Working WITH Streams in the Urban Environment, Instead of Against Them: A New Approach to Stormwater Management in the City of Fort Worth

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Temporary solutions could include:

- The use of recycled rock or concrete to armor the toe
- Dirt work to lay the banks back, decrease slope angle
- Vegetate the bank

This temporary solution is a band aid fix. The issue is much larger. Need to keep in mind the big picture and plan for problems.
The photos show the channel degradation and the aftermath from knickpoint migration. Significant amounts of sediment are depositing in French Lake. The knickpoints will continue to migrate in the upstream direction!
Need slide showing reach-wide look at Cottonwood segment.
House
Stream Evolution
In Space & Time

Hydrology & Hydraulics

Biotic Processes

Human Influences

Geologic Processes

Material & Energy Exchange
Justification

• Identify the contributing factors for erosion

• Approach for maintenance: “active” vs. “passive”, “long-term” vs. “short-term” maintenance

• Reduce life-cycle cost of assets connected to the creek

• Geo-morphology as a tool to bring stakeholders together

• Stream-wide instability as framework for “common” agreement of problem

• Task order contract with FNI to provide flexibility
Fluvial Geomorphology
What is Fluvial Geomorphology?

Fluvial = River
Geo = Relating to the Earth
Morphology = Study of shape, form, and structure
Lane’s Relationship

- Sediment size: coarse to fine
- Slope: flat to steep
- Sediment load
- Erosion to sedimentation
- Discharge

Diagram showing the balance between sediment size and slope, with arrows indicating the movement from erosion to sedimentation.
Landuse
Channel Evolution...CHANGE

Texas...We have a problem...
Shear Stress and Erodibility Evaluation

- Shear stress of flow
- Velocity of flow
- Permissible shear and velocity of the material
- **Will the material erode?**
Lets Get to Work!
Sandy Lane  
Cottonwood Creek
Approximately 11 feet downcut
Indian Creek
Little Dosier
Howards Branch
Take Away

• Need for stream-wide context for localized (band-aid) erosion problems
• Framework for multiple stakeholder participation
• Understanding system through geomorphology
  • Reach-scale perspective
  • Identify stressors and change with time
  • Prioritize projects – is it really that bad?
• Holistic view
Questions?

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