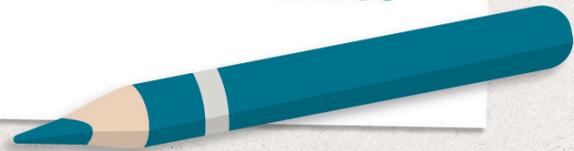


PRINTABLE STUDY GUIDE

WE ALL LIVE IN A WATERSHED

2026 Conservation Poster Contest



Learn more &
register online:

[WAKE.GOV/POSTERCONTEST](https://wake.gov/postercontest)

Registration deadline:
Nov. 3, 2025

Poster submission deadline:
Dec. 3, 2025

This study guide includes:

A notetaking sheet → to help you take notes on the main ideas you want to show in your poster

Core concepts → what you need to know to answer the research questions for your poster. No need to cover all of it in your poster – just what you think are the most important things and what’s most interesting to you!

A glossary → to help you understand new terms and definitions about conservation

Notetaking Sheet

What is a watershed, and what are its different parts?



Why are healthy watersheds important?



What are the main threats to our local watersheds?



How do we keep watersheds healthy?



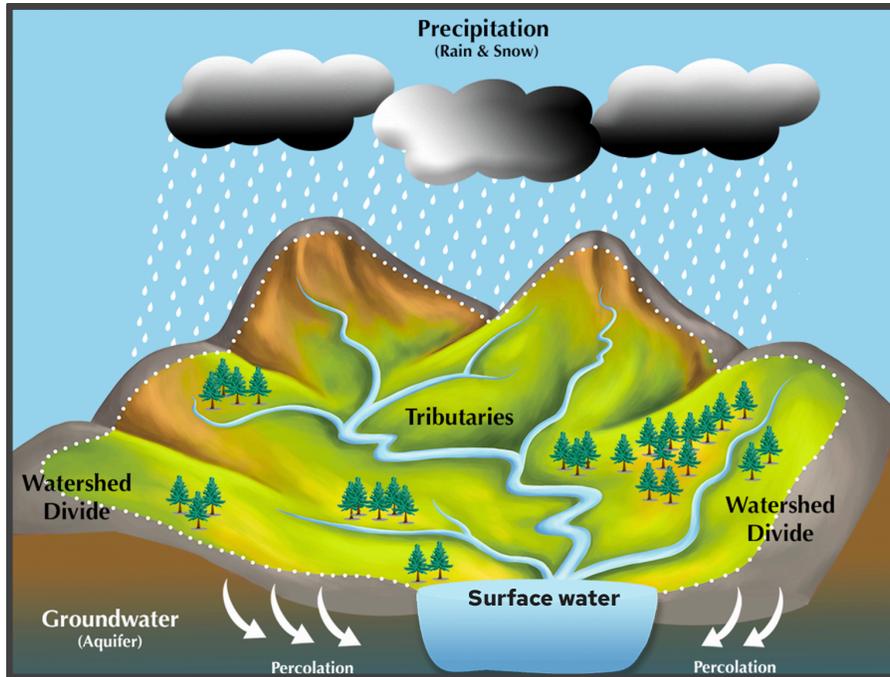
Fun facts



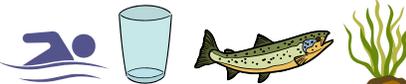
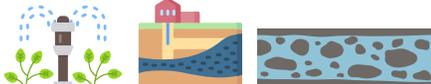
What is a watershed?

(hint: it is NOT a shed with water in it)

A **watershed** is an area that drains all the rain that falls in that area into the same location – this could be a river, a lake, the ocean, a wetland, or something else! When rain falls, it either runs downhill and picks up trash and dirt as it goes (this kind of water is called **surface runoff**), or it soaks into the ground and eventually becomes part of the groundwater. Surface water collects in small streams, which combine into larger ones, which form rivers which flow to the ocean. These smaller streams are called **tributaries**, and even one polluted tributary can pollute the rest of the watershed downstream! Study the diagram below to see the different parts of a watershed.

