Activity 3: "Surf" your watershed!

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Name: _____

The basics: In this activity, you will learn more about your community's watershed in the U.S. Environmental Protection Agency (EPA)'s online tool, **How's My Watershed** (formerly Surf Your Watershed). We will gain familiarity with our water and issues of water quality that are important in your area. *To familiarize yourself with concepts in this activity, please watch through to end of lecture 3.4 in the Modules page before starting this activity*.

This activity is adapted and modified from the EPA's How's My Watershed lesson plan.

Background: *Watersheds* are areas that drain (e.g. via *runoff*) into a body of water such as a river or lake (surface water) or into groundwater. Individual watersheds are sometimes called *drainage basins* since water tends to drain to lower basins with gravity; accordingly, watershed boundaries are often defined by physical barriers such as relatively higher elevation land features or impermeable barriers. The edge between two watersheds is called a *watershed boundary*.

Watersheds vary in size due to many landscape-level and geological factors. Watersheds are also "*nested*" meaning that smaller watersheds together form a larger watershed. The boundaries between these largest watersheds are also called *hydrological* or *continental divides* – the Great Continental Divide of the Americas, running from the Arctic Ocean to the Rockies to the Andes, is the boundary in which to one side, water drains to the Atlantic Ocean and to the other side water drains to the Pacific Ocean. There are smaller divides too, such as the Subcontinental Divide in Wisconsin. In some cases, such as in the Great Basin of Western North America, a watershed does not ultimately drain into the ocean. These are known as *endorheic basins* or closed basins.

The environmental quality of a watershed has substantial impacts on the quality of the water because it necessarily collects the water that will run-off into that waterbody. Both point source and non-point sources may influence the inputs to that watershed's waterbodies. When the recreational, economic, or environmental character of a waterbody is hampered, that watershed is considered *impaired*. The EPA, under the Clean Water Act's mission, works to monitor watersheds and develop plans to improve watersheds and water bodies.

In the activity below, we will use some EPA tools to find our watershed and then assess its quality as well as answer some other questions about the security and health of our waterways and drinking water.

Activity:

1. Navigate to the EPA's [How's My Waterway?](https://mywaterway.epa.gov/) homepage (https://mywaterway.epa.gov/)

2. Enter in the Zip Code of the waterway you would like to investigate for this activity. You may select your current zip code, the zip code of your hometown, or any other zip code (in or outside of the Midwest). Then click **>>Go**.

   Zip Code selected: _____

3. You should now see a map on the left side of your screen and a page on the right side We will stay in the "Overview" tab and explore the other tabs and windows below.
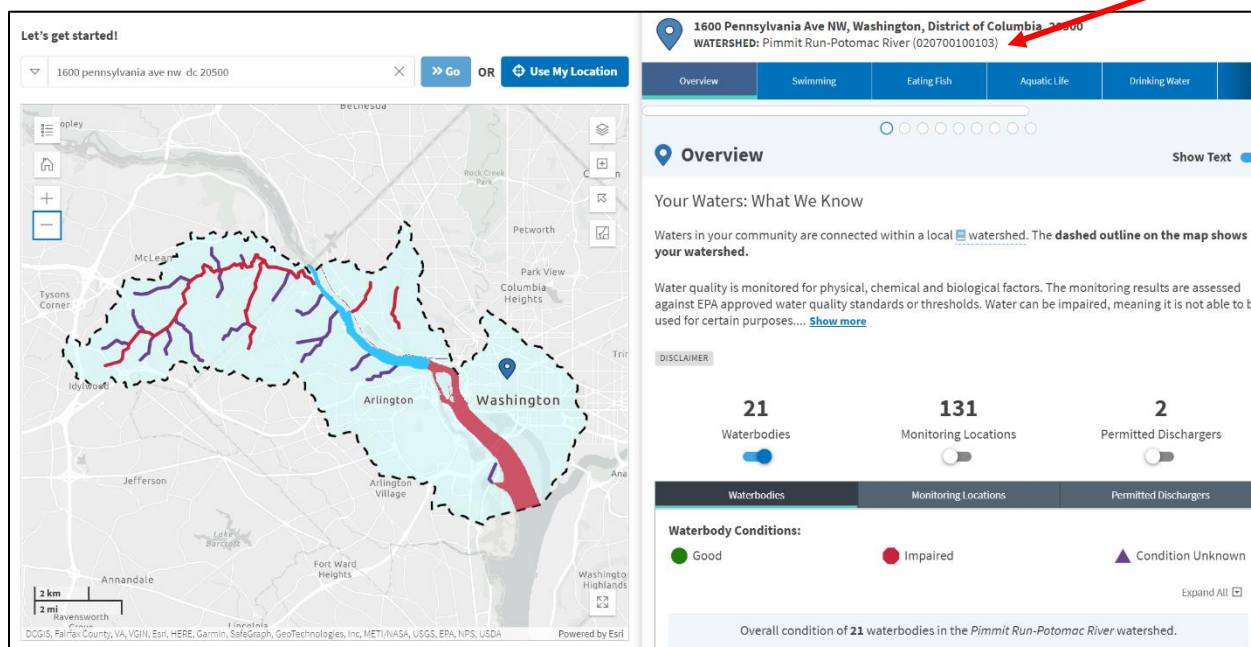
4. We will explore this page more soon, but first let's get some geographical bearings. Recall from the Background above that watersheds are nested in one another. Each local watershed has an "address" (some number of digits) called the *Hydrologic Unit Code* (HUC) that is nested into increasingly encompassing watersheds. Look for the HUC of your local watershed in the top right corner where it says "WATERSHED". Below, enter the full name and number of your watershed below.

