SJRRP Flow Bench Evaluation

November 1, 2012

In the September 7, 2012 recommendation, the Restoration Administrator recommends increasing the combined Interim Flow and riparian release from Friant Dam to achieve a flow rate of 575 cfs at Gravelly Ford starting November 1, 2012. Recent loss information between Friant Dam and Gravelly Ford suggests that the 700 cfs release from Friant Dam will not achieve the 575 cfs target at Gravelly Ford. Based on recent data, an additional 50 cfs is expected to satisfy the holding contracts and channel losses and releases from Friant Dam will be increased above the RA recommendation to 750 cfs to account for these additional losses. To date, groundwater levels in monitoring wells adjacent to the Eastside Bypass continue to restrict flows below Sack Dam to 0 cfs. The combined release from Friant Dam including Interim Flow and riparian releases will be increased to 750 cfs on November 1, 2012 at noon.

As of November 1, 2012:

1. Flow rates are below known conveyance thresholds.

2. Operations calls identified a concern regarding the amount of exchangeable demand available in Mendota Pool. Operations calls will increase in frequency to monitor this situation.

3. The seepage hotline received one call in WY 2012. This does not restrict releases.

4. Real-time groundwater monitoring did not identify groundwater monitoring wells above thresholds. These wells do not restrict releases.

5. Priority well weekly groundwater measurements, Table 2, identified groundwater tables above thresholds in MW-10-95. This restricts releases below Sack Dam at this time.

6. Flows at the San Joaquin River Bifurcation Structure are fluctuating within 5 cfs. Flows at Gravelly Ford are fluctuating by 40 cfs. Seepage concerns are near the bifurcation structure and thus flows have stabilized enough at that location to evaluate an increase in flows.

7. Projected groundwater levels from the proposed increase in flow (Table 4) calculated based on groundwater levels measured the week ending October 27, show projected groundwater levels above thresholds in one well.

8. The LSJLD has not identified any concerns.

9. The SJRECWA or member agencies have not identified any concerns.

Analysis

The WY 2012 hotline call was received on July 31, 2012 regarding long-term seepage concerns on a property in Reach 2B. Reclamation installed monitoring wells and is currently evaluating the potential future seepage concerns on the property. This hotline call does not restrict releases.

Priority well MW-10-95 (Reach 4B1 Eastside Bypass) measurements show depths to groundwater at 1.6 feet above the threshold. No water from the San Joaquin River currently reaches the Eastside Bypass. The projected water surface elevation in the Eastside Bypass adjacent to this well with 10 cfs in the channel is 92.7 feet above sea level. The threshold elevation in MW-10-95 is 92.8 feet above sea level. This does not provide enough of a gradient (0.1 feet) to allow groundwater levels to drain below the threshold. This well restricts releases past Sack Dam to 0 cfs at this time.

Operations calls identified a potential lack of demand in Mendota Pool. The current demand level of around 1000 cfs allows the planned release from Friant Dam to occur with full recapture of flows in Mendota Pool. The recent demand trend is upward. Operators will re-evaluate demands on the next operations call on November 5.

Data

Table 1 shows the groundwater depth in 7 realtime wells as of October 30, 2012 and manual measurements from field staff as reported in the weekly groundwater report with a publish date of October 27, 2012. 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. 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 1: Well Data

Well	Reach	Measured Groundwater Depth in Well (feet bgs)	Ground Surface Buffer (feet)	Lateral Gradient Buffer (feet)	Field GW Depth (feet bgs)	Field Threshold (feet bgs)	Comment
FA-9	2A	9.3	-3.7	2.5	8.1	5.0	Acceptable
MW-09-47	2A	9.2	-3.5	3.3	9.1	7.0	Acceptable
MA-4	2A	12.2	-6.1	4.6	10.7	7.0	Acceptable
MW-09-49B	2A	6.6	-1.7	2.4	7.3	4.5	Acceptable
MW-09-54B	2B	16.2	-7.9	5.5	13.8	10.0	Acceptable
MW-09-55B	2B	10.7	-3.7	3.0	10.0	7.0	Acceptable
PZ-09-R2B-1	2B	-	-1.3	0.0	-	5.0	-
PZ-09-R2B-2	2B	11.8	-3.9	0.0	7.9	4.5	Acceptable
PZ-09-R3-5	3	11.4	-1.2	0.0	10.2	5.0	Acceptable
PZ-09-R3-6	3	10.2	-1.5	0.0	8.7	4.0	Acceptable
PZ-09-R3-7	3	9.1	-0.7	0.0	8.3	3.5	Acceptable
MW-10-75	3	13.1	-0.5	0.2	12.8	6.3	Acceptable
MW-11-130	4A	8.4	0.0	0.0	8.4	5.0	Acceptable
MW-09-87B	4A	-	-1.9	1.0	-	4.2	-
MW-10-89	4A	14.0	-3.4	0.0	10.5	7.6	Acceptable
MW-10-92	4A	8.6	-2.6	0.0	6.0	5.0	Acceptable

MW-10-90	4B1	7.3	0.8	0.0	8.0	7.0	Acceptable
MW-10-94	4B1	12.2	0.0	1.0	13.1	7.0	Acceptable
MW-10-95	4B1	4.6	-2.2	1.0	3.4	5.0	Above Threshold
MW-11-142	4B1	6.8	0.0	0.0	6.8	4.0	Acceptable

bgs = below ground surface; GW = groundwater

Table 2 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. Project flows assume the 750 release experiences Exhibit B losses (i.e. over-shoots the Gravelly Ford compliance target).

Table 2: Anticipated Change in Flows

	Recent Flows (cfs)	Projected Flows for Evaluation (cfs)
Reach 1	390	750
Reach 2A	225	625
Reach 2B	145	525
Reach 3	170	180
Reach 4A	0	10
Reach 4B1 (ESB)	0	10

Table 3 shows the current and maximum rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 2. Field depths are calculated by taking the most recent measurements from Table 1, 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 3: Predicted Groundwater Levels for Key Wells

