SJRRP Flow Bench Evaluation

April 26, 2010

The April 12th SJRRP flow bench evaluation evaluated an increase to 1600 cfs in Friant Dam releases for the SJRRP. Interim Flows at Friant Dam increased to 1,500 cubic feet per second at noon on Monday, April 12, 2010. Flows were reduced to 1,250 cfs at 4 p.m. on Tuesday, April 13, to manage flows at Gravelly Ford. Flows were increased to 1,350 cfs at 9 a.m. on Saturday, April 17. Flows decreased to 1,100 cfs on Monday, April 19th due to water quality issues in Mendota Pool. On Friday, April 23, flows increased to 1,350 cfs. The evaluation of increasing to 1600 cfs on April 26th is as follows:

1. No change in operation will occur. Friant Dam releases will remain at 1350 cfs with partial recapture at Mendota Pool. Release should be reduced by anticipated Cottonwood and Little Dry Creek inflows so as not to exceed 1300 cfs at the Chowchilla Bifurcation Structure.
2. Sack Dam releases should be maintained at 700 cfs due to potential Reach 4 seepage impacts.
3. Mendota Dam can release water to meet the 700 cfs flow target at Sack Dam and limit releases for the SJRRP such that the combined releases for Interim Flows and Arroyo Canal deliveries do not exceed 1300 cfs.
4. SLDMWA may meet Sack Dam flow targets through the Firebaugh Wasteway to maintain at least 400 cfs of flow in the lower Delta-Mendota Canal. Under conditions when DMC flows fall below 400 cfs, all of the pool demands may be met from SJRRP flows and DMC deliveries to the pool may be zero.
5. Reclamation may request that CCID deliver up to 200 cfs through the Outside Canal from Mendota Pool to Los Banos Creek (Reach 5) if SJRRP inflows exceed the combined demands of Mendota Pool and Sack Dam targets.

Daily evaluations per the water right order will continue throughout the bench.

As of April 26, 2010:

1. Flows 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 identified concerns regarding water quality in the DMC and Mendota Pool. This issue was resolved with the use of the Firebaugh Wasteway.

3. The seepage hotline received eight calls, described below. All evaluations determined the planned releases from Friant could proceed but that flows over Sack Dam should be limited, due to seepage concerns within Reach 4, to 700 cfs and Fort Washington Beach in Reach 1 will likely become inundated as described in hotline call #3.

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

5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds. CCID maintained shallow groundwater observation wells show high groundwater depths as reported below.

6. Measured losses in Reach 2A from operations estimates show approximately 200 cfs. Changes in flows below Sack Dam have not stabilized.

7. Projected groundwater levels from the upcoming increase in flow to 1500 cfs are below the top of the buffer zone except for wells R2B-1, MW-49B and MW-55B.

8. The LSJLD was notified of potential increases in flows. The LSJLD provided information on March 29th that flows are adjacent to or inundating 12 flapgates and informed Reclamation that the LSJLD would need to increase monitoring activities in these locations. Merced County's Dan McNamara Road crossing of the Eastside Bypass is unpassable and has been posted, placing public access along the right levee of the Eastside Bypass for County connections.

9. The CCID provided groundwater monitoring information in anticipation of the 1600 cfs flow bench evaluation. A conference call on April 10th between Reclamation and the General Manger reviewed data on 25 wells compared to historical conditions when available. CCID recommended not increasing flows into Reach 4A and performing necessary evaluations to determine if a flow reduction is warranted.

10. The SLCC was notified of potential increases in flows and did not identify any potential issues.

Seepage hotline call #1 was placed on March 4, 2010 regarding Monitoring Well R2B-1. The groundwater level is not predicted to exceed the top of the buffer zone. Figure 1 below plots groundwater level in R2B-1 and Mendota Pool stage.

Seepage hotline call #2 was placed on March 11, 2010 regarding potential seepage in a pomegranate orchard and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Seepage hotline call #3 was placed on March 15, 2010 regarding future potential flooding at Fort Washington Beach campground and addressed through the March 16th evaluation. 1100 cfs was the owner's estimated maximum flow before flooding. A follow-up call on April 11th described that flows are likely to inundate 9-10 acres of a total of 11 acres of campgrounds that will require a dry-out period prior to returning to a usable state.

Seepage hotline call #4 was emailed on March 26, 2010 regarding groundwater levels in CCID monitoring well 144 in reach 4A with reported levels near the top of the buffer zone. A site evaluation was conducted on March 29. This bench evaluation continues prior release rates in this Reach.

Seepage hotline call #5 was emailed on April 3, 2010 regarding water in seep drains around Jim Nickel's property in Reach 4B. The site was evaluated and found to have water table elevations beneath the field from 4.3 – 8 feet below ground surface. The proposed buffer zone for alfalfa and tomatoes, the applicable crops in this field, is 4-6 feet below ground surface. Evaluation determined that further increases in San Joaquin River flows through Reach 4A may risk seepage impacts. A reduction in flows in this area would likely complicate the data collection efforts of the SJRRP, but would not reduce the risk of impact. Mr. Nickel called the seepage hotline the morning of April 10th to discuss the site, which was recorded as seepage hotline call #6. A follow-up call by Reclamation on the evening of April 10th discussed the evaluation process.

Seepage hotline call #7, emailed on April 19th, 2010 regarding a flooded trail in Lost Lake County Park was evaluated by Fresno County staff and determined to be standing water from the rain. A follow-up check will be conducted in 2 weeks. Planned releases can occur.

Seepage hotline call #8 was discussed with Reclamation staff on April 15, 2010 regarding potential seepage concerns in a future almond orchard. SJRRP staff is conducting a site evaluation and will site monitoring wells. No seepage is reported at this time. Planned releases can occur.

Monitoring Well R2B-1 was measured at 0.85 feet to the top of the buffer zone on April 22, with flows in the river between 1100 and 1350 cfs. Seepage Hotline Call #1 provides an evaluation.

Monitoring Well 49B in Reach 2A measured groundwater depths 0.16 feet above the top of the buffer zone on April 20, with flows in the river between 1100 and 1350 cfs. A site evaluation at this location found a steep groundwater slope away from the river, on the order of a half foot of groundwater elevation decrease for every one hundred feet away from the river. Levels in the monitoring well above the top of the buffer zone will not result in groundwater levels in the fields that are above the top of the buffer zone. There are also protective drains in this area as backup.

Monitoring Well 55B, at San Mateo Road on the left bank, was measured on April 21 at 0.66 feet above the top of the buffer zone, with flows in the river between 1100 and 1350 cfs and recent rainfall. The rating curve for estimating groundwater levels was updated from manual measurements taken at San Mateo Road and predicts a rise to 5 feet below ground surface. A site investigation and evaluation on March 29th identified a groundwater table sloping down, away from the river to depths of 20 feet bgs. Crops consist of young palm trees near the river and pistachios farther inland. Young trees are unlikely to have extensive root systems and pistachios are salt tolerant. Reclamation staff met with the landowner – Baker Farms – on April 9, 2010 to discuss allowing groundwater levels to potentially rise up to 5 feet below ground surface.

Monitoring Well 47, in Reach 2A, shows encroachment into the buffer zone. A site investigation and evaluation is underway. The groundwater level is not predicted to exceed the top of the buffer zone.

