



Dear Citizens:

Annually the City of Griffin presents its Stormwater Utility Report to its rate payers. This presentation is an overview of the progress made in the administration of environmental issues, operation and maintenance and regulatory compliance. The United States Environmental Protection Agency oversees the nations Clean Water Act governing the water quality standards in our watersheds. As required in the City of Griffin's MS4 Permit (GAG610000) National Pollutant Discharge Elimination System (NPDES) is pleased to present this past year's performance.

In 2014 the Georgia Environmental Protection Division re-issued the new 2013-2018 NPDES Phase II MS4 Permit to the City of Griffin. Permit conditions have been increased to include additional requirements for Low Impact Development (Green) Best Management Practice's (BMP's) the requirements for water quality improvement and the increased measurement and data collection. The City of Griffin is currently in the process of aligning all City codes to meet the requirements of the Clean Water Act Municipal Separate Storm Sewer System (MS4) requirements. The Georgia Environmental Protection Division oversees and enforces compliance of our permit and requires the City of Griffin to make measurable improvement in public education and outreach, public involvement, illicit discharge detection and elimination, construction runoff, post construction runoff and pollution prevention. In 2015 the City will be in complete compliance of the Act.

The Georgia Environmental Protection Division approved the City's Stormwater Management Plan, the Implementation Plan and the Monitoring Plan as required by our MS4 NPDES Permit. In 2014 the City completed 3 stormwater quality improvement projects. The City Golf Course had 800 linear feet of failed 84 inch drainage pipe which was converted to a stream bank restoration project. The Library/Cemetery Site was constructed with a wetlands pond and an impervious walking trail. Oakhill Cemetery was retrofitted with a micro-pool and wetland pond and in 2015 a stream restoration will complete the project. Water quality is a key element in the Nation's NPDES permitting program. The City of Griffin remains committed to improve the water quality in its watersheds for future generations.

In 2014 the City of Griffin Environmental Council was created. In January the Environmental Council held its "Goals Retreat" at the UGA campus to make plans for the up-coming year. Wade Hutcheson chaired the 2014 Stream Clean-Up. 206 local volunteers traversed the City of Griffin's streams collecting over 1.67 tons of debris and 75 tires. Bettye Bogue Jones spearheaded "Make a Difference Day" in efforts to clean up and recycle waste in Griffin's neighborhood's. The Stormwater Utility's annual "STREAM" Workshop had over 221 attendee's gathering to discuss soil erosion, water quality products and related issues in the Georgia. USEPA's Region IV Mike Mitchell was the keynote speaker addressing the importance of the Construction NPDES Permit as it relates to water quality and its improvements toward reaching biological, chemical and physical characteristics.

In 2014 the City of Griffin's Floodplain Management Program was reviewed by the National Floodplain Insurance Program staff. Not only did the City retain its CRS5 rating but we made significant progress in securing additional measures to improve our position for qualifying. What it means to you as a resident of Griffin is that if you are required to obtain flood insurance on your property you will qualify for a 25% discount on your premium. Griffin remains the first and only community in Georgia who holds a CRS5 rating in the flood insurance program.

The Stormwater staff inspected over 175 drainage networks, 250 detention pond reviews, stabilized 9,750 feet of stream channels as part of the maintenance of the stormwater conveyance system. Our environmental staff conducted 58 water quality sampling events to measure the improvement of our water quality program. Our urban forester reviewed and inspected 99 of our urban forest trees.

This is just a brief summary of our program accomplishments in 2014. We would like to thank the many volunteers and staff who worked diligently this past year in making our MS4 NPDES permit successful and keeping Griffin in compliance with the Clean Water Act. We hope that more citizens will get involved in our program in 2015.

Sincerely,

Brant Keller, PhD
Director Public Works and Utilities

City of Griffin Stormwater Team



(L-R): Jim Shockley, James Moore, Kelly Walker, Ben McDaniel, Gary Ault, Quinten Dorrough, Shiela Daniell, Blake Gaddy, Jeremy Kenway, Jimmie Green, Chewy Varela and Kreg Jenkins.

What is Stormwater?

What is Stormwater?

If you are like most folks the first time you came across the term 'Stormwater' was on your utility bill. You may have wondered what this charge was for. Is the city charging you for the rain that falls from the sky? No. The Stormwater Utility Fee funds the infrastructure and programs that manage the rain once it has fallen to the ground. Why is this important? If the runoff from a storm cannot quickly drain away from an area, the result is flooding. If too much water drains off the streets too quickly erosion occurs, endangering private property and harming water quality. Runoff that travels across polluted surfaces washes those pollutants into our streams and lakes. Griffin's network of ditches, drains, pipes, and detention ponds (collectively called drainage infrastructure) serve to transport this storm runoff safely to the 30 miles of stream located within the city.

Water Quantity

According to the National Oceanic and Atmospheric Administration, more people die annually from flooding than any other weather-related cause, including tornados and hurricanes. The process of urbanization increases the chances of flooding, as runoff has less opportunity to soak into the ground once the surface

is covered in asphalt and concrete. In fact, the urban landscape speeds the rate at which runoff travels to your neighborhood stream. This can cause the drainage infrastructure to be overwhelmed, especially if not well-maintained and kept free of debris. Stormwater Division staff work diligently to ensure that this network of ponds, pipes, drains, and ditches keeps the water flowing and not flooding your neighborhood.