Well	Reach	Measured Groundwater Depth in Well (feet bgs)	Ground Surface Buffer (feet)	Lateral Gradient Buffer (feet)	Field GW Depth (feet bgs)	Maximum Predicted WSEL Increase (feet)	Predicted Shallowest GW Depth (feet bgs)	Field Threshold (feet bgs)	Comment
FA-9	2A	9.3	-3.7	2.5	8.1	1.0	7.1	5.0	Acceptable
MW-09-47	2A	9.2	-3.5	3.3	9.1	1.0	8.0	7.0	Acceptable
MA-4	2A	12.2	-6.1	4.6	10.7	1.4	9.3	7.0	Acceptable
MW-09-49B	2A	6.6	-1.7	2.4	7.3	1.4	5.9	4.5	Acceptable
MW-09-54B	2B	16.2	-7.9	5.5	13.8	1.6	12.2	10.0	Acceptable
MW-09-55B	2B	10.7	-3.7	3.0	10.0	1.6	8.4	7.0	Acceptable
PZ-09-R2B-1	2B	-	-1.3	0.0	-	0.2	-	5.0	-
PZ-09-R2B-2	2B	11.8	-3.9	0.0	7.9	0.0	-	4.5	Acceptable
PZ-09-R3-5	3	11.4	-1.2	0.0	10.2	0.1	10.2	5.0	Acceptable
PZ-09-R3-6	3	10.2	-1.5	0.0	8.7	0.1	8.7	4.0	Acceptable
PZ-09-R3-7	3	9.1	-0.7	0.0	8.3	0.1	8.3	3.5	Acceptable
MW-10-75	3	13.1	-0.5	0.2	12.8	0.1	12.7	6.3	Acceptable
MW-11-130	4A	8.4	0.0	0.0	8.4	0.1	8.3	5.0	Acceptable
MW-09-87B	4A	-	-1.9	1.0	-	0.2	-	4.2	-
MW-10-89	4A	14.0	-3.4	0.0	10.5	0.9	9.6	7.6	Acceptable
MW-10-92	4A	8.6	-2.6	0.0	6.0	0.3	5.7	5.0	Acceptable
MW-10-90	4B1	7.3	0.8	0.0	8.0	0.2	7.9	7.0	Acceptable
MW-10-94	4B1	12.2	0.0	1.0	13.1	0.3	12.8	7.0	Acceptable
MW-10-95	4B1	4.6	-2.2	1.0	3.4	0.3	3.1	5.0	Above Threshold
MW-11-142	4B1	6.8	0.0	0.0	6.8	0.0	6.8	4.0	Acceptable

Bgs = below ground surface; GW = groundwater; WSEL = water surface elevation

Table 4 shows the predicted maximum rise in groundwater based the elevation of the water surface in the river and the conceptual model shown in Figure 2. Reclamation uses this drainage method where current groundwater levels are higher than thresholds without flows in the San Joaquin River. A predicted elevation in the model above (or within 0.3 feet) of the threshold elevation does not allow drainage and therefore restricts flows.

Table 4: Predicted Groundwater Elevation for Key Wells

Well	Reach	Existing GW Field Elevation (feet)	Predicted WSEL in Model (feet)	Threshold Elevation (feet)	Drainage Method Comment
MW-10-90	4B1	94.0	94.2	95.1	Acceptable
MW-10-94	4B1	88.5	92.7	95.6	Acceptable
MW-10-95	4B1	93.4	92.7	92.8	Above Threshold
MW-11-142	4B1	89.2	0.0	92.0	Acceptable

