Overview

Key Forest Modeling Issues:

Mapping our way forward

Joint Workgroup Meeting

Land Use and Forestry

May 1, 2013

harvested forest

true forest

urban tree canopy

floodplain zone (forest/other)

forested wetland?

mixed open?

forest

Proposed Changes in Land Use Categories Related to Forests

Red: remove

Black: no change

Green: new

STAC:

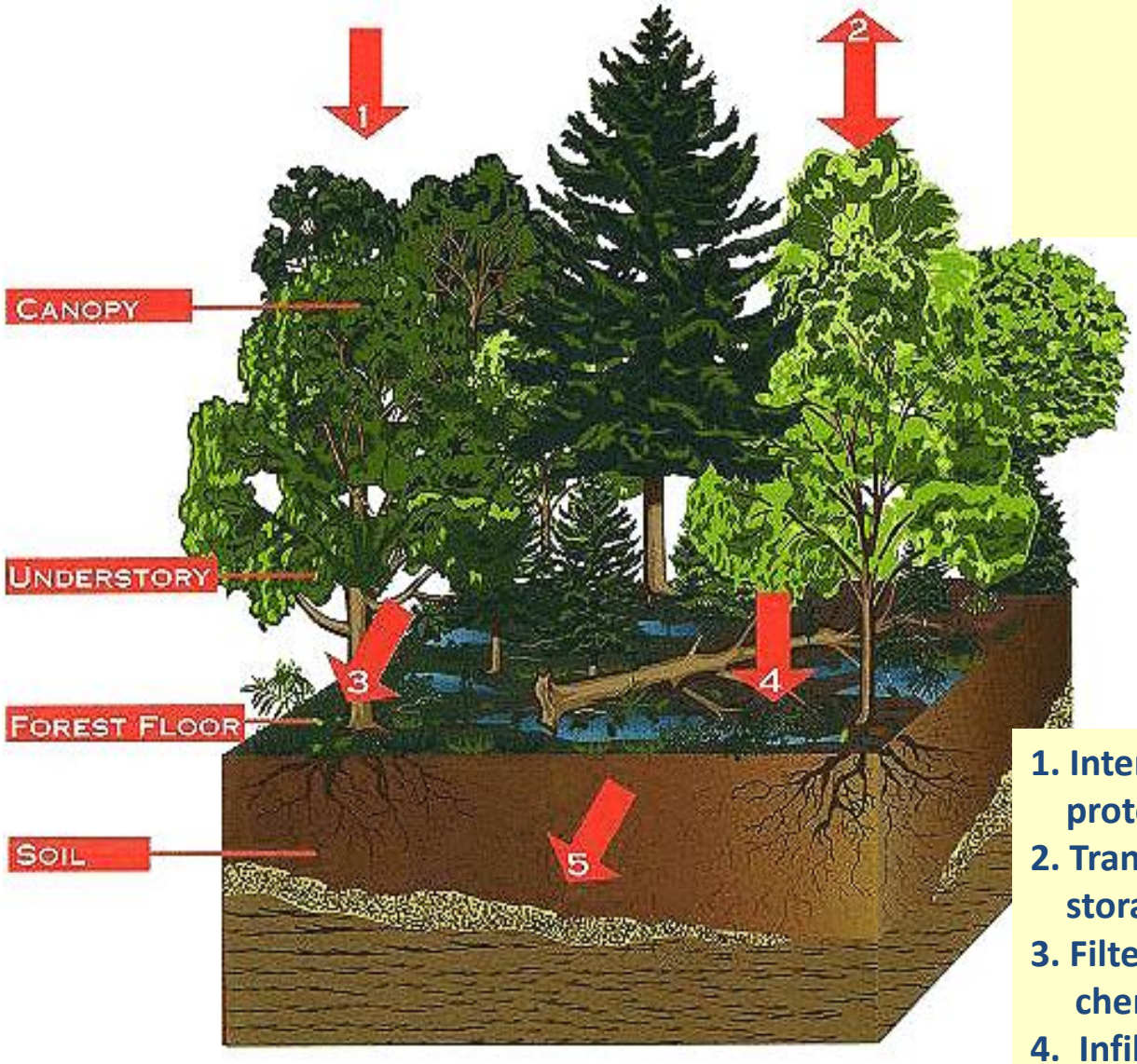
The Role of Natural Landscape Features in the Fate and Transport of Nutrients and Sediment

