Land & Water Quality Protection

Virginia Coastal Zone Partners Workshop
December 11, 2014

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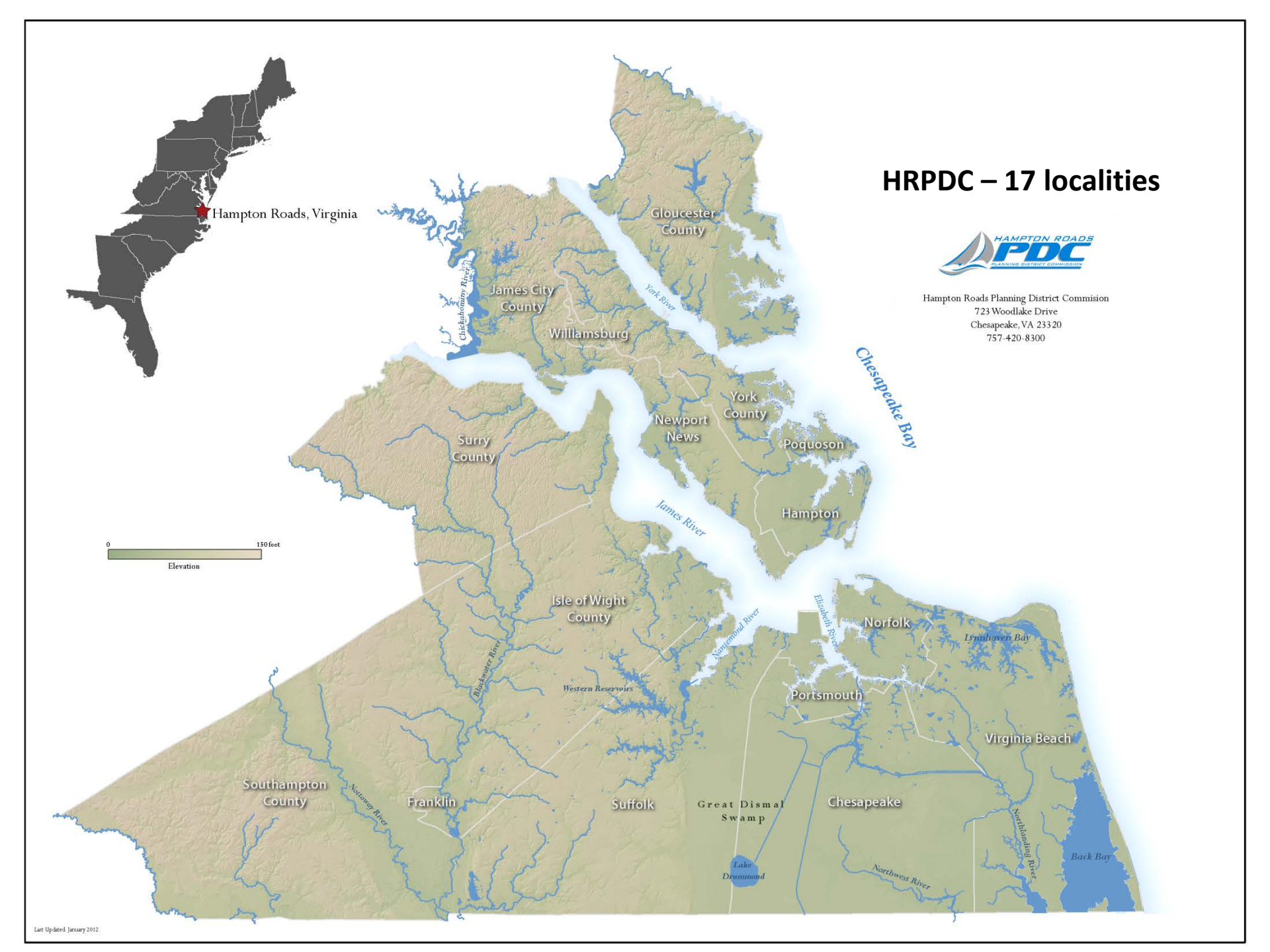
Hampton Roads, Virginia
HRPDC – 17 localities
HAMPTON ROADS PDC
PLANNING DISTRICT COMMISSION
Hampton Roads Planning District Commision
723 Woodlake Drive
Chesapeake, VA 23320
757-420-8300
Gloucester County
James City County
Williamsburg
York River
Chickahominy River
Chesapeake Bay
York County
Newport News
Poquoson
Hampton
Surry County
James River
0
150 feet
Elevation
Isle of Wight County
Blackwater River
Western Reservoirs
Nansemond River
Elizabeth River
Norfolk
Lynnhaven Bay
Portsmouth
Virginia Beach
Southampton County
Nottoway River
Franklin
Suffolk
Great Dismal Swamp
Chesapeake
Lake Drummond
Northwest River
Northlanding River
Back Bay
Last Updated: January 2012

Key Question to Address

How will the new Stormwater regulations impact development?

- HRPDC Coastal Zone project began in October 2011.
  - July 2014 - new water quantity and quality standards for post construction runoff went into effect.

