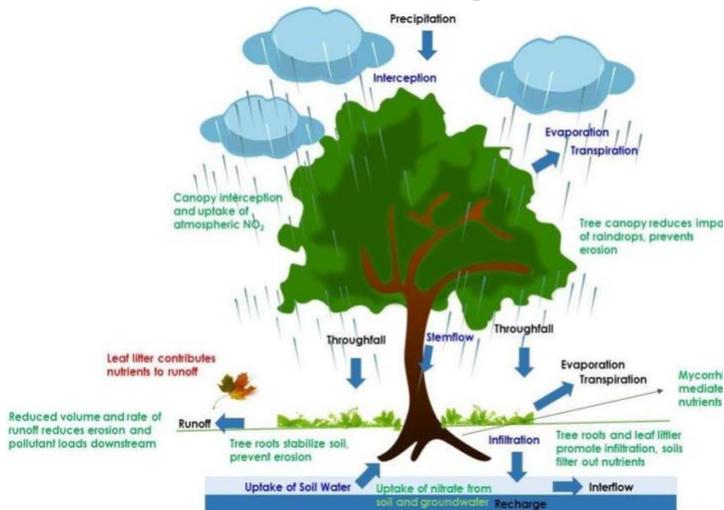


## OVP The Role of Trees in Controlling Storm Water



amounts of chemicals, including metals, organic compounds, fuels, and solvents from the soil (US EPA 2013). Inside the tree, pollutants may be transformed into less harmful substances, used as nutrients, or stored in roots, stems, and leaves.

### Runoff

(source: Urban and Community Forestry, Vermont Dept. of Forests, Parks & Rec. / Stormwater Management Benefits of Trees / March 11, 2014 )

Trees provide us with a host of wildlife and habitat benefits, energy savings, social and health benefits, and economic benefits. Trees also act as natural reservoirs by intercepting and storing rainfall, which can reduce runoff volume and mitigate its effects...

### TREE PROCESSES THAT AFFECT STORMWATER

**RUNOFF:** Three primary processes—interception, transpiration, and infiltration—can reduce the amount of rain falling on trees that becomes stormwater runoff.

**Interception** occurs first, when precipitation collects on leaves, branches, and trunks and evaporates or is absorbed. This process reduces the amount of water reaching the ground, delaying the onset and reducing the volume of peak flows (U.S. EPA 2013).

**Transpiration** is the transfer of water from the soil through the tree and its eventual release in a gaseous form through microscopic pores in the leaves and stems (Herrera Environmental Consultants 2008).

**Infiltration** is the movement of surface water through the soil. Tree roots, combined with the organic material that typically builds on the soil at the base of trees, promote the infiltration of runoff through shallow subsurface zones, reducing both the rate and volume of stormwater runoff (U.S. EPA 2013).

**Pollutant removal** is another important function performed both by trees and by the soils they grow in. Along with water, trees take up nutrients and trace

## OVP HOW SHOULD WE MANAGE STORMWATER?

<https://www.americanrivers.org/threats-solutions/clean-water/stormwater-runoff/>

Traditionally, our water infrastructure— such as storm drains and culverts — has treated precipitation as something to dispose of rather than something to protect. This infrastructure channels rainfall and snowmelt into storm drains and pipes, and dumps it into receiving waters, often far from its place of origin. The consequences are the loss of groundwater recharge, reduced base flows in streams, increased flooding, and lower water quality.

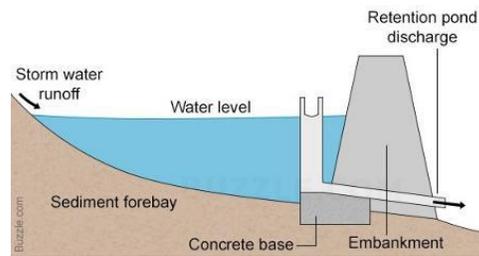
Instead of channeling stormwater into pipes and drains, a more natural method of water management has benefits for the environment and economy.

**Natural stormwater management** refers to management approaches that accomplish one of three things:

- Use soil and vegetation in a constructed technique, such as rain gardens or green roofs, to mimic natural hydrologic processes like percolation through soil and plant uptake and transpiration.
- Preserve natural features, such as floodplains with a natural vegetation buffer along streams that can slow, filter, and store polluted runoff.
- Minimize or disconnect impervious surfaces (such as pavement), using methods such as rain barrels, narrower streets and permeable paving.

