SJRRP Flow Bench Evaluation

October 11, 2011

The Restoration Administrator recommends Friant Dam to release 700 cfs for Interim Flows starting on October 11, 2011. Reclamation's calculations as shown herein indicate 700 cfs of flow from Friant Dam will not cause material adverse seepage impacts to Mendota Pool. Reclamation's measurements of groundwater levels indicate that flow below Sack Dam may not increase fully without causing adverse impacts in the downstream reaches. Flows will increase on October 11, 2011 to 700 cfs from Friant Dam. Flows below Sack Dam will remain at 0 cfs at this time pending additional data collection.

As of October 11, 2011:

1. Flow rates from provisional real-time data are below known conveyance thresholds.

2. Daily operations coordination calls and the weekly planning call identified a potential concern regarding the Highway 165 project. Reclamation contacted CALTRANS and they did not have any concerns.

3. The seepage hotline received no calls to date in WY 2012.

4. Real-time groundwater monitoring did not identify groundwater levels above thresholds, Table 1. These wells do not restrict Friant Dam releases at this time.

5. Priority well weekly groundwater measurements, Table 2, identified groundwater tables above thresholds in one well. Reclamation conducted a site visit to MW-10-95 and determined with the concurrence of the landowner that nearby gravity irrigation caused the shallow groundwater levels. Reclamation will delay any increase in flows below Sack Dam in order to verify that elevations are decreasing now that gravity irrigation has halted.

6. Stability has been achieved.

7. Projected groundwater levels from the proposed increase in flow, Table 4, calculated based on groundwater levels measured on October 11 for real-time wells or the previous week for manually measured wells, show groundwater levels below thresholds except for four wells. These wells restrict Sack Dam flows at this time.

8. The LSJLD has not identified any concerns with planned releases to Mendota Pool.

9. The CCID has not identified any concerns with planned releases to Mendota Pool.

10. The SLCC has not identified any concerns with planned releases to Mendota Pool.

Analysis

Priority well MW-10-95 (Reach 4B1 Eastside Bypass) measurements last week show depths to groundwater at 3.2 feet above the threshold. Adjacent gravity irrigation caused this shallow level. Reclamation visited the landowner on Friday, October 7, 2011 and the landowner did not

identify concerns, providing groundwater levels do not trap his equipment in mud. The landowner has a working interceptor drain at this location. Reclamation will delay any increase in flows below Sack Dam in order to verify that elevations are decreasing now that gravity irrigation has halted. Predictions (Table 4) show MW-10-95 groundwater levels may rise to 7.7 feet above the threshold if the 700 cfs pulse continues downstream. This well restricts releases past Sack Dam at this time.

Predictions (Table 4) show MW-10-90 groundwater levels may rise to 2.8 feet above the threshold if the 700 cfs pulse continues downstream. This does not take into account sand excavation which should lower the water surface elevation. Reclamation conducted a site visit with the landowner on Friday, October 7, 2011 and the landowner did not have concerns with the predicted increase. This well restricts releases below Sack Dam to less than the full amount.

Predictions (Table 4) show MW-10-92 groundwater level may rise to 3.1 feet above the threshold if the 700 cfs pulse continues downstream. The landowner has a working interceptor drain at this location. This well restricts releases below Sack Dam to less than the full amount.

Predictions (Table 4) show MW-10-94 groundwater level may rise 3.9 feet above the threshold to 3.1 feet below ground surface. This does not take into account sand excavation which should lower the water surface elevation. The landowner has a working interceptor drain at this location. This well restricts releases below Sack Dam to less than the full amount.

Data

Table 1 shows the groundwater depth in 7 realtime wells as of October 11, 2011 at 9:00 am. The data shows no groundwater depths in the realtime groundwater wells above thresholds. The property underlying one of these realtime wells, MW-10-92, contains an existing tile drain.

Table 1 – Realtime Well Data as of 10/11/2011

Well	Reach	Measured Groundwater Depth in Well (feet bgs)	Ground Surface Buffer (feet)	Lateral Gradient Buffer (feet)	Field Depth (feet bgs)	Field Threshold (feet bgs)	Comment
MW-09-54B	2B	15.1	-7.9	5.5	12.6	10.0	Acceptable
PZ-09-R3-7	3	8.5	-0.7	0.0	7.8	3.5	Acceptable
MW-10-75	3	8.3	-0.5	0.2	8.0	6.3	Acceptable
MW-11-130	4A	7.4	0.0	0.0	7.4	5.0	Acceptable
MW-10-89	4A	11.5	-3.4	0.0	8.1	7.6	Acceptable
MW-10-92	4A	9.1	-2.6	0.0	6.5	5.0	Interceptor Drain in Place
MW-11-142	4B1	5.7	0.0	0.0	5.7	4.0	Acceptable

bgs = below ground surface

Reclamation publishes the weekly groundwater report with manual measurements via electronic well sounder and recent flow data on the SJRRP website at: http://www.restoresjr.net/flows/Groundwater/Groundwater.html. Table 2 shows the manual measurements from field staff as reported in the weekly groundwater report. To calculate field depths, Reclamation adds ground surface buffers and lateral gradient buffers to measured groundwater depths in the well. A negative ground surface buffer indicates the well is above the field.

Table 2 – Priority Well Weekly Groundwater Measurements

Well	Reach	Measured Groundwater Depth in Well (feet bgs)	Ground Surface Buffer (feet)	Lateral Gradient Buffer (feet)	Field Depth (feet bgs)	Field Threshold (feet bgs)	Comment
FA-9	2A	7.9	-3.7	2.5	6.7	5.0	Acceptable
MW-09-47	2A	8.2	-3.5	3.3	8.0	7.0	Acceptable
MA-4	2A	10.1	-6.1	4.6	8.6	7.0	Acceptable
MW-09-49B	2A	5.7	-1.7	2.4	6.5	4.5	Acceptable
MW-09-55B	2B	10.1	-3.7	3.0	9.4	7.0	Acceptable
PZ-09-R2B-1	2B	NR	-1.3	0.0	-	5.0	Acceptable
PZ-09-R2B-2	2B	10.3	-3.9	0.0	6.4	4.5	Acceptable
PZ-09-R3-5	3	10.5	-1.2	0.0	9.3	5.0	Acceptable
PZ-09-R3-6	3	9.7	-1.5	0.0	8.3	4.0	Acceptable
MW-09-87B	4A	10.9	-1.9	1.0	10.1	4.2	Acceptable
MW-10-90	4B1	5.7	0.8	0.0	6.5	6.0	Acceptable
MW-10-94	4B1	6.6	0.0	1.0	7.5	7.0	Acceptable
MW-10-95	**4B1**	**3.0**	**-2.2**	**1.0**	**1.8**	**5.0**	**Above Threshold**

Note: bgs = below ground surface

Table 3 shows the anticipated flow rates used to evaluate future groundwater depths. Reclamation calculated losses from Friant Dam to the Mendota Pool based on the long-term pattern established by Exhibit B. Reach 3 includes an estimated 320 cfs delivery to Arroyo Canal in addition to the 50 cfs of Interim Flows.

