

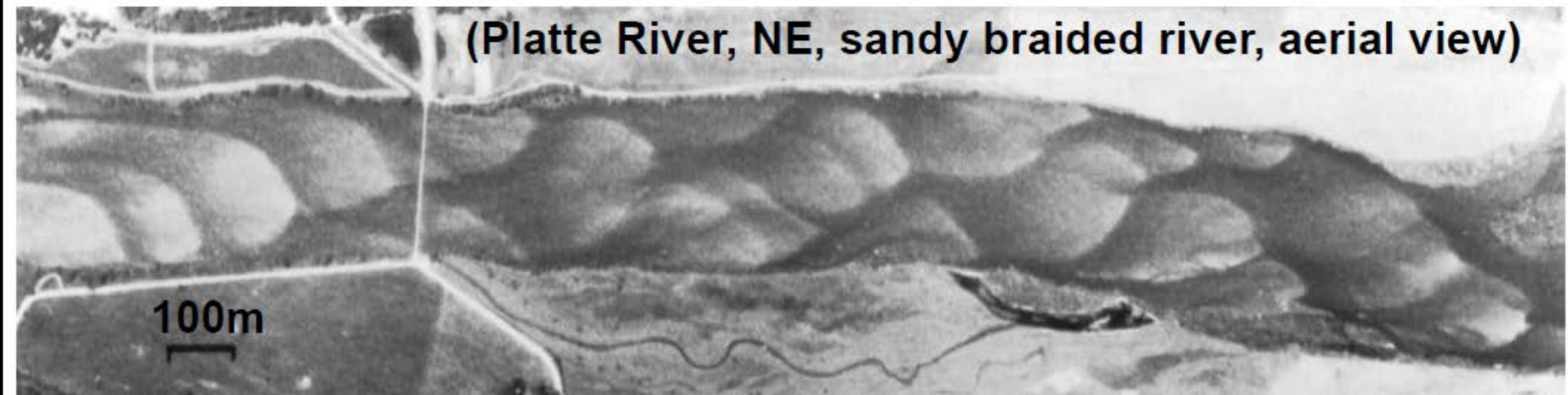
Braided Rivers

**Toutle River, WA,
gravelly braided
stream-**



Individual channels within a braided river are very active, changing form via sediment erosion and deposition between the master, vegetated banks.

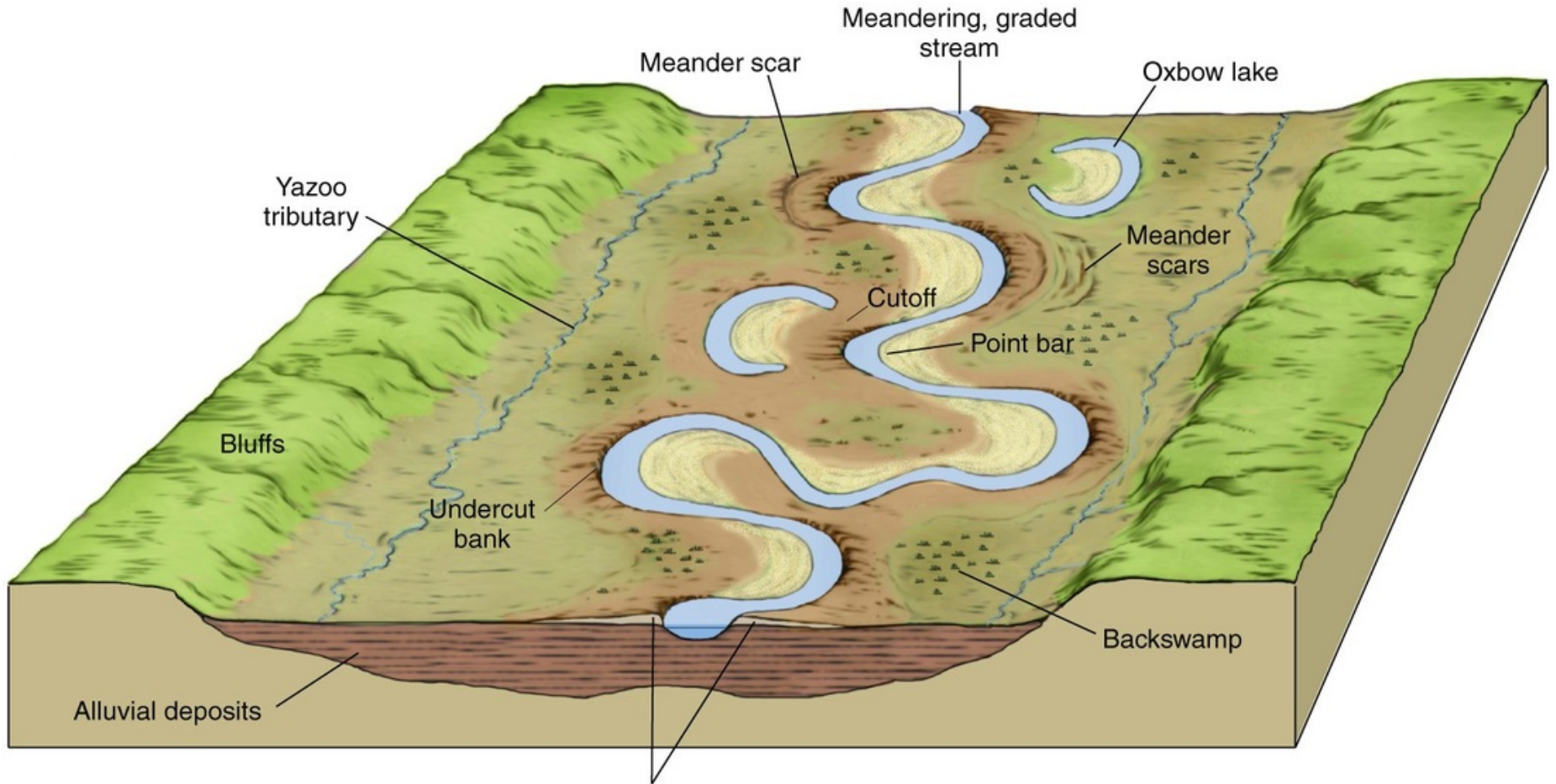
(Platte River, NE, sandy braided river, aerial view)



