Growing an Urban Riparian Program

City of Austin
Urban Stream Syndrome

(Walsh et al. 2005)
Building Blocks

- Mature monitoring program
- Stream restoration superstars
- Strong education/outreach group
- Green council/citizenry
- Water quality priority
Healthy Riparian Buffers

- Increase Water Storage – baseflow
- Improve Water Quality – Filter, shade, food web
- Minimize Erosion – Anchor soils, reduce velocities
8,600 km!!
285 parks
Restoration 101

- Grow Zones
- Willowbrook
- Monitoring
- Prioritization
- Partners
- Rescue Nursery
- Stormwater...
Why?
Low Impact Retrofit: small, soft and everywhere

• Disconnect impervious cover.
• Slow, store and infiltrate stormflow.
• Smaller drainage areas
• Headwaters
• Fast and affordable
• Function over form, not landscaping.
• Monitor and manage vegetative succession.
• Perennial, deep-rooted veg (infiltration!)
Basic Tools (so far):

RAIN GARDENS
A rain garden is a shallow, vegetated depression designed to absorb and filter runoff from impervious surfaces. They can be highly manicured and landscaped or planted as ephemeral wet habitat.

BERMS AND SMILES
A berm (smile) is a low, raised landscape feature that collects water behind itself, much like a dam. Ideal for slopes, smiles stop water from eroding the hillside and carrying away precious topsoil.

SWALES
Swales are shallow linear depressions that can collect and carry water. When placed at the bottom of a slope, a vegetated swale can filter and infiltrate water sheet flowing down the hill.
Dottie Jordon Rain Garden

At Dottie Jordan Recreation Center, the terraced rain gardens allow for water to infiltrate along the entire slope where it can eventually make its way to the stream. This one system alone can infiltrate 158,948 gallons of rain water every year, which is ~42% of the water that falls on the parking lot.
Shoal @ Allandale Bioswales
Performance

Avg. Annual Runoff Capture Efficiency

- Gillis Park: 40%  $1.61
- Dottie Jordan: 42%  $4.01
- Bartholomew: 48%  $3.26
- Adams Hemphill: 76%  $1.73
- Boggy Creek - Hargrave: 39%  $1.52

Cost Effectiveness (TSS)
Value and Co-Benefits

- Water quality, erosion and flood benefits.
- Infinitely expandable/scalable.
- Wide range of partners: internal and external.
- Volunteers! Stakeholder buy-in!
- Educational/local support
- Climate change adaptation/resilience
Next Steps

• Demonstrate method, costs, performance.
• Sub-shed scale modeling
• Sub-shed scale pilot (Insitu!).
• Push for an in-house crew to expand/mature program
Questions?
Performance

• N=5 Rain Gardens
• DA, 0.5 – 11.3 acres
• WQ volume, 322 – 3800 cubic ft (2.4k-30K gal)
• Cost, $8k - $45K
• Avg annual infiltration, 3.5 – 11.5 inches
## Performance

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Drainage Area (ac)</th>
<th>Impervious cover %</th>
<th>WQV (cu.ft.)</th>
<th>Avg. Annual Runoff Volume Captured and Infiltrated</th>
<th>Avg. Annual TSS Load Removed (lb/yr)</th>
<th>Est. Cost</th>
<th>Cost Effectiveness (TSS)</th>
<th>Cost effectiveness (infiltrated cu.ft.)</th>
<th>Cost effectiveness (Cost/W QV)</th>
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</thead>
<tbody>
<tr>
<td>Gillis Park</td>
<td>0.9</td>
<td>84%</td>
<td>586</td>
<td>40%</td>
<td>9.17</td>
<td>317</td>
<td>$10,282</td>
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<tr>
<td>Dottie Jordan</td>
<td>0.503</td>
<td>95%</td>
<td>521</td>
<td>42%</td>
<td>11.27</td>
<td>218</td>
<td>$19,000</td>
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<td>Bartholomew</td>
<td>1.045</td>
<td>30%</td>
<td>322</td>
<td>48%</td>
<td>3.2</td>
<td>129</td>
<td>$8,000</td>
<td>$3.26</td>
<td>$0.03</td>
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<tr>
<td>Adams Hemphill</td>
<td>1.55</td>
<td>31%</td>
<td>1,802</td>
<td>76%</td>
<td>5.23</td>
<td>313</td>
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<td>Hargrave</td>
<td>11.32</td>
<td>41%</td>
<td>3,865</td>
<td>39%</td>
<td>3.62</td>
<td>1,578</td>
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