Table 3 Anticipated Change in Flows

	Recent Flows (cfs)	Exhibit B Losses from Friant Dam at 700 cfs release (cfs)	Projected Flows (cfs)
Reach 1	350	0	700
Reach 2A	210	-155	545
Reach 2B	120	-255	445
Reach 3	320	-255	765

	Recent Flows (cfs)	Exhibit B Losses from Friant Dam at 700 cfs release (cfs)	Projected Flows (cfs)
Reach 4A	0	-255	445
Reach 4B1	0	-255	445

Table 4 shows the current and maximum rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 1. Field depths are calculated by taking the most recent measurements from Table 2, adding the ground surface and the lateral gradient buffer, and subtracting the maximum predicted stage increase. Subsequent pages show the rating curves for each of the key wells from the Mussetter Engineering, Inc., 2008 San Joaquin HEC-RAS Model Documentation Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2.

Table 4 Predicted Maximum Change in Groundwater Levels for Key Wells

Well	Reach	Measured Groundwater Depth in Well (feet bgs)	Maximum Predicted Stage Increase (feet)	Ground Surface Buffer (feet)	Lateral Gradient Buffer (feet)	Predicted Field Depth (feet bgs)	Field Threshold (feet bgs)	Comment
FA-9	2A	7.9	1.0	-3.7	2.5	5.7	5.0	Acceptable
MW-09-47	2A	8.2	1.0	-3.5	3.3	7.0	7.0	Acceptable
MA-4	2A	10.1	1.3	-6.1	4.6	7.3	7.0	Acceptable
MW-09-49B	2A	5.7	1.3	-1.7	2.4	5.2	4.5	Acceptable
MW-09-54B	2B	15.1	1.4	-7.9	5.5	11.3	10.0	Acceptable
MW-09-55B	2B	10.1	1.4	-3.7	3.0	8.0	7.0	Acceptable
PZ-09-R2B-2	2B	10.3	0.0	-3.9	0.0	6.4	4.5	Acceptable
PZ-09-R3-5	3	10.5	1.9	-1.2	0.0	7.5	5.0	Acceptable
PZ-09-R3-6	3	9.7	1.8	-1.5	0.0	6.5	4.0	Acceptable
PZ-09-R3-7	3	8.5	1.9	-0.7	0.0	5.9	3.5	Acceptable
MW-10-75	3	8.3	1.6	-0.5	0.2	6.4	6.3	Acceptable
MW-09-87B	4A	10.9	4.1	-1.9	1.0	6.0	4.2	Acceptable
MW-10-92	**4A**	**9.1**	**3.6**	**-2.6**	**0.0**	**2.9**	**5.0**	**Above Threshold, Interceptor Drain in Place**
MW-10-90	**4B1**	**5.7**	**3.2**	**0.8**	**0.0**	**3.2**	**6.0**	**Above Threshold**
MW-10-94	**4B1**	**6.6**	**4.5**	**0.0**	**1.0**	**3.1**	**7.0**	**Above Threshold, Interceptor Drain**
MW-10-95	**4B1**	**3**	**4.5**	**-2.2**	**1.0**	**-2.7**	**5.0**	**Above Threshold, Interceptor Drain**

