



3rd Edition

Inside this issue:

Title	Page	
Rainwater Harvesting 101	2	One of these required activities is to provide a Stormwater Public Education and Outreach Program. The County's program focuses on three high-priority water quality issues: Sediment , Bacteria , and Nutrients , for the following reasons:
What About PCBs?	3	⇒ Sediment often clogs storm drain pipes and inlets, which leads to street flooding. It also washes into waterways, clouding waters, covering stream bottoms, and smothering the aquatic critters on which fish feed; this can adversely affect the diversity of fish populations and the overall health of streams.
County Accomplishments: Look What We Did...	4/5	⇒ Bacteria in streams can increase the risk of human infections from water contact or accidental ingestion.
Just for Fun: Stormwater Word Scramble	6	Note: Excess sediment and bacteria in the Roanoke River and most of its tributaries have led DEQ to classify these waters as impaired, meaning they no longer provide their full recreational and environmental benefits.
Top 10 Ways to Reduce Stormwater Pollution at Home	7	⇒ Nutrients (phosphorus and nitrogen, in particular) wash off of lawns, farm fields, and other managed turf areas via stormwater runoff and are transported to local waterways. Excess nutrients in waterways cause algae overgrowth, which decreases the oxygen that marine life need to survive. This often results in fish kills, fish illnesses, and even the tainting of human food. Also, groundwater supplies may be negatively affected.
Land Disturbing at Home: When Do You Need a Permit?	8	

Of Special Interest:

- Building Rain Barrels
- County-funded storm drainage projects
- Best Practices at Home to Prevent Stormwater Runoff Pollution

Remember . . .



Pollutants reach streams thru storm drainage inlets and underground pipes.

A Stormwater Guide for Homeowners

APRIL 2017

Stormwater Education with a Focus



Roanoke County has a Municipal Separate Storm Sewer System (MS4) permit issued to it by the Virginia Department of Environmental Quality (DEQ). This permit requires the County to perform certain activities to protect and to improve the water quality of the Roanoke River and its tributary streams.

- ⇒ **Sediment** often clogs storm drain pipes and inlets, which leads to street flooding. It also washes into waterways, clouding waters, covering stream bottoms, and smothering the aquatic critters on which fish feed; this can adversely affect the diversity of fish populations and the overall health of streams.
- ⇒ **Bacteria** in streams can increase the risk of human infections from water contact or accidental ingestion.
- ⇒ **Nutrients** (phosphorus and nitrogen, in particular) wash off of lawns, farm fields, and other managed turf areas via stormwater runoff and are transported to local waterways. Excess nutrients in waterways cause algae overgrowth, which decreases the oxygen that marine life need to survive. This often results in fish kills, fish illnesses, and even the tainting of human food. Also, groundwater supplies may be negatively affected.

In addition to the three high-priority water quality issues, the County continues its work to educate businesses and residents about other issues that may affect local water quality. Topics include:

- Proper disposal of fats, oils, and grease
- Proper use and disposal of fertilizers, pesticides, herbicides, and weed killers
- Proper yard maintenance (sweeping up and proper disposal of leaves, grass clippings, and lawn debris)
- Proper waste disposal of used motor oil, antifreeze, paint, pool chemicals, and many other household chemicals
- Encouraging local businesses to conduct employee training for Stormwater Pollution Prevention and Good Housekeeping, Illicit Discharge Detection and Elimination, and Spill Prevention

The County uses various means to conduct public education, including spots on the local cable channel, posting of educational materials on the County's website, outreach activities with garden clubs, homeowners associations, civic leagues, etc., and the publication of newsletters, such as this one, Fact Sheets, and brochures.

For ways that YOU can help reduce stormwater pollution to the Roanoke River and its tributary streams, see page 7. ■

Rainwater Harvesting 101

When it rains, water flows off of impervious surfaces like rooftops, driveways, parking lots, and sidewalks into the street and to nearby storm drains, picking up pollutants and trash along the way. This stormwater runoff is discharged **untreated** into the nearest creek, stream, or river. The pollutants collected by the runoff can cause detrimental effects to the receiving waters, harming aquatic plants, marine life, and even people.

