

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 37-22835

Exam Date: 12/3/2015

1. Current Owner: CHRISTY LOU AWALT
PO BOX 392
SAN MIGUEL CA 93451-0392
(805)238-1315

2. Accompanied by: In-house Field Exam

3. SOURCE**TRIBUTARY**

WASTE WATER

B. OVERLAP REVIEW

1. Other water rights with the same IRRIGATED POU: 37-12868, 37-797, 37-21486, 37-21828
Water rights the same STORAGE POU: 37-21456, 37-21486, 37-21827 and 37-21828
2. Other water rights with the same point of diversion: 37-21456, 37-21486, 37-21827 and 37-21828

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

WASTE WATER

NW1/4NW1/4

Sec. 36, Twp 06S, Rge 13E, B.M.

GOODING County

Method of Determination: WMIS record 101786 & field visit

2.

PLACE OF USE: AESTHETIC STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
06S	13E	35	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
																X			

PLACE OF USE: IRRIGATION STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
06S	13E	35	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
																X			

DIVERSION TO STORAGE same as IRRIGATION
STORAGE

Method of Determination: Field visit and aerial imagery

3. ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- ☐ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- ☒ Aerial Photo Attached (required for irrigation of 10+ acres).
- ☐ Photo of Diversion and System Attached

4.

<u>Well or Diversion</u> <u>ID No.*</u>	<u>Motor Make</u>	<u>Hp</u>	<u>Motor Serial No.</u>	<u>Pump Make</u>	<u>Pump Serial No. or Discharge</u> <u>Size</u>
WMIS 101786					

D. FLOW MEASUREMENTS

1.

<u>Measurement</u> <u>Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>
Staff Gauge on a 5' rectangular weir (see attached photos)						

2. Measurements: Flow data taken from the Annual Summary for the Malad Reservoir POD from 2013 & 2014 calendar years (see attachments):
 2013 Maximum Flow – 12.7 cfs (April and May)
 2014 Maximum Flow – 10.7 cfs (April and June)

E. FLOW CALCULATIONS: N/A

_____ Additional Computation Sheets Attached

Measured Method:

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: N/A

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

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

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses: Per Dam Safety records volume of reservoir calculated as 99.9 acre feet (see attachment).

G. NARRATIVE/REMARKS/COMMENTS

Permit 37-22835 was filed seeking to authorize an additional flow rate for diversion to storage at the Malad Reservoir. The original permits for the reservoir (37-21456; 37-21486; 37-21827 and 37-21828) were initially processed as on-stream storage but are actually off-stream (see attached memo dated 06/14/2013), and they were eventually licensed with diversion to storage rates that are considerably less than what is actually diverted into the reservoir. This permit is seeking to authorize an additional 5.0 cfs in addition to the licensed 2.76 cfs authorized under rights 37-21486 & 37-21828 and 1.80 cfs authorized under rights 37-21456 & 37-21827. The permit also seeks to authorize a 99.0 acre foot aesthetic storage component for the reservoir, which is very close to the estimated volume storage capacity of 99.9 acre feet reported NRCS in the dam safety record. The irrigation storage component of 502.4 acre feet on this permit reflects the amount already licensed under water rights 37-21486 and 37-21828 with no additional storage.

There are two separate irrigation systems utilizing the irrigation storage from this reservoir. The system used under this permit also delivers water rights 37-21486 and 37-21828, and provides irrigation for 111.0 acres owned by Christy Lou Awalt. The second system, owned by Amy Ruth Jensen Testamentary Trust, provides irrigation for 65.0 acres under rights 37-21456 and 37-21827. The Jensen Trust has also filed a similar permit, 37-22834, for an additional 5.0 cfs diversion to storage, 99.0 acre feet aesthetic storage and an irrigation storage component of 318.4 acre feet, which reflects the amount of irrigation storage previously licensed under rights 37-21456 and 37-21827. The irrigation storage volume for all the rights was based on 4.0 acre feet per acre with seepage and evaporative losses added to the volume (see attachment).

The high flow measured on this ditch is 12.7 cfs in April and May of 2013 (see attached Annual Summary). I'm recommending licensing the permitted 5.0 cfs for diversion to storage and conditioning both licenses to limit the total combined diversion rate to 12.7 cfs (Conditions X35 & F06 on license). I also recommend licensing the permitted aesthetic storage for 99.0 acre feet and the irrigation storage of 502.4 acre feet when combined with rights 37-21486 and 37-21828. There is a condition on the permit(s) that will be carried over to licensing that limits combined annual volume for this system to 762.4 acre feet for initial and multiple refills of the reservoir for all rights. The 762.4 acre foot limit is also based on 4.0 acre feet per acre with seepage and evaporative losses included (see attachment).

