

Teacher Notes for Watersheds

Slide #	Notes	Additional Notes
1	Image courtesy of Scenic Hudson, Inc.	
2	A watershed includes all of the land that drains into a particular body of water. Remind students that water always flows <i>downhill</i> . Shown here is a Hudson river view, with stormking mountain in the foreground and arrows showing the approximate direction that water would flow down the landscape. This entire region ultimately drains into the Hudson River. Image courtesy of Scenic Hudson, Inc.	
3	Ask students: What happens to water when it hits the ground? Encourage them to look at the different surfaces and think about where the water that hits each of those surfaces goes.	
4	Ask students: Which areas in the image do you think will have the most runoff? Which will have the most water taken in by plants? Etc.	
5	Briefly review the water cycle using either this or the next water cycle slide.	
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7	Then ask: What determines what happens to water when it hits the ground? Answer: Land cover! In this image, we see many types of land cover. Ask: What land cover types can you identify?	
8	Have students brainstorm different types of land cover. They should be able to provide an explanation for why their land cover type is different from others. (i.e. different size, type, and/or abundance of vegetation.)	
9	Shown here are four major land cover types: farms, urban areas, forests, and mixed use land cover.	
10	Have the students tell a story about how water moves in this landscape during a big rainstorm. Where does the water go? (Answer: infiltrates into the soil, is taken up by the trees and other vegetation, flows downhill into streams, reservoirs, and ultimately the Hudson River.)	
11	In what ways might water move similarly in a forest and on farmland? How might it move differently? Similarly: infiltrates into the soil, is taken up by the vegetation, runs into nearby holding reservoirs and streams; Differently: low vegetation doesn't use as much water as it would in a forest, rain will wash away a lot more soil than it	

	would in a forest (more bare ground/tilled so easily mobile, fewer leaves to break water's speed when it hits); also carries fertilizer from farmland to streams/ponds nearby.	
12	<p>Have a student put these images into an order of increasing urbanization. (top-right: Fishkill; bottom-left: Newburgh; bottom-right: Manhattan). Point out that Fishkill has a mixed-use landscape – lots of trees, but also lots of ‘grey’ (impermeable) surfaces.</p> <p>Then ask: How does water move across the landscape of Manhattan during a big storm? What implications does this have for flooding and the cleanliness of our waterways? Have them compare this with the forested and agricultural landscape.</p>	
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16	<p>Ask: Which landscape shown has the highest amount of vegetation? Which has the most impermeable surfaces? Which has the most permeable surfaces?</p>	
17	Note the added bonus of forests.	
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21	<p>Urban areas typically deal with their storm water by quickly channeling it to a water treatment facility, and with it motor oil, sediments, fertilizers, garbage and other pollutants. Aging water treatment plants are often used despite using out-dated technology designed for a much smaller population years ago.</p> <p>After treating the water as best as the facility can (which can be quite poorly done due to the above-mentioned problems), the facility releases the water into a nearby stream or waterway. This frequently has negative impacts on local wildlife.</p> <p>Standing water in these impervious surfaces is prime breeding ground for nuisance organisms such as mosquitoes.</p>	
22	Let's look back to our watershed as a whole.	
23	<p>This image shows the health of various streams, tributaries, lakes, and rivers in the New York portion of our watershed. The health of these waterways is often assessed by sampling macroinvertebrate (stream bug) populations. Some bugs can live in polluted waters, but many can't. If you find the ones that can't live with pollution in your stream, you know it's healthy. Their absence is a good indicator that the water is not healthy.</p>	

24	<p>Ask: Do you see any trends in where the impaired and impacted (red and orange) waterways are compared with the healthy waters (blue)?</p> <p>Many of the impacted waters in our watershed are near or along the Hudson River and associated canal systems.</p> <p>Ask: Why do you think we see this trend?</p> <p>These are typically more urban and/or agricultural areas.</p> <p>You'll see that places with big chunks of 'blue' (healthy waters) also correspond to mountainous regions (see brown areas in watershed map at left), where there are fewer urban areas and the land is unsuitable for agriculture.</p>	