

Lick Creek Watershed Restoration Plan

Stakeholder Meeting 8

March 19, 2009

East Durham Regional Library



Agenda

- 9:35-9:45 Hello and Housekeeping (Where we've been and where we're going)
- 9:45-10:15 Long-term Monitoring Plan
- 10:15-10:45 Analysis of Pot. Dem. Projects
- 10:45-11:00 Break
- 11:00-12:15 Final Recommendations
- 12:15-12:25 NCEEP Implementation Planning
- 12:25-12:30 Next Steps

Housekeeping

- **Accomplishments**

1. Watershed Characterization
2. Fieldwork and Findings
3. Watershed Treatment Model Analysis
4. Short-term Monitoring
5. Identified Restoration Opportunities
6. Critical Lands Protection Analysis
7. Summary Water Quality Data
8. *Draft Long-term Monitoring Recommendations*
9. *Draft LC LWP Management Strategies*

- **To Do**

1. Finalize Long-term Monitoring Recommendations
2. Finalize Management Strategies
3. Demonstration Projects
4. Compile Final Plan (September 2009)
5. Next Meeting?

Long-Term Monitoring

Long-Term Monitoring Plan

- Review long-term monitoring plan goals
- Current and proposed monitoring locations
- Why are additional monitoring locations considered critical? How do they support monitoring goals?
- How can achieve additional monitoring?
 - Volunteer network?
 - DSS?

