Virginia Cooperative Extension
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Virginia Master Naturalist Basic Training Aquatic Ecology and Management: Exploring Virginia's Watersheds Lesson Plan

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Virginia Master Naturalists

Overview

This lesson plan is intended to serve as an interactive activity to accompany a presentation on aquatic ecology and management during the Virginia Master Naturalist basic training course for volunteers.

Objectives

Upon completion of this activity, participants will:

- Understand the definition of a watershed
- Know the major watersheds and rivers of Virginia and be able to identify their own 'watershed addresses'
- Be aware of impaired waters in their watersheds and sources of pollution causing the impairments

Materials

1. Color copies of Maps 1, 2, 3, and 4, one each per participant
2. Exploring Virginia's Watersheds handout, one per participant
3. Fact sheets on impaired waters in your watershed basin, obtainable at https://www.deq.virginia.gov/water/water-quality/assessments/integrated-report. At that site, scroll down to Appendix 4 and choose the Fact Sheet for the major river basin in your area.

Other Resources

The Aquatic Ecology and Management multimedia presentation and background readings are found at https://www.virginiamasternaturalist.org/training/basic-training/aquatic-ecology-and-management/.

Time

15-25 minutes, depending on level of discussion.

Leader Instructions

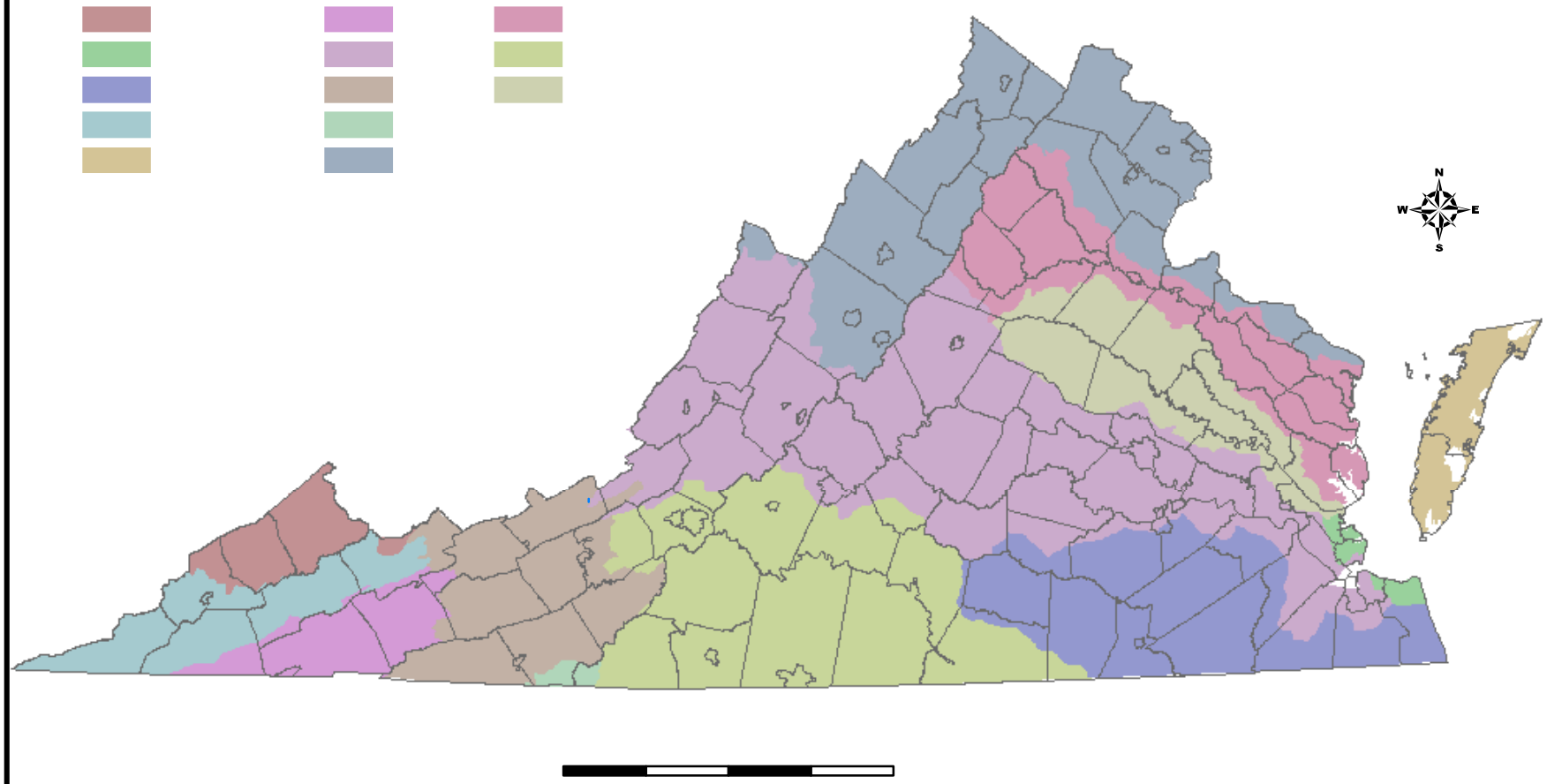
1. As a lead-in to the activity, the leader should discuss the definition of a watershed. The first section of the Aquatic Ecology and Management presentation includes slides and text addressing watersheds.