Bgs = below ground surface; GW = groundwater; WSEL = water surface elevation

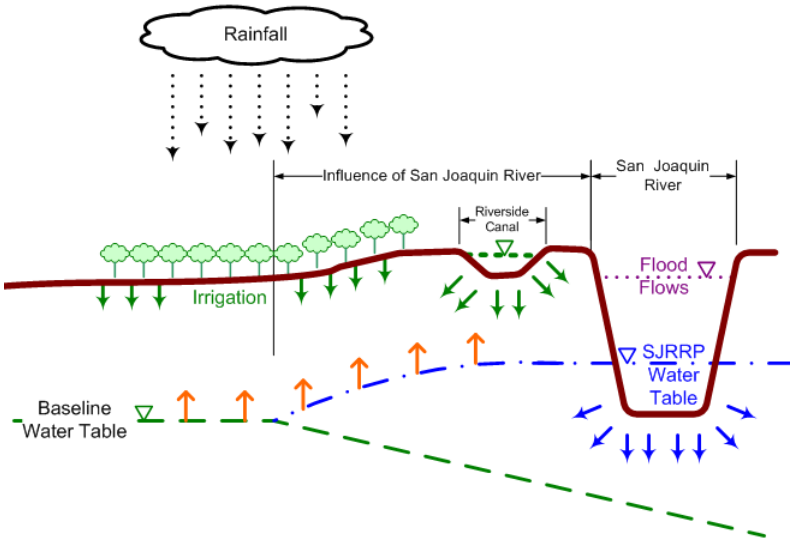
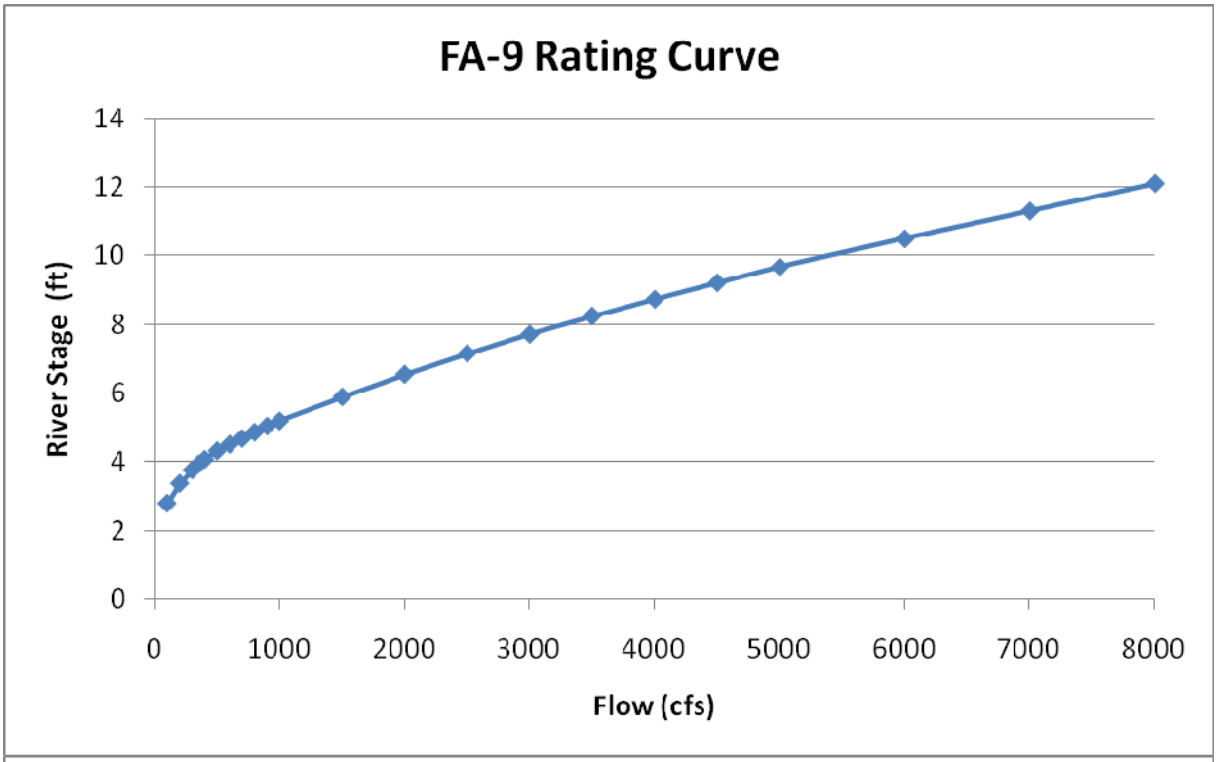
