

Lake Maumelle Watershed Policy Advisory Council Meeting June 15, 2006



Facilitated by



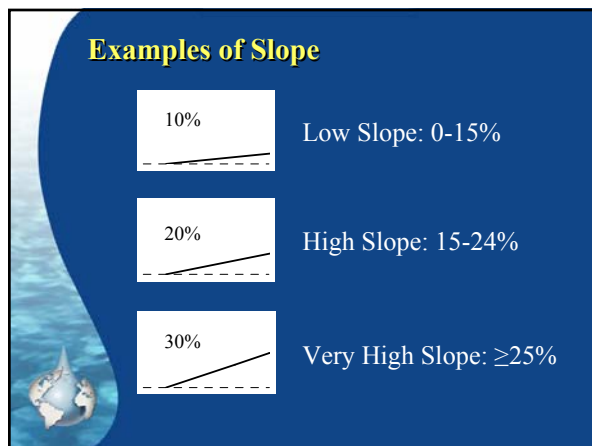
TETRA TECH, INC.



- ### 3/16 Meeting Objectives
- Respond to some questions raised
 - Review additional analysis
 - Review cost and land value considerations
 - Discuss policy questions regarding further defining new development and land owner flexibility

Some Questions Raised Since Last Meeting

Clarify “high slope” vs. “low slope” and what percent of the land is in the different categories.

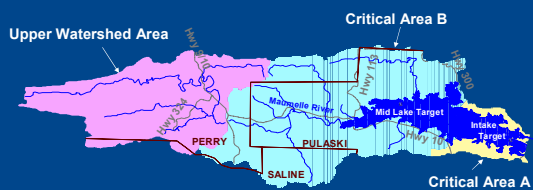


Distribution of Slopes in Watershed

Management Area	% Developable		Acres
	Low Slope	High Slope	Very High Slope
Upper Watershed Area	52%	48%	600
Critical Area B	45%	55%	4600
Critical Area A	45%	55%	60

What's the technical basis vs. policy basis for the performance standards, particularly for Critical Area A?

Revised Management Areas



Watershed Scale Allowable Loading

Indicator	Maximum Allowable Load
Total Phosphorus (TP)	19,250 lb/yr
Total Suspended Solids (TSS)	5,840 t/yr
Total Organic Carbon (TOC)	2,445,000 lb/yr
Fecal Coliform	2.25 · 10 ¹⁵ #/yr

Site-Scale Allocations

	TP (lb/ac/yr)	TSS (tons/ac/yr)	TOC (lb/ac/yr)
Critical Area A	0.200	0.080	36.4
Critical Area B	0.300	0.110	43.9
UWA	0.330	0.130	50.0

Policy Driver

- General guidance from the PAC and public comments to make protection requirements stricter as you get closer to the lake and intake.

Technical drivers

- Account for difference in pollutant delivery to the lake from the management areas
- Recognize difference in relative risk to water supply from the different management areas
(e.g., transmission rates of *Cryptosporidium oocysts*)

What is meant by requiring pilot demonstration projects before using BMPs to meet performance standards?

- Set up full-scale tests by building BMPs for proposed design types on equivalent slopes and soils outside the watershed
- Monitor design and construction
- Monitor water quality performance for 3 years following construction
- Use results to refine design and construction guidance, and modify design requirements as appropriate

What if a development is proposed that has livestock, like a horse farm development?

- The Management Plan will recommend Best Management Practices for developments with livestock, including:
 - providing vegetated filter strips and stream buffers.
 - locating waste away from streams and controlling its drainage.
 - sizing paddocks properly.
 - etc.

What if a landfill or major animal operation is proposed in the watershed?

- *Uses* can be regulated by local zoning and such threats prohibited; alternatively
- CAW could use its power of condemnation for egregious threats to water quality

Additional Analysis of Non-Engineering/Land Conservation

Where we left off...

Non-Engineering/Land Conservation Scenario – Large Lot Option

- Meets TP, TOC, and TSS performance standards if
 - Road improvements required and
 - Off-site mitigation required for conservation land

PAC wanted to see more analysis for larger lots and different combinations of road and driveway composition.

