Downstream Impacts of Reservoir Sedimentation

RSM-U Reservoir Sediment Management Workshop
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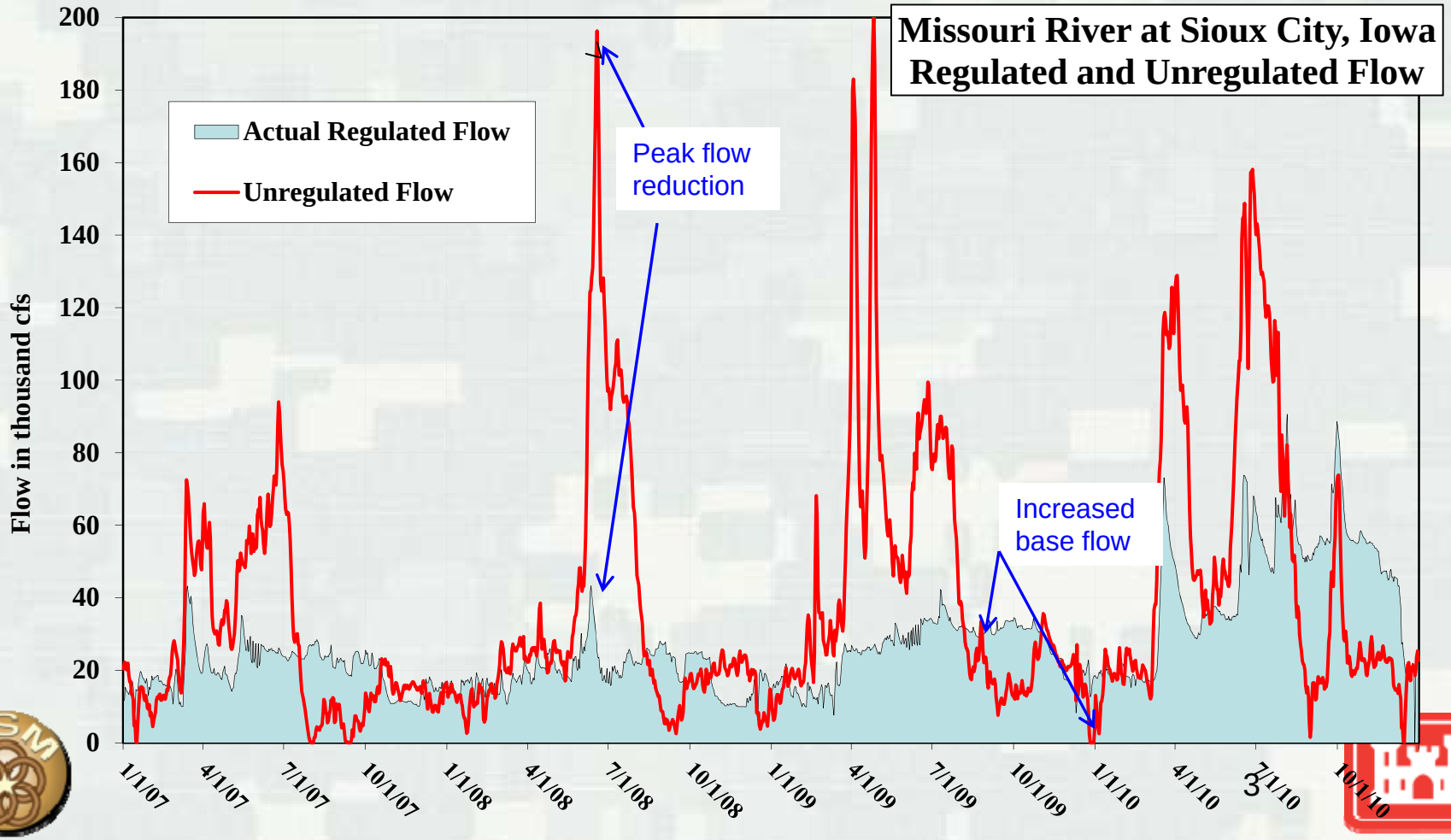
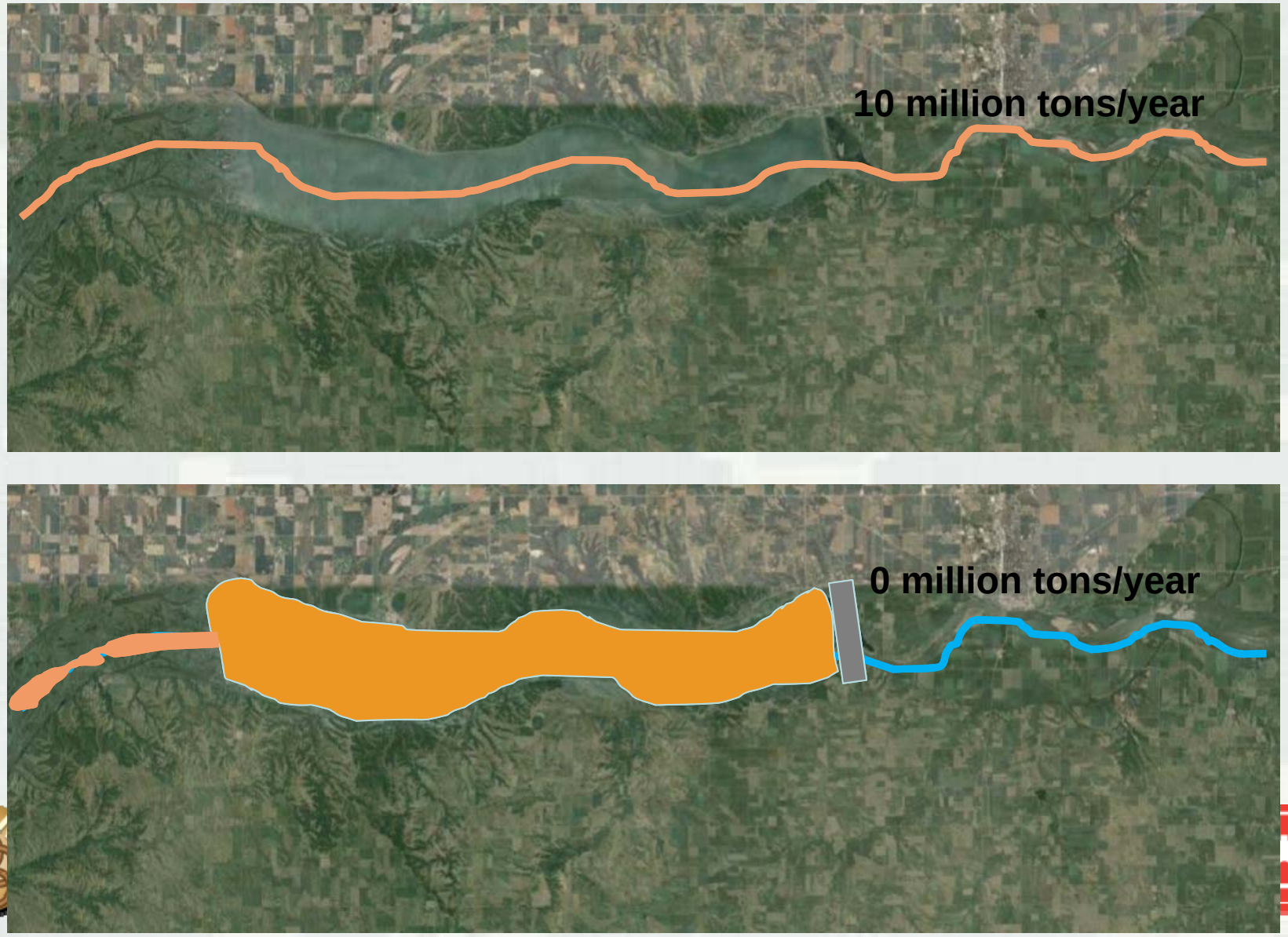
Impact of Dams