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
AESTHETIC STORAGE	01/01 to 12/31		99.00 AF
DIVERSION TO STORAGE	03/15 to 11/15	5.000 CFS	
IRRIGATION STORAGE	01/01 to 12/31		502.40 AF
<u>Totals:</u>		5.000 CFS	502.40 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

Field Examiner's Name

Reviewer

Date

Date

12-21-2015

8/8/16



Figure 1: Malad Reservoir from southwest looking north east (2008)



Figure 2: POD from W-Drain into ditch



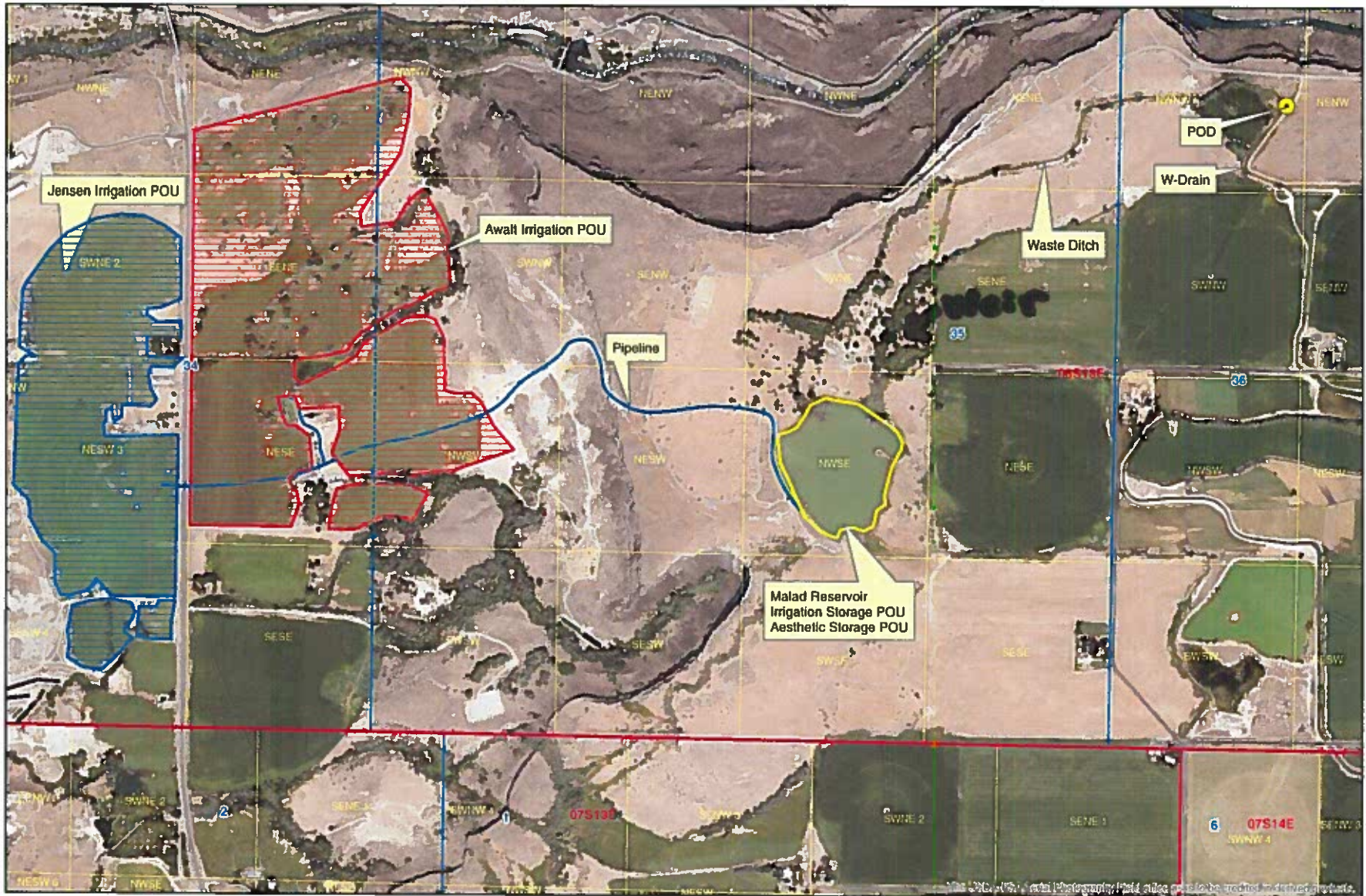
Figure 3: 5' Rectangular Weir with staff gauge on ditch



Figure 4: Downstream side of weir

System Diagram 37-22834 & 37-22835

37-22835



**Annual Summary for Water District 130 Thousand Springs Area
370101786 - D - MALAD RESERVOIR**

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR 01/01/2013 - 12/31/2013

c - Calculated, e - Estimated, i - Interpolated, m - Measured and n - Not Specified