   Watershed Name: _____   10- or 12-digit HUC: _____

   Click the link [here](#) to see a visualization and explanation of nested HUCs.

5. Let's now look at where your local watershed drains to. Enter the following URL in a new tab, replacing the "XXXXX" with your watershed number (HUC). Click enter.

   https://water.usgs.gov/lookup/getwbd?XXXXXXXXXX
   e.g. https://water.usgs.gov/lookup/getwbd?030801021105

   TIP: your local watershed will have between 10-12 digits. In some cases, the USGS site will not recognize your code, in which case go to the link here and click on your location to retrieve the HUC at each level.

6. In the spaces below, enter in the 2-, 3-, 6-, 8-, 10-, and 12-digit HUC and names.

   2-digit HUC: _____   2-digit HUC name: _____

   3-digit HUC: _____   3-digit HUC name: _____

   6-digit HUC: _____   6-digit HUC name: _____

   8-digit HUC: _____   8-digit HUC name: _____

   10-digit HUC: _____   10-digit HUC name: _____

   12-digit HUC: _____   12-digit HUC name: _____

USGS Water Resources Links for: 030801021105 - Paynes Prairie

Major Water Resource Links

- USGS Drought Watch - U.S Map of Drought and Low Flow Conditions
- USGS WaterWatch - Real-time Streamflow Map for the South Atlantic-Gulf Region - HUC 03
- USGS WaterWatch - Real-time Floods and High Flow Conditions Map for the South Atlantic-Gulf Region - HUC 03
- USGS Spatial Data Sets Available on the Water Mission Area NSDI Node
- USGS Current News and Developing Issues Affecting Watershed Activities for Paynes Prairie
- USGS Annual Water Data Report Mapper
- Search USGS for Links, Publications and Web Sites Associated with
  - Paynes Prairie - HUC 030801021105
  - Paynes Prairie - HUC 0308010211
  - Oklawaha - HUC 03080102
  - St. Johns - HUC 030801
  - St. Johns - HUC 0308
  - South Atlantic-Gulf Region - HUC 03
- EPA How's My Waterway in Subwatershed - Paynes Prairie 030801021105
- EPA - Water Data and Tools
- NOAA-The National Weather Service - Advanced Hydrologic Prediction Center

2- to 12-digit HUC and names

Online USGS Watershed Information For:

According to the USGS sites, "This [HUC] system divides the country into 22 *regions* (2-digit), 245 *subregions* (4-digit), 405 *basins* (6-digit), ~2,400 *subbasins* (8-digit), ~19,000 *watersheds* (10-digit), and ~105,000 *subwatersheds* (12-digit)"

7. Look at your 2-digit HUC, or region. Use the map below to visually locate your hydrological region. Compare your number on the USGS map on the left to the Continental Divide on the map to the right.
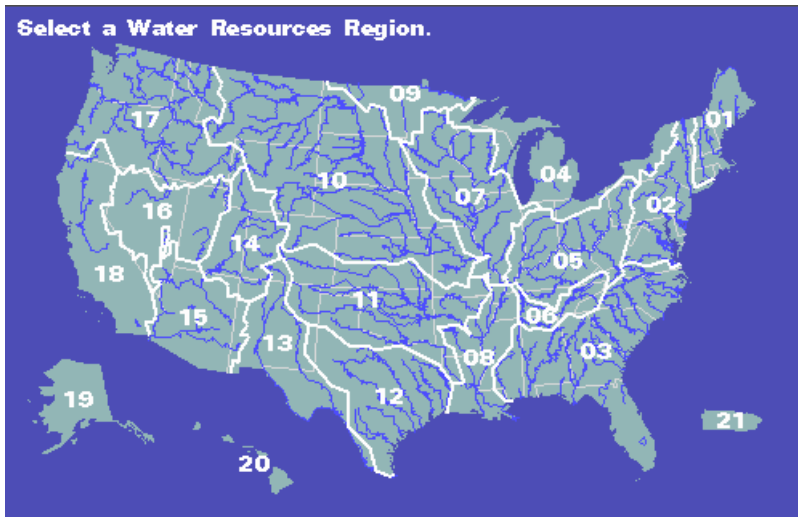

