

This supplement contains the following sections:

- Additional plots for the Cumberland Plateau: Supplementary Figure S1 shows additional width-area plots for the Cumberland Plateau; Supplementary Figures S2 and S3 show width against distance downstream for each channel.
- Additional plots for the Appalachian Plateau: Supplementary Figure S4 shows width against distance downstream for each river.
- Supplementary Table S1 documenting the thresholds for slope and elevation used for each field site.

1 Additional plots for Cumberland Plateau

This section presents additional plots for the Cumberland Plateau analysis to supplement main text Section 4.1.

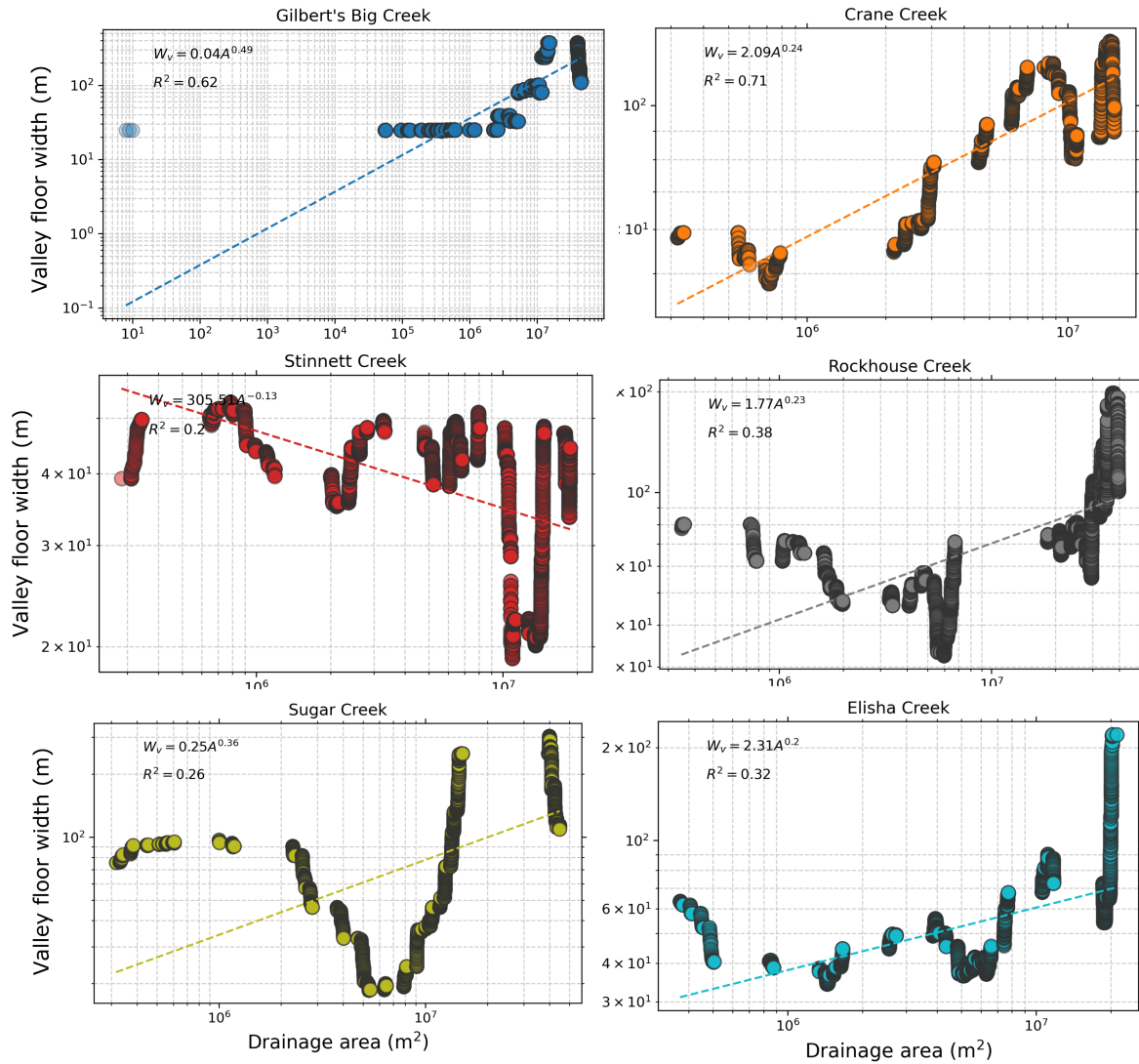


Figure S1: Width-area plots for the Cumberland Plateau creeks not shown in main text Figure 11. The dashed line represents a linear regression through the data in log-log space (power law).

