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MEASURING VOLUNTARY COMPLIANCE WITH BEST MANAGEMENT PRACTICES IN EAST TEXAS' FORESTS

Roger G. Lord and Kelly Bell, Jr.

Background. The Federal Clean Water Act of 1987 called for states to establish a program for development and implementation of voluntary Best Management Practices (BMPs) to reduce nonpoint source water pollution. The *Texas Silvicultural Nonpoint Source Pollution Project*, funded by a Section 319 Grant from the EPA, is administered by the Texas Forest Service (TFS). One task of the project was to develop a monitoring program to evaluate the implementation and effectiveness of the voluntary silvicultural BMP program. Objectives of the monitoring program were to: (1) measure the degree of compliance to BMP standards by forest landowners, contractors, forest industry, and government agencies, and (2) evaluate the effectiveness of BMPs as applied in the field and identify weaknesses in the BMP guidelines that need revision.

A total of 257 check sites were targeted using the formula of one compliance check site per two million cubic feet of harvested timber. Sites were distributed regionally and among ownership categories based on the proportion of estimated annual timber harvest for each county to total harvest in East Texas and were intended to represent the distribution of all silvicultural operations. Three years of data were used in order to reduce the estimation error inherent in the county-level data. Ninety-six sites, or 37 percent, were targeted in Northeast Texas, and 161 sites, or 63 percent, were targeted in Southeast Texas. Evaluations were conducted from July 1, 1991 through August 31, 1992 using a checklist comprised of 62 questions divided into seven categories: site characteristics, permanent roads, skid trails/temporary roads, streamside management zones, site preparation, log sets and overall compliance.

Research Findings. BMP compliance was evaluated on 162 of the 257 targeted sites, totalling over 25,000 acres. Initial contact with landowners, gathering background information, and post-inspection follow-up used more time than was anticipated. Serious deficiencies found within the major categories during the inspections included: (1) Permanent roads: failure to stabilize stream crossings, and roadside ditches dumping into streams; (2) Temporary roads: lack of water bars or other drainage structures, incorrect stream crossings (poor location or wrong angles), use of logs and dirt in stream crossings, and failure to restore and stabilize stream crossings; (3) Streamside management zones (SMZs): lack of SMZs on intermittent streams (not required under the current version of BMPs); and (4) Site preparation: erosion on firelines

surrounding the tract. Eighty-eight percent of the sites received a passing grade of fair or better overall compliance rating. Compliance varied by ownership, type of operation, landowner and contractor knowledge of BMPs, level of forester involvement, and other site specific factors.

Generally, compliance was highest on sites (1) managed under public ownership; (2) where a forester was involved; (3) with low soil erodability; (4) where the landowner was familiar with BMPs; (5) where the logger or contractor was familiar with BMPs; (6) where the activity was supervised by the landowner or a representative; and (7) where the activity was site preparation or commercial thinnings. The deficiencies related to temporary roads especially at stream crossings had the greatest negative impact on water quality.

Compliance checks were also helpful in evaluating BMP effectiveness. When implemented properly, BMPs are effective in controlling nonpoint source pollution. Failures observed were the result of either incorrect implementation or failure to integrate other BMPs in addition to those that were used. Although the BMPs appear to be an effective means of preventing nonpoint source pollution, two weak areas were identified. These weaknesses resulted in recommendations that BMPs be revised to include (1) extension of SMZs to include protection of intermittent streams, and (2) increased attention to the control of fireline erosion.

Application. Results confirm superior BMP compliance on public lands, especially the National Forests. The major forest products companies and large nonindustrial private forest (NIPF) landowners have done a commendable job since 1990 in incorporating BMPs into operations on their lands, although improvements are possible. As expected, NIPF landowners with small tracts have tended to lag behind larger landowners in BMP compliance. These landowners are generally less intensively involved in forest management, only infrequently sell timber, have limited cash flow from which to pay the additional expenses of BMPs, and most often lack the technical background needed to consistently implement BMPs when they are needed. At times, they are taken advantage of because of their lack of experience in timber marketing. However, results show landowners and silvicultural contractors improve their compliance as they become more familiar with BMPs. It is estimated there are 150,000 NIPF landowners and 2,500 silvicultural contractors in East Texas. A long term educational effort will be needed to improve BMP compliance and reduce nonpoint source pollution from silvicultural activities.