Water Quality

In 2010, 59% of the streams and rivers assessed in Georgia were determined to be impaired by the Environmental Protection Division (EPD). This means these waters were not fit for their intended purpose- fishing, drinking water, swimming, etc. The number one cause was stormwater pollution. Sediment from construction sites, oil on the parking lot of a shopping centers, and pet waste that's left on the sidewalk- all of these can wash directly into your neighborhood streams and lakes through the nearest storm drain. Locally, Potato Creek, Wasp Creek, and Cabin Creek are listed as impaired for having poor fish populations due to sediment, while Cabin Creek is listed additionally for having excessive fecal coliform bacteria. Griffin Stormwater's Environmental Technicians monitor our streams to identify

potential sources of pollution and eliminate them. All permitted construction sites within the city are required to install appropriate erosion control measures, like silt fence to ensure their mud stays on their site during a storm and out of our storm drains and streams. Griffin's drainage infrastructure discharges into the environment at 526 separate points scattered across the city. Every one of these discharge point (call outfalls) get inspected regularly to ensure that pollutants are not escaping from them during dry weather.

Infrastructure Maintenance

There is 102 miles of stormwater pipe in Griffin. If laid end-to-end, these pipes would reach to the Alabama line- and (almost) back. This network of pipes is critical to protect public safety and prevent flooding. However, most of this pipe is metal, rusting and past its serviceable life. When it deteriorates to a certain point the pipe collapses, causing a sinkhole to open above it. Much of this pipe is under city streets. When the pipe fails a street can unexpectedly fall in, endangering drivers and cutting off access to neighborhoods. The Stormwater Utility Fee funds the replacement of these rusting metal pipes with only high density polyethylene pipe (HDPE) that will keep the streets above operational and the water below flowing for up to 100 years.

What We Did In 2014

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTALS	
Administrative															
Customer Service - Requests Received	Each	4	4	0	11	14	29	17	7	7	5			98	Total
Customer Service - Site Investigations / Meetings	Each	0	11	19	17	23	33	20	10	7	10			150	Total
Customer Service - Service Requests / Work Orders Generated	Each	0	0	5	4	10	28	22	7	7	5			88	Total
Floodplain Inquiries	Each	0	0	0	0	0	1	1	1	0	1			4	Total
Stormwater Bills - Reviewed	Each	8	4	7	104	5	10	22	15	8	111			294	Total

Operations and Maintenance															
Channels / Ditches - Constructed	Feet	0	0	0	400	0	400	0	0	0	60			860	Feet
Channels / Ditches - Maintained	Feet	400	650	500	3,000	0	180	1,190	3,000	650	435			10,005	Feet
Devices (Proprietary BMP's) - Serviced	Each	0	5	1	0	0	0	0	0	0	0			6	Total
Driveways - Raised	Each	0	0	0	0	0	2	1	0	0	1			4	Total
Inlets - Maintained	Each	192	357	93	104	0	103	172	0	0	10			1031	Total
Inlets - Raised	Each	0	0	0	1	0	0	0	0	0	0			1	Total
Inlets - Structures Built	Each	1	0	1	0	2	0	0	1	3	0			8	Total
Inlets - Structures Repaired	Each	3	2	1	0	2	2	1	2	2	0			15	Total
Pipes - Installed (New)	Feet	0	30	0	0	240	0	0	0	0	0			270	Feet
Pipes - Installed (Replaced Pipes)	Feet	20	220	60		10	0	30	220	0	0			560	Feet
Pipes - Maintained	Feet	16	227	24	28	0	3	7	0	0	12			317	Feet
Special Projects - Completed	Each	0	0	0	0	0	0	0	0	0	1			1	Total
Special Projects - Completed	Each	0	0	0	1	0	0	0	0	1	0			2	Total
Walls - Constructed	Each	0	1.5	6	8	12.5	100	8	0	29	12.5			177.5	Total
Work Orders - Received	Each	6	7	5	4	9	9	8	4	10	4			66	Total
Work Orders - Completed	Each	6	3	3	3	9	7	8	4	10	4			57	Total

Trees															
Trees - Complaints	Each	1	4	10	0	6	13	5	3	4	6			52	Total
Trees - Inspected	Each	1	26	13	11	6	24	8	3	7	7			106	Total
Trees - Mulched	Each	0	12	99	0	0	0	0	0	0	0			111	Total
Trees - Planted	Each	0	12	21	0	0	0	3	0	0	0			36	Total
Trees - Pruned	Each	3	2	1	0	7	0	0	0	0	0			13	Total
Trees - Removed City	Each	10	29	1	1	4	8	0	0	1	2			56	Total
Trees - Removed Contractor	Each	1	13	0	2	1	4	3	6	8	0			38	Total
Trees - Watered	Each	0	12	0	0	39	38	76	98	0	0			263	Total