Lick Creek Monitoring Plan

D. Line & D. Penrose

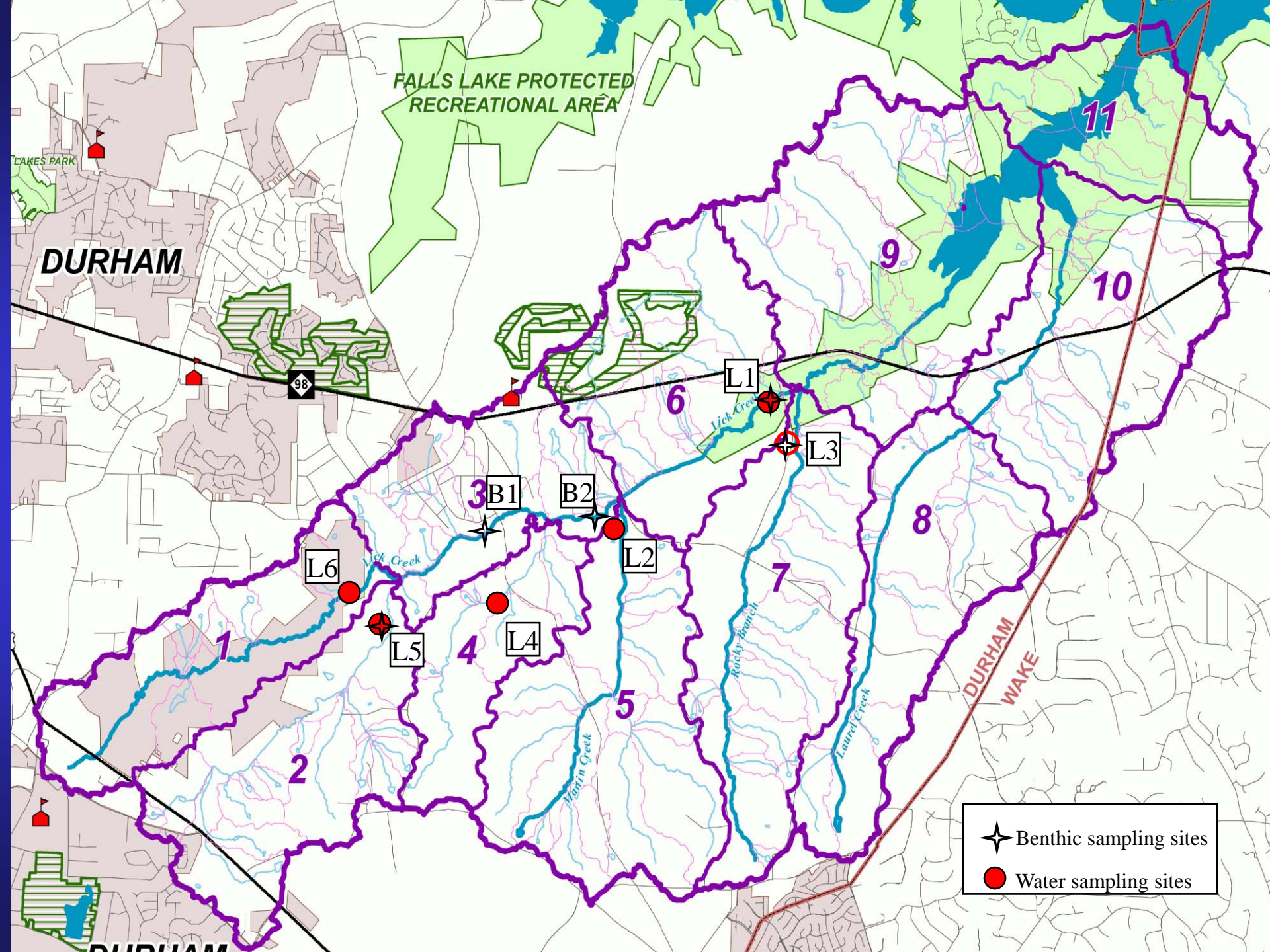
NC State University

Bio. & Ag. Engineering-Extension

Long Term Monitoring Plan

Objectives

1. document changes in pollutant inputs from the overall watershed to Falls Lake
2. identify subwatershed(s) most in need of restoration then document the effects of restoration efforts in that subwatershed
3. document the effects of development on water quality in a subwatershed
4. Others?



FALLS LAKE PROTECTED RECREATIONAL AREA

DURHAM

98

11

9

10

6

L1

L3

3B1

B2

L2

8

L6

1

2

L5

4

L4

5

7

DURHAM WAKE

- ★ Benthic sampling sites
- Water sampling sites

Vick Creek

Martin Creek

Rocky Branch

Laurel Creek

DURHAM

Long Term Monitoring Plan

Case for keeping all sites

Recommended Sites (L1, L3, L5, & L6)

- L1: Objective 1 and possibly 2 & 3
- L3: Objective 1 and 2
- L6: Objective 3 and possibly 2
- L5: Objective 3
- Others?

Long Term Monitoring Plan

Recommended Parameters

- TKN, NH₄, NO_x, TP, TSS
- Turbidity, DO, Temp., pH, conductivity
- Bacteria
- Stream Stability (at L6)
- Macroinvertebrates at L1 only

Average Concentrations- Grab

Site	Samp	EC	TKN	NOx	NH4	TP	TSS
	#	mpn	----- mg/L -----				
L1	21	189	0.54	0.05	0.07	0.09	12.4
L2	16	100	0.48	0.08	0.04	0.05	11.9
L3	20	507*	1.19	0.09	0.39	0.09	148
L4	14	80	0.54	0.04	0.05	0.06	7.1
L5	17	111	0.45	0.05	0.04	0.09	9.2
L6	16	198	0.68	0.06	0.07	0.13	29.4

Demonstration Projects

Analysis of Potential Demonstration Projects

- **GOAL**
 - Use SET to evaluate nutrient and sediment removal potential of several priority stormwater retrofit and critical lands protection projects
 - Conduct community information meetings when projects have been identified
- **Group has already prioritized projects**
 - Pursue those ranked highest first?

