

# **Cross-Section**

**Cross-section Overview**

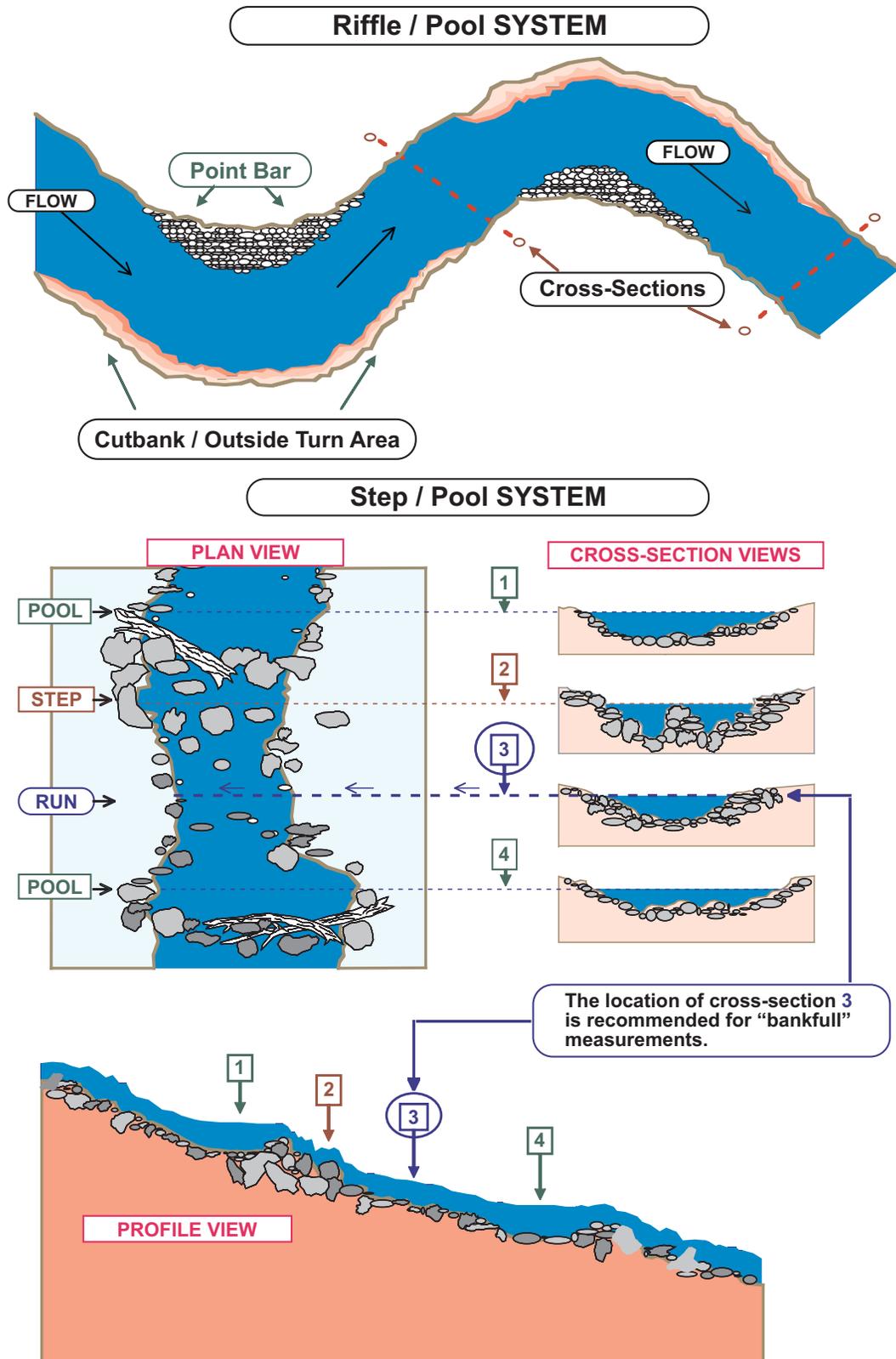
**Cross-Section Instructions**

**Sample Cross-section Survey Notes**

**Cross-section Survey Forms**

# Cross-Section Locations

Appropriate locations to measure bankfull widths corresponding to a consistent normal high flow (bankfull) stage are indicated for riffle/pool and step/pool channels in **Figure A-5**.