Which body of water (e.g., ocean) does your watershed ultimately drain into? Or, is your watershed endorheic?

_____

_____

Do you live near a continental or subcontinental divide? Do you cross one or more hydrological divides every year for work, school, or family?

_____

_____

_____

8. Now, return to the How's My Waterway? page and turn your attention to the map on the left side and the tabs list on the right side. First, visually inspect the blue pin to make sure it is close to your address – if you are on the isthmus of Madison for instance, it sometimes can move you around a bit – in fact there is a subdivide right through the isthmus where water drains either into Monona or Mendota. You can click on the map to reset your location.

Note that by default, the map color codes waterbodies by their condition: impaired, in good condition, or unknown.
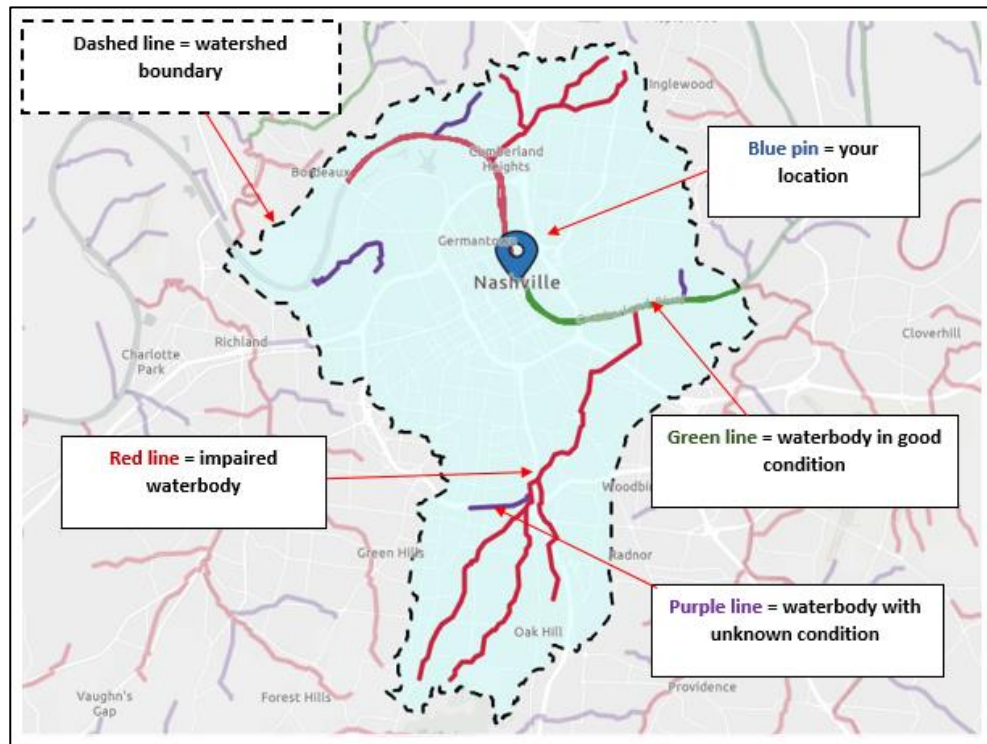
Now look at the right side of the page under the Waterbodies tab.

How many waterbodies are defined in your watershed? _____

How many of those waterbodies are in GOOD condition? _____

How many of those waterbodies are in IMPAIRED condition? _____

9. Select up to three IMPAIRED waterbodies. Complete the table on the following page:

Name of Waterbody	Year Last Reported	What is this water used for?	Identified Issues
1.			
2.			
3.			

10. For each of the three impaired waterbodies above, click on "View waterbody report".

On the popup page, scroll to the bottom right under "Plans to Restore Water Quality". Is there a plan to restore this waterbody?