- Flow regulation
- Habitat segmentation
- Sediment trapping

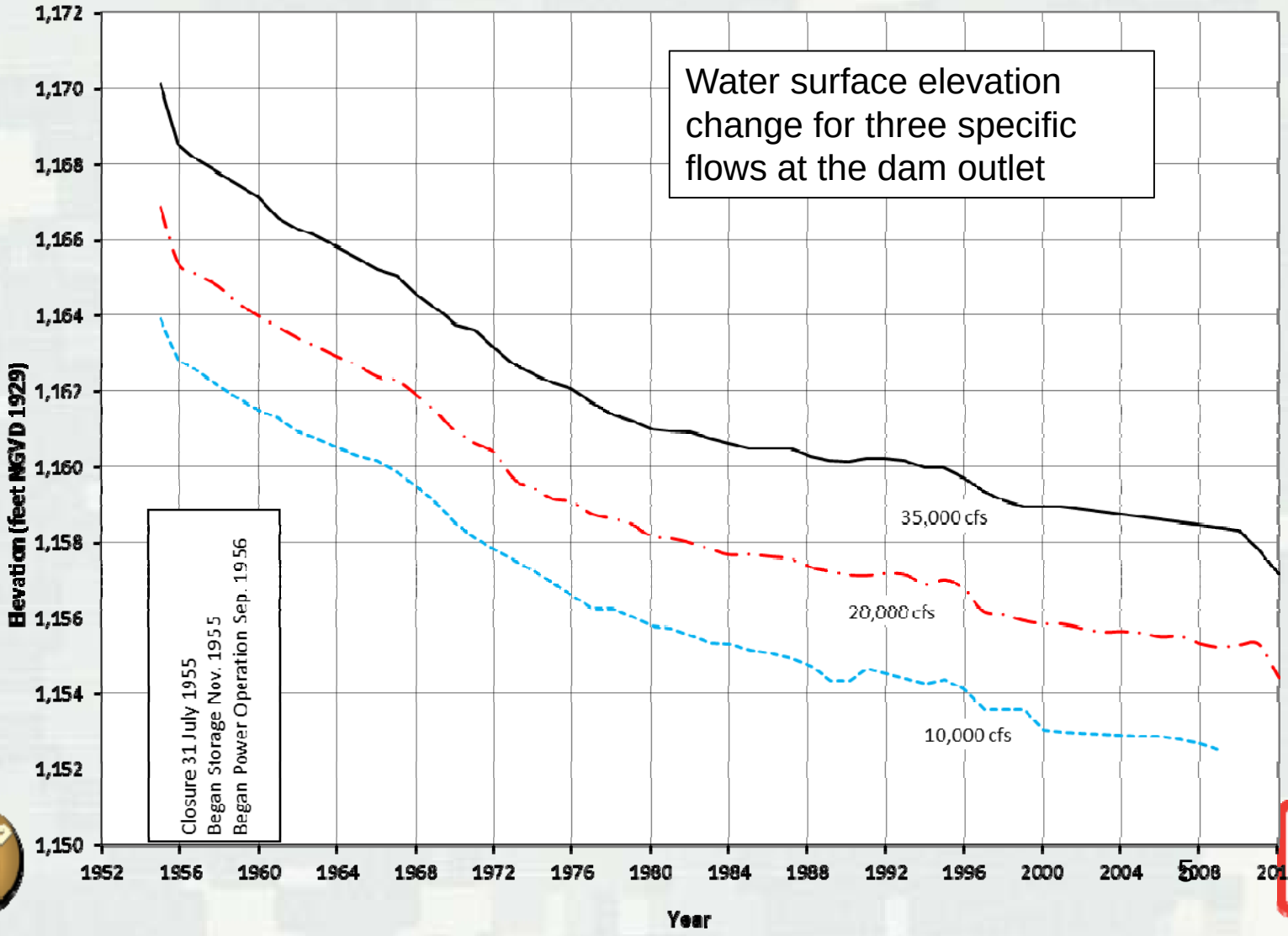