Monitoring Well R3-7, in Reach 3, is predicted to go into the buffer zone by 0.1 feet. The groundwater level is not predicted to exceed the top of the buffer zone.

Data

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

Table 1 shows the anticipated changes in flows used to predict future groundwater depths based on Exhibit B loss assumptions and a Reach 3 capacity limitation.

Table 1: Anticipated Change in Flows

	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	955	1355	400
Reach 2B	820	1200	380
Reach 3	1120	1300	180
Reach 4A	700	1000	300

Table 2 shows the current and predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 2. Subsequent pages show the rating curves for each of the key wells. (Mussetter Engineering, Inc., 2008. *San Joaquin HEC-RAS Model Documentation.* Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2). Rating curves were updated April 9, 2010 for MW-55B to include a linear trend rating curve developed from Reclamation's manually measured stage-discharge data that better fits historical groundwater level rise. Rating curves for Reach 4A were updated April 23, 2010 to include new wells and updated model run for Reach 4A, 4B, and the Eastside Bypass.

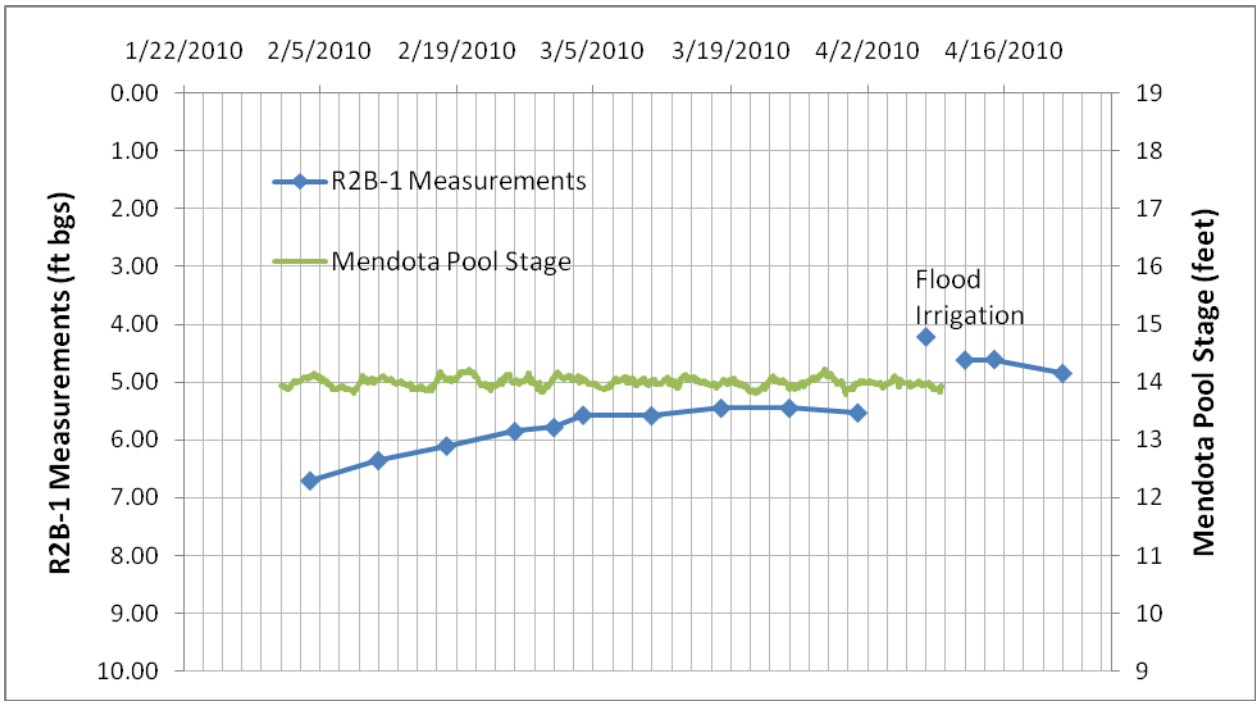


Figure 1 Comparison of Monitoring Well R2B-1 and Mendota Pool Stage

Table 2: Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of April 4th (ft bgs)[1]	Predicted Stage Increase (ft)	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	7.98	0.7045	7.3
MW-47	Reach 2A – Transect 12 – Right	**6-8**	**20-40**	**7.42**	**0.7045**	**6.7**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11	0.8863	10.1
MW-49B	Reach 2A – Transect 13 – Left	**4-6**	**10-20**	**4.52**	**0.8863**	**3.6**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	12.53	1.406	11.1
MW-55B	Reach 2B – San Mateo Ave. – Left	**6-8**	**10-15**	**6.33**	**1.406**	**4.9**
R2B-1[2]	Reach 2B – Right	**4-6**	**8-11**	**4.61[2]**	**0.628**	**3.982**
R2B-2	Reach 2B – Right	4-6	17-20	12.09	0.076	12.0
R3-1	Reach 3 – Right	4-6	9-24	7.83	0.966	6.9
R3-6	Reach 3 – Right	4-6	17-20	7.37	0.732	6.6
R3-7	Reach 3 – Right	3-5	17-20	5.75	0.888	4.9
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	29.45	0	29.45
MW-87B	Reach 4A – Highway 152 – Left	4-6	TBD	Dry (>14)	0	Dry

[1] Wells in Reaches 2A were measured on Tuesday, April 6th; MW-54B and MW-56B were measured on Wednesday, April 7th; R2B-1, R2B-2, and wells in Reaches 3 and 4A were measured on Thursday, April 8th. This week of measurements are used because flow was steady at 1100 cfs release from Friant. Later measurements were during unsteady flow periods.
[2] Calculations used the measurement from the week of April 17th. April 10th readings measured depth below ground surface of 4.22 feet due to flood irrigation. Observations the morning of April 12th found depths of 4.62 feet with some standing water in the flood irrigation ditch.

Table 3: Predicted Increases in Groundwater Levels for Reach 4A Wells

Well_ID	Site	Buffer Zone (ft bgs)	Current Depth Week of April 24th (ft bgs)[1]	Predicted Stage Increase (ft)	Anticipated Depth (ft)
MW-84	Reach 4A – Highway 152 – Right	4-6	27.76	.99	26.77
MW-87B	Reach 4A – Highway 152 – Left	4-6	Dry (>14)	.99	Dry to 13.01
CCID 191	S. of San Juan Ranch	4-6	7.6	0.77	6.83
Nickel #1	Hand Auger on San Juan Ranch	4-6	7.08	0.65	6.43
Nickel #2	Hand Auger on San Juan Ranch	4-6	5.39	0.62	4.77
MW-91	San Juan Ranch	4-6	4.36	0.55	3.81
MW-92	San Juan Ranch	4-6	6.14	0.55	5.59
MW-93	San Juan Ranch	4-6	6.76	0.55	6.21
ESB	ESB near Sand Slough	4-6	3.2	0.44	2.76