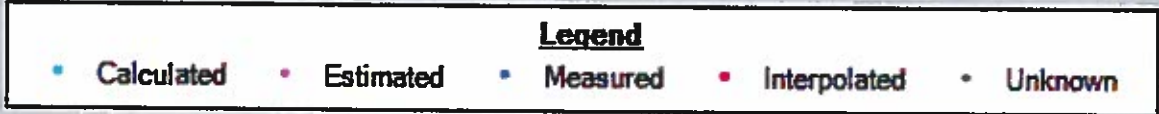
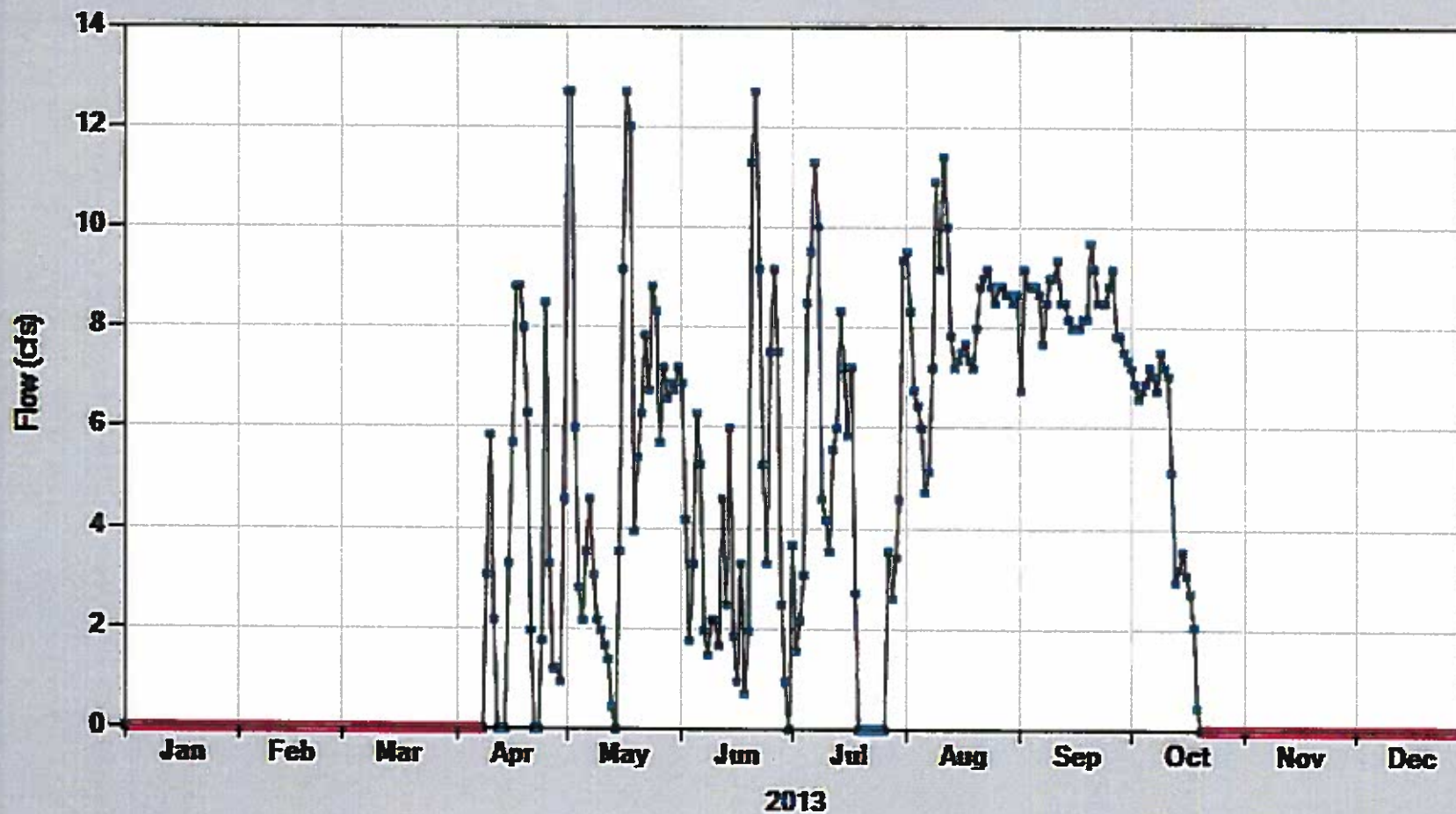
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	12.7 ^m	6.90 ^m	3.67 ^m	9.50 ^m	6.75 ^m	7.21 ^m	0.00 ⁱ	0.00 ⁱ
2	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	12.7 ^m	4.18 ^m	1.55 ^m	8.33 ^m	9.16 ^m	6.90 ^m	0.00 ⁱ	0.00 ⁱ
3	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	6.00 ^m	1.75 ^m	2.16 ^m	6.75 ^m	8.82 ^m	6.59 ^m	0.00 ⁱ	0.00 ⁱ
4	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	2.82 ^m	3.30 ^m	3.06 ^m	6.44 ^m	8.82 ^m	6.75 ^m	0.00 ⁱ	0.00 ⁱ
5	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	2.16 ^m	6.29 ^m	8.49 ^m	6.00 ^m	8.82 ^m	6.90 ^m	0.00 ⁱ	0.00 ⁱ
6	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	3.54 ^m	5.27 ^m	9.50 ^m	4.72 ^m	8.66 ^m	7.21 ^m	0.00 ⁱ	0.00 ⁱ
7	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	4.58 ^m	1.95 ^m	11.3 ^m	5.13 ^m	7.68 ^m	7.05 ^m	0.00 ⁱ	0.00 ⁱ
8	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	3.06 ^m	1.46 ^m	10.0 ^m	7.21 ^m	8.49 ^m	6.75 ^m	0.00 ⁱ	0.00 ⁱ
9	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	3.06 ^m	2.16 ^m	2.16 ^m	4.58 ^m	10.9 ^m	8.99 ^m	7.52 ^m	0.00 ⁱ	0.00 ⁱ
10	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	5.85 ^m	1.95 ^m	2.16 ^m	4.18 ^m	9.16 ^m	8.99 ^m	7.21 ^m	0.00 ⁱ	0.00 ⁱ
11	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	2.16 ^m	1.65 ^m	1.65 ^m	3.54 ^m	11.4 ^m	9.33 ^m	7.05 ^m	0.00 ⁱ	0.00 ⁱ
12	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	1.37 ^m	4.58 ^m	5.56 ^m	10.0 ^m	8.49 ^m	5.13 ^m	0.00 ⁱ	0.00 ⁱ
13	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	0.43 ^m	2.48 ^m	6.00 ^m	7.84 ^m	8.49 ^m	2.94 ^m	0.00 ⁱ	0.00 ⁱ
14	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	0.00 ^m	6.00 ^m	8.33 ^m	7.21 ^m	8.17 ^m	3.18 ^m	0.00 ⁱ	0.00 ⁱ
15	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	3.30 ^m	3.54 ^m	1.85 ^m	7.21 ^m	7.36 ^m	8.00 ^m	3.54 ^m	0.00 ⁱ	0.00 ⁱ
16	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	5.70 ^m	9.16 ^m	0.93 ^m	5.85 ^m	7.52 ^m	8.00 ^m	3.06 ^m	0.00 ⁱ	0.00 ⁱ
17	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.82 ^m	12.7 ^m	3.30 ^m	7.21 ^m	7.68 ^m	8.00 ^m	2.71 ^m	0.00 ⁱ	0.00 ⁱ
