Overview

- Overview of TXRAM
- Objectives of TXRAM
- Stream Metrics
- Local application in Carrollton to Furneaux Creek Stream Segment 1 Restoration / Enhancement
- Updates

TXRAM Overview

USACE - Fort Worth District
- No standard assessment method prior to 2011
- HDR selected to develop assessment method
  - Review of existing methods
  - Develop wetlands and streams modules
  - Lead agency field review
TXRAM Objectives

- Rapid, repeatable, field-based method
- Measure multiple observable metrics
- Single score of condition
- Developed to fit USACE regulatory program

Streams Module

- Stream Assessment Reach (SAR)
- Stream types
  - 3 based on water source and duration of flow
  - Perennial, intermittent, and ephemeral

Streams Module

<table>
<thead>
<tr>
<th>Core Elements</th>
<th>Metrics</th>
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<tbody>
<tr>
<td>Channel Condition</td>
<td>Floodplain Connectivity</td>
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<tr>
<td></td>
<td>Bank Condition</td>
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<td></td>
<td>Sediment Deposition</td>
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<tr>
<td>Riparian Buffer Condition</td>
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<td>Flow Regime</td>
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<tr>
<td></td>
<td>Channel Flow Status</td>
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</table>
**Streams Module**

- Floodplain Connectivity

1 3 5

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**Streams Module**

- Bank Condition

1 3 5

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**Streams Module**

- Sediment Deposition

1 3 5
Streams Module

- Riparian Buffer Condition

Streams Module

- Substrate Composition

Streams Module

- In-stream Habitat
Streams Module

- Flow Regime

Streams Module

- Channel Flow Status

City of Carrollton
Furneaux Creek Segment 1
City of Carrollton
Furneaux Creek Segment 1

- Property History
  - Unstable banks and excessive deposition
  - S-shaped region endangering roadway
- City acquired Segment 1 area with following objectives:
  - Identify unstable channel areas
  - Restore stream to a stable condition
  - Enhance potential for future development
- Use TXRAM to enhance ecological value and accelerate permitting process

Initial Study Phase – Main Channel

EXISTING CONDITIONS

UNSTABLE BANKS

HEAVY SEDIMENT DEPOSITION

Initial Study Phase – Northern Tributary

EXISTING CONDITIONS

30' VERTICAL BANK FAILURE

STREAM HEAD CUT EATING INTO ENERGY DISSIPATORS
Proposed Design – Overall Grading Plan

- J-Hook Design
- Grade Controls
- Jersey Vane
- Aids in long term stream stability
- Stream Access for Maintenance

Innovative Design – In-Stream Habitat Features

- J-Hook Design
- Grade Controls
- Jersey Vane
- Aids in long term stream stability
- Stream Access for Maintenance

Design Innovation

- J-Hook & Jersey Vane Concept and Design – Main Channel
  - HDR created the J-Hook concept based on jersey barrier and rock riprap
  - Ideal element to promote habitat features / controls bank erosion
  - Aids in long term stream stability
**Furneaux Creek J-Hook Installed**

**Northern Tributary – Design and Application**
- Cross Vane Concept and Design – Northern Tributary
  - Provides grade control & habitat features
  - Establishment of bankfull benches

**City of Carrollton Furneaux Creek Segment 1**

Existing vs. Improved Channel Condition
**Furneaux Creek J-Hook Installed**

**Native Revegetation Plan**

**MSE WALLS AND NATIVE PLANTS**

"Ecological lift" for NWP 27 Demonstrated
### Furneaux Creek
#### Section 404 Permitting & TXRAM

- **TXRAM Stream Metrics**
  - Channel Condition
    - Floodplain Connectivity - 1
    - Bank Condition - 1
    - Sediment Deposition - 2
  - Riparian Buffer Condition
    - Left Bank – 1.2
    - Right Bank – 1.5
  - In-Stream Condition
    - Substrate Composition – 3
    - In-Stream Habitat – 1
  - Hydrologic Condition
    - Flow Regime – 4
    - Channel Flow Status – 3

### Metric scores increased by design of the project:

<table>
<thead>
<tr>
<th>MAIN CHANNEL</th>
<th>Core Element</th>
<th>Metric</th>
<th>Proposed</th>
<th>Existing</th>
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<td>Channel Condition</td>
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<tr>
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<tr>
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<td>Overall TXRAM Score</td>
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</table>

### Section 404 Permitting Update

- **Stream Mitigation Method**
  - In-stream channel work
  - Permittee-responsible mitigation requires site protection

- **Waters of the U.S. – Proposed Rule**
  - Not currently implementing
  - Could increase USACE jurisdiction (e.g., drainage channels and detention pond)

- **TXRAM Update - TBD**
Conclusions

Project objectives were met:
- TXRAM accelerated NWP 27 404 permit
- Stream restored to a stable condition
- Potential for future development enhanced
- Land acquisition costs recovered
  - Floodplain Reclamation added 12 acres
- Green belt (trail and bridge)