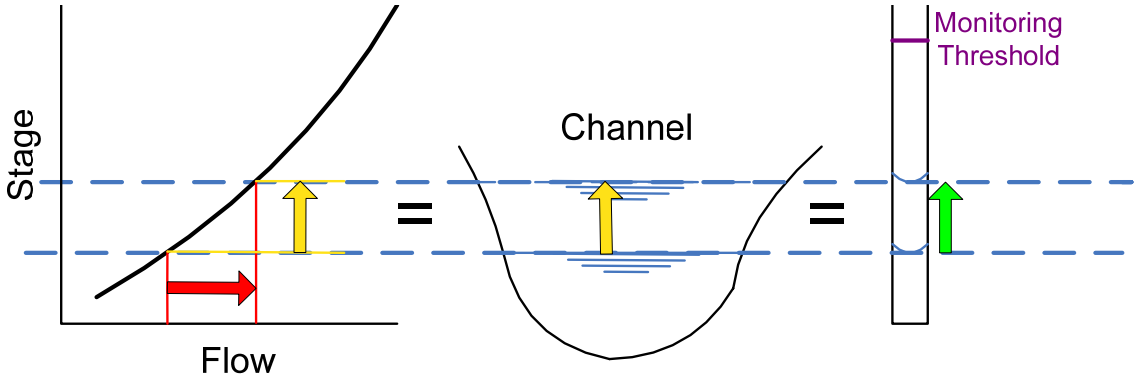
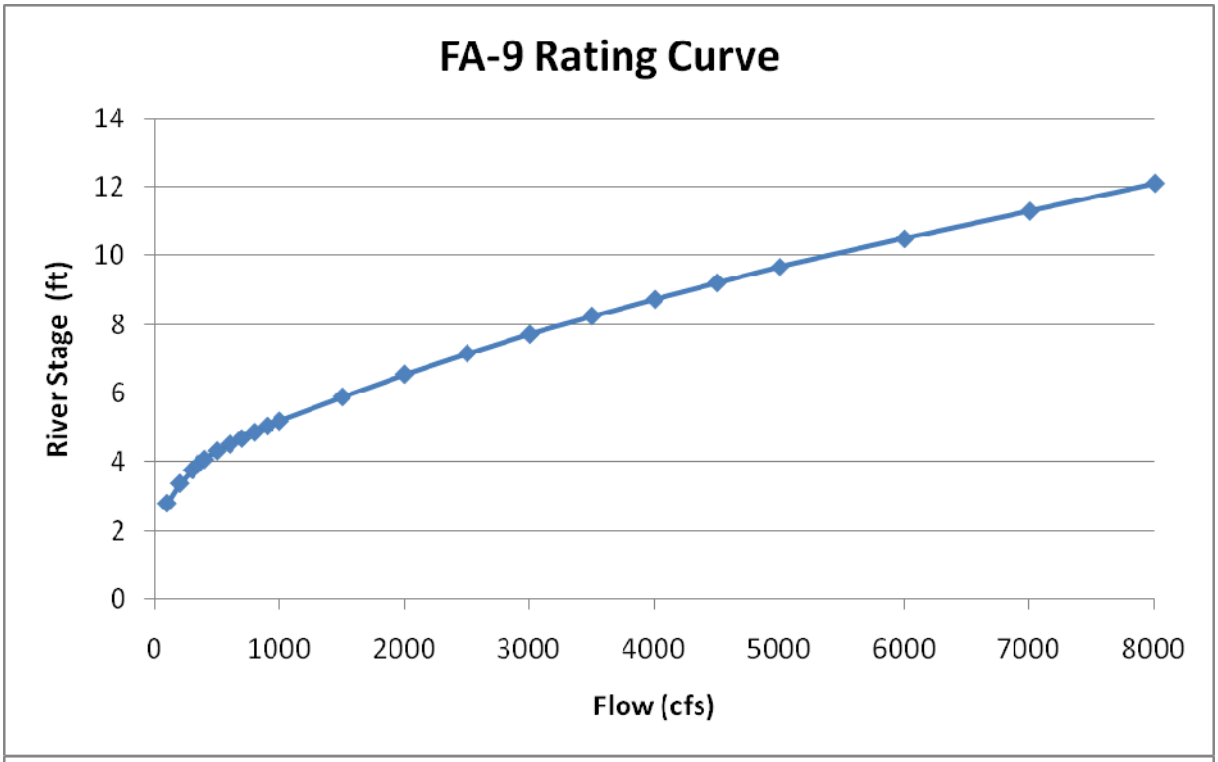
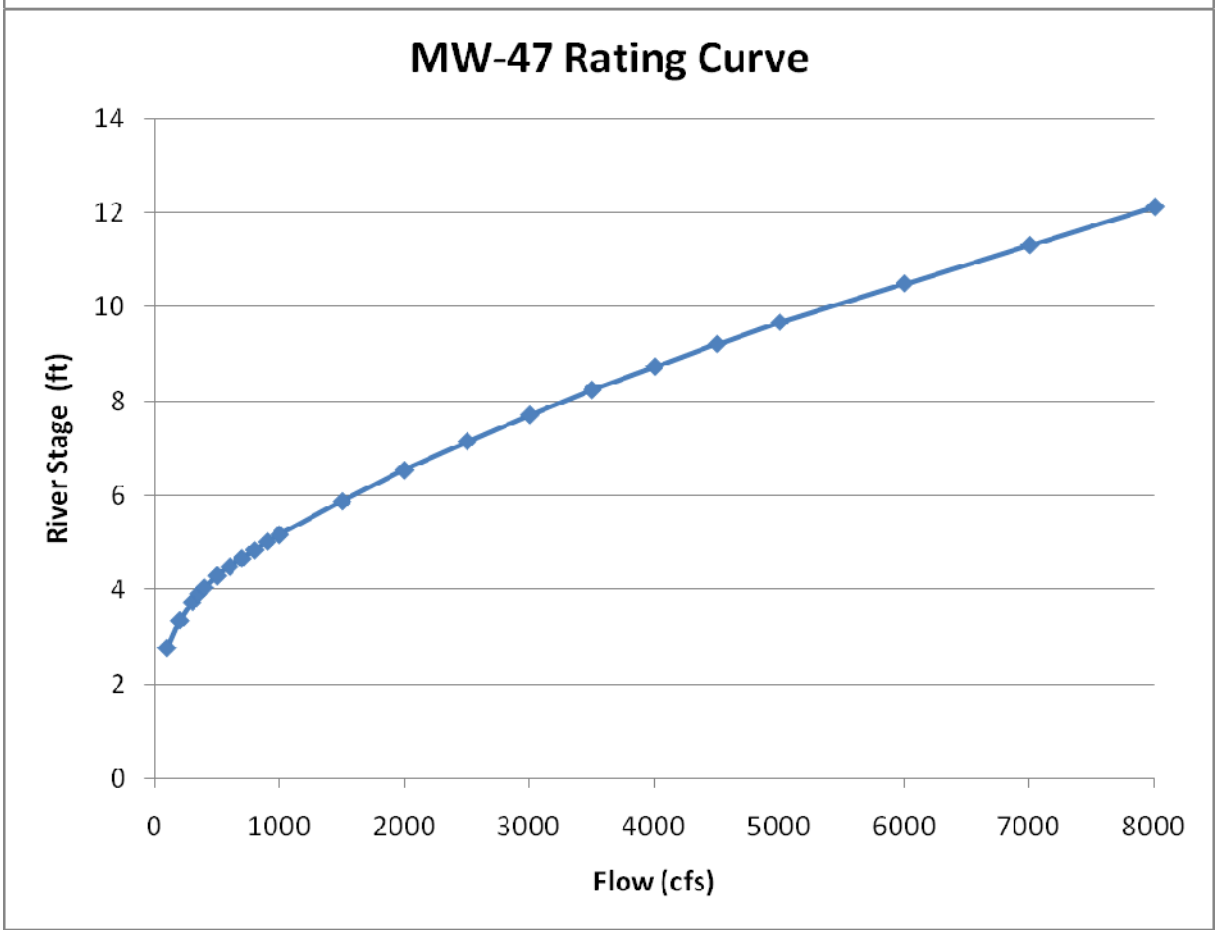