18	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.82 ^m	12.0 ^m	0.70 ^m	2.71 ^m	7.36 ^m	8.17 ^m	2.05 ^m	0.00 ⁱ	0.00 ⁱ
19	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.00 ^m	3.93 ^m	1.95 ^m	0.00 ^m	7.21 ^m	8.17 ^m	0.43 ^m	0.00 ⁱ	0.00 ⁱ
20	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	6.29 ^m	5.42 ^m	11.3 ^m	0.00 ^m	8.00 ^m	9.67 ^m	0.00 ^m	0.00 ⁱ	0.00 ⁱ
21	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	1.95 ^m	6.29 ^m	12.7 ^m	0.00 ^m	8.82 ^m	9.16 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
22	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	7.84 ^m	9.16 ^m	0.00 ^m	8.99 ^m	8.49 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
23	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	6.75 ^m	5.27 ^m	0.00 ^m	9.16 ^m	8.49 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
24	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	1.75 ^m	8.82 ^m	3.30 ^m	0.00 ^m	8.82 ^m	8.49 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
25	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.49 ^m	8.33 ^m	7.52 ^m	0.00 ^m	8.49 ^m	8.82 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
26	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	3.30 ^m	5.70 ^m	9.16 ^m	0.00 ^m	8.82 ^m	9.16 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
27	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	1.19 ^m	7.21 ^m	7.52 ^m	3.54 ^m	8.82 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
28	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	1.19 ^m	6.59 ^m	2.48 ^m	2.60 ^m	8.66 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
29	0.00 ⁱ	--	0.00 ⁱ	0.93 ^m	6.90 ^m	0.93 ^m	3.42 ^m	8.66 ^m	7.52 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
30	0.00 ⁱ	--	0.00 ⁱ	4.58 ^m	6.75 ^m	0.00 ^m	4.58 ^m	8.49 ^m	7.36 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
31	0.00 ⁱ	--	0.00 ⁱ	--	7.21 ^m	--	9.33 ^m	8.66 ^m	--	0.00 ⁱ	--	0.00 ^m
Total:	0.00	0.00	0.00	75.4	180.3	128.2	128.3	252.1	252.8	100.2	0.00	0.00
Mean:	0.00	0.00	0.00	2.51	5.82	4.27	4.14	8.13	8.43	3.23	0.00	0.00
Min:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.72	6.75	0.00	0.00	0.00
Max:	0.00	0.00	0.00	8.82	12.7	12.7	11.3	11.4	9.67	7.52	0.00	0.00
AC-FT:	0.00	0.00	0.00	149.5	357.6	254.2	254.5	500.1	501.5	198.7	0.00	0.00

