

VA Statewide Regulations

(EPA – Clean Water Act)

■ 2004

- DCR directed to develop new water quality and quantity standards

■ 2005 – 2009

- Development of new standards by DCR

■ 2009

- DCR introduced the Runoff Reduction Method (0.28lbs/yr)

■ 2010-2011

- EPA approved TMDL merged into new regulations (0.41lbs/yr)

■ July 1, 2013

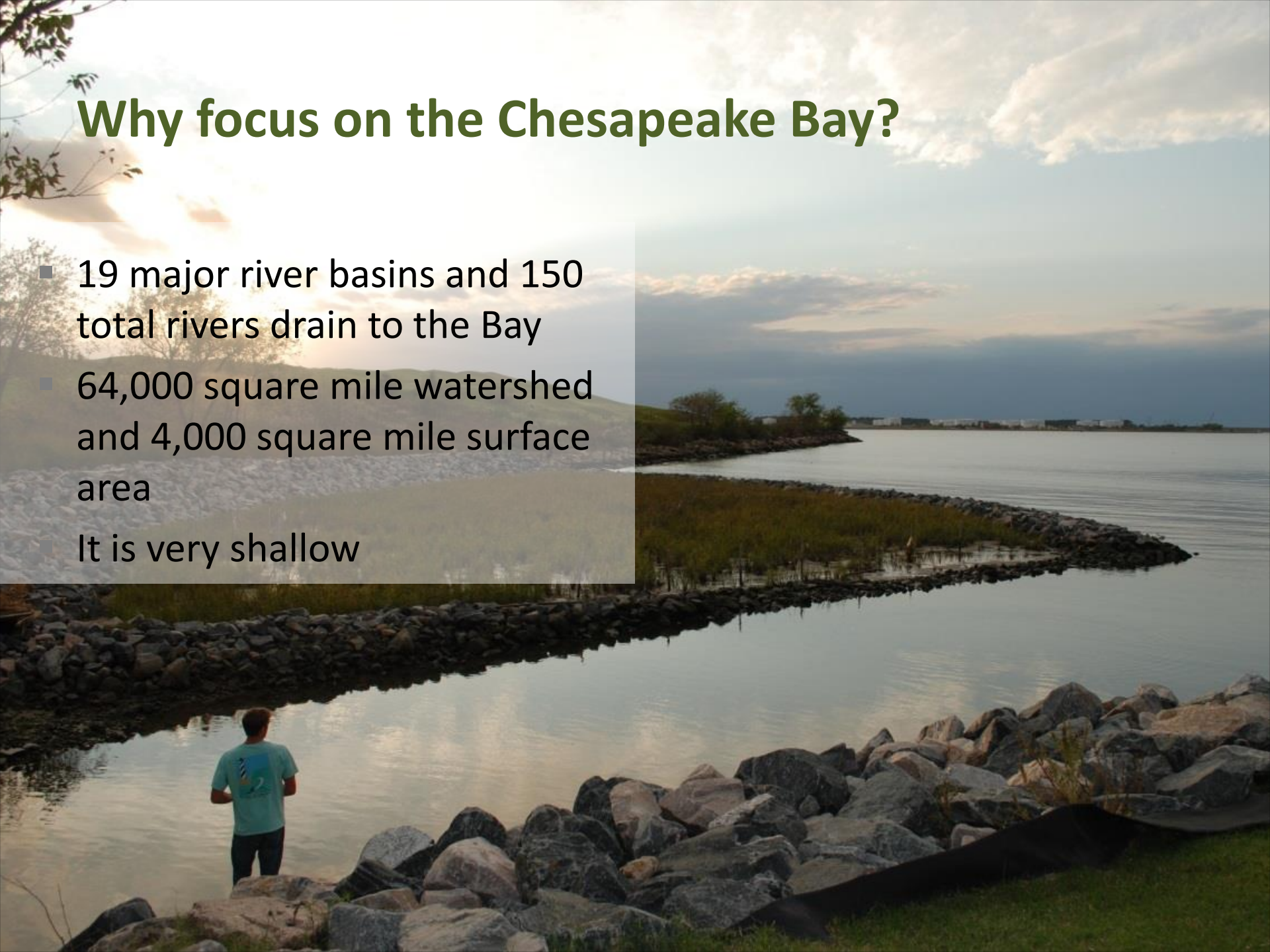
- Submit Draft VSMP programs to DEQ (no longer DCR)

■ July 1, 2014

- Municipalities are required to have their adopted VSMP Program

Why focus on the Chesapeake Bay?

