is then 0.41 cfs. Seepage and evaporation calculations were completed and are attached to this report. Evaporation data was taken from the Evapotranspiration and Consumptive Irrigation Water database from the Nampa station managed by U of I. Seepage calculations are based on soil types of the system. Soil data shows a combination between inorganic silts to sands. The hydraulic conductivity for these soils range from 0.016"/day to 0.20"/day. If we use a suggested seepage rate of 0.15"/day, we may account for the loss of water in the system. This value seems reasonable given the soil type we observed. Additionally, aerial photos show sub water passes to the west; seepage of water lost by the ponds. 0.41 cfs calculates to an annual volume of 296.8 af. This number matches the value associated with the calculated seepage and evaporation loss, suggesting that values used in the pond calculation are accurate.

Recreational, Aesthetic, and Wildlife use was all confirmed during the visit. Mr. Nicholson uses the ponds to catch fish and bird hunt.

Condition #5 requires permanent measuring devices installed at both the inlet and outlet. There were no devices installed at the time of the field exam and licensing will not be approved until this condition is met. The measuring devices are required to monitor the loss of water diverted from the unnamed drain. In a letter from Reynolds Irrigation District dated May 19, 1998, Tom Nicholson (applicant) agreed that any loss of water between the point of diversion and the point of return for this Application for water right will be deducted from T&S Farm's other water rights within the Warm Springs Creek and flows from artesian wells and springs.

Condition 259 was added to describe the storage values of the right. The permit was issued for 20 af of storage use and a diversion rate of 5.00 cfs. The diversion of 5 cfs would be an annual volume of 3,619.8 af. This number is what we associate the total volume value to the permit. Because 1.74 cfs was observed, we assign a total volume of 1,259.7 af to the license since this is the volume being diverted annually. To better describe the storage component of the right, we associate the seepage and evaporation loss encountered when keeping these ponds filled year round plus the capacity to the storage use (316.8 af). The aesthetic and recreation uses describe water passing through the system and return to the ditch. (942.9 af). The total volume of the right is still 1,259.7 af. An application for amendment to the permit will be sought to make these changes.

OVERLAP

63-32529, 63-32531 & 63-3121 are irrigation and domestic water rights owned by the property owner, TFI LTD Partnership. 63-23672 & 63-3590 are neighbor rights not used on the land.

United States of America Acting Trust, Boise Project Board of Control, Boise Kuna Irrigation District & New York Irrigation District all own water rights across the land. These rights not used for purposes of this license.

RECOMMENDATION

Licensing should not become final until the owner installs measuring devices required by conditions of the permit. Once this has been accomplished in a timely manner, I recommend that this permit be licensed for all uses authorized at a diversion rate of 1.74 cfs and a total annual volume of 1,259.7 af.

Have conditions of permit approval been met? ____Yes ____X__No

- Permanent measuring devices were not installed at time of field exam.

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
RECREATION	01/01 to 12/31	1.74 CFS	942.9 AF
DIVERSION TO STORAGE	01/01 to 12/31	1.74 CFS	
AESTHETIC STORAGE	01/01 to 12/31		316.8 AF
WILDLIFE STORAGE	01/01 to 12/31		316.8 AF
AESTHETIC	01/01 to 12/31	1.74 CFS	942.9 AF
RECREATION STORAGE	01/01 to 12/31		316.8 AF
<u>Totals:</u>		1.74 CFS	1,259.7 AF

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☐ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☒ Other

I. AUTHENTICATION – Patrick Kelly Water Right Agent

Field Examiner's Name Patrick Kelly Date 4/29/2014

Reviewer _____ Date _____

State of Idaho
Department of Water Resources
Field Exam Map
63-12443

This map depicts the WILDLIFE STORAGE, RECREATION, RECREATION STORAGE, AESTHETIC, AESTHETIC STORAGE, & DIVERSION 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.

02W



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

0 0.1 0.2 0.4 Miles





63-12443 System Diagram

Water is diverted from an unnamed drain at a rate of 1.74 cfs. System uses a 15 hp pump and water enters pond via underground pipes from the 2 inlets. 2 foot culverts connect the 3 ponds until an overflow drain directs water back into unnamed drain. Outlet flow measures 1.33 cfs. Seepage and evaporation account for difference in flow.

