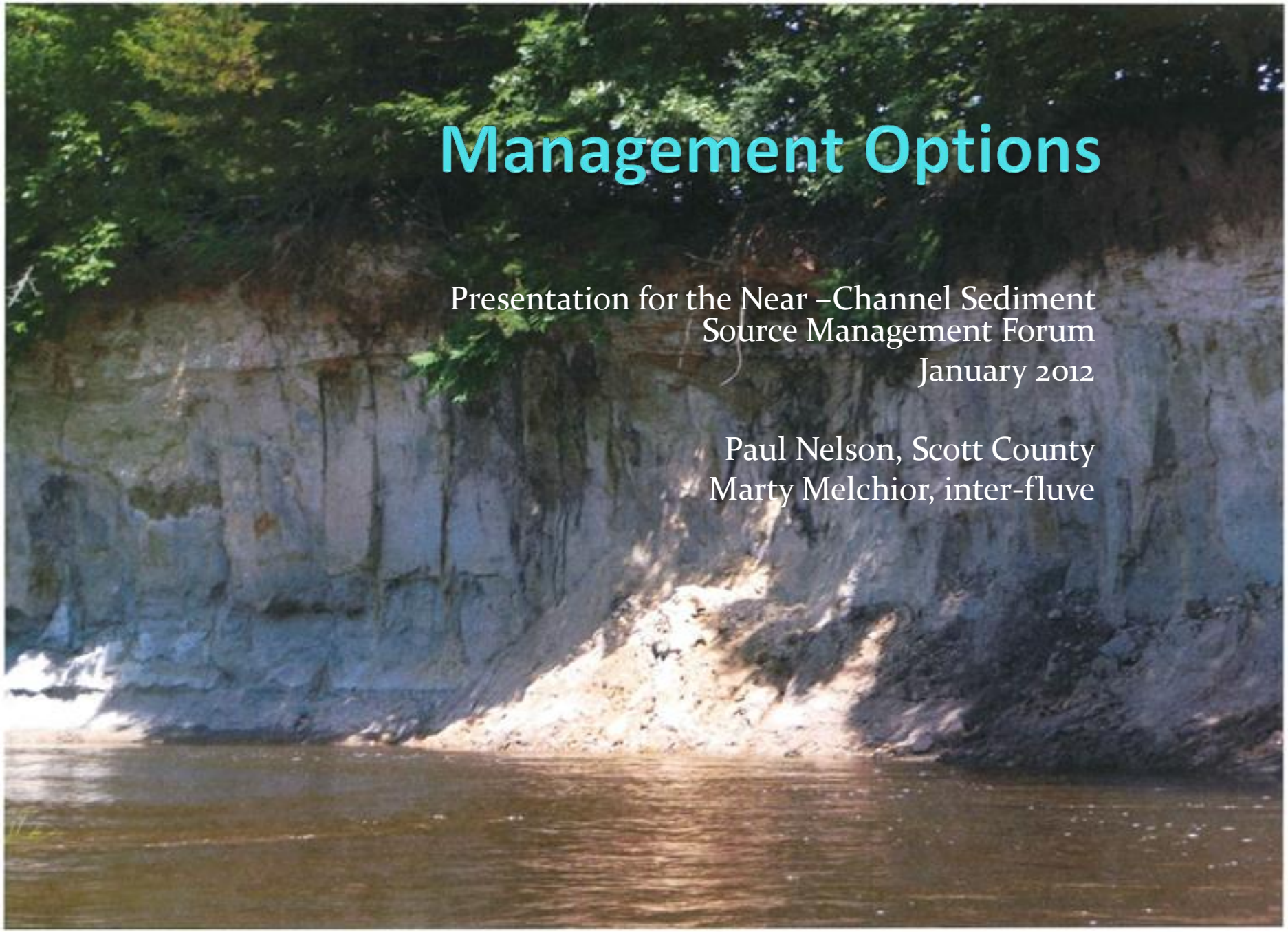


Management Options

Presentation for the Near –Channel Sediment Source Management Forum
January 2012

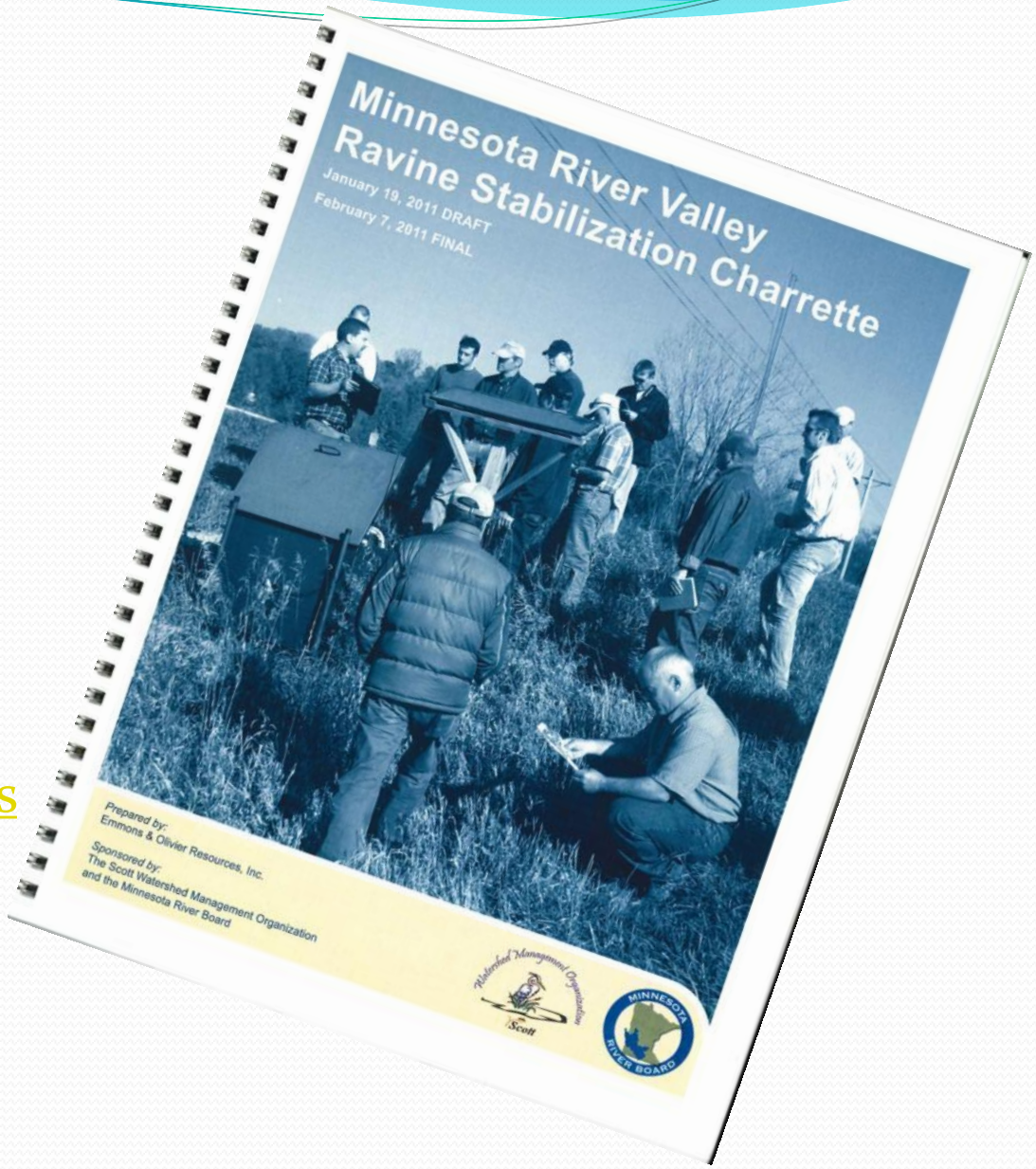
Paul Nelson, Scott County
Marty Melchior, inter-fluve

Local, National, and Regional Experts

- General discussion the challenges and potential approaches