Oak Hill Cemetery Wetland

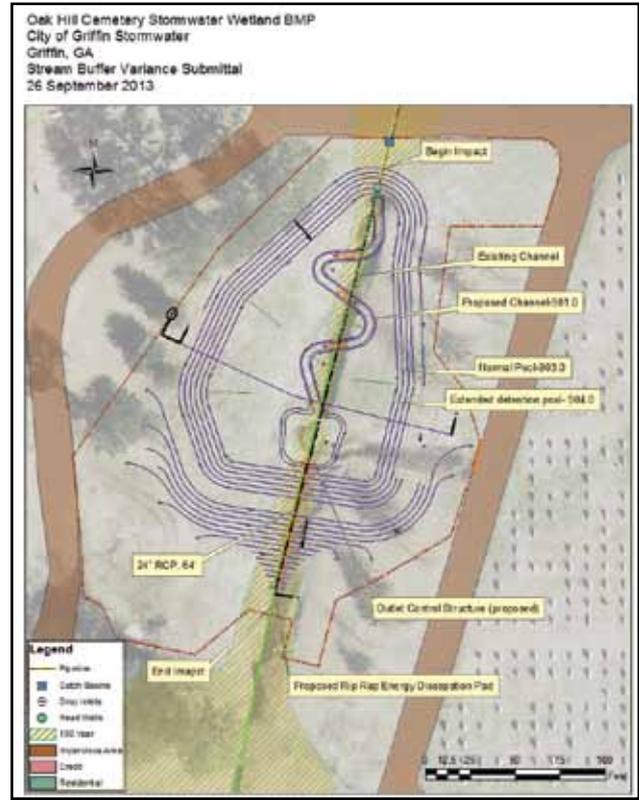


If you have had an opportunity to visit Oak Hill Cemetery in recent months you may have noticed that the area immediately behind the Cemetery Office has undergone some changes. In 2014, the City constructed an engineered wetland and detention basin in the heart of the cemetery. This facility is located there because this spot is the beginning, also known as a "headwater", of a major tributary of the Flint River. The purpose of

this facility is to improve water quality in Potato Creek, which is listed on the State of Georgia's list of impaired streams. Previously, a drainage ditch ran through this area which allowed heavy flows of stormwater runoff from the East Solomon Street/Searcy Avenue to rush quickly through this area- so quickly in fact the these flows contributed to stream banks being washed away downstream. This stream bank erosion harms water quality, destroys wildlife habitat, and threatens infrastructure.

The Oak Hill Cemetery Wetland was engineered to replace the drainage ditch with a meandering channel surrounded by an engineered floodplain to slow the stormwater discharge. Surrounding the channel are board, flat areas planted in wetland vegetation. These features allow storage, and slow release of, heavy flows of stormwater in protect downstream areas. Additionally, the wetland plants have the opportunity to consume excess nutrients often found in urban stormwater runoff that can lead to poor water quality and fish kills.

This project was undertaken as part of the City of Griffin watershed protection plan mandated by the State of Georgia. Construction took place in June-July 2014.





2014 S.T.R.E.A.M. Workshop

Two hundred twenty civil engineers, public works officials, and construction professionals gathered in Griffin on October 22 to hear from stormwater experts at the City's annual S.T.R.E.A.M. conference. An acronym for "Stormwater Training for Regional Engineers And Municipalities," S.T.R.E.A.M. gives professionals the opportunity to learn the latest practices related to stormwater management.

Started in 2003, the event started as a means for the City's stormwater division to field test commercial products before use on projects within the City. Stormwater is rainfall that erodes land and deposits dirt and pollutants such as oil and metals into rivers and streams. These deposits accumulate and can affect water quality and potentially change the shapes and directions of streams and rivers.

"We also work to include construction professionals working with municipalities," said Deputy Director for Stormwater James Moore. "We wanted to focus on education versus enforcement by bring those professionals into the event to teach them about local, state, and federal guidelines."

Construction professionals received training discussing how to reduce erosion and control sediment. As construction professionals became more proficient with basic erosion control methods, the event expanded to include other aspects of watershed protection such as stormwater management, floodplain management, and pollution prevention.

Moore added, "We couldn't ask for more. We had a great turnout of people committed to better managing our lakes and streams."



The City of Griffin Annual Stream Cleanup



drainage infrastructure, reducing flooding, and preventing water pollution.

On May 7th students in Ms. Cristi Johnson's GHS art class received an added treat thanks to the efforts of their classmate, ninth grader Alexis Dalton. Dalton designed the 2014 Stream Cleanup t-shirt. In exchange, Dalton received \$50 from the Kiwanis Club of Griffin. Additionally, Slices Pizzeria sponsored a pizza party for her class.



Each year the City of Griffin sponsors a stream cleanup. This year's cleanup (held April 12) featured more than 180 volunteers in Griffin's streams. Volunteers collected 1.67 tons of garbage and 75 tires. The event was a collaboration between the city's environmental council and Griffin Stormwater.

Dalton's design was selected online by Griffin residents. Area elementary, middle, and high school students submitted more than 140 designs. The top eight staff picks were posted to the city's facebook page where Dalton's design was the most liked.



Environmental Council is a volunteer citizen body charged with advising the city Board of Commissioners on policies and procedures to protect and preserve Griffin's natural resources for future generations.

The date for next year's event has not yet been decided. Please refer to the website below for information on the 2015 stream cleanup.

Griffin Stormwater is a division of City of Griffin Public Works and is tasked with protecting the Griffin's watersheds by maintaining the city's

For more information about the City of Griffin, visit www.cityofgriffin.com. Follow us on Facebook at www.facebook.com/cityofgriffin and on Twitter @CityofGriffin.



Geographic Information Systems

During the past year, the GIS Division has been focusing its resources on the gathering of water infrastructure related data. The GIS Division currently maintains a database of approximately 4,000 Fire Hydrants, 7,000 water meters, 3,000 valves and 700 miles of water lines. This effort will help improve the city's overall ability to manage and maintain the distribution network for all existing and future customers.

The water infrastructure data allows us to create more accurate maps with unique symbolization to help people visualize the layout of the vast water distribution network. It also allows the City of Griffin the ability to track repairs and maintenance in our HIPERWEB work order program. We are currently in the planning and development stage of using our data for hydraulic water modeling purposes. The ultimate goal of this extensive data gathering exercise is to increase the overall efficiency of the water distribution system, plan for future capital improvement projects and improve water quality.

