

Stormwater Credits, Mitigation Fees and Trading



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Chesapeake Stormwater Network

Nonprofit organized to align the local, state, federal and private sectors to solve the Bay stormwater problem through an independent network of concerned stormwater professionals

www.chesapeakestormwater.net



Key Topics

- Basic Compliance Tools

- Soft Stormwater Credits

- Harder Stormwater Credits

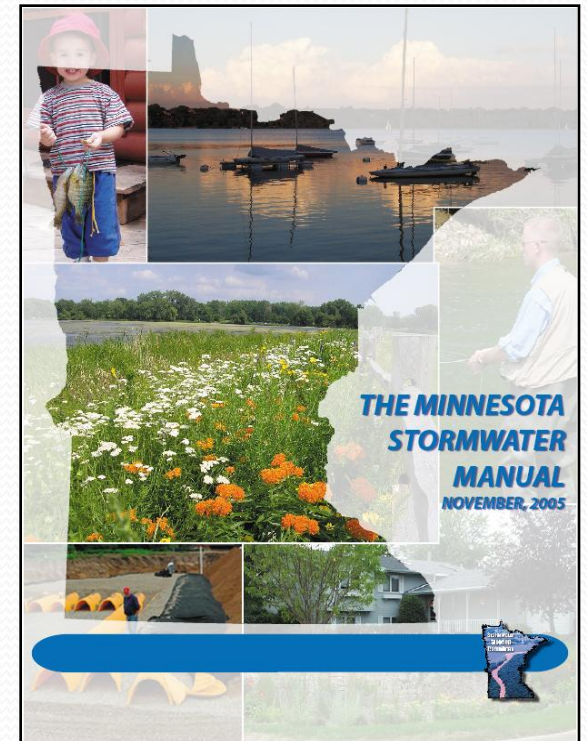
- Stormwater Mitigation Fees

- Stormwater Trading

- Discussion

Soft Credits

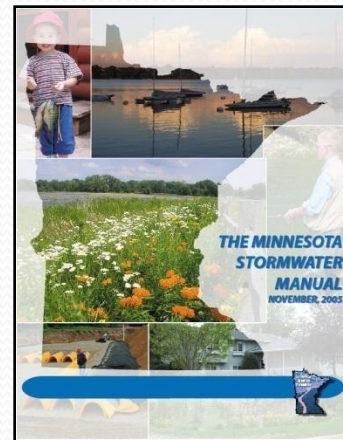
- Soft Deductions from site water quality volume for installing non-structural practices.
- Featured in 2005 MN Manual



Six Stormwater Credits

1. Natural Area Conservation
2. Site Reforestation/Prairie Restoration
3. Drainage to Buffers (*stream, wetland or shoreline*)
4. Surface Impervious Cover Disconnection
5. Rooftop Disconnection
6. Use of Grass Channels

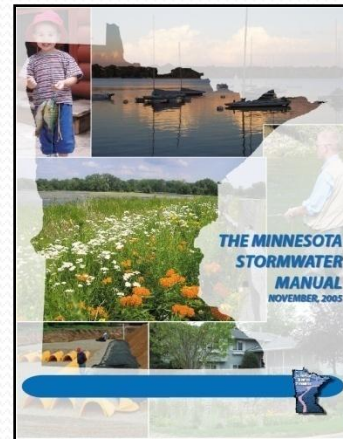
Depending on the site, credits can reduce required V_{wq} by 10 to 50%



How Do Credits Work?

1. Reduce Water Quality Volume (V_{wq}) by reducing Site IC *
2. Reduce storage volume for Channel Protection and Larger Storms by:
 1. Adjusting Curve number (CN) or
 2. Decreasing Time of concentration (T_c)

* Simple area based adjustments to the appropriate MPCA V_{wq} Sizing Rule



1. Natural Area Conservation Credit

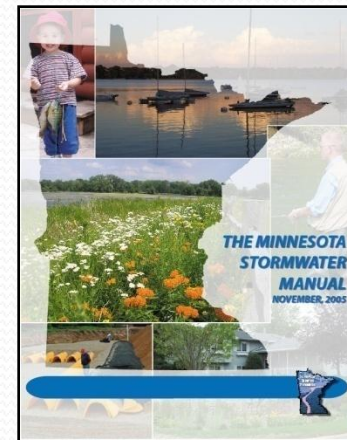
An aerial photograph of a residential development. The scene is dominated by lush green trees and well-maintained lawns. A winding asphalt road curves through the center of the development. Several houses with dark roofs and light-colored siding are visible, interspersed among the trees. In the upper left, a large, open green field or park area is visible. The overall impression is of a high-quality, green residential neighborhood.