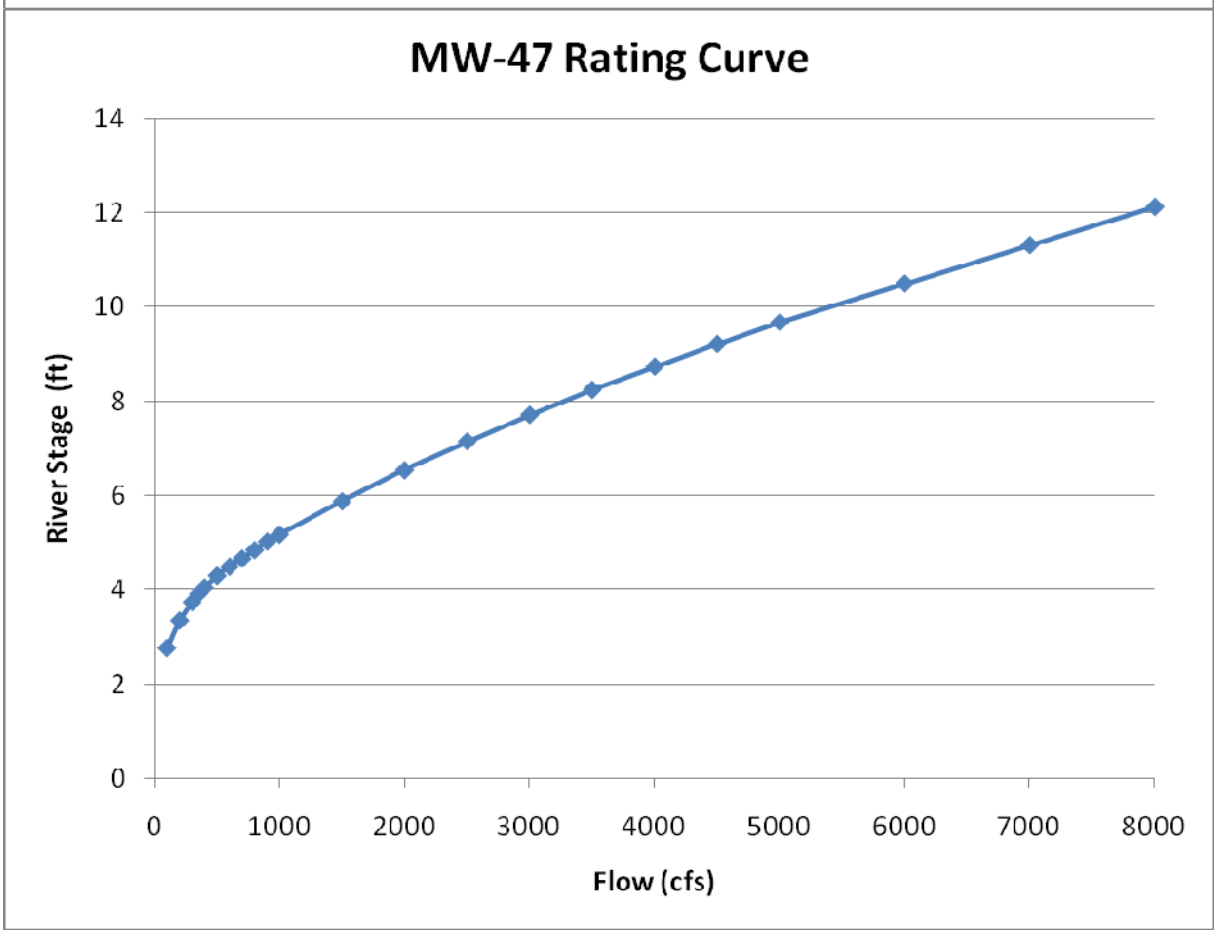
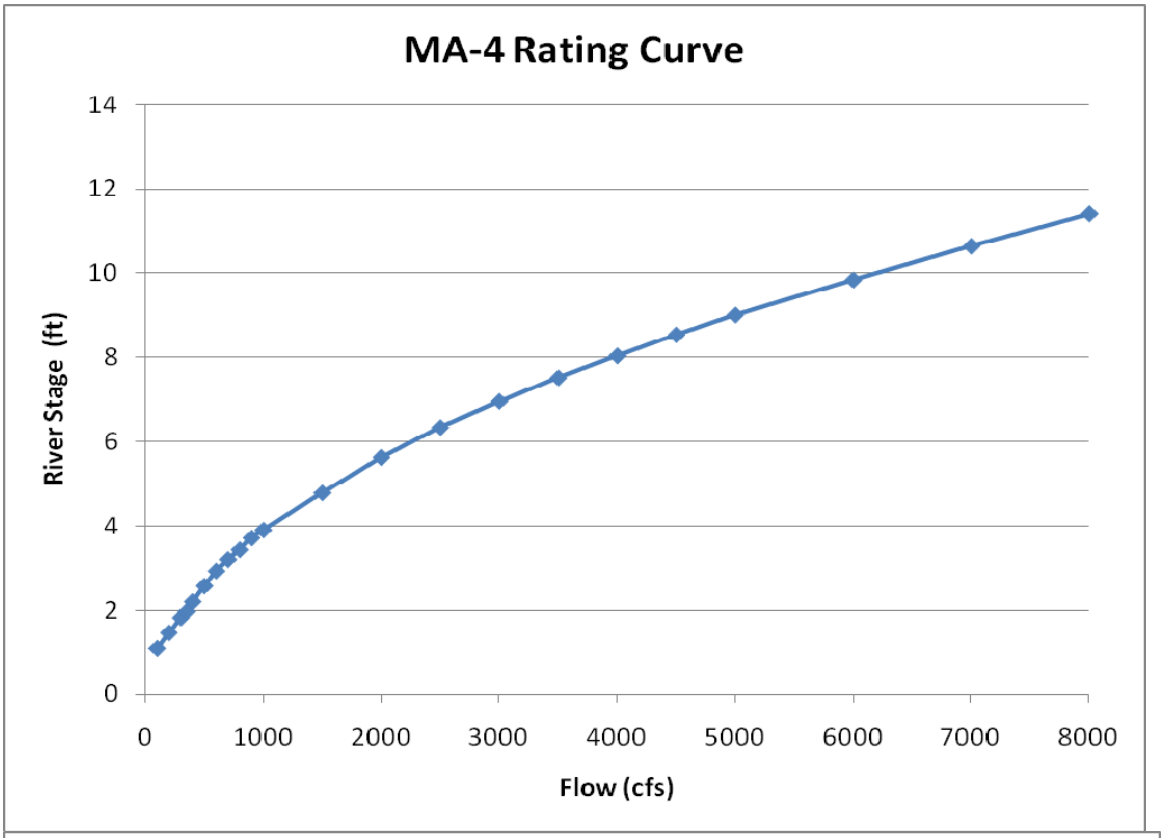
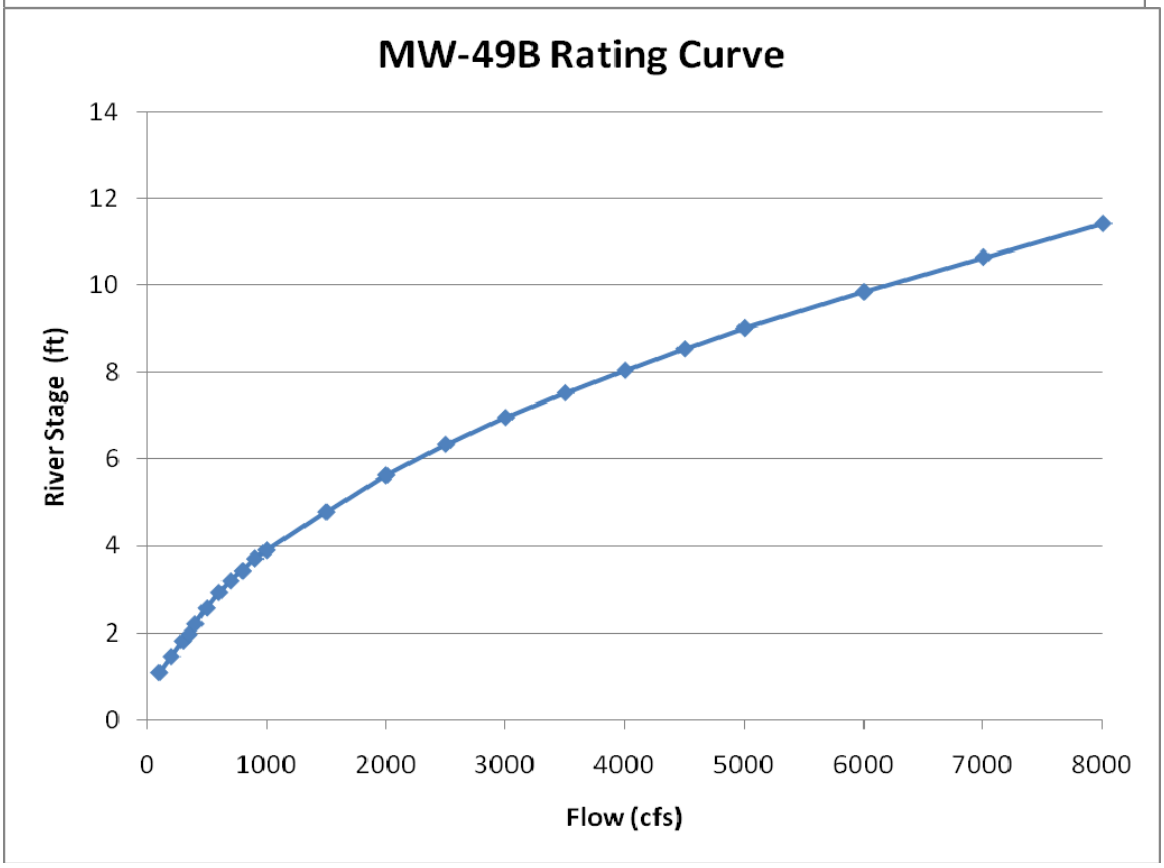