Volunteer Restoration Opportunities (Buffer)

APPENDIX 2: VOLUNTEER RESTORATION PROJECTS																			
Restoration projects suitable for construction primarily by volunteers. May require some design or limited labor by contractor.																			
Project Types: wetland creation, stream repair, stormwater retrofit, buffer planting, reforestation																			
Project ID	Name and Location	Project Type	Description	Agency for Follow-up	Size as Length (ft)	Implementation Feasibility						Environmental Benefits						Total Project Score (of possible 20)	
						Relative Construction Cost	Owner / Manager Support*	Physical Constraints***	Total Feasibility Score (of possible 8)	Flag: Agency Criteria*	Flag: Public Land****	Water Quality**	Channel Protection	Natural Areas Impacts****	Total Environmental Benefits Score (of possible 10)	Flag: High Priority Subwatershed***	Flag: Headwaters		Flag: Involves Citizens in Construction
IB-213	Wayward Dr.	Buffer planting	Stream between properties is mowed to the edge. Homeowner is interested in creating a buffer to control stormwater flows.	TBD	238 ft	2	3	3	8	-	-	1	2	3	6	9	✓	✓	14
IB-121	Along RCH-122	Buffer planting	Assist residents to plant buffers with native vegetation.	TBD	552 ft	2	2	3	7	-	-	2	-	3	5	3	✓		12
IB-336	Off Baptist Road and Southview Rd	Buffer planting	Intermittent stream through pasture.	TBD	1032 ft	2	1	1	4	-	-	3	2	3	8	9	✓		12
ER-170 and IB-170	Kinard Rd at Phillips Farm	Stream repair and buffer planting	Banks actively eroding due to lack of buffer vegetation.	TBD	IB-170 = 1200 ft	1	1	3	5	-	-	3	3	?	6	2	-		11
IB-332	Triple Crown Farm	Buffer planting	Small tributary through pasture has no buffer. Hoof prints indicate that horses have access.	DSWCD-Eddie Culberson	625 ft	2	1	1	4	-	-	2	2	3	7	6	✓		11
R-303	Amish Barns - business on Route 70	Buffer planting	Stream through commercial property and highway ROW lacks a buffer. Plant a non-woody wetland fringe and educate owner about management.	TBD	425 ft	2	1	2	5	-	✓	1	2	3	6	2	-		11
IB-100	HWY 70 along RCH 101	Buffer planting	Section of buffer with mowed grass. The rest is nicely forested. Address with natural regeneration (stop mowing) or active planting.	TBD	414 ft	2	1	3	6	-	✓	1	-	3	4	2	-		10
IB-102	Along RCH103 North of HWY 70 at Amish Barn	Buffer planting	Cleared for timber harvesting. Remaining buffer patchy at best. Safe location for volunteer tree planting. Potential difficulty establishing vegetation due to beaver presence.	TBD	900 ft	2	1	2	5	-	-	2	-	3	5	2	-		10
IB-330	Homeowner off Kemp Rd	Buffer planting	Stream through residential property has trees but is mowed.	TBD	218 ft	2	3	1	6	-	-	1	-	3	4	6	-		10
ER-121	RCH 122	Stream repair	Small section of stream behind residential property with bank failure. Right bank is 4 ft high.	TBD	<100 ft	1	2	2	5	-	-	1	3		4	3	✓		9
IB-331	Triple Crown Farm	Buffer planting	Small tributary through pasture has less than 10' buffer. Horses may have access.	DSWCD-Eddie Culberson	983 ft	2	1	1	4	-	-	2	-	3	5	6	✓		9
IB-222	Kingsmill Farm, Kemp Rd.	Buffer planting	Lack of buffer on stream adjacent to driveway entrance.	TBD	160 ft	2	1	2	5	-	-	1	-	3	4	7	-		9
IB-333	Homes on 98 west of Kemp Rd	Buffer planting	Small tributary passes behind backyards. Mowed to edge in many spots.	TBD	202 ft	2	1	0	3	-	-	1	-	3	4	6	✓		7
IB-334	Field on 98 west of Kemp Rd	Buffer planting	Intermittent stream through small field. Outside City but just downstream of development in City.	TBD	284 ft	2	1	0	3	-	-	1	-	3	4	6	✓		7

* Flag, agency criteria--assumed 1,500 feet length to meet EEP criteria

** Wetland WQ score based on area treated (same as stormwater BMP)

*** Flag, high priority subwatershed--assumed subsheds 1, 2, and 3 are highest priority for restoration

****Physical constraints, natural areas impacts and Flag, Public Land based on CWP fieldwork review, fieldwork/landowner follow-up needed