Note: bgs = below ground surface

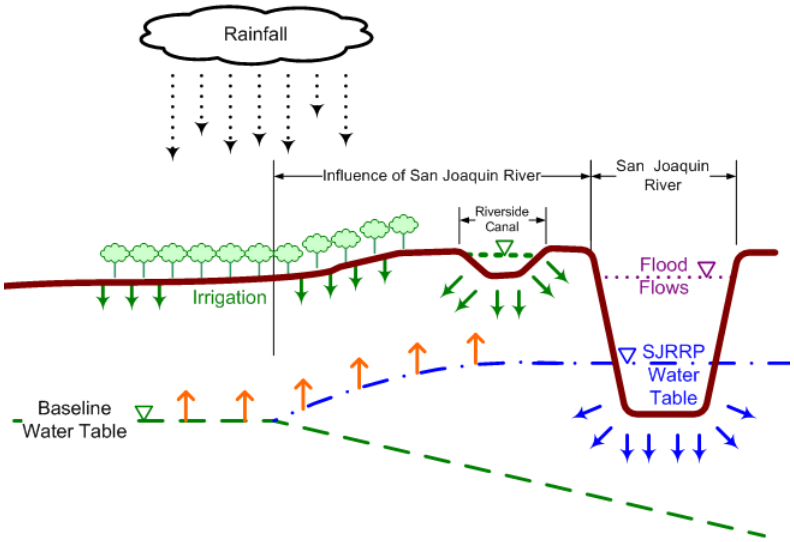
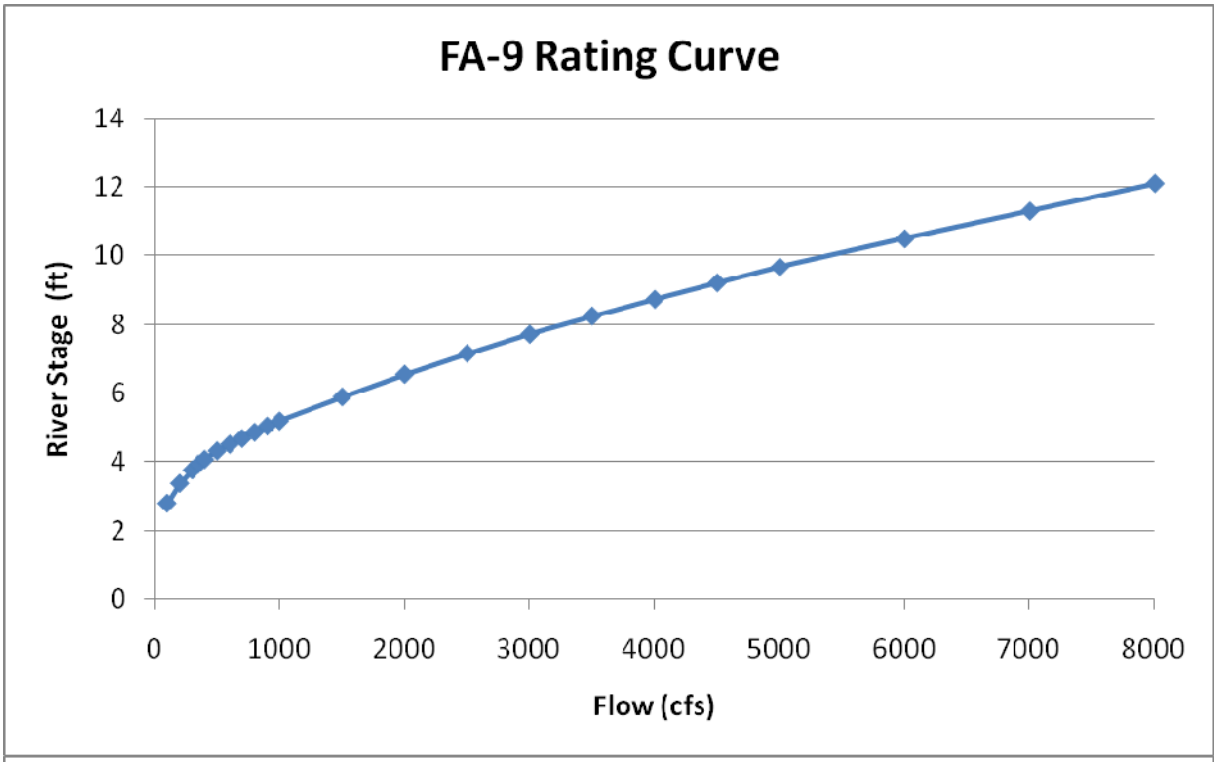
