SJRRP Flow Bench Evaluation

November 15, 2010

Flows below Friant Dam are scheduled to increase to 700 cfs starting on November 15, 2010 as recommended by the Restoration Administrator.

Based on evaluations presented in this document, flows past Sack Dam will be increased in 30 cfs increments, and will remain constant for a minimum of 3 days to evaluate surface water stage and groundwater response. The SJRRP will operate to a river stage elevation target of 99.7 feet at Washington Avenue gage based on the recommendation by adjacent landowners which corresponds to water table depth of 7.5 feet below ground surface. Reclamation is still evaluating this condition recommended by adjacent landowners, and will be operating under this condition as an interim measure.

Sand removal operations downstream of Washington Avenue in October 2010 positively affected the flow rating curve at Washington Avenue gage. Reclamation's current estimates at this location are based on the old rating curve as a conservative approach.

As of November 2, 2010:

1. Flow rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).

2. Mendota Pool operations' calls did not identify any issues.

3. No hotline calls have been received to date in response to Fall 2010 flows.

4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds.

5. Measurements in key groundwater wells do not show groundwater depths above identified thresholds except for CCID Well 186A.

6. Measured losses in Reach 2A from operations estimates are stable within 20 cfs. Flows below Sack Dam were re-released on October 20, 2010 and downstream flows are stable.

7. Projected groundwater levels from the upcoming increase in flow are below thresholds except for wells MW-49B, R2B-1, MW-92, MW-93, Nickel Family Farms Well SJR W-11, and CCID Well 186A. At the request of stakeholders including CCID and the adjacent landowner, thresholds in Reach 4A near Sand Slough Control Structure will operate to an elevation on the Washington Avenue staff gage of 99.7 feet.

8. The LSJLD has not identified any issues to date.

9. The CCID has identified possible groundwater seepage issues and has provided a river stage target of 99.7 feet at Washington Avenue that corresponds to water table depth of 7.5 ft below ground surface at MW 93.

10. The SLCC has not identified any issues to date.

Monitoring Well 49B is in Reach 2A on the river side of the levee. With the change in river stage at this location, the maximum predicted rise of the water table due to Interim Flows is expected up to a depth of 5.40 feet. Measurements taken during Spring 2010 indicated a groundwater level of 5.10 feet after several weeks of similar river flows. Both the maximum predicted groundwater level due to SJR stage increase and measured groundwater values are within the buffer zone of 4-6 feet. Due to the slope of the water table away from the river, and the short root depth of alfalfa, it is unlikely seepage impacts will occur in the adjacent alfalfa field. The groundwater level is not expected to exceed the top of the buffer zone; planned releases can occur.

The groundwater level in R2B-1 is currently within the buffer zone, and the maximum predicted groundwater level due to Interim Flows at this location is 5.79 feet below the ground surface. The Fall 2009 pulse increased the groundwater level in this well to 5.70 feet. Both the maximum predicted groundwater level due to Interim Flows and previously measured groundwater values are within the buffer zone of 4-6 feet. Planned releases can occur.

The groundwater level in MW-92 is currently above the buffer zone. The maximum predicted groundwater level due to Interim Flows in MW-92 is 0.23 feet above the threshold (7.5 feet) suggested by adjacent landowners. In coordination with the landowners, Reclamation will operate to the Washington Avenue staff gage. Planned releases from Sack Dam will occur in 30 cfs increments to evaluate surface water stage and groundwater response.

The maximum predicted groundwater level due to Interim Flows in MW-93 is to 7.39 feet below the ground surface. This is 0.11 feet above the threshold value of 7.5 feet suggested by adjacent landowners. In coordination with the landowners, Reclamation will operate to the Washington Avenue staff gage. Planned releases from Sack Dam will occur in 30 cfs increments to evaluate surface water stage and groundwater response.

The groundwater level in CCID Monitoring Well 186A is currently above the buffer zone. Groundwater levels do not appear to be primarily influenced by river stage at high groundwater levels. In coordination with the landowners, Reclamation will release flows from Sack Dam in 30 cfs increments to evaluate surface water stage and groundwater response.

The groundwater level in Nickel Family Farms Well SJR W-11 is currently below the threshold. The maximum predicted groundwater level due to Interim Flows in Nickel Family Farms Well SJR W-11 is above the threshold suggested by adjacent landowners. In coordination with the landowners, Reclamation will release flows from Sack Dam in 30 cfs increments to evaluate surface water stage and groundwater response.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://www.restoresjr.net/flows/Groundwater/Groundwater.html.

Table 1 shows the anticipated changes in flow targets used to evaluate future groundwater depths based on Exhibit B loss assumptions for Reaches 2A through 3 and an estimated 300 cfs delivery to Arroyo Canal. In Reach 4, a flow of 80 cfs was assumed.

Table 1 Anticipated Change in Flows

	Current Target (cfs)	Average Recent Flow (cfs)	Future Target (cfs)
Reach 2A	**195**	**190**	**575**
Reach 2B	**115**	**100**	**475**
Reach 3	**415**	**250**	**380**
Reach 4A	**115**	**50**	**80**

Table 2 shows the current and maximum rise in groundwater based on estimated changes in river stage and the conceptual model shown in

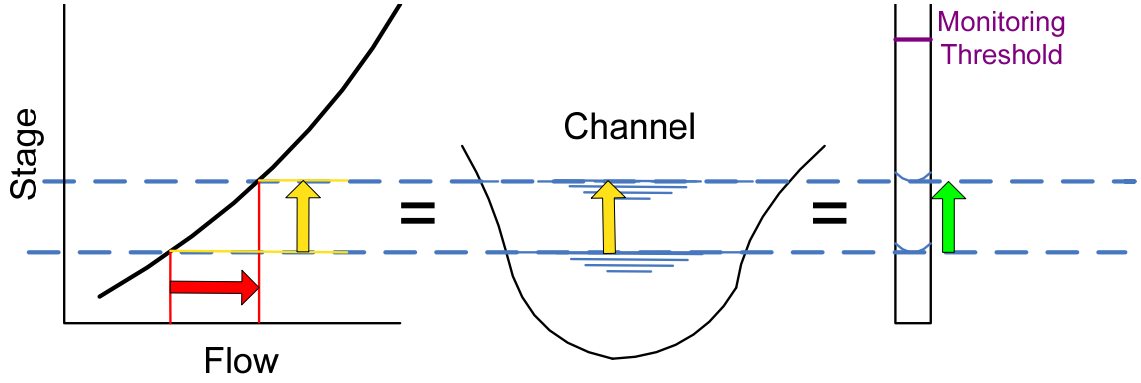


Figure 1. Subsequent pages show the rating curves for each of the key wells from the Mussetter Engineering, Inc., 2008 San Joaquin HEC-RAS Model Documentation Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2. Maximum groundwater rise in wells on San Juan Ranch in the end of Reach 4A were based on the Washington Avenue gage assuming a direct relationship between river stage and groundwater elevation.