- Objective: address how to meet new standards as easily and cost effectively as possible.




Stormwater Paradigm Shift

- Previous paradigm:
  - Move water offsite and into waterways as quickly as possible
- New paradigm:
  - Infiltrate onsite
  - Reduce quantity and velocity of water delivered to streams and waterways

major implications for the planning, design, and development of sites….




Coastal Zone project

- Acknowledge technical challenges of stormwater treatment in Coastal Plain & provide solutions
- Explain how existing local policies might be making meeting stormwater requirements unnecessarily expensive
- Show examples of how policies impact development
- Identify tools that localities can use to evaluate the impacts of their policies on development.




Coastal Plain Challenges

Too Flat: 63% of Hampton Roads has slope of less than 3%.....many BMPs require minimum slope

Poor Soils: 70% of Hampton Roads has C or D soils (slow or very slow infiltration rates)….need to amend soils or add underdrains to encourage infiltration

Water Table too high: 40% of Hampton Roads depth to water table is less than 1 ft……diminished BMP performance




Coastal Plain Options

Practice	Coastal Plain Suitability	Level 1 Efficiency (%)		Level 2 Efficiency (%)		Relative Bacteria Removal Efficiency	Level 2 Available in Hampton Roads
		P	N	P	N		
Rooftop Disconnection	Preferred	25	25	50	50	None	A&B soils/CA[1]
Sheet flow to open space	Preferred	50	50	75	75	Low	A&B soils
Rainwater Harvesting	Preferred	40	40	40	40	None	NA
Bioretention[2]	Preferred	55	64	90	92	Medium	Limited
Permeable Pavement[2]	Preferred	59	59	81	81	No Data	Limited
Dry Swales[2]	Preferred	52	55	76	74	Low	Limited
Small Scale Infiltration[2]	Accepted	63	57	93	92	Medium	Limited
Soil Amendments	Accepted	50	50	NA	NA	None	NA
Vegetated Roofs	Accepted	45	45	60	60	None	Yes
Grass Channels[2]	Restricted	24	28	40	44	Negative	A&B soils/CA[1]
Large Scale Infiltration	Restricted	63	57	93	92	Medium	Limited

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Integrating Planning & Stormwater

Review of challenges and BMPs highlights the need to realign local policies to make implementation as easy as possible.

Opportunities exist to modify existing ordinances and codes to achieve stormwater goals, make them less expensive, and provide multiple benefits to localities:

- Site design
  - Preserve forested areas
  - Reduce setbacks
- Roadway specifications
  - Narrower roadways, fewer cul de sacs
- Parking requirements
  - Parking maximums, reduced minimums, pervious pavement
- Vegetation ordinances




Explain link between site design & stormwater

Treatment volume is the only variable in the standard that the developer can control.

- Amount of Impervious, Turf and Forest on a site will determine the Treatment Volume.
- Ultimately determine the cost of BMPs to treat runoff to meet the standard.

Old Standard	New Standard
Based on phosphorus load from impervious area	Based on phosphorus load from impervious area, turf and forest




Site Design Example: Cost Savings (68%)

Environmental Site Design Practice	Soil Type	Forest Acres	Turf Acres	Impervious Cover Acres	Remaining Phosphorus Load Reduction Requirement	Cost to treat remaining Phosphorus Load with Bioretention	Cost to treat remaining Phosphorus Load with Constructed Wetland
Predevelopment Condition	C soils	5			NA	NA	NA
	D soils	5					
Traditional Development	C soils		3.5	1.5	6.15 lbs	$237,900	$148,800
	D soils		3.5	1.5			
Conserve Natural areas	C soils	2.5	1	1.5	4 lbs	$167,100	$96,400
	D soils	2.5	1	1.5			
Minimize Disturbance of permeable soils	C soils		5		6.05 lbs	$232,700	$147,300
	D soils		2	3			
Reduce impervious area	C soils		4	1	4.52 lbs	$189,500	$109,684
	D soils		4	1			
All of the above	C soils	5			1.94 lbs	$82,300	$47,000
	D soils	1	2	2			

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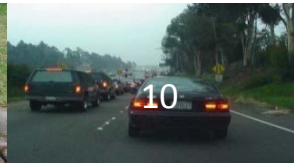

Parking Requirements: Norfolk Example

- Norfolk changed its parking requirements during the project.
- HRPDC used ArcGIS/CommunityViz model to calculate the impact if all parking lots in the city were rebuilt.

1500 fewer parking spaces required.