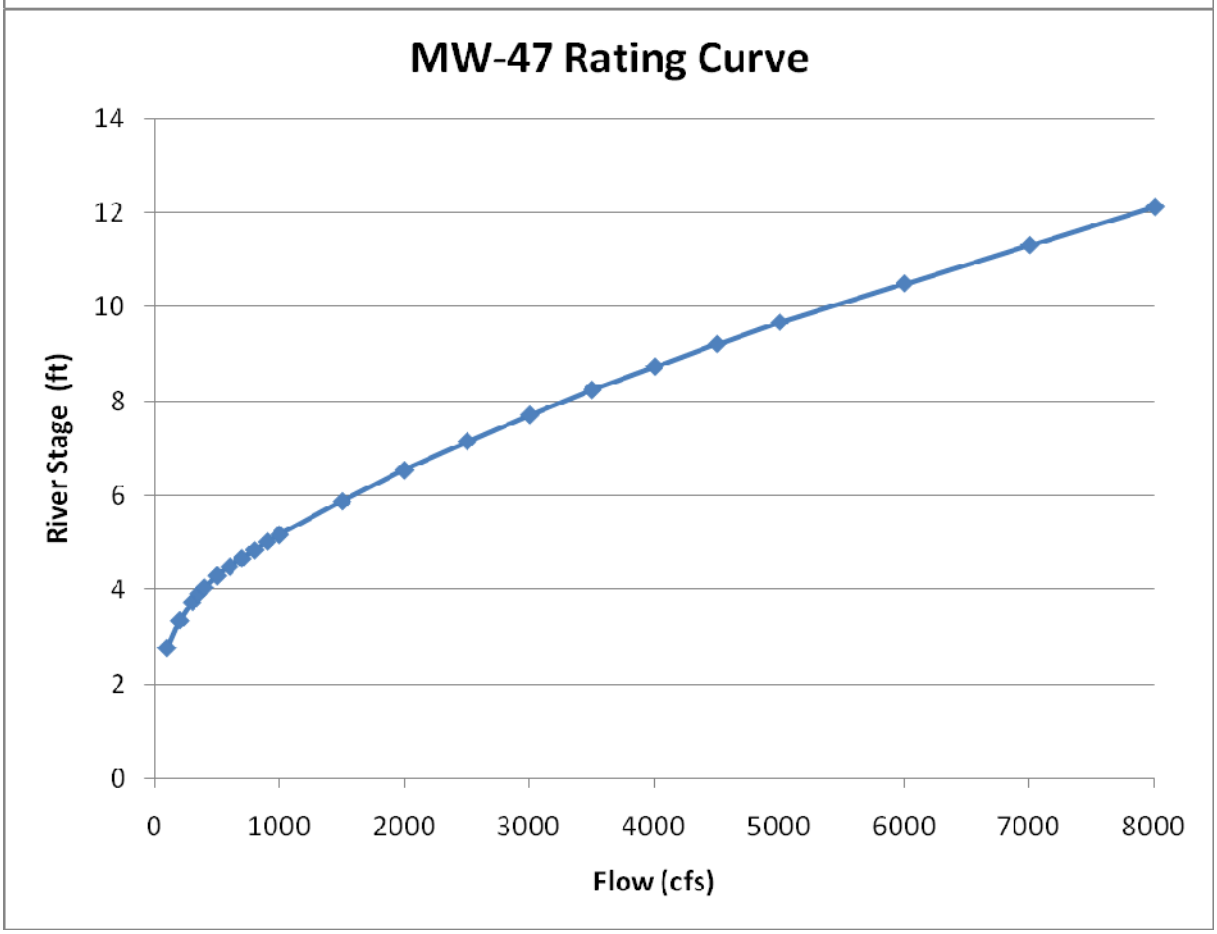
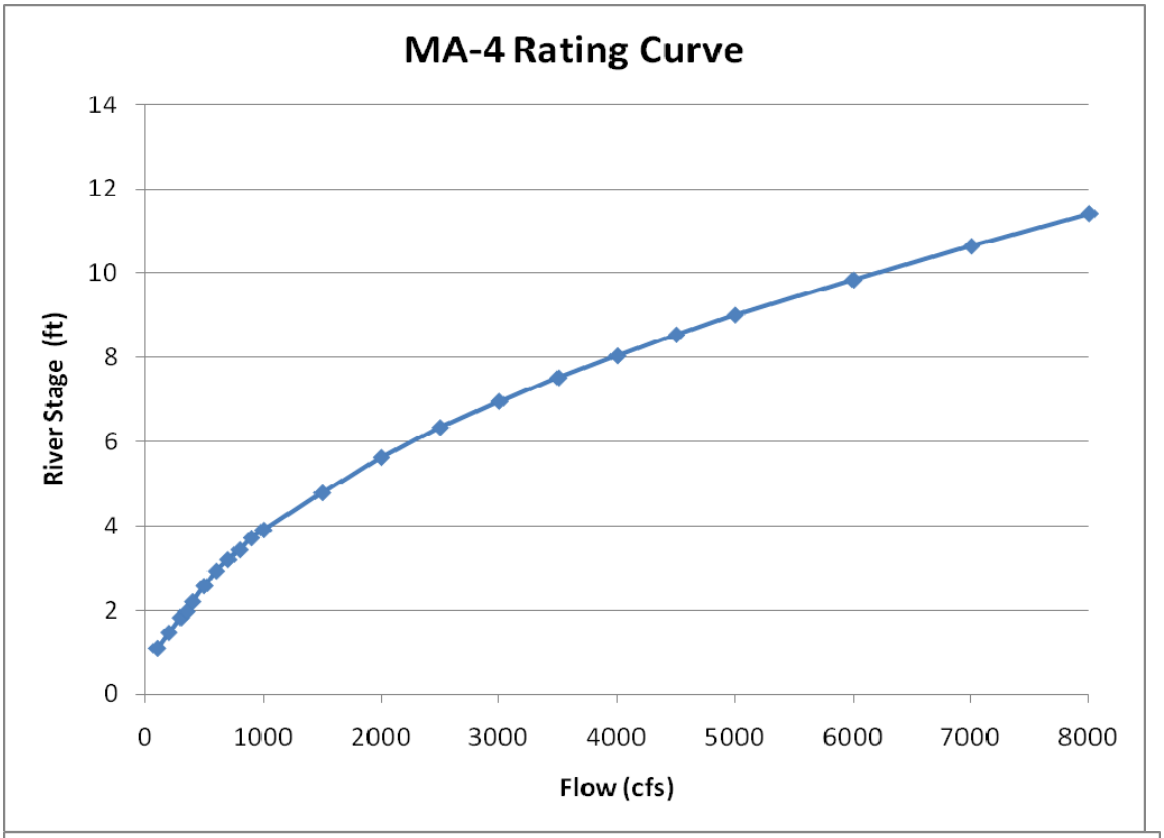
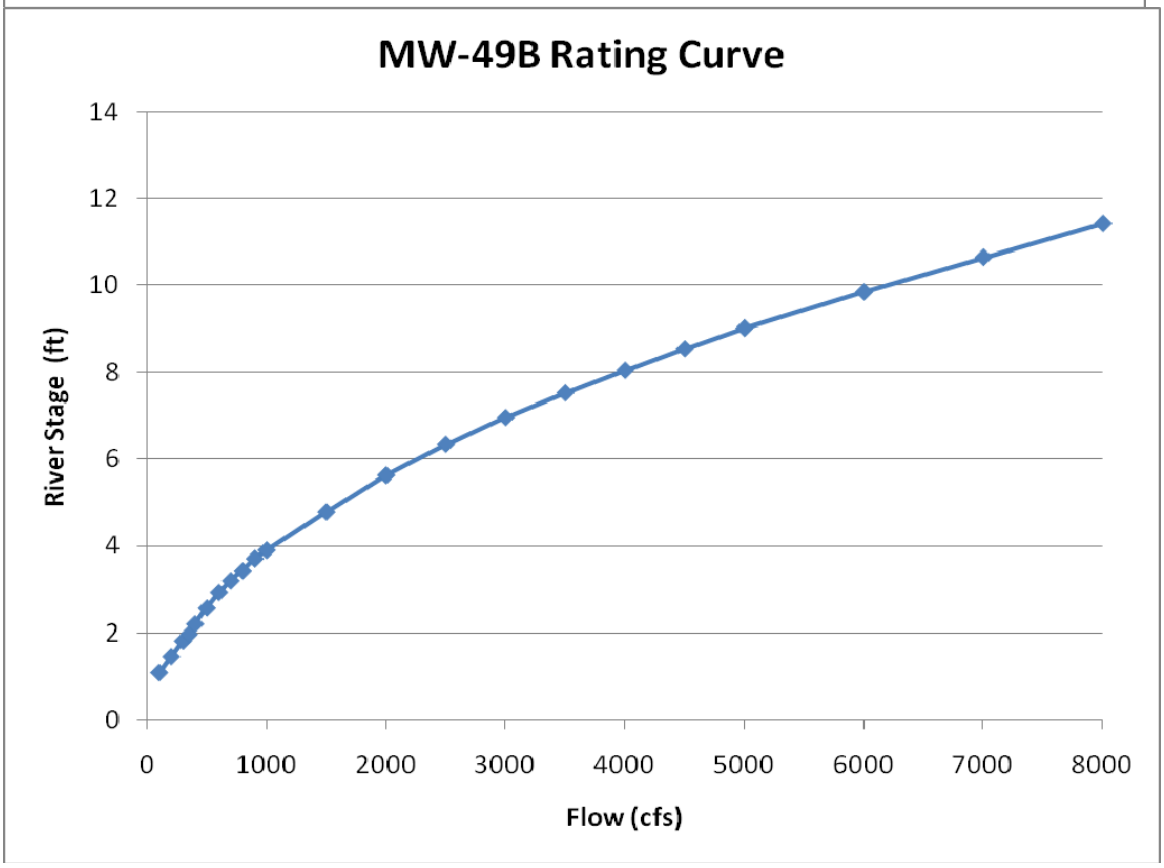


