



Grow Zone

Function over form in urban
riparian restoration



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Urban Stream Syndrome (Walsh et al. 2005)

- Flashier hydrograph
- Elevated concentrations of nutrients and contaminants
- Altered channel morphology
- Compromised bank stability
- Nonpoint source pollution
- Disconnected floodplains



Focusing on riparian buffers

- Water quantity
- Water quality
- Soil erosion
- Nutrient cycling
- Ecosystem services



Willowbrook Reach (1997)



Willowbrook Reach (2010)



Willowbrook Reach (2013)






Ecological restoration through facilitated succession

- No Mow Zone (eliminate main disturbance)
- Seed bank
- Woody recruitment
- Soil erosion and compaction
- Invasive species control




Outreach

- Educating staff
- Local stakeholders
- Workdays
- Educational materials
- Creek Walks/Talks
- Signs
- Guides



Future Creekside Forest




Grow Zone (No Mowing!)


The City of Austin is working to **restore the native forests** that used to flourish beside creeks by creating "grow zones" in city parks. *This area was designated as a "grow zone" in 2012 and it will take several years for seedlings to become large trees.* Volunteers, birds and squirrels are taking care of the planting – the City of Austin won't hamper this natural process by mowing.

Benefits of a creekside forest:


- Improves the natural and beneficial functions of the floodplain
- Prevents stream bank erosion
- Filters storm runoff, removing pollutants before they reach the creek
- Provides habitat and food for a diverse group of animals
- Provides shade that cools air and water temperatures
- Creates a greenbelt forest with diverse tree and plant communities for outdoor enthusiasts
- Reduces the City's carbon footprint
- Reduces maintenance so park staff can focus on other park projects



Mowed



First Year of Growth



5 to 10 Years

www.austintexas.gov/watershed/creekside

512-974-2550



Light

Starfish Shells
Shell Needs:

- Aerate/seal with 3/4" of air/water
- Be sure that your tank has a 3" air pump
- If aeration is not needed, use a glass bowl to let the air bubbles rise 20% (topped, 40% zoom and 10% salt)

Water Needs

Once established, these plants require little care, unless it starts to look "faded," water from tap water, 24 weeks if there is no rain.

Pruning:

- Monthly watering is recommended
- If you need use an irrigation system, use pumps for the heads

Turf

Not recommended, used to protect plants

Gardening Tips:

- Grows best in water or in a stream channel
- If you're growing in a stream, start with the roots. Grow up to the stream, growing up to the roots and then down to the roots to the stream
- Allowing the vegetation to be exposed to the stream will keep the stream clean and the stream more like a stream channel

Good Plant Choices

Large Trees

- Star Cypress
- Star Oak
- Chinese Elm
- Live Oak
- Sycamore

Small Trees

- Chinese Elm
- Maple
- Japanese Maple
- Redwood
- Yucca

Shrubs

- Camellia
- Japanese Maple
- Japanese Maple
- Japanese Maple
- Japanese Maple

Water Plants

- Water Hyacinth
- Crabgrass
- Crabgrass
- Crabgrass
- Crabgrass

Perennials

- Star Cypress
- Star Oak
- Star Oak
- Star Oak
- Star Oak

Ground Covers

- Star Cypress
- Star Oak
- Star Oak
- Star Oak
- Star Oak

Creeping Grass

- Star Cypress
- Star Oak
- Star Oak
- Star Oak
- Star Oak

Creeping Grass

- Star Cypress
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www.starfish.com or www.growgreen.com

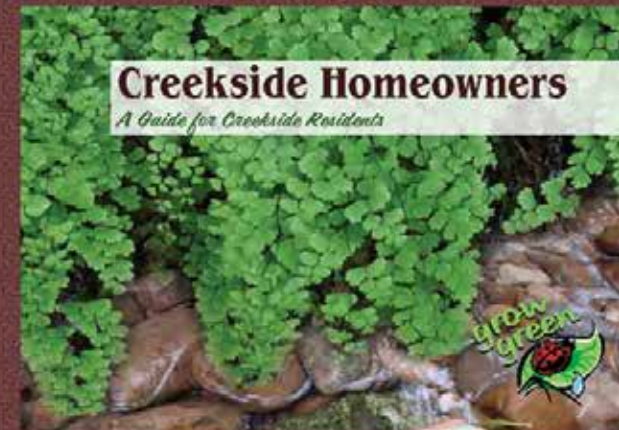
For more worldwide growing tips, visit www.growgreen.com

For more growing tips and details, visit www.starfish.com

www.growgreen.org









Outreach

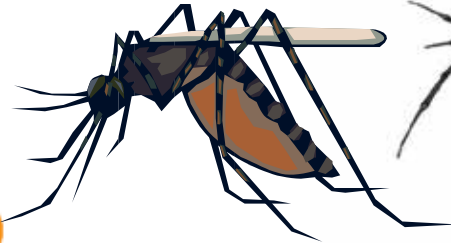




Outreach



www.firewise.org
www.austinhsem.com
www.austintexas.gov/watershed/creekside





Management Template

- Guiding principles
- Environmental criteria
 - Canopy
 - Moisture
 - Slope
- Four management axis
 - Seeding
 - Seedling planting
 - Soil amendments
 - Invasive species control



Financial Benefits

- Cost $\sim \$25 \text{ ft}^{-1}$ ($\sim \$850 \text{ ft}^{-1}$ engineered bank restoration, \$6800 per acre (max.)
 - Small scale
 - Reduce future degradation requiring engineered solutions
- ~ 80 acres (2012, 21 Grow Zones) removed from mowing ($\$48\text{K yr}^{-1}$)
- Key bacteria TMDL solution (avoid $\sim \$25\text{K day}^{-1}$ in fines).



Other Benefits

- Healthy and calming natural spaces
- Shade for recreation
- Education
- Promote diversity and stewardship
- Contribute to carbon neutrality



Restoration Challenges

- Severe soil erosion/compaction
- Low plant establishment in harsh soils
- Compliance with No Mow zone
- Citizen concerns



Future directions

- More Grow Zones!
- Restoration management templates and schedule (volunteers, stakeholders).
- Establish local functional trait monitoring component to insure resilience.
- Ongoing research...



We are getting there...

Givens

Robert E. Lee

Bartholomew



Questions?

