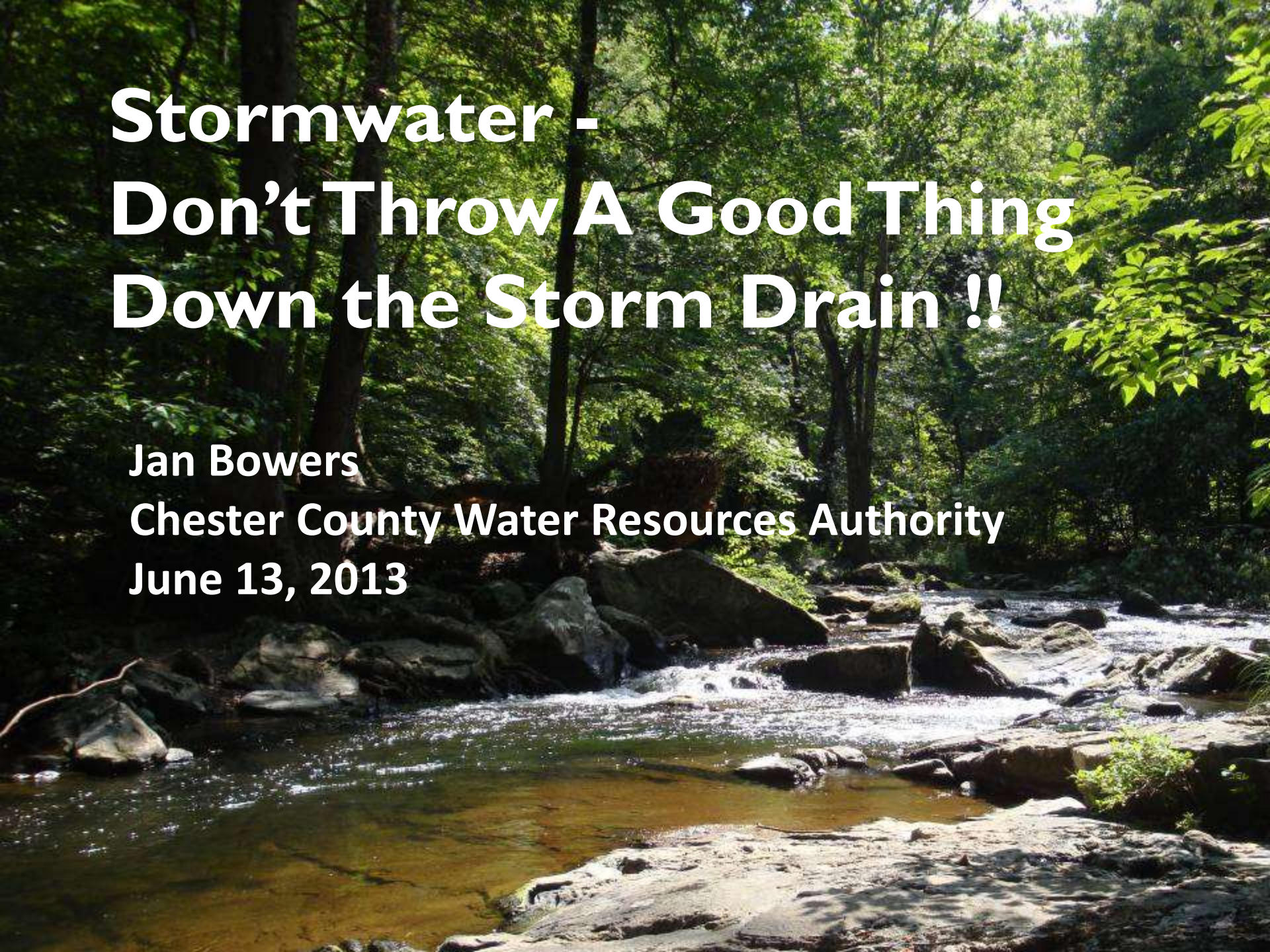


Stormwater - Don't Throw A Good Thing Down the Storm Drain !!

Jan Bowers
Chester County Water Resources Authority
June 13, 2013

What Is Stormwater ?

- **Wikipedia (5/10/13)**
- **Stormwater** is water that *originates during precipitation events*. It may also be used to apply to water that originates with snowmelt that enters the stormwater system. *Stormwater that does not soak into the ground becomes surface runoff, which either flows directly into surface waterways or is channeled into storm sewers, which eventually discharge to surface waters*.
- Stormwater is of concern for *two main issu*es: one related to the *volume and timing of runoff water* (flood control and water supplies) and the other related to potential contaminants that the water is carrying, i.e. *water pollution*.
- Stormwater is also *a resource and ever growing in importance as the world's human population demand exceeds the availability of readily available water*. Techniques of stormwater harvesting with point source water management and purification can potentially make urban environments self-sustaining in terms of water.
- **http://en.wikipedia.org/wiki/Main_Page**

Is It Stormwater ….?