**Figure A-5.** Recommended cross-section locations for bankfull cross-sectional area measurements.

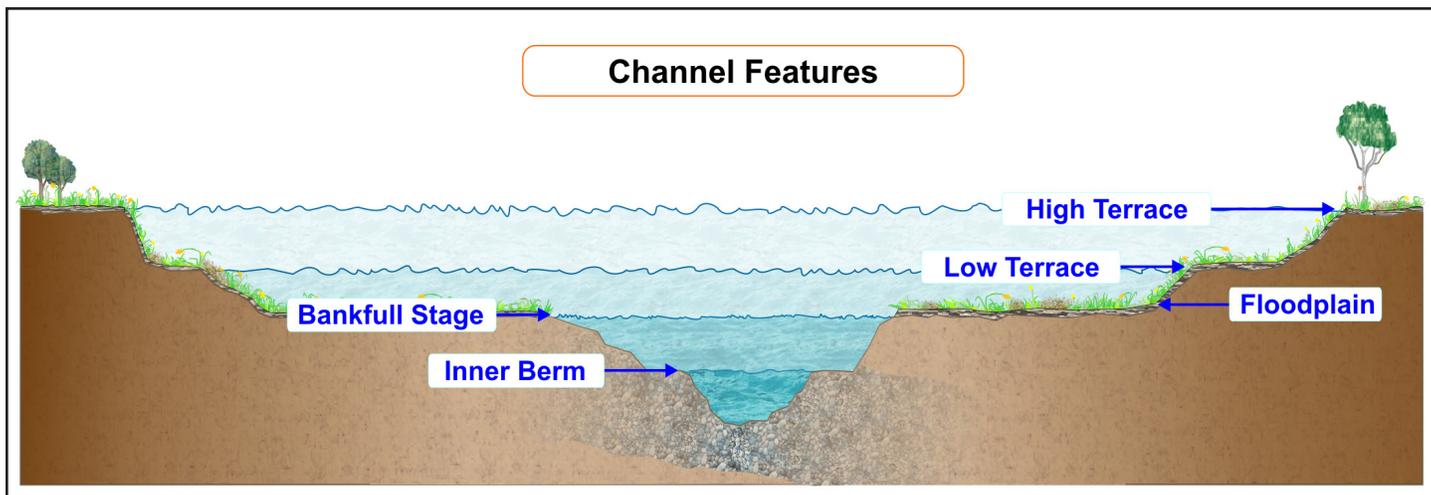


Figure A-6. Typical channel features for a C Stream Type in a terraced, alluvial Valley Type VIII.

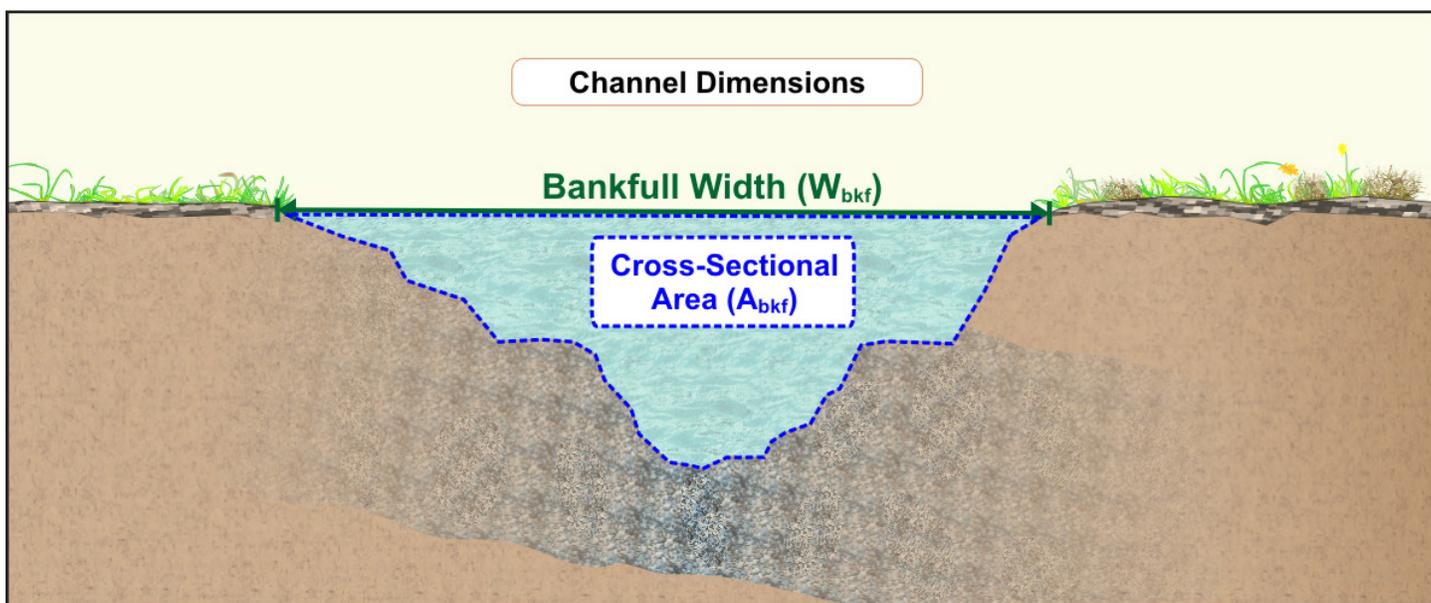


Figure A-7. Bankfull width and Cross-sectional area obtained from the riffle cross-section.

