Chesapeake Bay Watershed Model Construction Land Use

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Chesapeake Bay Program
A Watershed Partnership

University of Maryland
Center for Environmental Science

CBWM Calibration Construction Land

- About 84,500 acres (2%) of construction in any given calibration year
- Highest unit area sediment load of any landuse
- 16% of the total delivered sediment load from the urban sector

CBWM Target Loads for Sediment and Nutrients, without ESC Controls

Sediment Targets			
Source	**Yield**	**Unit**	**Comment**
Guy and Ferguson (1962)	39 to 78	ton/ac-yr	
USEPA (2005)	7.2 to 500	ton/ac-yr	
Schueler (1987)	35 to 45	ton/ac-yr	Literature review
CBWM 5.3	***40***	***ton/ac-yr***	*discounted to **24.4 ton/ac-yr** to account for estimated exposure and duration of construction phases*

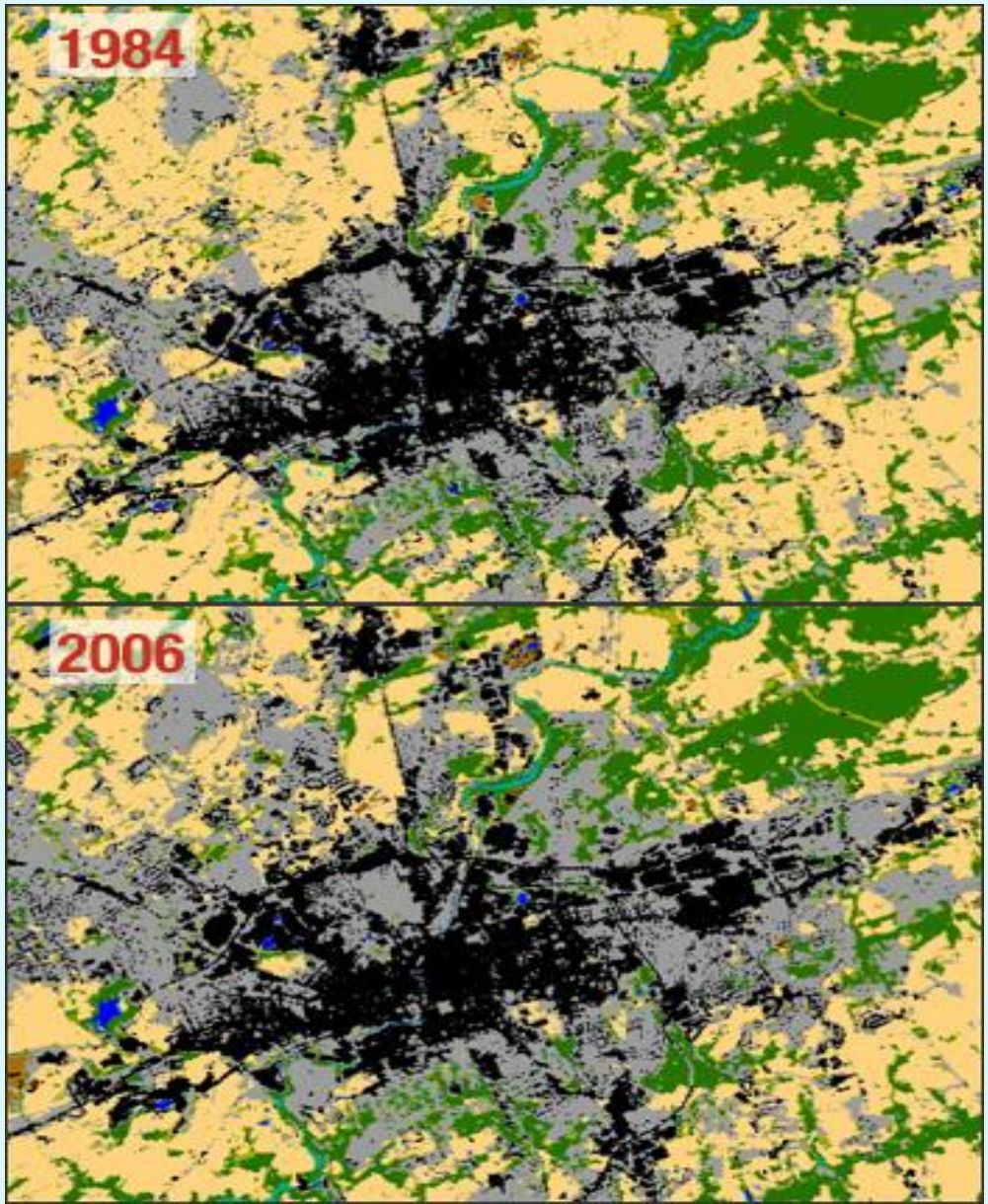
Nutrient Targets			
Source	**TN (lb/ac-yr)**	**TP (lb/ac-yr)**	**Comment**
Line and White (2001)	7.2	2.6	Residential
Daniel et al (1979)	12.2 to 49.5	6.7 to 17.9	Residential
Median target selected for CBWM	***26.4***	***8.81***	

