

## Stormwater Management

### *Recommendations for reducing impacts to aquatic species*

Stormwater runoff occurs when rainfall flows over the ground. Hard surfaces such as driveways, streets, and roofs prevent rain from soaking into the ground.

#### Is stormwater a problem?

**Yes.** Stormwater runoff picks up debris, chemicals, dirt, and other pollutants from hard (impervious) surfaces and washes them into storm drains. Anything that enters a storm drain flows - often untreated - into the rivers and streams that we use for swimming and drinking water. In Georgia, stormwater runoff is identified as the cause of impairment for 98% of all impaired waters.

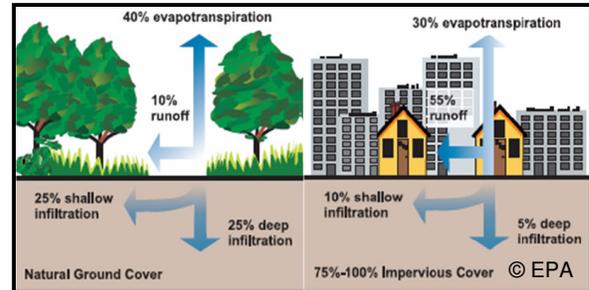
Stormwater runoff can have many adverse effects on animals, plants, and people:



- Sediment can cloud the water, destroy aquatic habitat, and increase water treatment costs.
- Excess nutrients, such as lawn fertilizers, can cause algal blooms.
- Bacteria and other disease-causing organisms can wash into water bodies and create health hazards.
- Hazardous chemicals such as oil, household pesticides, auto fluids, and paint solvents can poison aquatic life.

#### Effects of Development on the Water Cycle

Naturally, almost half of rainfall infiltrates into the ground. Only around 10% of all rainfall is converted to surface runoff.



Development affects this balance by replacing trees with impervious surfaces, reducing the amount of infiltration and increasing the amount of runoff. As presented above, this can impact the water cycle dramatically.

#### Stormwater Recommendations

Our recommendations are based on the Georgia Stormwater Management Manual and require that development sites meet five specific performance criteria:

##### Water Quality Protection

- All stormwater runoff must be adequately treated before discharged
- The first 1.2" of rainfall must be treated and 80% of the suspended solids removed

##### Stream Channel Protection

- The 1-yr, 24-hr storm event must be detained for 24 hours

##### Overbank Flooding Protection

- The post-development peak discharge rate of the 25-year, 24-hour storm can not exceed natural conditions

##### Extreme Flooding Protection

- The 100-yr, 24-hour storm event must be controlled and safely conveyed so that flooding is not exacerbated.

##### Aquatic Species Protection

- Volumes of stormwater runoff are limited to those that would occur under natural conditions for the two-year storm event.



# U.S. Fish & Wildlife Service, Georgia Ecological Services

## Do these recommendations apply to all development?

The Georgia Field Office recommends any development requiring a General Construction Permit under the State of Georgia's 'National Pollutant Discharge Elimination System' (NPDES) program follow these stormwater management standards.

As part of the NPDES program, all of the Atlanta Metropolitan Counties are already required to meet the first four performance standards (water quality, stream channel protection, overbank flood protection, and extreme flood protection). Although these four standards are generally fine for protecting human health, sensitive aquatic species need more protection.



The Etowah darter (*Etheostoma etowahae*) is extremely sensitive to hydrologic alteration. Photo by Candace Stoughton.

The fifth performance standard (Aquatic Species Protection) is a volume control standard, which limits the volume of surface runoff that can leave the site during small storms. This volume control standard or 'Runoff Limit' will help new development closely mimic the natural hydrology of a site providing better pollutant removal, decreasing runoff volumes, and returning rainfall to groundwater where it can maintain stream flows during droughts.

## What methods can be used to meet these standards?

There are many different ways to achieve protective stormwater management standards. Depending on the site and type of development being constructed, it is best to use a combination of both structural and non-structural practices. Structural control practices detain and/or infiltrate excess stormwater generated by land-use changes. They are constructed facilities that require maintenance to continue functioning properly. Examples of structural controls include:

- Detention Ponds
- Infiltration Basins
- Rain Gardens
- Infiltration Trenches
- Dry Wells
- Grass Swales
- Filter Strips
- Porous Pavements
- Vegetated Rooftops
- Capture Re-use Systems



Contemporary structural controls for reducing and infiltrating excess stormwater generated by development (Wetpond, grassed swales, vegetated rooftop and raingarden).

Additionally, developers can use non-structural controls to minimize impervious cover and stormwater runoff. There are many examples of these better site design practices currently in use all around Georgia.



The left picture shows a traditional development with straight streets and square lots. The right picture shows contemporary designs that protect ecologically important habitats and provide green space for the community.

Details of these methods may be found in the Georgia Stormwater Management Manual (GSMM) and the draft Runoff Limits Manual. The Runoff Limits Manual is a document written as a supplement to the GSMM specifically to protect federally endangered fish in the Etowah Watershed. It specifically describes management solutions to volume control performance standard number five.

For more information, please contact staff Hydrologist, Eric Prowell at (706) 613-9493, [eric\\_prowell@fws.gov](mailto:eric_prowell@fws.gov) or visit our website: [www.fws.gov/athens/](http://www.fws.gov/athens/)