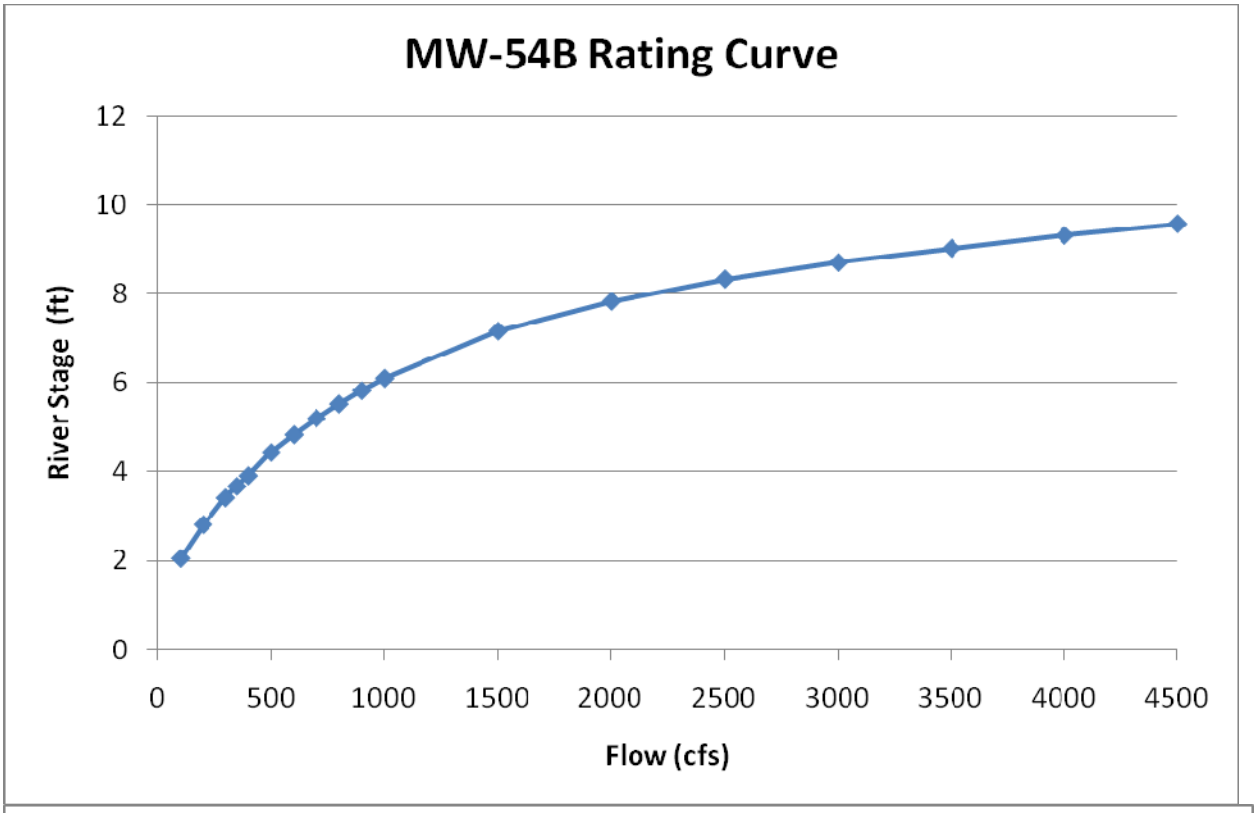
Figure 1 Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