Our GIS staff is always available to provide help or answer questions regarding the City's mapping products. Please feel free to contact us at 770-412-9950.



Floodplain Management



Even though the City of Griffin (City) is not located near a major river, there are still areas of the City that lie within a floodplain and have the potential to flood. Along sections of Shoal, Cabin and Grape Creeks and Ison Branch exists floodplains which are low lying areas that are prone to flooding during periods of heavy rain. The last major flood to hit Griffin occurred during 1994 when flood waters disrupted essential government services, damaged critical structures and caused transportation delays due to flooded streets. Since then, the City has taken steps to reduce the impacts from flooding.

Floodplains are natural areas that help reduce flood water velocities which, allows water to slow down and sediment to drop out of the water, improving the water quality of the City. The sediment that drops out of water has nutrients and other pollutants attached to it that plants can take up and use, further aiding water quality. In addition to slowing down the velocity of flood waters, the floodplain also allows water to slowly filter through the ground which further reduces the volume of stormwater. It is important to not fill in areas of the floodplain and reduce their ability to hold flood waters. These areas are very important to reduce the volume and improve the quality of flood waters. Floodplains are very effective at treating flood water and the use of floodplain is much more cost effective than building structures to hold and treat stormwater. The largest connected floodplain within City limits is along Grape Creek west of Macon Rd near the intersection with E. College St. and along Ison Branch near the intersections of Maple Dr with Wesley Rd and 4 Oaks Dr.

If your home is within a floodplain, it is important to take steps to protect your property from flooding. There are methods to permanently retrofit structures to help protect them from flooding. Materials such as waterproof coatings or veneers and water

tights shields can be applied to help protect your home from the damages of flood waters. Buildings can be anchored to prevent floatation or walls can be strengthened to withstand the pressure of flood waters or the impact from floating objects. Property owners can also either raise electrical and HVAC systems so that they are above the floodplain or HVAC systems can be flood proofed to prevent damage. If there is a propane or other fuel tank on your property, they should be properly anchored into the ground so they cannot float away in flood waters and cause damage to nearby structures. In addition to outside damages, heavy rains can cause sewage to back up into basements of homes, even in areas outside of the floodplain. A floor drain plug, standpipe, or sewer backup valve can prevent sewer backup flooding and can be purchased at a hardware store for under \$25.

One of the most important steps that can be taken to protect your home and your belongings is to purchase Flood Insurance. Homeowner insurance policies do not cover damages from flooding and additional policies need to be purchased. However, because the City participates in the National Flood Insurance Program and Community Rating System, everyone can purchase a separate flood insurance



policy backed by the Federal government at a reduced rate, even if their property has flooded before. Some people have purchased flood insurance because it was required by the bank when they got a mortgage or home improvement loan but these policies usually just cover the building's structure and not the contents. Under most circumstances, it takes 30 days to write a flood insurance policy so, planning is essential for proper protection. More

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information on flood insurance is available at <http://www.FloodSmart.gov>. If you don't have flood insurance, talk to your insurance agent or call (1-800-CALL-FLOOD, 1-800-225-5356).

In times of flooding it is very important to put safety first. Turn off the gas and electricity to your home to help reduce the potential of additional damages. Move valuable paperwork and objects to higher elevations in your home (second floor or on top of shelves). Bring any outdoor items such as lawn furniture and toys inside your home or garage so, they do not become a floating hazard and possibly clog storm drains or creeks. Stay clear of all power lines and electrical wires. If you are going to leave your home, be sure to bring all necessary medication with you. While leaving your home, be cautious of flood waters and limit walking or driving through flood waters. Six inches of flowing flood water has the potential to knock over a person and only two feet of water is enough to float a vehicle and wash it downstream.

The disposing of any material that is not 100 percent stormwater down a storm drain or directly into a creek or stream within the City of Griffin is against City Ordinances. Even materials such as grass clippings, leaves or fallen branches have the potential to increase the severity of floods by clogging the creek or reducing the volume of water that can be carried down the creek. If your property is along a ditch or creek, please do your part and inspect your property and keep the banks clear of fallen woody debris. If you ever see someone dumping anything into a creek or storm drain or if you find large debris dams in a

creek, please contact the Stormwater Department at 770-229-6424.

The City pays special attention to any potential development and redevelopment within the floodplain. Before any development or improvement to your property (building of any structure, grading, or filling with any materials) can start the Planning and Zoning Department should be contacted to ensure there are no permits required. Permits are required in some instances to prevent losses to downstream properties from increased flood waters. In the case of redevelopment, any "substantial improvement", including repairs to a structure with "substantial damage", is subjected to the same requirements as new buildings.

A "substantial improvement" or "substantial damage" is defined as any building where any combination of repairs, reconstruction, alteration, or improvements to a building,



taking place during a 10-year period, in which the cumulative cost equals or exceeds 50 percent of the market value of the building prior to the improvements. If you notice any building or development of any type without a City permit sign posted, contact the Planning and Zoning Department at 770-233-4130.