Capturing the runoff water from rooftops is an easy way to divert some of the rain and lessen the amount of stormwater runoff from your property. How do you do this? Connect the downspout from your gutter system to a Rain Barrel!



Why Use a Rain Barrel?

Rain barrels are an environmentally-friendly way to capture rooftop runoff via your roof's downspout. Over an entire growing season, a rain barrel can help you save a little cash, too, because from each inch of rain that falls on 500 square feet of rooftop, you can collect 300 gallons of water! That's 300 gallons that you do not have to buy. According to the Better Homes & Garden website, that means you can collect more than 1,000 **chemical-free** gallons of water a year to use for your containers, garden, houseplants, lawn, or car washing. But beware, rain water from your rooftop and rain barrel is not potable, so please do not drink it or give it to your pets.

<http://www.bhg.com/shop/garden-and-yard/care/rain-barrels-a3243.html>

Where to Get a Rain Barrel?

Rain barrels can be purchased from many local stores, including garden shops, hardware stores, or online. The Better Homes & Gardens website provides a large selection of styles and vendors, which can be accessed here:

<http://www.bhg.com/shop/garden-and-yard/care/rain-barrels-a3243.html>

Of course, you can also build one yourself, which is likely the less-expensive option depending on the style you choose. Here are a variety of resources for learning how to build your own rain barrel:

- **Roanoke Master Gardener Association** - a group of specially trained individuals who act on behalf of Virginia Cooperative Extension (VCE) as volunteer educators within the community. The Roanoke Master Gardeners will offer a *Build Your Own Rain Barrel Workshop* in the fall on Saturday, September 23, 2017. For more information, call the VCE-Roanoke Main Office at (540) 772-7524 or the Master Gardener Help Desk at VCE-Roanoke: (540) 776-7178. Or, contact Kathleen Reed, Agriculture & Natural Resources Extension Agent, at reedka@vt.edu.
- **The Family Handyman**
<https://www.familyhandyman.com/smart-homeowner/how-to-build-a-rain-barrel/view-all>
- **This Old House**
<https://www.thisoldhouse.com/how-to/how-to-build-rain-barrel>
- **Better Homes & Gardens**
<http://www.bhg.com/gardening/yard/tools/make-a-rain-barrel-save-water/>
- **Do It Yourself Network**
<http://www.diynetwork.com/how-to/outdoors/structures/how-to-create-a-rain-barrel> ■



What About PCBs?

PCBs are a group of man-made compounds that were widely used in the past, mainly in electrical equipment, because of their non-flammability and chemical stability. PCBs have no taste or smell and range in consistency from oil-like to a waxy solid. Their manufacturing was banned in the U.S. in 1979 because of growing health and environmental concerns.

PCBs and the Environment

PCBs currently exist in the air, soil, and water from previous releases. PCBs do not break down well in the environment due to their chemical stability. They often attach to sediment that is washed into local waterways, accumulating in living organisms, especially fish. In fact, the Roanoke River (within the Roanoke Valley area) is under a health advisory issued by the Virginia Department of Health; this advisory recommends eating no more than two meals per month from many fish species caught in the Roanoke River.

Products that may contain PCBs

Although no longer commercially produced, PCBs may be present in products and materials made before the 1979 PCBs ban, including the following:

- ◆ Transformers and capacitors
- ◆ Electrical equipment (voltage regulators, switches, re-closers, bushings, etc.)
- ◆ Oil used in motors and hydraulic systems
- ◆ Old electrical devices or appliances containing capacitors having PCBs
- ◆ Fluorescent light ballasts
- ◆ Cable insulation
- ◆ Thermal insulation material including fiberglass, felt, foam, and cork
- ◆ Adhesives and tapes
- ◆ Oil-based paint
- ◆ Caulking
- ◆ Plastics
- ◆ Floor finish

Preventing the Release of PCBs

Caution must be taken to prevent PCBs from being released through:

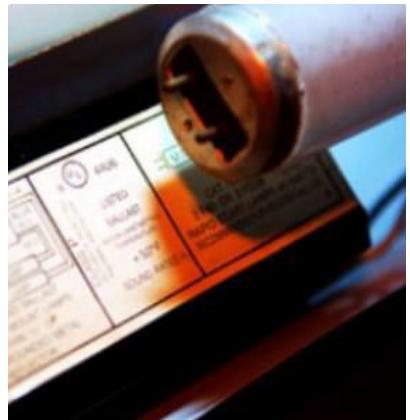
- ◆ Spills and leaks from electrical and other equipment
- ◆ Improper disposal and storage
- ◆ Illegal or improper dumping of wastes containing PCBs
- ◆ Burning wastes containing PCBs

It is important to minimize the amount of PCBs in the environment by:

- ◆ Properly replacing all fluorescent light ballasts containing PCBs
- ◆ Properly disposing of caulk, paint, and other building materials with PCBs during planned renovations and repairs
- ◆ Taking precautions during renovations so that building materials with PCBs do not contaminate surrounding surfaces
- ◆ Using properly trained and licensed contractors to remove, clean-up, and dispose of materials containing PCBs
- ◆ Consulting with regulatory officials when questions arise regarding PCBs

For More Information on PCBs, contact:

- ◆ Virginia Department of Environmental Quality <https://www.deq.state.va.us>
- ◆ Environmental Protection Agency <https://www.epa.gov/pcbs> ■



Older Fluorescent light ballasts (FLBs) can contain PCBs. Because of this, FLBs should be removed and disposed of by trained professionals.



Transformers containing PCBs, which contain more than 50 ppm of PCBs, are subject to specific EPA regulations. Proper PCBs identification labels must be visible near the access and on the transformer itself.



Old paint and caulk and nearby substrate (brick, masonry, cinder block, wood, etc.) may contain PCBs. Care must be taken during removal of these materials to avoid the creation of dust and to contain contaminated waste.



County Accomplishments: Look What We Did...

Roanoke County's Department of Community Development is tasked with a variety of functions, including implementation of the Virginia Erosion and Sediment Control Program, implementation of the Virginia Stormwater Management Program, and oversight of the county-wide activities required by its MS4 Permit.

As part of the MS4 permit requirements and in accordance with its Total Maximum Daily Load (TMDL) Action Plan, which was developed to help reduce sediment loading to the area's receiving waters, the County opted to undertake two stream restoration projects.

The two projects are: 1) Restoration of Glade Creek in Vinyard Park, Phase 1, and 2) Restoration of Murray Run at Ogden Road. Both projects were designed to help reduce sediment from the highly eroding stream banks and both will also help to reduce bacteria (E.coli) that enters the two streams via stormwater runoff. With both projects now complete, approximately 4,000 linear feet of eroding stream was restored in a natural fashion. More specific information about these two projects follow:

#1. Restoration of Glade Creek, Vinyard Park - Phase 1

- Project completed December 31, 2016
- 2,500 linear feet of stream restored
- 831 tons/year of sediment load reduction*
- Total Cost \$888,000
 - ◊ Local Contribution \$448,000
 - ◊ SLAF Grant \$440,000

Glade Creek was experiencing excessive erosion where it passes through Vinyard Park. In some areas, there were near vertical banks almost 10 feet in height. The County obtained a Stormwater Local Assistance Fund (SLAF) grant from the Virginia Department of Environmental Quality (DEQ) and procured a Design-Build Contractor. Permitting for the project was complicated by the need to obtain a U.S. Fish and Wildlife biological opinion, as Glade Creek is habitat for an endangered freshwater fish, known as the Roanoke Logperch, which is depicted below:

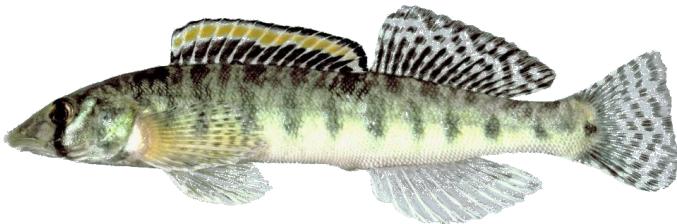


Photo Credit: USGS - Noel Burkhead

The restoration of 2,500 feet of stream in the upper part of Vinyard Park is expected to decrease sediment discharge by 831 tons/year. This project lowers both sediment and bacteria (E-coli) discharges. (con't. on page 5)



Prior to Construction: Steep & eroding banks at Glade Creek



Post-Construction: Naturally-restored banks at Glade Creek

*Note that the pollutant load reduction value for each project was estimated using the Chesapeake Bay Program Interim Rate, as reported in the respective grant application package that was submitted to DEQ.