Deposits From Braided Rivers



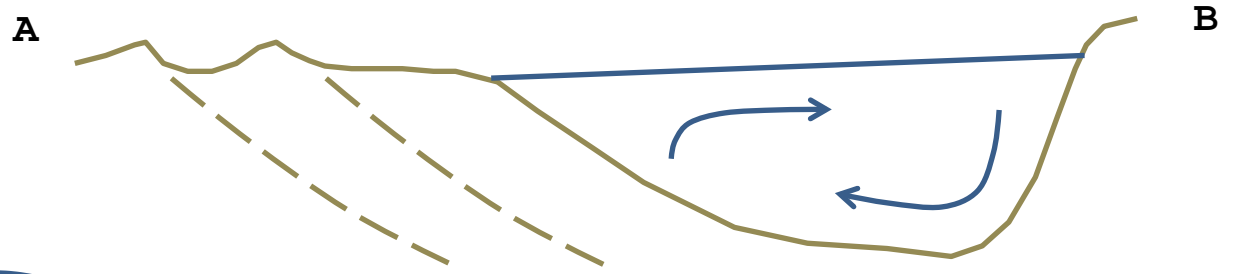
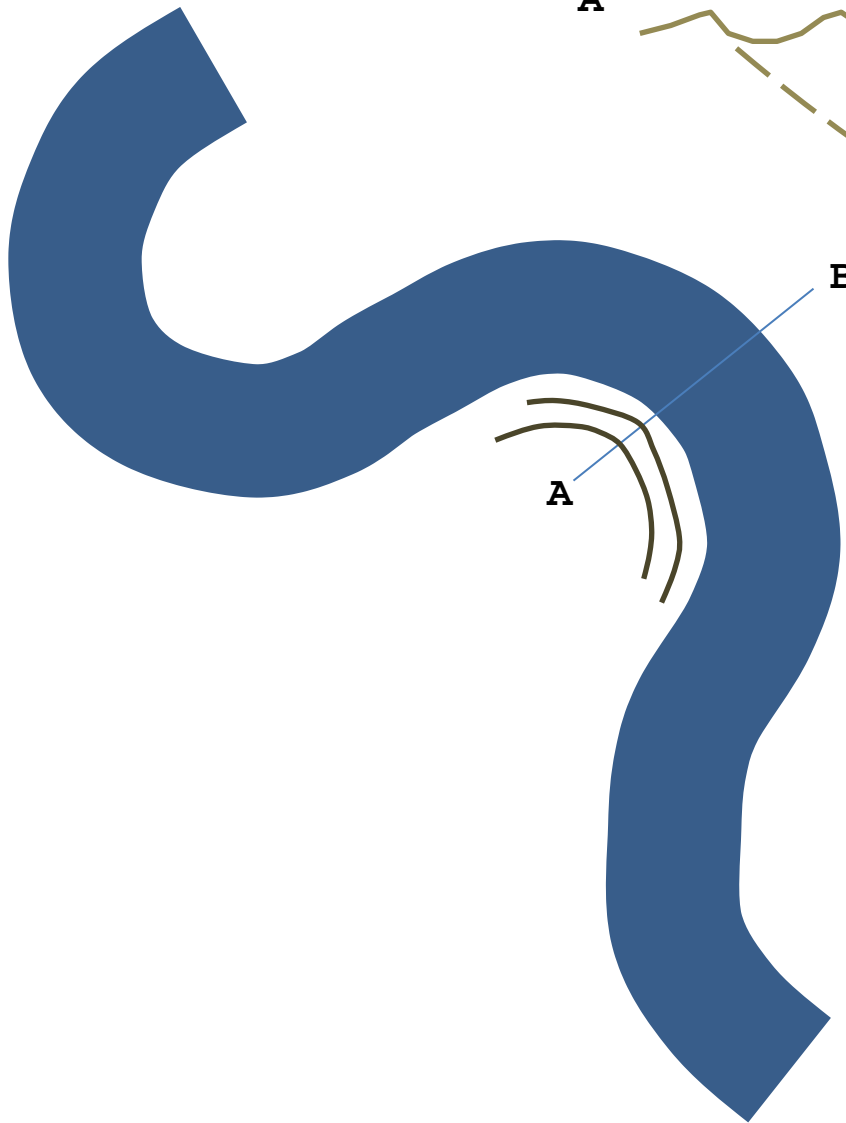
Flood Plain & Valley