Table 2 Maximum Increases in Groundwater Levels for Key + San Juan Ranch Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of October 30th (ft bgs)	Maximum Predicted Stage Increase (ft)	Predicted Shallowest Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	9.67	1.12	8.55
MW-47	Reach 2A – Transect 12 – Right	6-8	20-40	9.56	1.12	8.44
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11.55	1.4	10.15
MW-49B	Reach 2A – Transect 13 – Left	**4-6**	**10-20**	**6.80**	**1.4**	**5.40**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	17.32	1.27	16.59
MW-55B	Reach 2B – San Mateo Ave. – Left	6-8	10-15	10.31	1.27	9.04
R2B-1	Reach 2B – Right	**4-6**	**8-11**	**5.94**	**0.15**	**5.79**
R2B-2	Reach 2B – Right	4-6	17-20	12.12	0.02	12.10
R3-6	Reach 3 – Right	4-6	17-20	9.83	1.26	8.57
R3-7	Reach 3 – Right	3-5	17-20	8.51	1.38	7.13
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	25.35	0.62	24.73
MW-87B	Reach 4A – Highway 152 - Left	4-6	TBD	>14 (dry)	0.62	13.38 to dry
MW-91	Reach 4A – San Juan Ranch - Left	7.5 – 9.5	10-25	7.83	0.3	7.53
MW-92	Reach 4A – San Juan Ranch - Left	**7.5 – 9.5**	**10-25**	**7.48**	**0.3**	**7.18**
MW-93	Reach 4A – San Juan Ranch - Left	**7.5 – 9.5**	**10-25**	**7.69**	**0.3**	**7.39**
CCID 191	Reach 4A – San Juan Ranch - Left	7.5 – 9.5	TBD	9.47	0.3	9.17
CCID 186A	Reach 4A – San Juan Ranch - Left	**7.5 – 9.5**	**TBD**	**5.93**	**0.3**	**5.63**
SJR W-11	Reach 4A – San Juan Ranch - Left	**7.5 – 9.5**	**TBD**	**7.55**	**0.3**	**7.25**