- pursue upgrades to the CB Model that incorporate more accurate estimates of nutrient and sediment processing rates
- *three new land use classifications should be identified immediately: riparian forest, forested floodplains, and other wetlands*

What to Consider for Phase 6.0

- Does the new land use have unique nutrient or sediment loading characteristics?
- Is the new land use needed for planning, tracking and reporting of BMPs and/or regulatory actions?
- Will the new land use help inform management decisions and implementation at the local level for any other reasons?

Forest Watershed Functions



1. Intercept rainfall , protect soils, provide shade
2. Transpiration, nutrient storage, trap air pollutants.
3. Filter sediment and other chemicals.
4. Infiltration, water and nutrient storage
5. Biological removal of nutrients and pollutants.

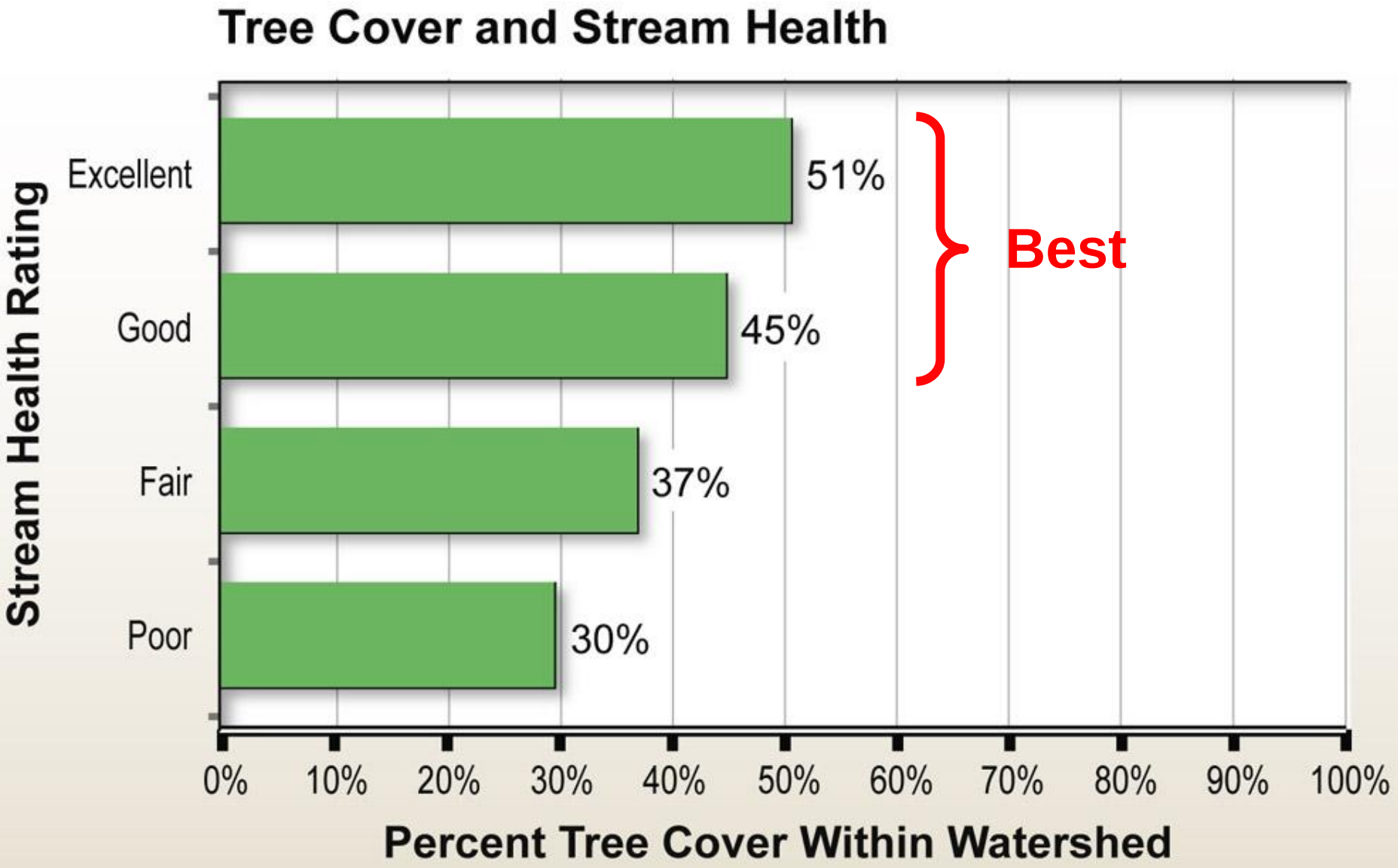
True Forest v. Mixed Open

FIA

The Nation's Forest Census

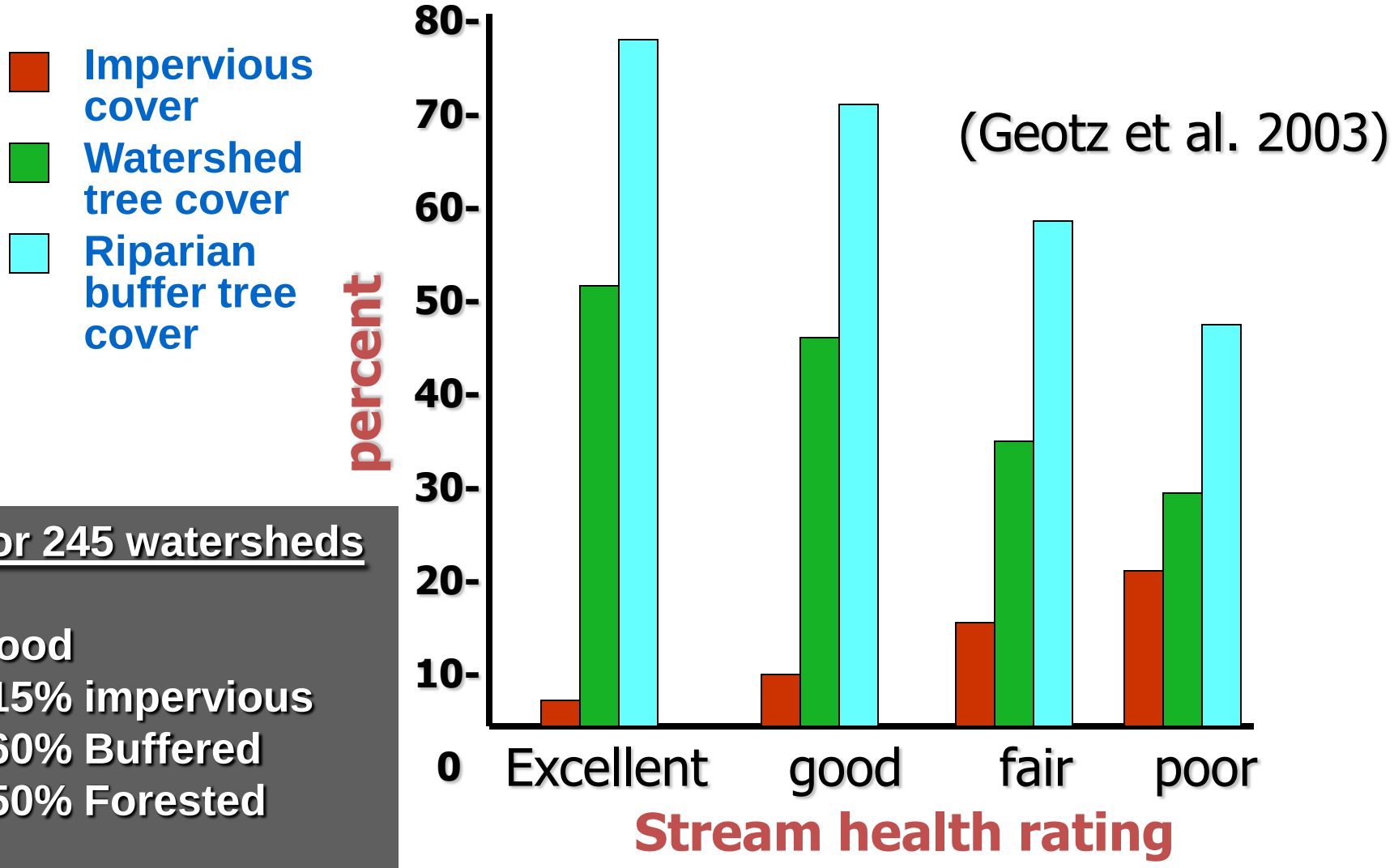
- **Forest Inventory Analysis**: "true" forest in CBW =55%
- Phase 5.2 "forest" = 62%
- Literature: forest retains ~88% of nitrate deposited SOCF (2006)
- Model 76% TN retention for woody-open category (high N loss rate of 24% from upland forests --this is the same rate as the pastures and farms given much more soluble N and higher total N loading)