POLYSONIC READINGS

PERMIT #: 63-12443

POINT OF DIVERSION

Artesian Well Lat 43.356092 Long -116.568735

FIRST SET OF INFORMATION:

SET-UP IMPUT DATA USED DURING
PREPARATION FOR FLOW MEASUREMENTS.

SECOND SET OF INFORMATION:

THESE ARE THE READINGS TAKEN FOR
THIS PUMP. THE TOTAL FLOW WAS
AVERAGED OVER A 10 MINUTE READING.

FLows IN GALLONS PER MINUTE (GPM)

780 GPM FLOW RATE

FLows IN CUBIC FEET PER SECOND (CFS)

780 GPM / 448.8 = 1.74 CFS FLOW RATE

ZERO MODE
AUT ZERO

4-30 12:1800 *R
+0002.30 % AI2

0291.1 MMSEC
101.11 % T0

12:25+774.024E 00GPM 00H
+ 5.324E 00FPS 00R
+000000 *10 G 00H
-000000 *10 G 00H

12:26+825.537E 00GPM 00R
+ 5.679E 00FPS 00R
+000000 *10 G 00H
-000000 *10 G 00H

12:30+783.534E 00GPM 00R
+ 5.390E 00FPS 00H
+000000 *10 G 00H
-000000 *10 G 00H

12:31+801.498E 00GPM 00R
+ 5.515E 00FPS 00H
+000078 *10 G 00H
-000000 *10 G 00H

12:32+803.611E 00GPM 00H
+ 5.528E 00FPS 00H
+00156 *10 G 00H
-000000 *10 G 00H

12:33+776.401E 00GPM 00H
+ 5.341E 00FPS 00H
+00235 *10 G 00H
-000000 *10 G 00H

12:34+776.401E 00GPM 00H
+ 5.341E 00FPS 00H
+00314 *10 G 00H
-000000 *10 G 00H

12:35+791.195E 00GPM 00R
+ 5.442E 00FPS 00H
+00391 *10 G 00H
-000000 *10 G 00H

12:36+774.816E 00GPM 00R
+ 5.331E 00FPS 00H
+00469 *10 G 00H
-000000 *10 G 00H

12:37+767.155E 00GPM 00H
+ 5.278E 00FPS 00H
+00547 *10 G 00H
-000000 *10 G 00H

12:38+760.023E 00GPM 00H
+ 5.229E 00FPS 00H
+00625 *10 G 00R
-000000 *10 G 00R

12:39+768.212E 00GPM 00H
+ 5.285E 00FPS 00R
+00702 *10 G 00H
-000000 *10 G 00H

12:40+773.495E 00GPM 00R
+ 5.321E 00FPS 00R
+00780 *10 G 00H
-000000 *10 G 00H

TOTAL STORAGE

FILE NUMBER	63-12443
REVIEWER	Patrick Kelly
DATE	4/29/2014

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond

Surface Area (in Acres)	5.1	"Surface Area" is automatically carried over from the "Seepage Loss Sheet"
Average Pond Depth (in feet)	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 suggest multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that
Pond Capacity (in acre feet)	20.4	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

Volume Needed Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (in acre feet)	0	The "Volume Needed 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). PLEASE 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 (in acre feet)	279.2	The "Estimated Seepage Loss" is automatically carried over from the Seepage Loss Sheet
Estimated Evaporation Loss (in acre feet)	15.2	The "Estimated Evaporation Loss" is automatically carried over from the Evaporation Loss Sheet
Total Volume Required (in acre feet)	314.8	"The Total Volume Required" is calculated by adding the Pond Capacity, Multiple Fills, Seepage Loss, and Evaporation Loss amounts to determine the total amount of storage required.

