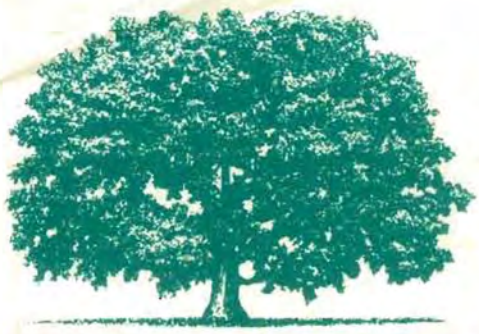
Forestry Best Management Practices: Managing to Save the Bay

An Assessment and Analysis Report on Forestry BMP Implementation in Maryland



Forestry Best Management Practices: Managing to Save the Bay

An Assessment and Analysis Report on Forestry BMP Implementation in Maryland

Prepared by:

Steven W. Koehn and Jeffrey D. Grizzel

Maryland Department of Natural Resources
Forest Service
Annapolis, Maryland

May 15, 1995

Maryland Department of Natural Resources Forest Service
.... leading the effort to sustain healthy forests, trees and greenspace...

DNR Forest Service Mission: To Conserve and Enhance the Quality, Quantity, Productivity and Biological Diversity of the Forest and Tree Resources of Maryland.

ACKNOWLEDGMENT

The Maryland Department of Natural Resources graciously acknowledges the contributions of personnel and resources made by the DNR-Forest Service, the Maryland Department of the Environment, the Maryland Association of Soil Conservation Districts, the Eastern Shore Resource Conservation and Development Board, and the Maryland Forests Association, without whom this project would not have been possible. Jack Perdue, then Chief of the DNR-Forest Service's Forest Product Utilization and Marketing Program, provided the initial impetus for this project in an earlier effort to secure CWA §319 funds. The assistance of Rob Northrop, Don VanHassent, Jack Perdue, Kenneth Jolly and Phil Pannill of the DNR-Forest Service is also appreciated for filling in as Project Coordinators, for some of the BMP site evaluation field reviews. Mike Grant and Mark Eanes, both with the DNR-Forest Service, were instrumental with the development of the BMP mail surveys and data processing respectively. Maureen Brooks and Barbara Rice with the DNR-Forest Service and Gail Fields with the DNR-Public Communications Office were extremely helpful with making the BMP mail surveys more user friendly and contributing to the design, layout and graphics of the report document. A special thanks goes to Pam Cressman for her patience and word processing skills in producing a quality report document.

* *Published by the Maryland DNR-Forest Service with funding provided by the U.S. Environmental Protection Agency through a competitive Clean Water Act Section 319(h) grant.*

INTRODUCTION

The Maryland Department of Natural Resources - Forest Service received a grant from the U.S. Environmental Protection Agency to conduct an assessment and analysis of forestry Best Management Practice (BMP) implementation in Maryland during the summer and fall of 1994.

Maryland's Nonpoint Source Pollution (NPS) Management Program, prepared in response to Section 319(h) of the Clean Water Act, addresses silvicultural activities. Silvicultural nonpoint source pollution impacts depend on site characteristics, climate conditions, and the forest practices employed. Sediment, nutrients, herbicides and increased temperature are pollutants commonly associated with forestry activities. These activities may include harvesting, forest management, and road construction and maintenance.

Nonpoint source runoff from forest harvest operations has the potential for causing sediment and nutrient loadings to water systems throughout the state. In an average year, over 27,500 acres of forest land are impacted by silvicultural operations, many of which can cause NPS pollution. Currently, there is no mechanism to check the effectiveness of the Department of Natural Resource's programs to educate loggers and landowners about the value and need to implement BMPs for forest harvest operations. Compliance inspections with the required sediment control plans are primarily complaint driven. Therefore good information on the effectiveness of forestry BMPs is not readily available. Adequate research has not been done to find out how effective current programs are in meeting the objectives of reducing sediment loads, the levels of BMP acceptance, implementation and success and, how effective DNR's logger education program is in actually modifying behavior on site.

The foundation for this project was a logger/landowner mail survey and an assessment and field survey of harvested sites to determine levels of BMP implementation and effectiveness. The information learned through this effort will be used to make changes to our technology transfer delivery system. If the on-the-ground inspection determines that a BMP failed due to improper installation, then additional technical assistance and training will be made available to the operator. If the inspection determines that the BMP itself is not capable of controlling water, then either a different BMP will be recommended for that particular situation, or that specific BMP will be redesigned to function properly for that given set of circumstances. The mail survey determined BMP awareness, implementation, compliance, and success. The survey was designed to yield data for use in evaluating information, education, and technical assistance.

PROJECT OBJECTIVES

The primary objective of this project was to estimate the level of compliance with Maryland's forestry BMPs by evaluating BMP implementation on private forest lands throughout the state. A secondary objective was to determine whether forest products operators and private landowners were aware of Maryland's forestry BMP requirements and what their attitudes towards implementing them are.