CALENDAR YEAR 01/01/2013 - 12/31/2013

TOTAL CFS: 1117

TOTAL AC-FT: 2216

Hydrograph of 370101786 - D - MALAD RESERVOIR



**Annual Summary for Water District 130 Thousand Springs Area
370101786 - D - MALAD RESERVOIR**

DISCHARGE, CUBIC FEET PER SECOND, CALENDAR YEAR 01/01/2014 - 12/31/2014

c - Calculated, e - Estimated, i - Interpolated, m - Measured and n - Not Specified

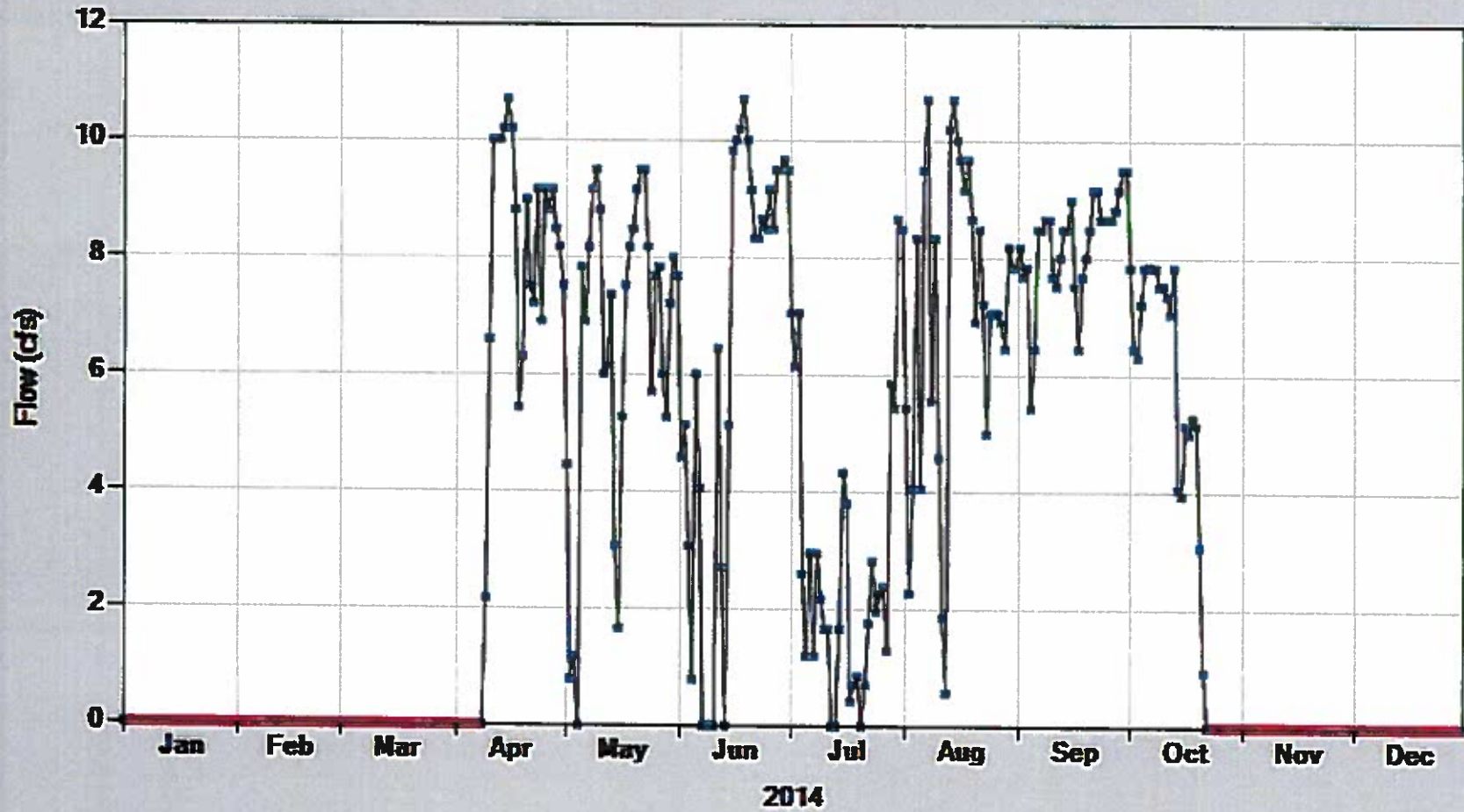
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.00 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	4.45 ^m	4.58 ^m	7.05 ^m	5.42 ^m	8.17 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ
2	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.78 ^m	5.13 ^m	6.14 ^m	2.26 ^m	7.68 ^m	6.44 ^m	0.00 ⁱ	0.00 ⁱ
3	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	1.19 ^m	3.06 ^m	7.05 ^m	4.05 ^m	7.84 ^m	6.29 ^m	0.00 ⁱ	0.00 ⁱ
4	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	0.78 ^m	2.60 ^m	8.33 ^m	5.42 ^m	7.21 ^m	0.00 ⁱ	0.00 ⁱ
5	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	7.84 ^m	6.00 ^m	1.19 ^m	4.05 ^m	6.44 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ
6	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	6.90 ^m	4.05 ^m	2.94 ^m	9.50 ^m	8.49 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ
7	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.17 ^m	0.00 ^m	1.19 ^m	10.7 ^m	8.49 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ
8	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	0.00 ^m	9.16 ^m	0.00 ^m	2.94 ^m	5.56 ^m	8.66 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ
9	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	2.16 ^m	9.50 ^m	0.00 ^m	2.16 ^m	8.33 ^m	8.66 ^m	7.52 ^m	0.00 ⁱ	0.00 ⁱ
10	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	6.59 ^m	8.82 ^m	0.00 ^m	1.65 ^m	4.58 ^m	7.68 ^m	7.52 ^m	0.00 ⁱ	0.00 ⁱ
11	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	10.0 ^m	6.00 ^m	6.44 ^m	1.65 ^m	1.85 ^m	7.52 ^m	7.36 ^m	0.00 ⁱ	0.00 ⁱ
12	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	10.0 ^m	6.14 ^m	2.71 ^m	0.00 ^m	0.56 ^m	8.00 ^m	7.05 ^m	0.00 ⁱ	0.00 ⁱ
13	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	10.0 ^m	7.36 ^m	0.00 ^m	0.00 ^m	10.2 ^m	8.49 ^m	7.84 ^m	0.00 ⁱ	0.00 ⁱ
14	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	10.2 ^m	3.06 ^m	5.13 ^m	1.65 ^m	10.7 ^m	8.49 ^m	4.05 ^m	0.00 ⁱ	0.00 ⁱ
15	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	10.7 ^m	1.65 ^m	9.84 ^m	4.32 ^m	10.0 ^m	8.99 ^m	3.93 ^m	0.00 ⁱ	0.00 ⁱ
