Water Watch Volunteer Manual

Monitoring and protecting the Neuse and Tar-Pamlico Rivers

What is a Water Watcher?

Water Watchers are community scientists who help keep an eye on our waterways by collecting basic observational data about river health.

Water Watchers are trained in the field to collect scientific observations about water quality, flooding, erosion, habitat, and more, that can help inform our understanding of the condition of our waterways and help flag any pollution concerns. With the help of volunteers with our Water Watch program, we can monitor and protect more stream miles in our watersheds!

What Brought You Here?

Did you sign up because you wanted to help Sound Rivers keep more eyes and ears on your waterways? Maybe you were looking for a hands-on way to learn about your local rivers and streams, and help protect them?

You've come to the right place! With what you will learn during training and inside this manual, you will discover that reporting water quality problems helps hold polluters accountable. The more people available who can recognize threats and report them, the more pressure the community puts on bad actors polluting your waterways!

Together, we can work to protect water quality!

What Do Water Watchers Do?

Water Watchers do Water Quality Assessments.

Water Watchers commit to participating in one training in water quality monitoring procedures. After their training is complete, volunteers commit to returning to a site of their choice (approved by Sound Rivers) at least once every month to collect observations & record field data.

Water Watchers Report Their Data

Once observations are made, data is submitted to our Sound Rivers staff so that we can analyze trends and share results with regulators and the public. Sharing your data allows agencies to move forward, enforcing policy, further helping your fellow Water Watchers and the Riverkeepers keep our waterways clean!

Safety in the Field

Safety is our number one priority for volunteers, so keep these guidelines in mind whenever working near a body of water!

WEATHER & OUTDOOR RISKS

- Be sure to check the weather before going out in the field and know the signs of changing conditions. **Do NOT go in the field if there is a high probability of lightning or extreme weather!**
- Pay attention and be prepared for outdoor risks such as poisonous plants, snakes, insects, and other wildlife.

GENERAL SAFETY TIPS

- Make sure you are always prepared when going out in the field; sunscreen, a reusable water bottle, and appropriate clothing are a must!
- **ALWAYS be aware of your surroundings!** If there is ever a situation where you feel uncomfortable or unsafe, leave the field immediately and notify our staff of any concerns.

STEP 1.
Pick Your Site

This is the easiest step you need to take as a Water Watcher! Sit back and decide which site do you want to observe.

Do you have any waterways closer to your home that you care about? Now is the chance to do your part to keep it clean. Take a moment to consider where you want to observe, then discuss it with Sound Rivers staff!

If all goes well, you will have a little piece of the watershed to call your own.

Once you have a good idea about where you want to monitor and have it approved by the Riverkeepers, it is time to move on to step 2.

Step 2.
Identifying Your Stream Type

Before you can understand what, you're looking *for*, you need to know what you're looking *at*.

Stream types are determined by how often they flow and where they get their flow from. In the field, these are the three parameters used to determine the type of stream:

- **Geomorphology**: The physical structure of the stream channel, the topography, and the type of soil
- **Hydrology**: The flow of the stream and the quality of the water
- **Biology**: The plant and animal life present

Ideally, you will only have to make this decision once, and it could be complicated depending on what you're observing. However, regardless of how difficult it is, what you will need to decide is if your stream is *Ephemeral, Intermittent*, or *Perennial*. Let's take a moment to go over what each type of stream is in more detail.

Ephemeral

- Only flows during or right after rain
- May or may not have a well-defined channel
- Typically lacks the biological, hydrological, and physical characteristics commonly associated with the continuous or intermittent conveyance of water

Intermittent

- A well-defined channel
- Water flows only part of the year
    - During the wet seasons
- Flow is heavily supplemented by stormwater runoff

Perennial

- Water flows year-round
- The aquatic bed is below the water table
- Its primary source of flow is from groundwater
- It exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water

Did you know?

Most of the Neuse and Tar-Pamlico is considered perennial!

STEP 3.
Make and Record your Observations

Now that you know where you are going to look and what type of waterway you are looking at, it's time to discover in what ways those rivers and streams can be challenged.

What you will be learning about in step three are the physical observations you can identify when watching the water and what they mean.

The physical observations we will be going over are:

- Color
- Films
- Clarity
- Litter
- Flooding and Flow Patterns
- Other Red Flags

Color: Sewage and Swine Waste

Sewage is something you may encounter when watching your waterway. Because of that, it is good to know how to identify it!