- Stabilization techniques

- With application to two case studies

- Available at: http://www.co.scott.mn.us Parks. Library and Environment tab, Watershed Management Organization



Main Conclusions

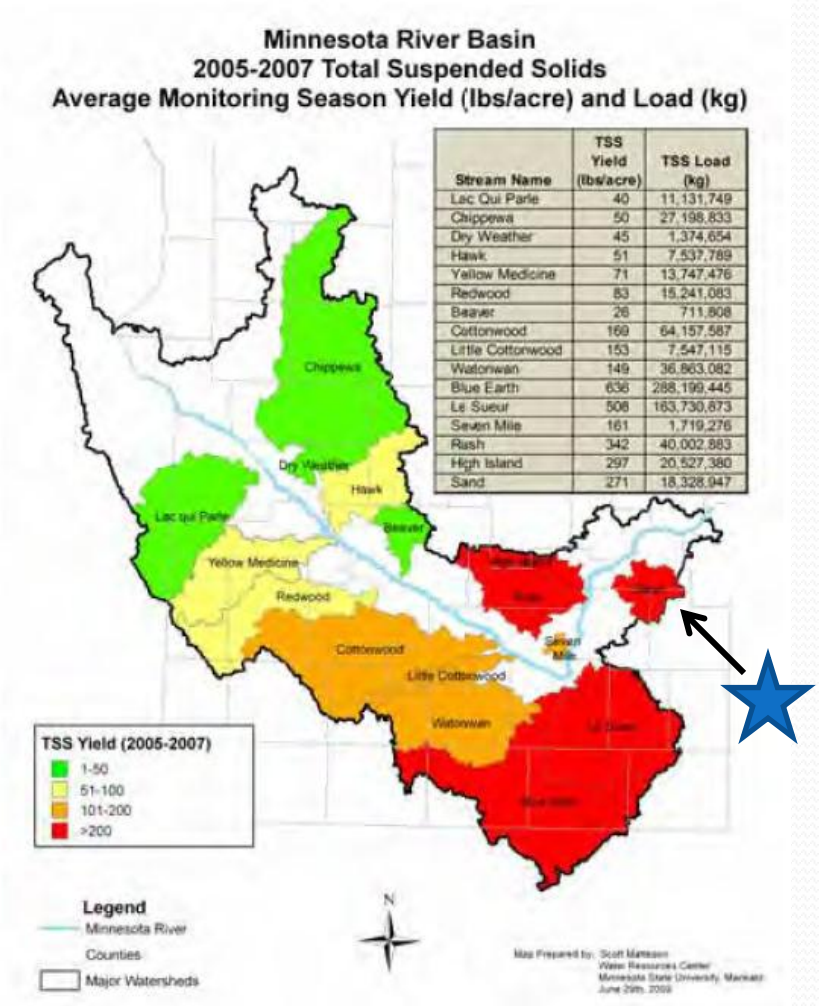
- Hydrology
- Grade Control
- Learning
- Trying
- Targeting
- Lag Time