City personnel are available to make site visits, free of charge, to assist City of Griffin residents in flood protection, drainage issues and any site specific flooding issues within the Community. The Federal Emergency Management Agency (FEMA) released new digital flood insurance rate maps (DFIRM) in May 2010. These new DFIRM publications show where the 100 year floodplain is and if your property is at an elevated risk of flooding. If you are now required to carry a flood insurance policy, please check with your agent about the Preferred Risk Policy Eligibility Extension that can temporarily reduce your flood insurance premiums. It is important to remember that flood waters cannot read a map and even if your home is not located within the floodplain there is still a risk of flooding. The City's Geographic Information Services Division has the capabilities to produce maps of the Community depicting structures and the 100 year flood plain to assist in determining if your home is located within the floodplain. If you would like any additional information on flooding, flood insurance, flood zones, retrofitting your home to protect from flooding, assistance in determining if your home is in the 100 year floodplain or if you would like to obtain an elevation certificate please check out the Flint River regional Library, our website www.griffin-storm.com, or call the City of Griffin Stormwater Department at 770-229-6424.

The Role of Trees in Stormwater Management*

In nature, trees play critical roles in controlling stormwater runoff and protecting surface waters from sediment and nutrient loading. In cities, trees can play an important role in stormwater management by reducing the amount of runoff that enters stormwater and combined sewer systems. Trees, acting as mini-reservoirs, control stormwater at the source. A healthy urban forest can reduce runoff in the following ways:

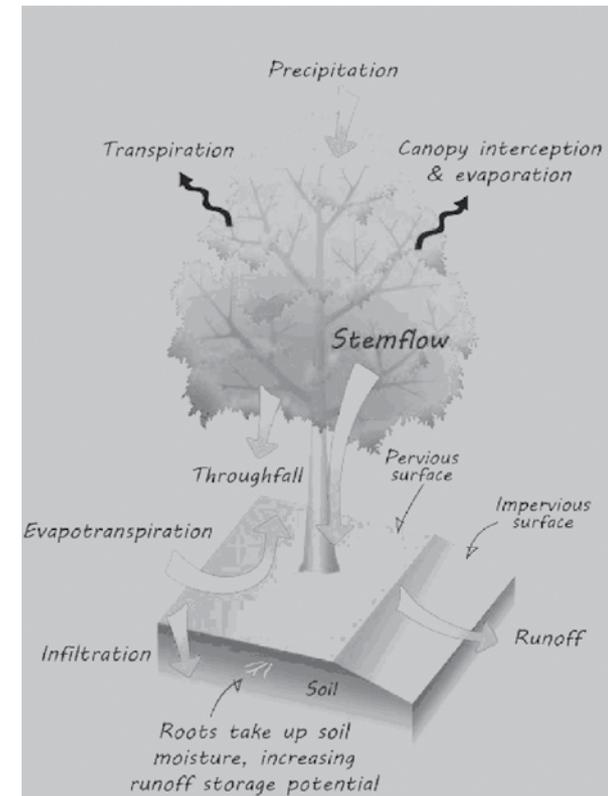
- **Transpiration**—Trees draw large quantities of water from the soil for use in photosynthesis. The water is eventually released into the atmosphere as vapor from the canopy, a process termed transpiration.
- **Interception**—Leaves, branches, and trunk surfaces intercept and absorb rainfall, reducing the amount of water that reaches the ground, delaying the onset and reducing the volume of peak flows.
- **Reduced Throughfall**—Tree canopies reduce soil erosion

by diminishing the volume and velocity of rainfall as it falls through the canopy, lessening the impact of raindrops on barren surfaces.

- **Increased Infiltration**—Root growth and decomposition increase soil infiltration capacity and rate.
- **Phytoremediation**—Along with water, trees take up trace amounts of harmful chemicals, including metals, organic compounds, fuels, and solvents from the soil. Inside the tree, these chemicals may be transformed into less harmful substances, used as nutrients and/or stored in roots, stems, and leaves.

* Excerpt from:

"Stormwater to Trees: Engineering Urban Forests for Stormwater Management"
U. S. Environmental Protection Agency
September 2013
EPA 841-B-13-001



Tree Removal Program



The City of Griffin has a tree inventory listing all of the trees on public rights of way and each tree is plotted on our GIS maps. The City recently contracted and completed a new tree inventory updating our existing one. In the process, tree inventory surveyors (all of whom are certified Arborists) observed and recorded the condition of each tree. Many trees were found to be in poor condition and deemed potentially hazardous due to disease, excessive lean, storm damage and other related reasons. These trees were, therefore, recommended for removal as a matter of public safety. Consequently, the City has undertaken preventive measures to remove any tree that may be considered a threat to public safety.

It is the intention of the City of Griffin to replant trees in or near the same general area from which trees have been removed. However, depending on underground utilities and other site restrictions, it is not always possible to replant trees in the same general area. Though trees may sometimes not be replanted in or near the same area, the City does have an urban forest enhancement program through which more than one hundred trees (on average) of all kinds are planted each year in various areas on public rights of way and public property. It is the City's goal that the number of trees planted in our urban forest always far exceeds the number of trees removed.

Comments and questions are always welcome. Please call Kreg Jenkins at 770-229-6424 Ext. 602



The City of Griffin has been a Tree City for 23 years.

Why your city should become a Tree City USA Community

The Tree City USA program provides direction, assistance, and national recognition to your community by supporting the framework for a sustainable urban forest.

- **Reduce costs** for energy, storm water management, and erosion control. Trees yield up to three times their cost in overall benefits to the city, averaging \$273 per tree.
- **Build stronger ties** to your neighborhood and community. Trees and green spaces directly correlate to greater connections to the neighborhood and neighbors.
- **Cut energy consumption** by up to 25%. Studies indicate that as few as three additional trees planted around each building in the United States could save our country \$2 billion, annually, in energy costs.
- **Honor your community** and demonstrate your commitment to a healthier environment through Arbor Day celebrations and Tree City USA recognition.
- **Boost property values** across your community. Properly placed trees can increase property values from 7-21% and buildings in wooded areas rent more quickly and tenants stay longer.