Flow Rate into Pond (in cfs)	1.74	The "Flow Rate" into the Pond depicts the actual flow either measured or estimated into the pond.
Highest Daily Evaporation Rate From Evaporation Tab. (in mm/day)	5.64	This number is automatically selected by picking the highest recorded number in the "Precipitation Deficit Table".
Maximum Required Daily Maintenance Volume (in acre feet per day)	0.86	"Maximum Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year, and is calculated by adding the highest daily evaporation loss to the average daily seepage loss in acre feet. The average daily seepage loss is calculated by dividing the "Estimated Seepage Loss" by 365 days. This is acceptable, since the seepage rate shouldn't vary throughout the season unless the pond completely freezes over during the winter months. The highest daily evaporation loss is calculated by dividing the Highest Daily Evaporation Rate by the 304.8 conversion factor and multiplying this number by the pond surface area to attain a combined daily acre feet requirement.
Minimum Maintenance Flow (in cfs)	0.43	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determine by dividing the "Maximum Required Daily Maintenance Volume" by 1.9835. This flow can be used to determine if the flow rate into the pond is adequate to maintain the pond level.
Days Required to Fill the Pond	8	The "Days Required to Fill the Pond" is calculated by dividing the "Pond Capacity" by the "Flow Rate" minus "Minimum Maintenance Flow" multiplied by 1.9835. This section will assist you in determining if the flow rate being diverted to the pond is adequate to fill the pond while maintaining the pond level. The length of time to fill the pond will help determine if the flow rate is adequate for the size of pond being proposed. This number should be between 1 and 365 days for a project to be successful.
Days Required to Fill the Pond at 13,000 gallons per day	-25	The "Days Required to Fill the Pond at 13,000 gallons per day" is calculated converting the "Pond Capacity" and the "Maximum Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Maximum Daily Maintenance Volume" in gallons to determine the number of days to fill pond. This number should be between 1 and 365 if this pond is to described as a domestic use.

User Input
Calculated value
Formula Explanations

Evaporation Loss Calculation

FILE NUMBER	63-12443
REVIEWER	Patrick Kelly
DATE	4/29/2014

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

The acronyms used on the Kimberly Research Center website are defined below:
P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

User Input
Calculated value
Formula Explanations

USING THIS SPREADSHEET

To ascertain the evaporation from a pond, you will need to go to the Kimberly Research Center website. The link is found below. This web site provides the Precipitation Deficit for the area where the pond is located. The Precipitation Deficit is the total amount of free pan evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used, and the entire state is pretty much covered. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at X:/Spatial/Climate/ETIdahostations.shp.

Found at: <http://www.kimberly.uidaho.edu/ETIdaho/online.php>

Precipitation Deficit

Station: Nampa (NMP1 - 108)

Month	mm/day ¹	Days per month	mm/Month
Jan	0.00	31	0.00
Feb	0.70	28	19.60
March	1.90	31	58.90
April	2.76	30	82.80
May	3.44	31	106.64
June	4.43	30	132.90
July	5.64	31	174.84
August	4.97	31	154.07
September	3.42	30	102.60
October	1.91	31	59.21
November	0.62	30	18.60
December	0.00	31	0.00

PLEASE NOTE: We cannot use the season average, because there are several areas in Northern Idaho with a negative Precipitation Deficit. Therefore, we must enter each monthly deficit, and enter in a zero (0) for each negative month. The reason for this is that precipitation can only offset evaporation to the extent of the evaporation.

Please enter the daily average Precipitation Deficit as shown in the example below.

Although it has sometimes been useful to consider wintertime evaporation to be zero, Allen and Robison (2007, p. 169) noted, "Evaporation during nongrowing (wintertime) periods varies widely"

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

Total mm/year = 910.16

$[(\text{mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$
 $(910.16 \div 304.8) \times 5.10 = 15.2 \text{ AFA}$

Surface Area of Pond is automatically Carried over from the Seepage Loss Sheet.

Example Data:

ET_{Idaho} 2012 -- Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to robison@kimberly.uidaho.edu Copyright 2012, University of Idaho.

Twin Falls 2 NNE (NWS -- 109294)

Statistics based on thirty year normal spans 1943 to 1973 years

For a different land cover or crop click on the above link.
 and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

Data enter negative values above as "0"

Open water - shallow systems (ponds, streams) Precipitation Deficit (Click here for a graph)

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Growing Season ^a	Non Growing Season ^b	Annual	
Mean ^c	mm/day												mm		
Monthly ^d	-0.37	0.32	1.19	2.40	3.17	3.73	4.94	4.24	3.11	2.00	0.22	-0.33	751	0	751
15-Day Moving Average ^e	-0.50	0.31	1.19	2.42	3.09	3.74	4.97	4.23	3.08	2.02	0.12	-0.35			
7-Day Moving Average ^f	-0.41	0.32	1.19	2.40	3.10	3.72	4.96	4.25	3.12	2.02	0.16	-0.38			
3-Day Moving Average ^g	-0.37	0.33	1.20	2.41	3.12	3.73	4.94	4.24	3.12	2.01	0.20	-0.35			

The above table is a snap shot of the tables you find at the Kimberly Research Center Webpage. The link above will take you there. You will want to enter the numbers found in this table into the table above. You will need to enter a zero (0) for any negative number. Unfortunately, you cannot copy and paste, so you will have to hand enter the data.