- Ugly
- Dirty
- Dangerous
- Damaging
- “Waste” water
- Unhealthy
- *Eeuuww!! Get it out of here – fast !!!!*

… Or Fresh Water Runoff?

- Water for plants
- Water for crops
- Water for drinking
- Water for businesses
- Water for pleasant “pretty” streams and waterfalls
- Water for wading
- Water for fishing
- *Aaahhh!!! Let’s Keep It !!!*

Let’s Transform Stormwater !!

[Stormwater] – [pollutants] – [erosion]

== Clean Fresh Water Runoff

Stormwater ≠ Flooding

- Stormwater –
  - refers to runoff from relatively common rain events (thunderstorms, rains of ~ <3.5” rainfall)
  - stormwater causes “nuisance flooding”
- Flooding –
  - refers to runoff from extremely heavy rainfall events (major storms, generally > 4” rainfall)
  - “flooding” causes serious harm such as property damage, personal injury, etc.

Where Does Stormwater Come From ?

When it rains (46”/yr), the rain either …

- 58% - Evaporates or transpires from shallow soils through plant roots back to the atmosphere (26”/yr),
- 26% - soaks through the soil to replenish groundwater (14”/yr),

OR …

- 17% - runs off as “stormwater” (8”/yr) ------>

Hard-cover surfaces create stormwater …

More hard-cover surfaces → More stormwater …

More stormwater → More pollution & erosion damage …

More pollution & damage → More community costs $$$$

What Do "I" Have to Do With It ?

- Everywhere we live, work, drive, go to school, shop, and grow food creates stormwater
  - From house and apartment rooftops, driveways, sidewalks, compacted lawns
  - From shopping center rooftops, sidewalks, driveways, parking lots
  - From streets, highways, parking garages
  - From school building roofs, parking lots, playgrounds, sidewalks, astro-turf athletic fields
  - From farm fields and livestock pastures

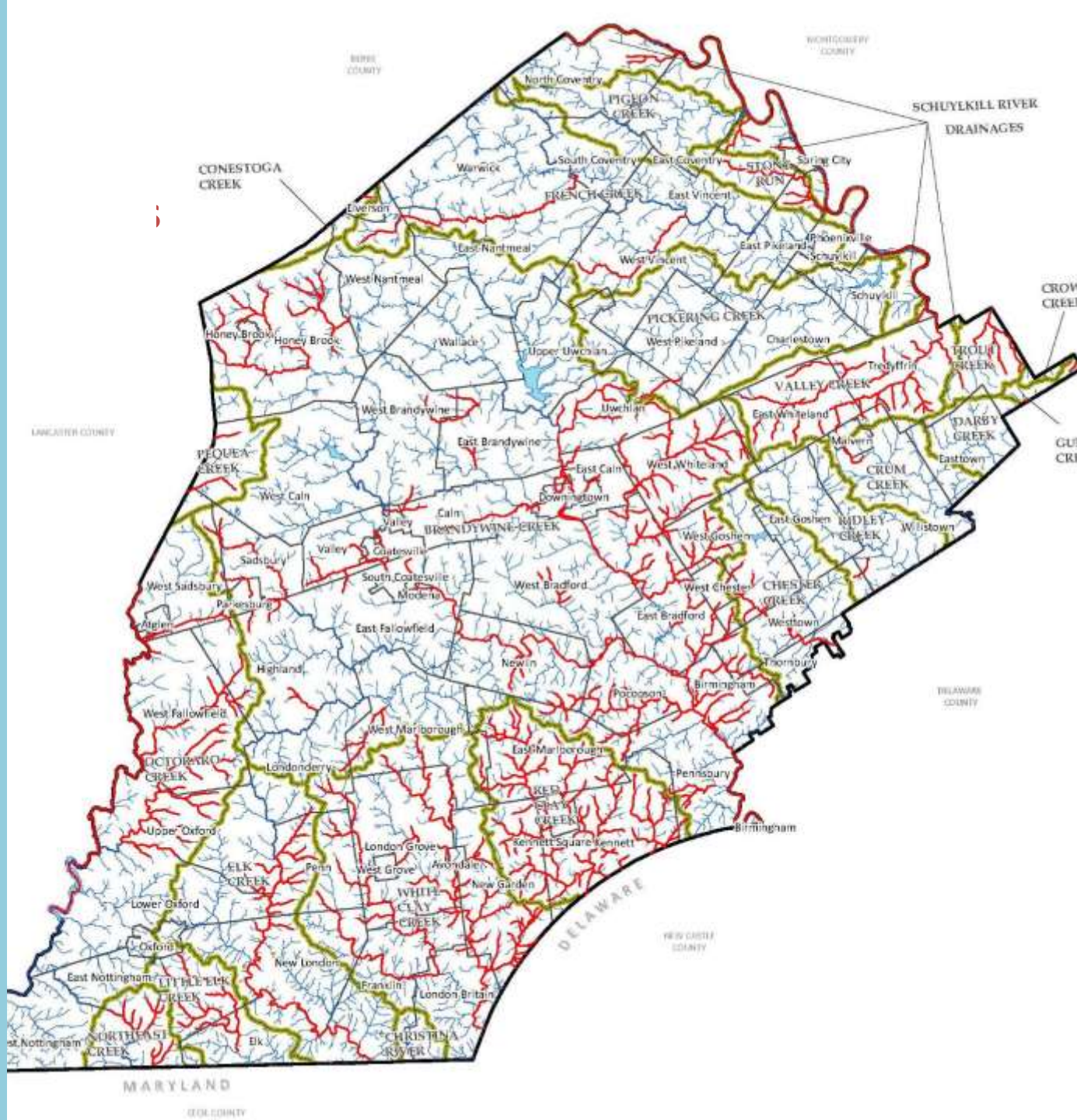
What Do "I" Have to Do With It ?