Comparison of Edge of Field Sediment Loads By Land Use in the Bay Watershed (CBWM 5.3.2)

Bay Model Land Use Category	Annual EoF Sediment Load (tons/acre/year)
Construction Sites, No ESC Practices	**24.4**
Construction Sites, with ESC Practices [1]	**14.6**
Degraded Riparian Pasture	14.0
Extractive, Uncontrolled	10.0
Crops, Conventional Till	5.8
Urban Impervious Cover	5.0
Crops, Conservation Till	3.9
Pasture	1.6
Hay	1.5
Urban Pervious Cover	1.2
Forest (un-harvested)	0.3

Sources: Table 9-1 and 9.12 in Chesapeake Bay Phase 5.3 Community Watershed Model (EPA CBP, 2011)
Note: Application of BMPs can reduce sediment loads as shown above
[1] ESC practices are assumed to have a 40% removal rate, per the existing CBP-approved removal rate

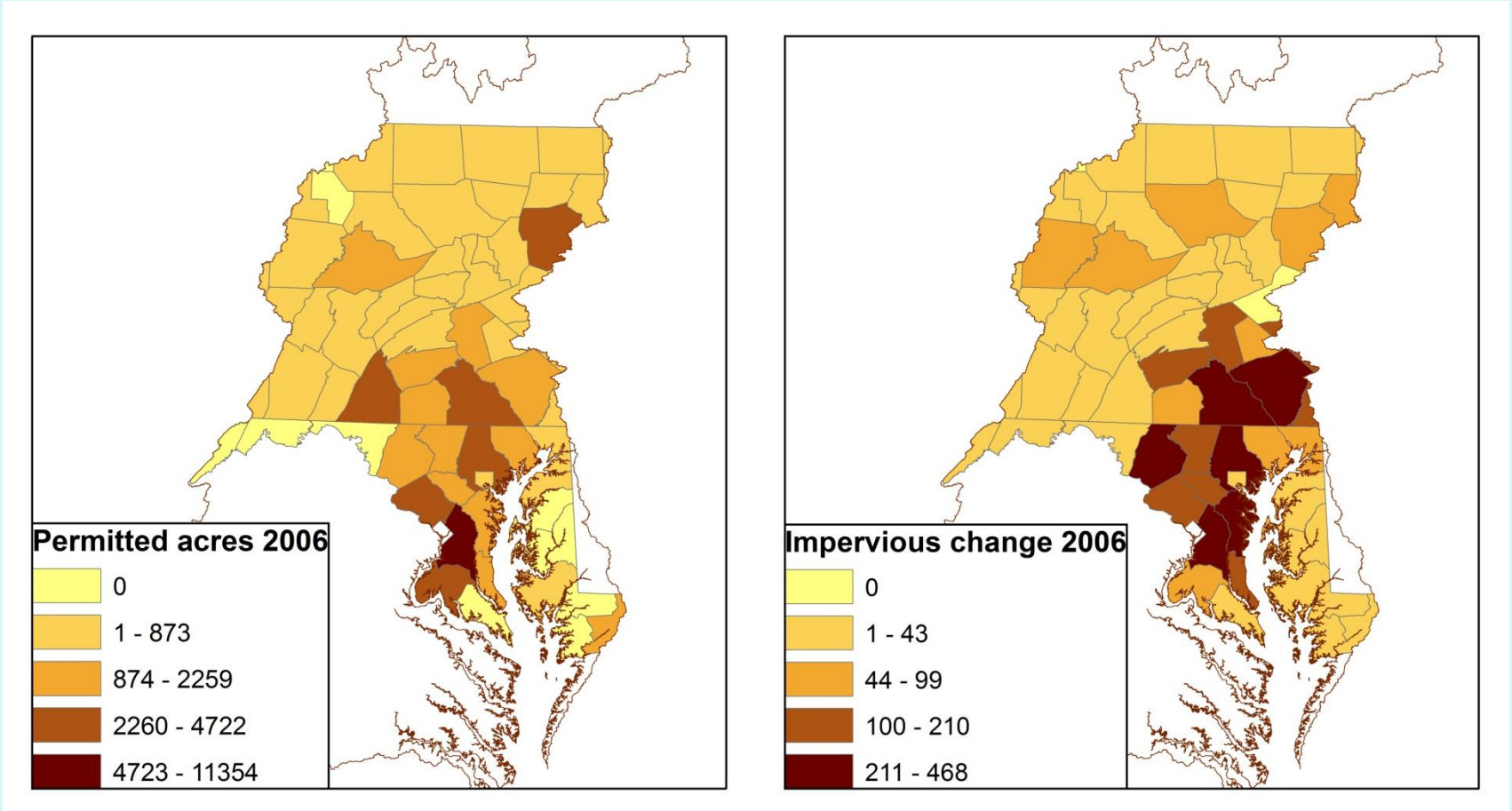
Impervious Cover Change



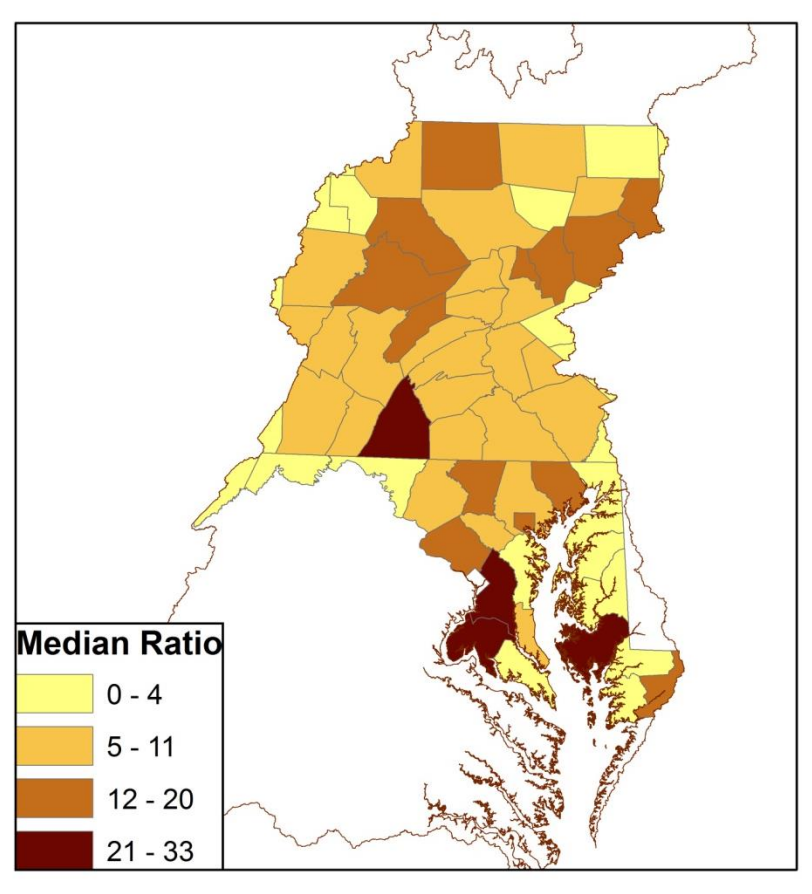
- USGS employs Landsat imagery to determine how impervious cover can changed through the watershed.
- Bare construction is not measured with satellite data.
- Assumption: there must be a relationship between new impervious cover and construction acres.