Subtract CA from Site IC

2. Site Reforestation/Prairie Restoration Credit

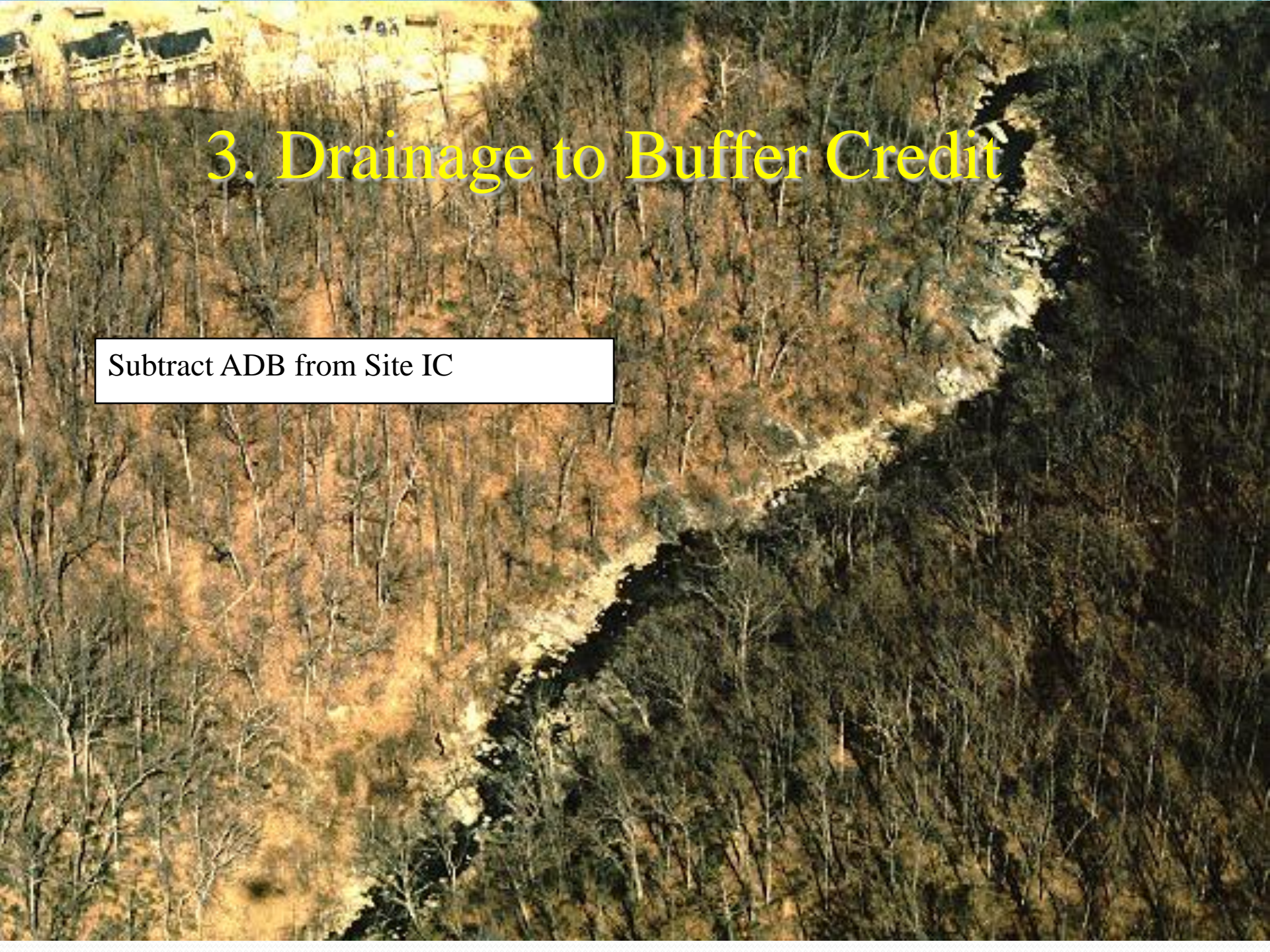


Subtract $\frac{1}{2}$ RA from Site IC



3. Drainage to Buffer Credit

Subtract ADB from Site IC

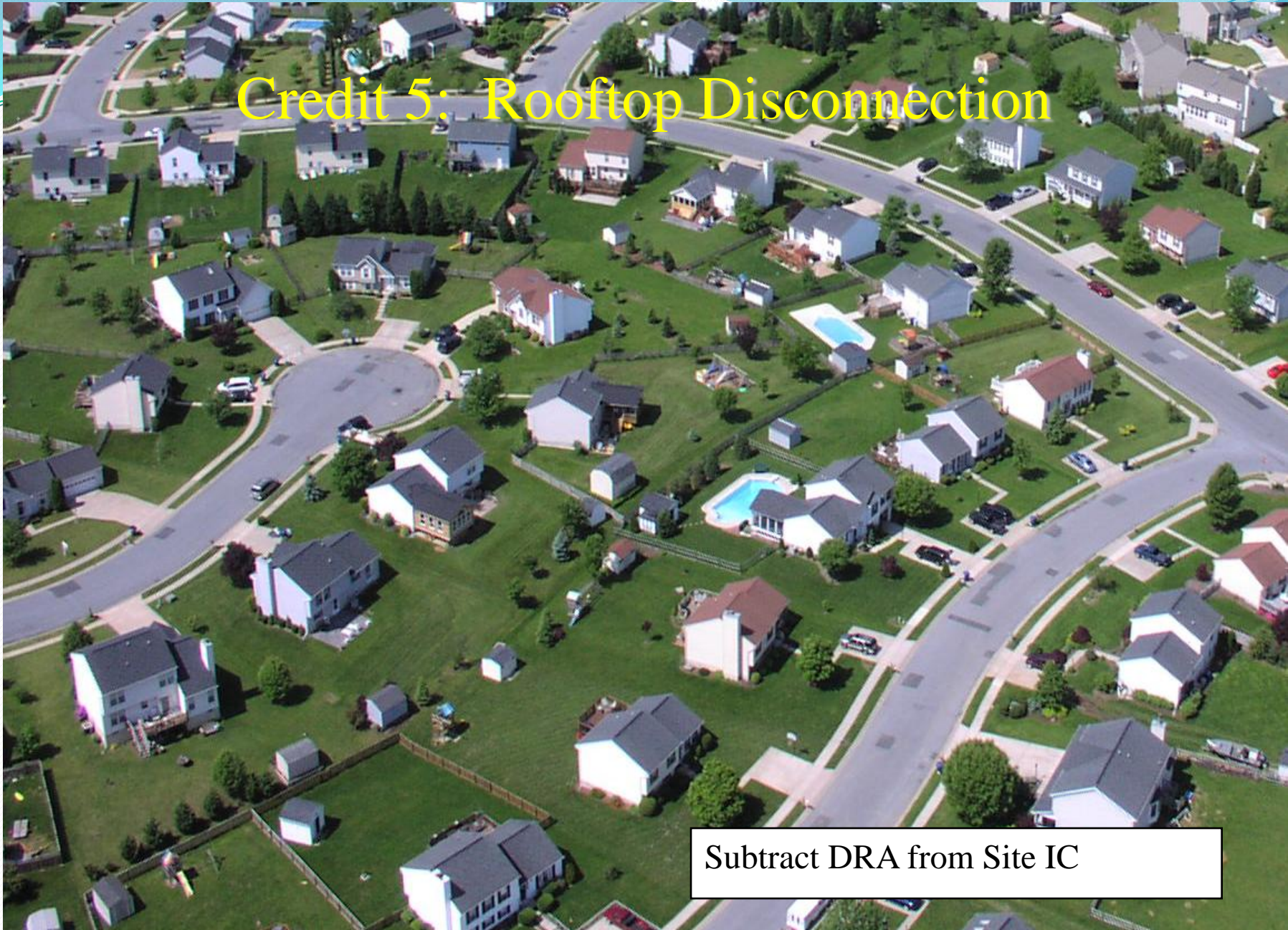


Credit 4. Surface IC Disconnection



Subtract DIA from Site IC

Credit 5: Rooftop Disconnection



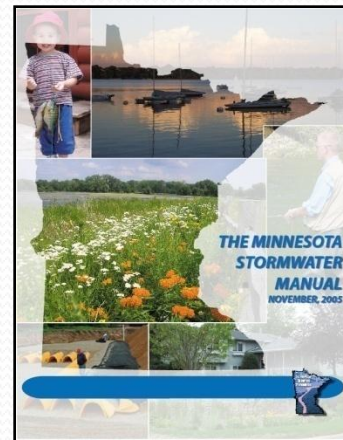
Subtract DRA from Site IC

Credit 6: Use of Grass Channels

Subtract GA from Site IC

Some MN Credit Basics

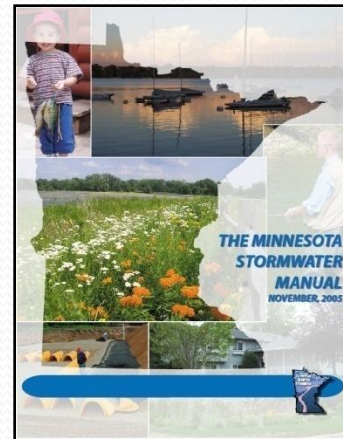
- ◆ Decision to offer credits is a local option
- ◆ Communities may offer all, some or no credits
- ◆ Developer use is strictly voluntary
- ◆ Credits not contained in current MN CGP but will be addressed when reissued in 2008



Manual provides guidance on each type of credit

1. Basic rationale for credit
2. Type of credit offered