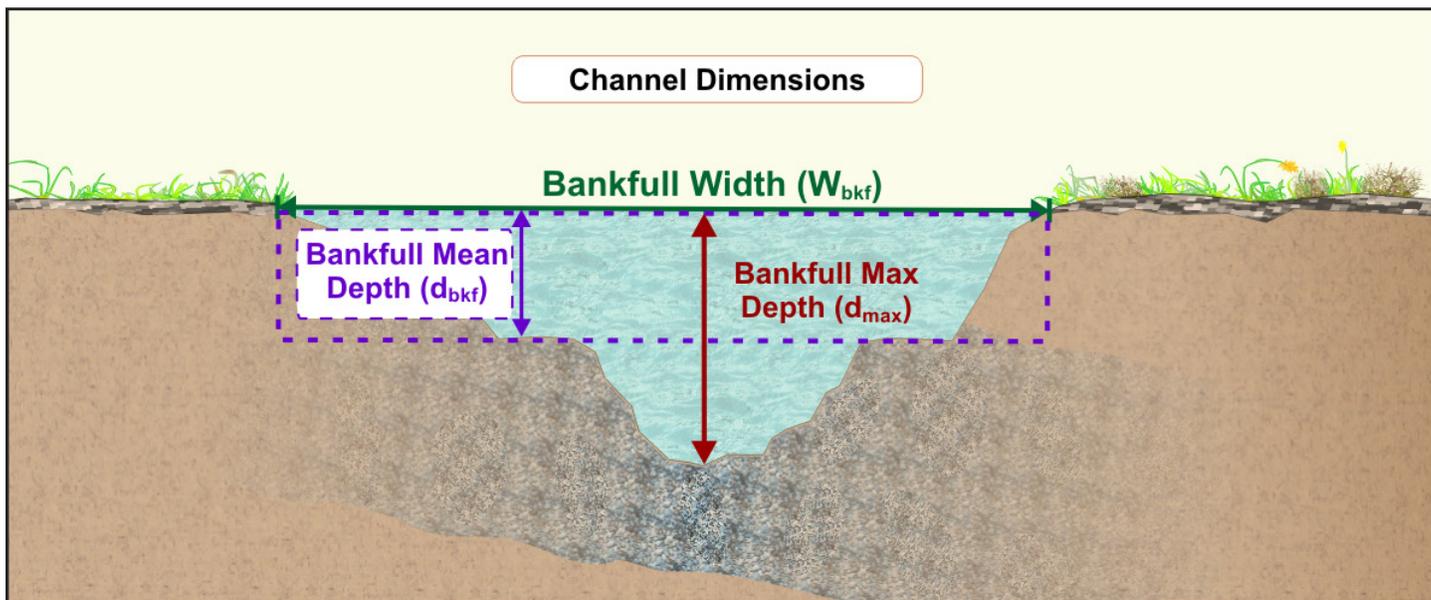
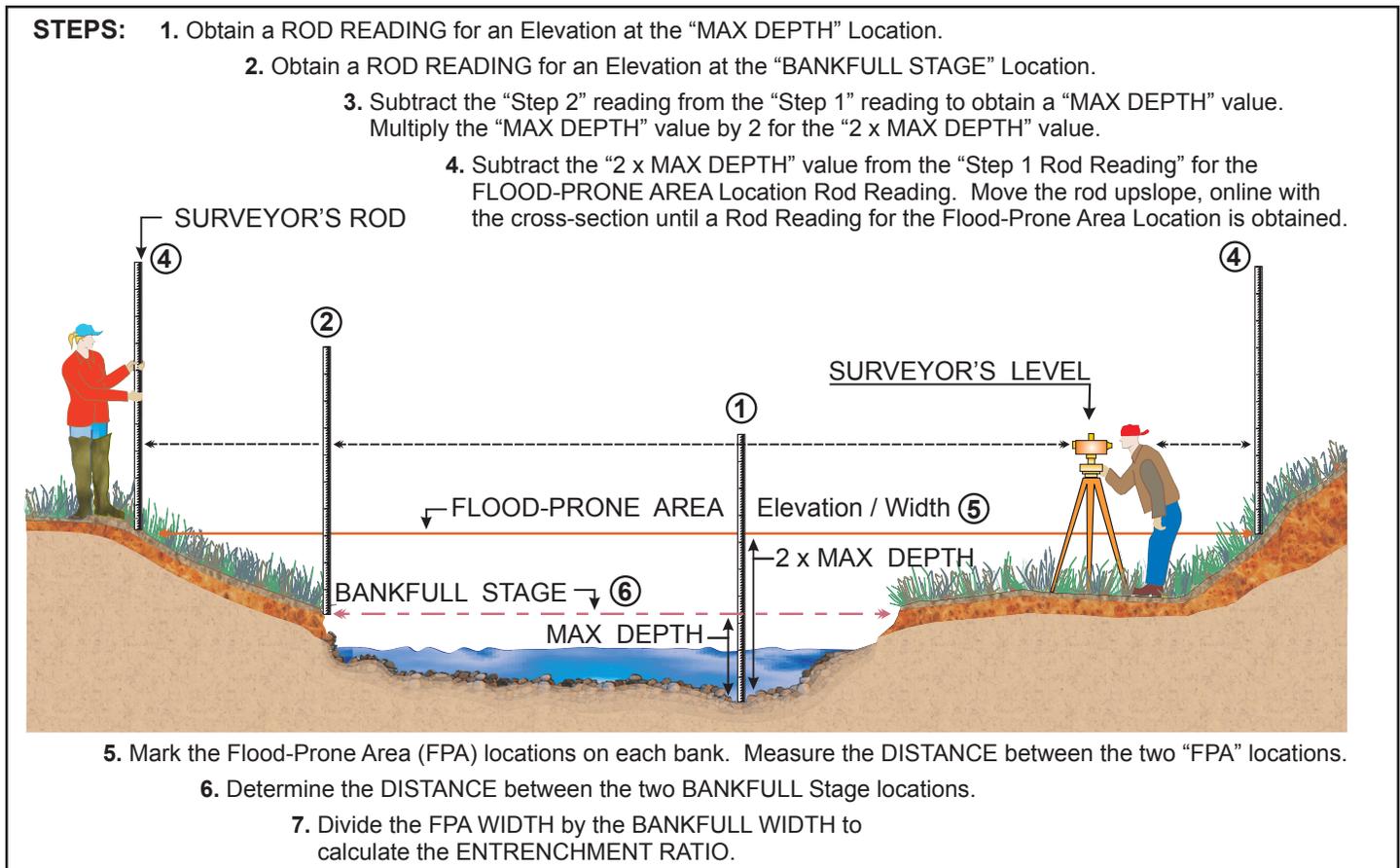