Waterbody 1: Yes / No

Waterbody 2: Yes / No

Waterbody 3: Yes / No

11. Now, click to the next tab over from Waterbodies to Water Monitoring Locations. You will see purple or yellow markers indicating where various sensors and collections are/have been made for water monitoring.
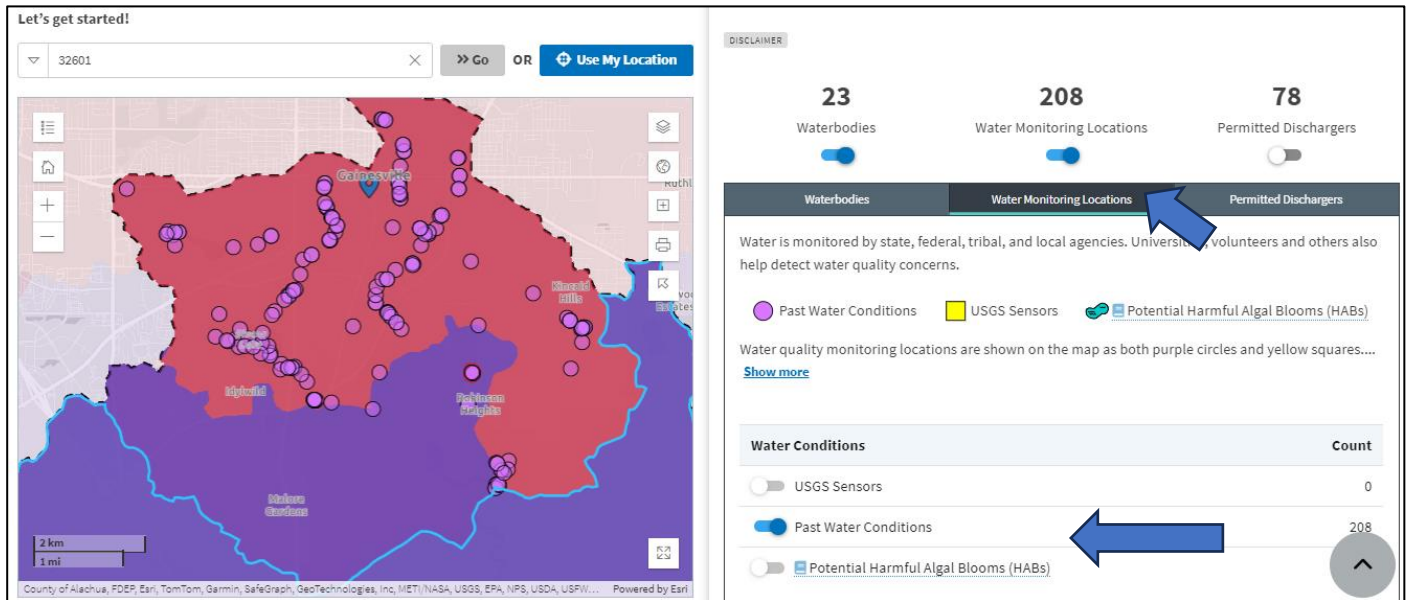
If there are any Harmful Algal Blooms in this watershed, a Toggle button called Potential Harmful Algal Blooms (HABs) will be visible. If there is an HAB button, toggle so that it is the only button that is "on". If there is an HAB, click the name of the waterbody below to see a map of the severity of that HAB.

Number of HABs in your watershed and waterbodies affected (if any):

_____
_____
_____

12. Now, move from the Water Monitoring Location tab to the third tab, Permitted Dischargers. As the name suggests, this lists all the dischargers with an NPDES (National Pollutant Discharge Elimination System) permit.

How many Permitted Dischargers are in your watershed?   _____

We can find dischargers who are noncompliant with NPDES specifications by scrolling down to the "Sort By" box and sorting by Compliance Status. For each Permitted Discharger, their NPDES ID, Compliance Status, and Permit Components are listed by default.

How many Permitted Dischargers in your watershed are noncompliant? _____

What industries are the noncompliant dischargers from (e.g., ag., utilities, industry)?:

_____
_____

If you have any violators in your watershed, choose one to click on and open the Facility Report. If you do not have one, click on the link here to see an example. There is a ton of information in here including a summary of their compliance history and any statutes they have violated (such as the Clean Water Act – CWA or Clear Air Act – CAA).

Under the Three-Year Compliance History by Quarter, you can see the pollutants in violation. See the example below. You can click on the pollutants to see more detailed information.