Effects of Revising Lot Size and Road/Driveway Requirements on Offsite Mitigation Needs

Lot Size (ac)		Driveway	Road	Offsite Mitigation (ac)	Percent of Developable Land in Offsite Mitigation
Low Slope	High Slope				
5	5	Gravel +BMPs	Gravel +BMPs	24,880	47%
5	10	Gravel +BMPs	Gravel +BMPs	14,560	27%
5	5	Gravel	Paved	7,080	13%
5	5	Gravel +BMPs	Paved	3,830	7%
5	5	Paved	Paved	1,150	2%
5	10	Gravel	Paved	0	%

Evaluation of more combinations of lot size and road/driveway composition

- See Tables 3 and 4 in Memo #2 (Additional Analysis of the Non-engineering/Land Conservation Scenario)

Key Points

- For low sloped land, can meet standards using gravel roads and driveways if:
 - Increase lot size to 10 acres, and maintain undisturbed area of 60% - 70%
- For high sloped land, can meet standards using gravel roads and driveways if:
 - Increase lot size to 13 acres, and maintain undisturbed area of 90%
 - Increase lot size to 20 acres, and maintain undisturbed area of 50% (CAB) or 30% (UWA)

Policy Questions to Discuss



Policy Questions

- Should the management plan stipulate “fixed” requirements for the Non-Engineering /Land Conservation option? (And, if so, what should be the fixed requirement ?)
- Or
- Should the plan provide for flexibility under this option?

Policy Questions

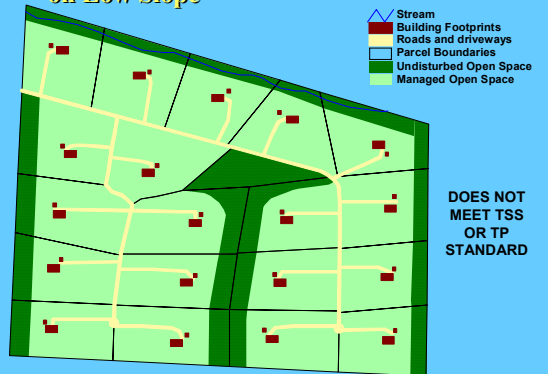
- If flexibility is desired, should there be a fixed menu of options?
- Or
- Should there be “ultimate” flexibility?

Policy Questions

- Should off-site mitigation be allowed?
- Are some options infeasible from a policy perspective?

Cost Considerations

Upper Watershed Area - Large Lot on Low Slope



Example Costs

Upper Watershed Area – Large Lot on Low Slope	Assuming Gravel Roads and Driveways	Assuming Gravel with BMPs on Roads and Driveways	Assuming Paved Roads and Gravel Driveways	Assuming Paved Roads and Gravel with BMPs on Driveways
Road Improvements				
Constr., Design, & Eng.:	\$557,000	\$592,000	\$1,201,000	\$1,219,000
Annual Maintenance:	\$161,000	\$161,000	\$59,000	\$59,000
Offsite Mitigation (cost for mitigating on low slopes; fee simple acquisition)				
Median:	\$655,000	\$385,000	\$30,000	\$0
Wastewater System Cost				
Constr., Design, & Eng.:	\$71,000 - \$142,000			
Avg. Annual Maintenance:	\$500 - \$700			
Administrative Hours Required (excluding mitigation banking)				
Existing:	45 hours			
Estimated Future:	90-120 hours			

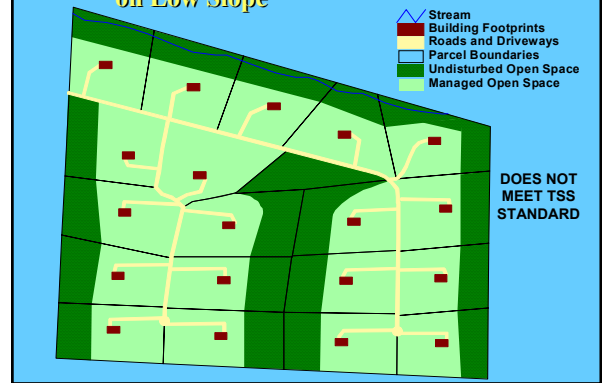
Key Points

- Road/driveway construction costs for gravel are half that of paved options.
- Annual maintenance for gravel is significantly higher than for paving.
- Overall construction and maintenance costs for paving is lower than gravel.
- Using gravel does not meet on-site load allocations, so must also buy conservation land off-site.

Key Points, cont.

- If landowner did not want to buy conservation land off-site or pave roads, could create 9 to 10 acre lots using gravel roads and driveways.
- Wastewater costs double with capping system compared to conventional septic
- Staff development review time would more than double.