Example of Flow Regulation



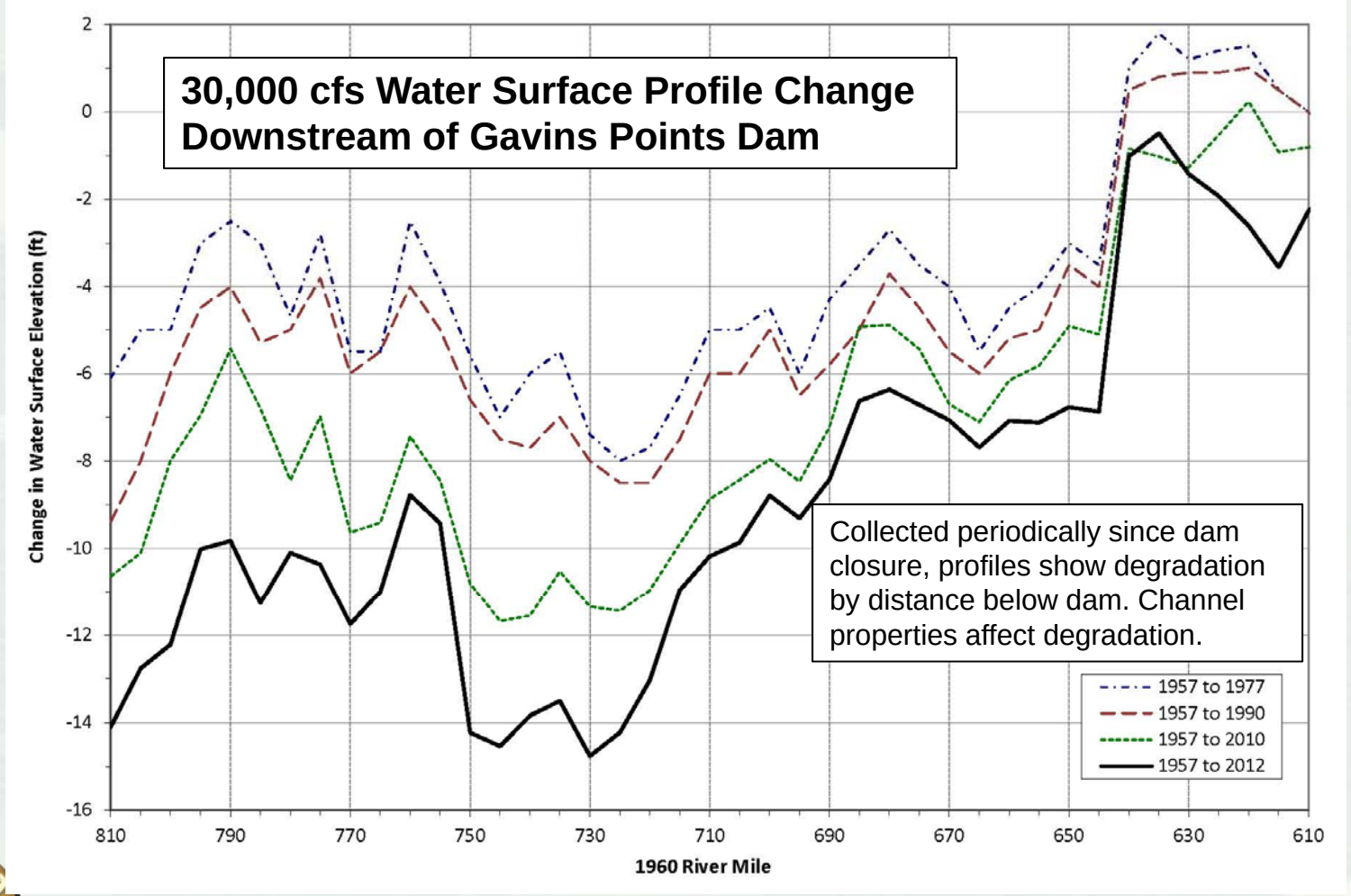
Sediment Trapping