2. Introduce the activity. Explain that this hands-on activity is intended to raise participants' awareness of Virginia's rivers and watersheds and to give them practice in looking at data about the health of streams in Virginia.
3. Provide each participant with copies of each of the four maps and a copy of the Watershed Questions handout.
4. Have the participants follow the directions on Part 1 of the handout and answer the questions provided. If preferred, you may organize the participants to work in pairs or groups**.**
5. Discuss the answers to Part 1 as a large group. Encourage any questions or discussion.
   a. All of the watersheds from the James River watershed north drain to the Chesapeake Bay. The western side of the Eastern Shore and the watershed labeled "Chesapeake Bay" also drain to the Bay. The Chowan watershed drains to coastal sounds in North Carolina, as do the PeeDee and Roanoke watersheds. The watersheds from the New River watershed west all eventually drain to the Mississippi River. Lastly, the eastern side of the Eastern Shore drains directly to the Atlantic Ocean.
   b. The largest watershed in Virginia is the James River watershed. It drains an area of more than 10,000 square miles.
6. It is recommended to do Part 2 after participants have learned about VDEQ's impaired waters listing and TMDLs. These topics are included in the online presentation and may be discussed by your in-class presenter as well. When you are ready for Part 2, provide each participant with Map D, and one or more fact sheets about impaired waters of the river basin in which your class is taking place. Have the participants follow the directions on Part 2 of the handout and answer the questions provided.
7. As a large group, discuss the answers to Part 2, which will be dependent upon the particular watershed and fact sheets you are examining.