2 Additional plots for Appalachian Plateau

This section presents additional plots for the Appalachian Plateau to supplement main text Section 4.2.

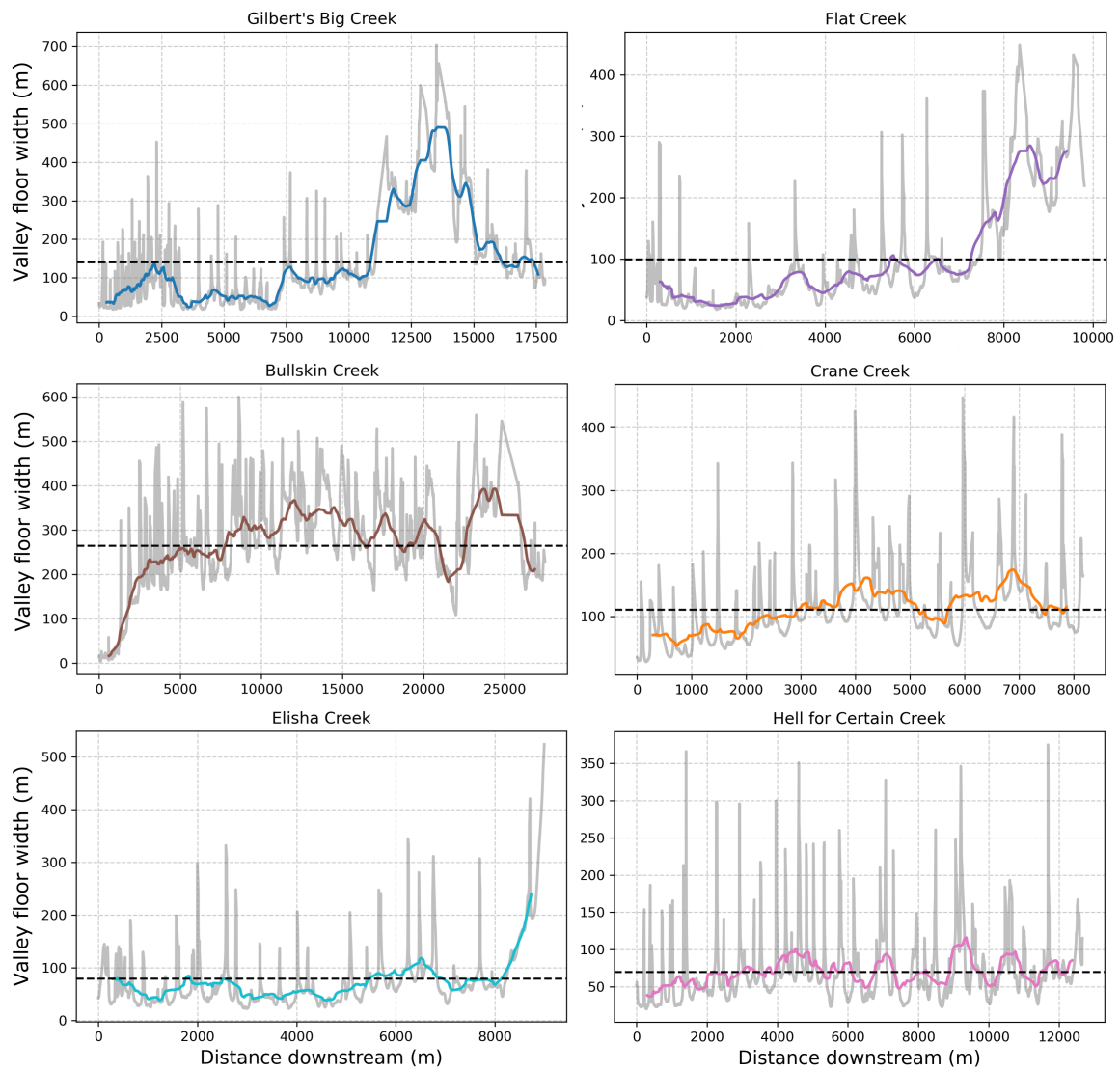


Figure S2: Width vs distance downstream for the small creeks analysed in the Cumberland Plateau. The grey data represents the raw data; coloured lines show a rolling mean through those data over a reach of 500 pixels. The dashed black line shows the mean width for each basin.