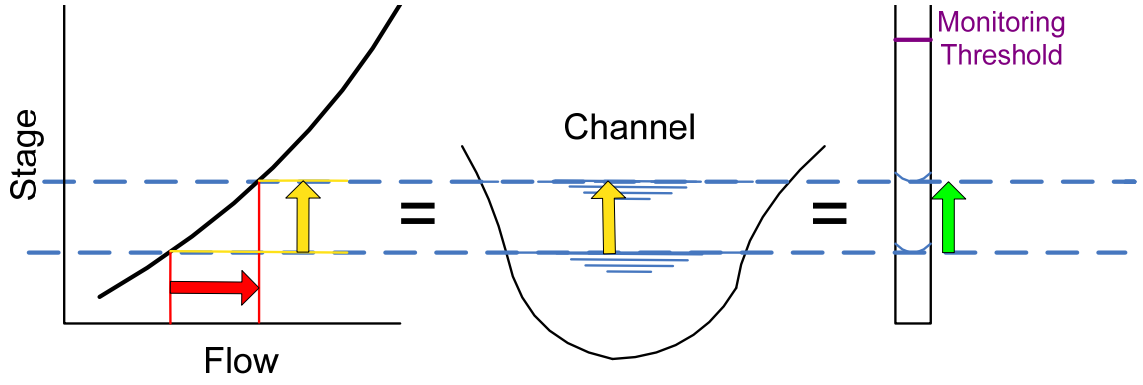
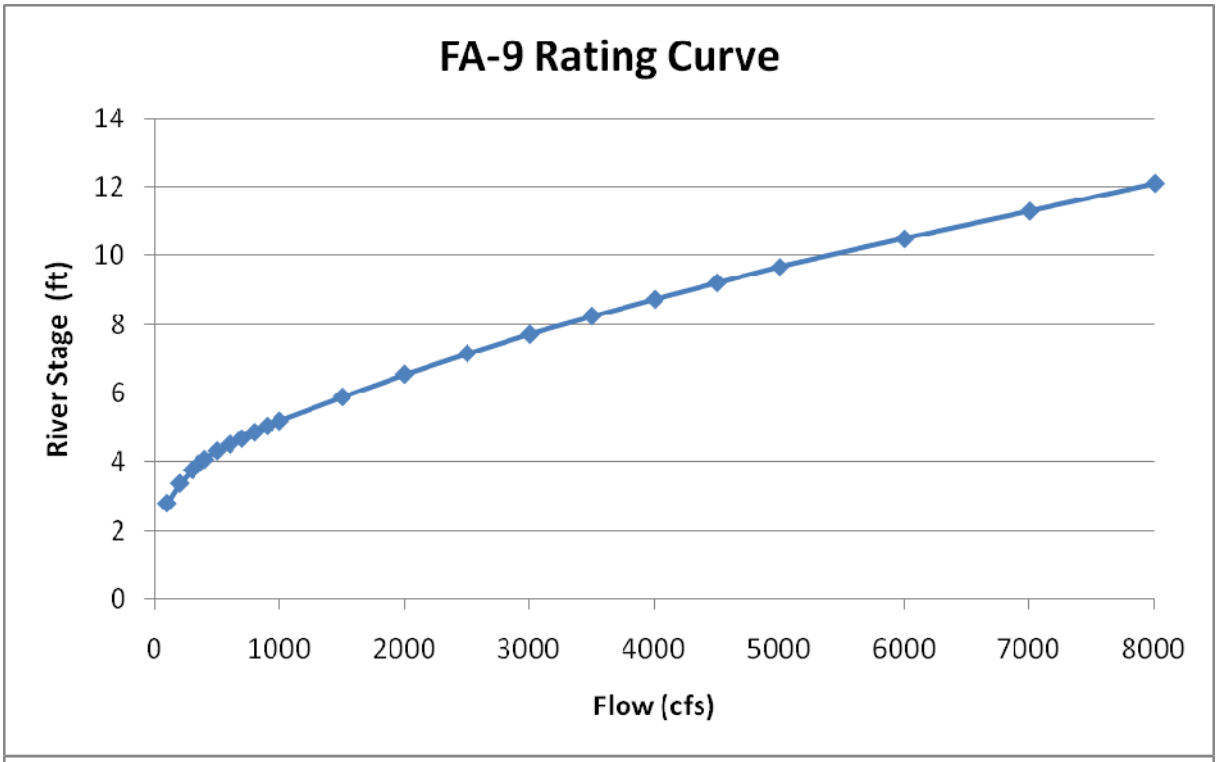
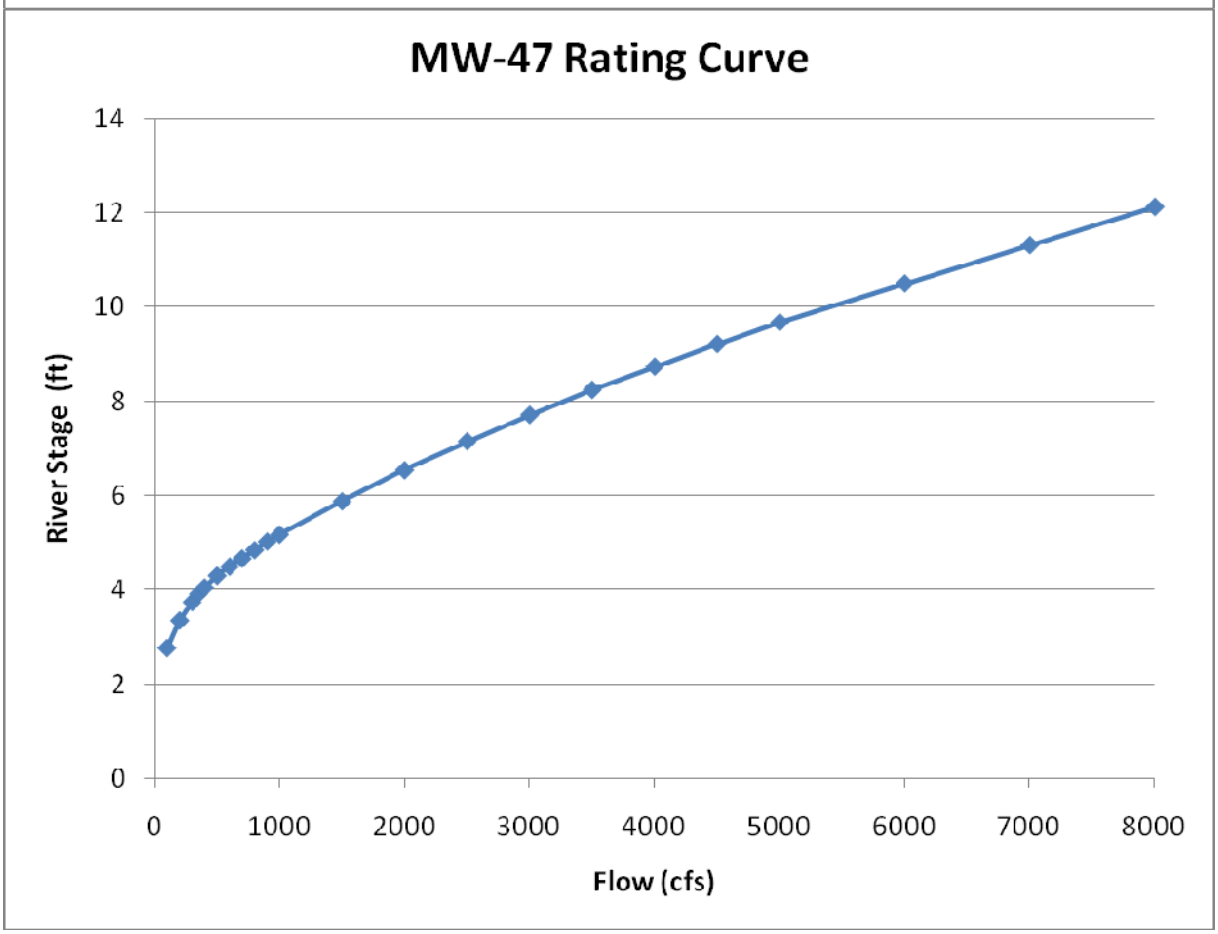
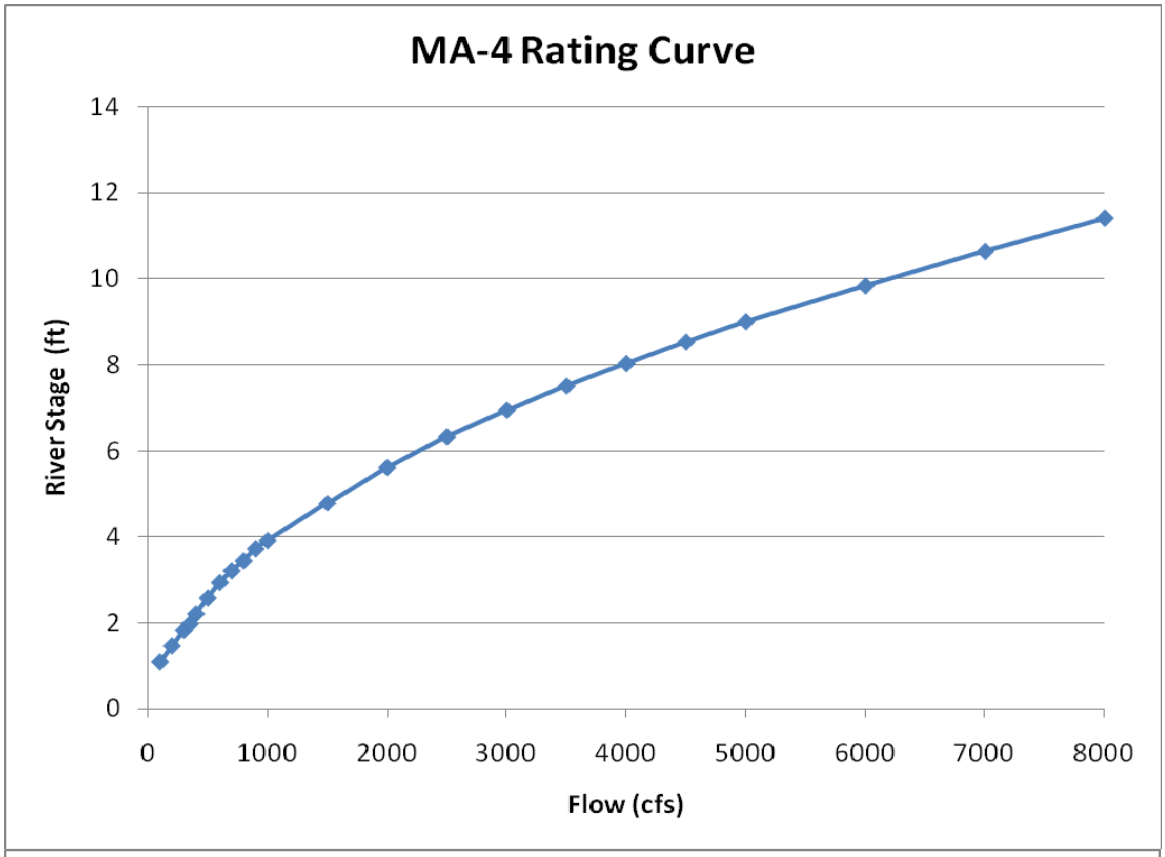
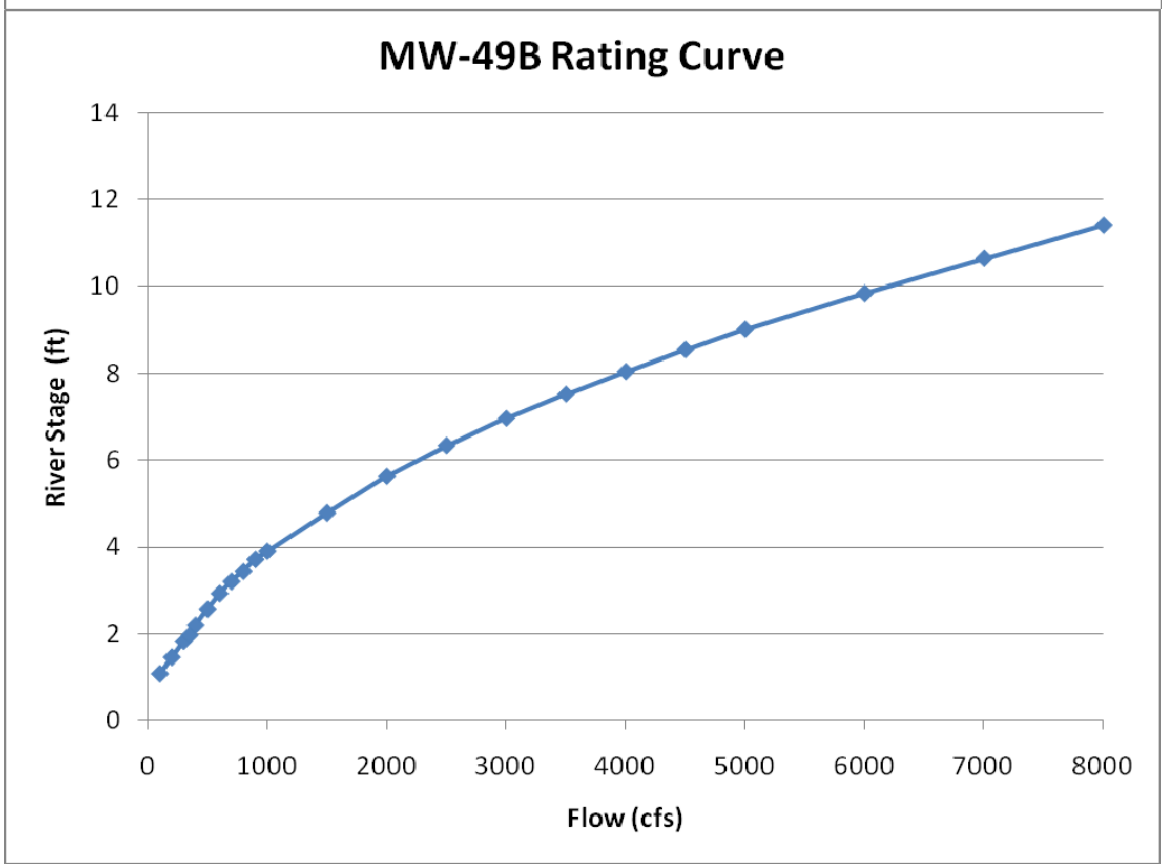