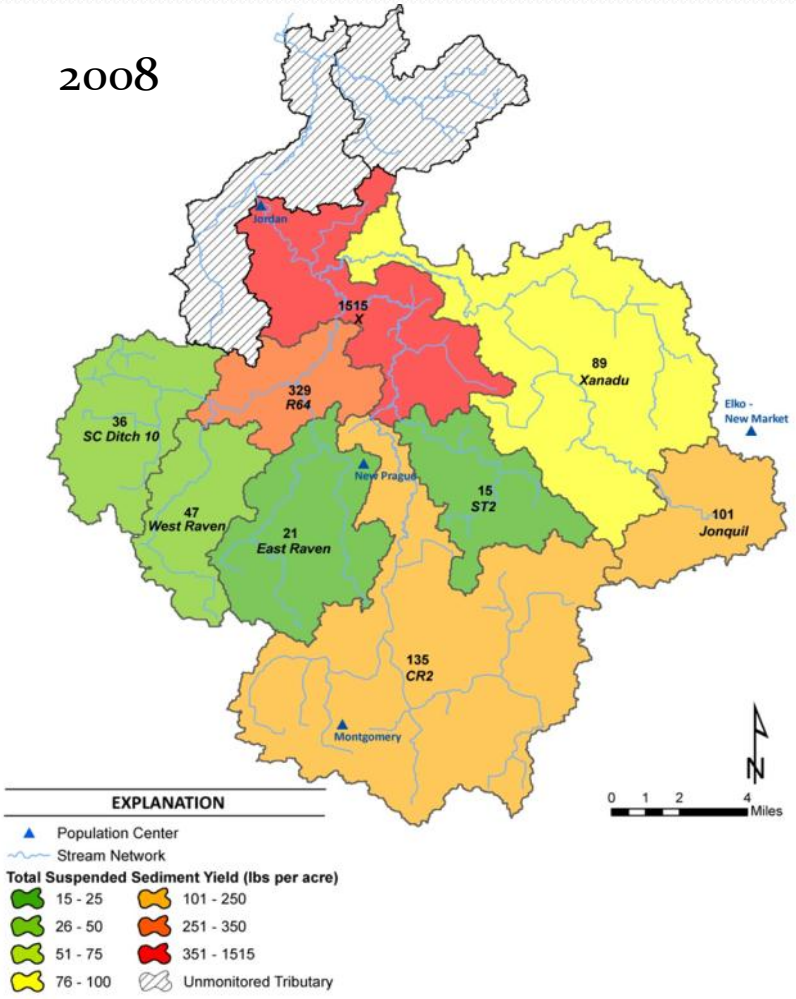
Today Expanded to Bluffs, Channel Banks as well as Ravines

Management Options

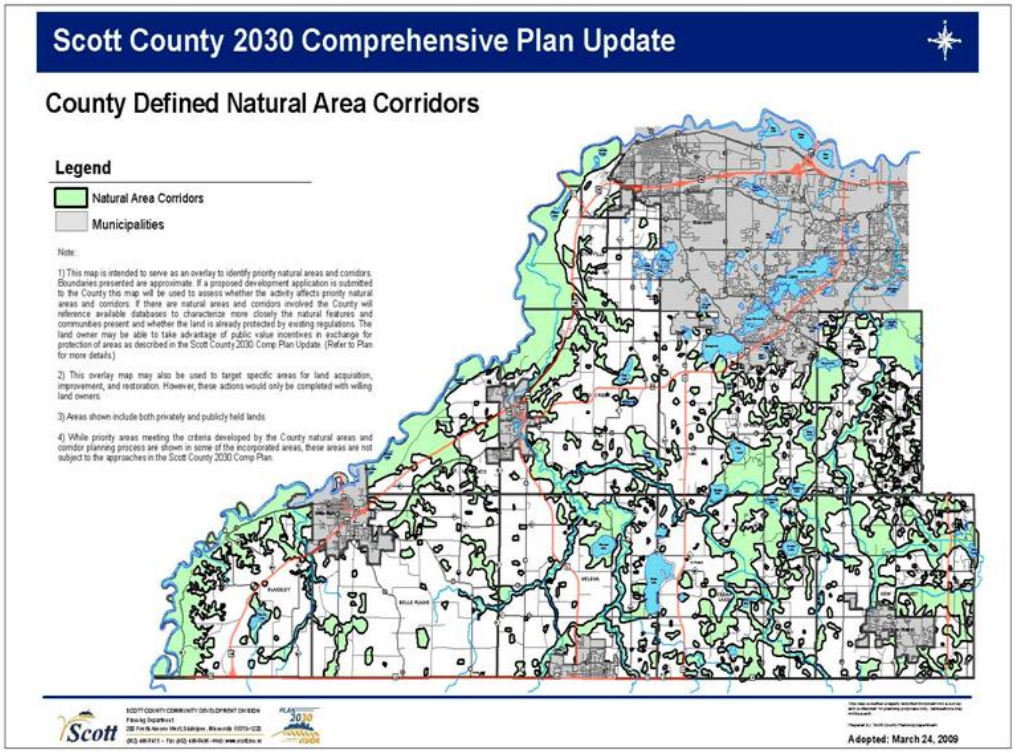
- Watershed Scale – Paul
- Site Scale - Marty