#2. Restoration of Murray Run at Ogden Road

- Project completed July 2016
- 1,460 linear feet of stream restored
- 226.3 tons/year of sediment load reduction*
- Total Cost \$558,000
 - ◊ HHHunt Local Match \$279,000
 - ◊ SLAF Grant \$279,000

Murray Run was experiencing excessive erosion where it passes through Pebble Creek Apartment complex. In some areas there were near vertical banks approximately 8 feet in height. The erosion was threatening to wash out an adjacent sanitary sewer, and it was beginning to threaten one of the nearby apartment buildings.

Under a unique agreement, as allowed by the

Public Private Education Act (PPEA), the County and the private property owner, HHHunt Corporation, partnered to restore approximately 1,460 feet of stream using natural stream concepts.

The County agreed to obtain and administer a SLAF grant from DEQ to pay for 50% of the project cost and to be responsible for long term maintenance of the stream. HHHunt agreed to pay for the 50% local grant match to design and construct the restoration project and to perform routine maintenance activities.

HHHunt benefited from this project by transforming an eroding stream that was a liability into an amenity for its tenants. The County benefited by eliminating a source of excessive erosion and decreasing sediment and E. coli discharge to Murray Run. It is anticipated that this project will decrease sediment discharge by 226.3 tons/year. ■



Post-Construction: Naturally-restored shoreline, Murray Run at Ogden Rd.

Drainage System Maintenance and Improvements

In addition to the two stream restoration projects mentioned above, the County's Stormwater Operations Division of the Community Development Department was quite busy this past year, completing 63 drainage system maintenance and improvement projects. This work resulted in:

- Feet of pipe installed = 1,686
- Total properties improved = 95
- Total feet of open/riprap channel improved = 864
- Total square feet of restoration area = 121,059
- Cubic yards of sediment removed = 400
- Number of Board-approved projects = 4
- Number of small projects = 12
- Number of routine/repetitive projects = 17
- Number of emergency / high priority projects = 22
- Inter-departmental projects = 8

A total of **16,562 labor** hours were committed towards maintenance and improvements to the municipal storm sewer (drainage) system. The value of the improvements

that were performed in-house was estimated to be **\$929,500**; further, the County contracted out for **\$297,929** in additional drainage improvements, bringing the total investment in storm sewer (drainage) system maintenance and improvements to **\$1,227,429**. ■