16	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	10.2 ^m	5.27 ^m	10.0 ^m	3.80 ^m	9.67 ^m	7.52 ^m	5.13 ^m	0.00 ⁱ	0.00 ⁱ
17	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.82 ^m	7.52 ^m	10.2 ^m	0.43 ^m	9.16 ^m	6.44 ^m	4.99 ^m	0.00 ⁱ	0.00 ⁱ
18	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	5.42 ^m	8.17 ^m	10.7 ^m	0.70 ^m	9.67 ^m	7.68 ^m	5.27 ^m	0.00 ⁱ	0.00 ⁱ
19	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	6.29 ^m	8.49 ^m	10.0 ^m	0.85 ^m	8.66 ^m	8.00 ^m	5.13 ^m	0.00 ⁱ	0.00 ⁱ
20	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.99 ^m	9.16 ^m	9.16 ^m	0.00 ^m	6.90 ^m	8.49 ^m	3.06 ^m	0.00 ⁱ	0.00 ⁱ
21	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	7.52 ^m	9.50 ^m	8.33 ^m	0.70 ^m	8.49 ^m	9.16 ^m	0.93 ^m	0.00 ⁱ	0.00 ⁱ
22	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	7.21 ^m	9.50 ^m	8.33 ^m	1.75 ^m	7.21 ^m	9.16 ^m	0.00 ^m	0.00 ⁱ	0.00 ⁱ
23	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	9.16 ^m	8.17 ^m	8.66 ^m	2.82 ^m	4.99 ^m	8.66 ^m	0.00 ^m	0.00 ⁱ	0.00 ⁱ
24	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	6.90 ^m	5.70 ^m	8.49 ^m	1.95 ^m	7.05 ^m	8.66 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
25	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	9.16 ^m	7.68 ^m	9.16 ^m	2.26 ^m	7.05 ^m	8.66 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
26	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.82 ^m	7.84 ^m	8.49 ^m	2.37 ^m	7.05 ^m	8.66 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
27	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	9.16 ^m	6.00 ^m	9.50 ^m	1.28 ^m	6.90 ^m	8.82 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
28	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ	8.49 ^m	5.27 ^m	9.50 ^m	5.85 ^m	6.44 ^m	9.16 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
29	0.00 ⁱ	--	0.00 ⁱ	8.17 ^m	7.21 ^m	9.67 ^m	5.42 ^m	8.17 ^m	9.50 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
30	0.00 ⁱ	--	0.00 ⁱ	7.52 ^m	8.00 ^m	9.50 ^m	8.66 ^m	7.84 ^m	9.50 ^m	0.00 ⁱ	0.00 ⁱ	0.00 ⁱ
31	0.00 ⁱ	--	0.00 ⁱ	--	7.68 ^m	--	8.49 ^m	7.84 ^m	--	0.00 ⁱ	--	0.00 ^m
Total:	0.00	0.00	0.00	181.5	202.2	187.4	89.9	219.2	247.1	128.9	0.00	0.00
Mean:	0.00	0.00	0.00	6.05	6.52	6.25	2.90	7.07	8.24	4.16	0.00	0.00
Min:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	5.42	0.00	0.00	0.00
Max:	0.00	0.00	0.00	10.7	9.50	10.7	8.66	10.7	9.50	7.84	0.00	0.00
AC-FT:	0.00	0.00	0.00	360.0	401.0	371.8	178.2	434.8	490.1	255.7	0.00	0.00

