

Exercise 9—Logarithmic Rating Extension

- Plot a rating defined by the measurements shown in the following table on the graph paper on the next page. Use an offset of zero. The stream reached a peak stage of 51.4 feet on April 8, 1938.
 1. Estimate the peak discharge associated with that peak.
 2. Now determine a more appropriate scale offset for the rating and draw that rating on the same piece of graph paper. Note: You will have to change the gage-height scale.
 3. Use this new rating to estimate the discharge associated with the 51.4 foot stage.
 4. Did your answers differ? **They should.**
 5. If so, why? **The second curve was extended using a straight line rather than a curved line.**
 6. Which answer would you supply to your local cooperator? **The second because it was extended as a straight line. This should allow for a much more confident extension. You don't have to rely on a curve of some sort.**
 7. **Which rule of thumb is violated in working the exercise** **Don't extend by more than twice the measured discharge.**
 8. **What assumption has to be made when extending the rating used for the exercise?** **That the channel geometry did not change significantly above the highest measured gage height.**

Discharge Measurements Coosa River	
Gage Height	Discharge
14	9540
16	17200
18	26500
21	42500
26	74500

If you have time do the same exercise using BARC. With BARC you can see the difference in the peak flow estimate derived from extending ratings developed using the two different offsets. This can be done by putting 51.4 feet into the gage height cell associated with the “Calculate a GH or Q for the Rating with the Show Button Selected” box and selecting different ratings using the “Show” button. You should see significantly different discharges corresponding to the 51.4 foot gage height.

Coosa River at Jordan Dam near Wetumpka, AL

Copy to Rating C Show Show Show

Single Offset Breakpoint Ratings

Regression	Rating A	Rating B	Rating C
Enter the Rating Offset	4.67	0.00	10.00
Enter the Low Endpoint Gage Height	14.00	14.00	14.00
Enter the Low Endpoint Discharge	10287.78	9540	9540
Enter a Breakpoint Gage Height (Optional)			
Enter a Breakpoint Discharge (Optional)			
Enter the High Endpoint Gage Height	26.00	26.00	26.00
Enter the High Endpoint Discharge	79204	74500	74500
Sum of the Percent Differences	52.25	-2.34	
Percent Difference Furthest From Zero	20.59	-1.17	

Measurement Data

Use	Number	Gage Height	Discharge	Rated	Rating A % Diff.	Rating B % Diff.	Rating C % Diff.
<input checked="" type="checkbox"/>		14	9540		0.00	0.00	
<input checked="" type="checkbox"/>		16	17200		15.73	-1.17	
<input checked="" type="checkbox"/>		18	26500		20.59	-0.60	
<input checked="" type="checkbox"/>		21	42500		15.93	-0.58	
<input checked="" type="checkbox"/>		26	74500		0.00	0.00	

Calculate a GH or Q for the Rating with the Show Button Selected

Enter a Gage Height
 The Corresponding Q is

Enter a Discharge
 The Corresponding GH is