*Red font in Owner/Manager Support category = owner contacted but no response

Major Restoration Opportunities (stream, wetland, buffer restoration; retrofits)

APPENDIX 1: MAJOR RESTORATION PROJECTS																		
Restoration projects requiring design by professional, permitting, construction by contractor.																		
Project Types: wetland creation, stream repair, stormwater retrofit, buffer creation, reforestation																		
Project ID	Name and Location	Project Type	Description	Agency for Follow-up	Size as Drainage Area (ac) or Length (ft)	Implementation Feasibility							Environmental Benefits					Total Project Score (of possible 20)
						Relative Construction Cost	Owner/Manager Support	Physical Constraints***	Total Feasibility Score (of possible 8)	Flag: Agency Criteria*	Flag: Public Land****	Water Quality **	Channel Protection	Natural Areas Impacts****	Total Environmental Benefits Score (of possible 10)	Flag: High Priority Subwatershed**	Flag: Headwaters	
IB-350	Downstream of Olive Branch Rd	Wetland Restoration	Area planned for stream restoration. Restoration should include significant buffer plants. Also a possible site for wetland restoration.	Durham SWCD	712 ft	0	3	3	6	wetland acreage?	-	4	3	3	10	3	-	16
ER-120 and IB-120 and ER-150	RCH 120 South of Ravenstone (near OT 122)	Stream restoration and buffer planting	Erosion at OT122 discharge and along reach. This is upstream of planned restoration sites. Banks are eroded, channel actively widening. Buffer removed when clearing forest. Future uncertain due to extensive new development upstream. Further downstream, small tribs are all showing extensive headcutting into main channel. Recommended major buffer planting. Possibly reconnect to floodplain.	TBD	IB-120 = 1883 ft	0	1	3	4	✓	-	3	3	3	9	3	-	13
IB-502, 503, 504, 506, 508	Falls Village Golf Course	Buffer Plantings	Streams are unbuffered where crossing fairways. A no mow buffer should be established. Contact superintendent regarding buffer mowing and nutrient management.	EEP- SWCD; City SWS	1996 ft	2	2	2	6	✓	-	4	0	3	7	6	✓	13
IB-507	Falls Village Golf Course	Wetland Restoration	Wet area downstream of cart booth is a candidate for restoration.	EEP- SWCD; City SWS	94 ft	1	2	3	6	-	-	1	3	3	7	6	-	13
R-300	Pizza Hut-Burger King at Route 70 and Mineral Springs Rd	Stormwater Retrofit	Create pocket wetland in remnant forest and intermittent stream area between fast food restaurants and adjacent businesses. Forest area is degraded, with much erosion and trash. No stormwater treatment present. Drainage area includes Pizza Hut parking lot, Burger King, and portions of Mineral Springs Road and Route 70 intersection.	NC DOT; Durham County Stormwater	6 ac	1	1	2	4	-	-	4	3	1	8	1	✓	12
R-301	Route 70 Outfall adjacent to Budget Truck Rental	Stormwater Retrofit	Create forested wetland by installing forebay downstream of 42' outfall and embankment in flat forested area. Drainage area includes commercial, residential, and highway land uses with no stormwater treatment. However, the forested floodplain provides existing benefits.	NC DOT; Durham County Stormwater	9 ac	1	1	2	4	-	-	4	3	0	7	1	✓	11
OT-102; OT-103; OT-104; ER-100	Triangle Point Apartments on Angier Rd	Stormwater Retrofit and head out control	In addition to O1-101 that is addressed with K-302, approx. 6 acres of uncontrolled runoff from the Triangle Point Apartments discharges to outfalls with scour that undermines the endsections. Rip rap along slope in fairly good condition. Significant erosion where rip rap stops. Fairly decent stream that could be protected by capture of the channel protection volume upstream. These sites are constrained by the small amount of open space, steep slopes, and utilities. Retrofitting is possible but may be expensive.	City SWS; Durham County Stormwater	up to 6 ac	1	1	1	3	-	-	4	2	1	7	2	✓	10
IB-110	Wetland between Woodale and Aylea Ct in Brightleaf	buffer planting	This wetland buffer was completely destroyed by sewer ROW and residential development. Either try to replant along ROW or mitigate elsewhere.	TBD	1667 ft	1	1	1	3	✓	✓	3	0	3	6	1	-	9
MI-100	Powerline Easement	Buffer Plantings	No buffers and often a lot of sediment coming off of dirt roadway/steep slopes.	TBD	100 ft	2	1	1	4	-	✓	1	0	3	4	2	✓	8
UT-401, ER-401	Power Easement west of Virgil Rd	Stream Stabilization; Buffer Plantings	Severe erosion downstream of power easement warrants stabilization. This may require buffer plantings, stormwater detention in easement, wetland restoration, and/or bank stabilization.	TBD	223 ft	0	1	2	3	-	?	1	2	1	4	5	-	7
ER-110	RCH-113 below Snappy's Lake at Brightleaf	Stream repair	Large headcut from new drainage channel from lake. This has occurred recently. 20ft radius 4-12 ft deep.	TBD	<100 ft	1	1	1	3	-	-	0	2	1	3	1	✓	6
R-302	Triangle Point Apartments on Angier Rd	Stormwater Retrofit	Upstream of OT-101, OT-312, ER-100. Create wet swale to treat parking lot runoff from Discovery Way and Beta Loop. Small drainage area. At least 1 utility conflict. Construction constrained by proximity of building foundations and steep slope downstream.	City SWS	1.4 ac	1	1	1	3	-	-	2	0	1	3	2	✓	6
OT-100	Fox Ridge Apartments	Stormwater Retrofit	LOTS of trash from outfall. Stormwater is currently untreated. Very green grass at Apartments.	Durham County Stormwater	1.1 ac	1	1	1	3	-	-	2	0	1	3	1	✓	6