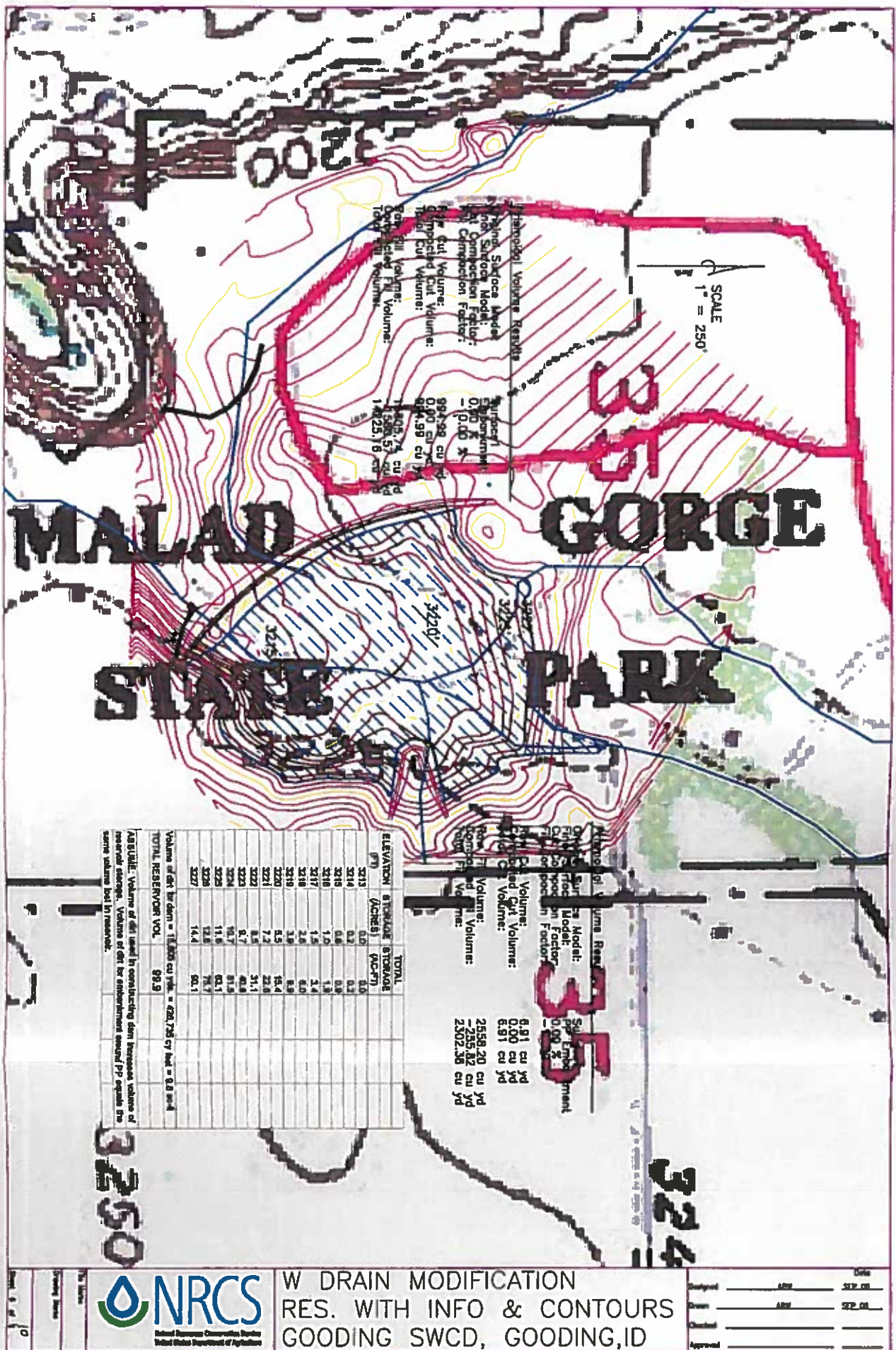
CALENDAR YEAR 01/01/2014 - 12/31/2014

TOTAL CFS: 1256

TOTAL AC-FT: 2491

Hydrograph of 370101786 - D - MALAD RESERVOIR





MEMO

TO: 37-21456, 37-21486, 37-21827, and 37-21828

FROM: Cherie Palmer

DATE: June 14, 2013

RE: Describing the System as Developed

The reservoir is OFF STREAM, despite it being permitted as ON STREAM. The PD is the point where water is diverted away from the WDrain. There have been many conversations with water right staff and the best way to move forward is to label the reservoir as off stream for a few reasons. The NRCS was involved in constructing the reservoir to settle sediment before WDrain water is spilled over the canyon rim. One might think that the channel leading up to the reservoir is an extension of the WDrain but, the headgate off of the WDrain is controlled so that water never spills over the reservoir. According to the watermaster, the Northside Canal Co. is aware that Cliff operates the reservoir in this manner. Therefore, the purpose of the system is to provide irrigation water to the reservoir and settling the sediment is a secondary purpose of the reservoir. Because the flow into the reservoir is controlled by a headgate and water never flows downstream of the reservoir, this system is indeed OFF STREAM.

