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ECOLOGICAL
RESEARCH PROGRAM

RESEARCH SHOWS IMPORTANCE OF RIPARIAN BUFFERS FOR AQUATIC HEALTH

Issue:

Excess nitrogen from fertilizer, septic tanks, animal feedlots, and runoff from pavement can threaten aquatic ecosystem health. Riparian buffers -- the vegetated region adjacent to streams and wetlands -- are thought to be effective at intercepting and controlling excess nitrogen. Resource managers often ask how wide a riparian buffer zone should be to effectively control nitrogen loads entering water bodies.

Science Objective:

Scientists at the U.S. Environmental Protection Agency's Office of Research and Development evaluated the importance of riparian buffer width on nitrogen control. They also determined if federal and state regulations regarding riparian buffer widths corresponded to the current scientific understanding of buffer effectiveness.

Scientists found that nitrogen removal effectiveness varied widely among riparian zones studied, but important and consistent trends emerged.

Nitrogen moving in water beneath the soil surface was more effectively removed in riparian buffers than when nitrogen flowed in water moving across the soil surface. While some narrow buffers (1-25 meters) were effective at removing significant proportions of nitrogen, wider buffers greater than 50 meters more consistently removed significant portions of nitrogen. Buffers of various vegetation types were equally effective at removing nitrogen.

Application and Impact:

This EPA research effort represents the most current, comprehensive review of nitrogen removal in riparian buffers. The 2005 EPA report on nitrogen removal effectiveness in riparian buffers has been accessed more than 50,000 times since being made available on EPA's Web site. This information can be used by natural resource managers to develop effective riparian management plans that employ buffers as a best management practice to control excess nitrogen in watersheds.

References:

Mayer, P.M.; S.K. Reynolds; M.D. McCutchen; and T.J. Canfield. *In press*. Meta-analysis of nitrogen removal in riparian buffers. *Journal of Environmental Quality*

Mayer, P.M.; S.K. Reynolds; M.D. McCutchen; and T.J. Canfield. Riparian Buffer Width, Vegetative Cover, and Nitrogen Removal Effectiveness: A Review of Current Science and Regulations. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-05/118, 2005. (Available at: www.epa.gov/ada/download/reports/600R05118/600R05118.pdf)

Contact:

Paul Mayer, Ph.D., ecologist, EPA's Office of Research and Development. 580-436-8647, or mayer.paul@epa.gov

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