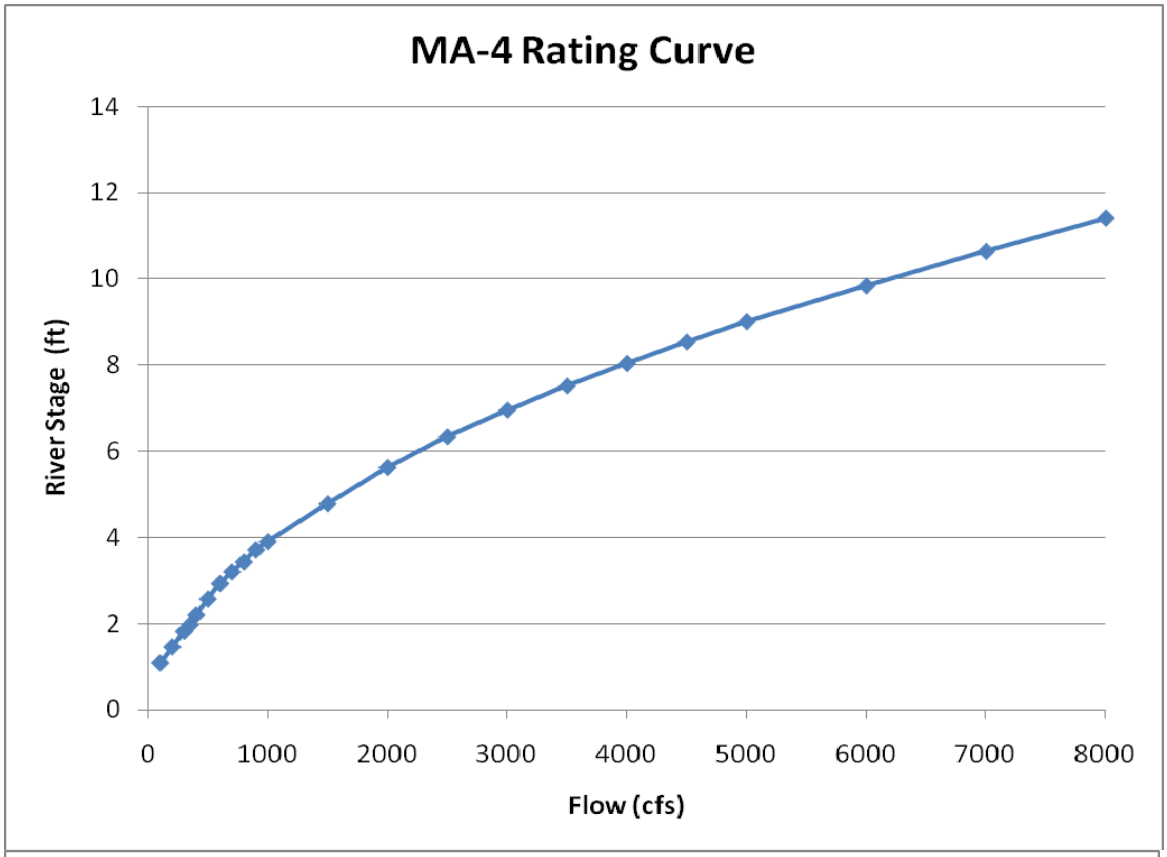
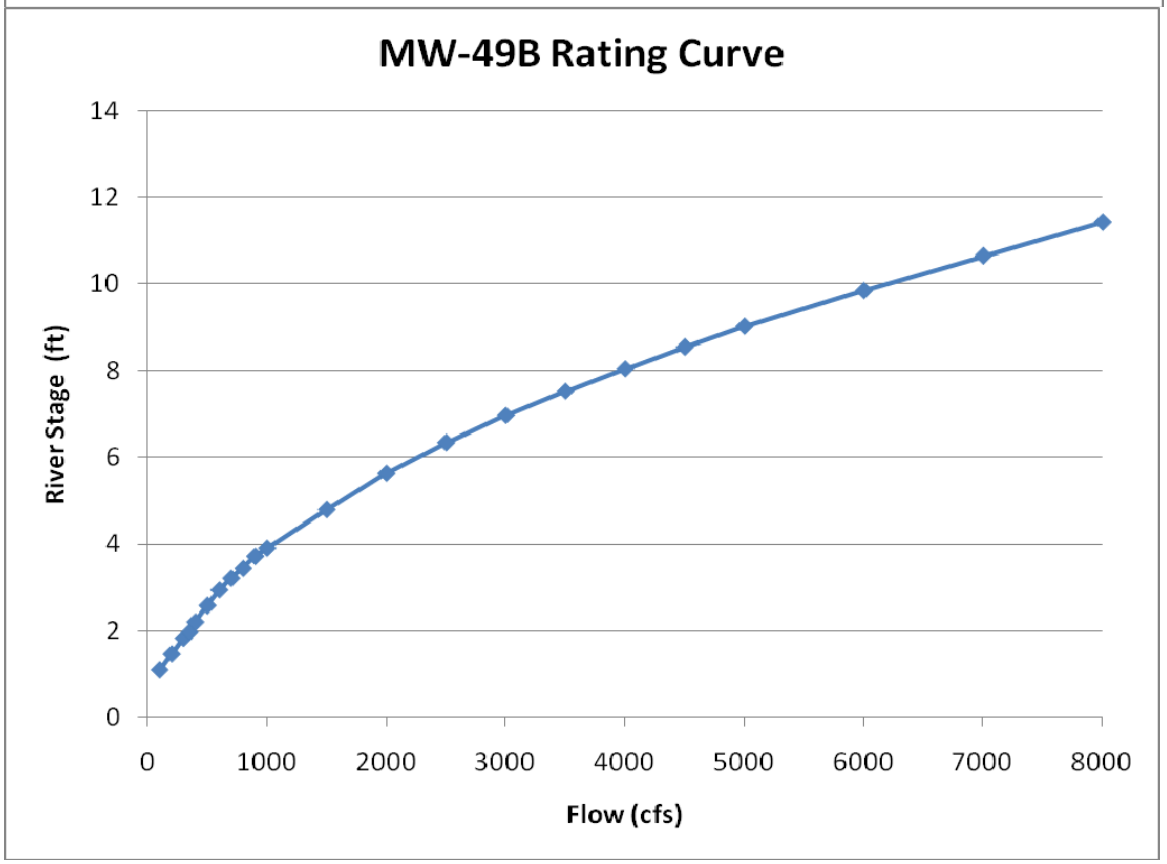