Land Cover and Stream Health



Source: Goetz et al. 2003

Influence of forests and imperviousness on Stream health (IBI)



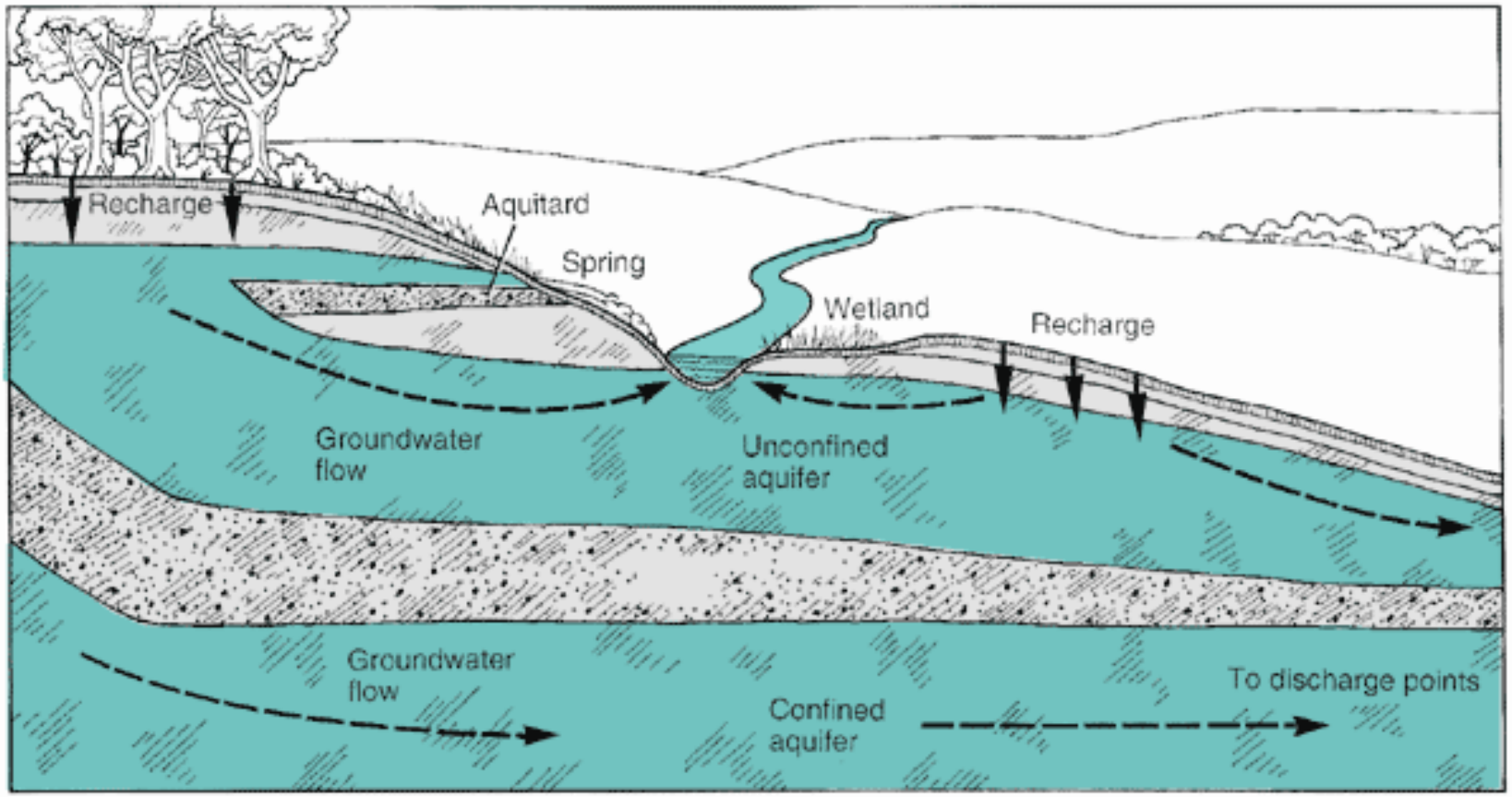
For 245 watersheds

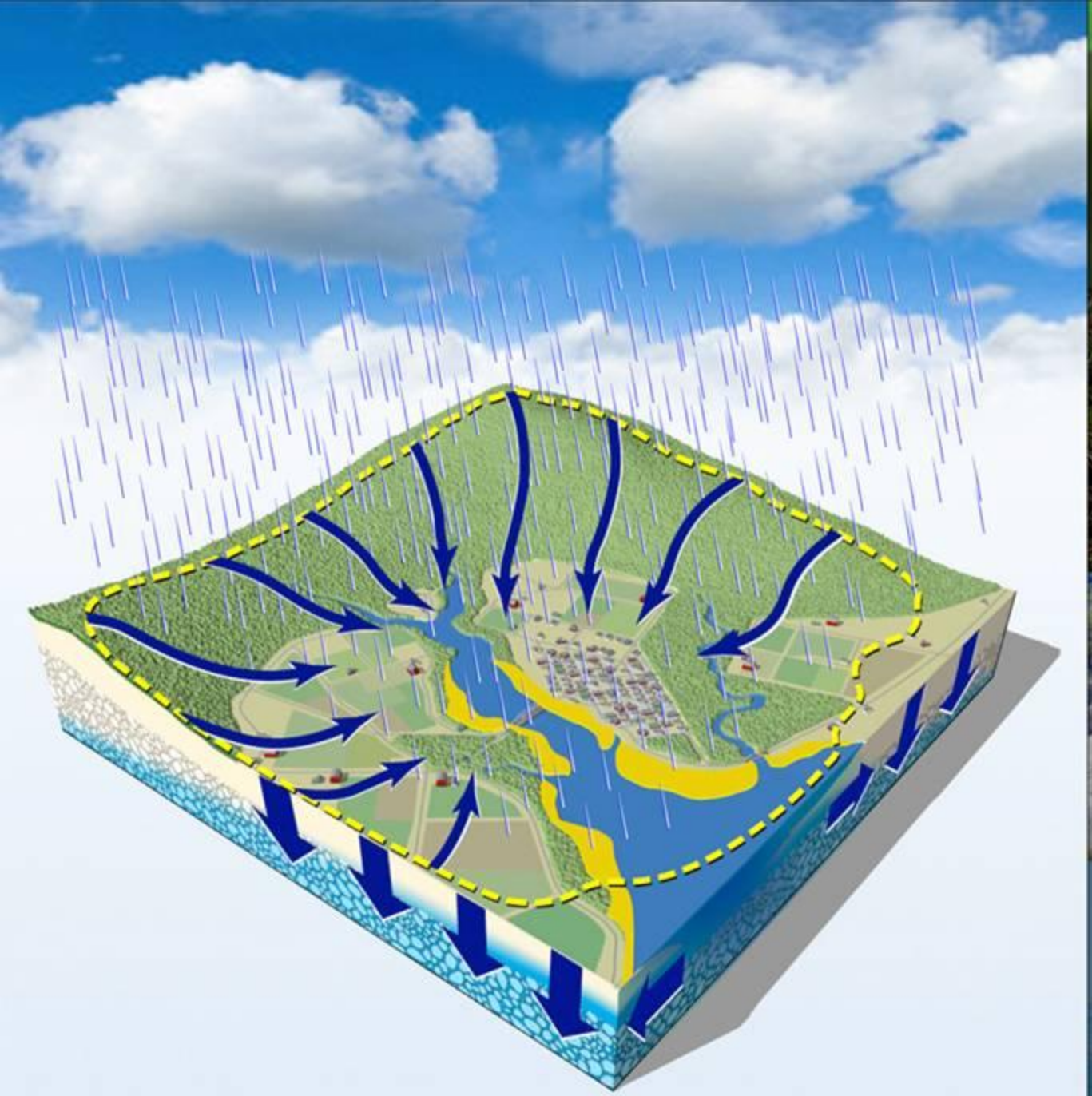
Good
<15% impervious
>60% Buffered
>50% Forested