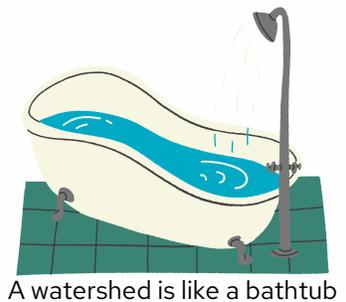


A watershed is made up of two main parts: **surface water** and **groundwater**.

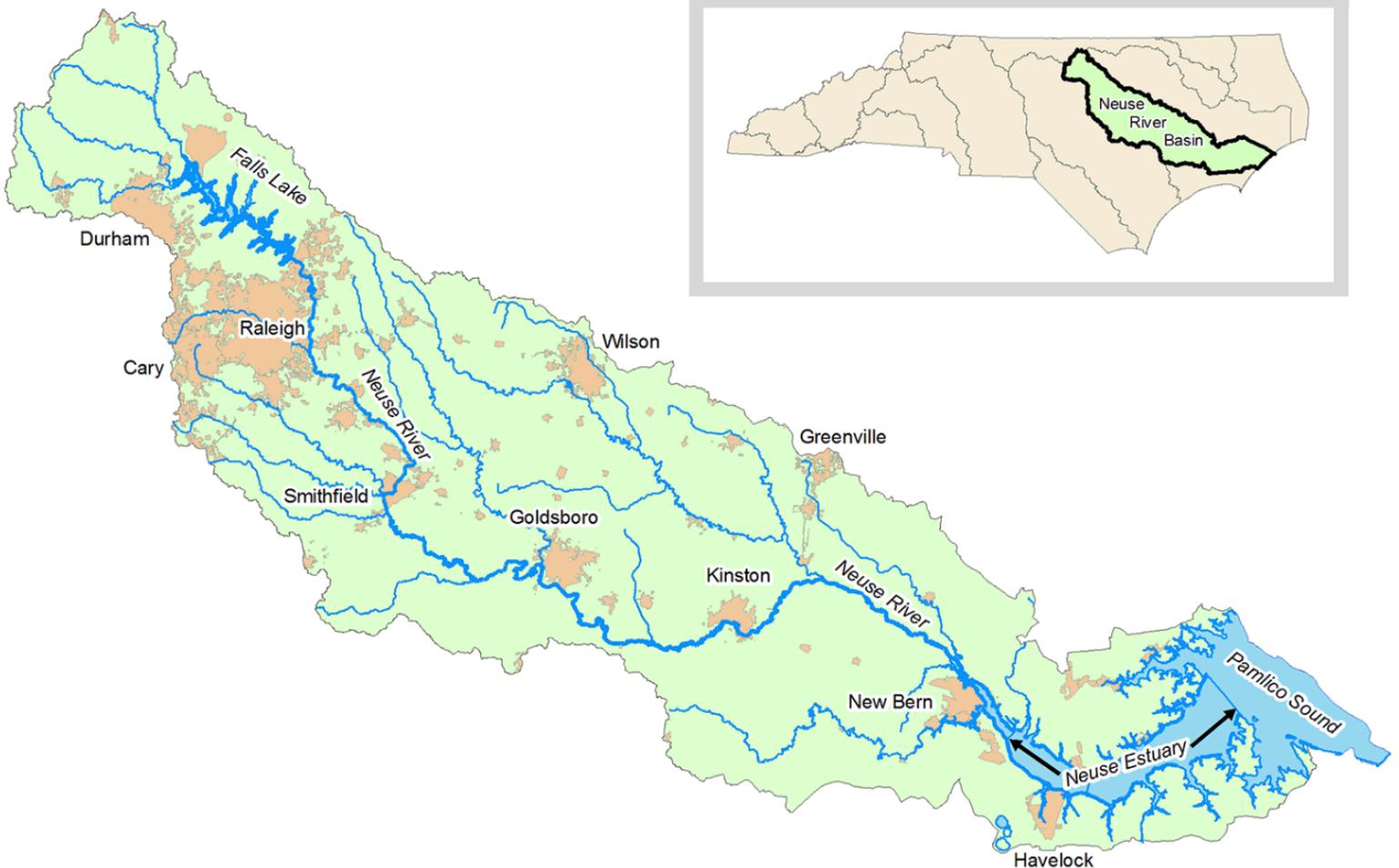
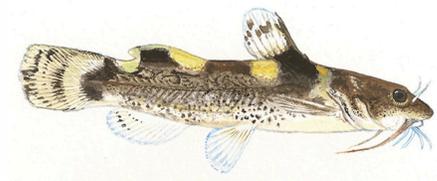
SURFACE WATER 	GROUNDWATER 
<p>Surface water includes:</p> <ul style="list-style-type: none">• streams & rivers• ponds & lakes• wetlands & estuaries• the ocean <p>Most people in the United States get their drinking water from lakes and rivers, and we also use them for fun activities like fishing, kayaking, and swimming. These bodies of water are also home to many types of plants and animals that need clean water to live!</p>	<p>Underground water flows slowly through small spaces in the soil and rocks. Aquifers are areas underground with lots of water that we can drill wells into. Many people get their drinking water from wells! This water is also used to irrigate farm fields to make our food.</p> <p>Groundwater comes from surface water that seeps into the soil, a process called percolation. Water also moves upward from groundwater to the surface, and adds water to rivers, lakes, and wetlands!</p>