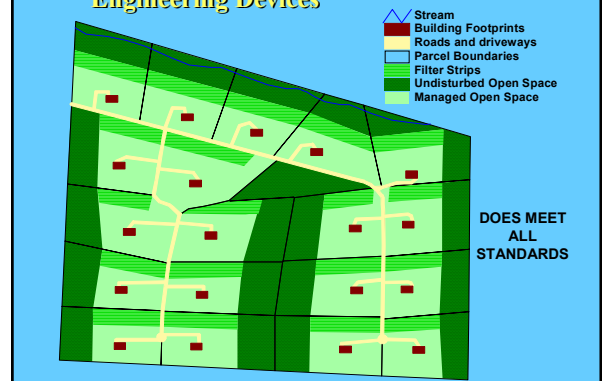
Critical Area B, Large Lot on Low Slope



Example Cost and Key Points

- Similar to example for Upper Watershed Area

Critical Area B, Large Lot on Low Slope Engineering Devices

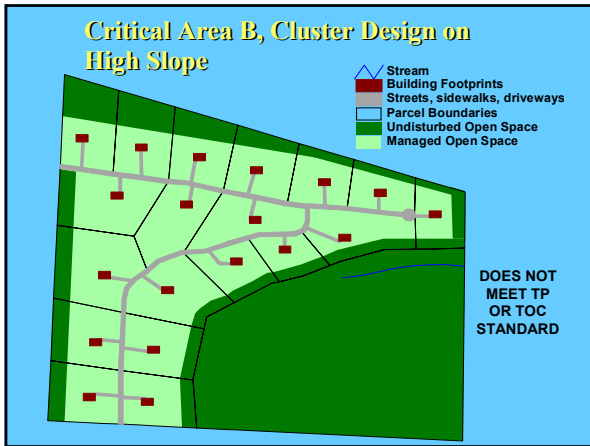


Example Costs

Critical Area B – Large Lot on Low Slope with Engineering Devices	Assuming Gravel Roads and Driveways
Stormwater Best Management Practices	
Construction, Design, and Engineering:	\$47,000
Annual Maintenance:	\$1,000
Road Improvements	
Construction, Design, and Engineering:	\$451,000
Annual Maintenance:	\$122,000
Offsite Mitigation (cost for mitigating on low slopes)	None
Wastewater System Cost	
Construction, Design, and Engineering:	\$71,000 - \$142,000
Average Annual Maintenance:	\$500 - \$700
Administrative Hours Required (excluding mitigation banking)	
Existing:	45 hours
Estimated Future:	115-153 hours

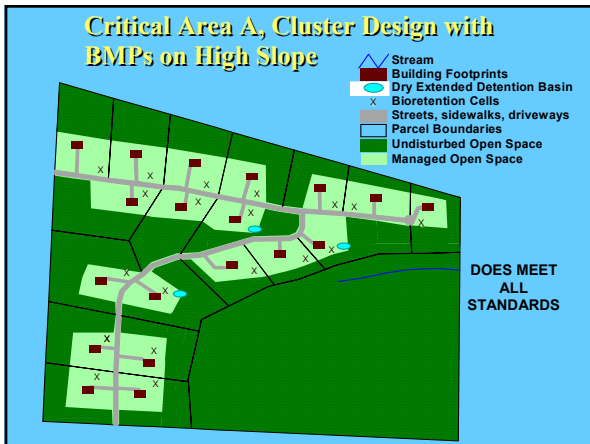
Key Points

- No off-site mitigation (conservation land) required.
- Stormwater BMPs cost \$47,000 (annual maintenance \$1,000)
- Admin costs increase due to stormwater BMP review/inspection
- Appears to be least costly option for 5-acre lots.



Example Costs

Critical Area B – Cluster Design on High Slope	Assuming Paved Roads and Driveways
Road Improvements	
Construction, Design, and Engineering:	\$831,000
Annual Maintenance:	\$20,000
Offsite Mitigation (cost for mitigating on low slopes; fee simple acquisition)	
Median:	\$75,000
Wastewater System Cost	
Construction, Design, and Engineering:	\$161,000 - \$240,000
Average Annual Maintenance:	\$7,000 - \$10,000
Administrative Hours Required (excluding mitigation banking)	
Existing:	45 hours
Estimated Future:	90-120 hours



