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Erosion from Logging Roads and Skid Trails: case study data from Robinson Forest

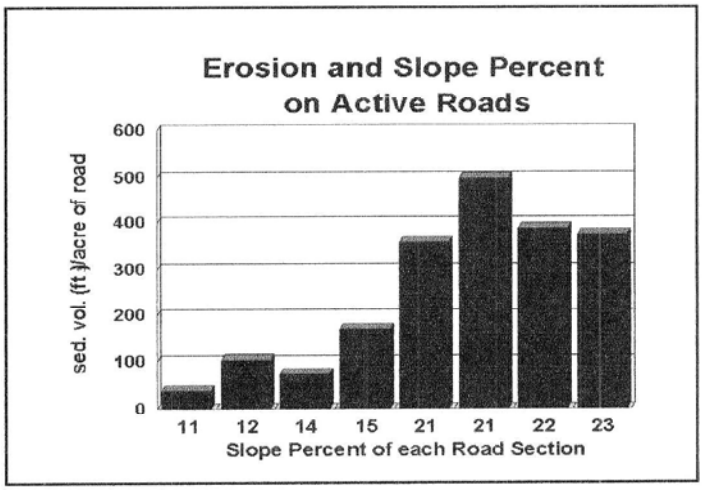
Jeff Stringer and Laurie Taylor

A set of timber harvesting haul roads and skid trails were established at Robinson Forest in 1994 to demonstrate how Best Management Practices (BMPs) can be used to reduce soil erosion, a leading contributor to nonpoint source pollution. This fact sheet provides a summary of the erosion data collected from these roads and trails and provides graphic support for the use of BMPs aimed at reducing erosion. This information demonstrates that erosion on active roads increases with increasing slope percent, retired roads and trails erode less than active ones, erosion of active roads continues for long periods of time, and armoring of reverse grade water control structures reduces erosion.

Slope percent varied widely among sections of the roads and trails and appropriate cross drainage water control structures were used at recommended intervals[1] to reduce erosion. The drainage control structures divided the roads and trails into sections. Sediment traps with sediment monitoring pins were placed at the outlet of each drainage control structure to collect the concentrated flows and to aid in the measurement of the sediments coming from each section. Erosion was also measured along transects over the road and trail surface to help pinpoint exactly where erosion was occuring on each section of road. To demonstrate the effectiveness of BMPs some sections of the roads and trails were retired while others were left open to traffic and some reverse grade drainage control structures were armored with gravel and others left bare. Sediment data were collected 1 year and 4 years after road and trail construction. Erosion data are displayed as volume of sediments collected per acre of road or trail.

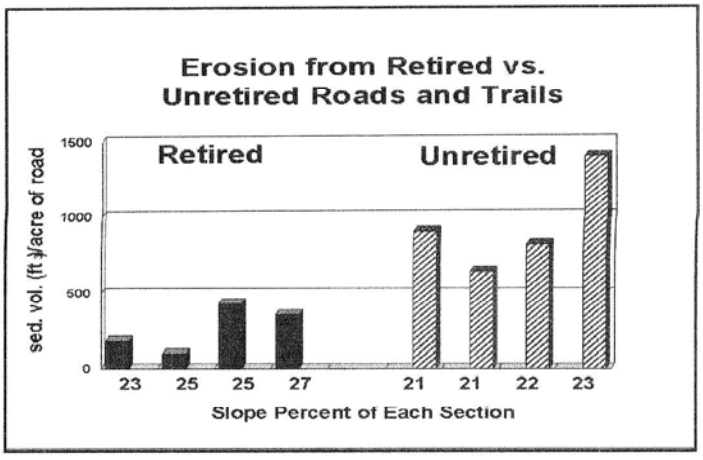
Erosion and Slope Percent on Active Roads

As the slope of a haul or access road increases so does the potential for soil erosion. Kentucky's road and trail BMP states that access or haul roads should maintain a maximum grade or slope percent of 15. Short stretches of 200 feet or less may be as much as 18 percent. This graph shows that erosion on active roads at Robinson Forest increased dramatically when slopes exceeded 15 percent. The erosion resulted from loose soil due to tire slippage and unstable cut banks. This indicates that controlling road slope as specified in the BMPs can help reduce erosion on active haul and access roads.