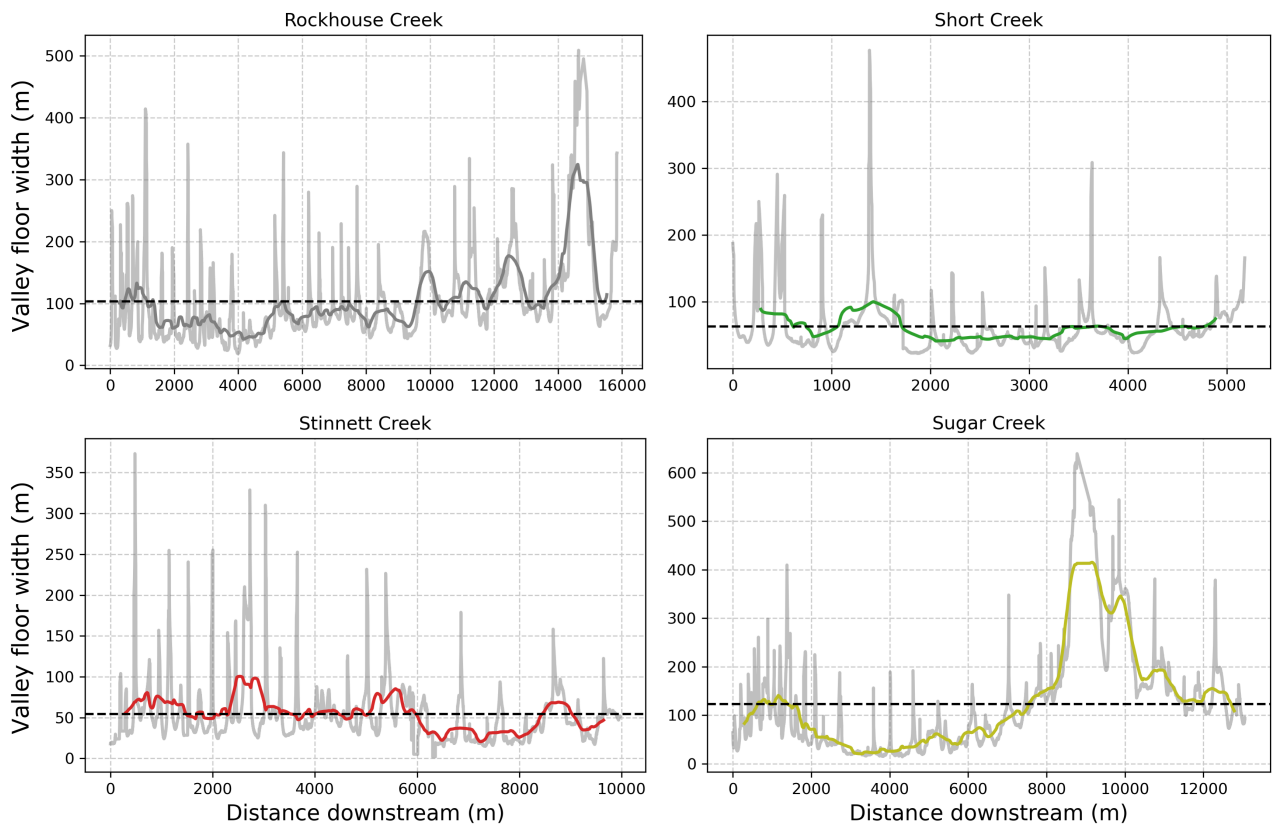


Figure S3: Width vs distance downstream for the small creeks analysed in the Cumberland Plateau. The grey data represents the raw data; coloured lines show a rolling mean through those data over a reach of 500 pixels. The dashed black line shows the mean width for each basin.