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Analysis of Potential Demonstration Projects cont...

- **Preferable to have diversity of project types?**
 - Retrofit, Buffer planting, Stream restoration, Conservation.
 - What evaluation methods for which type?
 - SET
 - Nutrient Worksheets
 - Other suggestions/resources?
- **Do any of these projects have legs?**
 - Does anyone have any inside information?
 - Who can follow up?

Break!!!

Draft Recommendations



MS. #1: E&S Control on New Development

Recommendations

1. Assess the problem
2. Inspection frequency? Schedule vs. risk-based?
3. Enforcement (are the penalties strong enough to deter non-compliance)
4. Transition to post-construction management (better coordination b/w County and City)
5. Require S&E on all projects above (what size limit? 1/2 acre?)
6. Pond-draining
7. S&E Training Requirement for Durham County Regulations

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #2: Managing Timber Harvesting Sites and Sites Classified as “Agricultural”

Recommendations

1. Overall, the list of strategies is designed to encourage compliance while not discouraging forestry operations.
2. Address conversion of forested land to development
 - a) Are buffer widths enforced even if buffers impacted?
 - b) Enforcement of waiting period (how long?)
 - c) What is the required restoration of buffers if not observed during construction?
3. Exempt operations (e.g. top soil mining, construction dirt piles?)
 - a) Could Soil and Water check receiving water bodies for impacts? (State Sedimentation and Pollution Control Act)

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #4: Impacts from Infrastructure Crossing Stream Corridor

Recommendations

1. Create database
2. Design/maintenance/enforcement of infrastructure and upkeep
 - a) Review design criteria
 - b) Develop inspection program (IDDE)?
3. Minimize stream crossings
4. Maintain buffers as much as possible
 - a) Native re-vegetation

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #5: Buffer and Floodplain Encroachment

Recommendations

1. Enforcement of existing buffer rules
2. Development of stricter requirements
3. Monitoring of active and post-construction buffer impacts
4. Detection of illicit buffer removal and follow-up
5. Emphasis on buffers as stormwater management tool
6. Protection of ephemeral and headwater areas not included in current buffer rules