Watershed Scale – Sand Creek



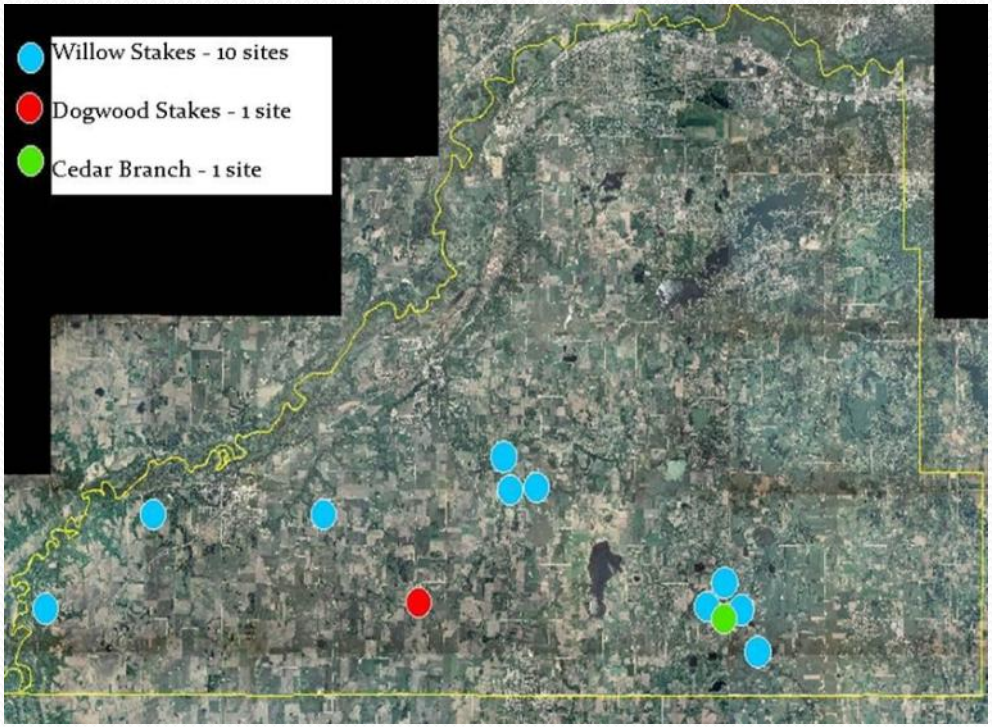


Scott WMO Strategy



- Promote corridors/Riparian Vegetation
- Moderate flows
- Control grades
- Strategic stream bank, bluff stabilizations
- Ravines?
- Work from upstream down