Statute	Program/Pollutant/Violation Type				QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8
	CWA (Source ID: WI0024597)				01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-09/30/22	10/01-12/31/22
	Facility-Level Status				Violation Identified	Violation Identified	Violation Identified	Violation Identified	Violation Identified	Violation Identified	Violation Identified	Violation Identified
	Quarterly Noncompliance Report History				Other Violation	Reportable Noncompliance	Reportable Noncompliance	Reportable Noncompliance	Reportable Noncompliance	Reportable Noncompliance	Reportable Noncompliance	Reportable Noncompliance
	Pollutant	Disch Point	Mon Loc	Freq								
▶CWA	Oxygen, dissolved [DO]	001 - A	Effluent Gross	Neither	10%					4%		
▶CWA	Solids, total suspended	001 - A	Effluent Gross	NMth								

13. As you scroll around the Facility Reports you may notice that the EPA keeps a summary of the potential communities impacted by a given pollutant or polluter. This is summarized at the bottom in the "Environmental Justice" tab. The demographics of the 1-, 3-, or 5-mile radius around the site are listed including income bracket, percent People of Color, households on public assistance, etc. Elsewhere there is also information on the proximity of the discharge to tribal communities.

Why do you think that it is crucial to track the effects of pollutant discharge on marginalized communities?

_____
_____
_____
_____
_____
_____
_____
_____

14. Demographic data can also be visualized on the map screen by clicking on filters and selecting Demographic Information. This is a useful way to consider the impact that water quality issues have on folks that are already marginalized in our nation. There is a lot more to explore with the tools on the How's My Waterway? page but we will conclude it here for now – please do keep exploring and showing your friends!
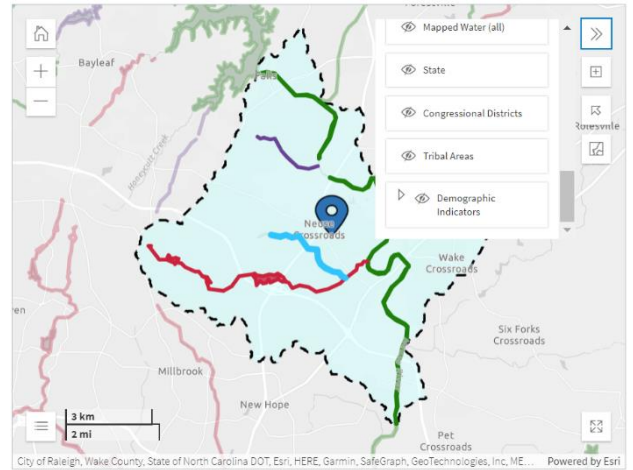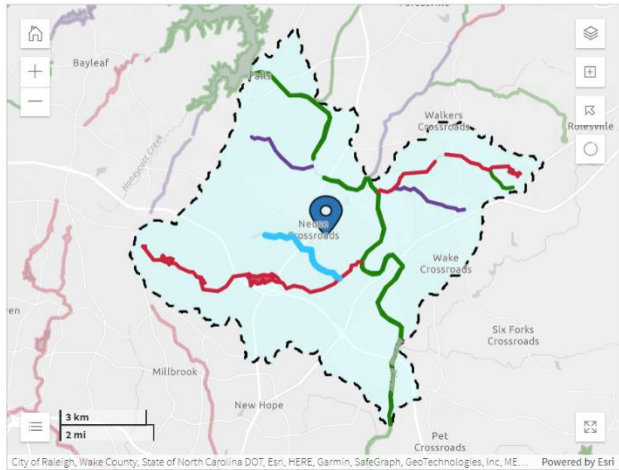
15. Finally, let's explore our drinking water on one more page. Navigate to the EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS) here. (https://geopub.epa.gov/dwwidgetapp/). Then click on the "Locate Drinking Water Providers" button on the left side. A map and a box titled "Drinking water providers" will appear. Enter your Zip Code and allow the feature to load.

How many of the drinking water providers in your Area come from surface water? How many from groundwater?

Surface: _____   Groundwater: _____

Are there any health-based violations in your drinking water utility? Yes / No

If so, what are they, summarized? (Hint, click the "More Details" button):

_____
_____
_____
_____

16. To conclude, visit the DWMAPS page for the City of Flint (MI)'s drinking water [here](). Scroll down to view the violations. Everyone deserves access to clean, safe drinking water. Learning where our water comes from, how it is monitored, and what goes into it are first steps that all of us can take to help clean water for everyone.

    What is one best practice that you can do at home (from our modules or other sources) that can improve water quality for you and your community, even at a small level?

    _____
    _____
    _____
    _____
    _____
    _____

    To summarize:

    Did anything discovered in the activity above surprise you?

    _____
    _____
    _____
    _____

    To submit this activity, please submit it to the Activity 3 page on Canvas. Thanks! If you have feedback or anything stops working, please email me at: bcorder@wisc.edu