SEEPAGE CALCULATIONS

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total annual seepage losses from a pond.

FILE NUMBER	63-12443
REVIEWER	Patrick Kelly
DATE	4/29/2014

User Input
Calculated value
Formula Explanations

INPUTS

SQ. FT. Calculator
Pond Surface area in acres
5.1

POND SURFACE AREA (SQ. FT.)	222156
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SUGGESTED SEEPAGE RATE (FT/DAY)	0.1500
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Use the table below to find the "SUGGESTED SEEPAGE RATES".

FORMULA:
(Surface Area X Seepage Rate) / 7.48 = Gallons Per Day loss

CONVERT TO GPD	249259	GPD
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TOTAL SEEPAGE LOSS (AFA)	279.2	AFA
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SUGGESTED SEEPAGE RATES FOR DIFFERENT SOIL TYPES:
GW, GP, GM, GC, SW, SP and SM (silty sand, sand silt mixtures and gravel mixtures) = 0.20 ft per day
OL and ML (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.016 ft per day
SC (clayey sands, sand clay mixtures) = 0.007 ft per day
CL (Low to medium plasticity clays) = 0.003 ft per day
MH, OH, PT and CH (high plasticity clays) = 0.0003 ft per day
LINED PONDS (liners can be chemical, fabric, or bentonite) = 0 ft per day
Ponds Intercepting Groundwater (excavated ponds filled with shallow Ground Water) = 0 ft per day

PLEASE NOTE: The initial basis for the Suggested Seepage Rates in the table above is found on Page 16 of Seepage from Fish Ponds, Bulletin 599, August 1989 Alabama Agricultural experiment Station, Auburn University, Auburn University Alabama. If you don't know the soil type, please refer to the map provided at X:\Spatial\Soils\USCS\PondSoils.lyr. Use "0" if the ponds intersect the water table.

**Wetted Perimeter and X-Sectional Flow Calculator for
Flow Rate in a Circular, Rectangular, V-Notch, or Trapezoidal Open Channel**

Select Channel Type from Pull Down Menu

Circular

Input Parameters

Depth = 0.36 feet (depth of the flow of water)

Radius = 1.00 feet (radius of circular channel)

Input Parameter 3 = Not Used

Input Parameter 4 = Not Used

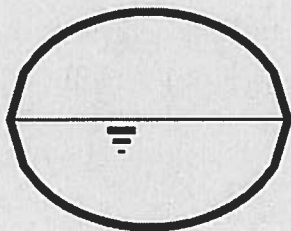
Cross Sectional Area of Flow

A = 0.38 square feet

Wetted Perimeter

WP = 1.75 feet

Channel Type Sketch



$$\begin{aligned} Q &= \text{Area} * \text{Velocity} \\ Q &= 0.38 \text{ ft}^2 * 3.51 \text{ ft/s} \\ Q &= 1.33 \text{ cfs} \end{aligned}$$