Natural levees
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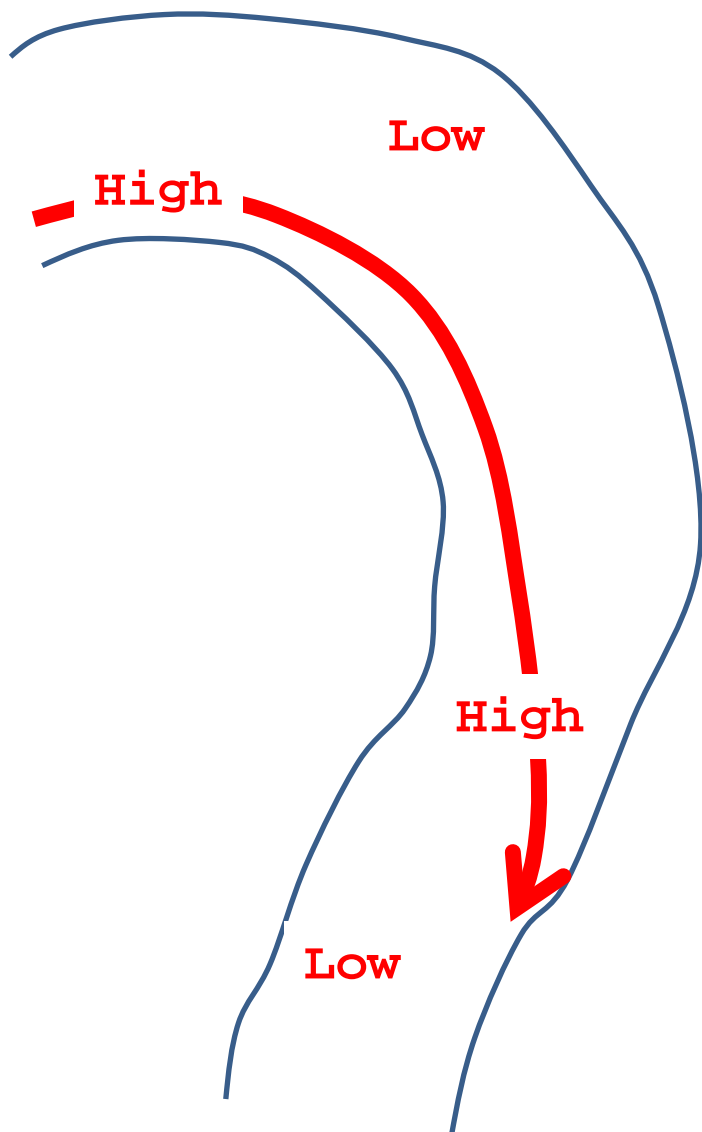
Meandering Rivers