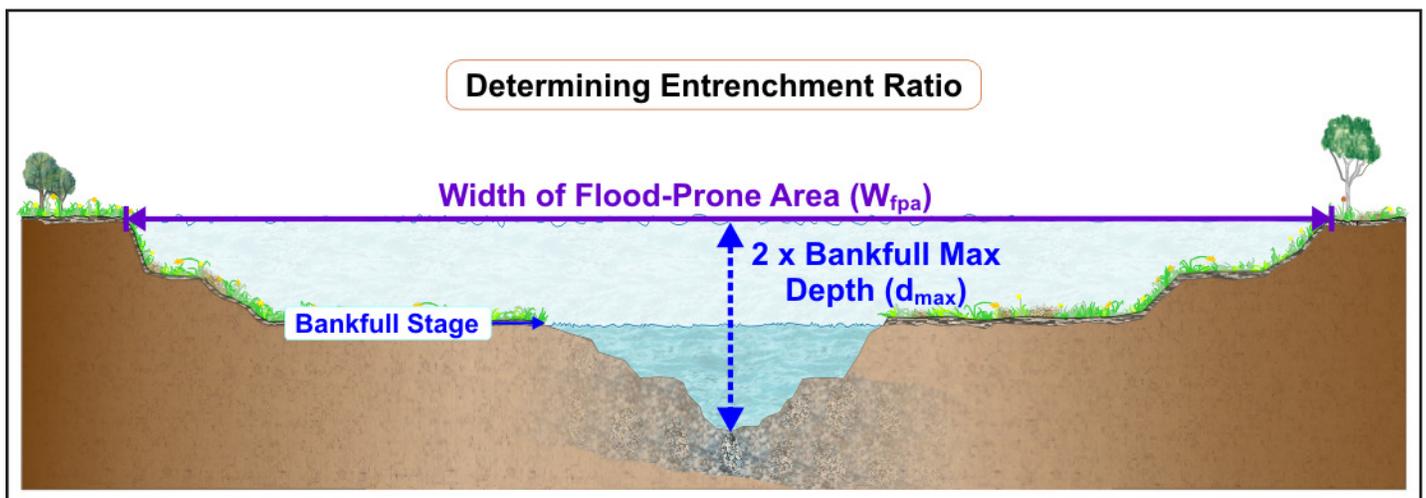


