

Watershed Assessment of Disturbed Streams Dusty Kimbrow Watershed Coordinator - City of Auburn, Alabama Fundamentals of Stream Morphology and Ecology Assessment October 28, 2016



Watershed Assessment of Disturbed Streams Presentation Outline

- City of Auburn Watershed Division Operations
- Local Watersheds & Impairments
- Watershed Assessment: Parkerson Mill Creek







City of Auburn Watershed Division Operations



Manage the City's MS₄

- 1. Public education & involvement
- 2. Illicit discharge detection and elimination
 - Illicit discharge ordinance
 - Water quality monitoring
 - Outfall mapping and screening
- 3. Construction site stormwater runoff control
 - Erosion & sediment control ordinance
 - Review development plans for proper BMP design
 - Construction site inspections for proper BMP installation
- 4. Post-construction stormwater management
 - Development must provide pollutant treatment of the first 1.2 in. of rainfall 60% reduction in Parkerson Mill Creek basin
 - Post-development peak Q must be less than or equal to pre-development peak Q
- 5. Pollution prevention/good housekeeping for municipal operations
 - Stream buffer ordinance

City of Auburn Watershed Division Operations Stream Buffer Ordinance



Drainage Area		Streamside Zone Managed Us		e Zone Upland Zone			Total Buffer Width	
<100 acres		25 ft	None		10 ft		35 ft	
>100 acres		25 ft	None		20 ft		45 ft	
>300 acres		25 ft	20 ft		10 ft		55 ft	
>640 acres		25 ft	50 ft		25 ft		100 ft	
Characteristics	Streamside			Managed Use Zone		Upland Zone		
Function	Protects the physical and ecological integrity of the stream ecosystem		Protects key components of the stream and provides distance between upland development and the streamside zone		Prevents encroachment and filter runoff from residential and commercial development			
Vegetative Target	Undisturbed natural vegetation		Mature vegetation and native trees; exotic vegetation and underbrush may be removed and maintained		Lawns, gardens, shrubs, and pervious landscaping features			
Uses	Very restricted- flood control structures, utility easements*, natural footpaths, crossings and approaches for paved roadways, and pedestrian paths and bikeways.		Restricted- all uses allowed in the Streamside Zone as well as storm water best management practices (BMPs), biking and hiking paths (with natural or pervious surfaces), greenway trails		Restricted- all uses allowed in the Streamside and Managed Use Zones, as well as, grading for lawns, gardens, and gazebos and accessory structures. No septic systems, principal structures or impervious surfaces are allowed.			

Local Watersheds and Impairments





Watershed Assessment: Parkerson Mill Creek



Watershed Approach

Knowledge of the watershed is KEY!

- Land use & history
- Geology
- Sediment sources
- Streamflow
- Infrastructure
- Water quality concerns



Watershed Assessment: Parkerson Mill Creek

City of Auburn

Watershed Land Use

- 9.6 sq. mi. (6147 acres)
- 61% Urban 3750 acres
 - Urban Stream Syndrome
 - Increased peak Q
 - Decreased flow duration
 - Upper reaches exacerbate this condition
 - 368 acres of rooftops
 - 326 acres of roadway
 - Little to no detention from streets
 - 350 acres of parking
 - 66 miles of open channel streams
- Urban land use is the primary driver of channel erosion in this system
 - Bank failure
 - Threats to infrastructure
 - Poor water quality particularly in the headwaters





Watershed Assessment: Parkerson Mill Creek



Where's Surface Water?



Watershed Assessment: Parkerson Mill Creek



Watershed Geology

- Determines sediment characteristics of a stream
- Clues to erosion potential
- Manchester Schist (pm)
 - Easily weathered/broken
 - Mica, graphite
 - Weathers to sand
 - Forms a few resistant outcrops
 - Some interbedded quartzite (resistant)
- Hollis Quartzite (ph)
 - Resistant to weathering
 - Forms ridges in south Auburn
- Tuscaloosa Group (Kt)
 - Sandy ridges (e.g. AU Turf Unit)
 - Easily eroded uplands
 - Can lead to large gullies



Watershed Assessment of Disturbed Streams Watershed Assessment: Parkerson Mill Creek



Watershed Geology



resistant quartzite layer -

Watershed Assessment: Parkerson Mill Creek



Paleo-Channel Assessment



Watershed Assessment of Disturbed Streams Watershed Assessment: Parkerson Mill Creek



Paleo-Channel Assessment



Watershed Assessment: Parkerson Mill Creek



Stream Hydrology

- Know your flow
 - Get your feet wet
 - High water marks
 - USGS Streamgage
 - USGS Streamstats
 - Pressure transducers
 - Indirect Q measurement •

- Channel gradient
- Impoundments
- Bedrock
- Tributary confluences
- Width Contractions
- Erosion





Watershed Assessment: Parkerson Mill Creek



Streambank Erosion Threat to Sewer Infrastructure

- Streambank Threat Assessment Score
 - City-owned sewer line?
 - Sewer line material
 - Clay = 3
 - Concrete = 2
 - Ductile Iron = 1
 - Active channel erosion in the direction of sewer line?
 - Yes with high BEHI = 2
 - Yes = 1
 - No = 0
 - Proximity of sewer line to top of bank
 - 0 1 ft. = 4
 - 1 5 ft. = 3
 - 5 10ft. = 2
 - > 10 ft. = 1
 - Proximity of sewer line to nearest manhole
 - 0 1 ft. = 4
 - 1 5 ft. = 3
 - 5 10ft. = 2
 - > 10 ft. = 1
 - Elevation of sewer line relative to channel
 - Above = 3
 - At grade = 2
 - Below grade = 1

Threat Level 0 - 4 = Low 5 - 9 = Moderate10 - 16 = High

The sewer division manager makes the final decision, regardless of score

Watershed Assessment: Parkerson Mill Creek



Streambank Erosion Threat to Sewer Infrastructure

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 - City-owned sewer line? **Yes**
 - Sewer line material **Clay = 3**
 - Active channel erosion in the direction of sewer line? **Yes w/ high BEHI = 2**
 - Proximity of sewer line to top of bank **0 1** ft. = **4**
 - Proximity of sewer line to nearest manhole > 10 ft. = 1
 - Elevation of sewer line relative to channel **Above = 3**



Threat Level = 13 0 - 4 = Low 5 - 9 = Moderate 10 - 16 = High



Watershed Assessment: Parkerson Mill Creek



Water Quality Concerns

- Pathogens
 - Aging sewer infrastructure
 - Septic tank systems
 - Pet waste
 - Agriculture
 - Wildlife
 - Green Infrastructure Master Plan
 - Best implementation of GI in Auburn
- Bank failure
 - Impervious surfaces
 - Pipe flow
 - Compacted earth fill
- Nutrients
 - Residential fertilizers
 - Pet waste
 - Wildlife
 - Agriculture
 - Septic tank systems

QUESTIONS?

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