Flow in a meander bend

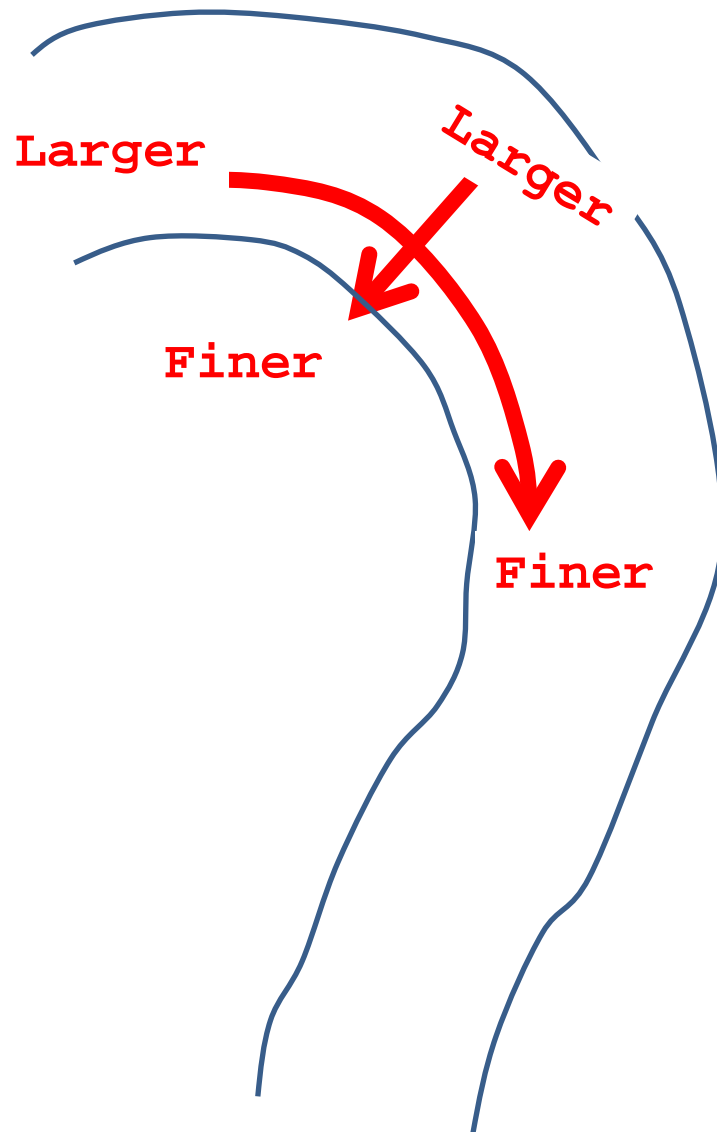


$$F_c = \rho \frac{u^2}{r}$$

Stress in a meander bend



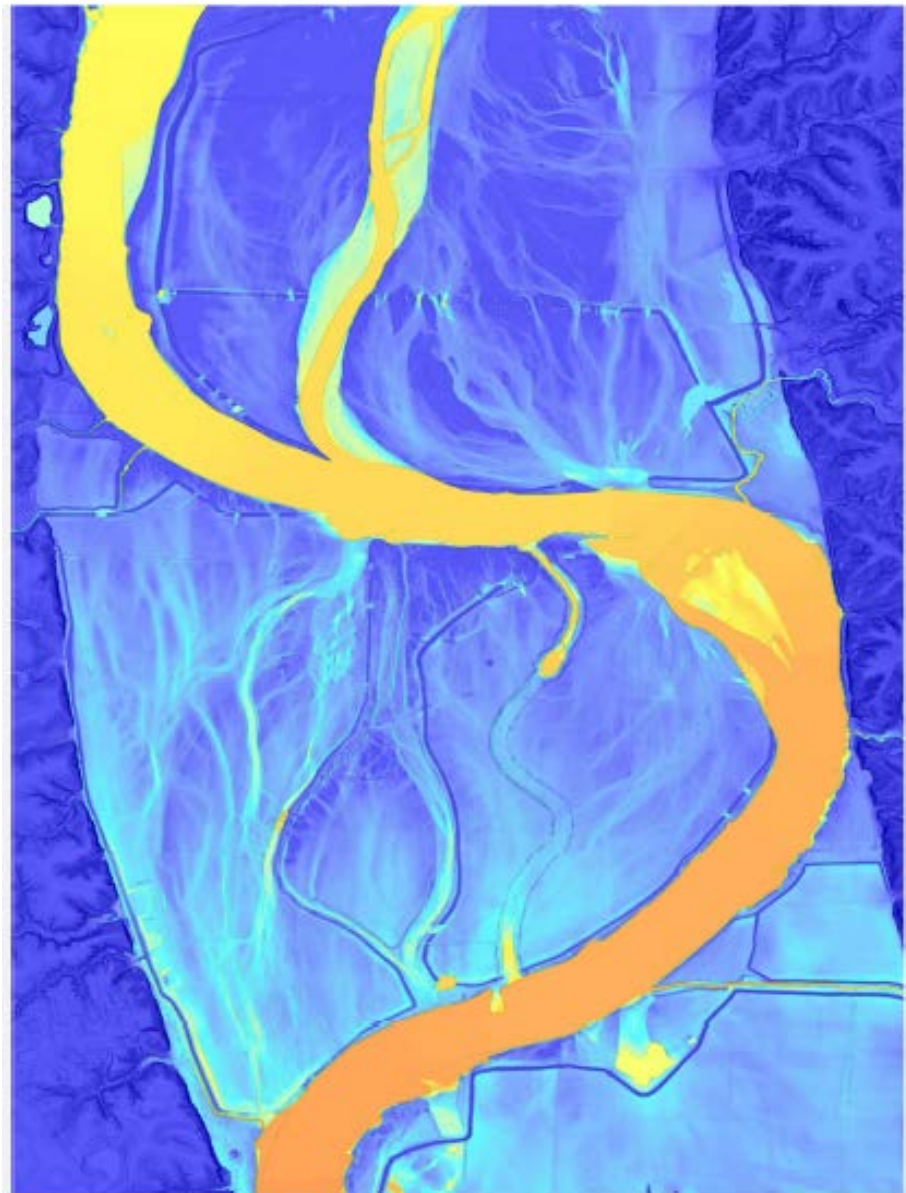
Grain size in a meander bend



Point Bar Strata



Point Bar Strata



Ancient Floodplains & Soils



