

Riparian Rain Check

Background: The riparian zone is the land adjacent to a stream or river. A healthy, functioning riparian zone is characterized by a diversity of plants, including trees, understory, and herbaceous species. The presence of a wide riparian zone ensures a healthy stream ecosystem in a number of ways and is the best method known for reducing the threat of nonpoint source pollution.

- The widespread roots of the trees, warm-weather grasses and other herbaceous plants help to hold the soil in place, especially along the banks of the stream.
 - Leaves and branches of the plants (of all sizes) break the force of falling raindrops, reducing the energy of the moving water. Slower-moving water is less likely to dislodge and carry soil particles into the stream.
 - Trees in the riparian zone absorb excessive nutrients, such as nitrates and phosphates, which may have been carried with rainwater from farmers' fields or residential lawns. These nutrients become bound in the growth of the tree and are held "in storage" until such time as leaves and branches fall to the ground or into the stream. There, with the help of decomposers, the nutrients are slowly released and recycled into the system through the food chain.
 - The survival needs for many wildlife species (food, water, shelter and space) are provided in a diverse, well-vegetated riparian zone.
1. Discuss with the students the above-listed functions of a riparian buffer zone. If possible, bring the group to the edge of an established riparian buffer to show them concrete examples as you direct the discussion. Compare this with an area without a buffer.
 2. Set up for the "Riparian Rain Check" game. Place two orange traffic cones approximately 15 feet apart on a playing field (these represent the edge of the stream). Place another two cones about 25 feet apart, located approximately 30 feet down the field from the first set (these represent a construction site with loose topsoil and no erosion control devices).
 - Construction Site
 - 25 feet apart *
 - 15 feet apart *
 - Stream
 3. Tell the students that they are going to become a newly planted riparian buffer zone on a rainy day. Select two students to be tree seedlings. They will station themselves somewhere near the stream bank, between the two cones. Their job will be to stop the raindrops before they can carry nonpoint source pollution into the stream. The remaining students will be raindrops carrying sediment toward the stream. Give each of these students a brown flag to tuck into their clothing and mark them as raindrops/soil particles.

4. The raindrops/soil particles should line up at the construction site. When the leader yells, "Go!" the raindrops should run toward the streambank and attempt to cross the line (they must run between the cones). The trees should attempt to tag as many raindrops as possible keeping one foot "planted" in the ground at all times. When they capture a raindrop, the trees should take their brown flags. Time this "rainstorm" for 10 seconds (adjust time according to the group's age and ability). Yell, "Stop!" when the time is up.
5. Count and record the number of raindrops that were intercepted by the trees during the 5-second time period. Explain that the nutrients carried by the raindrops has been captured by the root systems of the trees, and now it has been used to help the trees to grow and reproduce. The students who were tagged will now become trees (as the riparian zone grows wider and more vegetated).
6. Repeat the exercise with the additional trees guarding the stream. Count the captured raindrops again. Were there more captures? (Just as more nonpoint source pollutants can be filtered out by wider and more vegetated riparian buffer zones.)
7. Variation: have the trees link arms and stand directly in front of the stream bank to protect it. This simulates the intertwining of roots in the stream bank. The trees may decide to test whether it is more effective to be planted next to the stream or further away. Discuss the results.
8. At the conclusion of the game, explain that the riparian buffer zone acts to filter out nonpoint source pollutants such as sediment. The wider and more vegetated the buffer, the more effective it is.
9. Ask the students to describe ways that human activity can change the condition of the stream. Be sure that positive (plant riparian buffer zones) as well as detrimental (overfertilizing lawns, disturbing soil, and leaving unprotected) activities are mentioned.

*Activity borrowed from Penn State's Sustainable Forestry Teacher's Resource Center.
"To Protect Your Stream, Protect Your Mountains Lesson Plan"
<http://sftrc.cas.psu.edu/LessonPlans/Water/ProtectStreams.html>. Decemeber 7, 2006.