FIELD SURVEY TEAMS

In Maryland, the responsibility for protecting soil and water resources during forest harvest operations is shared among a number of organizations. Several state and local government agencies and the forest industry each play a role in ensuring that BMP requirements are met on all forest harvest operations in the state. The Department of the Environment (MDE) has regulatory authority for enforcing sediment and erosion control plans on logging operations; the Department of Natural Resources (DNR) provides technical and educational training to forest products operators and forest landowners; the local Soil Conservation Districts (SCD) review and approve sediment and erosion control plans; and finally, the forest products operators implement the sediment and erosion control plans based on Maryland's forestry BMP requirements.

Since all four groups mentioned above are part of the process, it was important for each to be involved in the project. Requests were made by the DNR-Forest Service to each governmental agency as well as the Maryland Forests Association (a private non-profit organization which represents the majority of the forestry industry in Maryland) to provide representatives for the field-level BMP implementation survey across the state.

Each survey team consisted of five members: the project coordinator (DNR forest hydrologist), a sediment control inspector (MDE), a forester (DNR), a soils specialist (SCD), and an industry representative (MFA). The original intent was to maintain consistency among sites by using a single team for each physiographic region. However, due to scheduling conflicts and other commitments among the members, the single team concept was not possible. While each organization was represented on the survey teams, representation varied within and among physiographic regions.

SITE SELECTION AND EVALUATION

Field survey sites were selected from sediment and erosion control plans approved between January 1993 and March 1994. An initial screening of the plans was performed to select: (1) only operations that involved greater than 10 acres but less than 350 acres, and (2) only sites which contained streams, ponds, lakes, or wetlands. Size limits eliminated both small sites that were likely to have little or no off-site impacts, and large sites that would require a lengthy evaluation. The presence of water bodies ensured the evaluation of a full range of BMPs (i.e. streamside management zones and stream crossings).

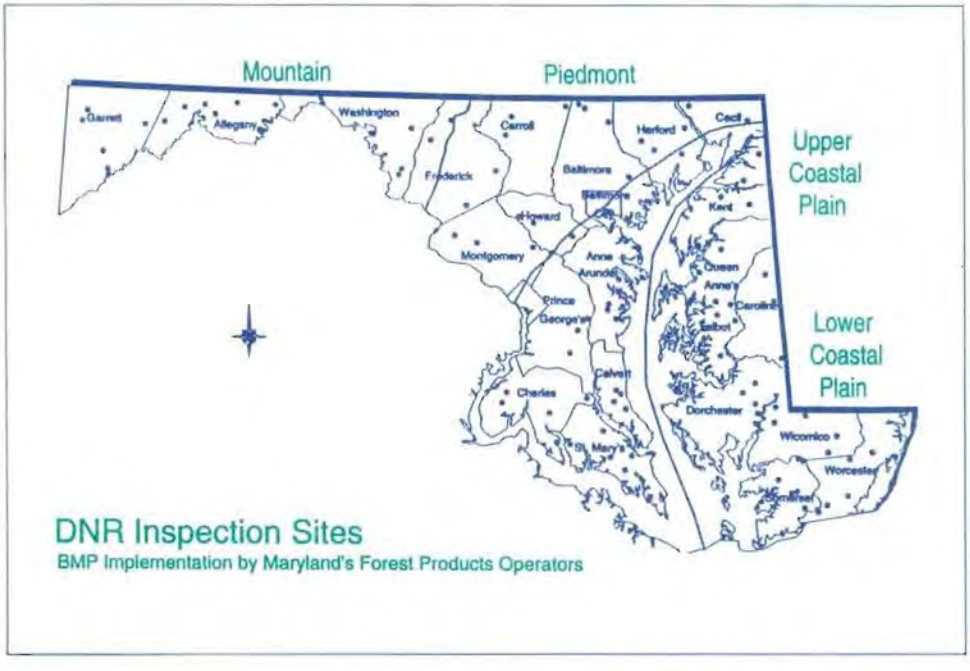
Final survey sites were randomly selected from the screened plans. In order to obtain a representative sample of forest harvest operations across the state, the number of survey sites within each county was predetermined. The number of survey sites within a county ranged from three to six and was based on the level of past harvest activity. In several cases, the harvest operation had not been completed at the time of site selection even though the sediment control plan had been approved. This eliminated several sites originally selected for evaluation. When this occurred, an alternate site was selected. In only one case was the survey team denied access by a landowner; here again an alternative site was chosen. A total of 99 sites were selected from the pre-screened population of approximately 800 sediment and erosion control plans approved during the 15 month period (12% sample). The locations of survey sites are illustrated in the State map on page 6.