Acknowledgements

Page Hutchinson (formerly with the Virginia Department of Forestry) provided ideas and content for this lesson plan. The Virginia Department of Wildlife Resources provided the watershed maps, and the Virginia Department of Environmental Quality provided the maps and data on impaired waters. The Virginia Environmental Endowment provided funding for the development of the Aquatic Ecology and Management curriculum.

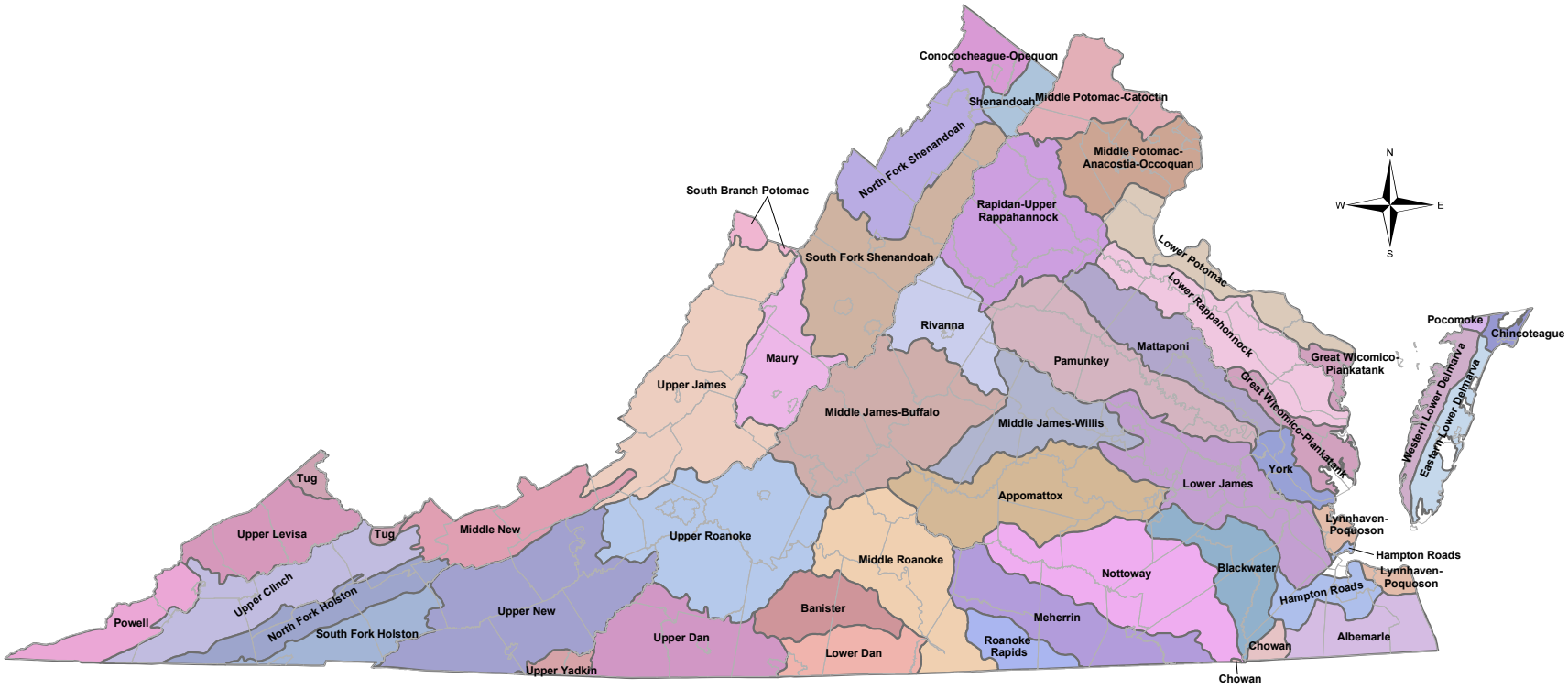
Virginia's Watersheds

A



Virginia Hydrologic Unit Map
8 Digit

B

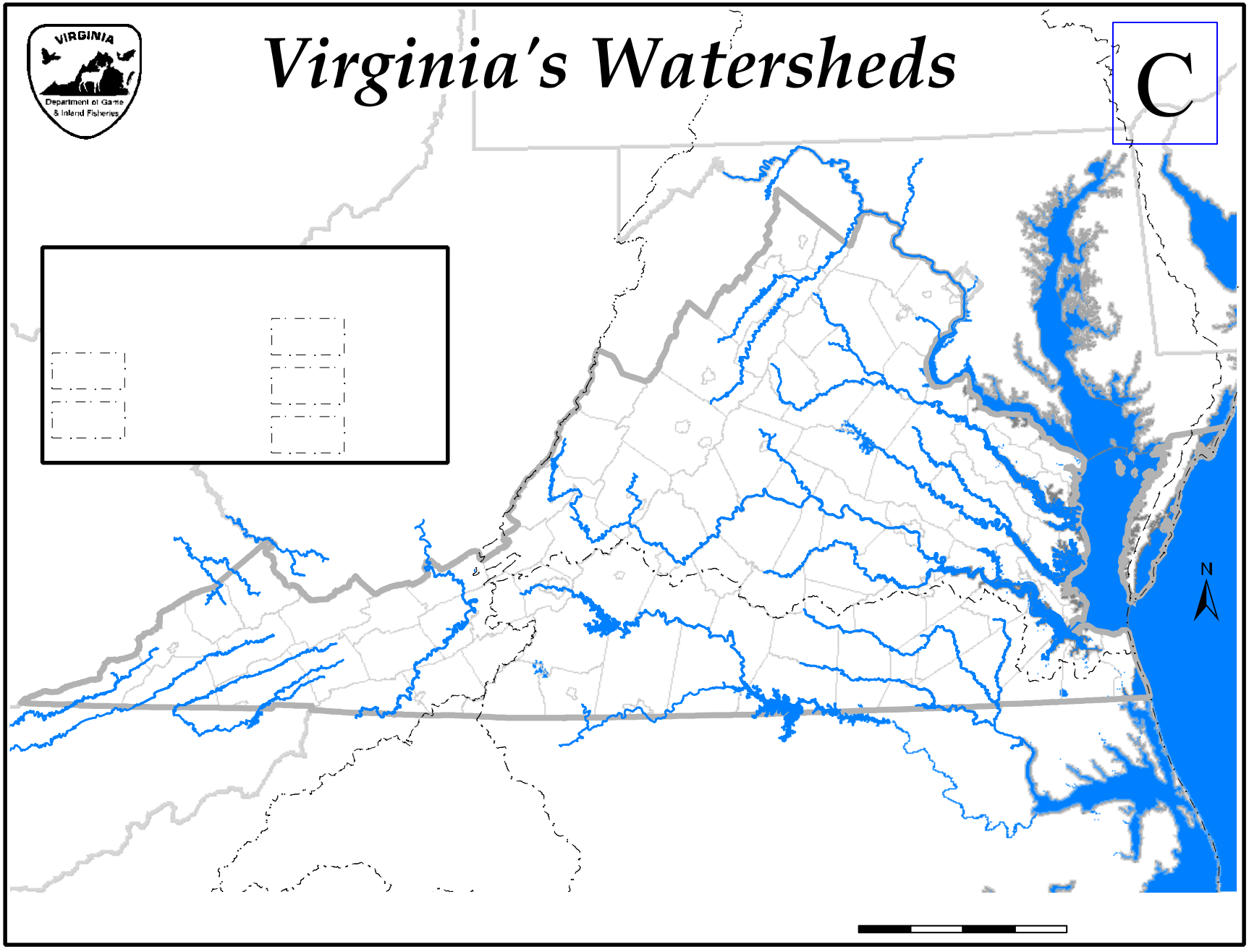


Sources:
USGS
DGIF

DGIF - Fish & Wildlife Information Services - LFH - 6/17/03

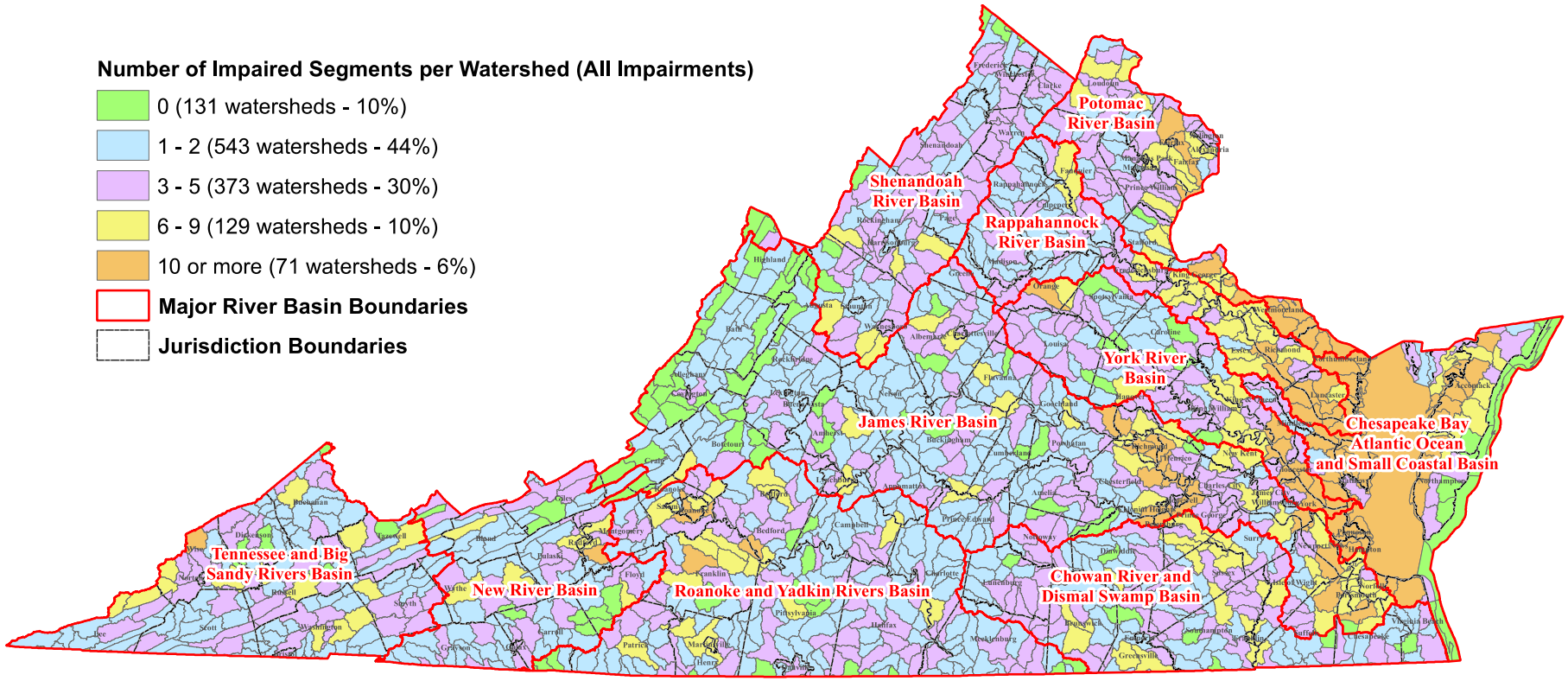
Virginia's Watersheds

C



D

Distribution of Impaired* Waters in Virginia's Watersheds



VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

N W E S

0 12.5 25 50 75 100 Miles

* Excludes Category 4B (Effluent Limited) Waters

Sources: Virginia Department of Environmental Quality, 2014 Water Quality Assessment
Virginia Department of Conservation and Recreation

draft; clb 063014