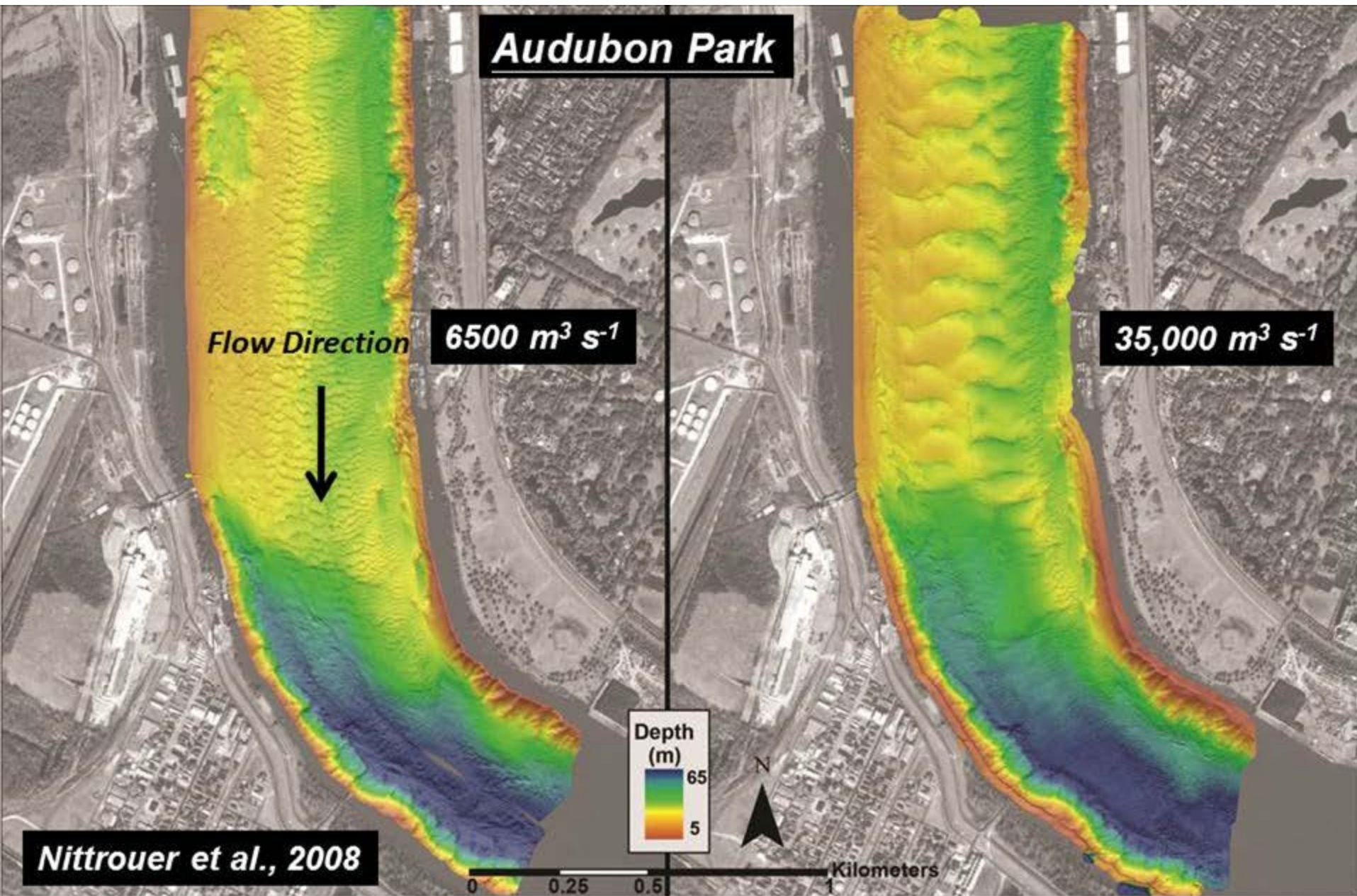
Ancient Channel Fill



Stacked Channel Sands & Floodplain Muds

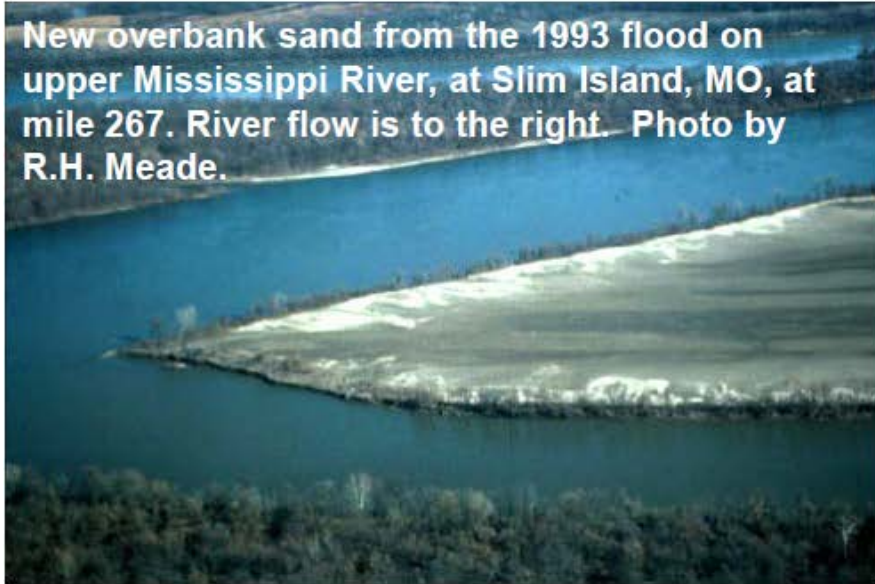


Lowland Rivers



Overbank sedimentation: Rates of overbank sedimentation are greatest near channel margins, producing natural levees.

