

## “Sum of the Parts” Storm Water Extension

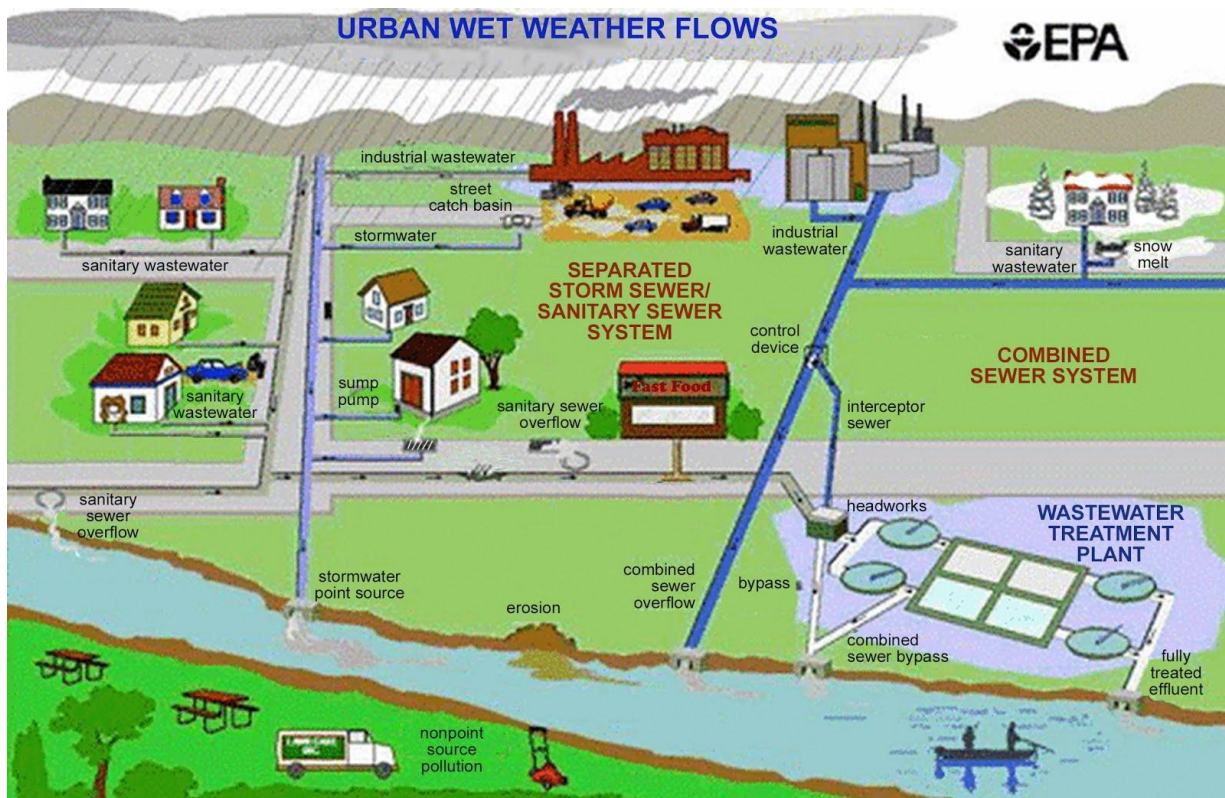
**Purpose:** To provide a storm water application for Project WET’s “Sum of the Parts” activity

**Submitted by:** Project WET Products and Publications Team, 2014

**Background:** Nonpoint source pollution is caused by runoff from storms as it passes over areas in which land use has been altered. In most areas of the country, increased urbanization often leads to an increase in the amount of impervious surface in a watershed. In residential or agricultural settings, nonpoint source pollution may be the result of pollutants contained in the runoff from lawns or agricultural fields that have been treated with a variety of chemicals. Through individual and group action, the amount of nonpoint source pollution entering a watershed can be reduced.

### Where does storm water go?

Cities want to move storm water away from streets, homes, and businesses as quickly as possible. They do this through a series of drains and pipes, usually under the streets. Since storm sewer systems are generally hidden from our view, you may not know how it is handled in your area. This graphic from the US Environmental Protection Agency shows two common storm sewer systems. Your community probably has one of these or a combination of the two:



One system is called a **Separated Storm Sewer/Sanitary Sewer System** (see the left side of the EPA graphic). In this system, there are two sets of pipes. One set carries stormwater and nonpoint source pollution from the storm drains and releases it directly into the nearest river or stream without treatment. The other set of pipes carries residential and industrial wastewater to the Wastewater Treatment Plant before it is released into the river.

The second system is called the **Combined Sewer System**, which combines sanitary sewer, industrial wastewater and storm water in the same pipes. Under normal circumstances, this wastewater mixture is sent to the Wastewater Treatment Plant before it is released into the river. This would seem like it would work well but during heavy rainfalls and storm events, when the treatment plant fills up, the excess water is channeled into the Combined Sewer Overflow (CSO) sending untreated human and industrial waste and more flowing into the river with minimal treatment! This type of sewer system was built from the late 1800s to mid-1900s in many American cities and has largely been discontinued now. Some cities, such as Atlanta, still have CSOs and have improved their systems by adding storage tanks and tunnels to capture the overflow and treating it before it is returned to the river.

**Objectives:** *no change*

**Storm Water Framework:**

*Urbanized Watersheds and Water Quality Impacts.*

People use and alter watersheds. Learners explore how storm water is produced, how it's handled (or not) by infrastructure, and what the impacts of storm water are on water quality of receiving bodies.

*Storm Water Management*

Learners discover how to prevent and remediate storm water impacts to lakes and streams where the storm water is discharged.

**Materials:**

*Cardboard for street or brown paper cut in strips*

*Markers to create the road with storm drains*

*Colored beads to represent the various types of nonpoint source pollution that come off of each property and get sent downstream*

*Container to collect beads.*

**Extension procedure:** Participants will create their “property” along a street that has drainage for runoff already in place (storm drains, effluent pipe(s) and a stream) instead of along a river. Each participant will discuss what types of nonpoint source pollution may come from their property as the runoff drains from their site. The participants should identify the hard surfaces that affect runoff. This would include roof tops, patios, driveways, and sidewalks they may have added to their properties. After each participant has discussed the type of nonpoint source pollution coming from their property, they will determine what BMP's should be used to manage their property to protect their water resources. As in the original activity, they will then make the alterations to their property addressing these impermeable surfaces through design or redesign.

**STEM Education Connections:**

Statistical analysis: State government websites ([www.GeorgiaAdoptAStream.org](http://www.GeorgiaAdoptAStream.org) )

EPA Water Quality Portal (<http://www.waterqualitydata.us/> )

Engineering: Explore Stormwater Activities on <http://www.teachengineering.org>