River Basins

Watersheds come in all shapes and sizes. You could say that your bathtub is a watershed. All the water, dirt, and soap that falls into the tub will all go into the tub's drain! Any water that falls outside of the tub will go somewhere else, into a different drainage area. Watersheds are also called "**drainage basins**" – this is similar to the idea of a sink which are also called wash basins!



When all of the water in a watershed drains into a single large river, it is called a river basin. For example, the Neuse River Basin includes 22 counties and covers 6,235 miles. Many smaller rivers and creeks drain into the Neuse River, which leads to the ocean. Wake County, which includes the major city of Raleigh, is in the Neuse River Basin. This means that any pollution on the ground in Raleigh can wash away into the Neuse River during big storms. About 2.5 million people live in this river basin and rely on the water in this watershed to be clean and abundant! Many aquatic animals, like the Carolina Madtom, Neuse River Waterdog, and Tar Spiny mussel need clean water to live, and are important in their ecosystem!



 How many cities can you count on the map above? What types of pollution do you think get into the Neuse River from them?



We All Live in a Watershed

What is a watershed?

A watershed, also called a drainage basin, is an area of land from which all water drains to a common waterway, such as a river, a lake or the ocean.

As rainwater and melting snow run downhill, they carry soil, pollutants and other materials from the land into our rivers, lakes and bays.

Watersheds are important because they provide drinking water and water for recreation, irrigation and industrial activities. They also provide food and water for plants and animals.

Watersheds consist of surface water - lakes, streams, reservoirs and wetlands - and all the underlying groundwater.

A watershed can be large or small. Some watersheds drain a few city blocks while others drain a large geographic area. The Mississippi River Basin drains 31 states before emptying into the Gulf of Mexico!

We all live downstream and our everyday activities can affect downstream waters.

Check out EPA's How's My Waterway - watersgeo.epa.gov/mywaterway - to learn more about the condition of your local water body. Use a smart phone, tablet or computer to find out if your local stream or river is polluted and what's being done to help address the problems.

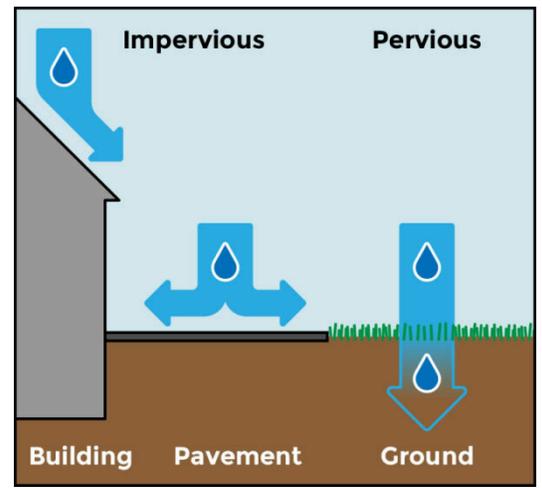
Watershed Threats

The health of a watershed is affected by two main things:

1. How much water is used (which affects water **quantity**)
2. Pollution from surface runoff (which affects water **quality**)

If we use up too much groundwater, we may run out, since it takes a long time for water to refill underground. If we dump toxic chemicals on the ground that seep into the groundwater, those chemicals stay there for a very long time and make it unsafe to use. Soil and rocks do a great job cleaning water as it flows through, but it takes many years to happen.