3. Site conditions that apply*
4. How it is computed (example)

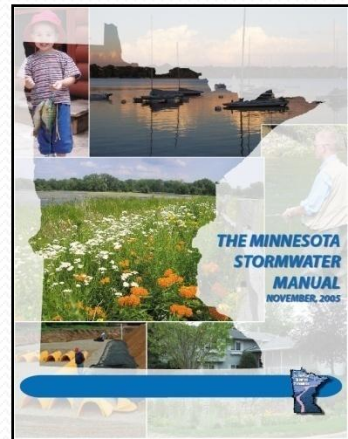
* Simple rules are given to guide plan review to avoid poor applications and prevent cheating



Reforestation credit “rules”

1. Minimum contiguous area of 20,000 sf
2. Long term vegetation management plan
3. Protected by conservation easement
4. Achieve 75% cover in 10 years
5. Planting plan approved by local watershed, stormwater or forestry agency

Prairie restoration also qualifies for the credit

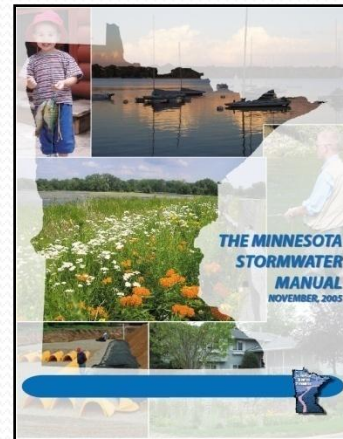


Reviewing Credits

Three Stage Review:

- Evaluate Feasibility During **Concept Design**
- Confirm Area in **Final Design**
- Verify as Part of Final **Construction Inspection**

Reviewers check delineation of credit areas and check adjusted V_{wq} computations



Pros of Soft Credits

- ◆ Promotes use of better site design techniques
- ◆ Reduce the size and cost of stormwater BMPs needed at site
- ◆ Provide economic incentive to use better site design
- ◆ Use a simple and verifiable computational approach

Cons for Soft Credits

- Cheating
- Local reviewers may not accept them
- May exaggerate runoff reduction on poor soils
- No credit given for preserving highly permeable soils or restoring compacted ones
- What is credited on paper may not be installed properly or at all

Harder Credits

- Now Being Implemented in Many Bay States
- More stringent on-site runoff reduction requirements make use of credits essential for compliance at most sites
- Use spreadsheet to spatially quantify their benefit across the site
- More detailed design specs and use of compost amendments to boost performance for poor soil sites
- Disincentive for turf cover and disturbed soils