- The landscape "sheds" water (rainfall runoff) to streams
- We all "shed" pollutants into the air and across the landscape and land surfaces
  - Bacteria and pathogens (e.coli, etc.)
  - Nutrients (nitrogen, phosphorus, fertilizers, etc.)
  - Sediment
  - Metals
  - Hydrocarbons
  - Pesticides
- Rainfall runoff washes our pollutants from the land surface into our groundwater and streams

"**Red**" streams = polluted streams (impaired)

2,300 miles of streams in Chester County

593 miles (25%) of Chester County's streams are "impaired"




84% of all Chester County land area drains to a public water supply intake

Where Does Stormwater Come From… ?

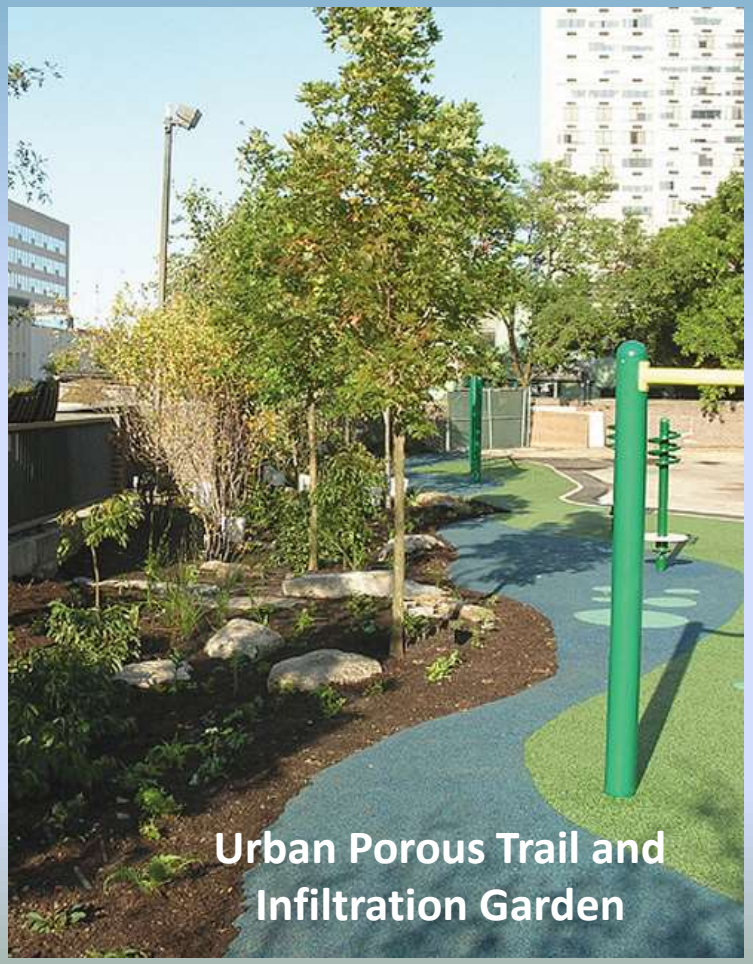
Hmmmmm…..