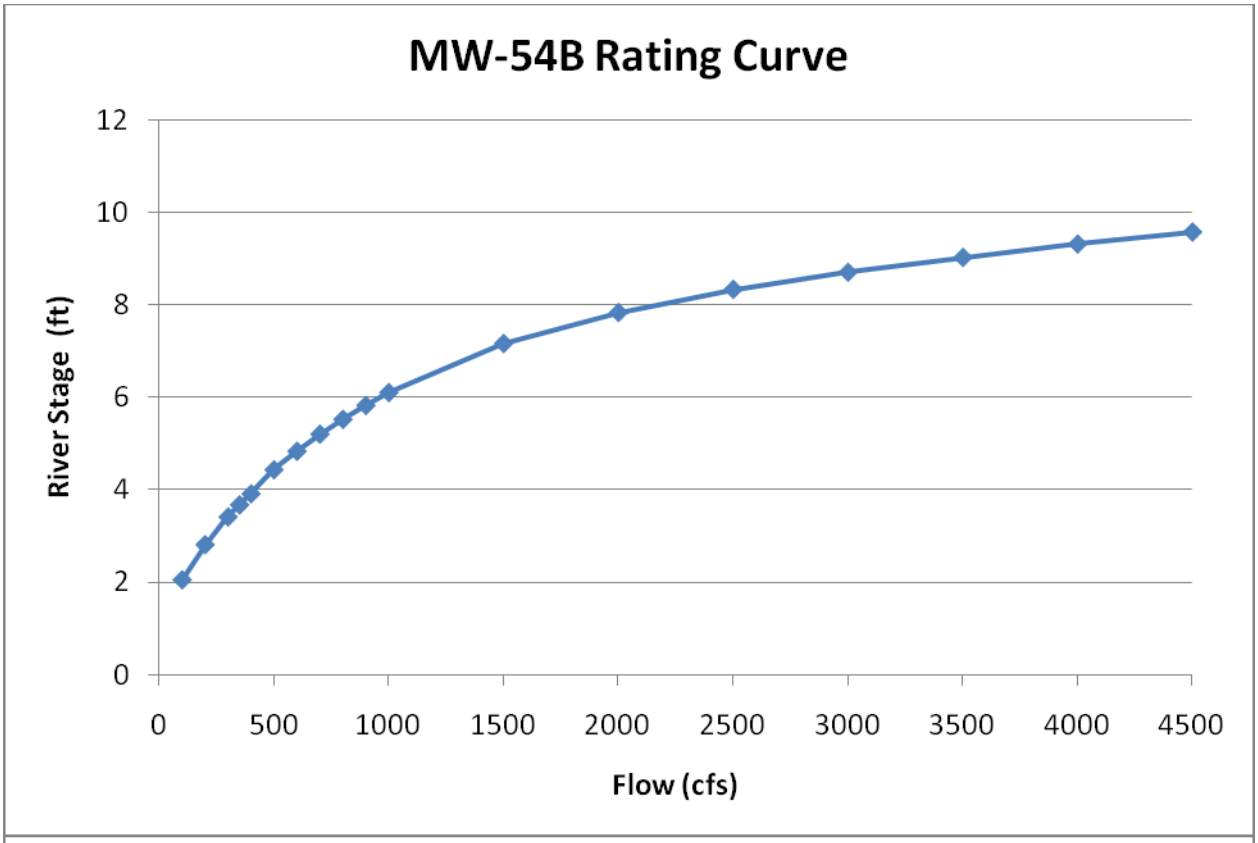
Figure 1 Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