You know when you are observing an untreated sewage spill when the water is a milky-bluish or gray color. However, sometimes sewage spills will not have that distinguishing color. You may see water flowing directly from a manhole, or water that has a strong odor of human waste. This is a good indication that you're looking at a sewage spill!

Another type of sewage is swine waste! Swine lagoons will have a characteristic pink color due to the bacteria that break down hog waste. However, this pink-colored water should **always** be contained within a lagoon, so any runoff that appears pink can indicate a spill or lagoon overflow.

Remember, if an *ephemeral* stream or storm drain has significant flow during a dry period, this could be an indication that there is some sort of cross-contamination.

If you notice a storm drain flowing in a dry period, investigate!

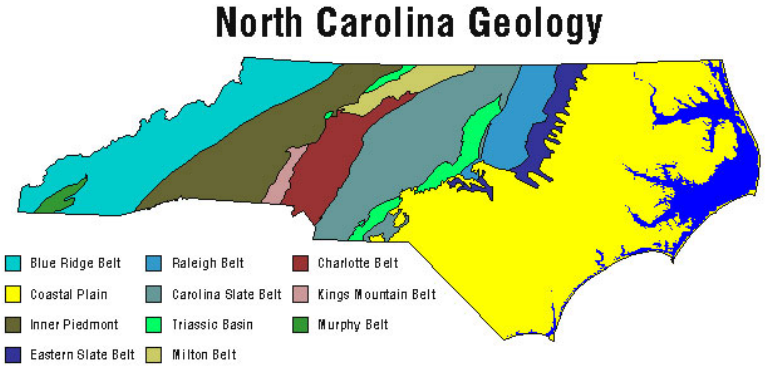
But why is my waterway Brown?

Don't panic! Clear, brown, tea-colored water is normal!

This is a result of naturally occurring tannins in decomposing plant matter, often seen in swampy or wooded areas. However, cloudy water that is difficult to see through is typically indicative of sediment pollution. The color of the water varies with sediment type but often appears reddish orange in the Piedmont region.

Color: Turbidity and Sediment Pollution

Turbidity is the measurement of the cloudiness of water caused by suspended particles such as sand, silt, or clay. It can be brown, cloudy, green, or orange depending on the type of soil nearby.



Soil found in the Neuse and Tar-Pamlico Watersheds

- Coastal: Sandy soil (lighter colored water)
- Piedmont: Cecil, loamy soils (brown/gray colored water)
- Triassic Basin: Clay, fine particulate, highly erosive soils (red colored water)
- Wetlands: Highly organic, carbon-rich soils (black colored water)

Turbidity and sediment pollution can look **very different** based on the soil composition of the area where the waterway is located.

The picture with the bright orange water is an example of turbidity in the Piedmont region. The water has a redder appearance because of the clay in the soil.

The example of turbidity on the coastal plain, however, is much different. The water has a light-brown appearance because there is more sand in that area.

Sediment pollution is bad for several reasons. It…

- Degrades aquatic habitats
- Clogs fish gills and suffocates small aquatic creatures
- Blocks sunlight needed by aquatic plant life
- Increases water temperature
- Sediment pollution carries bacteria & nutrients, contributing to algae blooms

Films and Foams

Films and foams can take many different forms. The first thing we want to go over is petroleum and organic films. They look very similar, so it is important to be able to tell them apart.

First, the traits of a petroleum-based film are that it will have a rainbow sheen and a gas-like odor. Another distinctive characteristic of petroleum film is that it **will** reform if disturbed.

On the other hand, organic-based films, which occur when decomposing plants and organic matter release fats and oils into the water, also have a rainbow sheen but **will not** reform if disturbed. Organic films, also, are often odorless.

Here are some examples of different foams and films you may find when watching your site!

You may see reddish-orange films, usually coating rocks and stream bottoms, which typically indicate the presence of iron-oxidizing bacteria. This type of bacteria is naturally occurring and poses no threat to human health.

Likewise, in the spring, it's common to see a thin layer of pollen in slower-moving bodies of water, usually appearing as a dusty white to yellowish film on the surface, which also does not pose a threat to humans (except for their seasonal allergies!).

Lastly, thick, foamy masses that appear along river and stream banks are a normal phenomenon. These usually occur in faster-moving waters and after very windy days, where the rapid churning of water and organic matter causes it to froth up and produce large amounts of foam. This foam will often have a yellow or brownish tint to it from the tannins and organic matter present in the water.

Films and Foam: The Good, The Bad, and the Algae

Sometimes we'll see surface films associated with algal blooms. These algal films can vary widely in color and consistency depending on the species, ranging from thin bright-green layers to brownish sludgy mats.

