"Natural" Channels in Harris County - Initiatives, Plans, and Challenges

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Topics

- What is a “Natural Channel”?  
- Looking Back at Channel Modifications  
- Channel Stability and Water Quality  
- HCFCD Initiatives  
- Bayou Stewardship and Flood Risk Reduction
“...not been significantly altered for flood risk reduction or other drainage purposes...or those that have ‘naturalized’”
2,500 MILES OF CHANNELS
1,500 CHANNELS
AREA = 1,756 SQUARE MILES
POPULATION = 4.5 MILLION (COUNTY)
2.1 MILLION (HOUSTON)
Channel Modification

1956 Aerial Photo
Channel Modification

1920 Topography and 1956 Aerial
Aggrading or Degrading?

Diagram showing the relationship between stream gradient and sediment size, with deposition and erosion as outcomes. The diagram is adapted from Lane 1955.
Stable Channel Defined

A channel that is able to maintain its
– dimension,
– pattern, and
– profile
without silting or eroding its channel bed over a long period of time
Existing Conditions
Existing Conditions
Beauty and Challenge of Natural Channels

- Developer/Land owner responsibilities
- Appropriate right-of-way
- Building setbacks
- Maintenance access
- Erosion control versus flood control
Evolution of Channels

- White Oak Bayou
- Brays Bayou
- Vogel Creek
- Mason Creek
Develop Vision Plan

- Upper Bank Canopy Trees: 400 trees per acre on 50% of slope
- Riparian Canopy Trees: At outer bends of bankfull channel, no more than 25% of geomorphic floodplain
- Maintenance Berm
- Meandering Bankfull Channel
- Trail
Design Guidance

- Detention Basins – Design Guidelines for HCFCD Wet Bottom Detention Basins with Water Quality Features
- Conveyance Projects – Natural Stable Channel Design Guidance Manual in the works…
Landowner Guidance

Biostabilization Guide for Harris County landowners with erosion problems
Corridor Channels

Langham Creek

Mason Creek

100 Year Floodplain (Width Varies) Geomorphic Floodplain (Width Varies)

Wet Vegetated Shelf Geomorphic Channel

Forebay (Size & Depth Varies) Deep Pool

Storm Sewer Outfall Pipe 2% Cross Slope
Streambank Erosion

[Map of Streambank Erosion with various erosion types indicated by different colors.]
Stabilization Project
Stabilization Project

Rummel Creek: Post-Construction 2008
Questions?
Design Initiatives

• Corridor Channel Design and Construction
  – In-line detention with geomorphic floodplain
  – Stormwater treatment opportunities
  – Riparian recreation areas
• Natural Stable Channel Design Guidelines
  – Highlight fluvial geomorphology considerations
  – Assessment Standards and Design Specifications
• Comprehensive Watershed Plans
  – Geomorphic Assessment
  – Flood Risk Reduction
  – Stream Restoration and Environmental Mitigation
Mason Creek Today