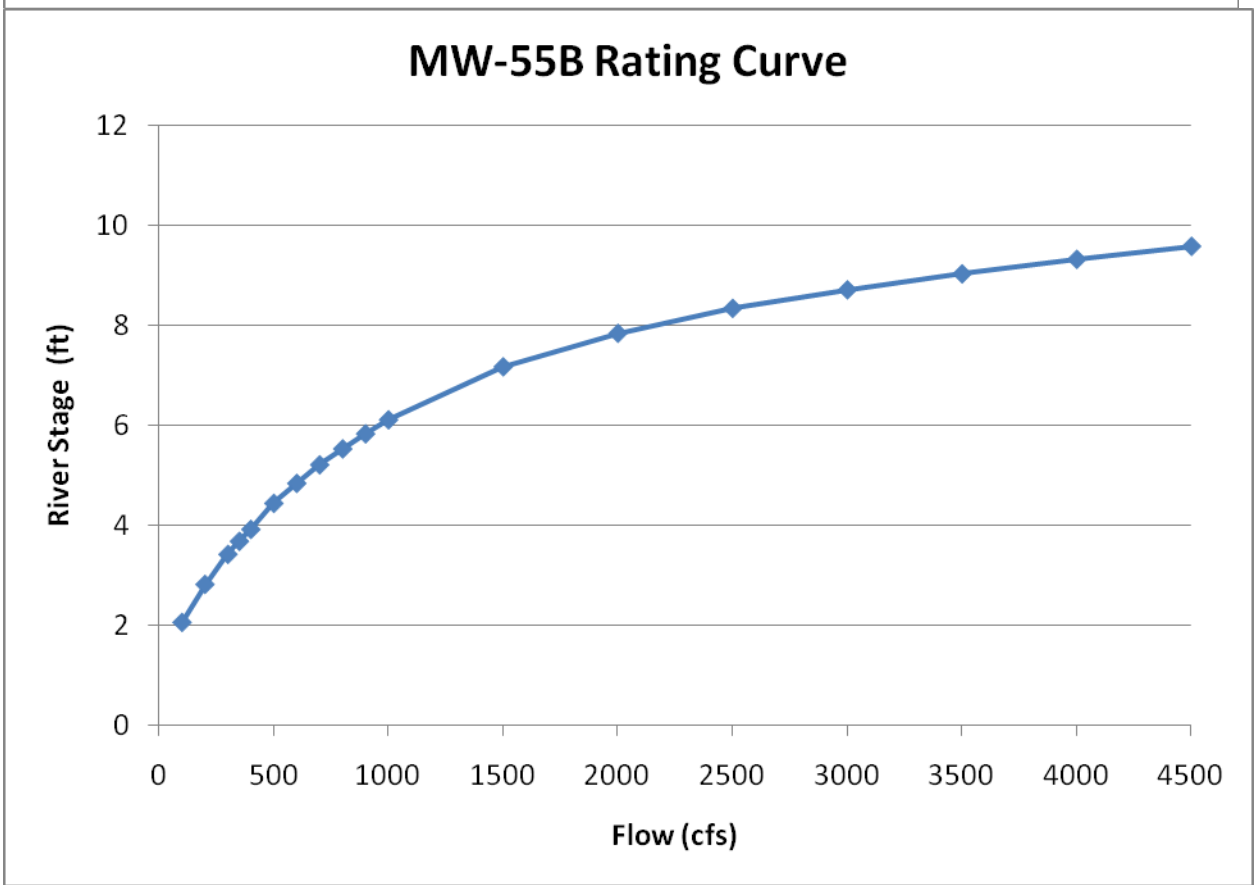

FA-9 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

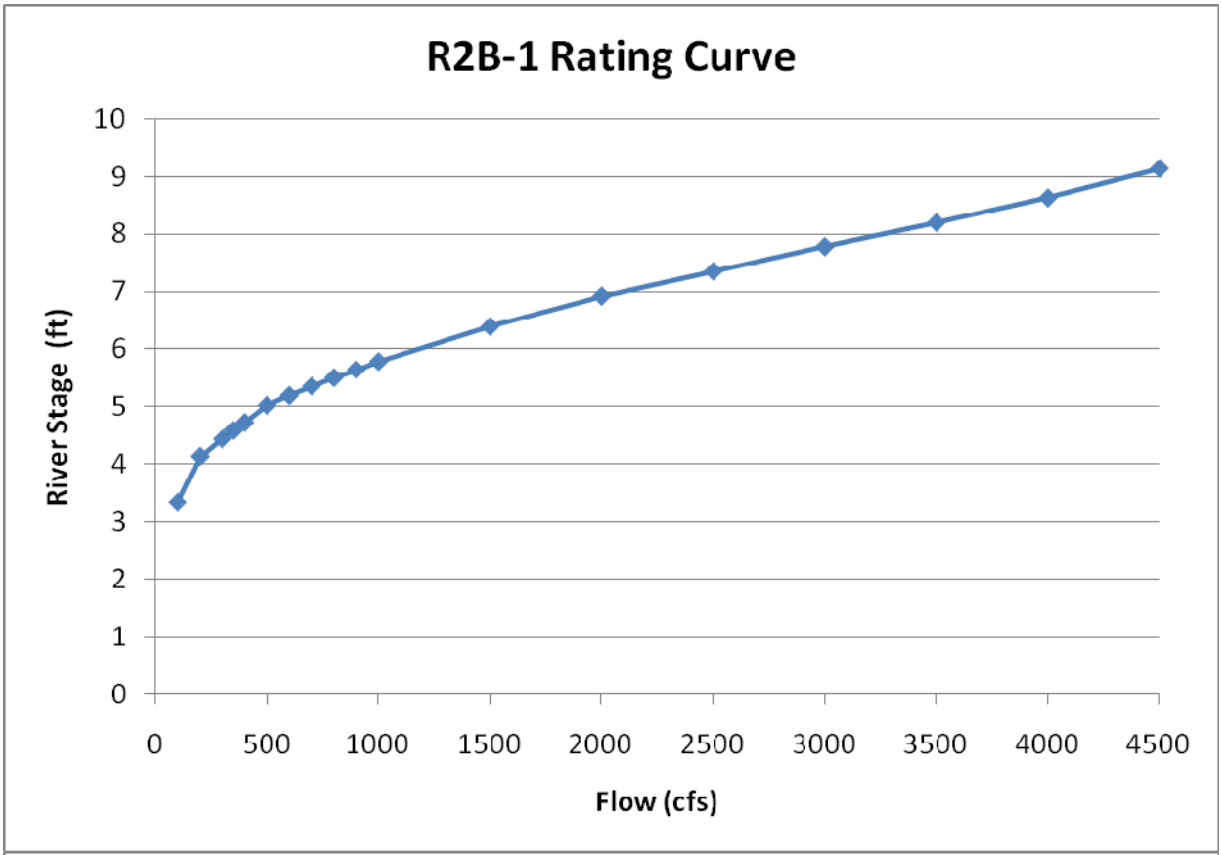

MW-47 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

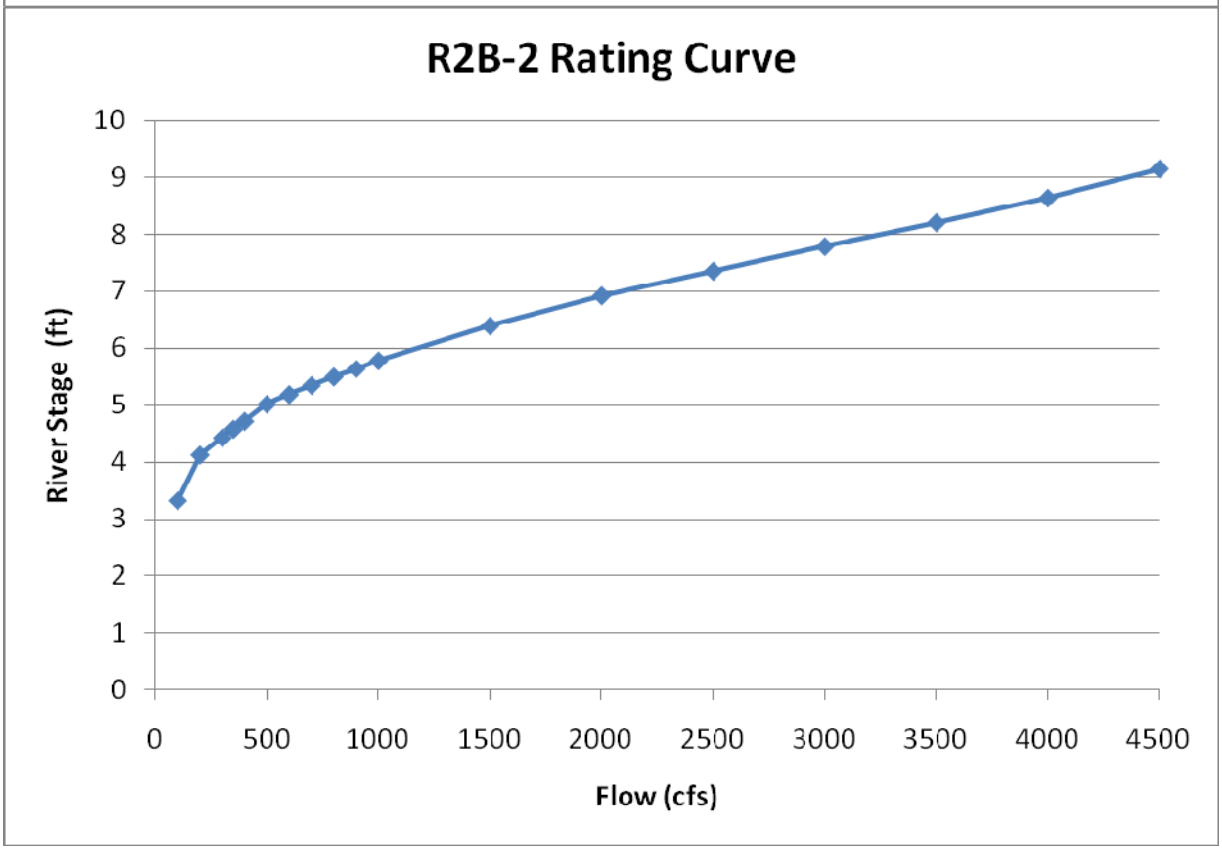

MA-4 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

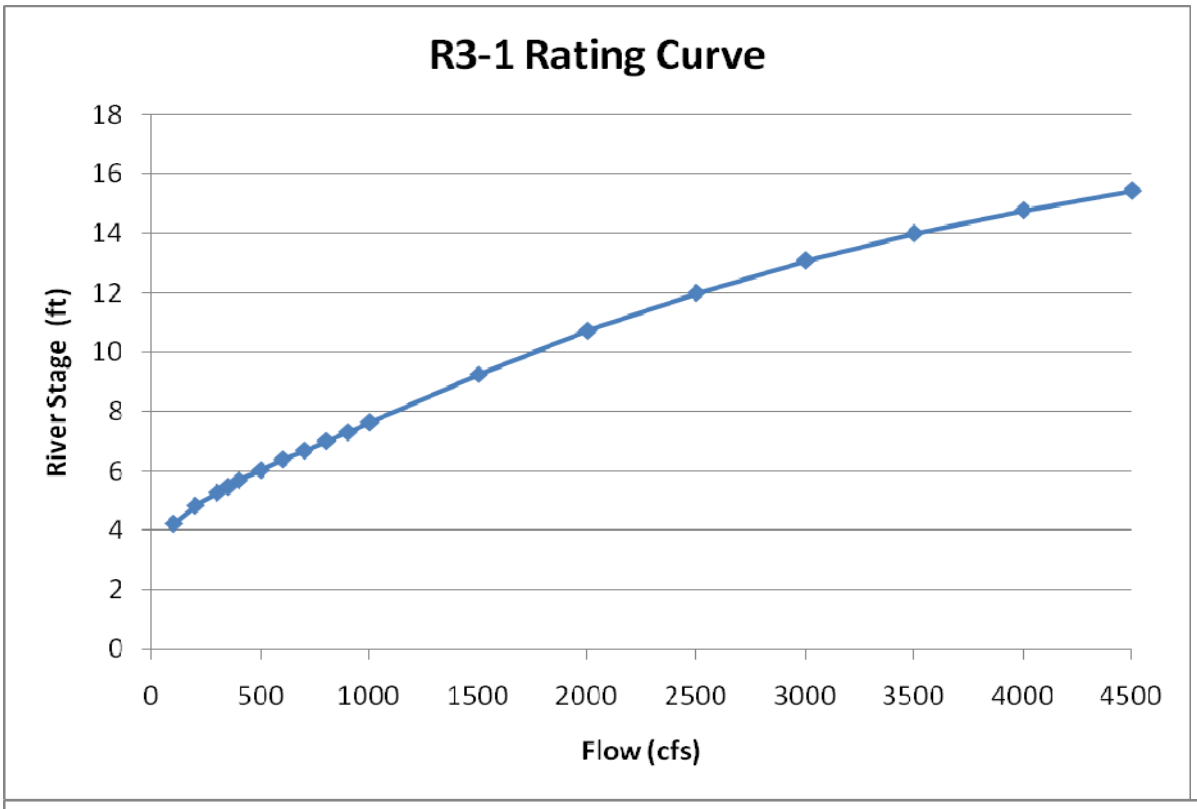

MW-49B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