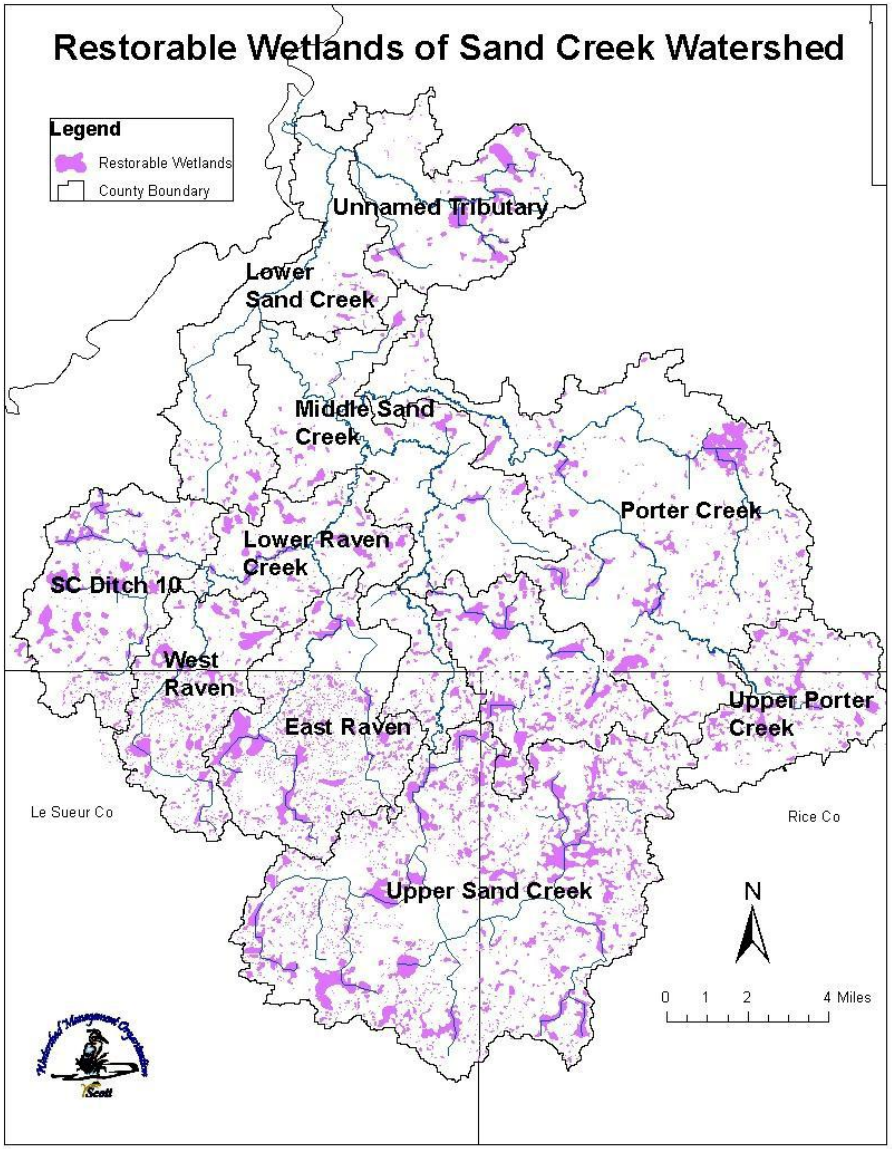
Promoting Corridors/Riparian Vegetation



- PUD ordinances
- Policies and procedures for conservation easements
- Marketing and outreach materials
- Transfer of Development Rights
- Cost share incentive for riparian forest
- BWSR Riparian RIM Buffer Program (3.7 Miles)
- 40 Filter strip contracts
- MCC live staking
- U of M Research Dr. Mae Davenport

Moderate Flows

- Runoff rate and volume control standards
- Regional ponding studies
- Alternative perennial crops – 250 acres native grasses
- Floodplain reconnection Feasibility Studies
- Wetland Restoration



Control Grades

- Technical Assistance and Cost Share – 90%
- Targeted
- 14 + last two years
- Mostly WASCOBs at the field edge

Strategic Stream Bank, and Bluff Stabilizations

- Policy
  - Removed stream bank stabilization as a cost share practice
  - Will consider as a CIP if:
    - Acute sediment problem
    - Will not heal itself
    - Threatening public or private infrastructure

Picha Creek C.I.P.

- Excessive Channel Incision (10')
- Lack of Active Floodplain
- Estimated Erosion 742 tons Per Year
- Re-establish Active Floodplain
- Increase Channel Meandering & Diversity

Upper Porter Creek C.I.P.

- Bluff Edge Retreating 0.8 Feet Per Year
- Estimated Erosion 1,790 tons Per Year
- Stabilize Toe Via Log Cribs
- Re-shape, Stabilize & Re-vegetate Slopes

Ravines

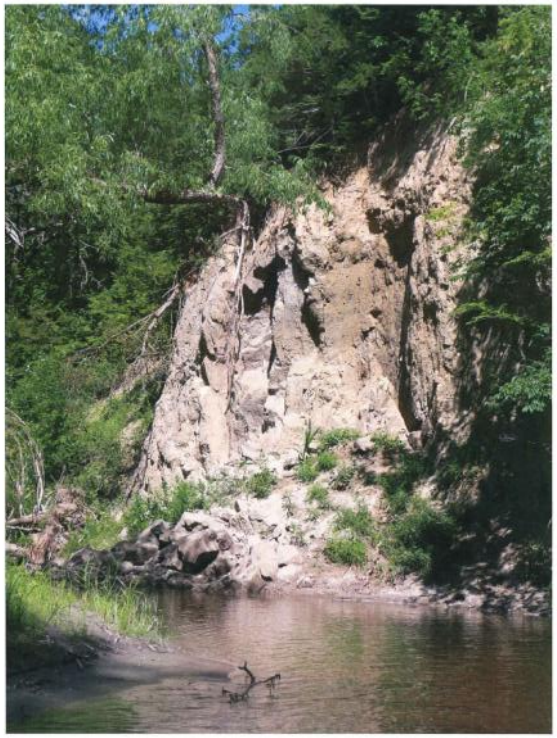
- Urban areas with the City of Savage (Credit River)

Ravines

- Rural Blakeley Bluffs Area

Will this strategy work?