Before

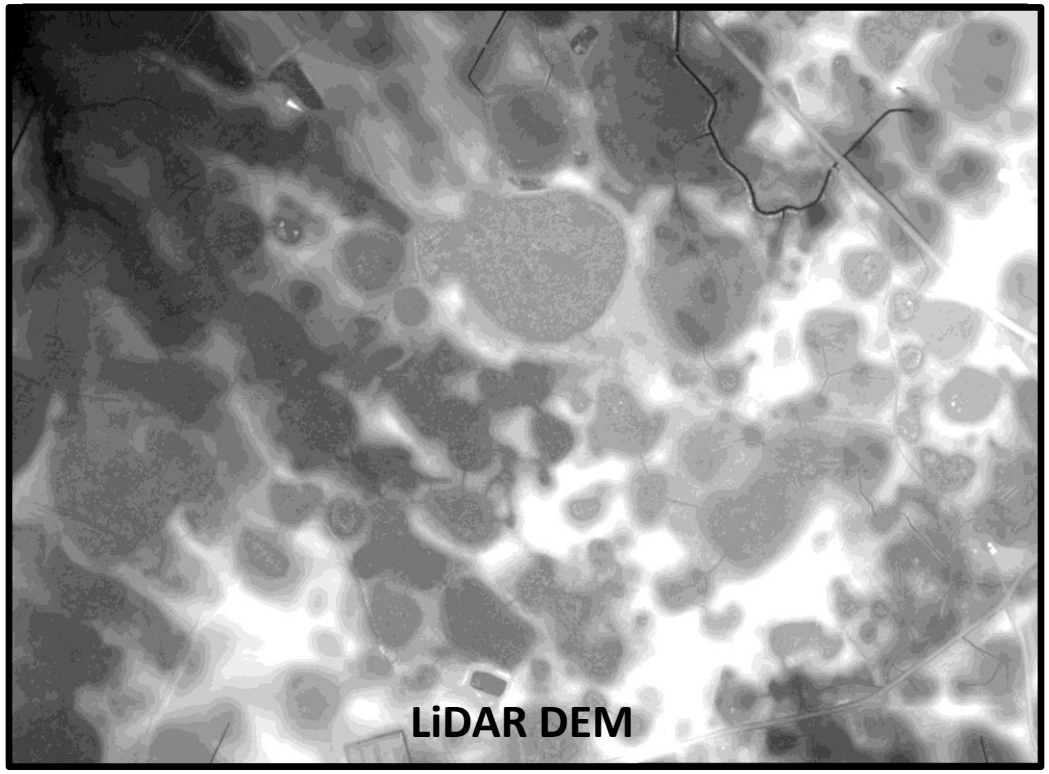

After

Surface Water & Groundwater





- LiDAR can reveal unmapped wetlands and surface water channels.



Urban Tree Canopy

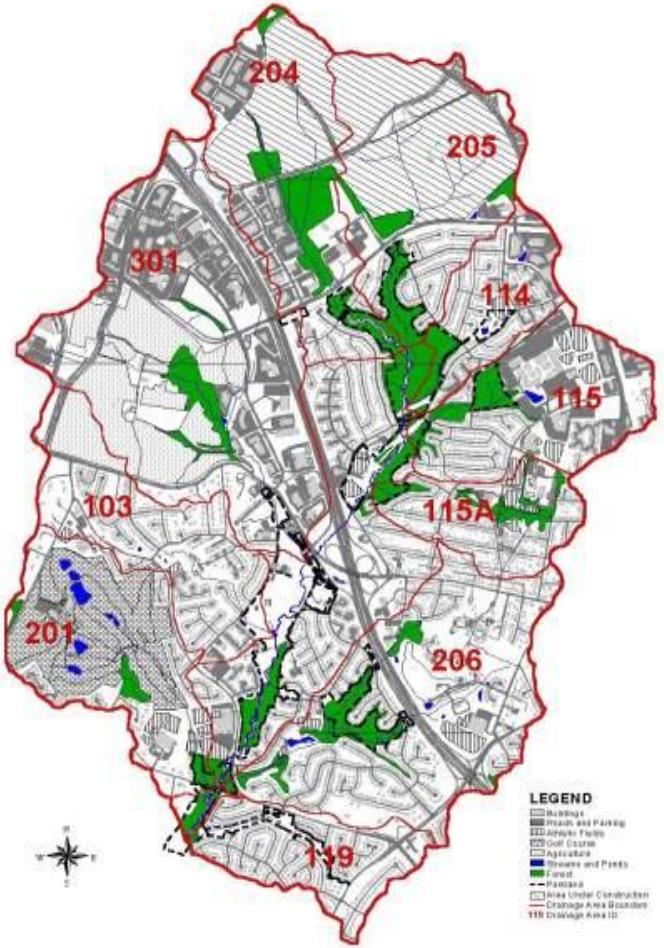
30 M Resolution v. 2 M Resolution

Urban Reforestation:

Assess canopy → Plan → Implement → (Report)

Maintain ← Monitor

- iTree; land classification software; value-added ID of planting locations




Thank-you!

Forest				**Pasture**			**Hayland***			**Cropland****	
	Process	lbs/ac-yr		Process	lbs/ac-yr		Process	lbs/ac-yr		Process	lbs/ac-y
	atmo dep	12.8		atmo dep	12.7		atmo dep	12.8		atmo dep	14.26
	export	3.1		manure	86.2		manure	26.4		manure	31.3
	attenuation	**76%**		export	8.2		fertilizer	97.6		fertilizer	72.3
				attenuation	**92%**		legume	0.31		legume	16.4
							export	9.5		export	44.8
							attenuation	**93%**		**attenuation**	**76%**
* hay with nutrients 97.57 26.43 0.31 12.84											
**high-till with manure 72.30 31.34 16.04 14.26											