Soil and plants do a great job of slowing down water when it rains, and absorb water into the ground. But when we cover the soil with hard surfaces like roads, sidewalks, and buildings, the water can't go into the ground. Instead, it runs off surfaces. Hard surfaces that water can't move through are called **impervious surfaces**, and they create **stormwater runoff**, which is the water that you see draining off of roads, sidewalks, and roofs that often goes very fast. This fast water creates flooding which damages cars, houses, roads, and can hurt people. Stormwater runoff also rips soil away as it goes, causing **erosion** and **sediment pollution** in waterways. Sediment pollution is the worst type of water pollution in North Carolina, and causes many problems in aquatic habitats and drinking water supplies. Other types of pollution are also picked up, like dog poop, trash, bad bacteria, chemicals, fertilizers and pesticides from farm fields, and sediment (dirt) from construction sites and logging areas. Anything dumped on the ground can get into waterways during a big rainstorm and can pollute the groundwater, lakes, and rivers. So, what you dump in your yard can affect your drinking water, and also someone else's miles away later on!



What forms of pollution do you see in this picture, and how do you think they affect our drinking water and aquatic habitats?

Keeping Watersheds Healthy

What can we do to keep our watersheds healthy? There are many different strategies that water quality specialists have figured out work best for keeping watersheds healthy. These strategies are called “best management practices” (BMPs), and there are different ones for city areas and farm areas.

Farm BMPs:

Soil and Water Conservation Districts help farmers keep their soil healthy and stop water pollution, and there are many BMPs that help with this!

Four important farmland BMPs that protect watersheds are:

1. Cover crops
2. Grassed waterways
3. Filter strips
4. Livestock exclusion fencing



Cover Crops

A cover crop is a crop that is planted the fall after the summer crop is harvested, and keeps the field covered during the winter. This helps prevent erosion as plants slow down water, absorb it into their roots, and help water seep into the soil rather than eroding the soil. Cover crops are great at returning nutrients to the soil, which keeps the soil healthy!



Bare soil



Covered soil



Grassed Waterways

A grassed waterway is a pathway planted with grass that helps move water off of farm fields in a way that slows the water down and prevents erosion into waterways.



A grassed waterway between fields

Farm BMPs:

Livestock Exclusion Fencing

A fence that keeps cows, horses, goats, and other livestock animals out of waterways. This helps to stop erosion and pollution from the animals' feces, which can cause algae blooms and diseases that can harm wildlife and the livestock animals.



Filter Strips

Filter strips, also called **buffer strips**, are planted areas along the edges of ponds, lakes, and other waterways. They act as barriers to slow down the water coming from farm fields and remove sediment and pollutants from the water. Filter strips protect water quality and also provide habitat for wildlife!

One important type of filter strip is a **riparian buffer**, which is an area planted on the edges of rivers with thick vegetation of trees and shrubs.



Filter strip bordering a field



Riparian buffer near a farm

City BMPs:

Cities and towns (**urban areas**) have a lot of impervious surfaces where water can't reach the soil – it runs off of those surfaces instead, causing flooding, erosion, and the spread of pollution. While paved surfaces are helpful for our cars and for moving around easily, they're not great for water quality! But there are many things we can do in cities to help water slow down and get into the ground.



