Study looks at best way to bring healthy streams back after development

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Is it possible to truly restore a stream disturbed by housing developments and road construction? Can it return to its natural state, complete with buzzing insects and fish and worms that wiggle through its muddy bottom? Ecologist Robert Hilderbrand is about the find out.

Dr. Hilderbrand and his research team at the University of Maryland Center for Environmental Science's Appalachian Laboratory are examining the abilities of different stream restoration techniques to better improve the ecological side of stream restorations in urban watersheds. His research under a newly funded Chesapeake Bay Trust grant will examine approximately 40 existing urban stream restorations in Montgomery and Anne Arundel counties over the next three years.

"Many people think that restoration will return a stream to its pre-disturbance state. However, few studies have looked at enough restorations to come to a firm conclusion," he said. "We're hoping that our research will not only identify the best techniques for ecological improvement, but will also identify realistic goals for stream restoration when faced with a highly degraded system."

The streams existed before the houses, roads and shopping centers were built, but they became degraded due to excessive runoff from the increase in impervious surfaces nearby, sudden increases in water temperature due to thunderstorms on hot parking lots, and sediment and pollution from nutrients and chemicals carried into the streams during storms.

Stream restoration is a widely used approach within the Chesapeake Bay watershed to improve degraded streams. Stream channels are reconstructed or reconnected to floodplains, and structures such as woods or rocks are added to help bring back habitat for wildlife and disperse the energy of the water flow when it rains.

While the stream channel may be reconstructed and look normal, aquatic organisms, such as fish and insects, seem to lag behind improvements in the "look" of a restored stream. Hilderbrand's research team will examine various restoration methods and sites—from those restored decades ago to those newly restored—to figure out which techniques work best to achieve the most ecological benefit.

"Restoring a stream can cost upwards of $1 million mile in extreme cases, almost like building a road, and it can be very time and money consuming," said Hilderbrand. "If we are not quite getting what we're expecting to get back in terms of the ecosystem, we need to reprioritize."

As a result of this study, the stream restoration community can use these findings when deciding where best to invest in restoration projects that will maximize benefits.

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