Learn More: www.arborday.org/TreeCity
(888)448-7337
E-mail: TreeCity@arborday.org

Arbor Day Foundation   

Greetings from Grand Junction, Colorado
A Tree City USA Community

Greetings from Madison, Wisconsin
A Tree City USA Community

This flyer from the Arbor Day Foundation describes the many benefits of a city becoming a Tree City. One of the requirements in becoming a Tree City is that the city sponsor an Arbor Day event.

Arbor Day Pictures 2014



Trees vs. Electricity

By: Kreg Jenkins, Environmental Tech/Arborist



Many of us are familiar with the on-going conflict between the trees that beautify our neighborhoods and the power lines that fuel our homes with electricity. None are more familiar with this conflict than the men and women employed by Griffin Power and other similar utility companies. It is their responsibility to maintain harmony among these two commodities that we would be hard-pressed to do without. The benefits of both are more important than we often realize.

Basically, when we think of trees, we think of shade. Shade is one of the many benefits of trees. Trees also benefit us by cleaning our air, preventing erosion, and providing habitats for plants and animals. These and other tree benefits are more

comforting to us than we generally realize. A good example of this is when an old tree we are familiar with is suddenly removed (as is regularly the case these days due to the current severe drought). All of a sudden there is a large bright area of hot sunshine where cool shade used to be. It is easy to take for granted the benefits we get from trees and the same could be said of electricity.

The benefits of electricity are too numerous to mention here but some of the most important include lights, heating, cooling, and of course TV. It is very easy to take these benefits for granted. For Example, we are thrown into a state of shock when the electricity goes off while we are watching a football game on TV. Yep! You guessed it. A tree limb fell on a power line just up the street from your house. Now, instead of pulling for the home team, we are pulling for the power company crew to come out and fix the power line before the game is over.

Griffin Power and other similar companies have to keep the peace in this conflict between trees and electricity. In Griffin, they accomplish this by keeping tree limbs trimmed back by at least 15 feet from the 385 miles of power lines in and around the City of Griffin. An attempt is made to trim with an aesthetically acceptable outcome but necessity dictates method. A tree growing too close to a power line is more than likely not going to have the natural familiar shape we are used to. However, with a little compromise and standard

pruning practices (ANSI A300), a trimmed tree can still provide substantial shade and provide a home for wildlife. Griffin Power is dedicated to providing us with uninterrupted electricity. According to Tom Ridgway of Griffin Power, they are equipped with a tree trimming budget of over \$300,000 and two year-round tree crews contracted from private tree companies. One of the two crews will likely be in your neighborhood soon.

In retrospect, does it really need to be trees vs. electricity? Can't we have the benefits of both? If we can compromise just a little on aesthetics (as long as ANSI A300 standard pruning practices are used), I believe that both commodities can exist in harmony. Can we expect to never have any interruptions in our electricity from falling tree limbs? No. It is always the intent of Griffin Power, however, to prevent electrical outages by keeping tree limbs trimmed away from power lines. Nature, though, has its own timetable and limbs sometimes break and cause outages in between trimming cycles. Let's try not to take these commodities for granted. Instead, let's be thankful for the convenience electricity provides and for the beauty and comfort trees provide. It may also be comforting to know that Griffin Power budgets over \$10,000 annually for the planting of new trees to perpetuate our aging urban forest.

If you should experience an electrical outage, please call 770-229-6406.

Tree Pruning Techniques



Though not always aesthetically pleasing, if pruned and maintained according to industry standards (ANSI A300), trees and power lines can coexist and we can still enjoy benefits from healthy pruned trees. The tree next to the power pole has been pruned through the middle. This pruning practice is known as “pruning through”.



Trees next to the power pole have been pruned on the side (“side pruning”) to provide clearance for the power lines. The trees remain healthy and still provide benefits as long as pruning has been performed according to industry standards (ANSI A300).



Magnolia trees can reach heights of 90 feet. As shown above, this Magnolia tree was planted under power lines (which are typically 30 to 40 feet high). The action taken here was to use a pruning technique called “topping”. Topping is not a desirable industry standard (ANSI A300) pruning technique as it leaves the tree grossly misshapen and the tree will continue to be a problem by sending limbs up into the wires. The preferred option is to remove the tree and plant an understory tree (Cherry, Dogwood, Trident Maple, etc.) to replace it.



Red Oak trees can reach upwards of 100 feet. As shown here, this Red Oak was planted across the street from the power lines so as not to interfere with them. It has been the policy of the City of Griffin for many years now to plant the “right tree in the right place” in cooperation with Griffin Power. This tree replaces an Oak tree that had to be removed last year.



In this location, the City planted a Trident Maple because it is near power lines. Trident Maples originate in China and reach an average of 15 to 25 feet (depending upon variety). This tree should not interfere with power lines and will provide shade and nice fall color for many years to come.

Streams in the City

It's a hard (surface) life

Close your eyes and imagine a cool, running stream. What comes to mind? Green forests? Leaping trout? Warm breezes? If you're like most people, you probably don't envision skyscrapers, business suits, or city buses. Walden comes to mind, not Wal-Mart.

Streams are an important part of every landscape, no matter whether that landscape is a forest, a city, or a suburb. Often they lie low when people, buildings, and streets are around. But rest assured, streams are there, flowing under sidewalks, meandering past ball fields, and rippling by shopping centers.