The site evaluation form was developed in accordance with "Maryland's Guide to Forest Harvest Operations and Best Management Practices" (DNR-Forest Service 1992). The form included a total of 23 questions separated into five broad BMP categories: (1) haul roads and skid trails, (2) stream crossings, (3) streamside management zones (SMZ), (4) landings and log decks, and (5) soil stabilization. Questions related to haul roads and skid trails focused on access point protection, location and construction of roads and trails, maintenance of surface water drainage and soil rutting. Questions related to stream crossings focused on the number of crossings, the level of streambank disturbance, and maintenance of surface water drainage. Questions related to streamside management zones focused on retention of forested buffers, the level of SMZ disturbance, and the amount of logging debris in stream channels. Questions related to landings and log decks focused on location relative to stream channels, maintenance of surface water drainage, and the amount of litter left on site. Questions related to soil stabilization focused on surface erosion control on cut and fill slopes, landings, and skid trails. The intent of the form was to be comprehensive yet minimize personal bias by requiring "YES" or "NO" answers to each question. There was space at the end of each question for each survey team member to include written comments as appropriate.

Evaluations began during May 1994 and continued through August 1994. Survey team members traveled to each site as a group but evaluated the site individually. During site evaluations, team members usually walked the site alone or split into small groups. Once the survey team had walked the site, the group reconvened to eliminate from the evaluation those survey questions which did not apply to the site. For example, soil stabilization questions were often not applicable to sites with low topographic relief. The consensus approach ensured that all team members answered the same questions which later proved to simplify the task of data analysis. Survey team members then completed their evaluation forms independently, answering each question that was applicable. Once evaluations were submitted to the project coordinator, the team discussed their findings, noting the positive and/or negative aspects of the operation.

LANDOWNER/ LOGGER BMP MAIL SURVEY

Two mail surveys were conducted; one for licensed forest products operators and the other for forest landowners who own between 5 and 350 acres and had conducted a forest harvest operation within the last 18 months. This pool of forest landowners was also used to select the harvest operations for the site evaluation inspections. These surveys sought to determine the levels of forestry BMP awareness, acceptance,



DNR Inspection Sites
BMP Implementation by Maryland's Forest Products Operators

implementation, compliance and success. See appendix for survey questions. The following are just a few examples of the information sought through the mail survey:

- Are landowners aware of forestry BMPs?
- Did a forester assist with the harvest?
- What types of BMPs are being implemented during harvesting operations?

Surveys were mailed to 624 licensed forest products operators, and 221 forest landowners. All respondents could choose to participate anonymously or affix the address label to the survey form if they were interested in learning more about forestry BMPs. Though the initial mailings differed by over 400 surveys, the response was amazingly similar 17.3% and 22.6% respectively.

DATA PROCESSING AND ANALYSIS

BMP Site Evaluations

Each evaluation form contained a total of 23 questions distributed among five broad categories for a total of 115 questions for each evaluation site. To calculate the percent compliance for each site, the number of questions receiving favorable responses was divided by the total number of applicable questions (since not all 115 questions were always applicable to each site). As a result, responses to individual questions formed the basis for determining compliance. Differential statistical weighting by category was based on the number of questions in each category.

Compliance percentages were calculated at the question and category levels for each of the 99 evaluation sites to determine statewide BMP compliance. The results were also grouped by Maryland's four physiographic regions to determine regional compliance. Survey team members' written comments were summarized by common "themes", which oftentimes corresponded to individual BMP questions or BMP categories. Four qualitative rating classes were established to define BMP compliance: Excellent=90%+, Good=80-89%, Fair=70-79%, and Low=<70%.

RESULTS

Statewide BMP Compliance

A total of 99 sites were evaluated statewide. The overall compliance score was calculated to be 82%, which placed statewide compliance in the Good class. Results indicate that compliance varies by BMP category, ranging from Excellent for Landings/ Log Decks to Low for Soil Stabilization. Compliance with BMP requirements for Streamside Management Zones and Haul Roads/Skid Trails was Good, while Stream Crossings compliance was Fair. Figure 1 illustrates the compliance percentages associated with each BMP category.