New overbank sand from the 1993 flood on upper Mississippi River, at Slim Island, MO, at mile 267. River flow is to the right. Photo by R.H. Meade.

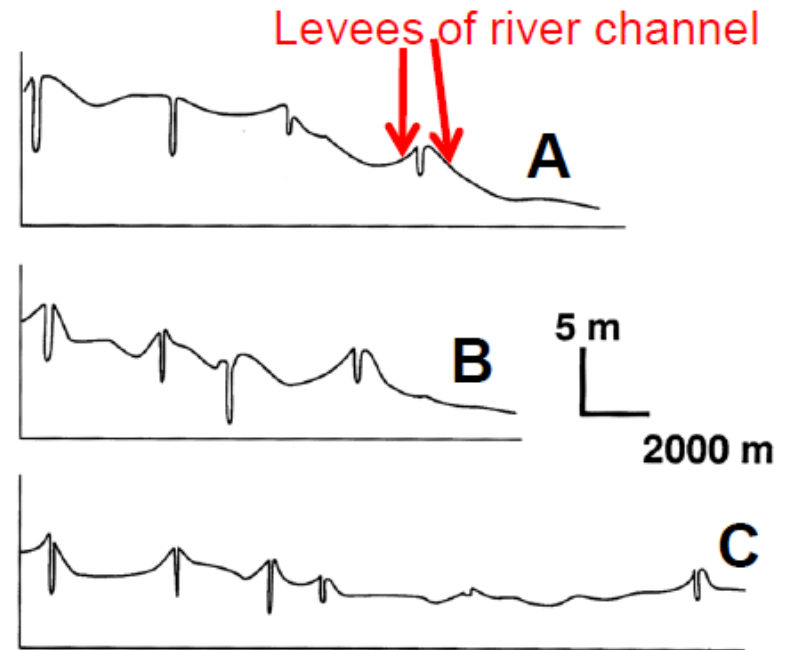
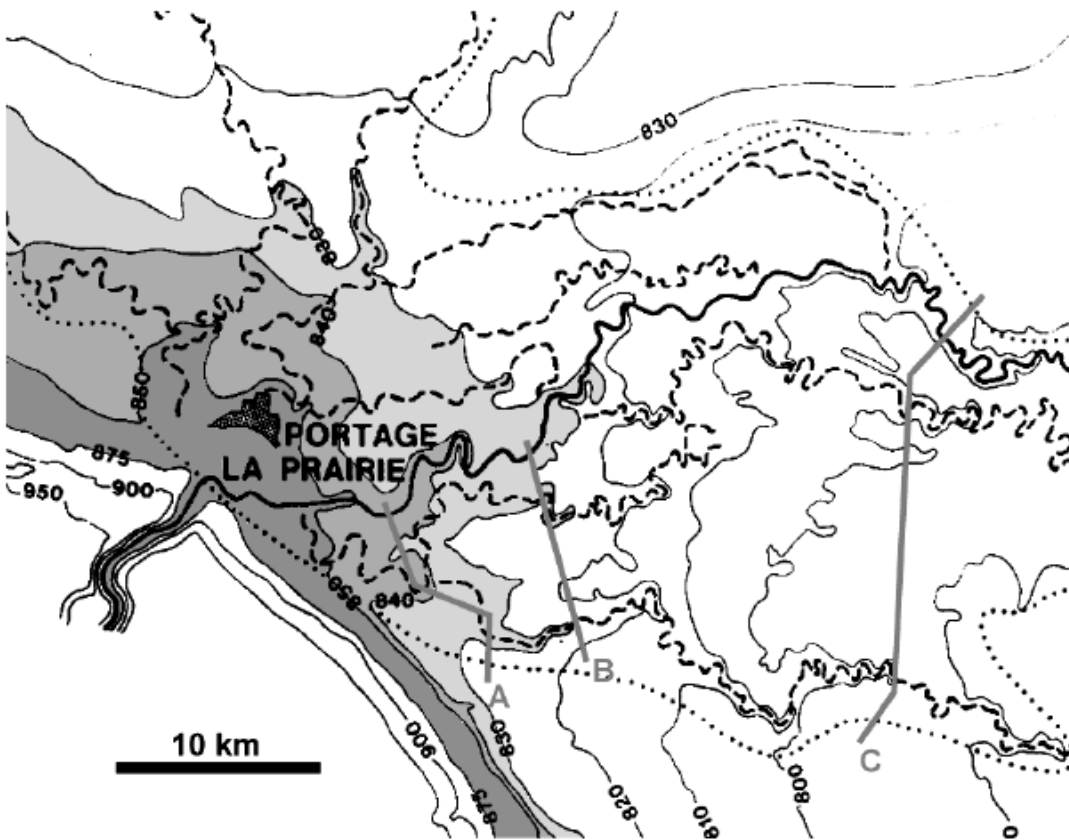


