Stream bank Stabilization in the Midwest: Lesson Learned

David J. Heinze, P.E.
dheinze@environcorp.com
303.382.5474
Benefits of Natural Solutions to Stabilization

- Minimize the amount of potentially contaminated material that needs to be removed from the banks
- Ecosystem benefits
- Benefits to downstream users
- Permittable
- Constructible
- Reliable, self-sustaining low maintenance solution
- $<$
Challenges of Natural Solutions to Stabilization

- Education
- Use of experienced contractors
- Climatic conditions
- **Interdependence of Engineering Reasoning AND Biological Science**
- Geotechnical & Geomorphic understanding
- Unless you are committed to re-engineer the agronomic, biologic, and ecological conditions of the soil, you must design native landscapes within the limits of your site conditions
Range of Stabilization Alternatives

• Biological (plants)
  – Local ecotype native plants

• Biotechnical
  – Rolled erosion control products
  – Turf reinforcing matrices (TRM)
  – Coir logs

• Geotechnical
  – Geogrid reinforced slopes
  – Geocellular confinement

• Structural
  – Rock, concrete, articulated concrete block
Pure Biological Stabilization

• Reliance solely on existing geology and performance of deep rooted indigenous species
• Often used for economics of approach
• Follow-up repairs and improvements may be required
• Utilize erosion control blanket or bonded fiber hydraulic mulch for biodegradable erosion control phase
Lessons Learned

- Catastrophic storm event following construction
- Short term climatic influences
- Formulation of indigenous species in correct ratios to provide for balanced development of grasses and wildflowers
- Difficulty in incorporating mycorrhizal and bacterial inoculants
- **Education** of regulatory, impacted public and capital improvement authorities
But Can it Work?
Monolithic Structural Installation in Combination with Biological Stabilization
Don’t Mess with Mother Nature
Lessons Learned

• Biogabions will not reseed themselves
• Tree removal is sometimes necessary
• Use of High-Tensile TRM is necessary in high flow/shear stress conditions
High Bank Stabilization
Lessons Learned

- Geomorphology was critical in design
- Loess soils on vertical slope continued to fail during construction
- Deep cell plugs/soil inoculation jump-starts growth
- Innovative construction practices saved $
Lessons Learned

• Mulch applied on TRM rather than soil filled – lack of soil-seed contact delayed germination
• Paper based hydro seed mulch not as native friendly; rapid decay of the fine newspaper fiber can cause fungal outbreaks if kept too wet
• High chlorine in irrigation water affected growth
Questions

There are as many stabilization alternatives as there are problems