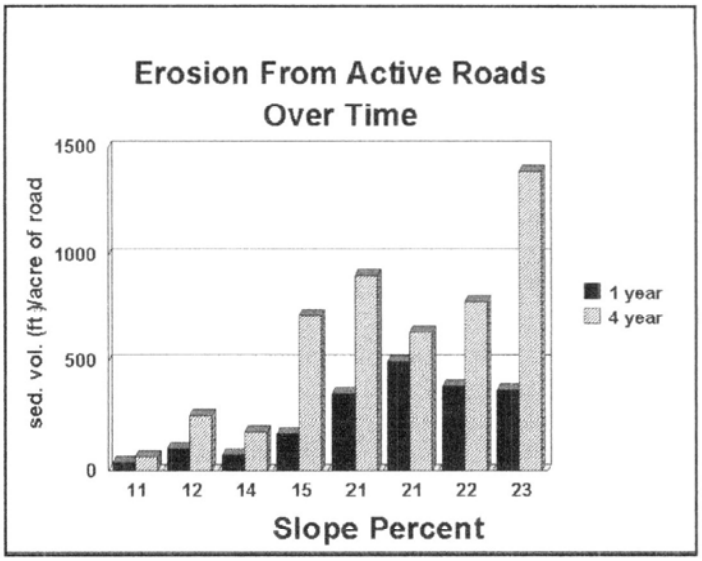
Road and Trail Retirement Reduces Erosion

A properly retired road or skid trail has much less erosion potential than one that is not retired. Kentucky's BMPs require that roads and trails are revegetated as soon as possible. The BMP manual also recommendeds that access be restricted on retired roads and trails. The adjoining graph shows the reduction in sediment volume due to revegetation and retirement compared to roads and trails which are left bare and traffic is not restricted. This data indicates that retiring roads and trails as soon as possible can help control erosion.



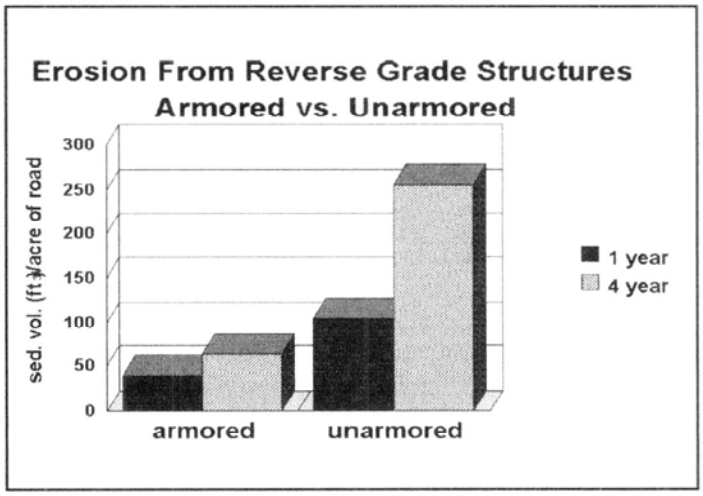
Erosion Continues on Active Roads

Erosion is usually greatest immediately after road construction. Comparing the sediments collected from active roads after the first year to the total sediments collected after 4 years supports this concept. However, notice that erosion is still occurring several years after construction. This indicates that maintaining proper road drainage is important as long as the road is being actively used. Road and trail maintenance and the appropriate timing of retirement activities can reduce problems in the future.



Erosion From Armored vs. Bare Reverse Grade Structures

Erosion from reverse grade water control structures, such as broad based dips and shallow water breaks can be reduced by the use of gravel on the structure (sometime referred to as armoring). This graph shows that when gravel was applied, just to the reverse grade structures, erosion was reduced. The gravel in this location was effective in eliminate rutting and disturbance of the dip, reducing erosion. Kentucky's BMP guidelines recommend armoring water control structures and the entrance of haul roads onto public highways when gravelling the entire road is not practical.



[1]Stringer, J.W., and C. Perkins. 1998. Kentucky Forest Practices Guidelines for Water Quality Management. University of Kentucky, Department of Forestry FOR-67.110pp.

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(J.Stringer 0.5M 9/98)