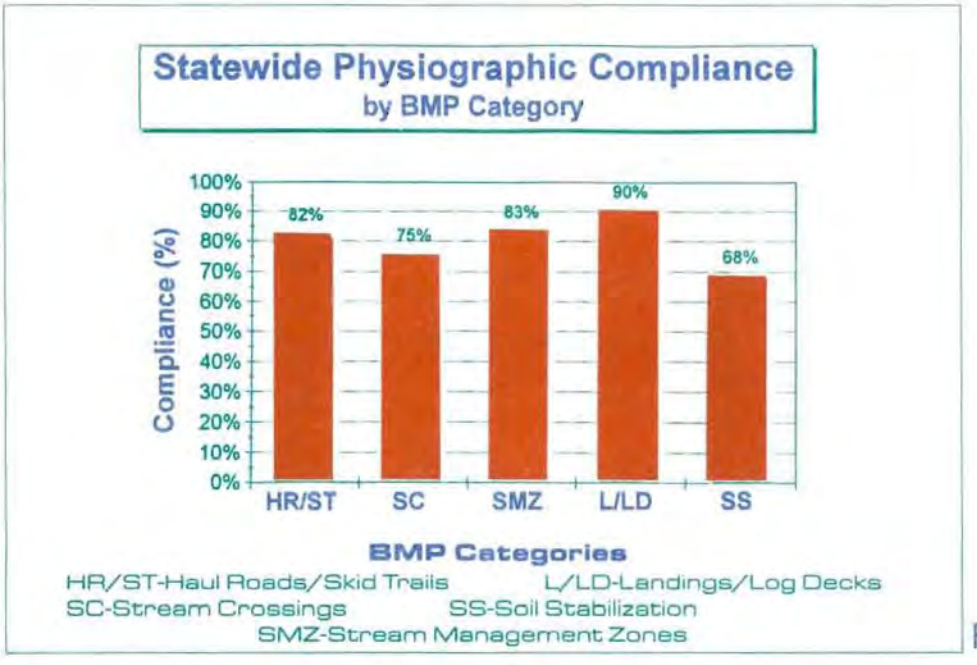


Figure 1.

BMP Compliance By Physiographic Region

Lower Coastal Plain:

The Lower Coastal Plain (LCP) region contained a total of 38 sites and received an overall compliance rating of Good. The calculated compliance score of 89% was the highest among Maryland's four physiographic regions. Figure 2 illustrates compliance percentages for each BMP category.

Haul road and skid trail compliance was rated as Good. In general, the ratings ranged from Good for BMPs such as minimizing rutting to Excellent for BMPs related to access point protection and landing location relative to streams. Written comments noted rutting as a major problem associated with haul roads and skid trails in the LCP region.

Stream crossing BMP compliance was rated as Good. Results indicated that while the number of stream crossings was often minimized (Excellent compliance), established crossings did not always minimize streambank disturbance (Low compliance). In written comments, survey team members attributed this Low compliance rating to poor crossing design or a lack of planning.

Streamside management zone BMPs received an Excellent compliance rating. The retention of forest buffers and the minimization of soil disturbance within the SMZ were both rated Excellent compliance. Although the minimization of slash and logging debris in streams was rated Good overall, written comments often noted excessive debris in streams.

Landings and log deck compliance was rated as Good. The location, construction, and drainage of landings all received Excellent compliance ratings. However, excessive litter left on site resulted in a Low compliance rating overall for this question. Soil stabilization BMPs were only evaluated on one site within the LCP region and therefore should be noted as such in the analysis.

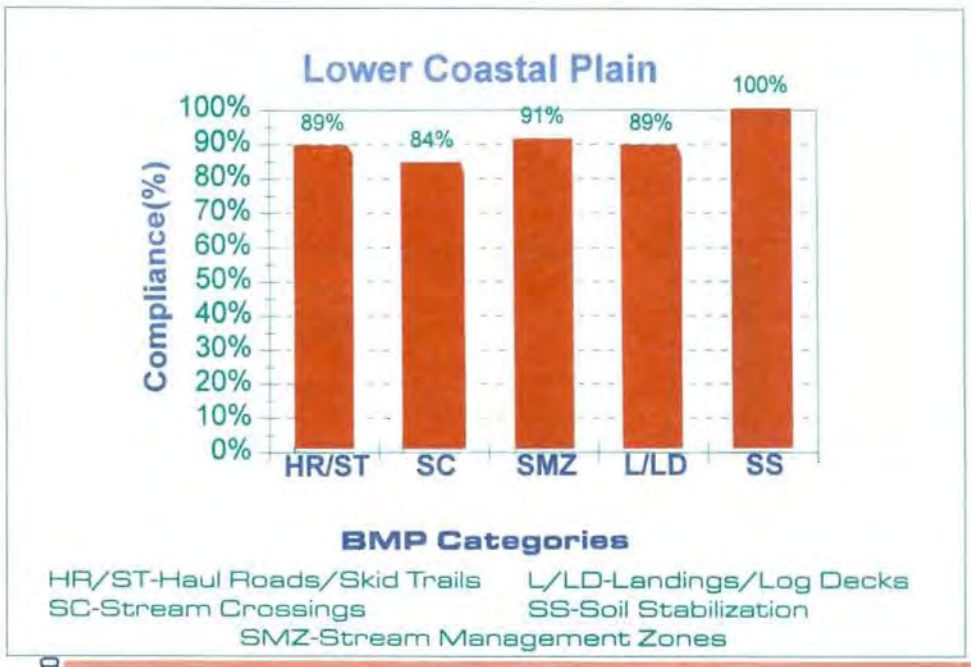


Figure 2.