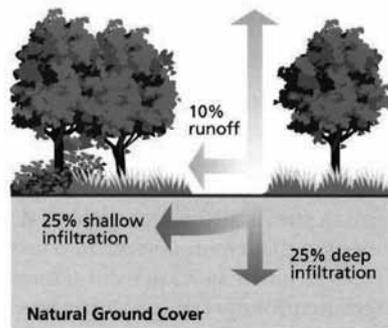
Streams, stream banks, and the low lands around them provide important habitat for animals and plants that share the urban/suburban landscape with us. They are also part of the network of channels that drains rain and melting snow off our streets, parks, and yards.

The Difference Between Streams in Forests and Streams in Urban Areas

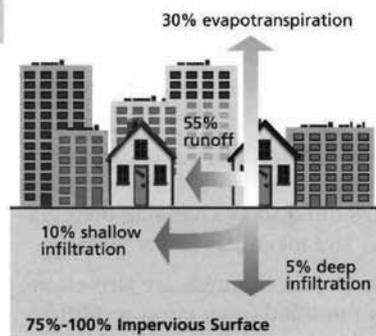
Streams in a town or suburb

are usually very different from streams in a forest or other natural area. Urban streams tend to carry more water at a faster speed after a storm than their country cousins. The reason for this has to do with what happens to rain after it hits the earth's surface. In forests, meadows, and other natural areas, about half the water that falls to earth soaks into or infiltrates the soil. Most of what remains on the ground and in the grass, tree leaves, and other plants gets returned to the atmosphere by evapotranspiration, a combination of evaporation and transpiration (loss of water vapor by plants). Only a small portion of rainfall (about 10 percent) travels across the land as runoff and drains into a stream, lake, or pond.

When people move into an area, they build houses, buildings, streets, and parking lots. When rain falls in urban areas it doesn't land on nice soft ground and plants. Instead it hits impervious surfaces like hard pavement and rooftops and has no chance to infiltrate the soil. Storm water has no choice but to flow downhill into street drains and ditches and then into streams.



In a natural landscape, about half the precipitation that falls soaks into the soil.



The land is more impervious in cities. Instead of soaking into the soil, most of the precipitation runs off hard surfaces into storm sewers, which empty into streams, lakes, and ponds.



Storm water in a city is usually collected in storm sewers and transported to a stream in large pipes. This photo shows water exiting a pipe into a stream.

The panels below illustrates how the fate of rainwater changes as cities grow.

Scientists use percent imperviousness to describe how much of a given area is covered by hard surfaces. Many cities have areas that are 75 to 95 percent impervious. This means that most of the rain that falls will not infiltrate into the soil and instead will flow off streets and parking lots. If all this extra water is diverted directly into a stream channel, several important changes will occur.

• More Flooding During Rainstorms

Streams that used to carry only a small portion of rain that falls are now asked to carry most of it. Natural channels easily become overwhelmed when a big storm hits. The extra water overflows the banks and floods the surrounding land.

• Less Flow During Dry Times

Where do you think the water that infiltrates into the ground goes? Some of it moves slowly underground and empties into stream channels days and even months after soaking into the soil. This

groundwater provides flowing water in the channel even during dry times. When impervious surfaces prevent infiltration of rainwater, there is less groundwater to move into the channel.

• Wider Channels with More Sediment in Them

Imagine rushing water moving down a channel after a rainstorm. Everything in its path that is too heavy to move gets carried away. This includes all the loose sand, sediment, and dirt on the banks of the stream. Overtime, pulses of rushing water erode the banks away and the channel gets wider and wider. Wider channels also allow large volumes of water to heat up from the sun, raising temperatures higher than what fish can tolerate.

• More Sand and Sediment on the Channel Bottom

City slicker streams have more sand and sediment at the bottom of their channels than their country cousins. Part of this material comes from eroding stream banks. A large fraction, however, is carried by runoff water washing the pavement and land clean. When runoff reaches the stream it drops its load of sediment on the bottom of the channel.



Learn about your urban streams at...

www.ga.usgs.gov/edu/urbaneffects.html

The USGS has developed a web site that shows how urbanization affects the local water system.

* Do you see any of the land use changes listed at the web site occurring in your neighborhood?

Let's Get Our Boots Muddy!



Shower sleuthing

It's raining!—a perfect time to observe impervious surfaces and runoff in action.

- * Walk around your yard and draw a map showing the location of impervious surfaces.
- * Draw arrows showing the path water takes off the property.
- * Follow the runoff and see how it leaves your neighborhood. (Does it run into a stream? A storm sewer?)

Career Corner



A **planner** develops long- and short-term land use plans for local governments to provide for growth and revitalization of urban, suburban, and rural communities. Planners promote the best use of a community's land and resources for residential, commercial, institutional, and recreational purposes.

A **landscape architect** designs residential areas, public parks, college campuses, shopping centers, golf courses, and other areas so that they are functional, beautiful, and compatible with the natural environment.

A **civil engineer** designs and supervises the construction of roads, buildings, airports, tunnels, dams, bridges, and water supply and sewage systems.

Stop Pointless Personal Pollution!

How everyday chores can harm your streams and lakes

It's a beautiful Saturday—a perfect day to make some extra spending money washing cars for family and neighbors, gassing up and oiling the lawn mower, laying down some fertilizer on those yellow patches in the yard, walking the dog, and spraying your mom's rosebushes for pesky bugs. Work hard and maybe you can make enough money to spring for movie tickets for you and your date.