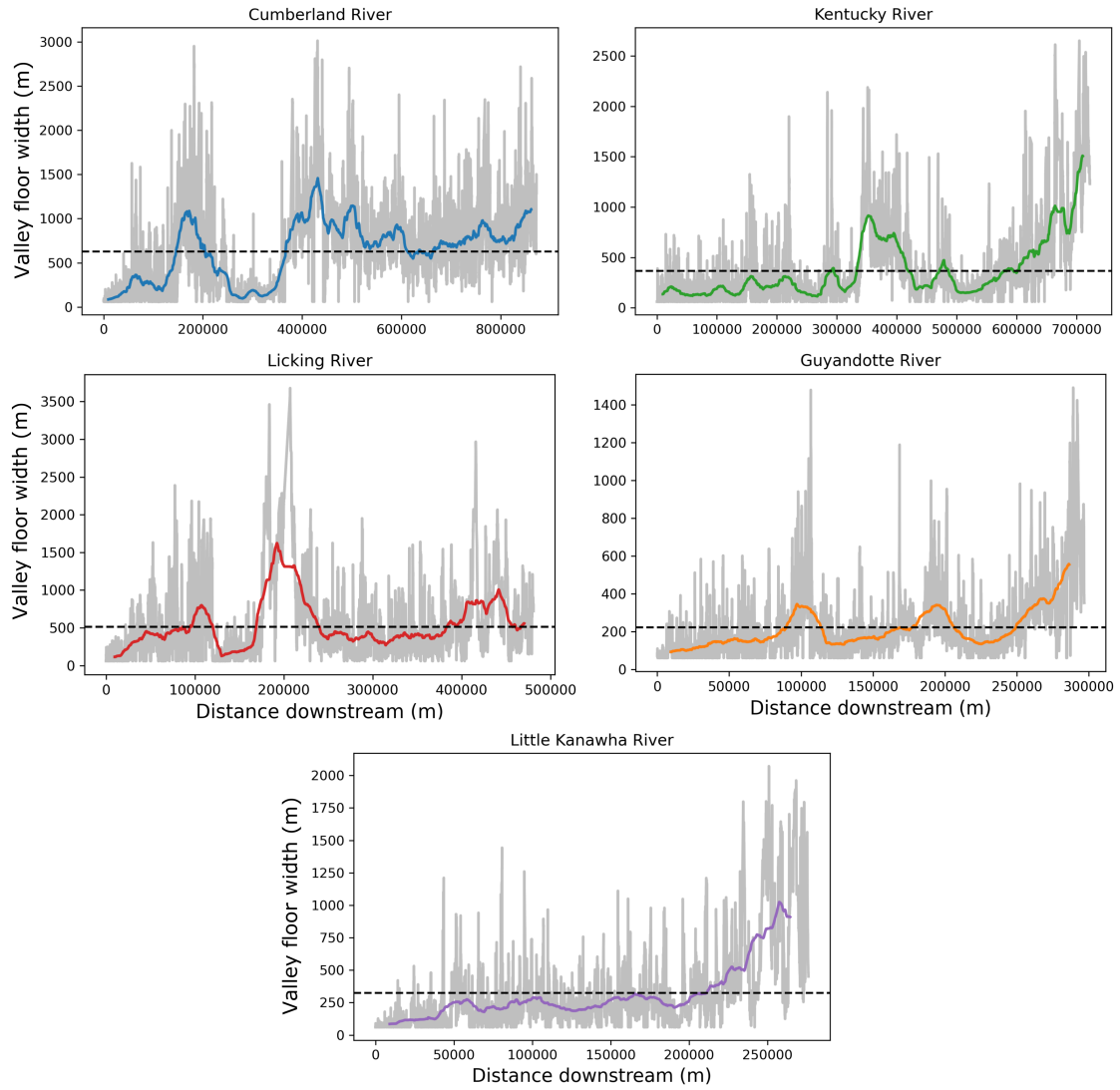


Figure S4: Width vs distance downstream for the large rivers analysed in the Appalachian Plateau. The grey data represents the raw data; coloured lines show a rolling mean through those data over a reach of 500 pixels. The dashed black line shows the mean width for each basin.

3 Thresholds for extracting floodplains

This section documents the thresholds used to extract the floodplains for each field site.

Field site	Relief threshold (m)	Slope threshold (m)	Node spacing	Search distance (m)
River Tweed	10	0.1	100	400
Weardale	25	0.1	200	400
Russian River	20	0.1	100	200
Bullskin Creek	10	0.1	100	150
Crane Creek	12	0.1	200	300
Elisha Creek	12	0.1	200	300
Flat Creek	12	0.1	200	300
Gilbert's Big Creek	12	0.1	200	300
Hell Creek	12	0.1	200	300
Rockhouse Creek	12	0.1	200	300
Short Creek	12	0.1	200	300
Stinnett Creek	12	0.1	200	300
Sugar Creek	12	0.1	200	300
Cumberland River	10	0.05	50	50
Guyandotte River	10	0.05	50	50
Kentucky River	10	0.05	50	50
Licking River	10	0.05	50	50
Little Kanawha River	10	0.05	50	50

Table S1: Thresholds used to extract floodplains for each field site. The relief threshold is the elevation of each pixel above the nearest modern channel pixel from the D8 flow routing. The node spacing is spacing between individual channel nodes used to calculate the overall flow direction, from which width is measured along the orthogonal direction. Increasing the width node spacing smooths meanders along the valley. The search distance is the search radius from the modern channel to the edge of the valley which is used to identify the valley walls - this should be set as around half of the overall valley width.