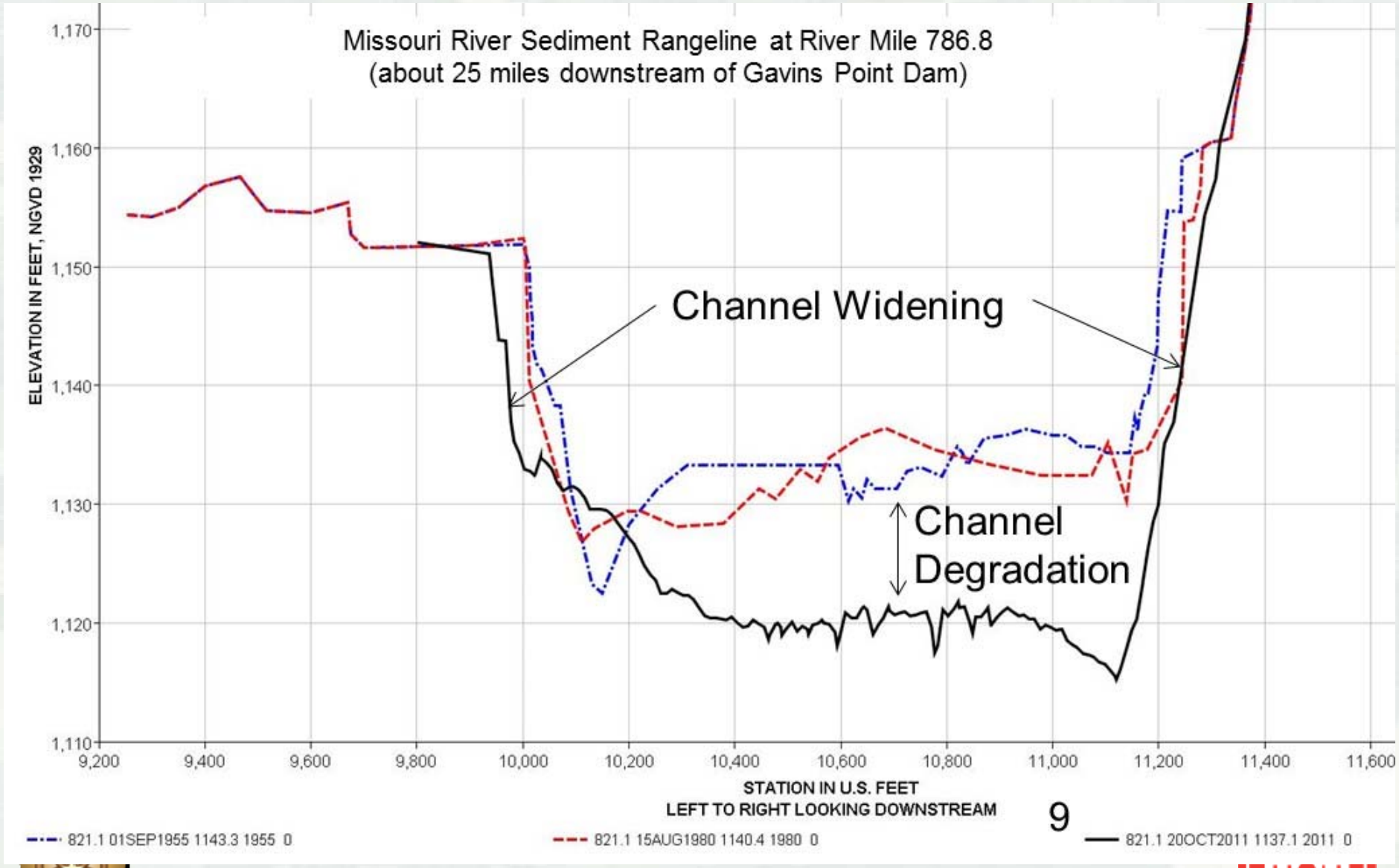
Degradation Downstream of Gavins Point Dam