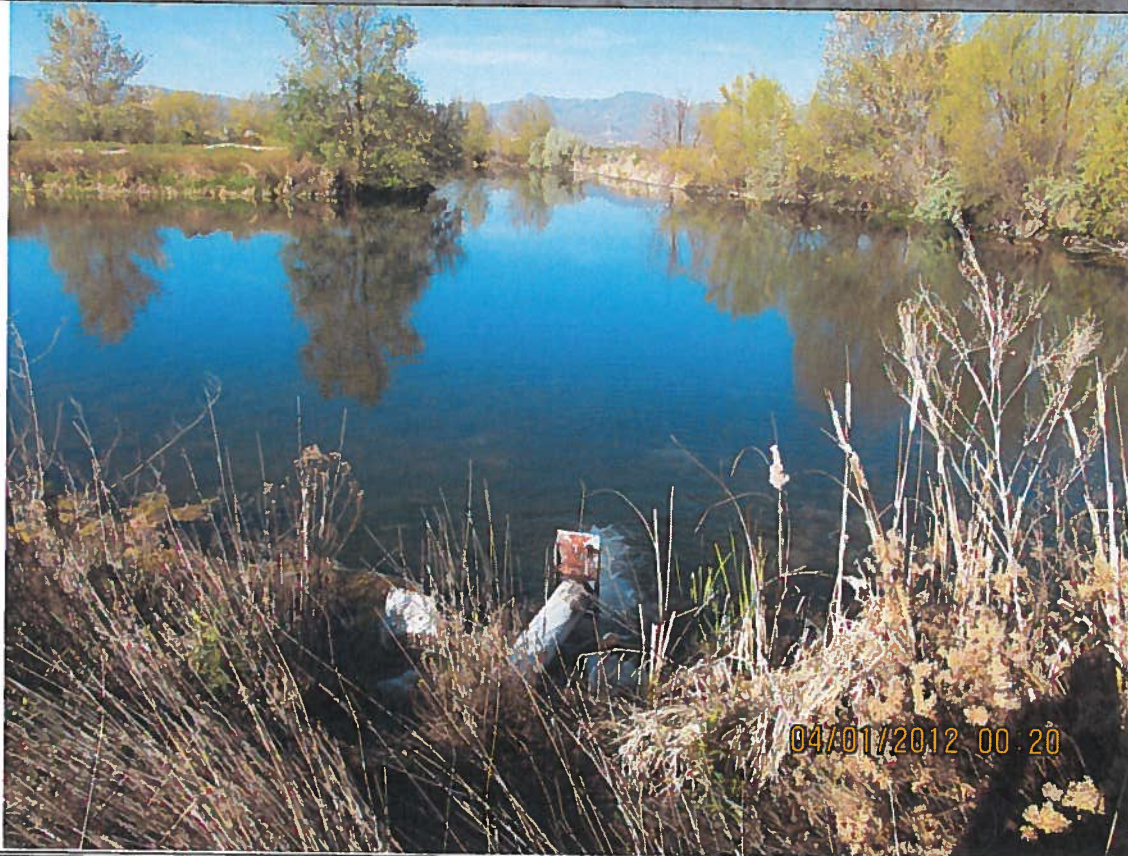
Point of
Diversion:
1 foot well is
dug into a
perennial ditch.



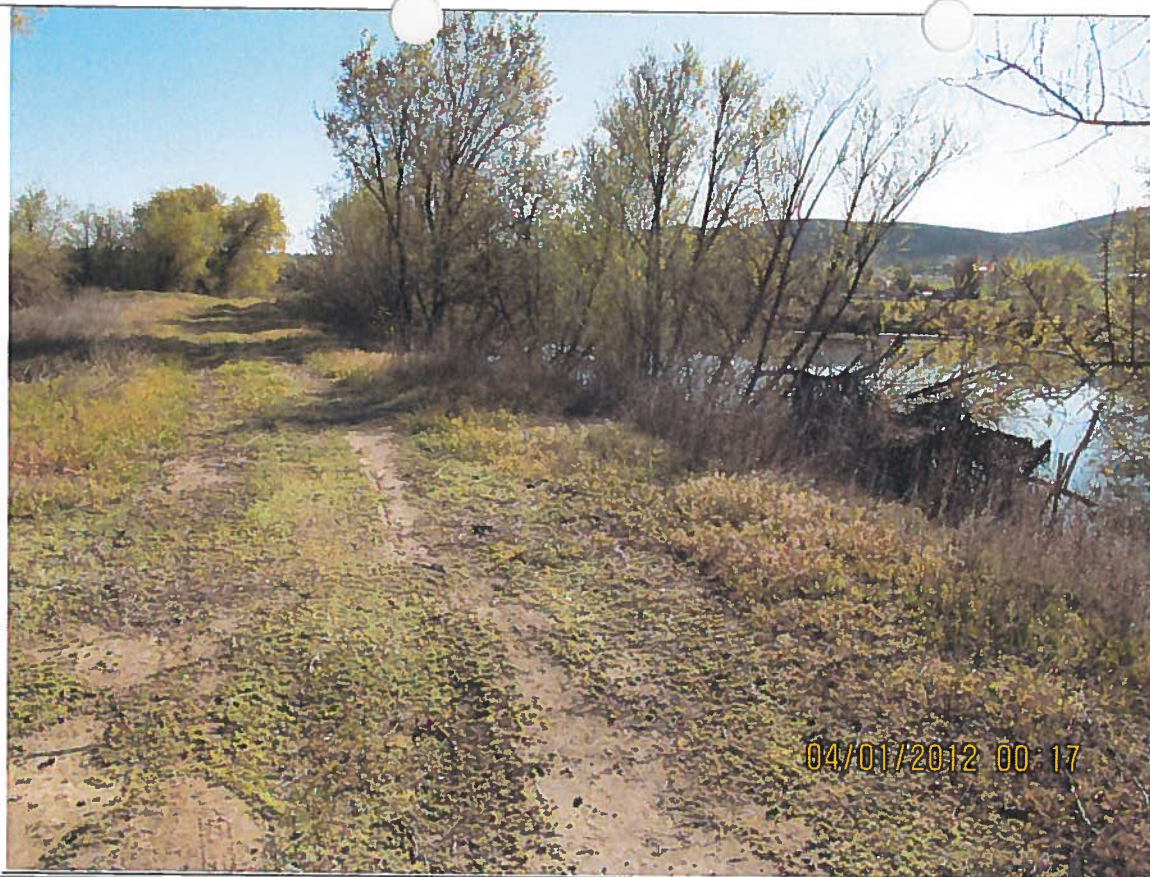
Pump tag at
diversion.