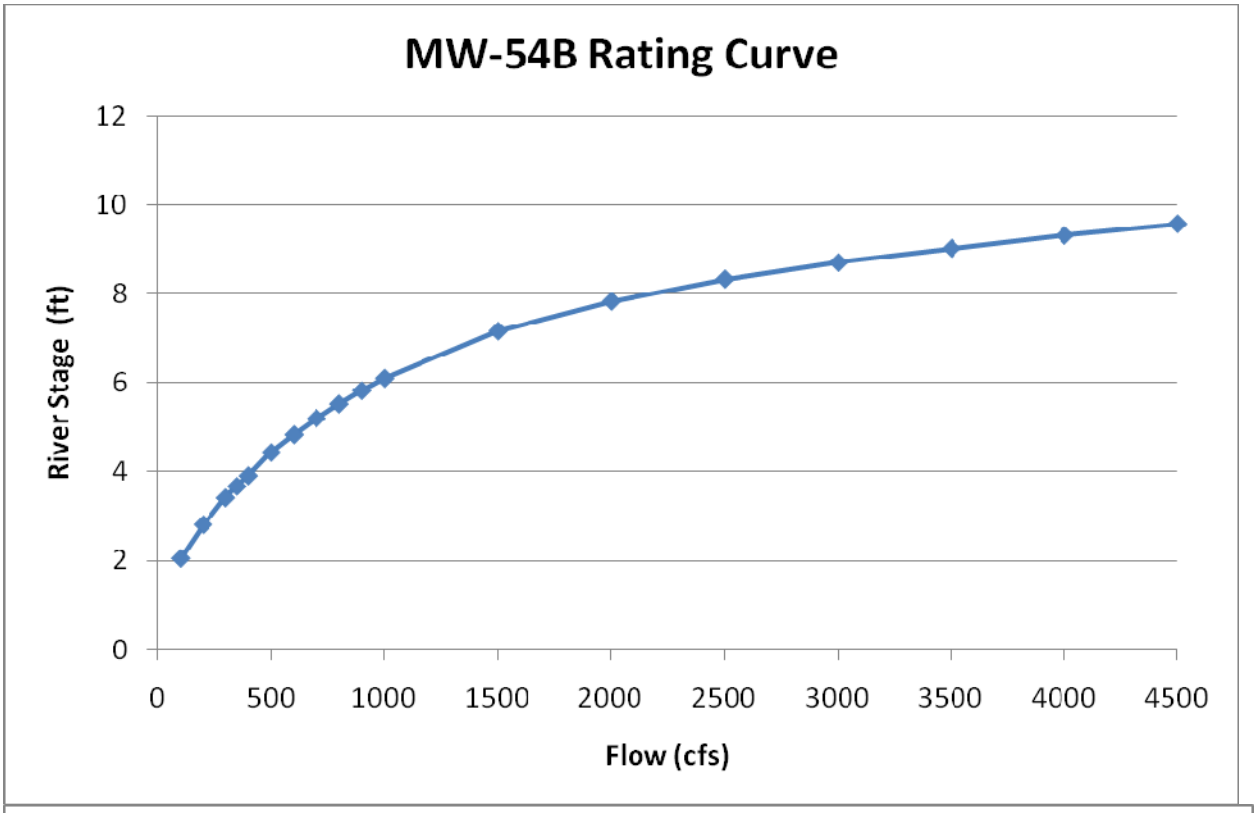
Figure 1: Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