Upper Coastal Plain:

The Upper Coastal Plain (UCP) region contained a total of 21 survey sites with an overall compliance rating of Fair. The 75% calculated compliance score was the lowest among Maryland's four physiographic regions. Figure 3 illustrates compliance percentages by BMP category.

In general, BMP compliance for haul roads and skid trails was Fair. Locating roads outside SMZs and other sensitive areas was rated as Excellent, however, the installation of waterbars following the harvest was rated as Low. Survey team members most often noted the lack of waterbars and the presence of haul road and /or skid trail rutting in written comments.

Compliance with stream crossing BMPs was rated as Low. While the number of crossings and the degree of disturbance were rated as Good and Fair, respectively, the installation of turnouts prior to crossings was rated as Low. Survey team members provided few written comments regarding stream crossings.

Streamside management zone compliance was rated as Fair, but varied widely among questions. The maintenance of forested buffers was rated as Good, however, the degree of soil disturbance within the SMZ and the level of logging debris in stream channels were both rated as Fair. Both of these issues were often included in team members' written comments. Areas within the SMZ that were disturbed during the operation were rarely seeded or mulched, which was reflected in the Low compliance rating.

Landings/log deck compliance was rated as Good. The location, gradient, and drainage of landings all received Excellent ratings, however, as was the case in the LCP region, litter on a large number of sites resulted in a Low compliance rating. Written comments most often noted the presence of litter left on site.

Compliance with soil stabilization BMPs was rated as Low. Seeding and mulching of road cut and fill slopes and skid trails were rated as Low, while landings were more often stabilized as reflected in the Good rating. A large number of written comments were made regarding the lack of soil stabilization or erosion control.

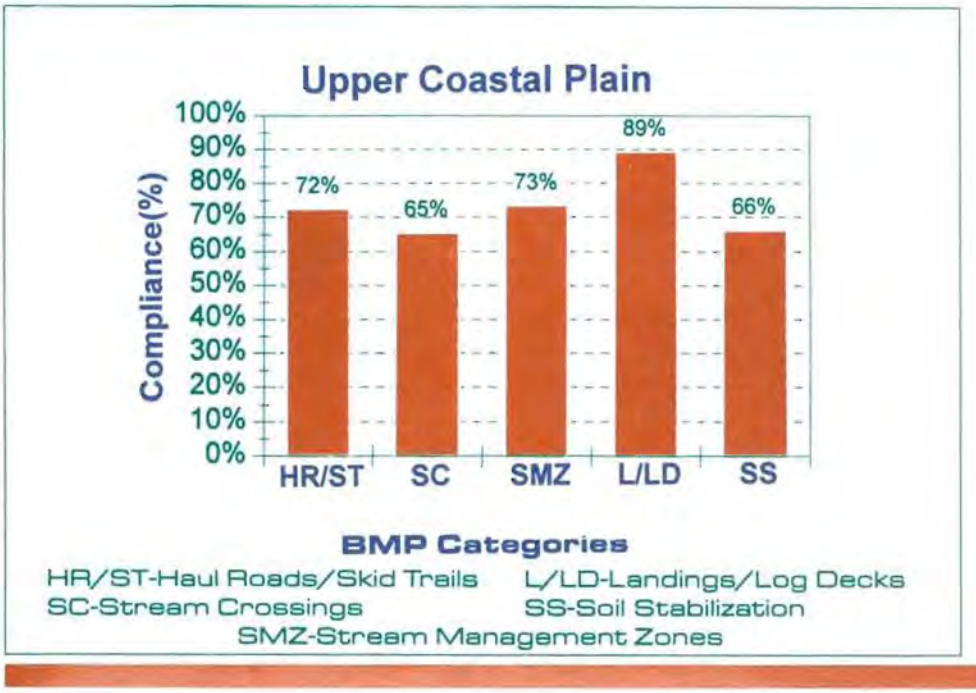


Figure 3.

Piedmont:

The Piedmont region contained a total of 19 survey sites and received an overall compliance rating of Good. The region's 86% calculated compliance score was second highest in the state. Figure 4 illustrates compliance percentages for each BMP category.

Compliance with haul road and skid trail BMPs was Good. In general, the location, construction, and drainage of haul roads received Excellent ratings, while skid trail construction received ratings of Good and Fair. While the minimization of rutting was rated as Good overall, many written comments noted rutting as a problem. The installation of waterbars following the harvest received the only Low rating in the category, which was also reflected in survey team members' written comments.

Compliance with stream crossing BMPs was rated as Fair. While team members felt that the number of crossings was minimized (Good rating), many crossings created excessive disturbance, as indicated by the Low compliance rating. In addition, turnout installation prior to crossings was rated Low. Written comments regarding stream crossings showed no significant trend

Streamside management zone compliance was rated Good, with the retention of forest buffers, minimizing soil disturbance within the SMZ, and limiting logging debris in streams all receiving Good ratings. The only Low ratings related to the repair of exposed soils within SMZs. Written comments were made regarding excessive logging debris in streams, which seems to contradict the Good compliance rating.