Defining Treatment Volume

$$T_v = \{P * (R_{vI} * \%I + R_{vT} * \%T + R_{vF} * \%F) * SA\}/12$$

Site Cover Runoff Coefficients	
Soil Condition	Runoff Coefficient
Forest Cover	0.02 to 0.05*
Disturbed Soils	0.15 to 0.25*
Impervious Cover	0.95
*Hydrologic Soil Group (HSG)	
Forest A: 0.02 B: 0.03 C: 0.04 D: 0.05	
Disturbed A: 0.15 B: 0.20 C: 0.22 D: 0.25	

P = rainfall depth for 90th percentile storm 1.0 inch

The spreadsheet drives them

Land Cover Summary	
Forest/Open Space Cover (acres)	6.00
Weighted Rv(forest)	0.04
% Forest	15%
Managed Turf Cover (acres)	20.00
Weighted Rv(turf)	0.21
% Managed Turf	50%
Impervious Cover (acres)	14.00
Rv(impervious)	0.95
% Impervious	35%
Total Site Area (acres)	40.00
Site Rv	0.45
Post-Development Treatment Volume (acre-ft)	1.48
Post-Development Treatment Volume (cubic feet)	64,614
Post-Development Load (TP)	43.78
Post_Development Load (TP) check	43.72
%RR Without RR Practices	74%