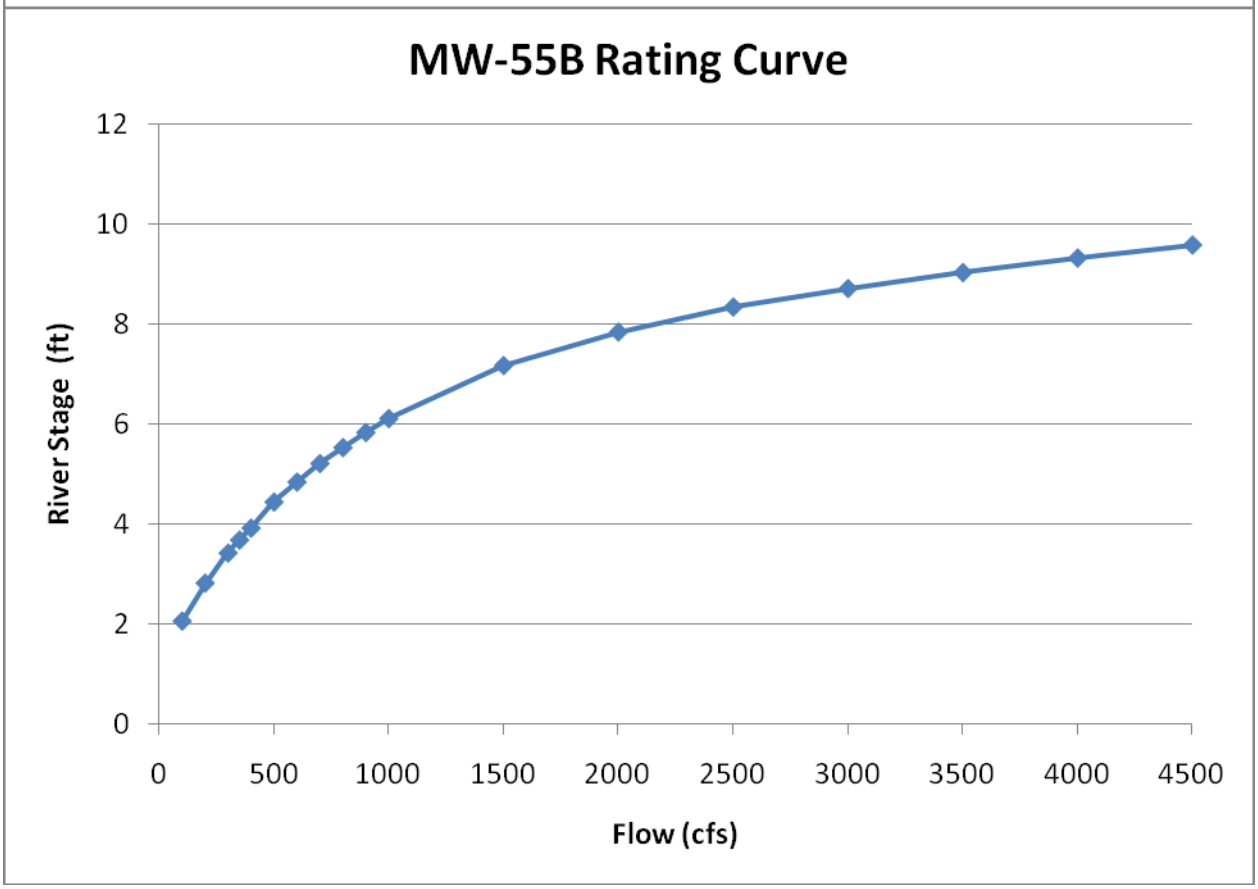

FA-9 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

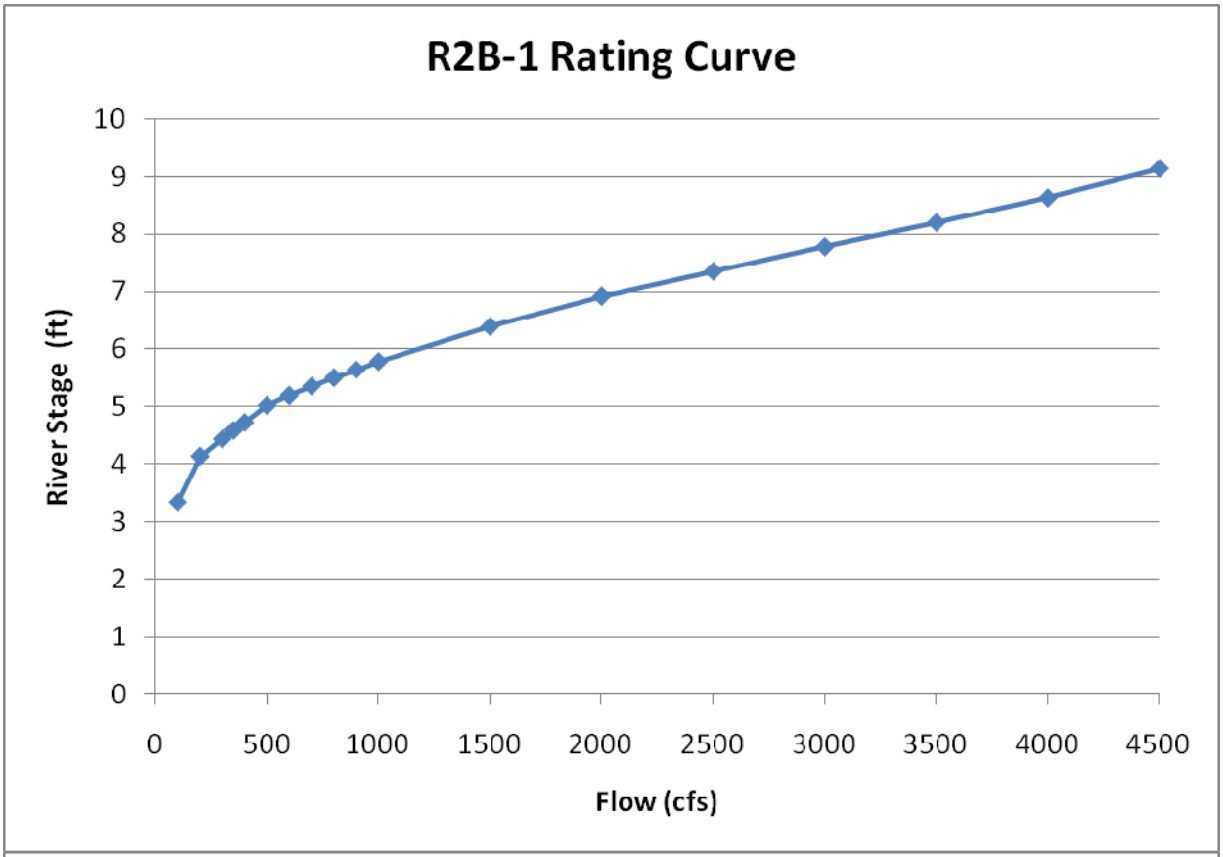

MW-47 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

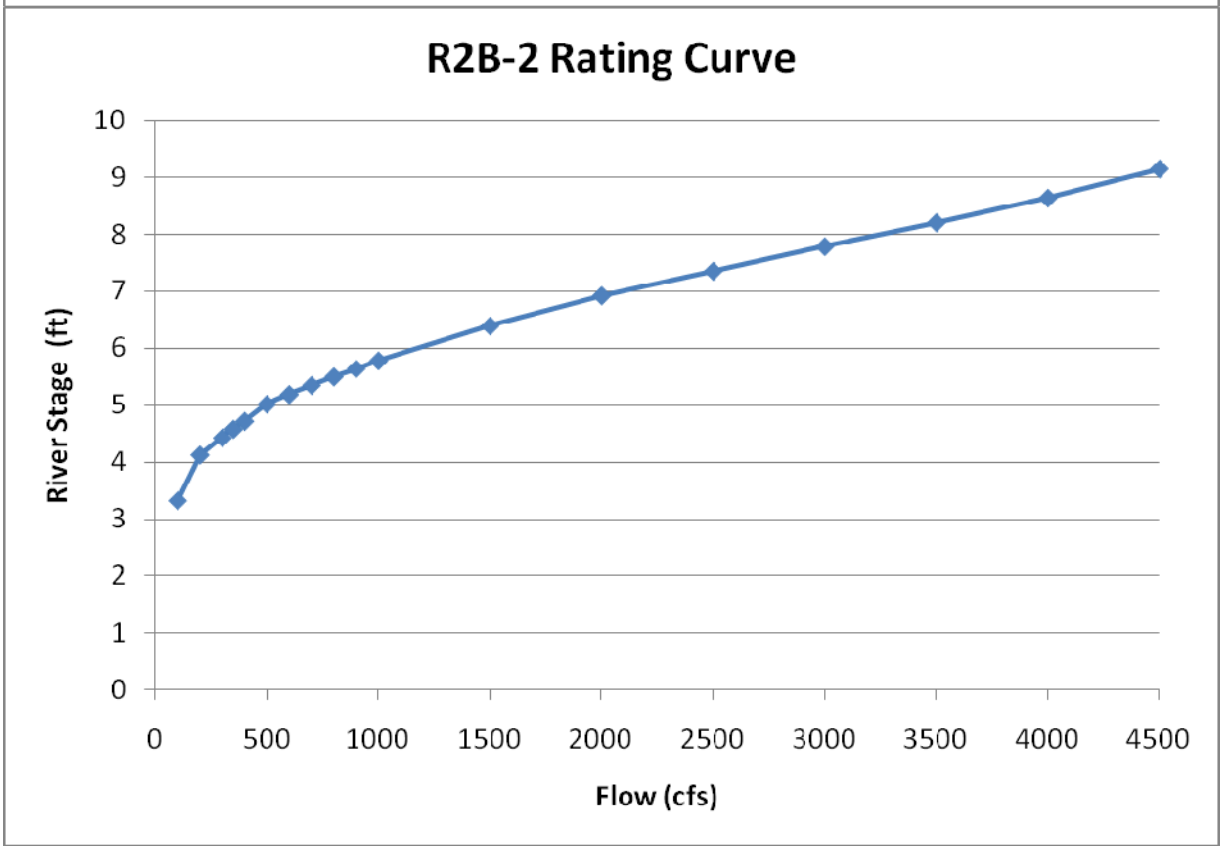