Motor tag at diversion.



1 of 2 inlet points. 8" pipe. East edge of pond facing west.



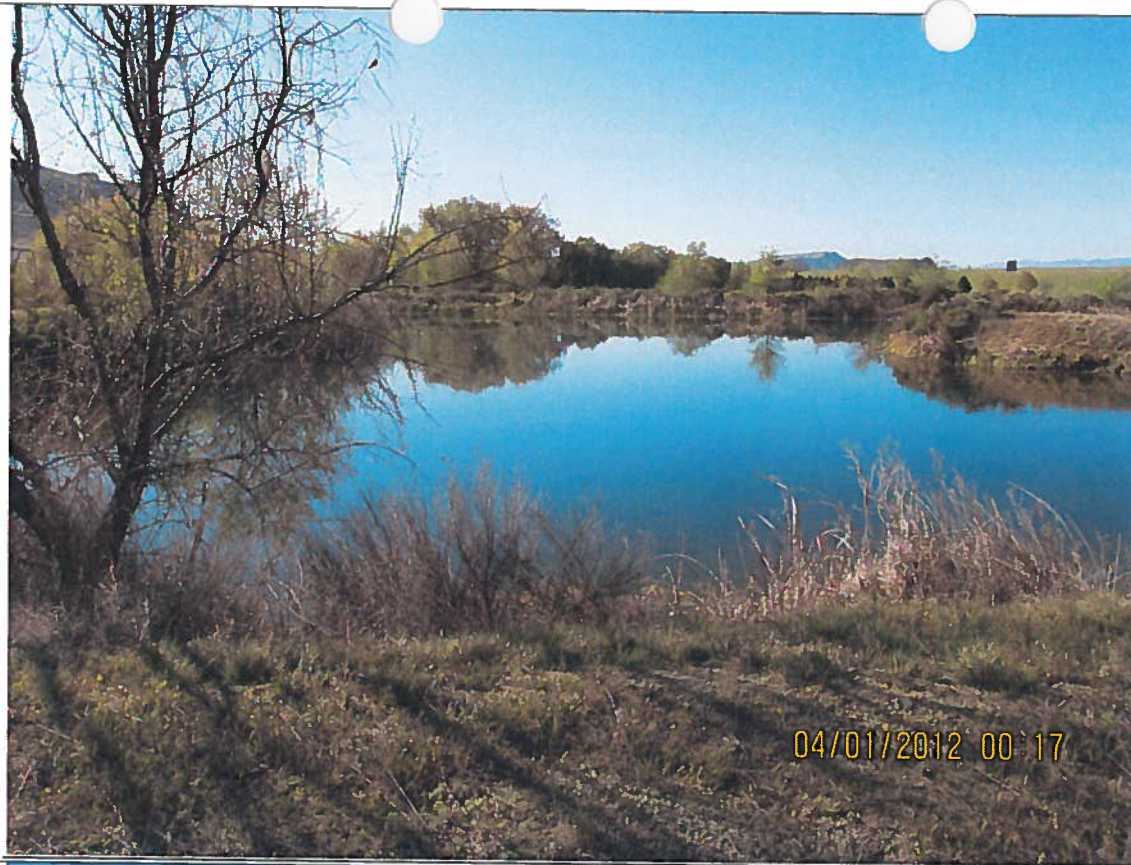
Center of ponds
facing east.