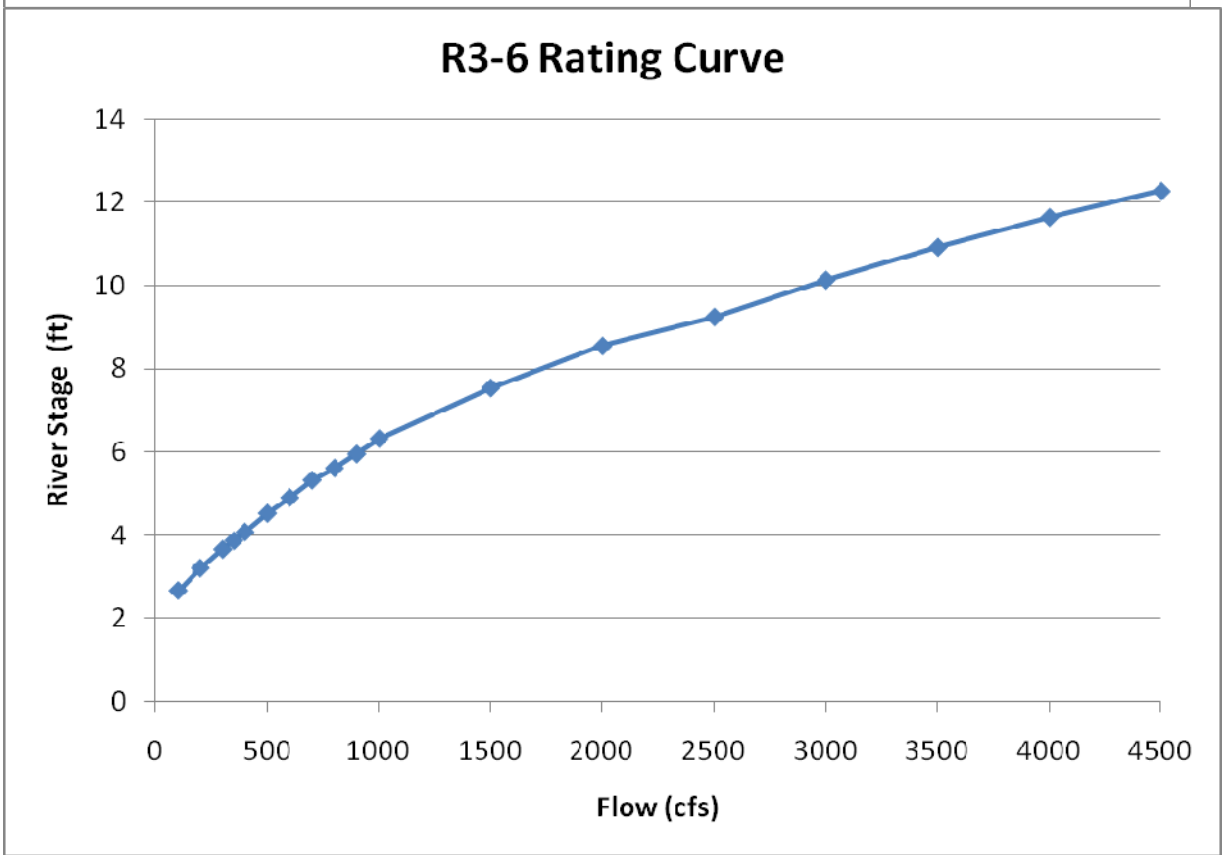

MW-54B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

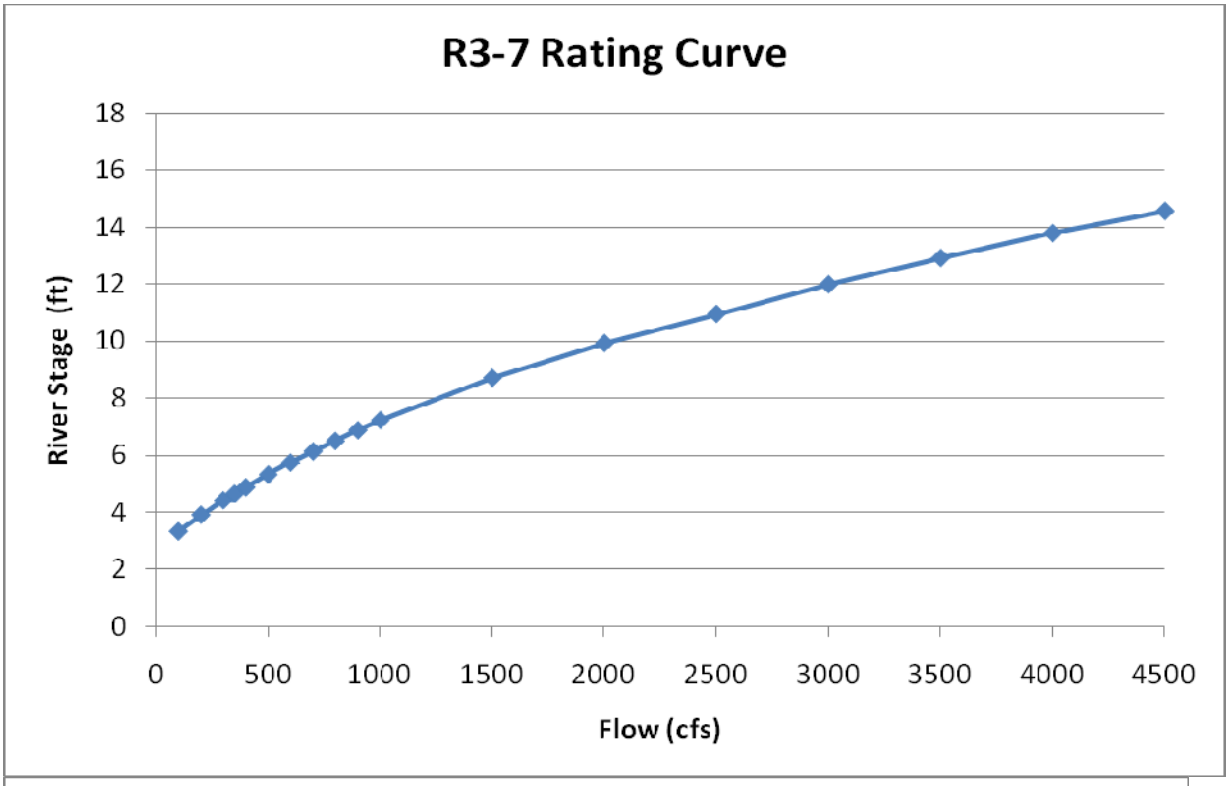

MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

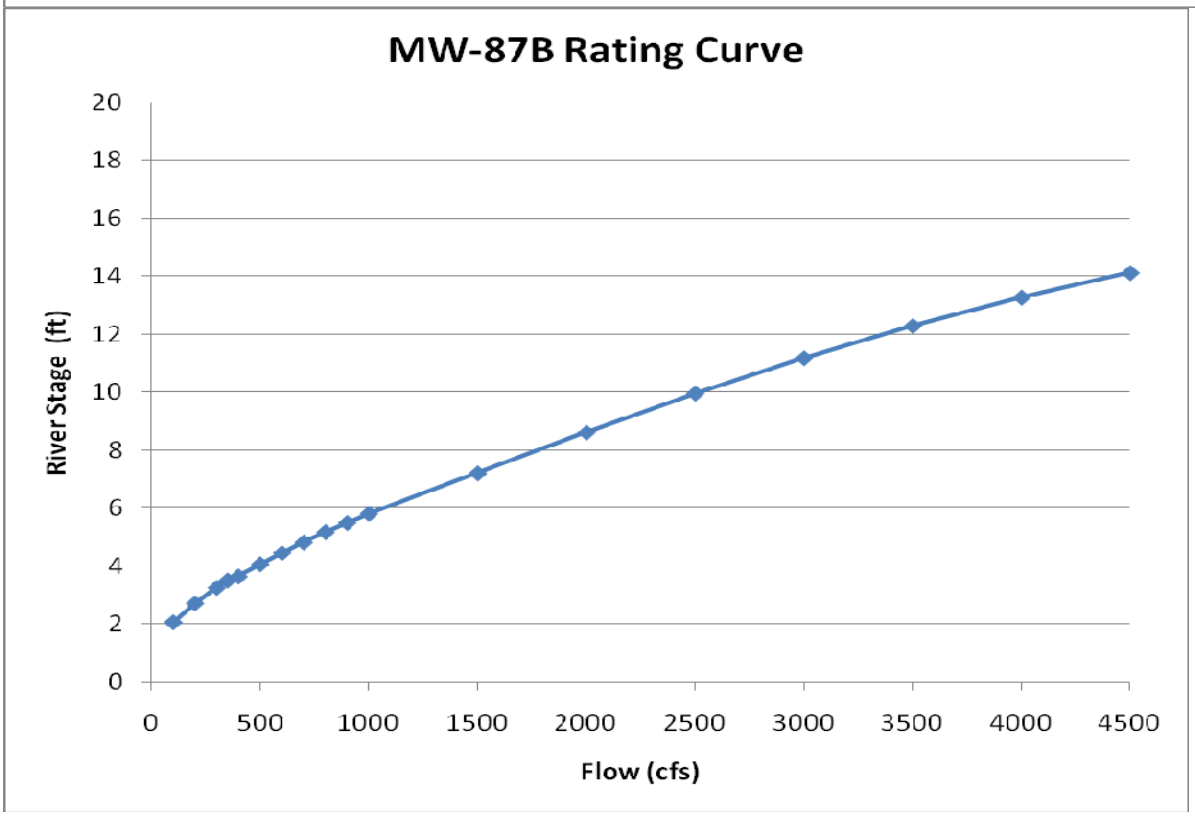

R2B-1 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

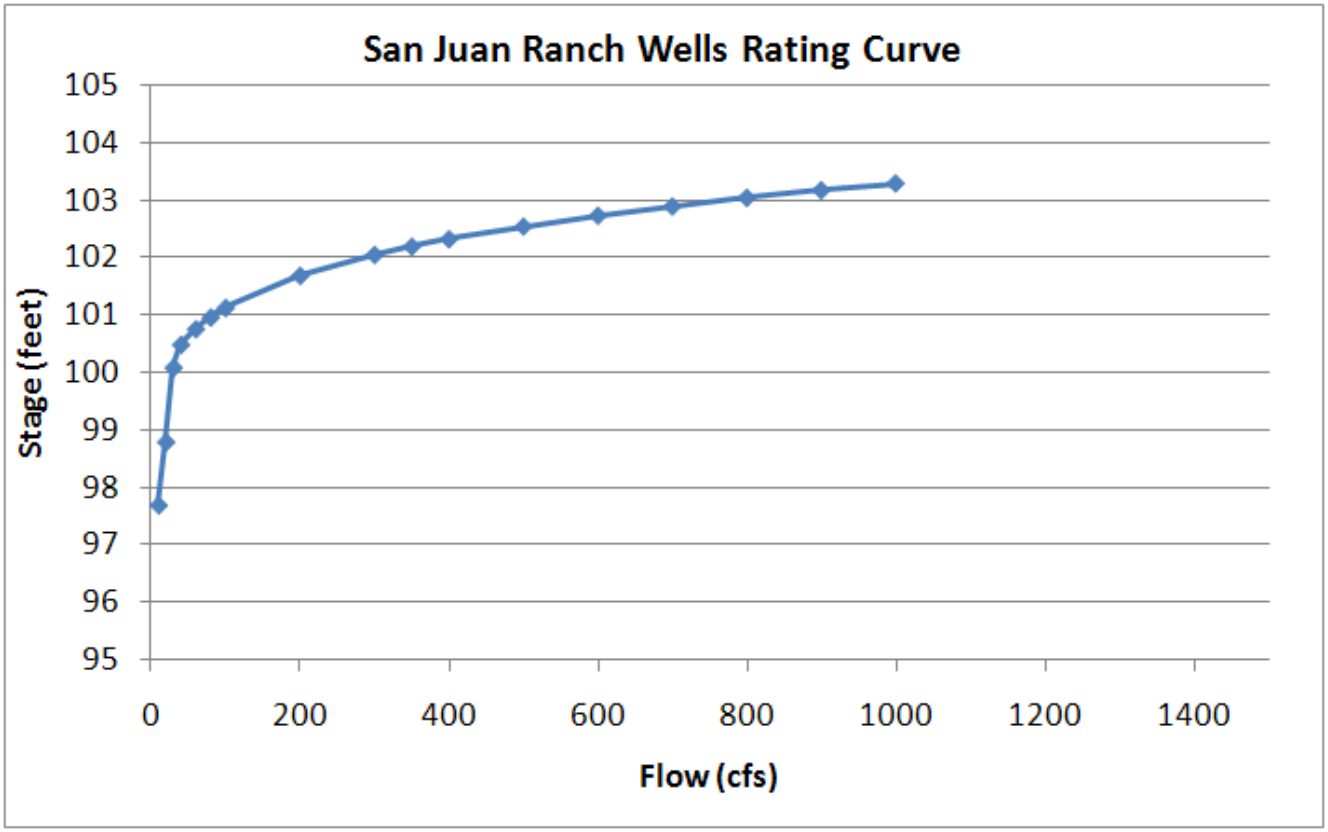

R2B-2 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-1 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-6 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-7 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-87B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500


San Juan Ranch Wells Rating Curve
Stage (feet)
105
104
103
102
101
100
99
98
97
96
95
0
200
400
600
800
1000
1200
1400
Flow (cfs)