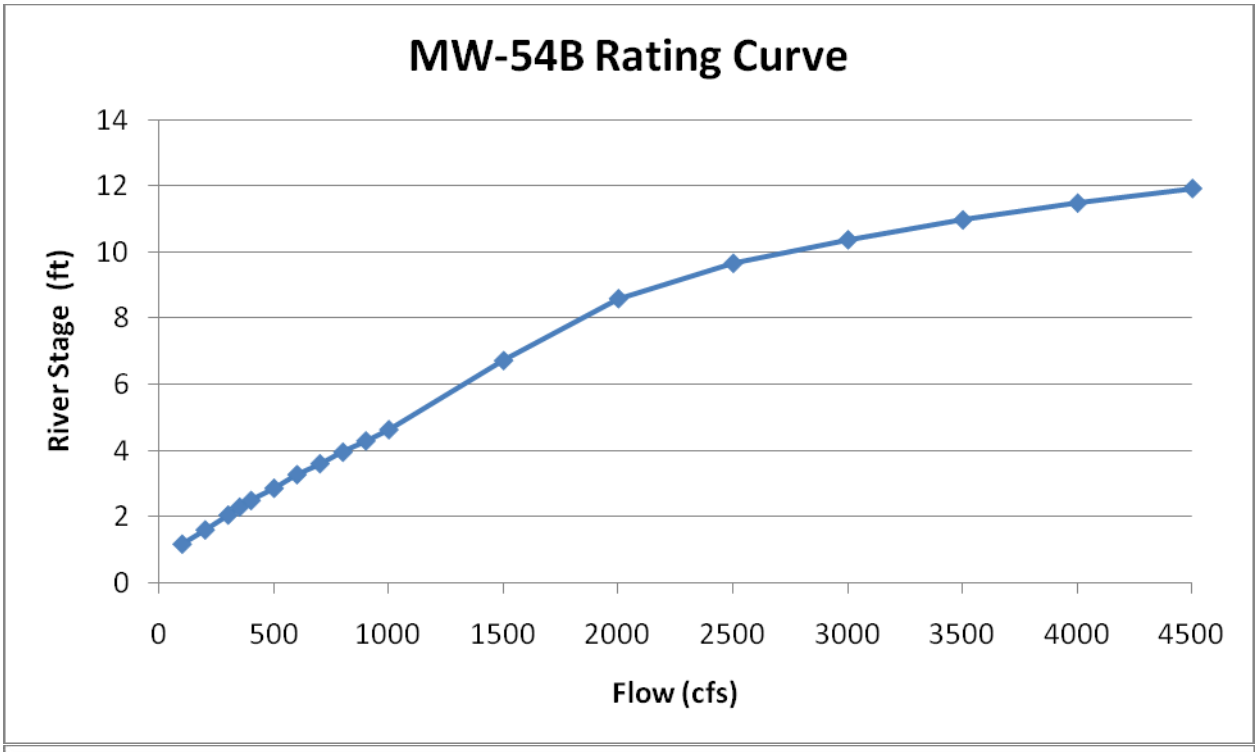
Figure 2: Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

