

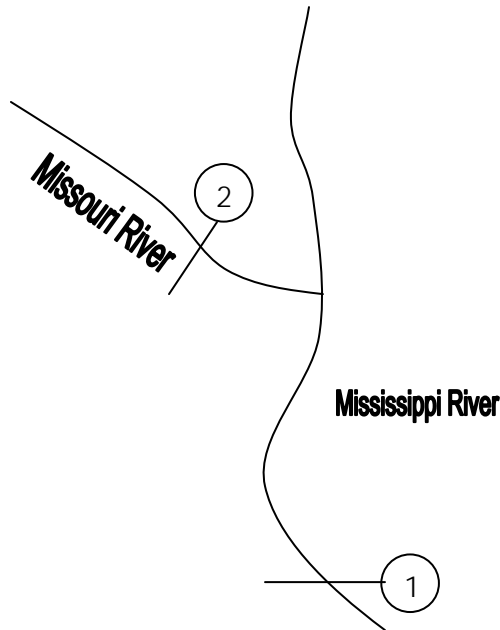
CIVE 413 – ENVIRONMENTAL RIVER MECHANICS

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Hydraulic Geometry and Relative Stability

1. You are given data on the Mississippi and Missouri Rivers:



1. Mississippi River

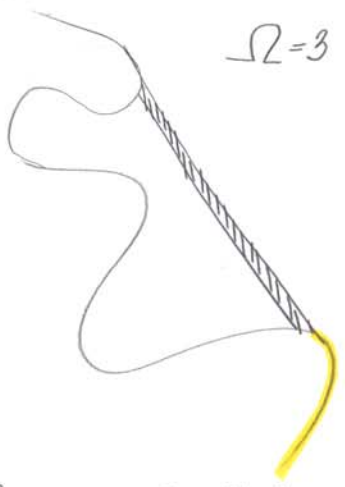
- $Q = 1,000,000$ cfs (bankfull)
- $W = 2000$ feet
- $H = 60$ feet

2. Missouri River

- $Q = 200,000$ cfs (bankfull)

- Determine the hydraulic geometry of the Missouri River. (HINT: Must determine necessary coefficients and used appropriate hydraulic geometry equation)
 - If the flow in the Mississippi River is reduced to 500,000 cfs, determine the change in W , h , and V .
2. In class on Thursday we looked at 5 different scenarios. We determine the Lane's relationship, tendency towards Braiding or Meandering and changes in hydraulic geometry. Using Figure 5.13 in Highways in the River Environment, determine approximately where you are on the diagram and the relative stability of each scenario, explain your answer. Also determine whether there is an increase or decrease in velocity, bed load and stability.

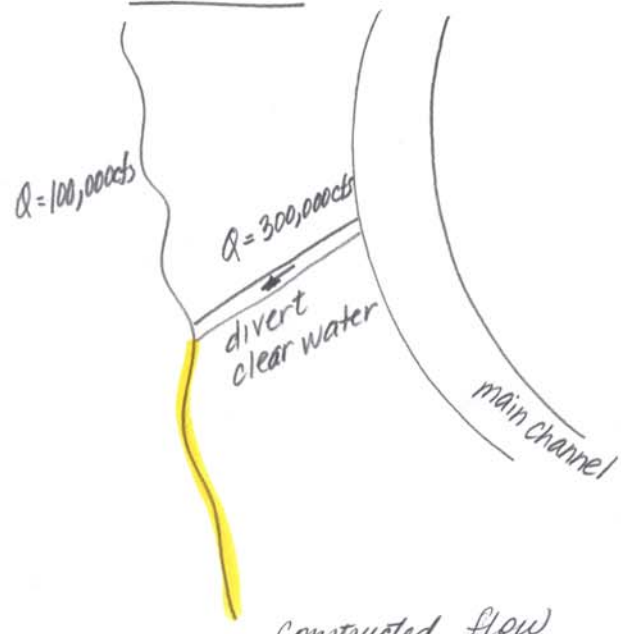
CASE #1



$\Omega=3$

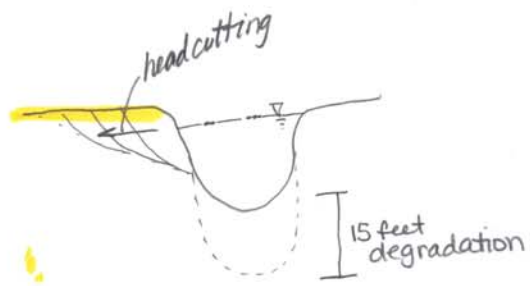
Constructed Cutoff for flood control.

CASE #2



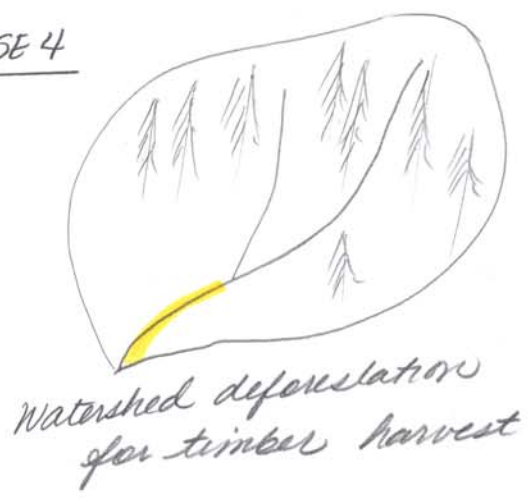
Constructed flow diversion for agriculture

CASE #3



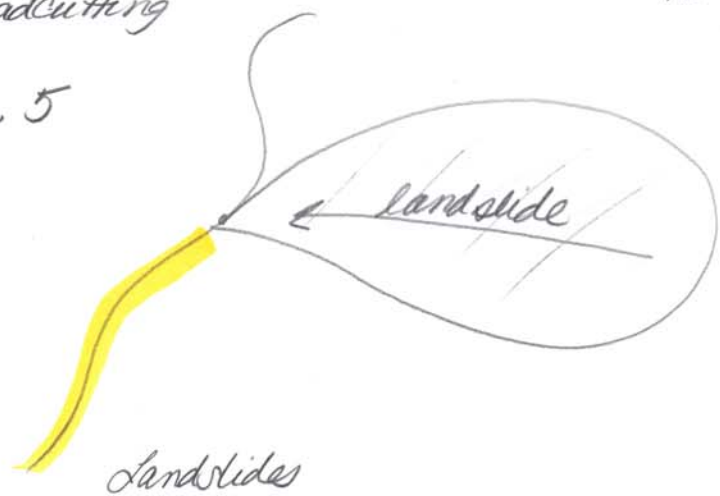
Headcutting

CASE 4



Watershed deforestation for timber harvest

Case 5



Landslides