A few important BMPs that work well around cities are:

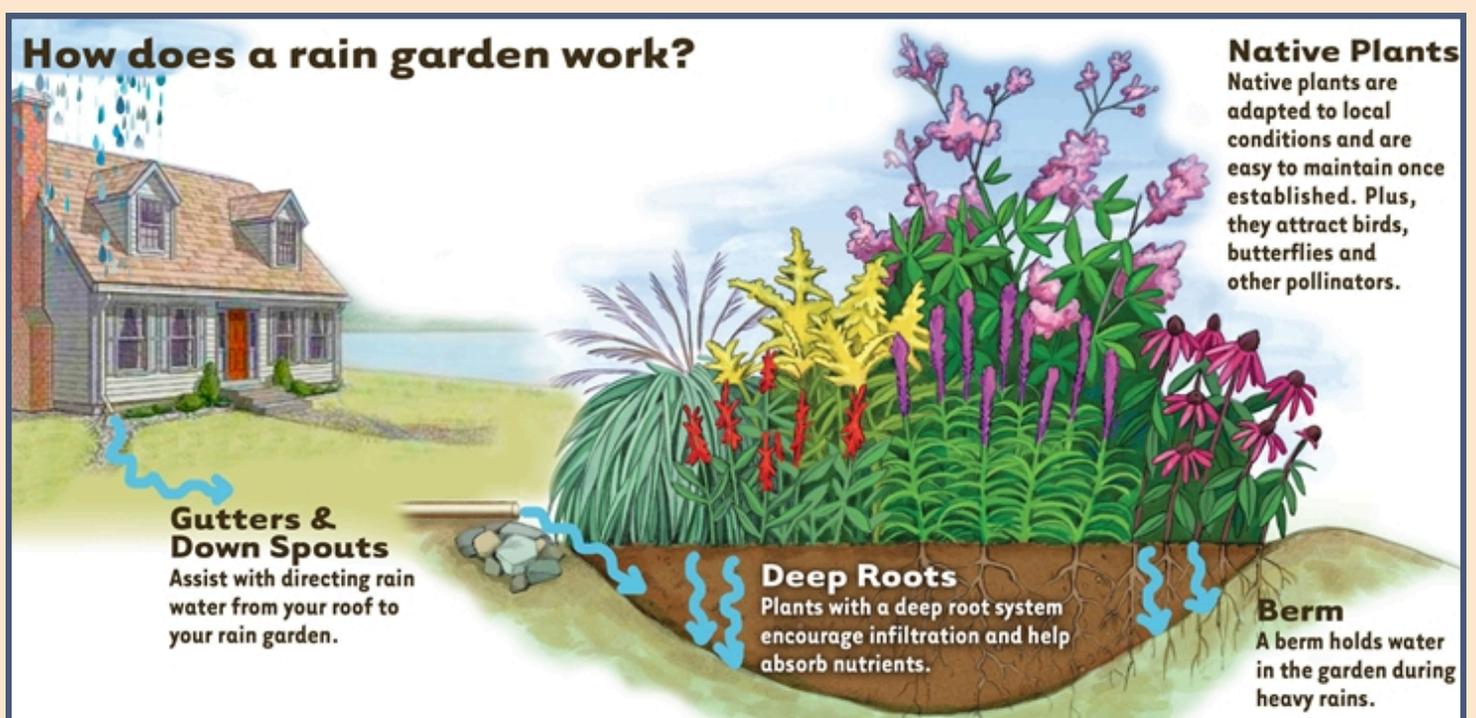
1. Rain gardens
2. Permeable pavement
3. Cisterns
4. Stormwater wetlands



Flooding in Raleigh after a large rain event

Rain Gardens

A rain garden is an area filled with native plants that is designed to slow water down and help absorb and clean the water, helping it to soak into the ground rather than running off the surface onto roads. Native plants work best, and they also provide important habitat to wildlife and pollinators! Rain gardens work well in cities as well as around our homes!



City BMPs:

Permeable Pavement

Most pavement does not allow any water to soak into it. The water then runs off, picks up pollution and speed, and then can cause flooding and water pollution problems. But, we can use pavement that DOES allow water to pass into the ground! It works by creating spaces between the pavement stones where water can flow. Sometimes grass is planted in these spaces as well, which also helps to slow down the water and soak it up!

