# *The Restoration of Reading Creek & Model Stream Buffer Ordinances/ Zoning Regulations for Alabama Streams*

Charlene LeBleu, AICP, ASLA,
Associate Professor of Landscape Architecture
Auburn University
Auburn, AL

# *This presentation*

- Stream Buffers/ Riparian Buffers
  - Function of water quantity & quality
- Overview city of Auburn, AL stream ordinance as a model ordinance
- Application of the city of Auburn, AL model ordinance to Reading Creek stream restoration at Jackson Reading Park in Prichard, AL

# *What are stream buffers?*

- Also called *riparian buffers*
- Permanently vegetated transition zones
- Typically  forested lands adjacent to streams
- Intercept runoff to filter pollutants
- Encourage infiltration of water before it enters water bodies.

# Pollutant Filter

- Deposition
- Infiltration
- Absorption
- Filtration
- Biodegration
- Plant uptake

# Pollutant Removal

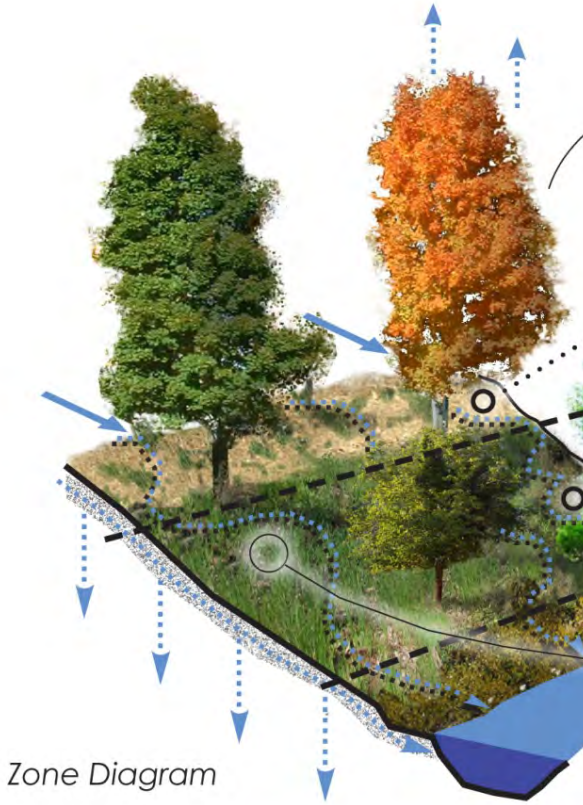
- Nutrient removal increases with buffer width
- Nutrient removal effectiveness is dependent on soil type, texture and biochemistry

***Pollutant Removal Table***

| Sediment | Nutrients | | Metals | Pathogens | Temperature |
|---|---|---|---|---|---|
| | N | P | | | |
| a. 60% | 30% | 35% | — | — | — |
| b. 85% | 30% | 40% | ~50% | ~70% | — |

Sources:
a. North Carolina Department of Environmental and Natural Resources, 2007
b. City of Auburn, 2009

# Three Main Zones



Zone Diagram

*Zone 3:* An optional area typically planted in dense grass . Aids in diffusing flow.

*Zone 2:* The wider middle zone consists of mostly slow-growing, woody vegetation to help diffuse flow.

*Zone 1:* The inner most zone contains herbaceous wetland plants needed to protect the body of water and should be undisturbed.

*Panicum virgatum* (switchgrass) is a native grass that may be used in a filter strip

# Outer Zone—Zone 3

- Zone farthest from the stream
- May be residential yards or maintained open space
- Native grass and/or turf grasses provide for even distribution of overland flow and increased effectiveness

# Middle Zone—Zone 2

- Transition zone between upland development and inner zone
- Zone of primary treatment/ pollutant removal
- Width range from 20’ – 100’
- Typically woody vegetation

# Inner Zone—Zone 1

- Closest to the water body
- Create, preserve & protect physical & ecological functions
- Floodplain zone with wetland characteristics and critical habitats
- EPA (2006) states a minimum of 25 feet
- Restricted human use
- Planted with undisturbed mix of native wetland, herbaceous and woody vegetation

# Stream Buffer Ordinance of Auburn, AL

- Variable Width
- Buffer applies to all perennial and intermittent streams
- Ephemeral streams must be vegetated
- Divides buffer into three zones to determine permitted use

# Model Ordinance:
# City of Auburn, AL Stream Buffer Ordinance

- Buffers required on each side of the stream
- Buffer width varies based on the size of the upstream drainage basin
- Three zones
  1) Streamside Zone
  2) Managed Use Zone
  3) Upland Zone