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #6: Protection of High-Quality Streams and Wetlands

Recommendations

1. Protect/conservate critical lands=protect high-quality streams/wetlands
2. Protect headwater drainage systems (often unprotected)
3. Prioritize developable lands and incorporate protection of riparian features/critical lands into plan review
4. Education and outreach

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #7: Delineation of Stream and Wetland Boundaries

Recommendations

1. Digitize hard-copy maps (soil surveys)
2. Update, revise, and consolidate maps
3. Ground-truthing
4. Ensure plan review staff use best available data

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #8: Major Watershed Restoration Projects

Recommendations

1. Continue to seek and atlas new restoration opportunities
2. Implement restoration projects identified through this planning effort
3. Ensure the plan review process is used to protect potential mitigations sites from encroachment or damage
4. Expand areas in which NCEEP can participate (e.g. retrofits)

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #9: Restoration Projects to be Implemented by Volunteers

Recommendations

1. Continued landowner outreach (include advocacy of rain-gardens, land conservation, etc.
2. Pursue grants to implement projects
3. Annual stream walks/photo review

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #10: Suspicious Discharges from Onsite Wastewater Systems

Recommendations

1. Database of onsite wastewater systems
2. Educate landowners about proper installation, maintenance, and potential need for NPDES permit
3. Ensure that ordinance language is consistent with state-mandated installer certification
4. Assist landowners in converting to city services (funding)
5. Enforcement

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #11: Targeted Outreach and Education

Recommendations

1. Outreach to and educate elected officials, residents, and businesses
2. Adopt-a-Stream program
3. Cross-reference with other management strategies

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #12: Long-term Monitoring

Recommendations

1. Follow long-term monitoring plan as developed by NC Water Quality Group
2. Identify funding sources for monitoring
3. Adopt-a-Stream and other volunteer programs to augment data collection
 - a) Improve credibility of volunteer-collected data

Costs/Funding Opportunities

- Anyone have anything to add?

MS. #13: Stormwater Management and Regulation

Recommendations

1. Develop living updateable database
2. Post-construction water quality treatment/monitoring
3. Discharge volume criteria considered
4. As-built certification requirements (interim site visits?)
5. Enforce penalties for improper maintenance/inspection requirements
6. Analyze effectiveness of traditional BMP's and adjust development standards (including stormwater treatment and site design as a whole)
7. Sufficient staff support

Costs/Funding Opportunities

- Anyone have anything to add?

PROPOSED MS. #14: Better Site Design

Problem:

A focus on BMPs/treatment standards does not go far enough to preventing impacts in the first place, especially in Triassic soils and the fact that we need to be managing development for more than just pollutants.

Examples from Little Lick Creek LWP:

1. Revise performance standards for stormwater to include/require better site design/LID
2. Allow grass channels in lieu of curb and gutter in low-dens. Res. areas. When not practical, require discharges from curb-and-gutter receive treatment to reduce nitrogen at least 30% in accordance with Neuse Buffer Rules
3. Encourage use of bioretention with underdrain systems in landscaped areas of parking lots for stormwater treatment
4. Encourage/require use of conservation subdivisions allowed in Durham's UDO
5. Require open space be maintained in natural condition
6. Adapt steep slopes ordinance to reduce required slope from 25% to 15%

NCEEP Implementation Planning

NCEEP Phase IV Implementation Planning

- Overview
- Get involved!
- Potential Issues:
 - How do we get potential projects in plan review process?
- Implementation
 - UNRBA has contract to implement projects already identified by us!

Next Steps

- Draft final plan with recommendations (UNRBA)
- Choose and begin running models on demonstration projects (Group, UNRBA)
- Next meeting? Leftover recommendations & Demonstration projects? (Group)
- Send out draft plan for review (Group)
- Finalize plan (UNRBA)
- Present final plan to Durham County and City of Durham (UNRBA)

Adjourn!
Thank you!