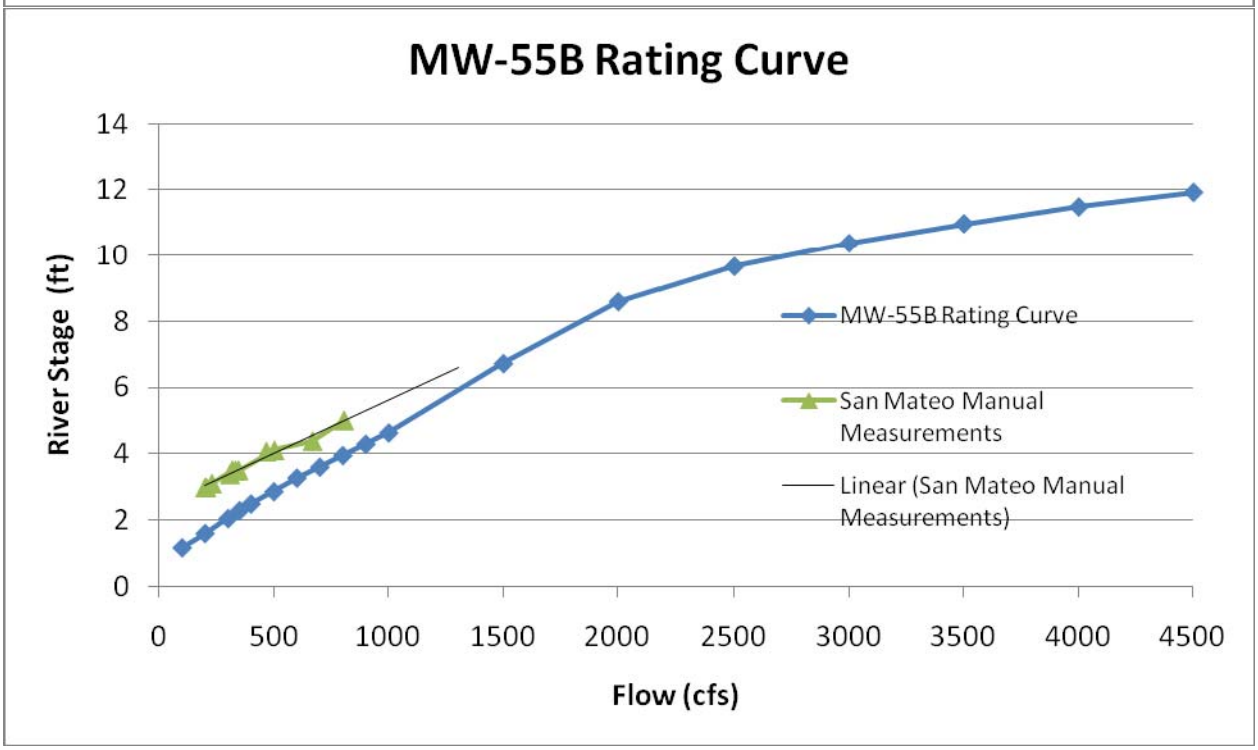

FA-9 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

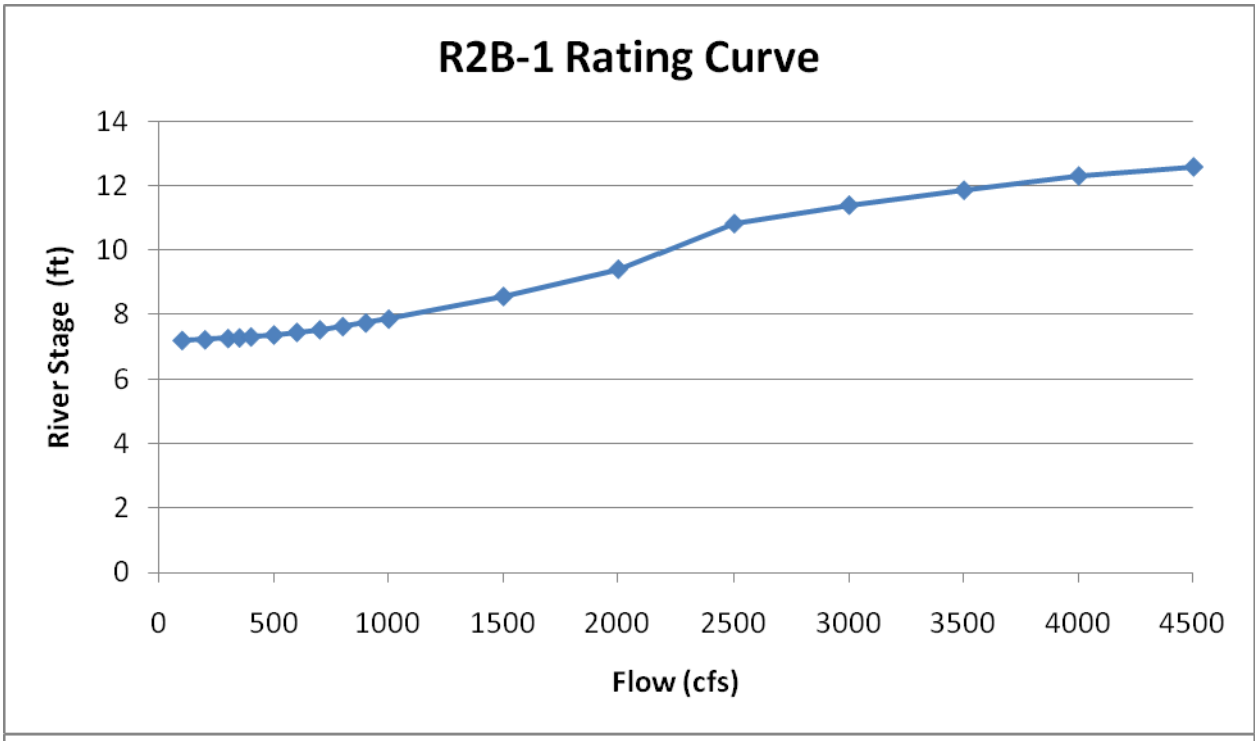

MW-47 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

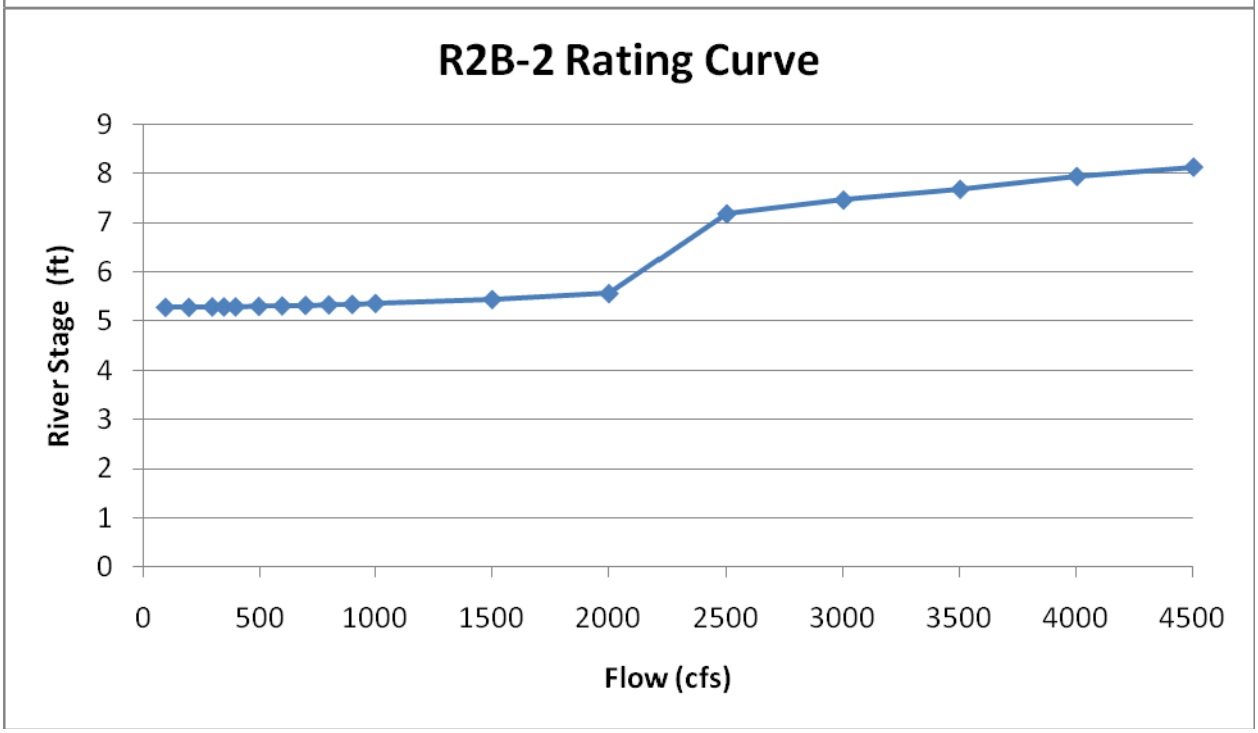

MA-4 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

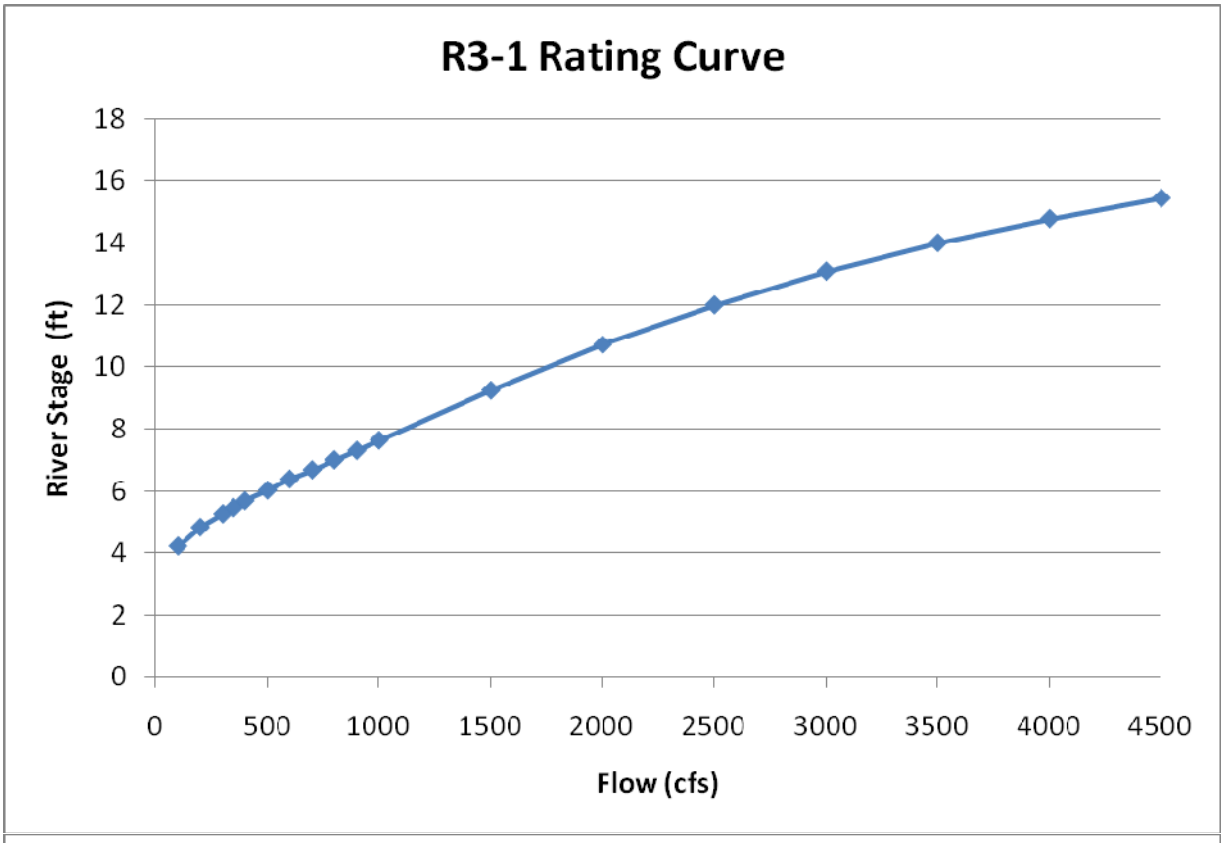