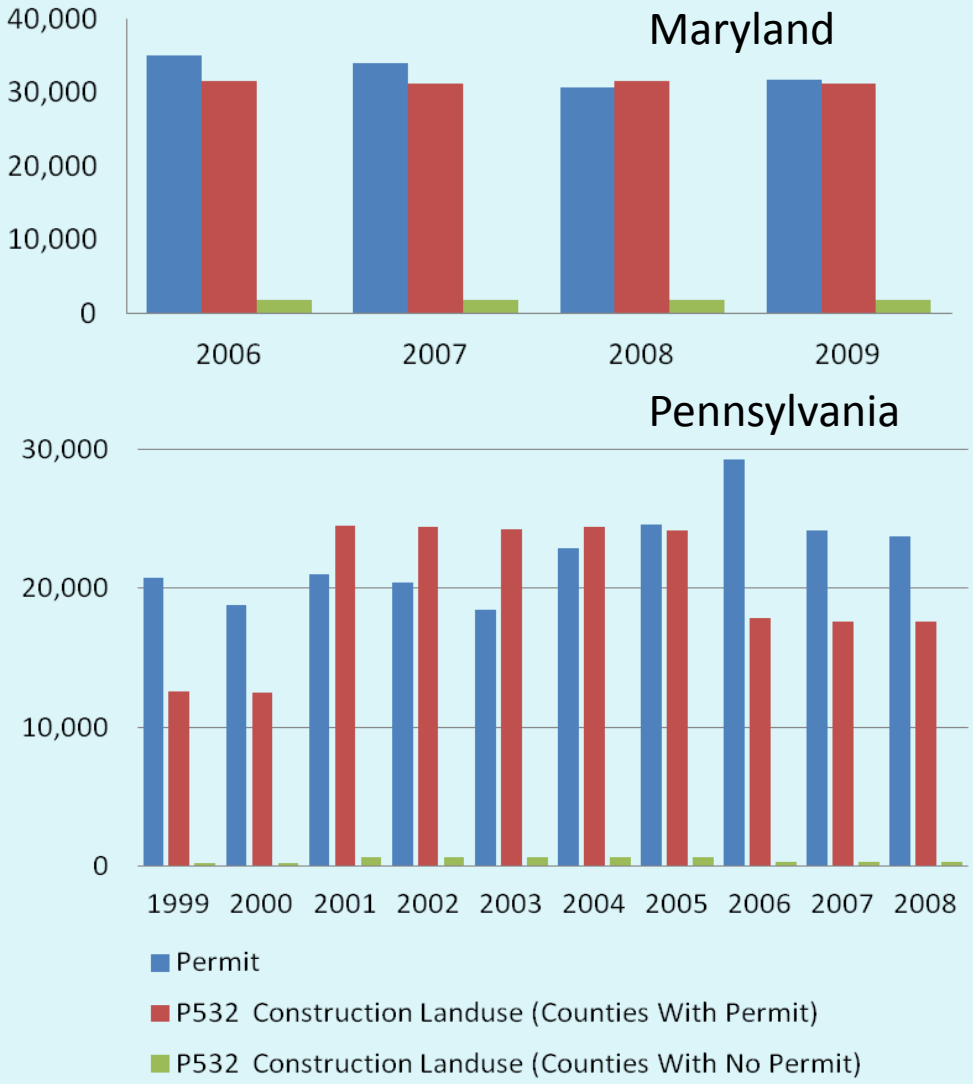
Image courtesy of CBLCM and Peter Claggett, USGS

Permitted Construction Acres



Ratios of Permitted Construction to Impervious Change





Creating a Construction Land Use

- The ratios of permitted acres to impervious acreage change found in the PA and MD data were used to estimate construction acres across the watershed.
- Both statewide and Baywide median ratios were used if permitted construction data was not submitted by a state.

Adjusting Construction Acreages

- Each year states have the option to either allow their construction acres to be estimated using the CBP ratios, or submit construction acres.
- Construction acres taken from Construction General Permit (CGP) data tracked by the state.
- Submitted construction acres should represent the average, annual, concurrently permitted construction area for a county.

- **Good Idea?** States are able to accurately reflect their own estimates of construction acres in the Watershed Model each year.
- **Bad Idea?** States who report permitted acres now receive 100% coverage of erosion and sediment control practices on these acres.
- **Good Idea?** Annual reporting will continue to improve the CBP's median ratios used to estimate construction lands.
- **Bad Idea?** Permitted acres can very significantly from year-to-year, making it more difficult to for managers and the public to assess the impact of construction on water quality.

Questions?