Permeable means that water can pass through it. Permeable pavement does a great job slowing water down, letting it sink into the ground, and reducing runoff. This helps the water quality of our rivers, lakes, and drinking supplies a lot!



Stormwater Wetlands

Wetlands are areas that have water in them for most of the year, and are filled with plants that are incredibly good at slowing down, absorbing, and cleaning water. They also provide great habitat for wildlife! In city areas, it's helpful to build wetlands in certain spots where water tends to collect.

Stormwater wetlands are also called constructed wetlands, because they are built by people and aren't natural to the landscape. They're built specifically to catch runoff, slow it down, and filter it.



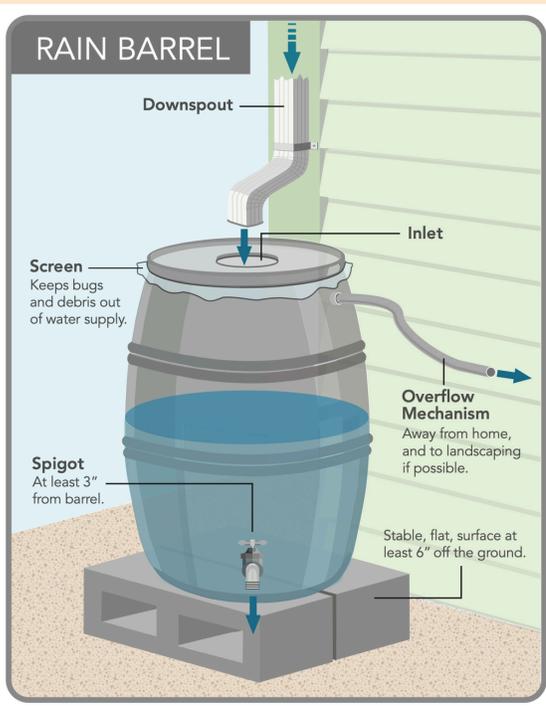
City BMPs:

Rain Barrels & Cisterns

A lot of rain falls on the roofs of buildings. As it does, it runs off the roof fast or flows through a gutter which drains the water onto the ground. But what if we could slow down this water, capture it, and then use it?

Rain barrels and cisterns are both containers that a gutter empties water from a roof into. Cisterns are larger and hold more water.

The water stored in rain barrels and cisterns can be used to water plants, flushing toilets, washing cars, and as a drinking source for livestock animals.



Important idea!

The way that you use water and what you leave on the ground *matters* and affects the water in the rest of the watershed and beyond!

Do Your Part to Protect Water Quality

Simple actions at home can reduce water pollution



Keep leaves and grass clippings out of streets and storm drains. Use them as mulch or compost in your garden.

Install a rain barrel to collect rain water. The rain water can later be used to water your plants and lawn.

Keep trash out of streets and storm drains. Make sure trash cans have tight-fitting lids.

Make sure sprinklers are watering your lawn – not the street or sidewalk.

Never dump household waste outside or in a storm drain. If you no longer need a product, take it to a local household hazardous waste collection program.

Always pick up after your pet.

Use fertilizer and pesticide sparingly. Read the label and wait for dry weather to apply.

Plant native trees and shrubs. Their roots help absorb and filter pollutants from rain water.

Find out more: NEEFusa.org

Glossary

Impress the judges with your new vocabulary!

Conservation:

The wise use and management of natural resources (soil, water, air, plants, and animals) to fulfill human needs now and in the future.

Soil Conservation:

To protect soil from erosion; to keep it productive and out of waterways, to use and manage soil wisely now to ensure a rich soil resource for future generations.

Water Conservation:

To protect water quality by keeping water clean from sediment, chemicals, oil and animal wastes; to protect water quantity by using smaller amounts; to use and manage water wisely now to ensure good water quality for future generations.

Best Management Practices (BMPs):

Agricultural practices that are suitable for reducing or minimizing the amount of water pollution generated by non-point sources; an engineered structure or management activity, or combination of these, that eliminates or reduces adverse environmental effects of pollutants. Often called BMPs.