The health of your nearby stream is probably one of the last things on your mind as you tackle your tasks. But guess what! Each of your jobs could harm a nearby stream, lake, or wetland. How? Well, consider....

Washing Cars

Many cleaning products contain phosphates and other chemicals that can make fish and other aquatic life sick. Using a hose to wash off suds creates a stream of wastewater that can travel down your driveway, into the street, and down a storm drain. No prob? Well, what do you think is at the other end of your storm drain? Usually a stream!

You can help protect streams when you wash your car if you:

- Use a bucket instead of a hose to save water and limit flow.
- Wash your car in sections and rinse it quickly using the high pressure flow on an adjustable hose nozzle.
- Use biodegradable soaps.

• Park your car over gravel or your lawn so wastewater doesn't flow into the street.

Working with Motors

Motors must be maintained if you want them to work properly. Oil,

gasoline, brake fluid, degreasers, and antifreeze are a few of the products you need. All of these products contain chemicals that can harm aquatic life if they get into a stream, lake, or wetland. One gallon of used oil can ruin a million gallons of fresh water—a year's supply for 50 people.

If you accidentally spill these products on the ground when you're working, clean them up quickly. If you don't, the next rainstorm will pick them up and carry them to the nearest stream. Some chemicals are acutely toxic and can cause immediate harm or death to insects, fish, and animals within 96 hours or less (for example, antifreeze, which is toxic to pets, has a sweet taste that cats and dogs love). Others are chronically toxic and cause harm over time. You can help prevent hazardous substances from getting into natural waterways if you:

- Use the product only when necessary and use only the amount needed. When it comes to hazardous chemicals, more is not better.
- Clean up any spills immediately. (Wear protective clothing and gloves.)

• Never flush chemicals down the toilet or pour them onto the ground or into a storm drain.

• Dispose of used oil and other hazardous products in a safe manner. Participate in collection programs or take products to collection centers for disposal.

Fertilizing the Lawn

Green lawns need lots of fertilizer, right? Wrong! Too much fertilizer applied at the wrong time can be very harmful to grass. It can cause disease, weeds, and poor root growth and make your

lawn less able to withstand periods of heavy rain or dry weather.

In addition, the same rains that pick up oil, gas, and other hazardous chemicals can also pick up excess fertilizer lying around and carry it to a lake or stream. Instead of making grass grow in your front yard, this fertilizer can make algae and weeds grow in the water.

You can have a nice-looking lawn and still keep streams and ponds healthy if you:

- Use native grasses that do not have high fertilizer requirements.
- Test your soil to find out exactly what nutrients your lawn needs.
- Apply fertilizer only when it is needed, during the right season, and in proper amounts.

• Do not leave fertilizer on driveways and sidewalks where it can be picked up and washed away by runoff from the next storm.

• Do not fertilize if a heavy storm is predicted.

Walking the Dog

Don't be embarrassed to say it—pet poop is potential pollution. Pet feces contain a lot of bacteria that can contaminate streams, lakes, and ponds. One study found that a single gram of dog feces contains 23 million fecal coliform bacteria. In a densely populated watershed in Arlington, Virginia (Four Mile Run), scientists estimate that dogs deposit more than 5,000 pounds of poop each day. You can help reduce the amount of pet waste entering local streams if you:

- Pick up after your pet and throw the poop in the trash can.

• Ask your town to set up pet wastestations that provide dog walkers with free plastic bags for picking up poop.

Controlling Insect Pests

Pests are a pain, but getting rid of them can be a greater pain if you do it wrong. Using harsh pesticides can be harmful for people and the environment. According to the Federal Centers for Disease Control, 82 percent of Americans already have the widely used insecticide Dursban in their bodies.

A technique known as integrated pest management is usually the best approach to controlling pests and protecting water. (www.epa.gov/pesticides/controlling). Chemical insecticides are used very sparingly, if at all. The focus is on early identification of pests and natural controls such as introducing predators to feed on the pests and planting plants that are naturally resistant to pests.

You can reduce the use of pesticides at your house if you:

- Learn about integrated pest management and practice it.

Do you know . . .

The difference between a storm drain and a sewer? Storm drains collect water from outside our homes and businesses and carry it, untreated, directly to streams and rivers. Sewers collect water from inside homes and businesses and carry it to treatment plants, where it is cleaned before it reaches streams and rivers. So remember, only rain should go into storm drains, not trash, oil, or other pollutants.



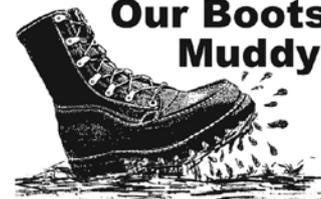
Learn what you can do to prevent pollution in your watershed

<http://water.epa.gov/polwaste/nps/whatudo.cfm>

EPA has developed a web site on how you can help prevent pollution in your watershed. Check out the information on:

- * Landscaping and gardening
- * Maintaining septic tanks
- * Choosing household chemicals

Let's Get Our Boots Muddy!



Storm Drain Stenciling

Most people don't know that storm drains collect storm water runoff and diverts it directly to a stream with any treatment. Stenciling the top of a storm drain inlet with the name of the waterbody the runoff travels to helps remind people that whatever flows into the drain will end up in the stream.

See <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=15> to learn how to organize a stenciling project.

Career Corner



A *chemist* researches and develops chemicals and consumer products that are safe for the public and the environment.

An *environmental consultant* provides technical support for governments, private industry, or not-for-profit organizations for developing solutions to environmental problems.