**Human made structures:** The basins are important for storing and slowing stormwater runoff from nearby areas, especially areas with asphalt or concrete development. Stormwater runoff flows much faster from these surfaces than naturally occurring areas and needs to be diverted to ensure the runoff occurs at the desired rate. The amount of cleaning and treatment of the water is limited. Dry basins, or detention basins, only control flood flows. *A retention pond is designed to hold a permanent pool of water that fluctuates in response to precipitation and runoff. A retention pond can also provide some water quality benefits by reducing pollutants and sediments.*

Storm Water Retention Pond and Control Structure



### Advantages

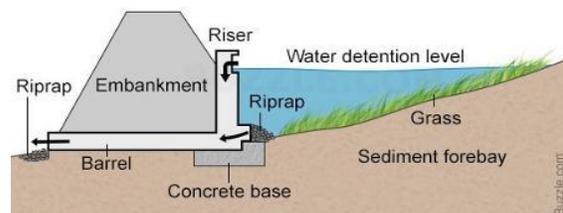
- *Retention ponds* are simple if space is provided.
- Collects and improves water quality.
- Naturally processes water without additional equipment.
- Improved stormwater collection and flood control.
- New habitats are created.
- Can be used for recreational purposes.

### Disadvantages

- Can be a drowning hazard.
- Large areas of land are needed.
- Negative water quality impacts if not properly designed.

**A detention pond**—or dry pond—is an area where excess stormwater is stored or held temporarily and then slowly drains when water levels in the receiving channel recede.

Storm Water Detention Pond and Control Structure



### Advantages

- Surrounding areas have vegetative buffer that can withstand dry or wet conditions.
- May cost less to implement than a wet retention pond because the size is generally smaller.

### Disadvantages

- Requires a large amount of space.
- Does not improve water quality.
- Can become a mosquito breeding ground.
- Can detract from property value, whereas retention ponds may add value

## OVP Dog Park

### Poolution

**What's the problem?** When you fail to clean up after your pet, the poop left on sidewalks and lawns is both unpleasant and a nuisance. But it can become an even bigger problem when it rains and is carried by stormwater into nearby rivers, lakes and streams. It can create a health hazard for people and can "doo" a lot of damage to the environment: **A single gram of pet waste contains an average of 23 million fecal coliform bacteria, some of which cause diseases in humans.**

Waters that contain high levels of bacteria and other pathogens from animal waste are unfit for human contact. As pet waste decays, it uses up oxygen that fish and aquatic life need. Pet waste contains nutrients that can cause excessive algae growth in a river or lake, upsetting the natural balance.

**Did you know?** According to the American Veterinarian Medical Association, there are 72 million dogs in the United States.\* **The average dog produces three quarters of a pound of waste a day. That means our pets generate 10 million tons of dog poop a year!**

#### Handy Tips

- Put bags in the car or tie them to the leash, so you'll be prepared when you travel with your pet.
- Place bags by the door so you don't forget them. You can recycle plastic grocery bags for this purpose too!
- Talk to your family and friends about stormwater pollution and picking up after their pets!
- Make use of "pet waste stations" in your neighborhood and parks.



## **Streambank Stabilization Demonstration Site Project; HARRIS SHOALS PARK**

From 2019-2020, a project to stabilize this segment of Calls Creek's streambank occurred. Due to stormwater runoff damage much of the creek's banks have been highly eroded and are very steep but this segment, due to its gentler slope, made a relatively low-cost stabilization feasible. After removal of invasive plant species and identification of native species that should remain, more native plants were added to the bank to increase vegetation in the riparian zone. Benefits of this stabilization effort include:

- Enhanced water quality by reducing streambank erosion
- Allowing native plants to flourish when invasive plants are removed. Invasive plants are non-native to the ecosystem under consideration and may cause economic or environmental harm or harm to human health.
- Restoring wildlife habitat along stream banks and improving in-stream habitat. Improvements include increasing food for pollinators and other native wildlife.
- Prevents loss of land and soil, increases property value and decreases local and downstream flooding.
- Adds beauty to the overall landscape.

### **BEFORE STABILIZATION PICTURE:**



**What differences do you see now?**

### **Effects of stormwater runoff**

Stormwater is rainwater that does not soak into the soil but runs off the land and enters our wetlands, lakes, ponds, streams and rivers where it can be stored and replenish flow. But, if polluted, stormwater can degrade these resources. The presence of hard or impervious surface (not allowing fluids to pass through) prevents rainwater from naturally filtering through the soil slowly. Impervious surfaces (roads, parking lots, rooftops, compacted soil) increase the amount of water and how fast water enters streams, which increases

erosion. Stormwater that drains impervious surfaces can deposit trash, oils, pesticides, fertilizers, detergents and animal waste from livestock, wildlife and pets. Sewage from failing septic systems or sewer lines carries potentially harmful bacteria and parasites into the water as well. Excess sediment due to erosion fills in the stream bed, destroys aquatic habitats and clogs the gills of fish and other aquatic animals as well as degrades water quality. ***Stormwater that enters a storm drain is not treated before it enters a creek, stream or river.***

### **What is a watershed?**

A watershed is the land from which water, sediment, and dissolved materials drain to a common point along a stream, wetland, lake or river. Calls Creek is a tributary to the Oconee River. Each creek in the Oconee River Watershed has its own watershed too so each creek can be impacted by polluted stormwater and contribute that pollution to downstream rivers.

