Project Overview

Project Goal

“Restore stream health and natural stream functions”
Assessment

Urbanized Watershed
- Residential
- Commercial
- Community Parks
- Natural Resource Areas

Springbrook Basin
- 1.95 square mile basin
- 2.9 miles long
- 31% impervious
- ½ mile project length
Assessment

Site Conditions
- Severe Bank Erosion
- Loss of Bed Materials

Assessment

Site Conditions
- Severe Bank Erosion
- Loss of Bed Materials
- Channel Incision
**Assessment**

**Site Conditions**
- ✔ Severe Bank Erosion
- ✔ Loss of Bed Materials
- ✔ Channel Incision
- ✔ Channel Containment of Flood Flows
- ✔ Loss of Riparian Habitat and Diversity
Assessment

Site Conditions
✓ Severe Bank Erosion
✓ Loss of Bed Materials
✓ Channel Incision
✓ Channel Containment of Flood Flows
✓ Loss of Riparian Habitat and Diversity
✓ Excessive Sediment and Phosphorous Deposition into Lake

Design

Design Objectives
✓ Restore Stable Natural Channel Form
  • Geomorphic Approach to Restoration
  • Stable Channel Dimension, Pattern, and Profile
  • Equilibrium with Basin Conditions
Design

Design Objectives

✓ Restore Stable Natural Channel Form
✓ Re-Connect Channel to Historic Floodplain
  • Construct New Meandering Channels
  • Abandon and Fill Old Straightened Channels
  • Elevate Stream to the level of the Historic Floodplain

✓ Restore Channel on Historic Floodplain
✓ Elevate the Localized Water Table
  • Enhance Native Riparian Vegetation and Wetlands
Design Objectives

- Restore Stable Natural Channel Form
- Restore Channel on Historic Floodplain
- Elevate the Localized Water Table
- Improve Water Quality
  - Bank Stability, Filtration, Shade, and Riffles
- Enhance Riparian Habitat for Fish and Wildlife
  - Increased Vegetative Cover and Species Diversity
  - Restoration of Pool and Riffle Features
  - Recruitment of Bed Material and Large Wood
After Three Years...

Fall 2004

After Three Years...

Spring 2001
After Three Years...

**Pre-Construction**
- Deeply Incised Channel
- High Bank Stress / Embankment Failure
- Partially-Occluded Channel
- Sediment Transport to Oswego Lake
- Loss of Bed Materials

Spring 2001

After Three Years...

Fall 2001
After Three Years...

**Post-Construction**
- Stream Channel Elevated
- Stable Natural Channel Form and Sinuosity
- Bed Materials Restored
- Flows Re-Connected to Historic Floodplain

Fall 2001

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After Three Years...

**Pre-Construction**
- Abandoned Double Culvert
- Deeply Incised Channel
- High Bank Stress / Embankment Failure
- Loss of Mature Riparian Habitat along Embankment

Spring 2001
After Three Years...

Spring 2001

Fall 2001

After Three Years...

Fall 2002

Spring 2001
After Three Years...

Post-Construction

- Removed Stream Constriction
- Elevated Stream Channel
- Stable Channel Alignment
- Overskirted Meander
- Improved Aquatic Community
- Enhanced Riparian Habitat

December 2004

Spring 2001
After Three Years…

Pre-Construction

- Channel Straightened 1960’s
- Sanitary Sewer Main
  - Adjacent to Stream Channel
- Double Culvert Establishes
  - Grade Control at Spring Lane
- Moderately Incised Channel
- Riparian Habitat Dominated
  - by invasive Species

After Three Years…

Spring 2001

Summer 2001

Spring 2001
After Three Years...

Post-Construction

- Elevated Stream Channel
- Stable Channel Dimensions
- Stream Flows Reacquire Historic Floodplain
- Enhanced Riparian Habitat
  - Re-Encroaching Invasive Species
  - Underline Need for Maintenance
  - and Long-Term Monitoring

January 2002

Spring 2001

December 2004
After Three Years...

Pre-Construction

- Straightened and Rip-Rapped
- Eroded/Failing Embankments
- Undersized Culvert/Pathway Restricting Channel Flows
- Peak Flows Overtop Channel Flooding Adjacent Residences

Spring 2001

After Three Years...

Spring 2001

Fall 2001
After Three Years...

Post-Construction

- In-Stream Boulder Bars
- Redirect Stream Flows
- Embankments/Public Utilities Protected from further Erosion
- Deposition of Sediment
- Native Riparian Vegetation Established at Bankfull Stage
After Three Years...
After Three Years...

January 2002

After Three Years...

Fall 2002
After Three Years...

Fall 2003

After Three Years...

December 2004
Jack Creek Ranch Stream and Wetland Restoration

After Three Years...

Pre-Construction
✓ Incised Stream Channel
✓ Highly Eroded Embankments
✓ Abandoned Floodplain
✓ Poor Riparian Habitat Quality
   Dominated by Invasive Species

After Three Years...

Aquatic Design & Construction, Inc.
2001
After Three Years...

After Three Years...

Fall 2001

Spring 2001

Fall 2001

Spring 2001

Fall 2003

Spring 2003
After Three Years...

Lessons Learned...

✓ Restoration of degraded urban stream employing a geomorphic design approach proven very successful
Lessons Learned...

- Restoration of degraded urban stream employing a geomorphic design approach proven very successful
- Elevating incised channel proves excellent technique for reconnecting stream flows to historic floodplain

December 2004

Lessons Learned...

- Do not sacrifice stream design alignment and patterns

December 2004
Lessons Learned...

- Do not sacrifice stream design alignment and patterns
- Elevated stream channel and local water table may have negative impact on adjacent mature vegetation

December 2004

Lessons Learned...

- Do not sacrifice stream design alignment and patterns
- Elevated stream channel and local water table may have negative impact on adjacent mature vegetation
- Establish long-term monitoring and maintenance plans

December 2004
Lessons Learned...

✓ Community Stream Stewardship Effort Established

Lessons Learned...

✓ Build upon success...
Questions?