Bay-wide Design Specifications for ESD

- Rooftop Disconnection
- Filter Strips
- Grass Channels
- Soil Amendments
- Micro-infiltration
- Micro-bioretenion

Drafts available at CSN website: www.chesapeakestormwater.net

Stormwater Mitigation Fees

- ✓ Spreadsheet approach to verify that good faith effort was made to maximize RR practices.
- ✓ No waivers, all sites should at least partially comply
- ✓ Typical sites where this occurs:
 - Ultra-urban redevelopment
 - Infill Development
 - Small commercial sites
 - Sites in karst or steep terrain
 - Sites with high water table or bedrock

LID Economics

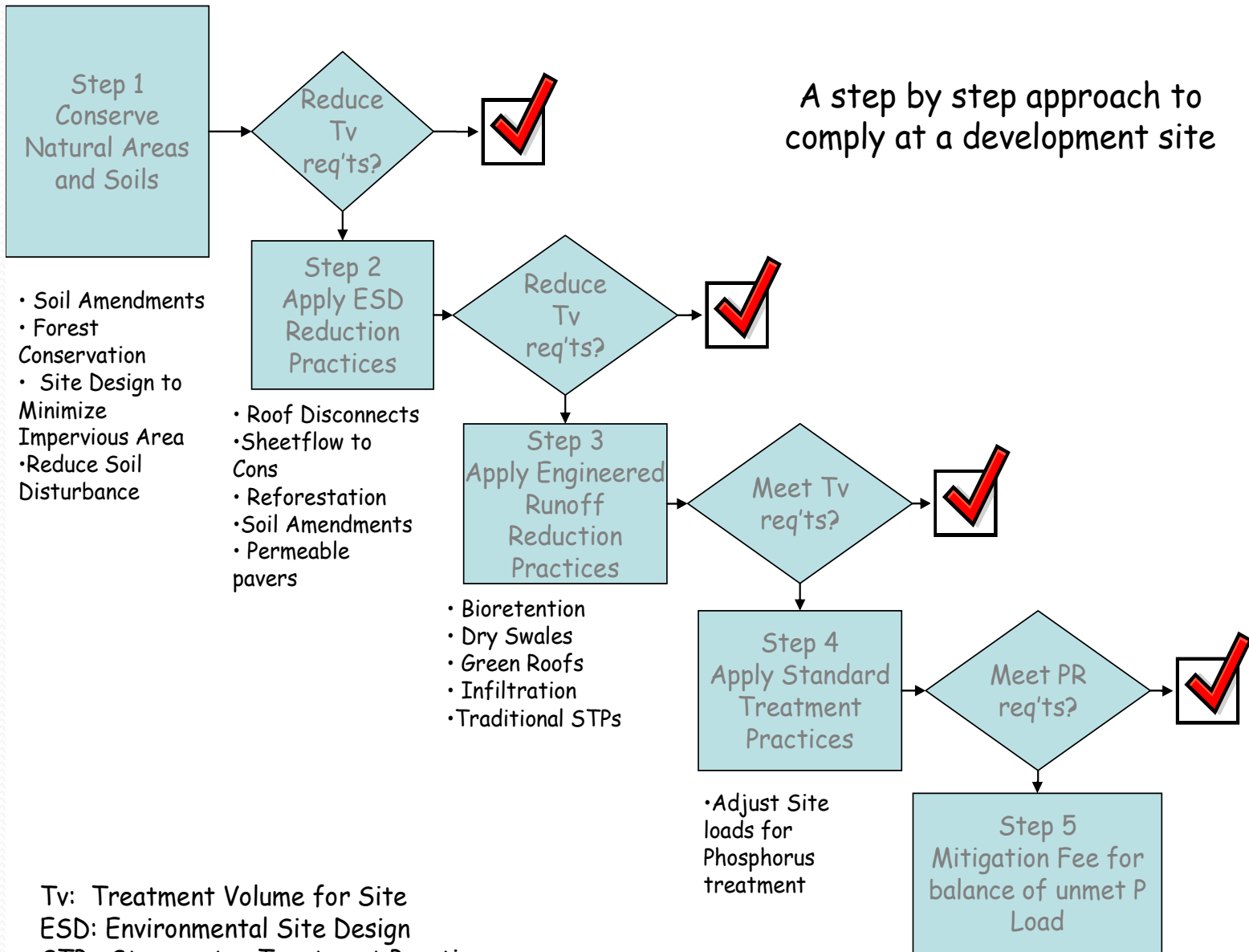
- Lots of recent studies (about ten)
- Most show LID cost-effective in greenfields
- Savings in pipes, paving, and stormwater infrastructure
- Actual LID practices cost more than traditional ones (economies of scale)
- Prototype effect: costs should drop some