MA-4 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

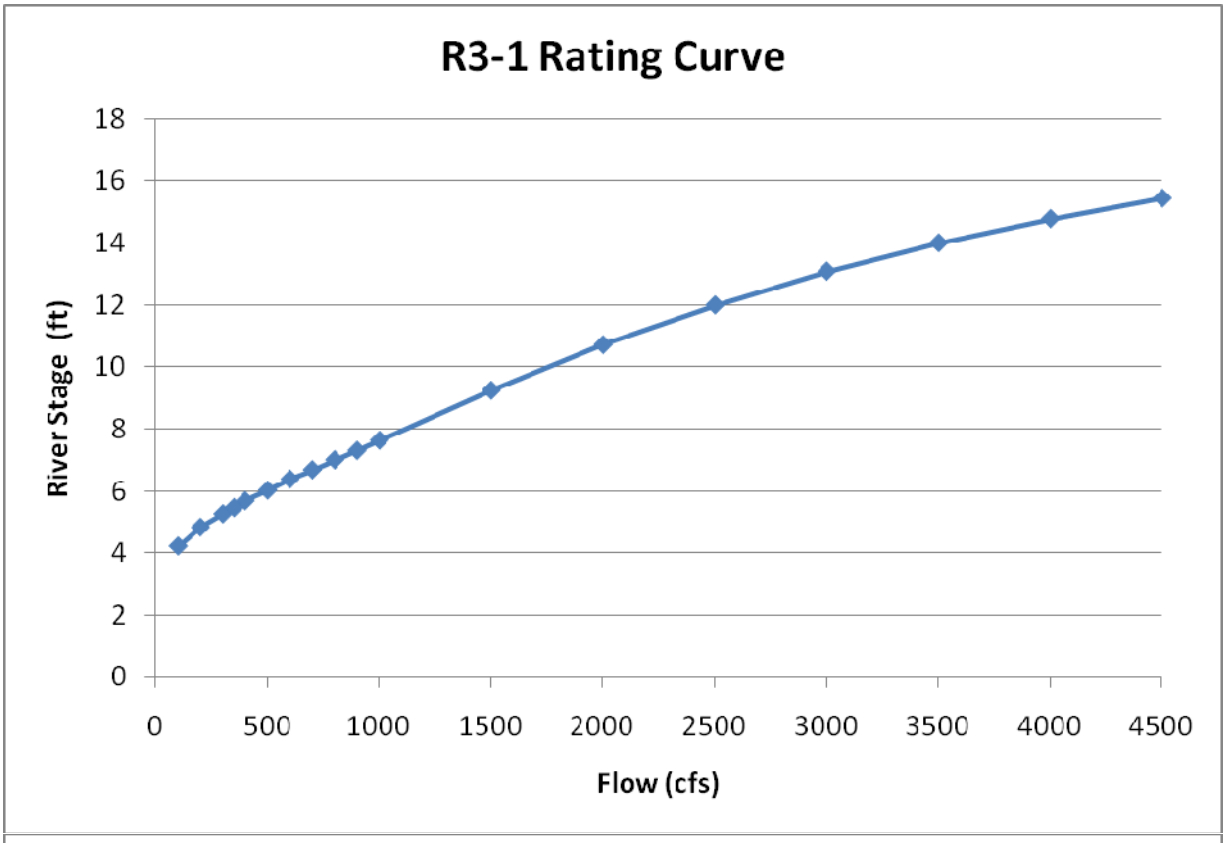

MW-49B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

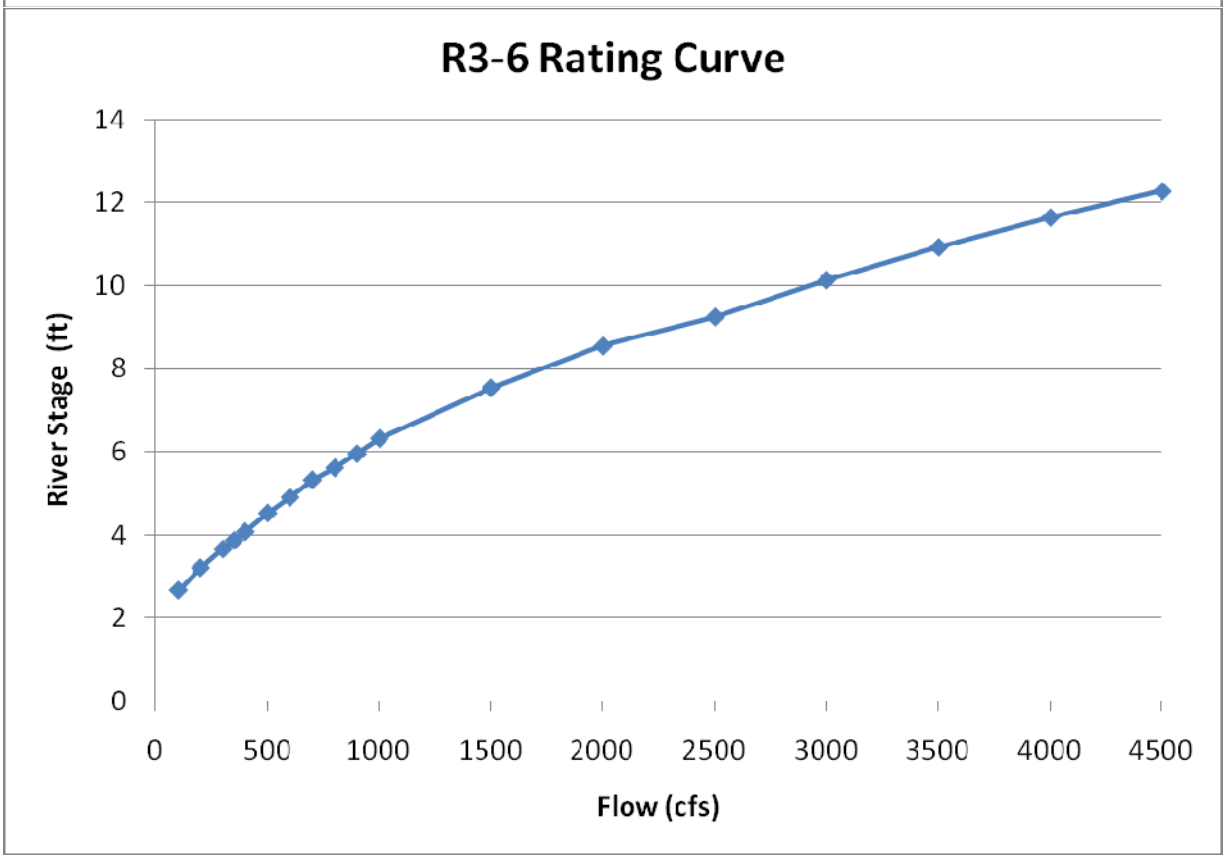

MW-54B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

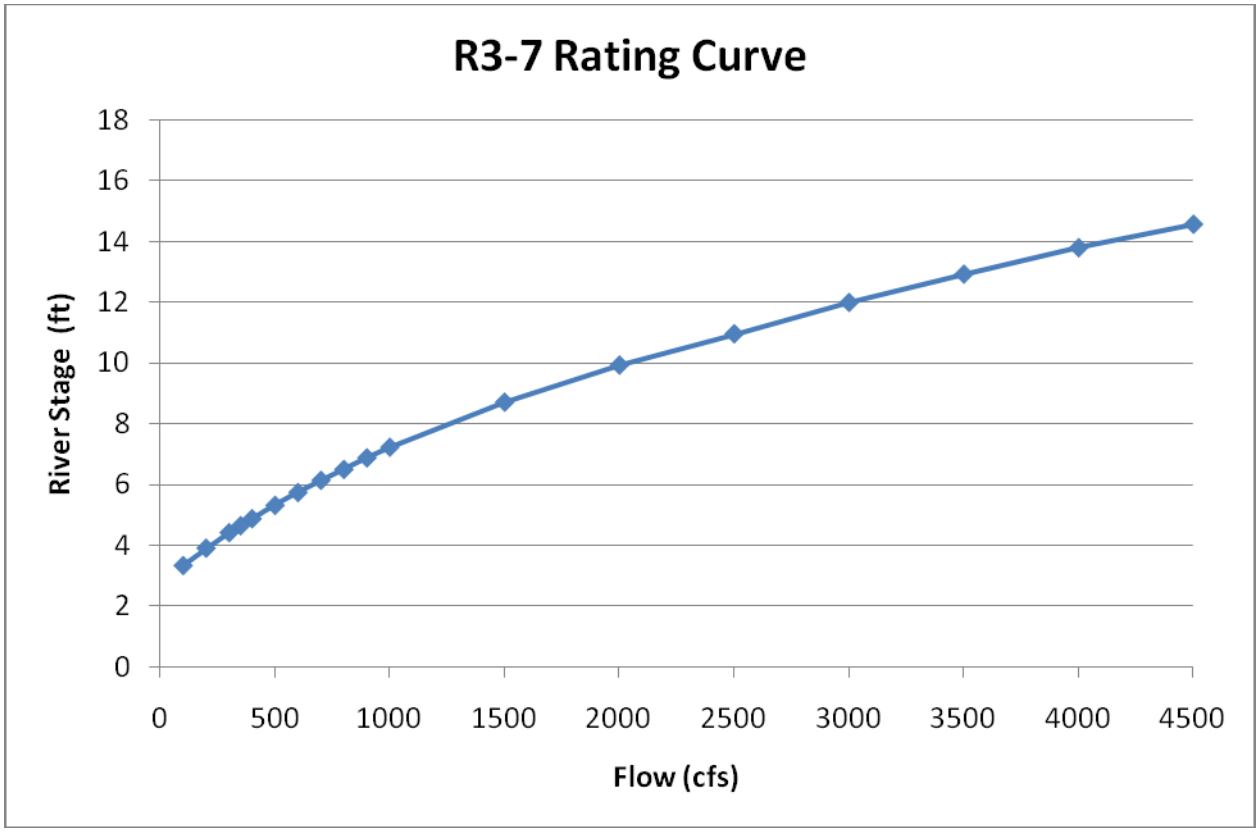

MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

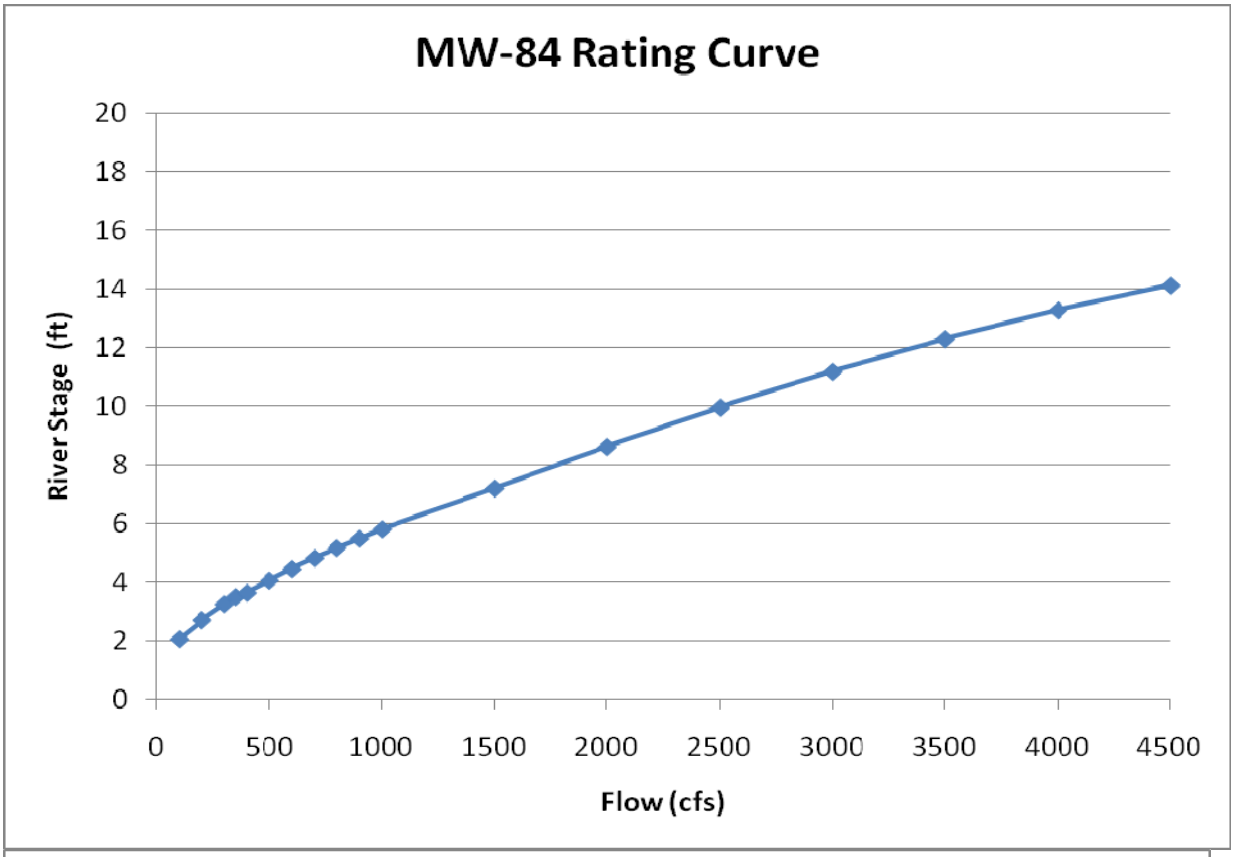

R2B-1 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

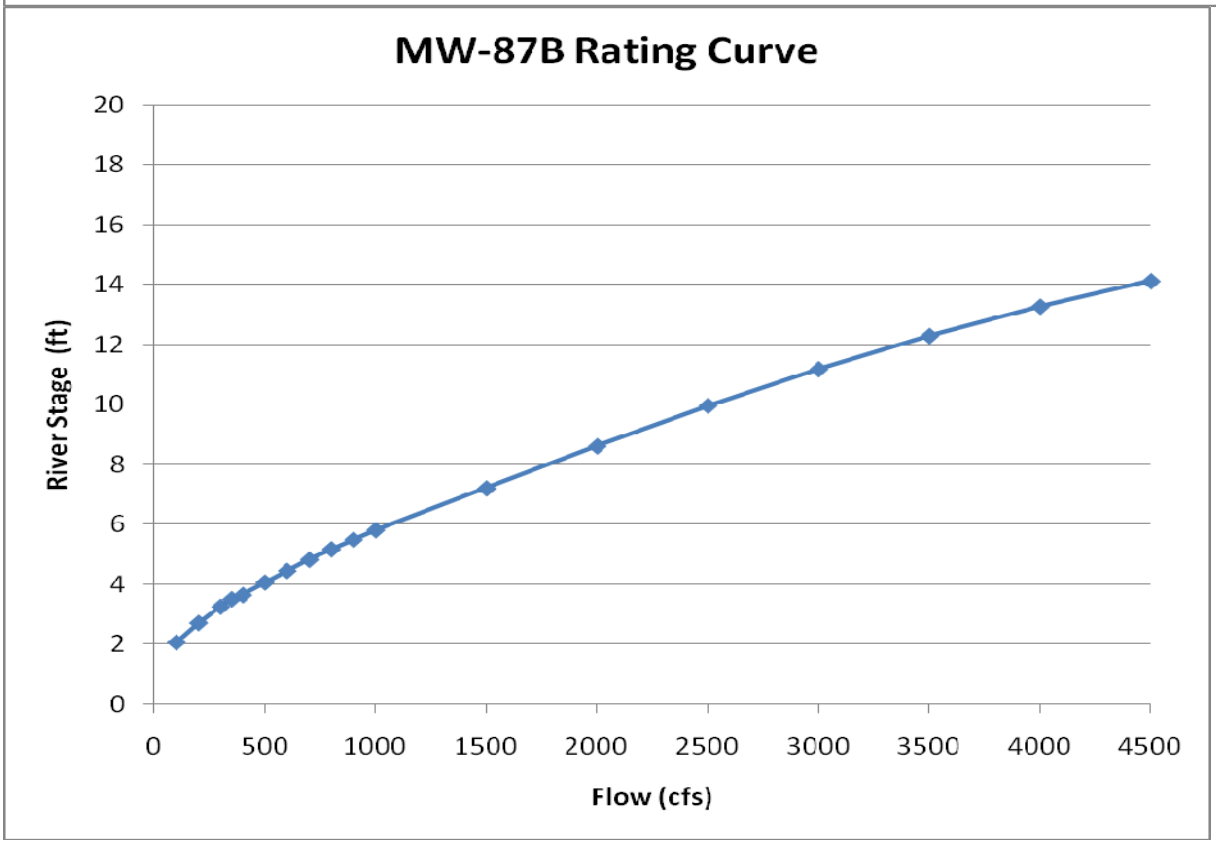

R2B-2 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