Example Costs

Critical Area A – Cluster Design with BMPs on High Slope	Assuming Paved Roads and Driveways
Best Management Practices	
Construction, Design, and Engineering:	\$256,000
Annual Maintenance:	\$1,000
Road Improvements	
Construction, Design, and Engineering:	\$831,000
Annual Maintenance:	\$20,000
Offsite Mitigation (cost for mitigating on low slopes)	
	None
Wastewater System Cost	
Construction, Design, and Engineering:	TBD – wastewater is to be pumped out of the watershed
Average Annual Maintenance:	TBD
Administrative Hours Required (excluding mitigation banking)	
Existing:	45 hours
Estimated Future:	300-400 hours

Key Points

- Wastewater costs – TBD
- Pilot projects required outside of Critical Area A
- Admin hours increase substantially due to design review and construction inspection of BMPs

Relative Enforcement Requirements

	Non-engineering, 5-acre Large Lot or 3-acre Cluster	Non-engineering, Large Lots Greater Than 5-acres	Performance Standard
BMPs	NA	NA	✓++
Roads	✓++	✓+	✓++
Wastewater	✓++	✓+	✓++
Open Space	✓	✓	✓

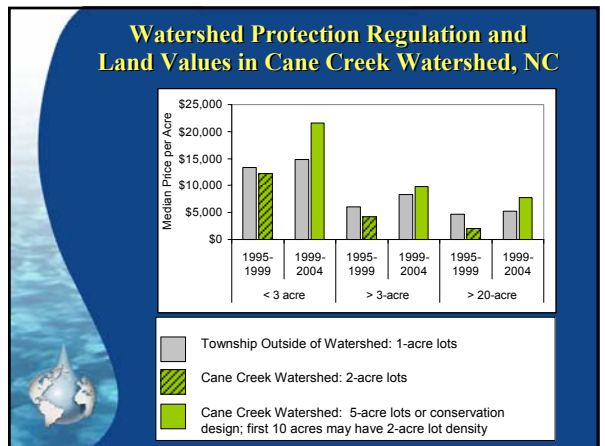
Land Value Considerations

- ### Decrease in Value for Vacant Lots
- Portland, OR:
 - Environmental Protection Overlay Zone for riparian area, wetlands, and upland forest
 - Under severe development restrictions
 - Only publicly beneficial development is allowed
 - Sells for 3-8% less than other land

- ### Increase in Value for Vacant Lots
- Chesapeake Bay Area:
 - Vacant parcels
 - With development restrictions
 - Increased up to 53% in value compared to control areas

- ### Increase in Value for Developed Lots
- Maryland:
 - Forest Conservation Act
 - Requires forest conservation and planting in subdivisions
 - Forested areas within subdivisions increase the average price of land within those subdivisions.
 - Indiana:
 - Conservation subdivision design
 - Maintained full development density
 - Added \$20,000 of value to each lot

- ### Increase in Appreciation for Developed Lots
- Amherst, MA
 - One conservation and one conventional subdivision compared
 - Nearly identical in density, time of construction, and original sales price
 - After 20 years, sales prices in the conservation subdivision were 13% higher than the conventional development



Summary of Land Value Research

Location	Type	Effect	Regulation
North Carolina	Vacant	+	Minimum Lot Size and Conservation Design
Oregon	Vacant	-	Severe Development Restrictions
Chesapeake Bay	Vacant	+	Development Restrictions
Maryland	Developed	+	Forest Conservation and Planting in Subdivisions
Indiana	Developed	+	Conservation Design (voluntary)
Massachusetts	Developed	+	Conservation Design (voluntary)

Defining “Development” and Landowner Flexibility

New Development: Example #1

- Development and land disturbing activities within the watershed after the adoption of the Watershed Management Plan.

New Development: Example #2

- Development created by the addition of built upon area to land void of built upon area after the adoption of the Watershed Management Plan.
- Redevelopment is rebuilding activities on land containing built upon area prior to the adoption of the Watershed Management Plan.

Built Upon Area

- That portion of a development project that is covered with impervious or partially impervious surface including, but not limited to, buildings; pavement and gravel areas such as roads, parking lots, or paths; and recreation facilities such as tennis courts.

Example Exemptions – Linked to...

- Land disturbance thresholds
- Additions to existing single-family residences on single-family lots
- Small subdivisions of land created by existing property owners

Proposed Exemptions #1

- Additions to existing residential building or driveways on single-family residential lots recorded prior to CAW's adoption of the Watershed Management Plan if additions disturb less than 20,000 square feet and the renovation and/or construction costs do not exceed 100% of the tax value of the property.