Missouri River Water Surface Change from 1957



Typical Downstream Cross Section



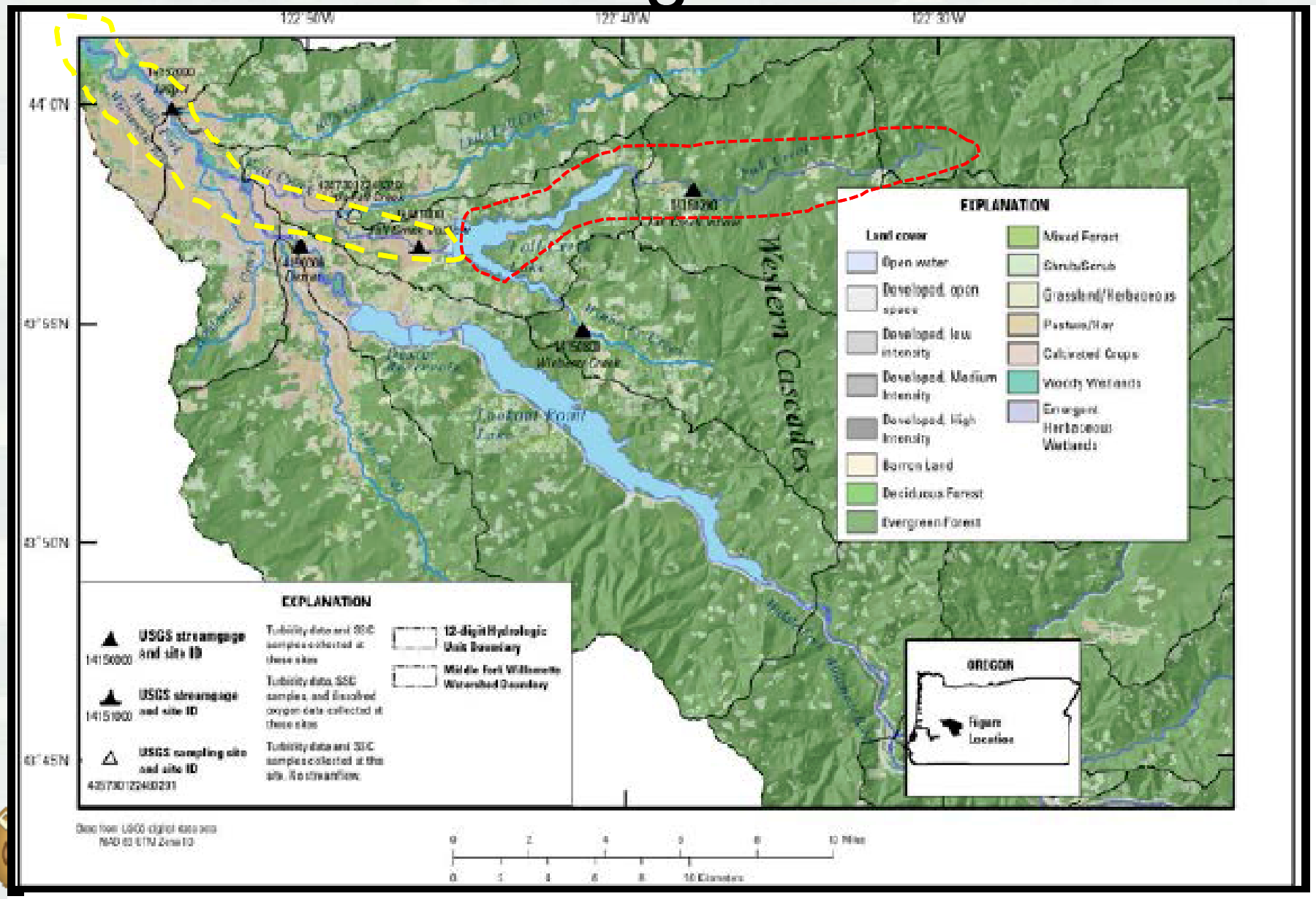
Undermining of Bridge Piers (Mainstem and Tributaries)