Exploring Virginia's Watersheds Participant Handout

The purpose of this activity is to introduce the concept of a watershed, to familiarize you with the watersheds of Virginia, to help you know your own 'watershed address', and to raise your awareness of impaired waters in your community.

Part One

1. Take a look at Map A, which depicts the 13 watersheds of Virginia.
    a. Locate the watershed in which you live.
    b. Draw a line along the bottom of the James River watershed and the small part of the Chesapeake Bay watershed in Virginia Beach. All of the watersheds above this line drain into the Chesapeake Bay.
    c. Which Virginia watersheds drain into the Chesapeake Bay? Which do not? Where do the watersheds outside of the Bay watershed drain? Which is the largest watershed in Virginia?
2. Next, look Map B, which shows hydrologic units, or essentially sub-watersheds within the major watersheds.
    a. Locate the sub-watershed in which you live.
    b. Within this sub-watershed, can you provide a more detailed 'watershed address' for yourself? Into what body of water does the area around your residence drain? What larger body of water does that one drain into?
3. Next, look at Map C, which shows the major rivers of Virginia. How many of these rivers can you name? Label as many as you can on the map.

Part Two

1. Look at Map D, which shows the distribution of impaired waters in Virginia's watersheds (2014.) Find the county or independent city where your VMN training class is being held. Approximately how many impaired stream segments were there in that county or city (provide a range.) Were there any watersheds in the county or city with no impaired stream segments? How does the county or city appear to compare to neighboring localities in terms of the distribution of impaired waters? Why do you think these waters might be or have been impaired? Brainstorm a list of possible sources of pollution that might exist in your county.
2. Now, look at the fact sheet(s) for some of the impaired waters in the major river basin for your area. Find the following information:
    a. For which use is the waterway considered impaired?
    b. What is the cause of the impairment?
    c. What are the sources of the pollution causing the impairment?