What to look out for, though, is bright, electric green water can indicate the presence of harmful algal bloom or cyanobacteria. Algal blooms are caused by nutrient pollution, usually caused by runoff from fertilizer or agricultural facilities.

Biotic Indices

Biotic indices are useful biological indicators of the health of a stream. As an example, the presence/absence and abundance of certain biotic factors can give us clues as to the overall health of a stream (as an example, large amounts of multiple species of aquatic insects can be an indicator of good water quality).

- **Vegetation**: Abundance of vegetation, types present, are they subaquatic or on the water surface?
- **Stream channel habitat**: Pebbly and gravely, silty, sandy, or leaf pack (leaves that have fallen into the stream and collected behind branches or debris)?
- **Aquatic insects**: Where are they, what kinds are present, how many can you see?
- **Other animals**: Fish, frogs, snakes, birds, etc.

Litter, Illegal Dumping, and Poultry Waste

Much of the plastic pollution and miscellaneous litter we see in our waterways end up there from urban stormwater runoff. To combat this, Sound Rivers has multiple Trash Traps located throughout the watersheds to catch this litter. If your chosen area is near one, and you notice it is full of litter, please contact Sound Rivers' staff so we can arrange a cleanout.

In addition to the general litter you may see, here are some other things to look out for when watching your waterway.

Illegal Dumping

According to the NC Department of Environmental Quality (NC DEQ), trends show that illegal dumping is on the rise in NC. The rapid increase in development and high disposal costs are contributing factors, and if seen, should be reported.

Poultry Litter

Chicken farms in North Carolina produce more than 97 million cubic feet of manure per year. Poultry litter piles should not be left uncovered for more than 15 days and should not be stockpiled within 100 ft of waterways.

Flooding and Water Quantity

When watching your waterway, flooding and excessive water are other factors you will need to consider when reporting to Sound Rivers. First, let's define flooding.

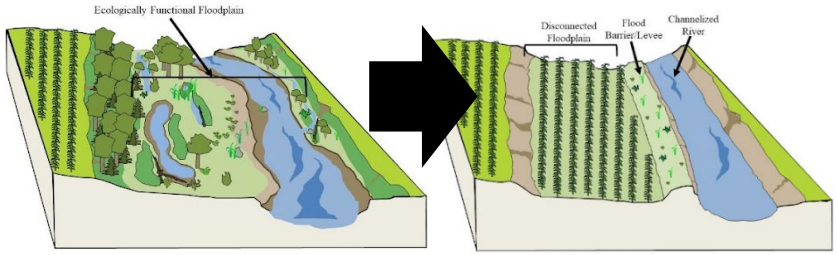
To determine if your waterway is in a flood stage as yourself:

- Are the banks full?
- Is water overtopping banks or exiting the channel?
- Is water swift, and is it turbid?
- Is the water level close to or higher than the flood stages for that location on your local USGS (United States Geological Survey) or NOAA (National Oceanic Atmospheric Association) gauge?
- Do you notice any flood impacts such as eroded streambanks, increased turbidity, or damage to vegetation in the riparian buffer?
- Is your ephemeral stream running during a dry period?

To look at USGS or NOAA maps, you can pull up Google on your phone and search for "NOAA Interactive Map of Stream Gauges" and click on the first link. Once the map is pulled up, you can either zoom into a geographic area and see if there's a nearby gauge, or you can utilize the search bar on the upper left. When you click on the icon for a location, it'll generate the specific gauge information!

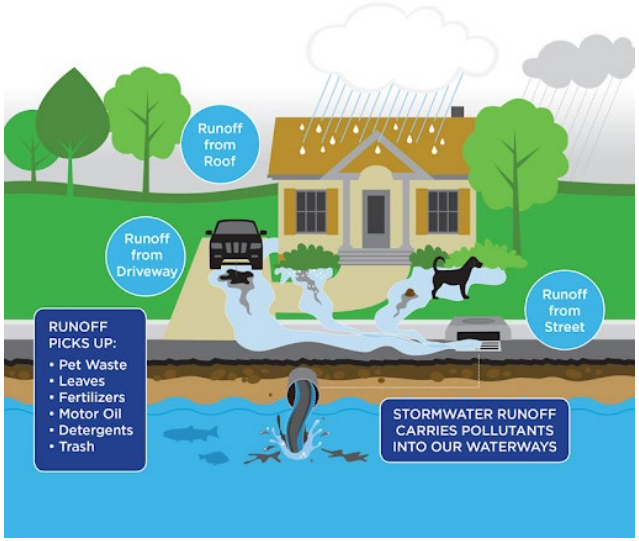
What are **water quantity parameters**? **Water quantity parameters** in rivers refer to measurements that describe the volume and flow of water within a river system. These parameters are crucial for understanding the health and functioning of the river, and include factors like flow rate, discharge, and water level.