Figure A-8. Bankfull mean depth and bankfull maximum depth obtained from the riffle cross-section.



**Figure A-9.** Determining Entrenchment Ratio.



**Figure A-10.** Determining Width of the Flood-Prone Area ( $W_{fpa}$ ).

## Cross-Section Instructions

1. Setup the surveying instrument in a location where the entire cross-section can be viewed. The instrument should be placed at an elevation higher than the highest feature required for the survey. Ideally, only one instrument setup will be required to survey the entire cross-section; however, determining the width of the flood-prone area may require multiple instrument setups due to dense foliage.
2. Stretch the tape across the channel (**zero on left bank**) making sure the tape is perpendicular to the bankfull discharge flow – not the baseflow.
3. Backsight (BS) a benchmark or permanent feature used for relocation or resurvey of cross-section.
4. Calculate Height of Instrument (HI);  $HI = BS + \text{Elevation (known or relative)}$ .
5. Obtain rod readings (Fore-Sights) at major breaks in bed elevation and key features, such as left bankfull (LBKF), left edge water (LEW), Thalweg (THL), right edge water (REW) and right bankfull (RBKF).
6. Record the distance on the stationing tape, the corresponding rod height and feature notes in the cross-section forms (see **Table A-2** for example).
7. Measure the flood-prone area width (width of the channel at an elevation that is two times the maximum bankfull depth) (**Figure A-10**) – be sure to measure perpendicular to the fall line of the valley.
8. Plot cross-section; calculate the bankfull cross-sectional area and bankfull width (**Figure A-11, Table A-3**).
9. Calculate bankfull mean depth, width/depth ratio and entrenchment ratio (**Table A-4**).
10. Using the appropriate regional curves, check to make sure the cross-sectional area, bankfull width and depth are reasonable. Make sure the bankfull velocity is reasonable ( $\text{velocity} = \text{bankfull discharge} / \text{bankfull area}$ ).
11. Record all data in the appropriate forms (**Worksheet A-1** and **Worksheet A-3**).

**Table A-2.** Form to record cross-section notes with example data.

SURVEY DATA $\longrightarrow$ CROSS - SECTION 1						
SITE: Lower Nevada Creek nr Helmville, MT					Date: 8/8/06	
Location: nr USGS Gauge # 12335500						
Party / Notes: Team #4			HUC: <input type="text"/>			
Item	Distance, Point, or	Back-Sight	Height of Instrument	Fore-Sight	Elevation	REMARKS
	STATION	B S	H I	F S		
	ft	ft	ft	ft	ft	NOTES
1	BM	5.0	105.0		100	Benchmark
2	0			8.00	97.00	LBKF
3	2			8.25	96.75	
4	3			8.80	96.20	
5	6			9.00	96.00	
6	8			9.50	95.50	LEW
7	12			10.00	95.00	
8	16			9.95	95.05	THL
9	19			9.50	95.50	REW
10	21			9.00	96.00	
11	22			8.45	96.55	
12	25			8.00	97.00	RBKF
13						
14						

<b>SURVEY DATA</b>		→ <i>CROSS - SECTION</i>				<i>1</i>
<b>SITE:</b>					<b>Date:</b>	
Location:						
Party / Notes:					HUC: <input style="width: 20px; height: 20px;" type="text"/>	
Item	Distance, Point, or	Back-Sight	Height of Instrument	Fore-Sight	Elevation	<div style="border: 1px solid black; padding: 2px;"> <div style="float: right; border: 1px solid black; padding: 2px; font-size: small;">REMARKS</div> <div style="border: 1px solid black; padding: 2px; font-size: small; margin-bottom: 2px;">COMMENTS</div> <div style="border: 1px solid black; padding: 2px; font-size: small;">NOTES</div> </div>
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<b>SURVEY DATA</b>		<b>CROSS - SECTION 2</b>				
<b>SITE:</b>					Date:	
	<b>STATION</b>	<b>B S</b>	<b>H I</b>	<b>F S</b>	<b>Elevation</b>	<b>NOTES</b>
Item	ft	ft	ft	ft	ft	COMMENTS
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