Landing/log deck compliance was rated as Excellent, as were ratings for landing location relative to streams, limiting landing gradients, and maintaining surface water drainage. Limiting the amount of litter left on site received a Good rating. No trend in written comments was apparent.

Compliance with soil stabilization BMPs was Fair, however, both cut and fill slope stabilization and landing stabilization were rated as Excellent. The single Low rating was associated with seeding and mulching of skid trails, which also appeared in the written comments.

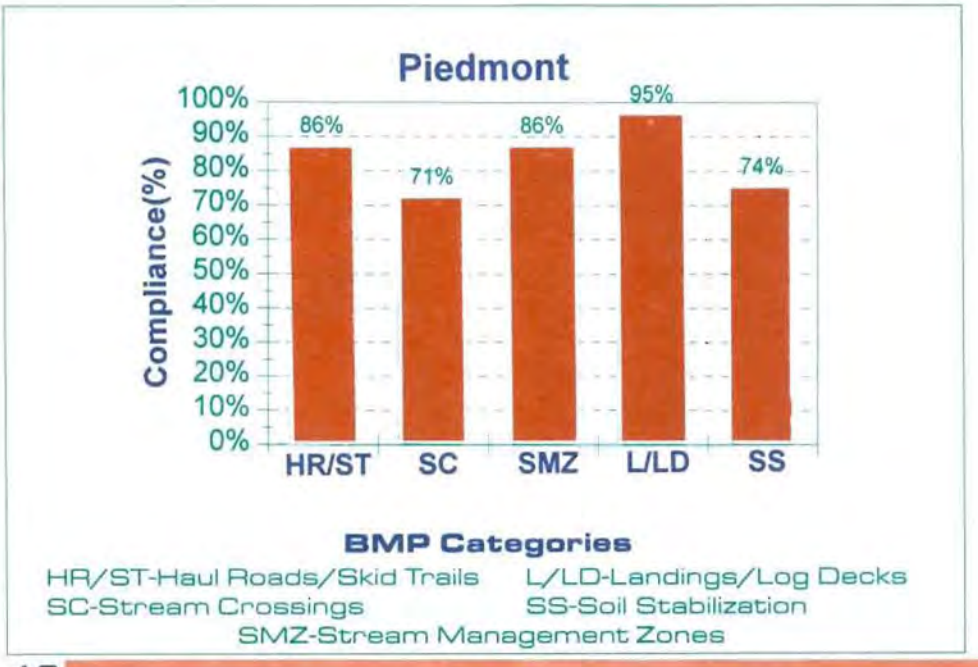


Figure 4.

Mountains:

The Mountain region contained a total of 19 survey sites and received an overall compliance rating of Good. The 78% calculated compliance score ranked third among Maryland's four physiographic regions. Figure 5 illustrates compliance percentage for each BMP category.

Haul road and skid trail compliance was rated as Good. While haul road BMPs were rated as Excellent, other BMPs in the category were rated as Low. These included limiting skid trail gradients, maintaining drainage on skid trails, and installing waterbars following the harvest. The minimization of rutting was rated as Good, while access point protection was rated as Excellent. Written comments focused mainly on the lack of waterbars and excessive skid trail gradients.

Stream crossing BMP compliance was rated as Fair. As was the case with all other regions, the number of stream crossings received a higher compliance rating then did the degree of disturbance associated with the crossings. In the Mountains region, the number of crossings was rated as Excellent (few in number), while limiting disturbance was rated as Low. The installation of turnouts prior to crossings was also rated as Low. Few written comments were provided for stream crossings.

Streamside management zone compliance was rated as Fair. The retention of forested buffers and limiting disturbance within the SMZ were both rated as Fair. Limiting the amount of logging debris entering the stream channel was rated as Good, however, the repair of exposed soil within the SMZ was rated as Low. Written comments were evenly distributed among excessive logging debris in streams, soil disturbance within the SMZ and adequacy of forested buffers.

Landing/log deck compliance was rated as Good. The proper location of landings relative to streams was rated as Excellent. Limiting landing gradient, ensuring adequate drainage, and limiting the amount of litter left on site received Good ratings. Few written comments relating to landings were provided.

Soil stabilization received a Low compliance rating. Road cut and fill slopes and landing stabilization both received Fair ratings, while compliance with skid trail stabilization requirements was Low. The lack of seeding and/or mulching was noted in survey team members' written comments.