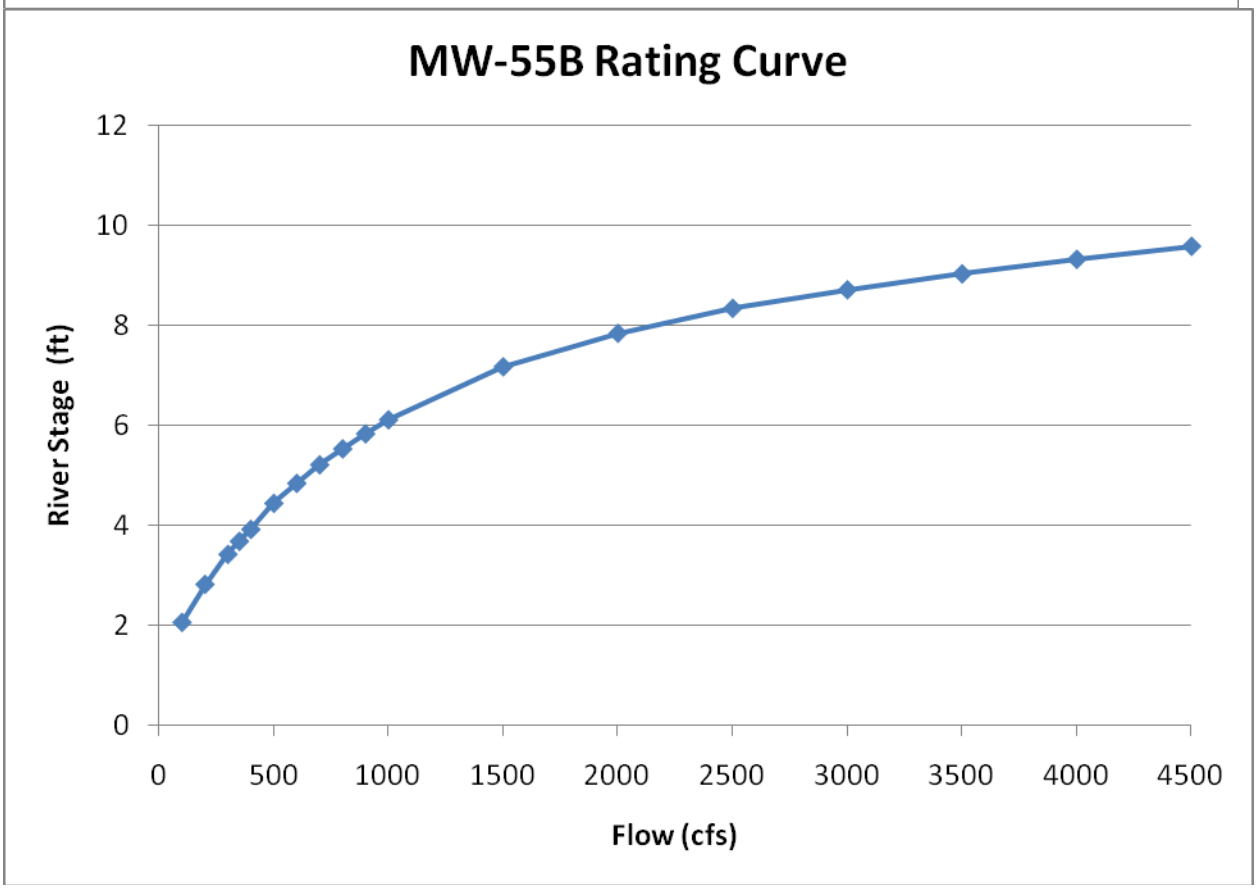

FA-9 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

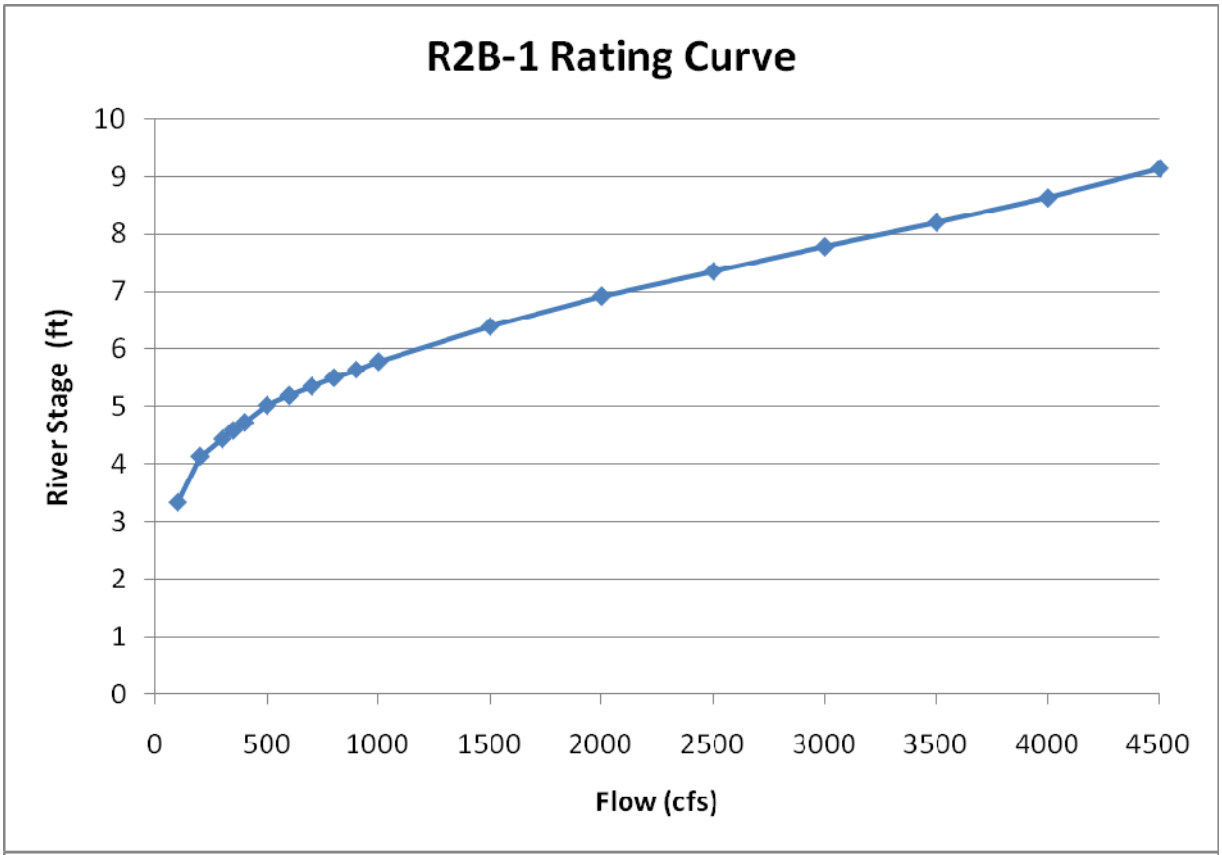

MW-47 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

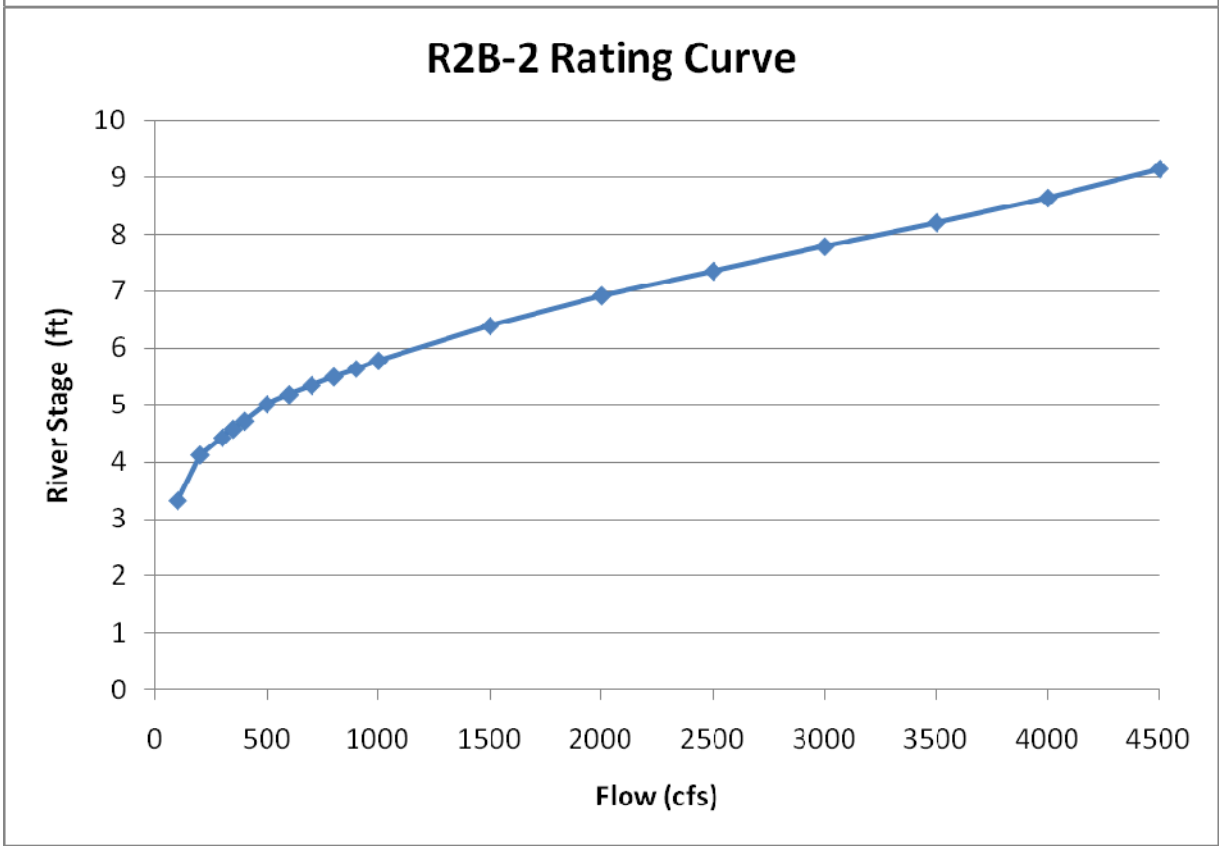

MA-4 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

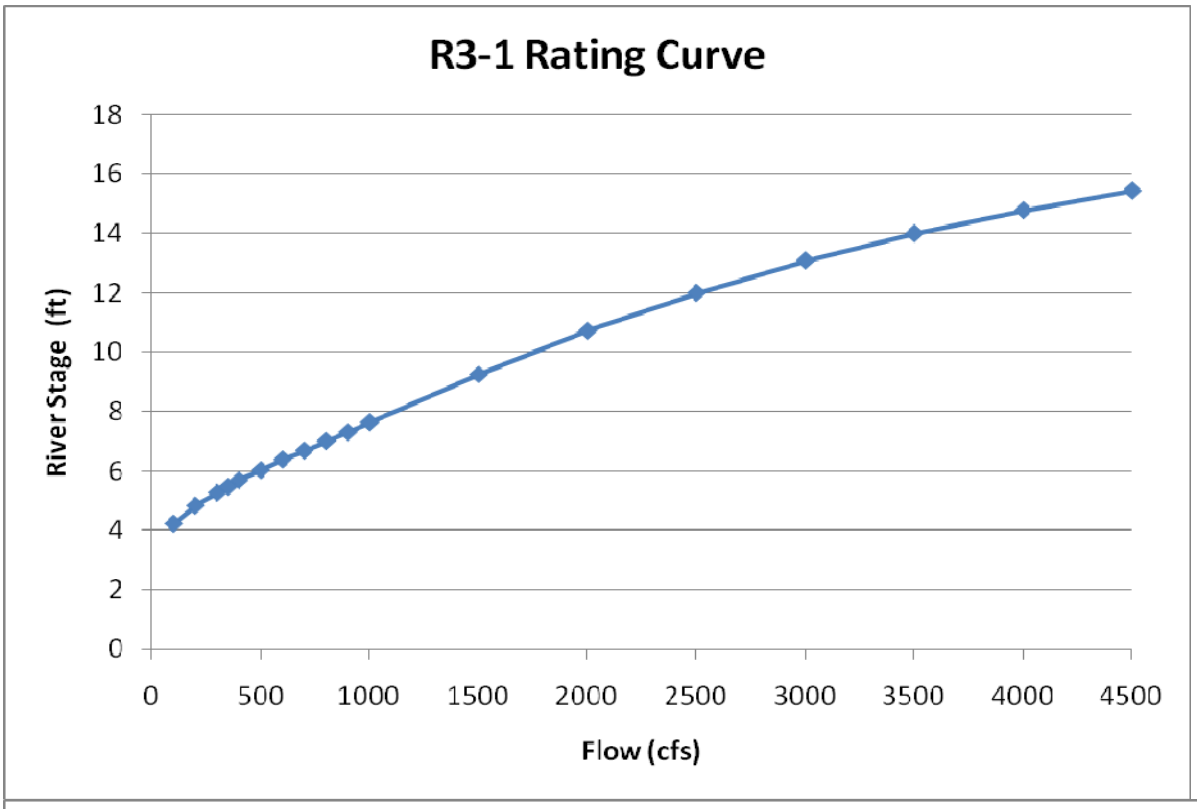