MW-49B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

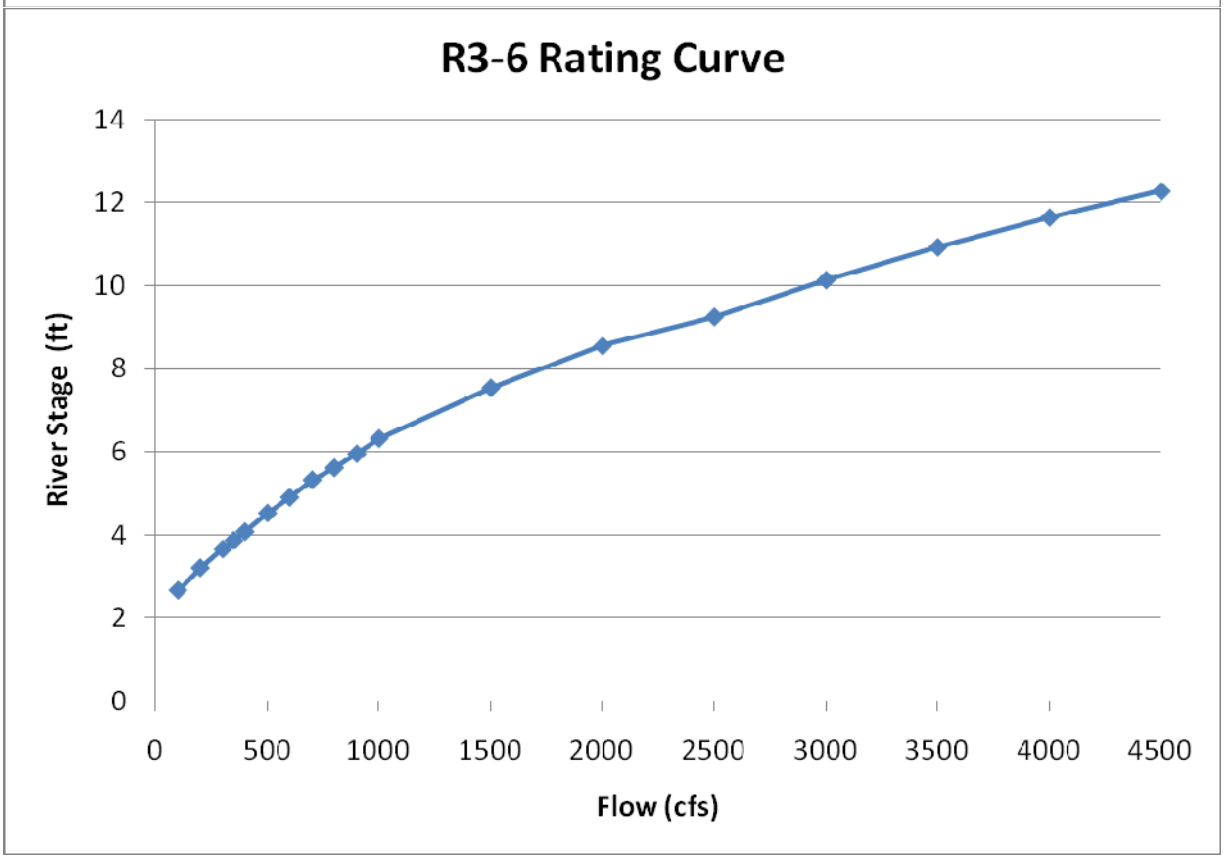

MW-54B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

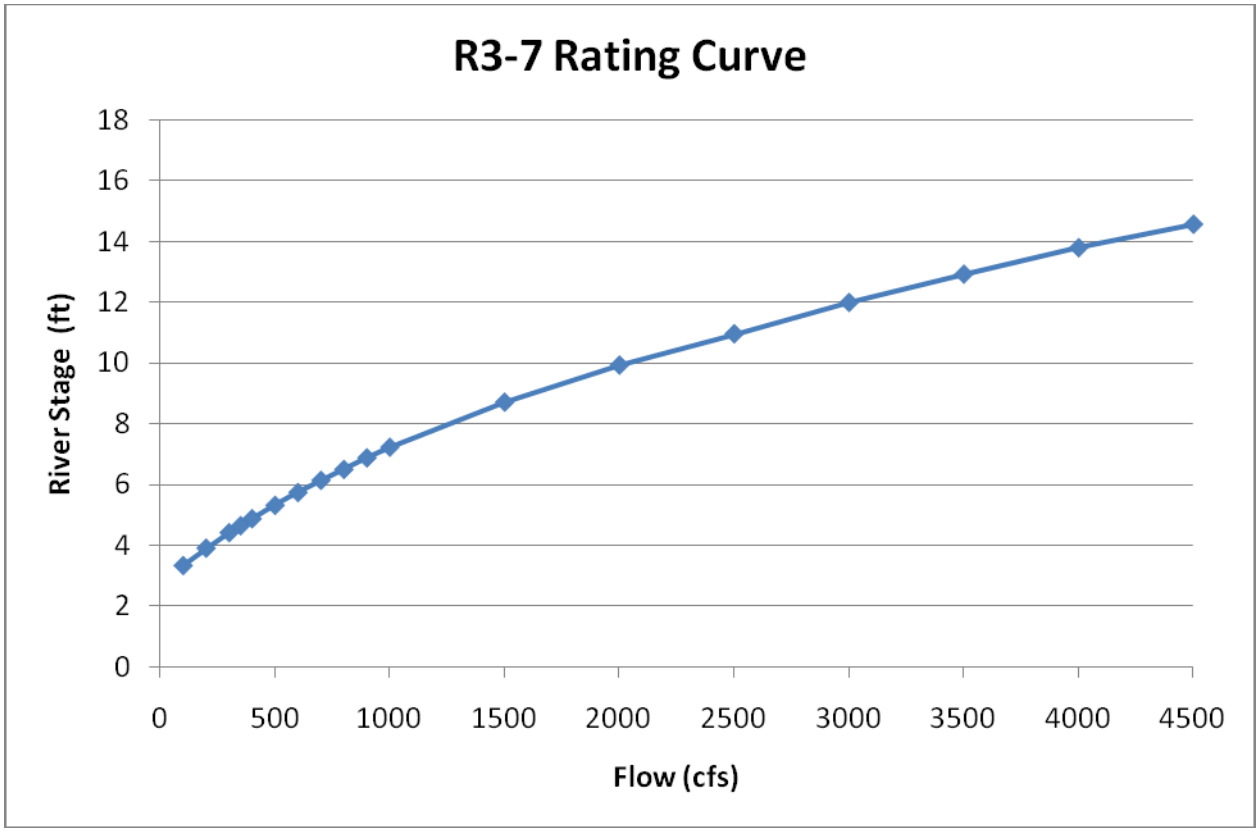

MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)
MW-55B Rating Curve
San Mateo Manual Measurements
Linear (San Mateo Manual Measurements)