To discuss water quantity, we must touch on **channelization. Channelization** significantly impacts water quantity by altering the flow patterns, reducing water storage, and potentially affecting groundwater levels, ultimately leading to changes in both surface water and groundwater availability. This can drain wetlands and increase the risk of downstream flooding.



Now that you know all about flooding and water quantity, we need to talk about stormwater, both stormwater runoff and signs of excessive stormwater.

Stormwater Runoff



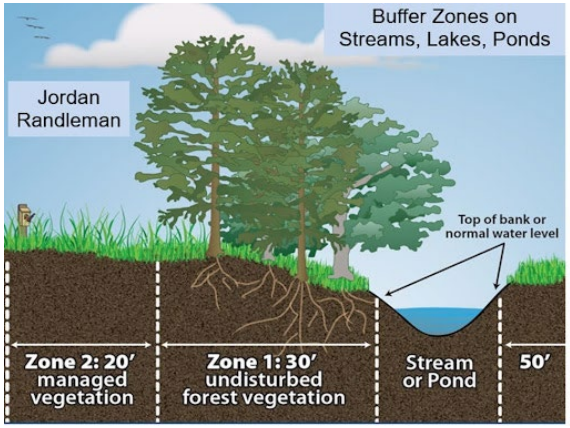
Evidence of Excess Stormwater

Downcut or eroded banks, seen especially in urban areas (dubbed 'urban stream syndrome'), can be the result of flash floods or large quantities of water rushing into creeks off highly developed and impervious areas.

Note any erosion or downcut banks!

Riparian Buffers

Riparian buffers are areas around streams where vegetation is planted, which creates a space that helps with water quality.



In the Neuse & Tar-Pamlico River watersheds, North Carolina requires a **minimum of a 50ft vegetated buffer** around streams! Areas exempt from this rule are in agriculture, forestry, and areas with specific permits. But what do they do? They...

- Filter water so it is cleaner before entering streams
- Slow down runoff velocity to reduce streambank erosion
- Store water that can be slowly released during drought
- Regulate and reduce stream temperature with shade

Wetlands: Why they Matter and Watching for their Destruction

You may see harm come to a wetland around you. Being a Water Watcher, you should know what wetlands are and why they matter to the environment

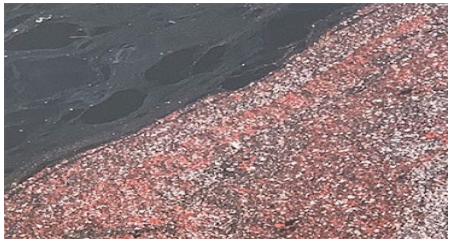
What are **wetlands**? **Wetlands** are areas where water covers the soil for at least part of the year and include a variety of natural systems, such as marshes, swamps, bottomland hardwoods, pocosins, and wet flats. Here are the reasons why they are important. Wetlands…

- Protect wildlife by providing them with a safe habitat and food, and support healthy fisheries
- Clean our water for drinking
- Protect our coast and communities from extreme flooding
    - 1 acre of wetlands can store 1.5 million gallons of water and can save coastal communities $24 billion annually by protecting them from extreme storms
- Are vital to the economy
    - Coastal wetlands provide $5.6 billion towards commercial seafood harvest in the US and support NC's billion-dollar commercial and recreational fisheries
- Recharge groundwater supplies

If you have a wetland near you and see development on it, reach out to Sound Rivers staff. They may be permitted, but legislation from 2024 made protecting wetlands much more difficult than it used to be, and looking into what is happening to them is worth both your time and your Riverkeeper's time.

Other Things to Watch For!

A crew member in protective gear was photographed grinding paint from the Gaston Bell, anchored in the Neuse River in February 2022.



Paint chippings from in-water vessel maintenance, Oriental Harbor.

Oil spill in Oriental Harbor, January 2025.