LID Costs: Redevelopment

- Redevelopment and ultra-urban conditions drive up all stormwater costs by 5 to 10 X (including LID)
- Its not the surface vs. underground, it's the incorporating LID into buildings
- LID provides impressive CSO abatement savings



A step by step approach to comply at a development site



Tv: Treatment Volume for Site
ESD: Environmental Site Design
STP: Stormwater Treatment Practices

Impervious Cover Mitigation Fee

What is the true cost to deliver equivalent runoff reduction/stormwater treatment in the subwatershed?

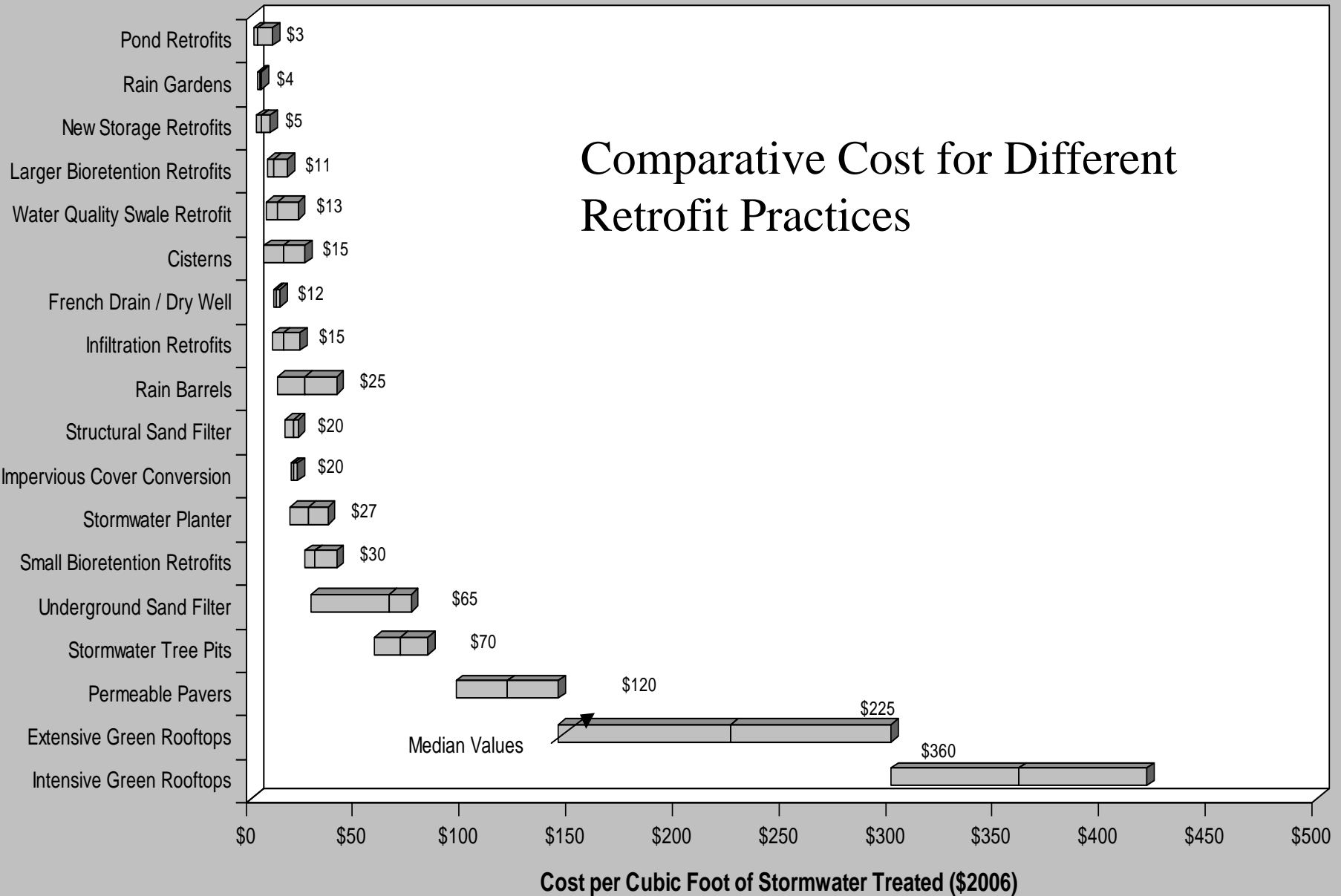
- Should reflect full cost of finding and delivering retrofits, including design, engineering, permitting and contracting
- Should be indexed to construction inflation
Storage retrofits first, on-site retrofits second