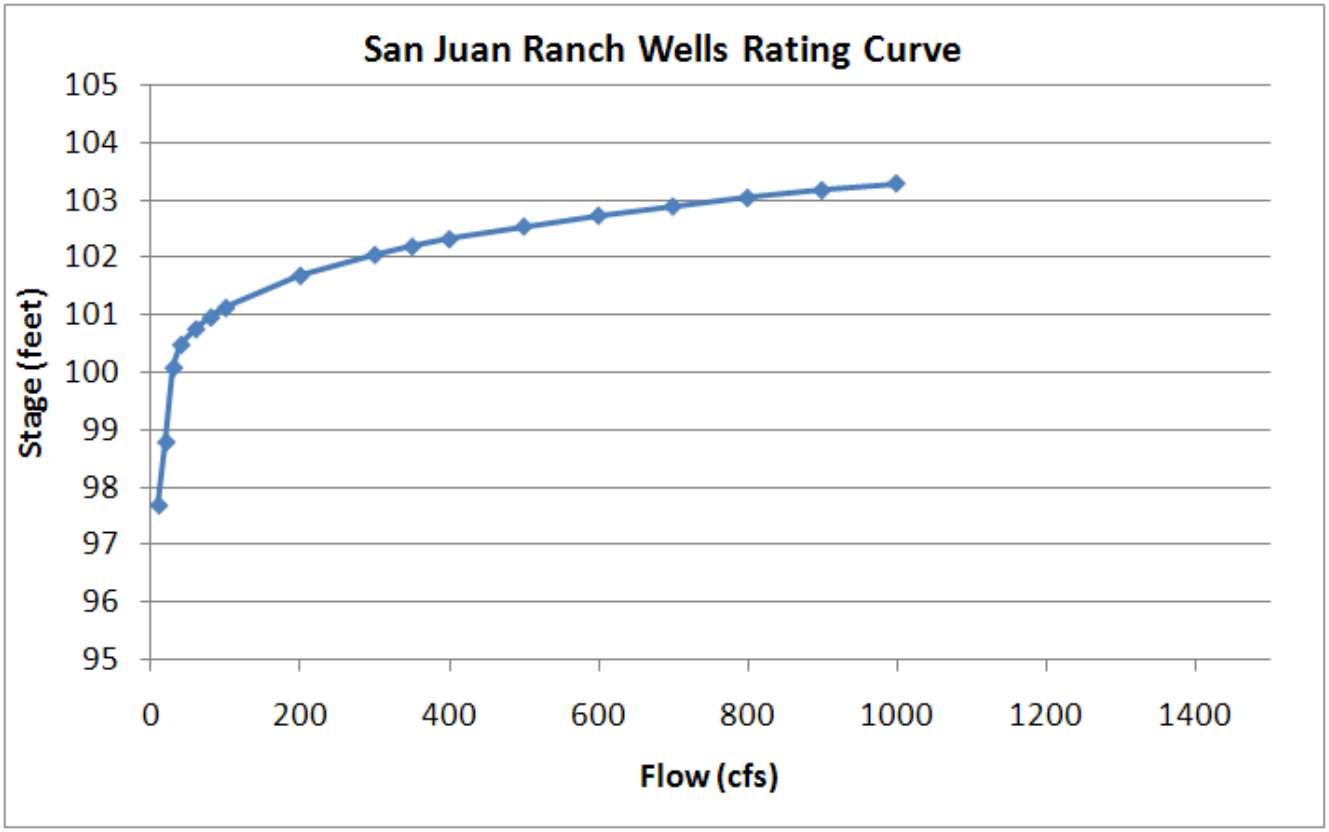

R3-1 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


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


MW-84 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)


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)