Converting Irrigation Use to Diversion to Storage: The point of diversion under the rights will be amended to the point where water is diverted away from the WDrain. In addition, there are multiple fills at the reservoir so, converting the live flow irrigation component means that we could cover additional volume under the irrigation from storage and storage components. In addition, the evaporative losses and seepage will be covered. Most likely the permittees will need to file another permit for any live irrigation flow.

The analysis for converting live flow to storage considers how much volume could have been available under the permit.

- Permit 37-21456 was permitted with 1.80 cfs on 180 acres. The potential volume under the permit is 720 af (180×4). The total volume required for the system is 318.4 af so no enlargement will occur when converting the live flow volume to a storage component.
- Permit 37-21486 was permitted with 2.76 cfs on 275.8 acres. The potential volume under the permit is 1,103.2 af (275.8×4). The total volume required for the system is 502.4 af so no enlargement will occur when converting the live flow volume to a storage component.

Permit 37-21827 and 37-21828 will also be getting a diversion to storage component. Because the system has always been operated the same since development, no enlargement will occur by clarifying the uses on the permit. In addition, permits 37-21827 and 37-21828 can be considered extensions of permits 37-21456 and 37-21486 as there will be combined limits between them that recognize the shared diversion rate and volumes.

There are more details in my field examination reports if further clarification is required.

TOTAL STORAGE

FILE NUMBER	Pond 1
REVIEWER	Cherie Palmer
DATE	6/10/2013

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

Surface Area (In Acres)	14	"Surface Area" depicts the actual surface area of the pond measured, determined by ArcMap, or estimated.
Average Pond Depth (In feet)	7.075	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated.
Pond Capacity (In acre feet)	99.05	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth.

Volume Needed Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (In acre feet)	605	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 " <u>From Storage</u> " component exceeding the initial fill on the permit to include a volume in this space.
Estimated Seepage Loss (In acre feet)	35.8	The "Estimated Seepage Loss" is automatically carried over from the Seepage Loss Sheet
Estimated Evaporation Loss (In acre feet)	22.6	The "Estimated Evaporation Loss" is automatically carried over from the Evaporation Loss Sheet
Total Volume Required (In acre feet)	762.4	"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)	4.56	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)	2.73	To determine the "Highest Daily Evaporation Rate" go to the Evaporation Loss Sheet and enter in the highest number recorded in the Precipitation Deficit table.
Maximum Required Daily Maintenance Volume (In acre feet per day)	0.22	"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 multiplying 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)	0.11	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determined by dividing the "Daily Required 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	11	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.

Attachment C

SEEPAGE CALCULATIONS

This spreadsheet has been designed by Idaho Department of Water Resources to
estimate the total seepage required for a pond.

FILE NUMBER	Pond
REVIEWER	Cherie Palmer
DATE	6/10/2013

INPUTS

SQ FT. Calculator
Pond Surface area in acres
14

POND SURFACE AREA (SQFT)	609840
--------------------------	--------

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

Use the table below to find the
"SUGGESTED SEEPAGE RATES".

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

CONVERT TO GPD	31931	GPD
----------------	-------	-----

TOTAL SEEPAGE LOSS (AFA)	35.8	AFA
--------------------------	------	-----

SUGGESTED SEEPAGE RATES FOR DIFFERENT SOIL TYPES:
SM (silty sand, sand silt mixtures) = 0.20 ft per day
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
CH (high plasticity clays) = 0.0003 ft per day
LINED PONDS (liners can be chemical, fabric, or bentonite) = 0 ft per day

PLEASE NOTE: Seepage Rates taken from 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 P:/MCIsell/Soils Soils.lyr. Use "0" if the ponds intersect the water
table.

Notes:

Attachment C

Evaporation Loss Calculation

FILE NUMBER	Pond 1
REVIEWER	Cpalmer
DATE	6/10/2013

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the evaporation losses required for 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

ABOUT THIS SPREADSHEET

To ascertain the evaporation from a pond, you will need to go to the Kimberley 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. You can find the nearest site using ArcMap. The shape file containing the sites can be found at X:\Spatial\Climate\ETIdahostations.shp.

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

Precipitation Deficit

Station: Twin Falls 2 NNE (NWS -- 109294)

Month	mm/day ¹	Days per month	mm/Month
Jan	0.13	31	4.03
Feb	0.21	28	5.88
March	0.70	31	21.70
April	1.21	30	36.30
May	1.59	31	49.29
June	2.28	30	68.40
July	2.73	31	84.63
August	2.47	31	76.57
September	2.32	30	69.60
October	2.00	31	62.00
November	0.42	30	12.60
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.

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

Total mm/year = 491.00

P_d= Convert to (mm/yr) ÷ (convert Surface area of pond, in acres.

491.00 304.8 14

(conversion factor)

P_d= 22.6 AFA

Attachment C