Crevasse splay sand from levee break at Bryants Creek MO crossing floodplain of upper Mississippi River near mile 260. Photo by R.H. Meade, USGS.



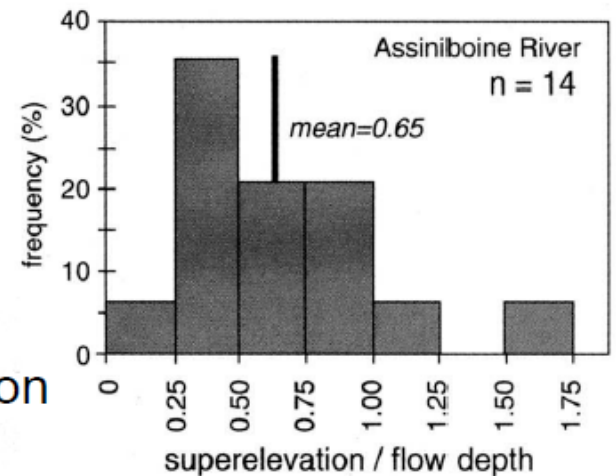
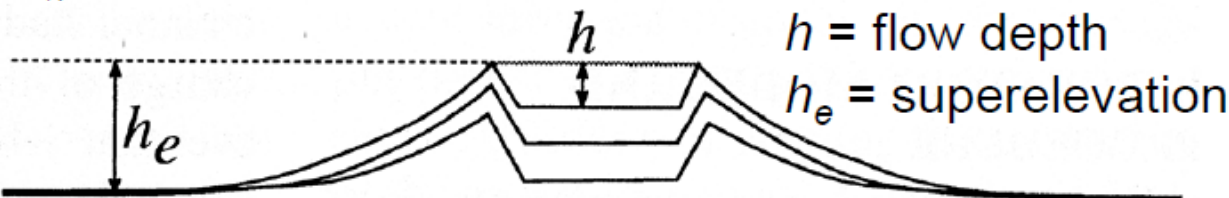
Ox-bow lake – produced by the cut-off of a meander bend

Focused sedimentation near channels results in their superelevation relative to the surrounding floodplain.

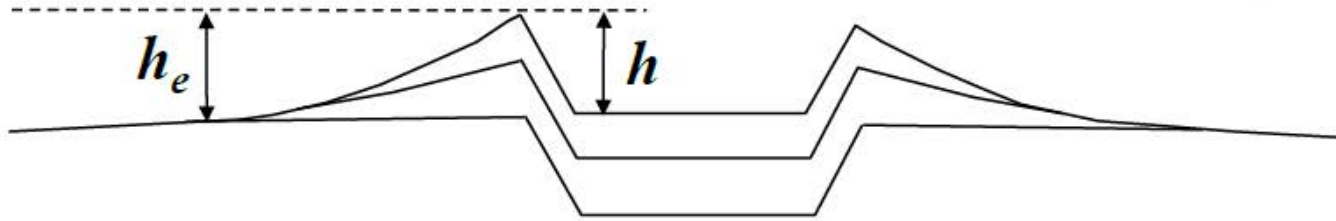


Rannie, W. F., 1990, The Portage La Prairie 'Floodplain Fan', in Rachoeki, A. H., and Church, M. (Eds.), *Alluvial Fans: A Field Approach*: John Wiley and Sons Ltd., p. 179-193.