- Promote corridors/Riparian Vegetation
- Moderate flows
- Control grades
- Strategic stream bank, bluff stabilizations
- Ravines?
- Work from upstream down



Technical Strategies

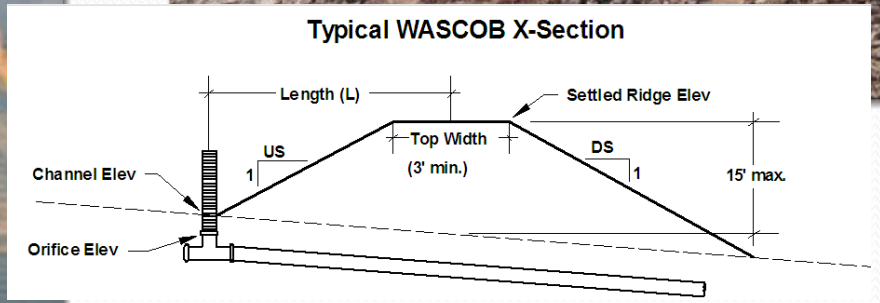
- Primary Design Options
  - Hydrology
- Secondary Design Options
  - Vegetative
  - Engineered structures

Hydrologic modification

- Headwater importance
- Wetland restoration
- Wetland creation
- Critical landcover alteration

Hydrologic modification

- Infiltration/detention
- WASCOB
- Buffer with depressional storage

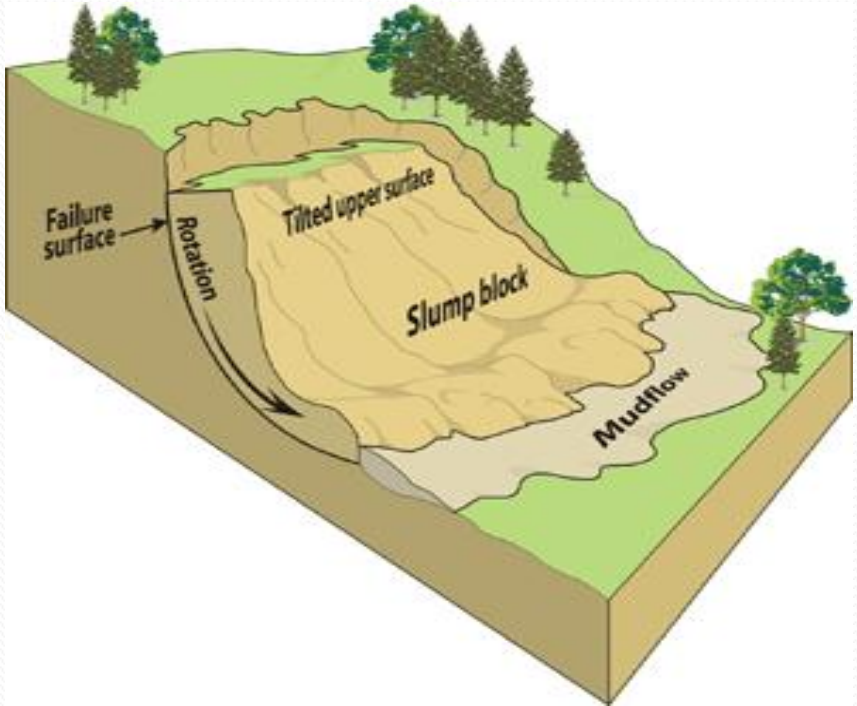


Vegetation modification

- Stiff grass – (Switchgrass) *Panicum virgatum* and others
- Similar backwater principle as with grade control
- Follows techniques developed with Vetiver grass worldwide

Vegetation modification

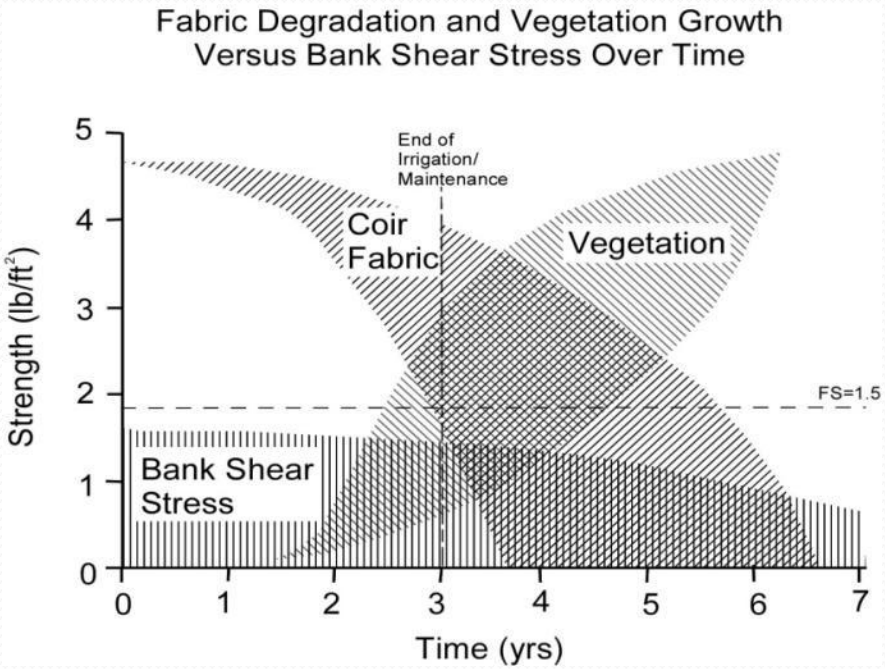
- Bioengineering or geotechnical engineering?
- Gullies
  - Arroyo qualities
  - Active headcutting
- Ravines, bluffs
  - Seepage
  - Slope stability - modes of failure