Line Creek, Tributary to the Missouri River in Kansas City

Exposure of Utility Lines

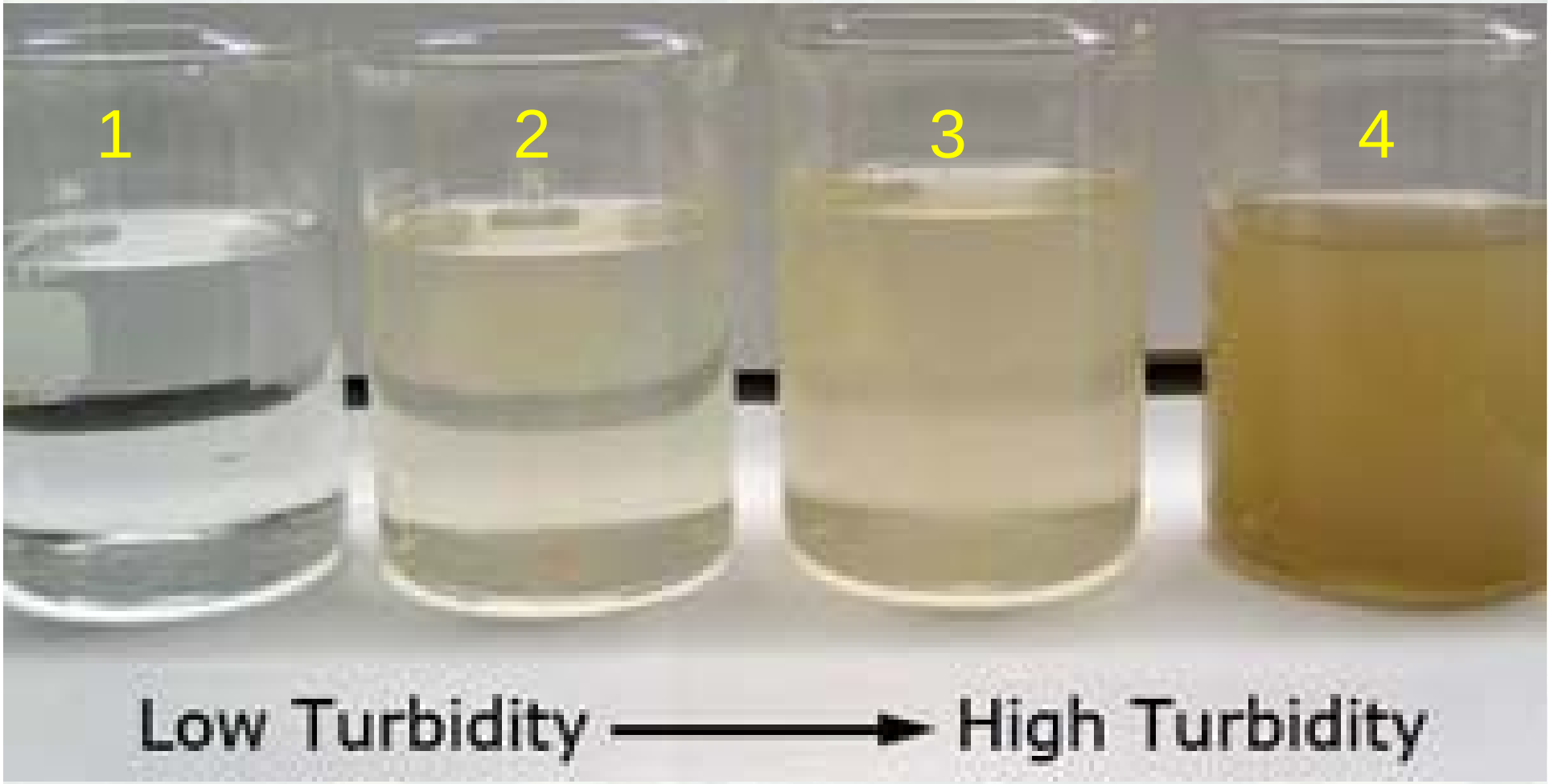
Head-cutting up a tributary to the Missouri River has exposed a 36” sanitary sewer line

Habitat Segmentation



Water Clarity Problems

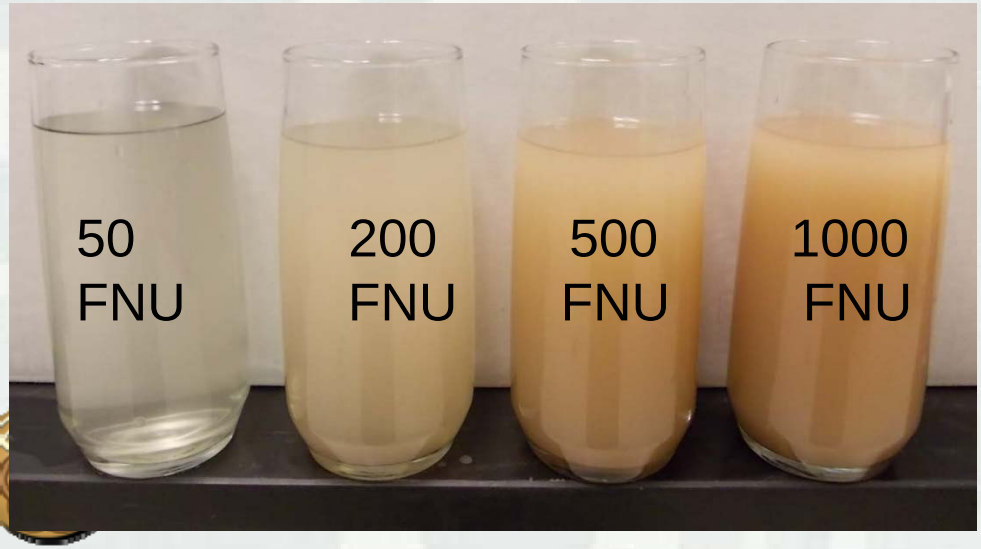
Trick Question: Which is Better Water Quality for Riverine Environments?