Setting the Mitigation Fee

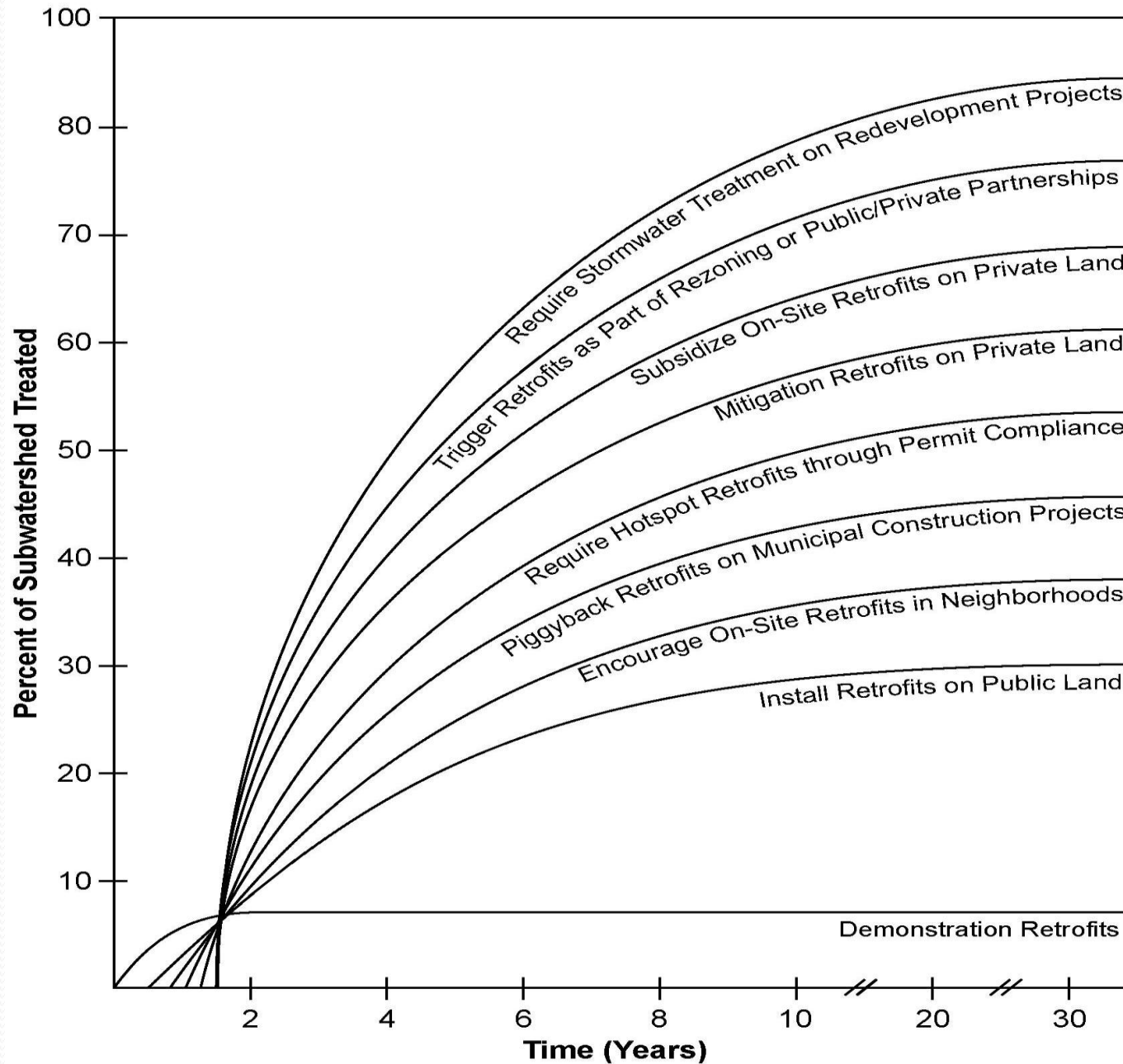
- Currency is either pounds of phosphorus or untreated impervious acres
- VA/MD: 15 to 25K per lb of phosphorus
- DC: 15K per untreated impervious acre
- Actual cost may be closer to 30 to 60K per IA
- Usually presumes local or state administer the retrofit program

Comparative Cost for Different Retrofit Practices

Retrofit Practice



STRATEGIES TO MAXIMIZE RETROFIT DELIVERY OVER TIME



Pros of Mitigation Fees

- ◆ Provides equitable way to deal with tough redevelopment sites
- ◆ Provides a significant future revenue stream to finance municipal watershed restoration practices
- ◆ At least initially, municipal retrofits are more cost-effective approach
- ◆ Over decades, can produce incremental water quality improvement in degraded watersheds

Cons for Mitigation Fees

- Shifts the burden from private sector to the public sector, often on public land and parks
- Some issues of watershed equity (retrofits may not occur in the same watershed)
- Requires considerable local infrastructure to deliver the mitigation retrofits
- Fees collected may be spent on other stuff
- What is credited on paper may not be installed properly or at all

Stormwater Trading

- ✓ Done on a larger watershed or river basin scale
- ✓ Best example: N trading in Neuse River basin in North Carolina
- ✓ Some exploratory trading in VA and PA
- ✓ Frequently involves urban, rural and agricultural practices
- ✓ Provides least cost solution to nutrient reduction
- ✓ The “bank” is typically run by state or quasi-state agency

Pros for Stormwater Trading

- ◆ Addresses the “smart growth” issue so that stormwater is not an disincentive for redevelopment
- ◆ Theoretically, maximizes nutrient reduction at the least total cost
- ◆ Provides subsidies for greater ag and rural practices

Cons for Stormwater Trading

- Money moves from urban watersheds to rural ones, since ag practices are cheaper per pound removed
- Many ag practices are annual practices and not permanent compared to retrofits
- Urban streams continue to be degraded by runoff
- Developers get a great deal and write a much smaller check than they would otherwise have to
- MS4 communities are still liable for restoration when their waters are impaired

Feedback and Discussion

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