Table 4: NRCS runoff curve numbers (CN) for other agricultural land

Cover description		*Cur hydro*
Cover type	**Hydrologic condition**	**A**
Pasture, grassland, or range – continuous forage for grazing[2]	Poor	68
	Fair	49
	Good	39
Meadow – continuous grass, protected from grazing and generally mowed for hay	--	30
Brush – brush-weed-grass mixture with brush the major element[3]	Poor	48
	Fair	35
	Good	30[4]
Woods – grass combination (orchard or tree farm)[5]	Poor	57
	Fair	43
	Good	32

Riparian Forest Buffer Credits

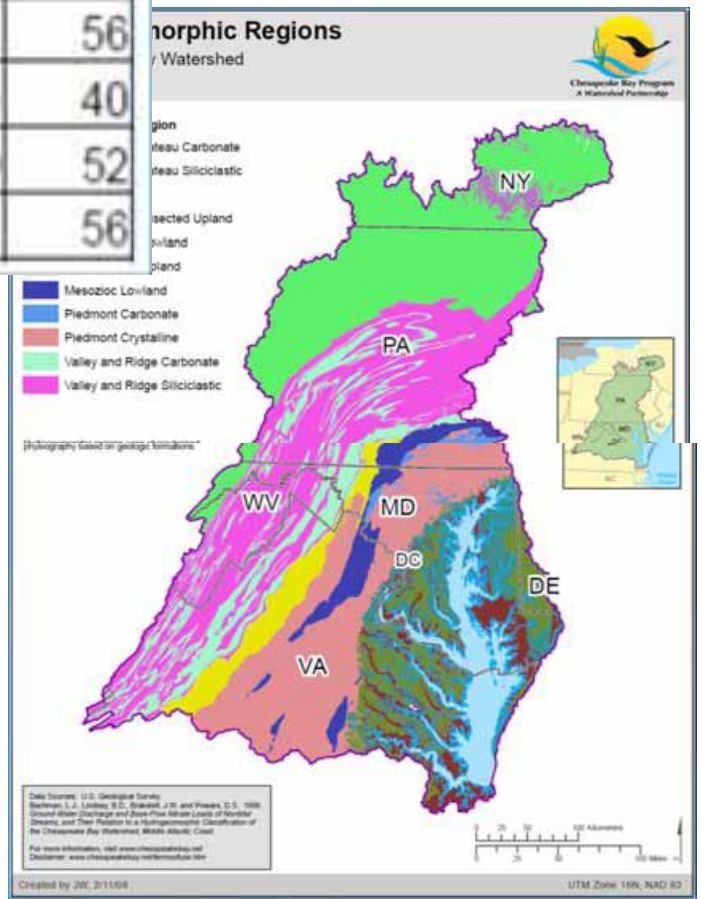
--35-foot minimum width, 2+ tree species

--Two kinds of credits applied

1. Land use change on the acre planted
2. Treatment efficiency credits for adjacent upland areas
   - 4 adjacent acres for N
   - 2 acres for P and sediment

--Land use assigned based on % of uses in the watershed segment

Riparian Forest Buffers - Nutrient and Sediment Reduction Efficiencies			
	TN	TP	TSS
Inner Coastal Plain	65	42	56
Outer Coastal Plain Well Drained	31	45	60
Outer Coastal Plain Poorly Drained	56	39	52
Tidal Influenced	19	45	60
Piedmont Scnist/Gneiss	46	36	48
Piedmont Sandstone	56	42	56
Valley and Ridge - marble/limestone	34	30	40
Valley and Ridge - Sandstone/Shale	46	39	52
Appalachian Plateau	54	42	56



For Example… Forest Buffer Treatment Efficiency:

--Piedmont Schist/Gneiss (Crystalline) treats:

46% N on 4 acres

36% P on 2 acres

48% sediment on 2 acres

--Valley and Ridge Carbonate treats:

34% N on 4 acres

30% P on 2 acres

40% sediment on 2 acres