MW-49B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

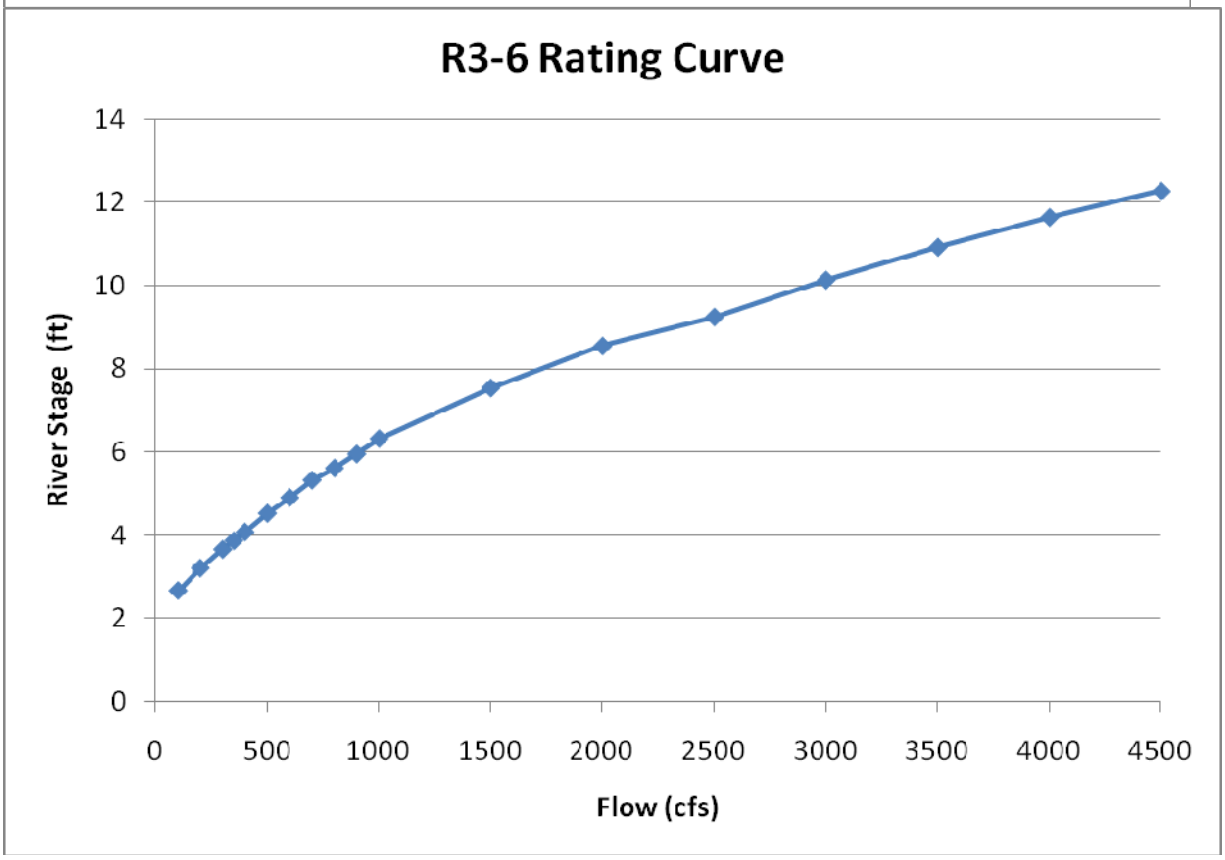

MW-54B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

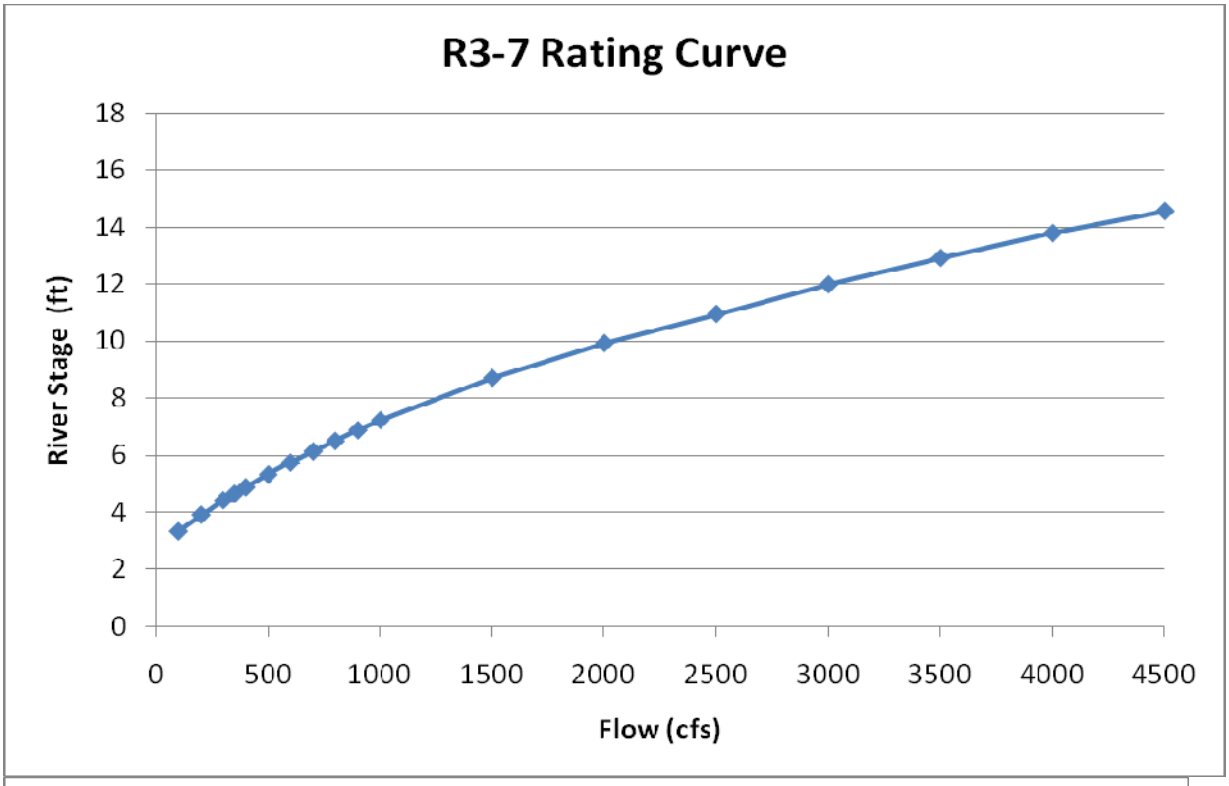

MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

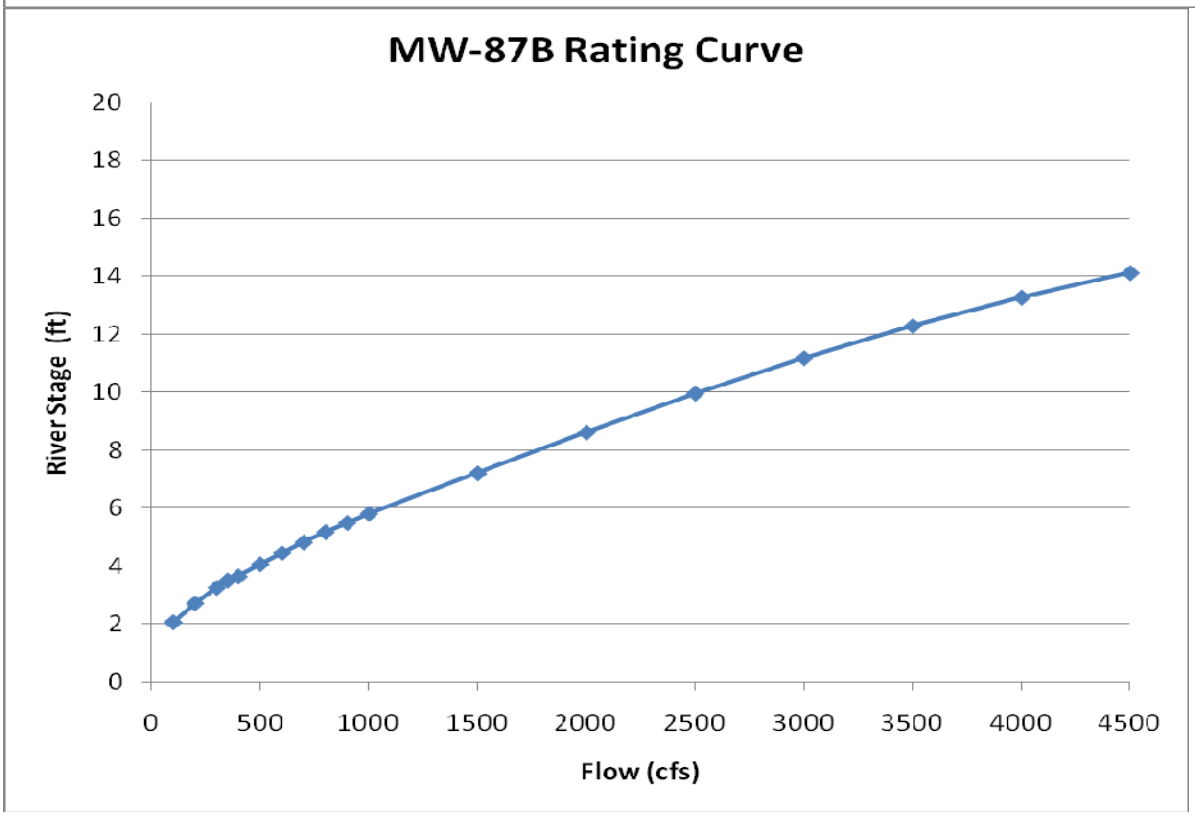

R2B-1 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