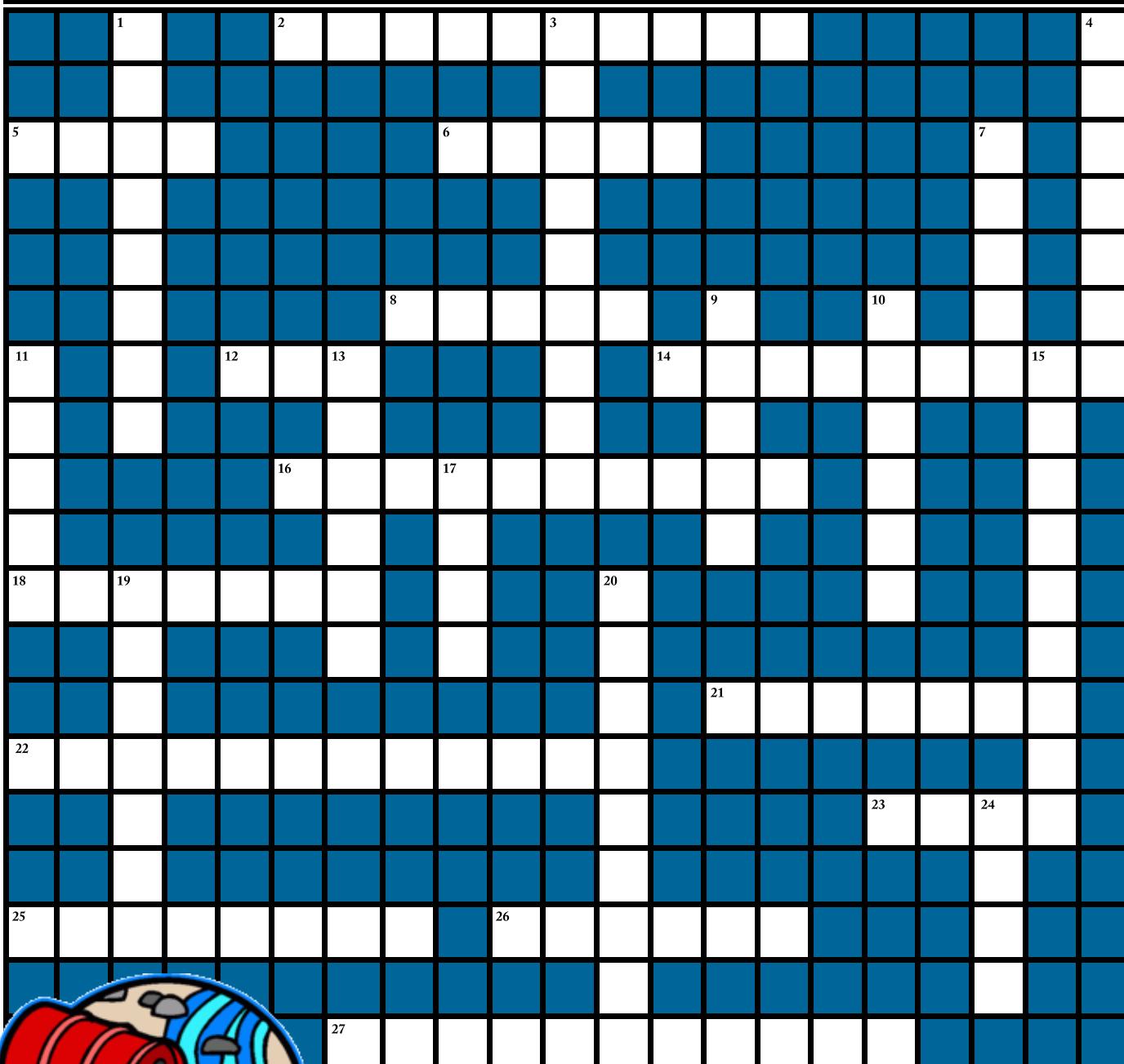


Striking channel improvements in The Orchards subdivision, constructed by Stormwater Operations Division, Dept. of Community Development

Just For Fun: Stormwater Word Scramble

INSTRUCTIONS: Complete the stormwater Word Scramble* by using the words below:

Carvin Creek	Impaired	Ore Branch	Runoff	Stormwater	Water
Cleanup	Lick Run	Pollution	Sediment	Stream	Watershed
E coli	Litter	Rain	Sewer	TMDL	HINT: Words can either go horizontally, from left to right, or vertically from top to bottom
Erosion	Murray Run	Recycle	Soil	Toxic	
Fish	Oil	Roanoke River	Storm Drain	Trash	



* For Word Scramble Solution, see County's website at <http://www.roanokecountyrva.gov/Puzzle2017>

Reminder... stormwater is not treated before it discharges directly into receiving waters.

Top 10 Ways to Reduce Stormwater Pollution at Home

In recent years, the water quality in the Roanoke River and its tributaries has remained in poor condition because of high levels of bacteria, PCBs, and sediment pollution caused from stormwater runoff. As a homeowner, you might wonder if there is really anything you can do that would truly make a difference in helping to keep such pollutants out of stormwater runoff. As it turns out, there are many easy ways to do this, especially for minimizing sediment and bacteria. Here are the top 10:

1. **Plant More Plants.** By planting more plants in strategic locations, you can limit erosion from your yard, minimize stormwater runoff, and improve filtration for any runoff that does leave your property. Be sure to pick plants that will thrive in the local conditions while avoiding invasive species. Make sure to consider sun exposure, soil moisture, and soil type. Go ahead, take the pledge and start planting more plants today! 
2. **Scoop the Poop!** What's the big deal? It's just a little poop, right? Well the next time your pup poops, think of this: 1 gram of dog droppings has over 20,000,000 E. coli bacteria colonies in it! YIKES!!! 
3. **Direct all Stormwater Runoff from Paved Areas and Rooftops to the Lawn.** This serves to filter the stormwater, reduce its flow, and allows for some infiltration into the soil. 
4. **Use a Drip Pan When Changing Your Vehicle's Oil.** Also, clean up spilled oil by pouring cat litter on it; then sweep it up and put it in the trash. 
5. **Mulch Mow, OR Bag Leaves and Grass Clippings.** For bagged materials, place the bags out on the street for bulk/brush collection day. NOTE: Leaves that are deliberately swept, raked, or blown into the street, ditches, swales, drainage inlets, or receiving creeks, streams, or rivers constitute an illicit discharge into the County's storm drainage system! 
6. **Throw All Trash in the Trash Can.** Also, "keep your butts out of the gutter." Put cigarette butts in ashtrays. 
7. **Minimize the Use of Fertilizers and Herbicides.** And, use a soil test to determine how much of these products to apply. 
8. **Pump Out Your Septic Tank.** Have it pumped out regularly to prevent sewage overflow. 
9. **Wash Your Car on the Grass.** The grass is a great filter. Or, use a commercial car wash. 

And last but not least . . .

10. **Report Illicit Discharges!** If you see someone placing anything into the storm drainage system, which includes storm drainage inlets, curb and gutter systems, roadside ditches, and underground drainage pipes, please report the activity to the County by clicking on "Report a Concern" on the County's website at this link: <http://roanokecountyva.gov/ReportID> or call us at (540) 772-2065.

If possible, take a picture of the illicit discharge activity when it is occurring and forward the pictures to the County's Stormwater Program Manager in the Department of Community Development, Stormwater Division, 5204 Bernard Drive, 2nd Floor, Roanoke, VA 24018.

Or, send it by email to: stormwater@roanokecountyva.gov. County staff will investigate the incident and attempt to resolve the issue. Also, to learn more about the harmful effects of illicit discharges on the area's receiving waters, please see the County's various public education videos, under Stormwater, at: <http://www.roanokecountyva.gov>



Please, only rain down the storm drain.





Division of Stormwater Management
5204 Bernard Drive, 2nd Floor
Roanoke, Virginia 24018
Phone: (540) 772-2065
Fax: (540) 772-2108
www.roanokecountyva.gov

This publication is a public service message brought to you by Roanoke County, Department of Community Development. As regulated by federal and state laws, the County's Stormwater Management Program must include public information strategies to encourage the prevention of stormwater pollution. For more brochures or information on ways to prevent stormwater pollution, please contact the County's Department of Community Development, Division of Stormwater Management, at 540-772-2065.

Land Disturbing at Home: When Do You Need a Permit?

Roanoke County implements an Erosion and Sediment Control Program for land disturbing projects, pursuant to its Erosion and Sediment Control Ordinance (Chapter 8.1 of the County Code) and as required by the Virginia Erosion and Sediment Control Law (Code of Virginia, Title 62.1, Chapter 3.1, Article 2.4) and attendant regulations.

The County's ordinance defines "land-disturbing activity" as **any man-made change to the land surface that may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands in the Commonwealth, including, but not limited to, clearing, grading, excavating, transporting and filling of land.**

Thus, certain projects undertaken around the home could be regulated and require a land-disturbance permit from the County's Department of Community Development. However, there are some exceptions for which NO PERMIT is needed. Here are a few of them:

- **Minor land-disturbing activities** such as home gardens and individual home landscaping, repairs and maintenance work;
- **Disturbed areas of less than 2,500 square feet in size**
- **Septic tank lines or drainage fields** unless included in an overall plan for land-disturbing activity relating to construction of the building to be served by the septic tank system

Projects Likely to Need a Permit:

- Detached Garages
- In-ground Swimming Pools
- Barns or Large Sheds
- Large Decks or Patios



If you are uncertain as to whether or not your home improvement project needs a land-disturbing permit, please call Roanoke County's Department of Community Development at 540-772-2065. One of the County's inspectors will be happy to assist you with an evaluation of your project. ■