- 19 major river basins and 150 total rivers drain to the Bay
- 64,000 square mile watershed and 4,000 square mile surface area
- It is very shallow



State Construction General Permit Requirements

■ State CGP Requirements

- Fee Submission (owner)
 - Base Fee
 - Modification Fee
 - Maintenance Fee
- Approval of ESC Plan
- SWPPP must be prepared prior to submission of CGP (contractor) – not submitted
- Now have 90 days to provide
- Expires on February 15th, 2017



Stormwater Pollution Prevention Plans (SWPPP)

- Online Examples Available!
- Required Contents
 - Schedule
 - Approved ESC Plan
 - Approved SWM Plan/Calcs
 - Pollution Prevention Plan
 - Dumpsters
 - Chemical/fuel storage
 - Equipment storage/maintenance
 - Washout station
 - Specific Control measures for TMDL's
 - Inspection Checklists



Erosion and Sediment Control Program

■ Inspections

- During Construction
 - Install Perimeter Controls
immediately
 - Once every two weeks max
 - Once every 4 day min
 - Maintenance
 - Small – 1 day corrective action
 - Large – 7 days corrective action
 - Documentation! Take photos
- New Certification Required

■ Enforcement

- Verbal Warning
- Notice of Corrective Action
- Notice to Comply
- **Stop Work Orders**
- Civil Penalty (NTE \$32,500/day)
- Criminal Penalty (15 yrs prison)



SWM Regulations - Old vs New

Stormwater Technical Criteria		
Criteria	Old Regs	New Regs
Land Use	Impervious cover (IC) only	IC + Forest/Open Space + Managed Turf
Event	0.5 inches of Runoff from the IC only	1.0 inches of Rainfall from the whole site
New Design Criteria	Average land condition/ technology based	0.41 lbs./ac/yr Total Phosphorus (TP)
Redevelopment Criteria	10% reduction TP	<1 acre = 10% red. TP, >1 acre = 20% red. TP
Compliance Methodology	Simple Method	Runoff Reduction Method
Water Quantity	Varied	Criteria for: Manmade conveyance systems Restored conveyance systems Natural conveyance systems

Stormwater Management – Quality Control

■ Runoff Reduction Method

- Increased pollutant removal requirement (0.41lbs/yr ~14% Impervious)
- Water Quality Credit due to reduction in overall runoff as well as BMP treatment
- Assess woods, turf and impervious surface in pre/post analysis
- Considers HSG (soil type)
- Water Quality volume increase from 0.5” to 1”
- BMP in series now allowed
- Proprietary BMP's being approved through 3rd party testing



Stormwater Management – Quality Control

■ VA BMP Clearinghouse

- Online Resource for SWM/BMP
- Wider range of “tools”
 - LID
 - Permeable Pavement
 - Cisterns
- Total Phosphorus Calculation
- Design Criteria
- Typical Details
- Regional Adaptation (Coastal Plain)
- Construction and Maintenance Information



Post Construction SWM – Quantity Control

■ Flood Protection

- History of flooding during 10yr storm events
 - 10-yr capacity in channel; or
 - Hold to 10-yr Pre
- No History of Flooding during 10yr storm events
 - 10-yr capacity in channel
- Study Limits (1% Rule)
 - site area
 - flow rate
 - mapped floodplain



Post Construction SWM – Quantity Control

- Channel Protection
 - **Natural Conveyance Systems**
 - Use Energy Balance Equation
 - 1 year 24 hour storm



Post Construction SWM – Quantity Control

■ Channel Protection

- **Man Made Conveyance Systems**
- Shall convey the post development peak flow rate without causing erosion to the system (2-year 24-hour storm) or
- Treat as a natural system
 - Energy Balance Equation



Post Construction SWM – Quantity Control

■ Channel Protection

- **Restored Conveyance Systems**
- Shall convey post development peak discharge consistent with the design criteria of the restored conveyance system, or
- Treat as a natural system
 - Energy Balance Equation



