Challenges, Innovations & Lessons Learned in Installing Urban Stormwater Retrofits
“There is no innovation and creativity without failure. Period.” - Brene Brown
Small Lots – Challenges

- Sheer Number
- Largest land use
- Lot sizes
- Slowest redevelopment
- Few regulatory requirements
- Knowledge base of property owners
Small Lot - Innovations

- RiverSmart Homes -
  - Rain Barrels
  - Trees
  - Native landscaping
  - Rain gardens
  - Permeable pavement
- Grantees oversee installations
- Avoid regulations
- RiverSmart Rebates
Small Lots – Lessons Learned

- Giving stuff away is easy
- Getting people to use it properly is hard
- Your average person is not a stormwater geek
- Make it simple for homeowners
- Follow up is crucial
Large Lot - Challenges

- Limitations in space downtown
- High up front costs
- Little incentive to install
- Regulatory impediments
- Proper installation and maintenance
- Environmental Justice
Large Lot - Innovations

- Stormwater Regulations
- Green Roof Rebate
- RiverSmart Communities
- Stormwater Credit Trading
- Shared stormwater facilities
Large Lot – Lessons Learned

- Financing harder for large lots
- Simplicity trumps cost savings
- Maintenance more likely on centerpiece projects
- Developing relationships good govt. role
Right-of-Way - Challenges

- Utilities
- Street trees
- Residential pressure
- ADA/other upgrades
- Constant construction
- Inter-agency coordination
Right-of-Way - Innovations

- Full sewershed retrofits
- Pre- and post-implementation monitoring of materials
- Develop guidebook with projects
- Inter-agency coordination
Right-of-Way – Lessons Learned

- Public acceptance of concept ≠ acceptance of BMPs
- Long term maintenance is difficult and crucial
- You will always be surprised when digging
Stream Restoration - Challenges

- Sewer lines
- Trash
- Invasive plants
- Extreme erosion
- Tight valleys
- Flooding
- Low water table
- NEPA compliance
- Lack of experienced contractors
Stream Restoration - Innovations

- Trash traps
- Regenerative Stream Channel
- Inter-agency coordination
- Up-front monitoring
Stream Restoration – Lessons Learned

- Models overestimate stormwater flows
- Designers underestimate material needed
- Public access = public support
Trees - Challenges

- Lack of space
- Dislike/fear of trees
- Overhead wires
- Critical root zone damage
- Crosses property boundaries
- Solar panels
- Sewer infrastructure
- Pests/Stress
Trees - Innovations

- Special/ Heritage Tree Laws
- Large lot canopy plans
- Silva cells/ structural soils/ root paths
- Growth inhibitors
- Green Area Ratio
- Flexi-pave
- Water by-cycle
Trees – Lessons Learned

- Trees live a long time so proper planning is crucial.
- Hard to undo damage – training & watchful eyes impt.
- People understate short-term benefits and overstate long-term drawbacks.
Conclusions

- To be effective urban restoration projects must be concentrated
- Stream restoration can be an early win
  - Less expensive
  - Fewer landholders and less infrastructure
- Hopefully current expensive/intensive monitoring will pay dividends in the long run
- Early and intensive outreach is crucial to win public support but is still not a guarantee
- Need to do everything everywhere – this will take time
“A noble purpose inspires sacrifice, stimulates innovation and encourages perseverance.” – Gary Hamel