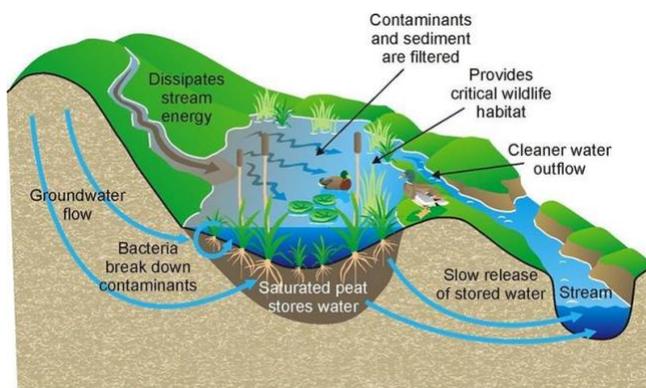
**Monitoring Water Quality and how you can help:** Local citizen volunteers with the Upper Oconee Watershed Network (UOWN) and its local committee Oconeewaters provide water quality monitoring at numerous sites in Oconee County and Athens Clarke County. You can volunteer to help by contacting UOWN at UOWN.org. You can learn how you can adopt a stream in your community by contacting the Georgia Adopt-A-Stream Program or volunteer to help monitor already established Oconeewaters sites locally on Barber and Calls Creek.

## The Role of Storm water runoff in polluting wetlands; HARRIS SHOALS PARK

Wetlands are indeed the vital link between water and land. "Wetlands" is the collective term for marshes, swamps, bogs, and similar areas found in generally flat vegetated areas, in depressions in the landscape, and between dry land and water along the edges of streams, rivers, lakes, and coastlines. ... Wetlands help regulate water levels within watersheds; improve water quality; reduce flood and storm damages; provide important fish and wildlife habitat; and support hunting, fishing, and other recreational activities. Wetlands are natural wonderlands of great value.

**Water Quality and Hydrology Wetlands** have important filtering capabilities for intercepting surface water runoff from higher dry land before the runoff reaches open water. As the runoff water passes through, the wetlands retain excess nutrients and some pollutants, and reduce sediment that would clog waterways and affect fish and amphibian egg development. In performing this filtering function, wetlands save us a great deal of money.

**Flood Protection Wetlands** function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees, root mats, and other wetland vegetation also slow the speed of flood waters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion. Wetlands within and downstream of urban areas are particularly valuable, counteracting the greatly increased rate and volume of surface water runoff from pavement and buildings.



**What Is Adversely Affecting Our Wetlands?** Human activities cause wetland degradation and loss by changing water quality, quantity, and flow rates; increasing pollutant inputs; and changing species

composition as a result of disturbance and the introduction of nonnative species. Common human activities that cause degradation include the following:

### Hydrologic Alterations-

- Deposition of fill material for development.
- Drainage for development, farming, and mosquito control.
- Dredging and stream channelization for navigation, development, and flood control.
- Diking and damming to form ponds and lakes.
- Diversion of flow to or from wetlands.
- Addition of impervious surfaces in the watershed, thereby increasing water and pollutant runoff into wetlands

Although wetlands are capable of absorbing pollutants from the surface water, there is a limit to their capacity to do so. The primary pollutants causing wet-land degradation are sediment, fertilizer, human sewage, animal waste, road salts, pesticides, heavy metals.

Pollutants can originate from many sources, including:

- Runoff from urban, agricultural, silvicultural, and mining areas.
- Air pollution from cars, factories, and power plants.
- Old landfills and dumps that leak toxic substances.
- Marinas, where boats increase turbidity and release pollutants.
- Vegetation Damage.

### How Can I Make a Difference?

- Get involved — find out where wetlands exist near your home, try to learn more about them, and support educational efforts.
- Support wetlands and watershed protection initiatives by public agencies and private organizations.
- Purchase federal duck stamps from your local post office to support wetland acquisition.
- Participate in the Clean Water Act Section 404 program and state regulatory programs by reviewing public notices and, in appropriate cases, commenting on permit applications.
- Encourage neighbors, developers, and state and local governments to protect the function and value of wetlands in your watershed.

- Rather than draining or filling wetlands, seek compatible uses involving minimal wetland alteration, such as waterfowl production, fur harvest, hay and forage, wild rice production, hunting and trapping leases, and selective timber harvest.
- Select upland rather than wetlands sites for development projects and avoid wetland alteration or degradation during project construction.
- Maintain wetlands and adjacent buffer strips as open space.
- Learn more about wetland restoration activities in your area; seek and support opportunities to restore degraded wetlands.
- In Georgia, participate in DNR's "Adopt-A-Stream" program; Wetlands Monitoring Workshop;  
<https://adoptastream.georgia.gov/>