Simple bioengineering

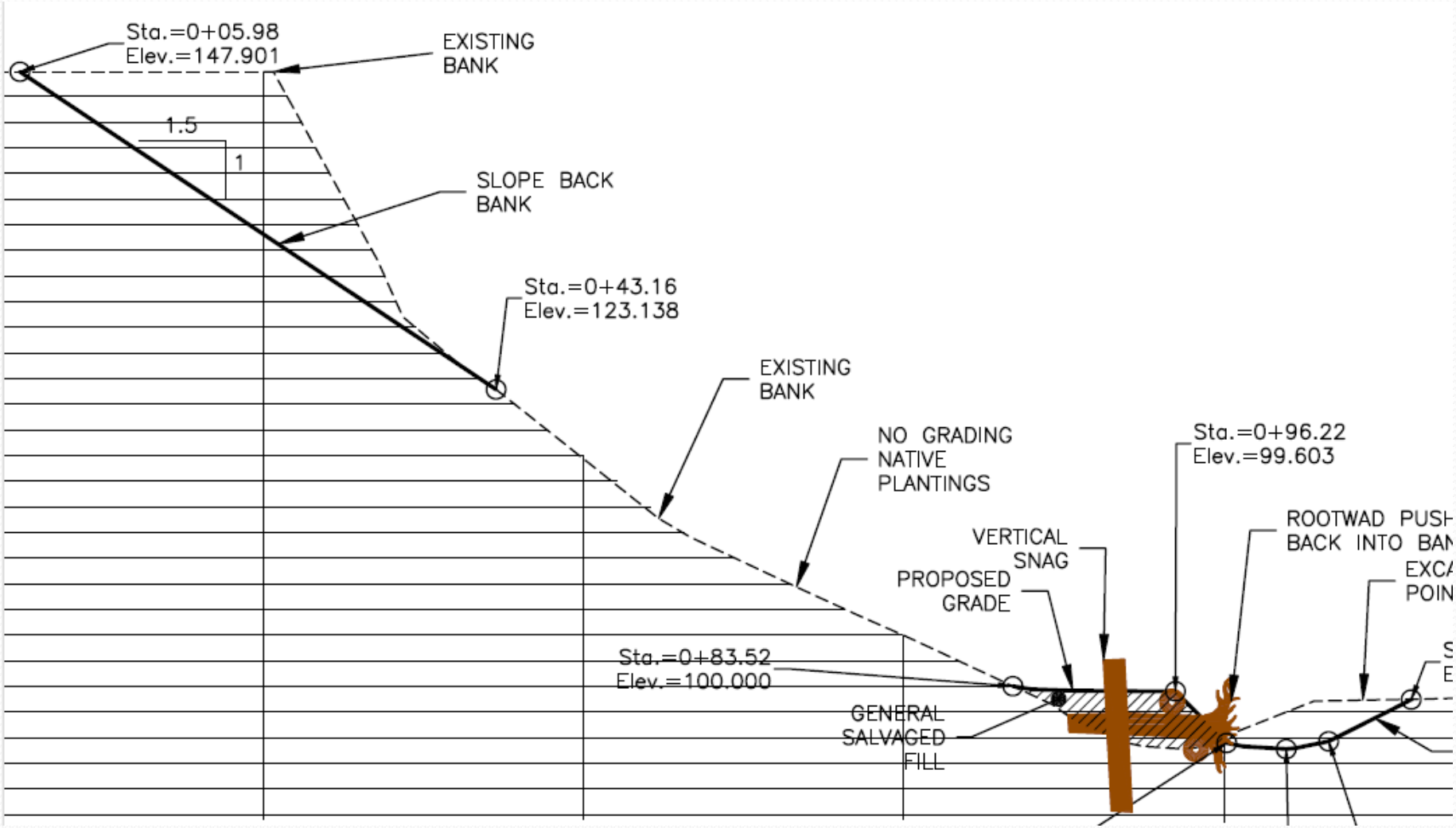
Vegetation/Engineering hybrids

- Toe treatments
  - Timed release materials
  - Large wood
  - Coarse wood
  - Mixed material cribbing