Sustainable Communities …
… Require *Clean* Water

- Clean water is good business
- Clean water is *EVERYBODY'S* business !!
- "Go Green" also means "Go Clean"
- Reduce the "water quality footprint" of our communities by reducing our "individual" water quality footprint

Are We Headed for 'Storm Crater-Scapes'?

- ***NO!!!***
- **Let's Use On-Site "Green-Scaping" Solutions !!**
- **For Our Homes ….**
  - Minimizing impervious cover
  - Permeable (porous) paving materials
  - Disconnecting impervious cover areas
  - Routing rooftop runoff over lawns
  - Rain gardens
  - Infiltration trenches
  - Cisterns
- **For Our Communities ….**
  - Reducing street widths
  - Single sidewalks
  - Roadway "islands"
  - Forebays
  - Streamside vegetated buffers
  - Bio-retention
  - Bio-swales
  - Stormwater basin naturalization/retro-fits



Urban Porous Trail and Infiltration Garden

Green-Scaping Let's You…

… *Keep <u>Your</u> Water !!!*

- Tap water costs $$$s !
- Rain Water Is *<u>YOUR</u>* Water – and It's *<u>FREE</u>* !!
- Keeping it on your property will
  - Reduce stormwater disposal fees
  - Reduce your "pollution contribution" to your community's streams
  - Reduce your contribution to community drainage problems and costs
  - Reduce your water or (electric) bill for landscape irrigation

Benefits of “Green-Scaping” for the Property Owner

- Reduces the owner’s “watershed footprint” and “pollution contribution”
- Captures and infiltrates runoff at the source , transforming “stormwater” into “Fresh Water Runoff”
- Are aesthetically attractive landscape features
- Less costly to maintain than traditional BMPs
- Easily maintained from the surface
- Helps preserve the natural hydrology of the site
- Replenishes local groundwater, which replenishes community stream flows
- Helps protect community streets and streams from “dirty stormwater”
- Transforms “stormwater” into clean “Fresh Water Runoff”

What Can My Municipality Do ?

- **Implement Municipal MS4 Stormwater Permit Requirements to**
  - Avoid future stream pollution problems
  - From future land development & redevelopment
  - Reduce pollution loads carried in stormwater
  - Reduce erosion caused by stormwater
  - Reduce volume of stormwater discharged
  - Restore existing stream pollution problems
  - Reduce stormwater pollution loads from residences, commercial properties, and municipal roads and properties

- **Implement PA Act 167 Stormwater Management Plan Ordinance Requirements to**
  - Avoid future flooding problems
  - Avoid future stream pollution
  - Reduce pollution loads carried in stormwater
  - Reduce erosion caused by stormwater
  - Reduce volume of stormwater discharged
  - From new development, redevelopment and constructed property improvements


Commercial Rain Garden

- **ALL of these are opportunities for “green-scaping” solutions**

Reduced Stormwater Infrastructure for the Developer

- Easily incorporated into land development design
- Minimize grading and disturbance to the land surface
- Less costly to install
- Captures and infiltrates “Fresh Water Runoff” at the source
  - BEFORE it gets dirty from surface pollutants
  - BEFORE it leaves the property
- Reduces the need for and size of
  - stormwater detention basins
  - municipal stormsewer systems

Parking Lot Infiltration Basin

Reduced Municipality Costs

- Reduces Municipalities' Costs for Regulatory Compliance and Stormsewer Maintenance
- Reduces the volume of stormwater and pollution discharged from municipal stormsewer systems
- Reduces the pollution loads discharged from stormsewer systems
- Reduces the costs of operation, inspection and maintenance of municipal stormsewer systems

How Can You Help ?

- **Reduce your "watershed footprint" !**
  - reduce your runoff (build a Rain Garden !!)
- **Reduce your "pollution contribution" !**
  - use "chemicals" sparingly; dispose of them properly
- **Understand that your actions make a difference !**
  - your runoff and "pollution contribution" help to degrade your community's streams
  - Your efforts to reduce your runoff and "pollution contribution" will
    - help reduce your community's drainage repair costs
    - help improve your community's streams
- **Lead by example** –
  - Install low cost, low maintenance, low impact features to capture rain water on-site
  - Make your property a solution to pollution
  - Encourage your neighbors, businesses, and community leaders to reduce their "watershed footprint" and "pollution contribution"


Residential Rain Garden

Don’t throw “free water” down the storm drain …

Keep it – it’s yours !!

For more information …..

www.chesco.org/water