STEP 4.
Where to Report

- Send a copy of your field form to Sound Rivers at **waterwatch@soundrivers.org**
- Report any water quality issues to Sound Rivers and to local regulatory contacts
- Meet with us and fellow water watchers quarterly to share your findings

Who to Contact

LOCAL–County & City Departments

- **Sediment and Erosion Control**– construction sediment pollution
- **Public Health**– septic, human health
- **Sewer/Water**– sewer issues
- **Stormwater**– stormwater pollution
- **Planning**– land use code violations

STATE OF NORTH CAROLINA

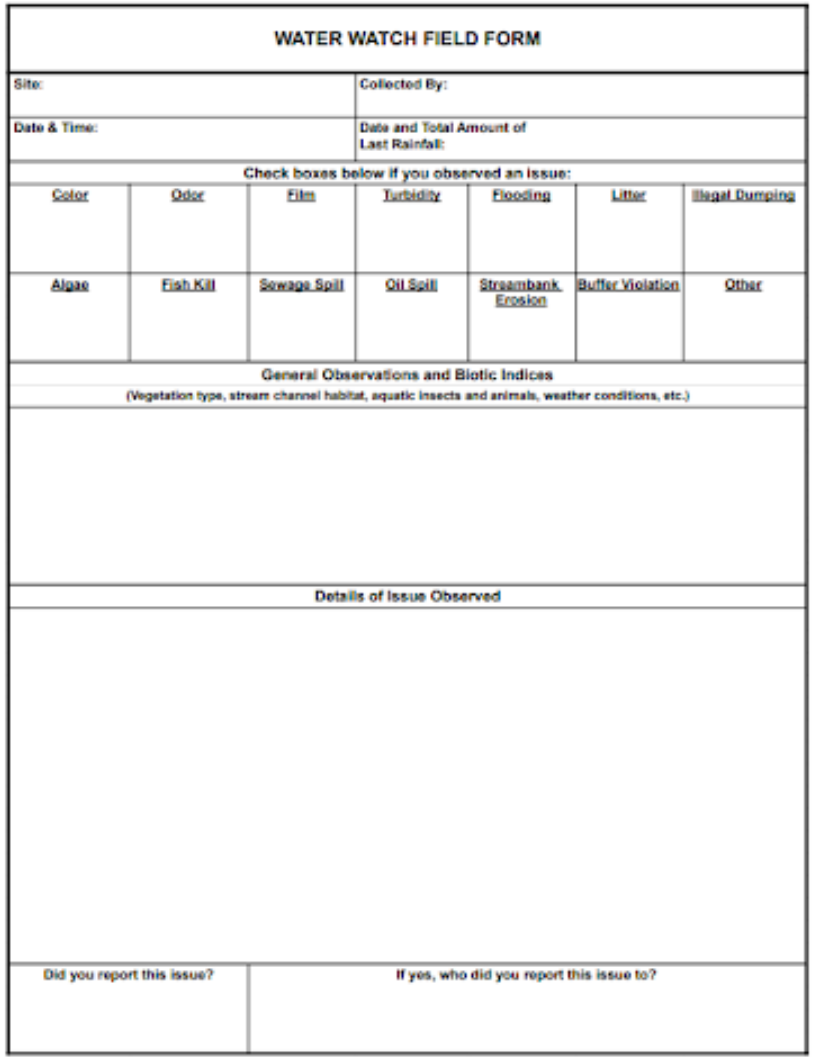
- **Department of Environmental Quality (DEQ)**
- **DWR–**water quality, 401 permits
- **DEMLR**–construction regulations
- **DCM**–coastal management, CAMA
- **DWM**–waste management
- **Wildlife Resources Commission**

FEDERAL

- **EPA**–Oversees DEQ, Environmental Standards, Permitting & Enforcement
- **Army Corps of Engineers–**Dredge & fill (404) permits
- **Coast Guard–**Coastal water quality & fisheries
- **National Fish & Wildlife Service–**Federally protected species & habitat

Your Field Form

- For each visit to your site, you'll fill out one of our Water Watch Field Forms and submit them to **[ADD EMAIL HERE]**
- If a water quality issue is observed, check the corresponding box and include your observations in the 'Details of Issue' section
- If you need more space, feel free to write on the back of the form!



WATER WATCH FIELD FORM

Site:	Collected By:
Date & Time:	Date and Total Amount of Last Rainfall:

Check boxes below if you observed an issue:

Color	Odor	Film	Turbidity	Flooding	Litter	Illegal Dumping
Algae	Fish Kill	Sewage Spill	Oil Spill	Streambank Erosion	Buffer Violation	Other

General Observations and Biotic Indices

(Vegetation type, stream channel habitat, aquatic insects and animals, weather conditions, etc.)

Details of Issue Observed

Did you report this issue?	If yes, who did you report this issue to?