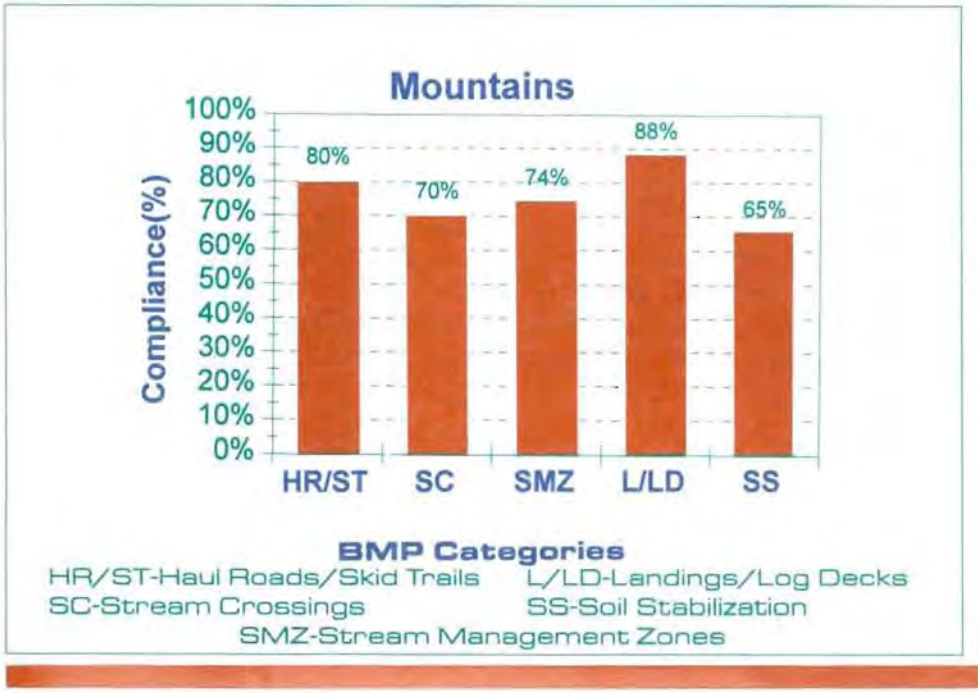


Figure 5.

Forest Products Operators Survey

The primary operations of the respondents were firewood, logging, and sawmill operator and 27% indicated that they operated multiple businesses. The majority of the respondents (78%) felt that BMPs were necessary and that the guidelines were adequate (62%). Of the remaining 38%, about half felt they were too strict and the rest felt it depended on the site or were unsure. BMP awareness came from multiple sources, the most common being: logger seminars (39%), state service foresters (27%), consulting foresters (21%), Soil Conservation Districts (20%), and other forest products operators (18%).

About half (47%) of the forest products operators responding to the survey were approached primarily by private landowners to initiate their most recent timber sale. Consultant and industrial foresters initiated timber sales with responding operators 8% and 6% of the time, respectively. Most of the recent harvests were between 5-20 acres, with the majority of the rest being between 51-100 acres. Most of the harvests were partial thinnings (70%), not clearcuts (12%). Forty-three percent responded that they had sought the advice and assistance of a forester prior to initiating their most recent sale. Consulting foresters (32%) and state service foresters (27%) were contacted most frequently, followed by industrial foresters (15%). Sixty-three percent of those responding had a written timber sale contract, of which more than half (52%) included provisions which exceeded the legal requirements for sediment and erosion control measures (BMPs). The types of BMPs used on the last harvesting operation included: landings (56%), roads & trails (54%), streamside management zones (53%), soil stabilization (48%), and stream crossings (35%).

Forest Landowner Survey

The majority (86%) of the respondents were non-industrial private forest landowners. Most forest holdings were between 21-50 acres (46%) with the next highest category between 101-250 acres (22%). The vast majority of respondents were aware of standard forestry BMPs (78%) and mandatory wetland BMPs (68%). As with the forest products operators, BMP awareness came from multiple sources, the most common being: consulting foresters (40%), state service foresters (32%), Soil Conservation Districts (18%), and forest products operators (18%). Landowner seminars were very low on the list (2%). Most landowners agreed that BMPs are necessary (78%) with the majority (46%) indicating that the BMP guidelines are adequate. Only 24% felt that the BMP guidelines were too strict.

The reasons given for harvesting varied but the most common was to generate income (80%) followed by salvage of damaged timber (36%), initiate forest renewal (38%), comply with a written forest management plan (26%), improve wildlife habitat (28%) and aesthetics (16%). Most of the recent harvesting was conducted on forest holdings between 21-50 acres with the majority of the balance between 5-250 acres (2 were over 500 acres). The majority of the landowners initiated their own timber sale (72%). Of the landowners who were approached to sell their timber, the most common solicitors were loggers, consulting foresters and sawmills, respectively. The majority of landowners (78%) sought advice from consulting foresters (48%), state service foresters (36%) and industrial foresters (10%) prior to marketing their timber. Only 20% of the respondents did not seek or receive any professional advice before initiating harvesting activities. Overall, 94% of the forest landowners responding indicated that they were satisfied with their most recent forest harvesting operation.