1 of 6 photo
series.



Center of ponds
facing south-
east.

2 of 6 photo
series.



Center of ponds
facing south.

3 of 6 photo
series.



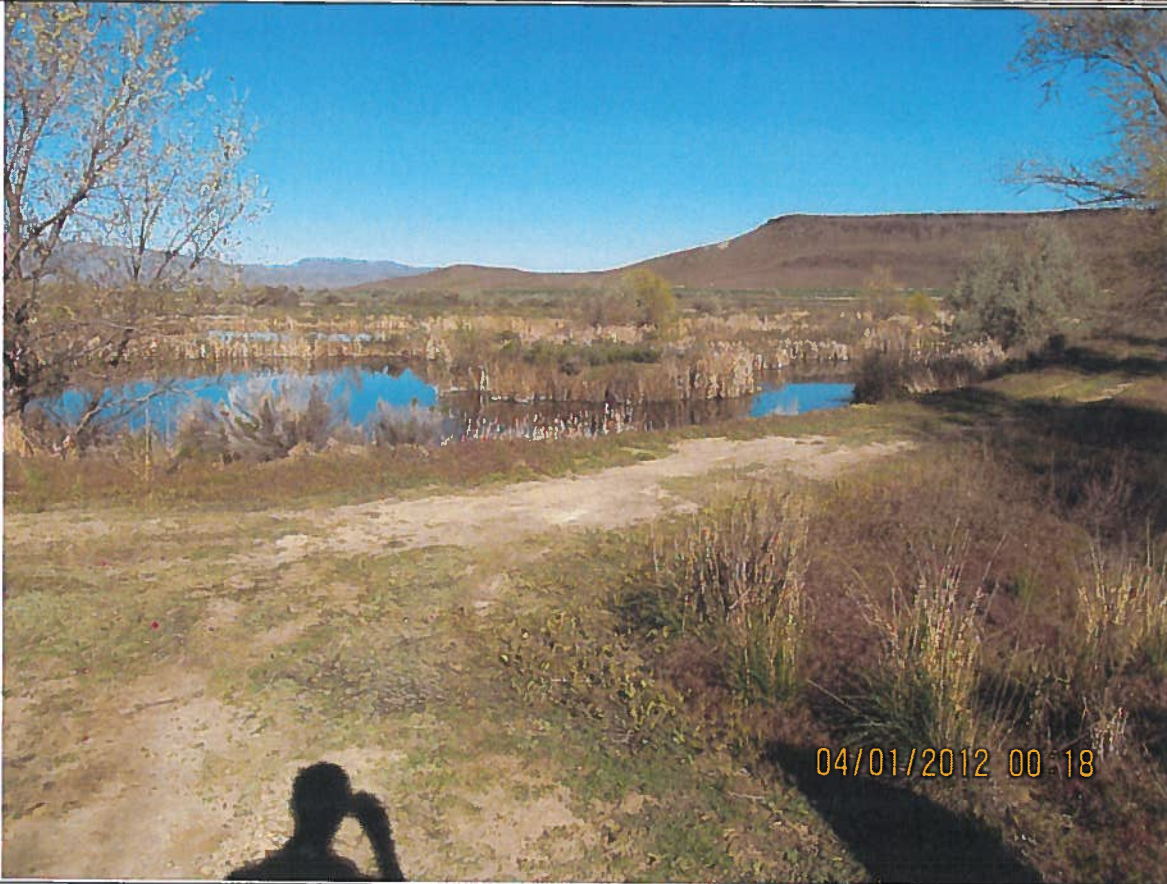
Center of ponds
facing west.

4 of 6 photo
series.



Center of ponds
facing west

5 of 6 photo
series.



Center of ponds
facing north-
west.

6 of 6 photo
series.



Overflow drain
to the outlet
culvert.

NW corner of
the ponds facing
south.