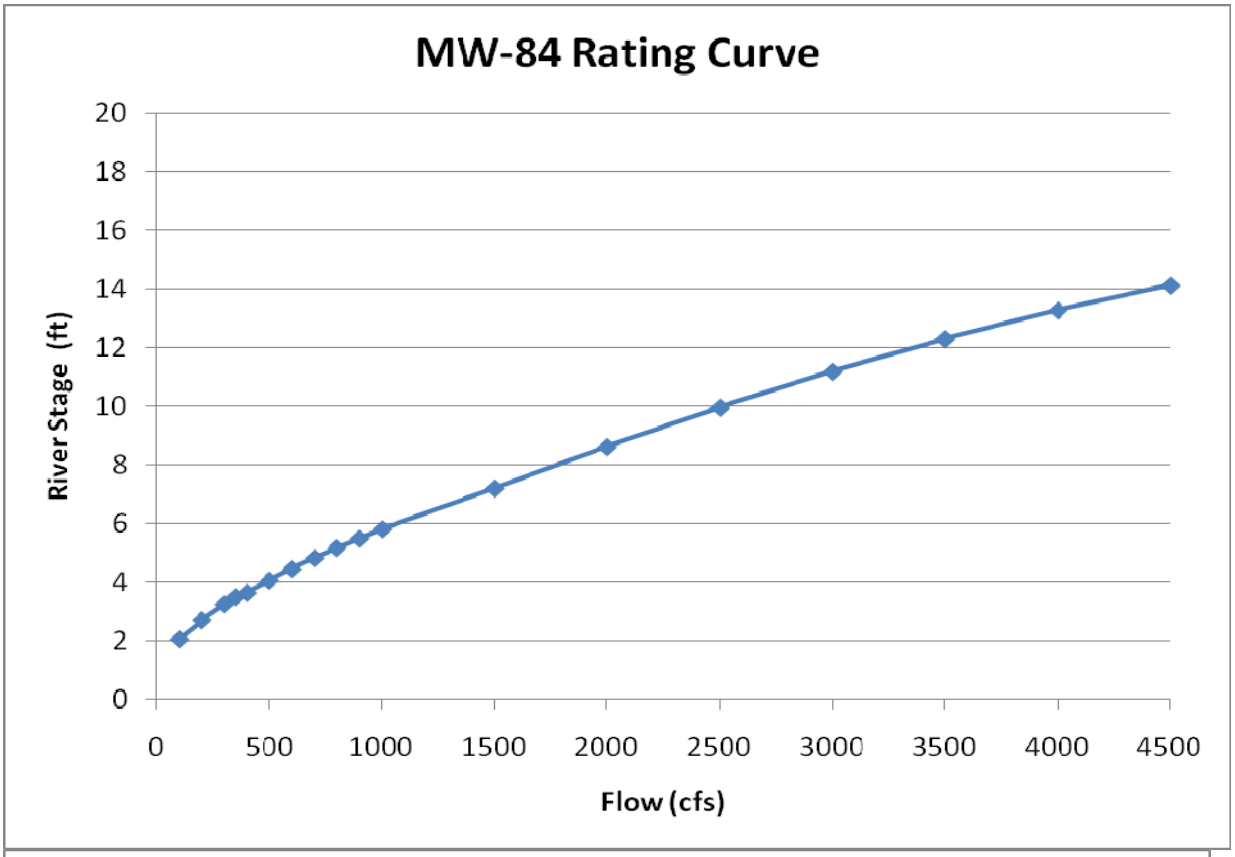

R2B-1 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

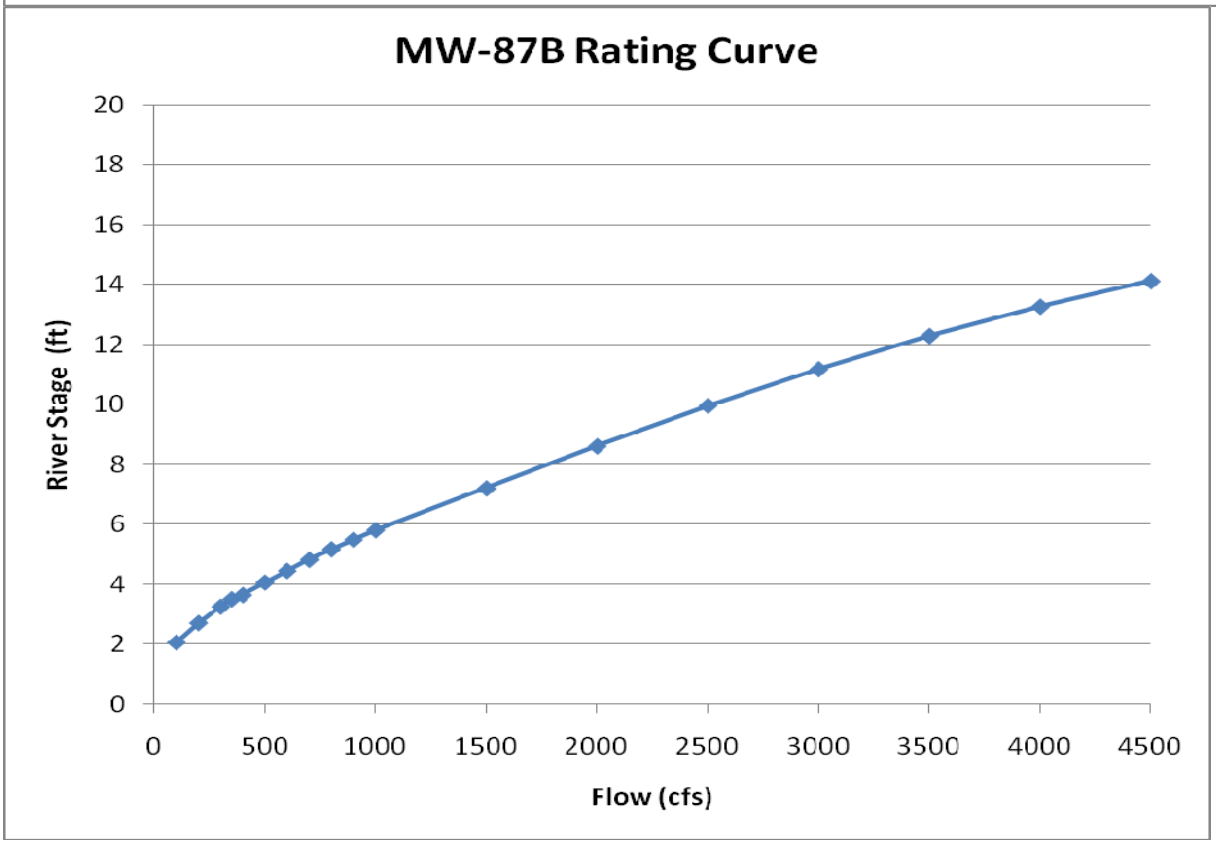

R2B-2 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


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)