**TABLE 4.31**

**Stream Buffer Width Based on Drainage Area**

| Drainage Area (Watershed) Designation | Streamside Zone 1 | Managed Use Zone 2 | Upland Zone 3 | Total Buffer Width on each side of Stream |
|---|---|---|---|---|
| < 100 acres | 25 feet | None | 10 feet | 35 feet |
| ≥ 100 acres | 25 feet | None | 20 feet | 45 feet |
| ≥ 300 acres | 25 feet | 20 feet | 10 feet | 55 feet |
| ≥ 640 acres | 25 feet | 50 feet | 25 feet | 100 feet |

# Mitigation Techniques

- Installation of structural BMPs
  - Bioretention, rain gardens, stormwater wetlands
- Controlled impervious surface
  - Impervious surface ration of $\leq$ 25%

# Mitigation Techniques

- Open Space Development
  - Preserves vegetative area on or near site that equal to 200% of the buffer encroachment area. Area promotes water quality
- Stream Restoration
- Stream Preservation

# Mitigation Techniques

- Wetland restoration
  - Restore two acres for every one disturbed
- Greenways
  - Trails and connectors as permanent open space
- Wider Buffer Width
- Other

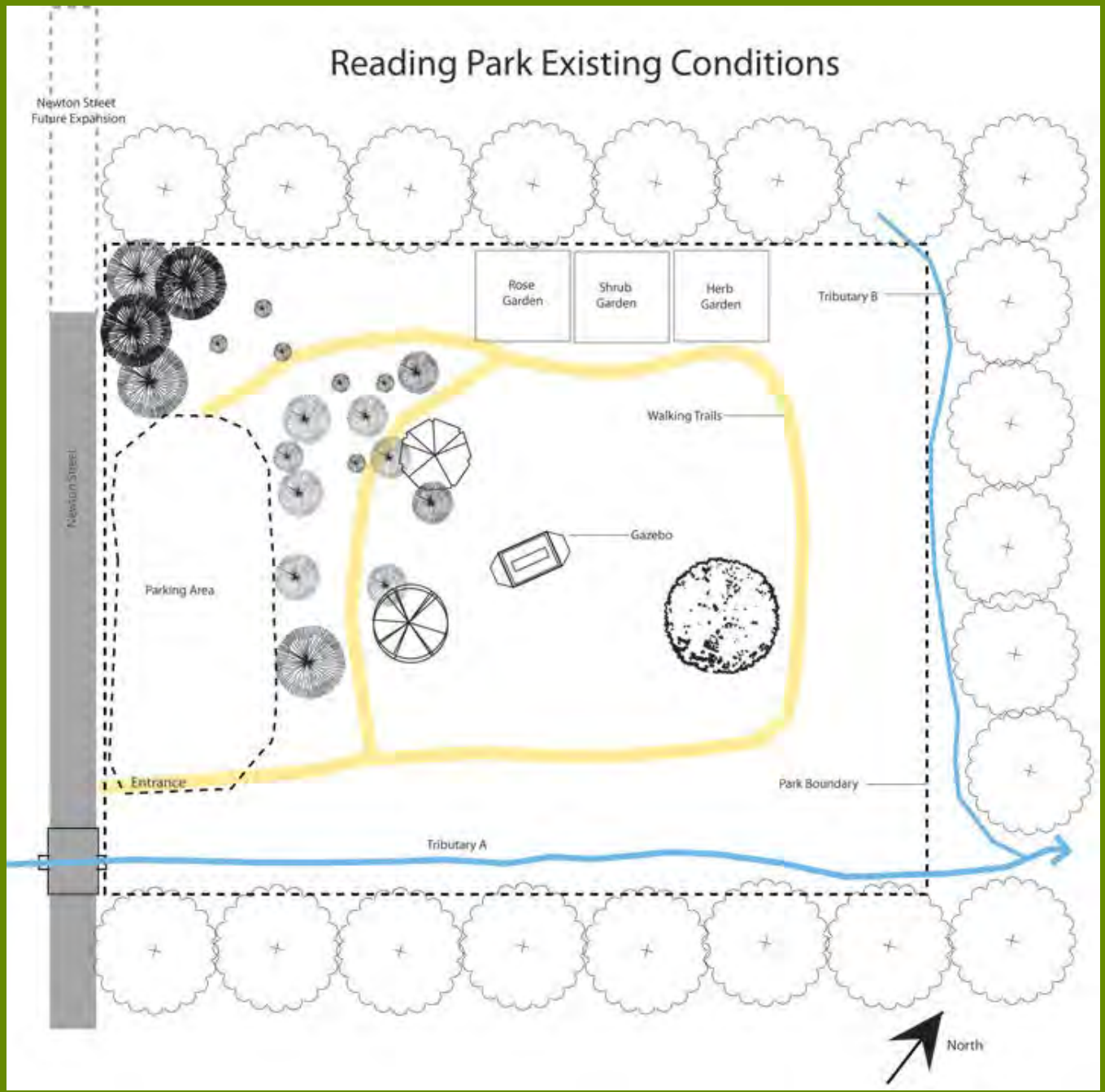
# Jackson Reading Park

# Prichard, AL

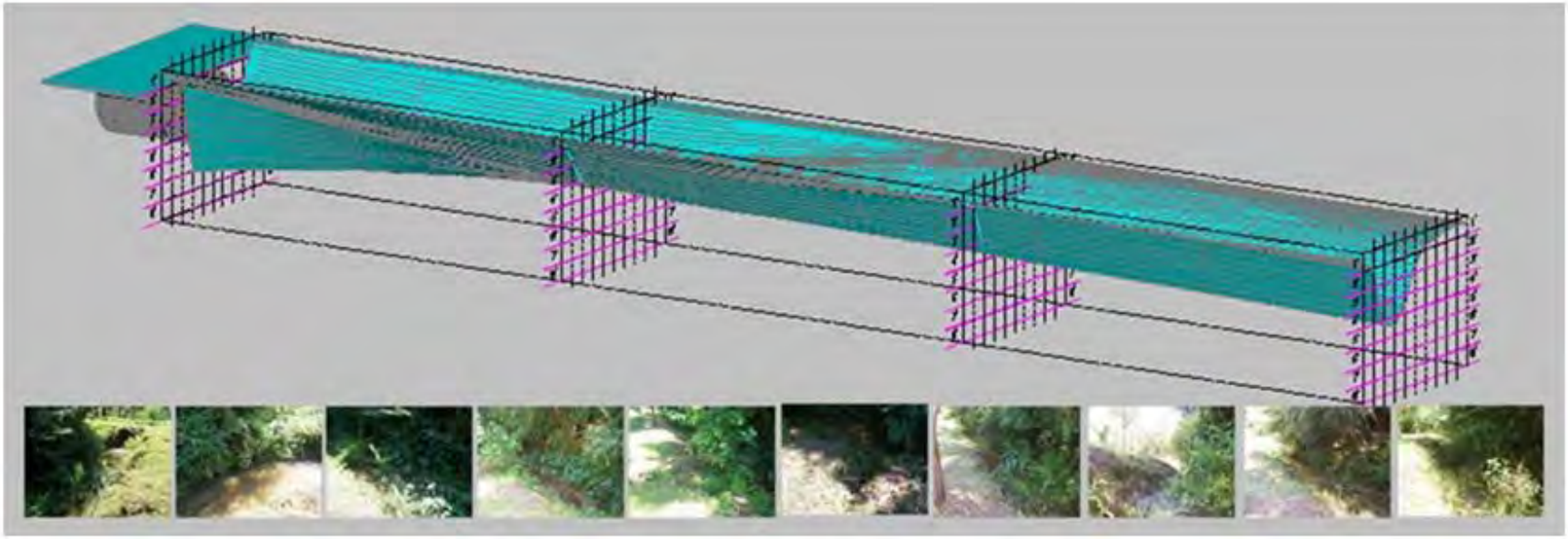

Northwest Congregation of Jehovah's Witness
17
Dudley Ave
New St
Branch Ave
Dream Center Mobile
Jackson Reading Park
Till St
S Anderson Ave
Cheeseman Ave
Owens St
New Light Baptist Church
Stile Ave
Newton St
My Father's House of Prayer
Boaz Ave
Mount Sinia Baptist Church
Mt Sinai Ave
Gilley Ln
Daniels Ave
Bear Fork Rd
St Stephens Rd
Spiritual Power Church
Bearfork Full Gospel Church
© 2009 Tele Atlas
Image U.S. Geological Survey
© USFWS
Orchard Ct
Opp Ave