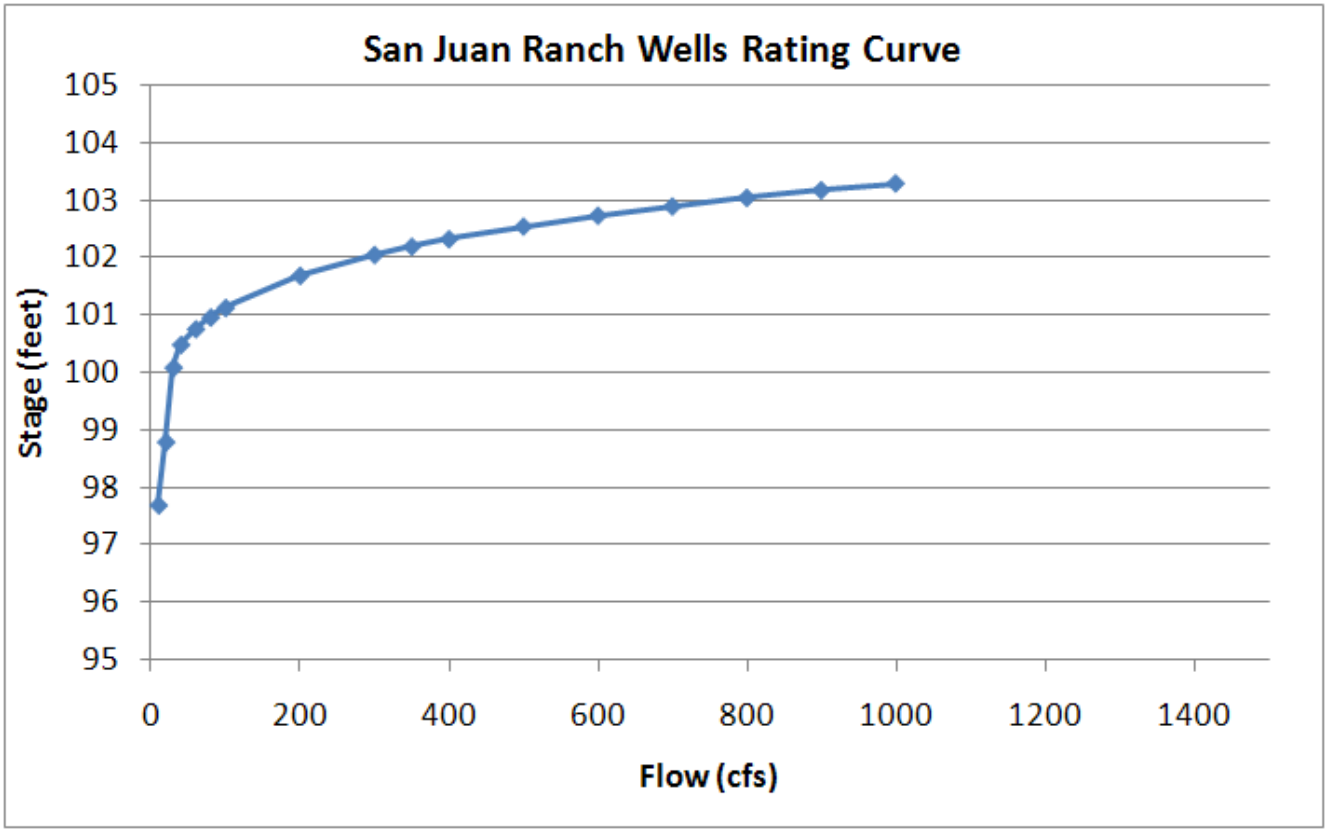

R2B-2 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


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)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


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


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)