Stormwater Management – Quantity Control

■ Channel Protection - Energy Balance Equation

$$Q_{\text{post}} \leq \text{I.F.} \times (Q_{\text{pre}} \times \text{RV}_{\text{pre}}) / \text{RV}_{\text{post}}$$

- Q_{pre} = Pre-development peak flow rate (cfs)
- RV_{pre} = Pre-development runoff volume (in.)
- Q_{post} = Post-development peak flow rate (cfs)
- RV_{post} = Post development runoff volume (in.)
- I.F. = Improvement factor (0.8 for sites > 1 acre, 0.9 for sites < 1 acre)



- a. ... site's contributing drainage area is less than or equal to 1.0% of the total watershed, or
- b. ... site's peak flow rate is less than or equal to 1.0% of the existing peak flow rate (based on a one-year 24 hour storm)

Post Construction SWM - Inspections

- Inspections
 - MS4 Operator
 - At least once every 5 years
 - Signed and sealed!
 - Owners/Developers
 - At least once every 5 years
 - Signed and sealed!
 - Submitted to MS4 Operator
- Audited by DEQ and EPA



Some BMP Examples

Good and Bad

Dry Detention Basin – Reduced Efficiency



Wet Retention Basin – Reduced Efficiency



Bioretention Filters / Rain Gardens



Wetland Creation / Restoration

Careful



Pervious Pavers

Not Pervious concrete or asphalt



Infiltration BMP Failure



Water Quality Inlet – Good Condition



Water Quality Inlet – Not so Good Condition



Not a great location for Greenhouse



Good BMP for Chemical/Material Storage



END OF PRESENTATION

4VAC50-60-66 Channel Protection

Manmade Stormwater Conveyance Systems

- Shall convey the post development peak flow rate without causing erosion to the system (2-year 24-hour storm) or
- Treat as a natural system (energy balance equation)



Restored Stormwater Conveyance Systems

- Shall convey post development peak discharge consistent with the design criteria of the restored conveyance system, or
- Treat as a natural system (energy balance equation)



Natural Stormwater Conveyance Systems

- Use energy balance equation (1 year 24 hour storm)



Manmade Channel Protection:

- Confirm 2-year velocity is non-erosive
Or
Use energy balance equation
- Study Limits: Site DA is 1% of Watershed DA
Or
Site flow is 1% of watershed flow for 1-year, 24-hr storm
Or
Point of Discharge if complies with energy balance equation

Natural Channel Protection:

- Confirm 2-year velocity is non-erosive
Or
Use energy balance equation
- Study Limits: Site DA is 1% of Watershed DA
Or
Site flow is 1% of watershed flow for 1-year, 24-hr storm
Or
Point of Discharge if complies with energy balance equation

Natural Channel Protection:

Channel Protection- Natural Channel

- Energy Balance for 1-yr, 24-hr

$$Q_{1\text{-yrDev}} * RV_{1\text{-yrDev}} \leq \text{I.F.} (Q_{1\text{-yrPre-Dev}} * RV_{1\text{-yrPre-Dev}})$$

$$\begin{aligned} \text{Improvement Factor} &= 0.9 \text{ for } SA \leq 1 \text{ ac} \\ &= 0.80 \text{ for } SA > 1 \text{ ac} \\ SA &= \text{Site Area} \end{aligned}$$

- Study limits: comply with Energy Balance at property line
- $Q_{1\text{-yrDev}}$ may not exceed $Q_{1\text{-yrPre-Dev}}$
- $Q_{1\text{-yrDev}}$ not less than $(Q_{1\text{-yrForest}} * RV_{1\text{-yrForest}}) / RV_{1\text{-yrPre-Dev}}$

Restored Channel Protection:

- Restored using natural channel design (NCD) to demonstrate that the total flows do not exceed the restored channel design parameters
Or
Use energy balance equation
- Study Limits: Site DA is 1% of Watershed DA
Or
Site flow is 1% of watershed flow for 1-year, 24-hr storm
Or
Property line if complies with energy balance equation

Restored Channel Protection:

Channel Protection- Restored Channel using NCD