- active channel
- abandoned channel
- location of profiles



Channel Avulsion began when channel became **superelevated**, $h_e/h \sim 1$.

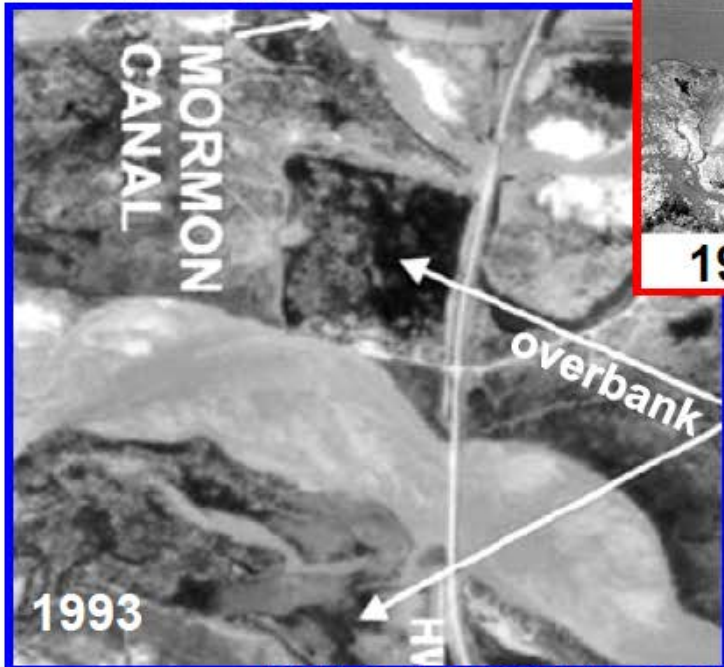


Avulsion =
relatively
rapid, lateral
change in
channel
position.

Niobrara River, NE
Pre-avulsion



1999



1993



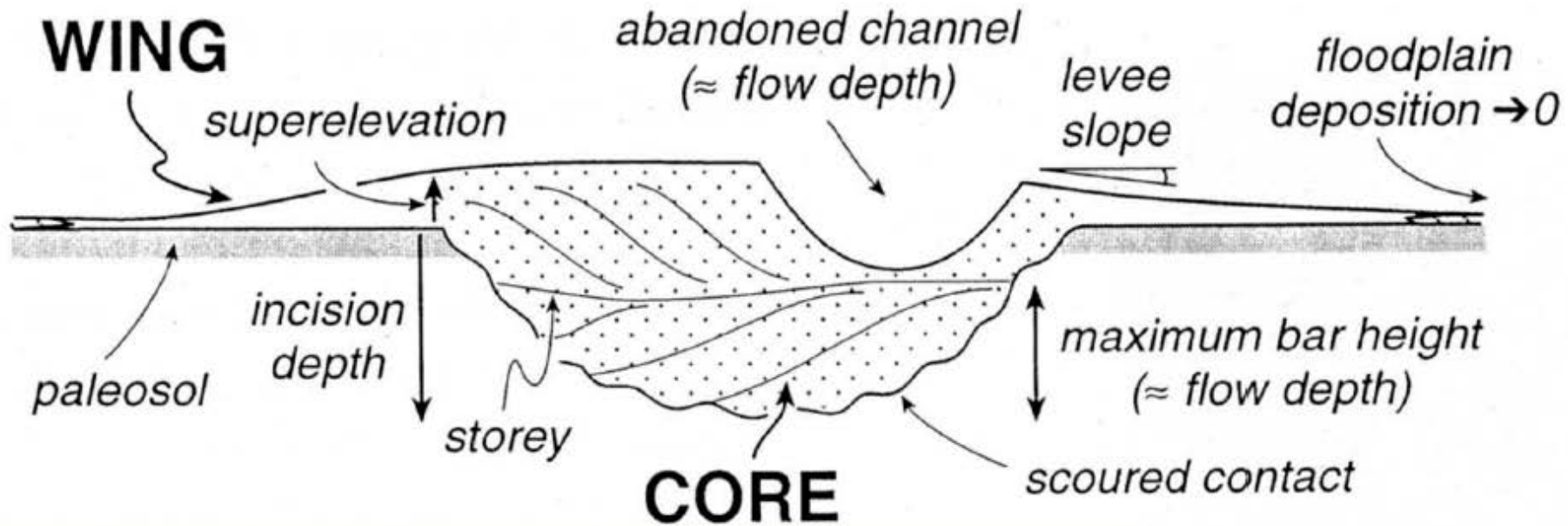
2003

bank

(Skelly, Bristow & Ethridge, 2003)

Architecture of a channel-fill

Connecting channel-filling and overbank sedimentation



Organization of strata from an avulsing river