Equals 16% reduction in impervious area (550 acres)

Zoning	Previous Requirements DU = Dwelling Units	New Requirements DU = Dwelling Units
Multi-Family	1.5 spaces/DU plus 2 spaces every 5 units (1.9)	DT: 1.5 spaces/DU TR: 1.6 spaces/DU SB: 1.75 spaces/DU
Commercial	1 space/250 sq. ft	DT: 1 space/600 sq. ft TR: 1 space/300 sq. ft SB: 1 space/250 sq. ft
Office	1 space/250 sq. ft	DT: 1 space/600 sq. ft TR: 1 space/300 sq. ft SB: 1 space/250 sq. ft
Industrial	1 space/250 sq. ft	DT: 1 space/850 sq. ft TR: 1 space/850 sq. ft SB: 1 space/850 sq. ft
Parking Stall Size	9 x 19 feet	8 x 18 feet

DT = Downtown
TR = Traditional
SB = Suburban

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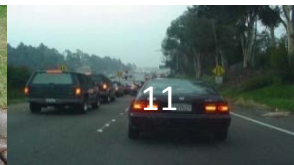
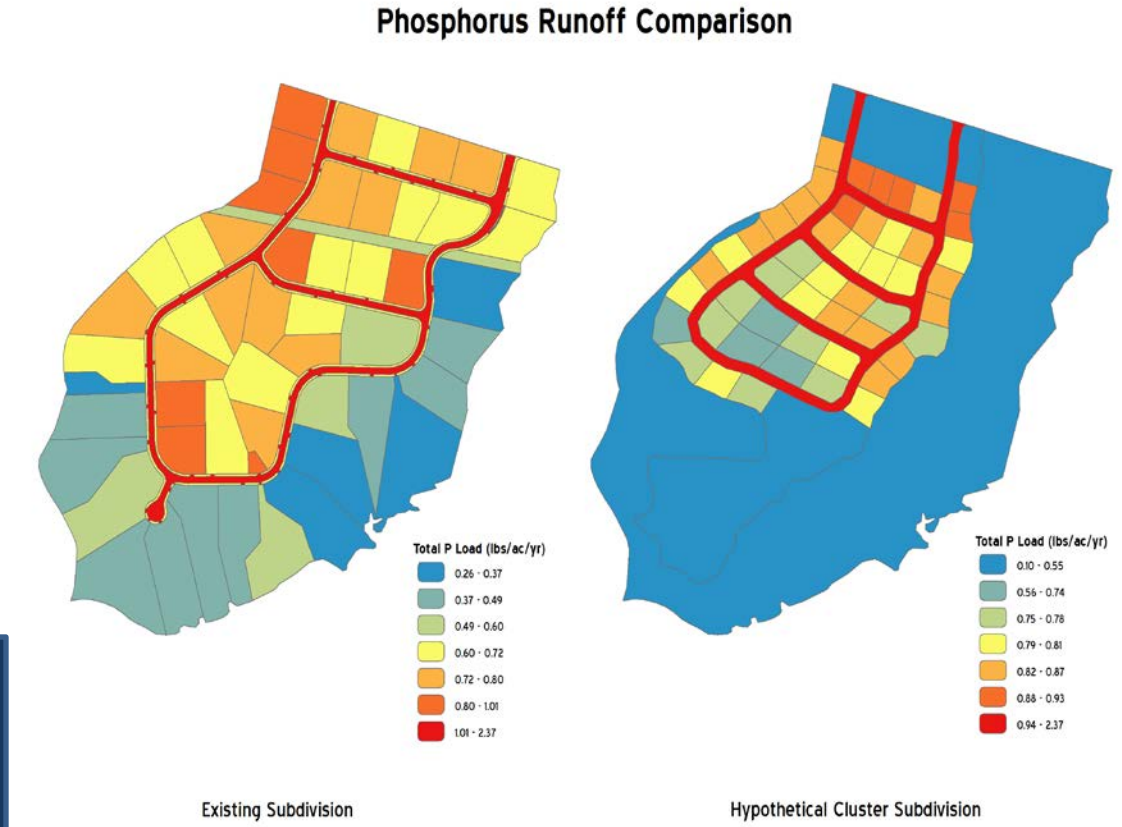


Cluster Ordinance: Suffolk Example

- Suffolk has a cluster ordinance but it is not widely implemented.
- HRPDC used ArcGIS/CommunityViz to calculate the impact if the ordinance was applied to a existing subdivision.

Stormwater treatment reduced from 26 to 10 lb phosphorus per year.

over 60% reduction in load



Tools for Local Governments

- Recommended localities review existing policies with Center for Watershed Protection's Codes & Ordinances checklist.
  - Norfolk scored 15.5 of 66 pts

- Recommended specific changes to Norfolk & Suffolk's codes and ordinances covering:
  1) Reducing impervious cover requirements
  2) Promoting redevelopment and protecting natural resources
  3) Removing impediments to stormwater BMPs

- Recommended localities use ArcGIS/CommunityViz to analyze impacts of policies that might influence cost of meeting stormwater requirements.

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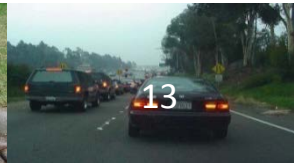

Summary

1. Provided technical analysis of requirements and options
2. Developed examples to illustrate concepts
3. Reviewed and recommended tools.
4. Provided specific policy recommendations

Developers concerned requirements are difficult to meet.

Not all localities have integrated departments to maximize multiple benefits.