Name _____   Date _____

Analyzing Watershed Health: Land Cover Answer Key

The Chesapeake Bay watershed covers more than 64,000 square miles across six states and Washington, D.C. The Chesapeake Bay is a major economic center with a history that dates back to pre-European settlement of the area. Major cities have developed around the bay, such as Washington D.C.; Baltimore, Maryland; and Norfolk, Virginia. Much of the watershed is used for crops and pastures for farm animals. Forests and wetlands are also abundant in the watershed. These different land uses have varying effects on the water in the Chesapeake Bay, but they all add nutrients to the water in some way. Major cities have many buildings and paved roads that make surfaces impervious to water. This means water will flow along these surfaces but will not sink into them. As the water moves through the cities, it collects pollutants, including nitrates, and deposits them into the waterways. Nitrates from animal waste and fertilizers used on crops are also carried from agricultural land into the Chesapeake Bay waterways.

We can take actions to limit the amount of nitrates that seep into the watershed from urban centers and agricultural land use. Riparian buffers can be added along the waterways in urban and agricultural areas. These buffers are vegetated areas of trees, bushes, and grass that line the waterways. They slow down erosion and reduce soil that flows to the waterways. The process that allows soil to flow into waterways is called sediment deposition. Fences can be added as well to prevent animals from accessing the waterways.

It is important to know what kind of land cover is around the selected sites of the Chesapeake Bay, so you know what steps need to be taken to improve water quality in that area. It is also important to know how the water flows from the sites into the bay because that shows you how the nutrients will travel from one site to another. This information will help you make a decision about which site would be the best location to put the action plan into place.

Part 1. Explore land cover around the Chesapeake Bay.

❶ You can use FieldScope to make observations about land cover around the Chesapeake Bay.

❷ Open the Fieldscope map **Land Cover in the Watershed:**
http://chesapeake.fieldscope.org/v3/maps/334

❸ Examine the legend.

NATIONAL GEOGRAPHIC

Analyzing Watershed Health: Land Cover
Answer Key, continued

1. What do the colors on the map represent? Different types of land cover

   _____

   _____

2. Are there any land cover types that are unfamiliar to you? What are they? Answers will vary.

   _____

   _____

3. Looking at the map, what do you notice about how the land is used in the Chesapeake Bay? Hint: look at the land cover type. There are many different types of land cover represented. There are emergent wetlands along the coast. There are large areas of cropland and deciduous forest. There are clusters of high and low intensity developed land along the coast. Encourage students to interpret this question: what is the difference between "high intensity" and "low intensity" developed land?

4. Which land cover types are common? Where are they located? Deciduous forest is most of the land cover—particularly on the western side of the watershed. Cropland is concentrated in the northern mainland and eastern peninsula of the bay. High- and low-intensity developed land is located along the coast.

5. For the action plan, there are some land cover types that will require a response. For instance, in areas where there is cropland, cover crops will have to be planted. Identify what color represents each of the following land cover types:

   a. Cultivated Cropland orange

   b. High-Intensity Developed (Urban) black

   c. Low-Intensity Developed (Urban) grey

   d. Pasture/Hay pale yellow

NATIONAL GEOGRAPHIC

NatGeoEd.org

Part 2. Examine land cover data at the selected sites.

❶ Enter "Annapolis, Maryland", in the Search box in the bottom right corner of the map.

    1.   What land cover types appear to be common around Annapolis? How do you know?

    High- and low-intensity developed deciduous forest, some woody and emergent wetlands, and less cultivated cropland.

❷ In the bottom left of the FieldScope screen, you should see a scale. Zoom in on the map until the maximum distance on the scale reads 10 km.

❸ Hold a ruler or piece of paper up to the screen and mark this 10 km distance. Later on, you will use this marking as your "10 km measuring tool."

❹ On the left toolbar, click on Data Query Tool. Click on Query by Drawing a Circle.

❺ Return to the map and place your cursor in the center of Annapolis. Hold it down until the radius of the circle (from the center to the outside) is approximately 10 km. Use your "10 km measuring tool" to help you estimate the size of the circle.

❻ A box will pop up that says, "Use the selected shape to perform query?" Click Continue.

    2.   A table pops up that describes the four most common land cover types within the area of your circle around Annapolis. On your *Project Data Table*, record the land cover types, along with the percentage and area of land they cover within your circle. Low-intensity urban (34.7%), deciduous forest (21.4%), woody wetlands (17.6%), and high-intensity urban (8.92%). Note: results may vary slightly based on the actual size of the students' circles.

❼ Repeat the same procedure for the other sites.

See Teacher Version *Project Data Table*

NATIONAL GEOGRAPHIC

Analyzing Watershed Health: Land Cover
Answer Key, continued

Part 3. Chesapeake Bay Action Plan Connection

❶ On your Project Data Table, you should have recorded the top four land cover types, including the percentages and the area for each type within your circle for each site. The Action Plan includes management plans for four different land cover types:
a. Cropland
b. Pasture/hay
c. Low-Intensity Developed
d. High-Intensity Developed

❷ Look over your Project Data Table and highlight these land cover types.

See *Project Data Table* answer key.

❸ Complete the third box on your Decision Statement Planner worksheet to identify the best site for an action plan based on type of land cover. Pay attention to the percentage and area of land used for different types of land cover and refer to your Stakeholder Table to help you make this decision.

See *Decision Statement Planner* answer key.

NATIONAL GEOGRAPHIC

NatGeoEd.org