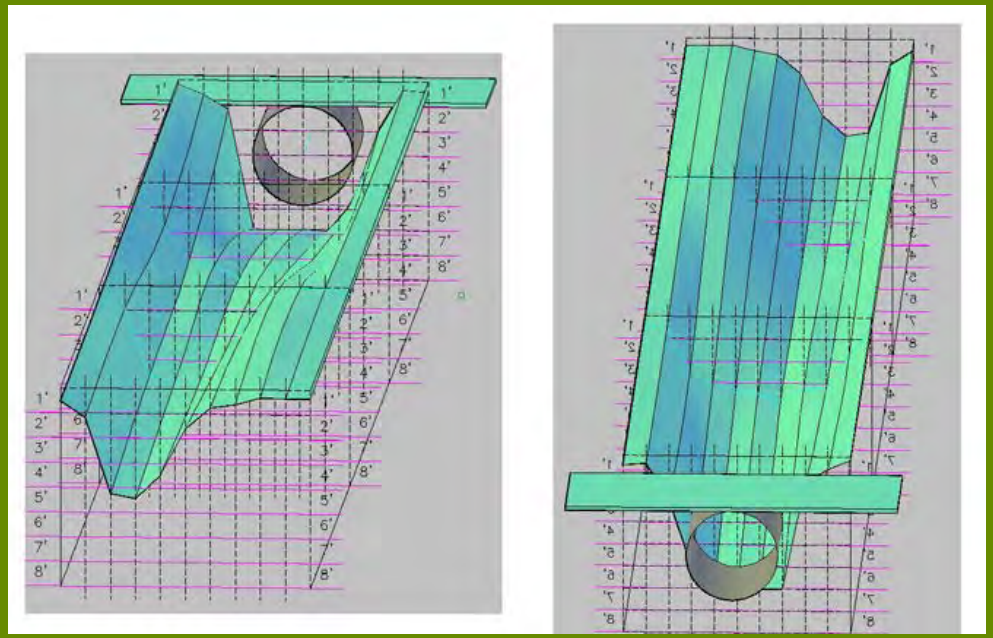

Reading Creek is a *perennial stream* and surrounding soils are *urban complex*

Various Pictures of existing conditions throughout Jackson - Reading Park


Reading Park Existing Conditions
Newton Street
Future Expansion
Rose Garden
Shrub Garden
Herb Garden
Tributary B
Walking Trails
Newton Street
Gazebo
Parking Area
Entrance
Park Boundary
Tributary A
North

# Model of Existing Stream







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Zone 1—25 ‘

Zone 2—50’

Zone 3—25’

Buffer extends into park area.

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Zone 2—50’

Zone 3—25’

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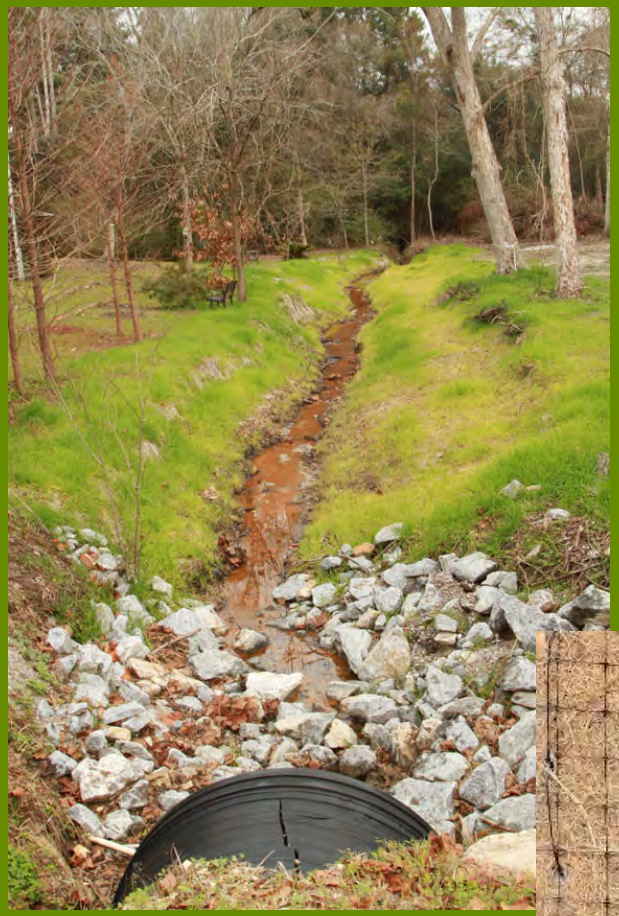
# Reading Creek Restoration




- Three zones
- Coir fabric (coconut)
- Over Brown Top Millet & Winter Wheat Mix,

  50 lbs /ac

# **Planting the Buffer**
(over 1,200 plants)

# April 10, 2013

# Maintenance

| Task | How Often | Comments |
|---|---|---|
| Irrigation | *After planting and during severe drought* | *2x/week for 6 weeks after planting* |
| Replace dead vegetation | *Annually* | *Diseased or infested vegetation should be removed* |
| Check for streambank erosion or incision | *Annually* | |
| Mowing of turf grass | *More often in summer months* | *Should not be cut below 3 to 5" and can be grown to a maximum of 12"* |
| Check for invasive nonnative plants | *Annually* | |
| Mowing of native grasses | *Annually* | *Mow before new growth in spring* |

# Summary

- Stream buffers are permanently vegetated transition zones that are typically forested
- Provide food and shelter to wildlife
- Intercept runoff, filter pollutants and encourage infiltration
- Nutrient removal increases with buffer width

# Summary

- Effective buffer ordinances
  - Meet minimum standards
  - Have clear variables
  - Flexibility + Variance Procedures
  - Are enforced!

# Summary

- The City of Auburn, AL Stream Buffer Ordinance is a good example of a “model ordinance.”

# Questions?