

### Goals

Students will develop on-line mapping skills to explore the school's watershed, using the Maryland FieldScope program (<http://maryland.fieldscope.org/>). They will learn how maps can support environmental research and understanding. They will predict and observe relationships of land use and water quality in their watershed.

### Background

FieldScope is a free online mapping program, developed by the National Geographic Society. It enables students to analyze, interpret, and share environmental data about their schools' watershed or an adopted stream. Students will use the Maryland FieldScope program to analyze and explore the following features about the watershed in which their school is located:

- Watershed boundaries
- Rivers and streams
- Land cover
- The percentage of impermeability in areas
- Land-use relationships to local stream health.

### Prerequisite Knowledge

It is helpful for students to understand what comprises a healthy stream system and the concepts of impervious surfaces and stormwater runoff. Refer to the land-use sections of the Score Four introductory presentation [Watersheds, Land Use, and Sustainable Practices PowerPoint](#).

### Materials Needed

- *Score Four: FieldScope Map Inquiry PowerPoint* (optional)
- Computers
- Student FieldScope map Inquiry handout
- *Note internet connection delays can occur when an entire class is using FieldScope; therefore, it can be beneficial for students to work in pairs or teams of 3.*

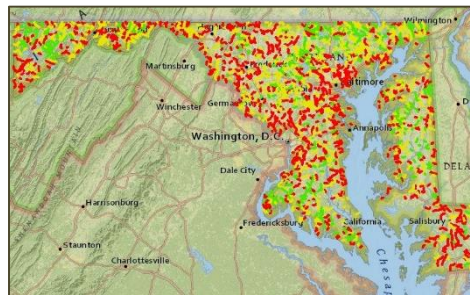
### Teacher Instructions

The overview of FieldScope provided in the *Score Four: FieldScope Map Inquiry PowerPoint* is useful for introducing students to this inquiry. As it introduces and provides examples of map layers, the tools they will use, and a preview of their inquiry. It is up to teachers to determine whether students will work best independently or by following the presentation on their computers.

For teachers, the best preparation for this lesson is viewing the *Score Four: FieldScope Map Inquiry PowerPoint* and doing the student inquiry. An outline of the presentation and inquiry follows.

#### 1) Instructions – Part One: FieldScope Basics

- a. Students learn how to use FieldScope and become familiar with various tools needed for this activity. These features include learning about base maps, map layers, using a legend, search and zoom features, and how to adjust different map settings.



**Grades:** 6-12

**Time:** 60-90 minutes

**Skills Exercised:** Analyzing and interpreting data; use of computer mapping programs as investigative models.

**Education Standards:** Next Generation Science — MS-ESS3-4, HS-ESS3-6; MD Environmental Literacy— Stand. 1 Topic A Indicator 5; Stand. 2 Topic B; Stand. 4 Topic D; Stand. 5 Topic

**2) Instructions – Part Two: Explore Your Watershed****a. Locate Your School**

- i. Students will locate their school, and create a label and marker for their school on their map.

**b. Watersheds**

- i. Students will learn about watershed boundaries and determine what watershed their school is located in.

*ii. Possible Discussion Questions:*

1. What watershed are you in?
2. How do watershed boundaries relate to the topography of land and the flow of streams?

**c. Rivers and Streams**

- i. Students will determine where their local stream is and its name, if it has one.

*ii. Possible Discussion Questions:*

1. What streams are closest to your school? How far away are they? (Use the Measure Tool)
2. Into what larger body of water does this stream flow?

**d. Land Cover**

- i. Students will identify different land covers in their watershed.

*ii. Possible Discussion Questions:*

1. What types of land cover (and/or land uses) do you observe?
2. Which type of land cover is most common in your watershed?
3. How do you think the condition of your local stream is affected by the types of land cover in your watershed?

**e. Impervious Surfaces Layer**

- i. Students identify areas and land uses with impervious surfaces.

- ii. Students hypothesize about the relationship of stream water quality and land-use and the proportion of impervious surfaces in their watershed.

*iii. Possible Discussion Questions:*

1. Generally, where do you find the greatest amount of impervious surfaces?
2. How do you think the stream health is affected by the amount of impervious surfaces in your watershed? (Students to make a hypothesis in their inquiry.)

**f. Watershed Health Layer**

- i. Students learn the results of MD Department of Natural Resources stream monitoring.

*ii. Discussion questions:*

1. What do you observe?
2. Is there any data for your local stream? If so, what does the data tell you?
3. Was your prediction correct? Why or why not?

**STREAM HEALTH:**

At times the FieldScope link to StreamHealth maps does not work, so this exercise now uses the Watershed Health map layer in this inquiry.

For interactive maps depicting the condition of Maryland streams, see the [Maryland Stream Health](#) website, administered by the Maryland Biological Stream Survey division of the Maryland Department of Natural Resources.

**3) Conclusions**

- a. The class summarizes what has been learned, particularly as it relates to information concerning land uses and the quality of stream ecosystems (from the Score Four initial PowerPoint presentation).