Vegetation/Engineering hybrids

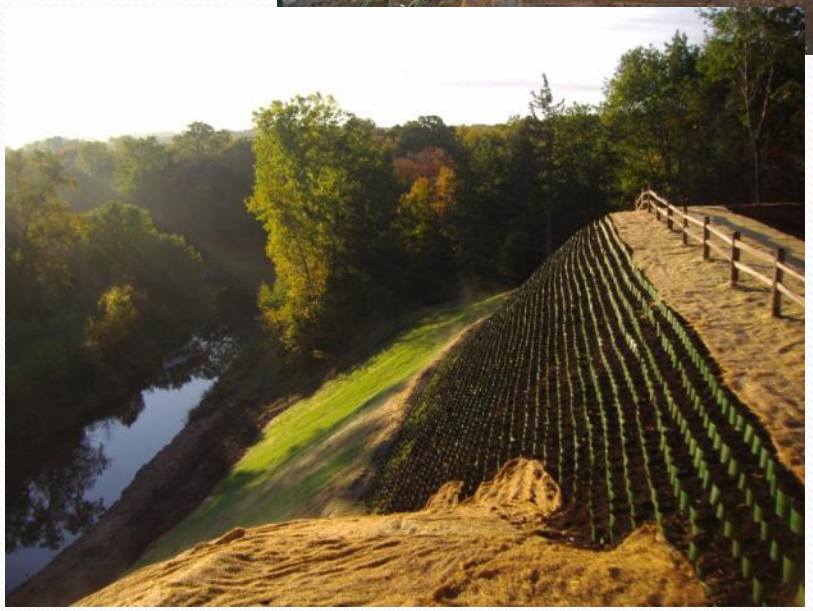
- Toe extension and protection



- Large wood
  - Timed release materials
  - Large wood
  - Coarse wood
  - Mixed material cribbing

Vegetation/Engineering hybrids

- Cellular confinement treatments



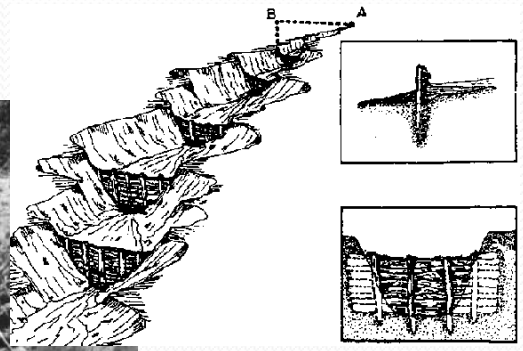
- Stone toe
- Stacked geocells
- Slope grading
- Stiff grass
- Gravel/pipe drain

Vegetation/Engineering hybrids

- Vegetated stone or riprap
  - High shear stresses
  - Lengthy inundation or seepage problems

Grade control

- Check Dams
  - Wood
  - Stone
  - Sheet pile
  - Cement
  - Combinations

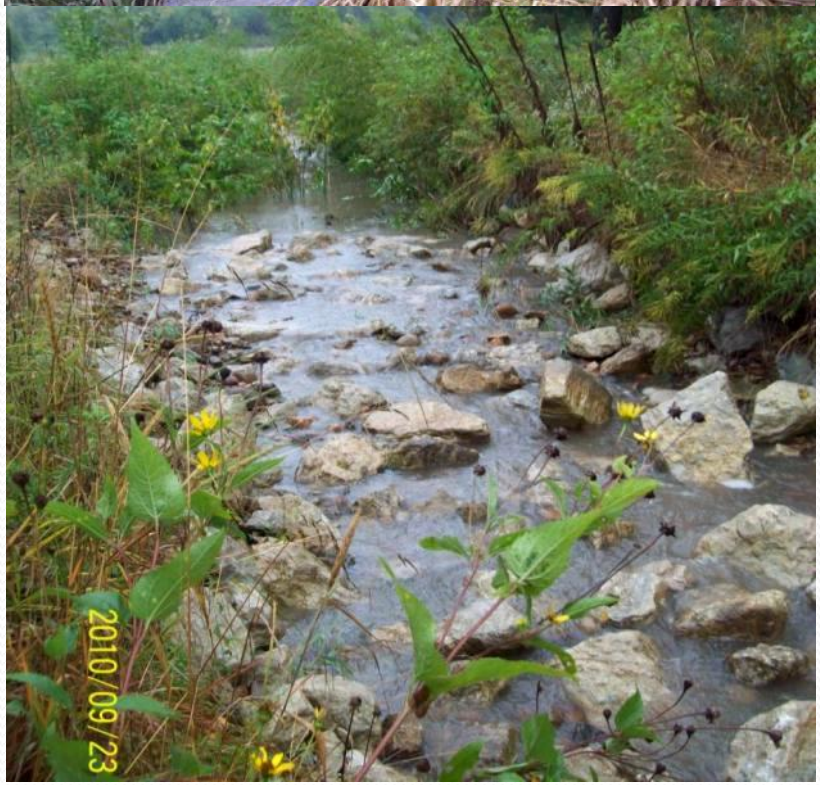


Grade control

- Check Dams
  - Wood
  - Stone
  - Sheet pile
  - Cement
  - Combinations

Grade control

- Check Dams
  - Riffles
  - Step pools



Other techniques

- Incised channel reclamation
- Example – Picha Creek
  - Partial floodplain excavation
  - Partial channel elevation
  - Base flow regeneration

Other techniques

- Vanes
- Weirs

Other techniques

- Relocate infrastructure
- Relocate river