Proposed Exemption #2

- Except in Critical Area A, parcels owned by private individuals and recorded prior to CAW's adoption of the Watershed Management Plan may be divided into as many as X (TBD) lots with minimum size of 2 acres. Any additional lots created from the parent tract must comply with the provisions of the Watershed Management Plan.

Impacts of Allowing Small Subdivisions by # Lots Allowed

	Number of Grandfathered Small Lots Allowed				
	1	2	3	4	5
Percent change in TP load	1.3%	4.1%	4.8%	6.2%	7.4%
Mitigation acres (low slope)	700	2,280	2,640	3,420	4,060
Mitigation acres (high slope)	980	3,200	3,700	4,820	5,730

Credit Banking

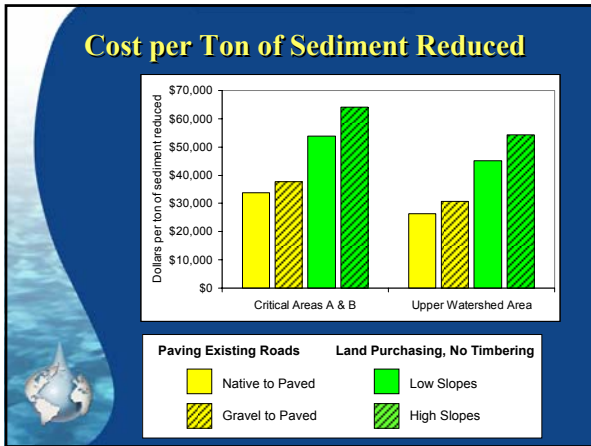
- Public Credit Bank
- Private Credit Bank

Potential Purposes of Public Bank

- Offset additional loading created by small subdivision exemption
- Share burden of small landowner in meeting protection requirements
- Add value to undeveloped land in the watershed

Creating Credits for Public Bank

- Paving existing unpaved roads
- Buying conservation land



- ### Potential Purposes of Private Bank
- Provide development flexibility
 - Add value to undeveloped land in the watershed

Per-Acre Credit for Land Conservation

Management Area	Slope	TP (lb/ac)	TSS (t/ac)
Critical Area B	Low	0.233	0.093
Critical Area B	High	0.179	0.078
Upper Watershed Area	Low	0.259	0.111
Upper Watershed Area	High	0.185	0.092

Per-Acre Credit for Various Development Options

Design	Details	Management Area	TP credit (lb/ac)	TSS credit (t/ac)
Performance Standard (with BMPs)	High slope; 3 ac cluster (5 ac net density); Roads and driveways paved; Grass swales + extended dry detention for BMPs	Critical Area B	0.008	0.047
		Upper Watershed Area	0.003	0.056
Cluster Design	Low slope; 3 ac cluster (5 ac net density); Roads and driveways paved; No BMPs	Critical Area B	0.078	0.040
		Upper Watershed Area	0.071	0.035
Standard Density	Low slope; 5 ac lots; Roads and driveways paved; No BMPs	Critical Area B	0.056	0.019
		Upper Watershed Area	0.054	0.015
Very Low Density	High slope; 20 ac lots; Gravel roads and driveways; No BMPs	Critical Area B	0.042	0.011
		Upper Watershed Area	0.041	0.014

- ### Main Points
- Per acre basis – land conservation generates more credits.
 - Cumulatively, small development credits may add up to large bank.
 - Both could be used to add flexibility and value.

- ### Policy Questions
- Is the exemption for additions to existing single family residences appropriate? If so, what should be included in the definition of a “single family residence”?
-

Policy Questions

- Is the exemption for small subdivisions appropriate? If so, what number of additional small lots should be allowed?

Policy Questions

- If public credits are established, who should be eligible to receive the credits?
 - Existing watershed residents who wish to apply for the small subdivision exemption discussed above?
 - Existing watershed residents who wish to disturb more than 20,000 sf of land for additions to their house or driveway?
 - Other?

Policy Questions

- If a private bank is established, should credits only be transferable to property owned by same landowner or should landowners be allowed to sell credits?

Policy Questions

- Should credits for the private bank be generated through dedication of conservation land, or should credits be allowed through use of stormwater BMPs that exceed the requirements of the performance standards?

Policy Questions

- Should there be a minimum qualifying load for banking credits (e.g., 1 lb for TP or 0.5 ton for TSS)?

Discussion of Upcoming Tasks and Meeting Wrap Up