Impacts from Lack of Turbidity: Colorado River

David Ward and Rylan Morton Starner, USGS, Grand Canyon Monitoring and Research Station

- Humpback Chub numbers have decreased substantially and they are now federally protected
- One primary reason is that the Colorado River used to be usually over 1000 FNU, but after construction of Glen Canyon Dam now is usually below 50 FNU. The small chub become easy prey for trout species in clear water.

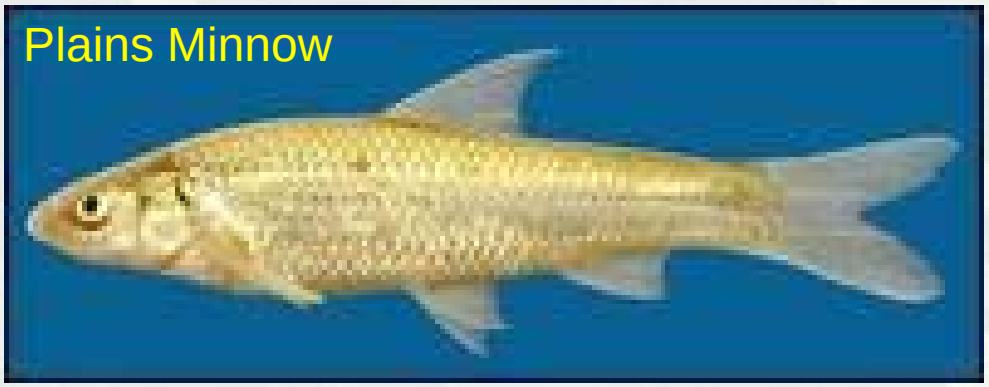


Brown trout
mean TL = 261 mm

Humpback chub
mean TL = 56 mm

Imperiled Due to Increased Water Clarity and Predation and Competition from Sight-Feeding Fish

- Formerly found in the lower Kansas River. Not found for 20 years. Considered “extirpated, or nearly so, in Kansas.”



- Significantly reduced in abundance

Identified in Current status of native fish species in Kansas, Transactions of the Kansas Academy of Science, Vol 108, 2005.

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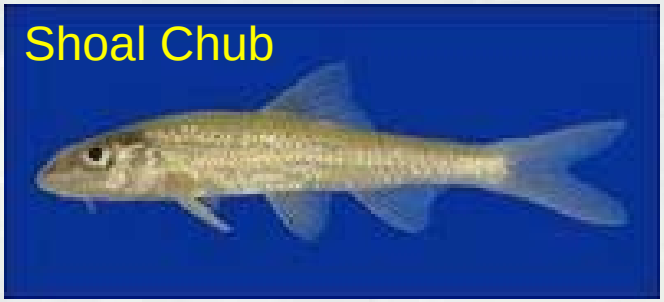

Significantly reduced
in range or abundance

Other impacted species showing significant decline or complete extirpation: Silver Chub, Flathead Chub, River Shiner, Carmine Shiner, Sturgeon Chub

- Sediment (even fine sediment) should not be universally considered as a pollutant, especially in historically-turbid river systems. To the contrary, the transport of sediment is a natural function in river ecosystems, and a lack of sediment can be deleterious to aquatic habitats and organisms.

Questions?