Comparison

It is interesting to compare the responses provided by each group of respondents. Both forest products operators and forest landowners feel strongly that forestry BMPs are necessary to control nonpoint source pollution and that the guidelines for implementation are not too strict.

While most operators get their BMP information through seminars, landowners prefer the one-on-one contact with a forester on their land as the best way to get BMP information. Both groups of respondents indicated that the majority of harvesting is done by partial thinnings and not clearcuttings. Across both groups, the most common tract size is between 5 and 50 acres. Only about half (43%) of operators sought professional assistance prior to the commencement of harvesting as opposed to landowners who sought such advice much more often (78%). Of those who sought assistance for both groups, consulting foresters, state service foresters and industrial foresters were the primary sources of information, respectively.

CONCLUSIONS

BMP Site Evaluation Inspections

The results seemed to confirm that it is easier to comply with forestry BMPs on flatter ground than on areas having greater topographic relief. While there were some regional differences, the results largely indicated a positive trend towards good pre-planning, layout and design. Improper implementation of construction practices for the installation of stream crossings, turnouts, waterbars, and soil stabilization were also indicated by the site evaluation inspections.

Landings/log decks and streamside management zones were areas with relatively good compliance. Landings were well located, constructed and sloped to facilitate good drainage and minimize erosion. Haul roads were also located and constructed correctly and access points were adequately protected. Streamside management zones showed good compliance for the retention of forest buffers and limiting the number of stream crossings.

The results also indicated that there are areas of concern which deserve further attention relative to correct implementation and educational outreach efforts. Stream crossings and soil stabilization were two areas where survey team members indicated improvements could be made. Controlling water on haul roads and skid trails was problematic since waterbars and turnouts were seldom installed or maintained properly. In the Mountain region, steep slopes were a problem on many of the skid trails, although this occurred for relatively short stretches. While the number of stream crossings appeared to be successfully limited, the level of streambank disturbance indicated operators still had trouble constructing acceptable crossings. Poor construction design and practice implementation appeared to be the major reasons so many stream crossings received low ratings. Soil stabilization using seeding and mulching proved to be a problem, especially within SMZs and on cut and fill slopes. Skid trails and stream crossings would also have received higher ratings if adequate soil stabilization had been completed properly. A problem which should be easy to address relates to the presence of litter on most landing areas. The elimination of litter on landings would improve the rating for the Landing and Log Deck category substantially.

The Logger/Landowner Mail Surveys

Several conclusions can be drawn from the results of the logger/landowner mail surveys. It is apparent that the BMP message has been successfully communicated to the job site and it has been embraced by both the forest products industry and private landowners. Since only a small segment of those responding felt that the BMP guidelines were too strict, the argument can be made that the majority think the guidelines are reasonable and readily implementable on-the-ground. Both groups respond well to one-on-one contact, and seminars seem to work quite well with forest products operators. One-on-one contact with target clientele is a very effective method of technical assistance delivery, as evidenced by half of the operators and three quarters of landowners seeking and receiving a forester's advice prior to the commencement of harvesting activities. The vast majority of operators and landowners prefer to do business with a written contract. Half of the contracts signed by operators and two thirds of the contracts signed by landowners, require extra BMPs above and beyond Maryland's legal requirements. Stream crossings was a BMP category which had lower applicability than other categories according to the mail survey. One possible reason for this may be that both operators and landowners are making efforts to limit crossing streams to avoid being delayed by the requirements of the regulatory and permit process.

RECOMMENDATIONS FOR FUTURE ACTIONS

- A detailed forestry Best Management Practice monitoring survey needs to be performed on a regular basis, at least once every three years. The monitoring system should include more quantitative techniques that will better assess how specific BMPs are functioning. A survey team made up of permanent members for each physiographic region of the state needs to be created to better facilitate consistency in field data collection.

- The DNR-Forest Service needs to assume the lead for BMP monitoring along with its technical assistance and educational responsibility for landowners and forest products operators alike.

- Forestry Best Management Practices' outreach and training delivery mechanisms need to be revised in several areas, especially soil stabilization, stream crossings, and water control devices for haul roads and skid trails. The DNR-Forest Service should take the lead in this effort with input from the forestry community, forest landowners,the general public and thc regulatory community.

- Efforts to educate forest landowners and forest products operators need to continue and in some cases be expanded. In addition to classroom lectures and slide shows, operators should be given the opportunity to learn BMP installation techniques in an outdoor setting using the types and kinds of equipment normally found on a harvesting site. Forestry BMP training should be a cooperative effort among the Rural Conservation and Development Boards, the DNR-Forest Service, the Cooperative Extension Service, and the Maryland Forests Association.

APPENDIX

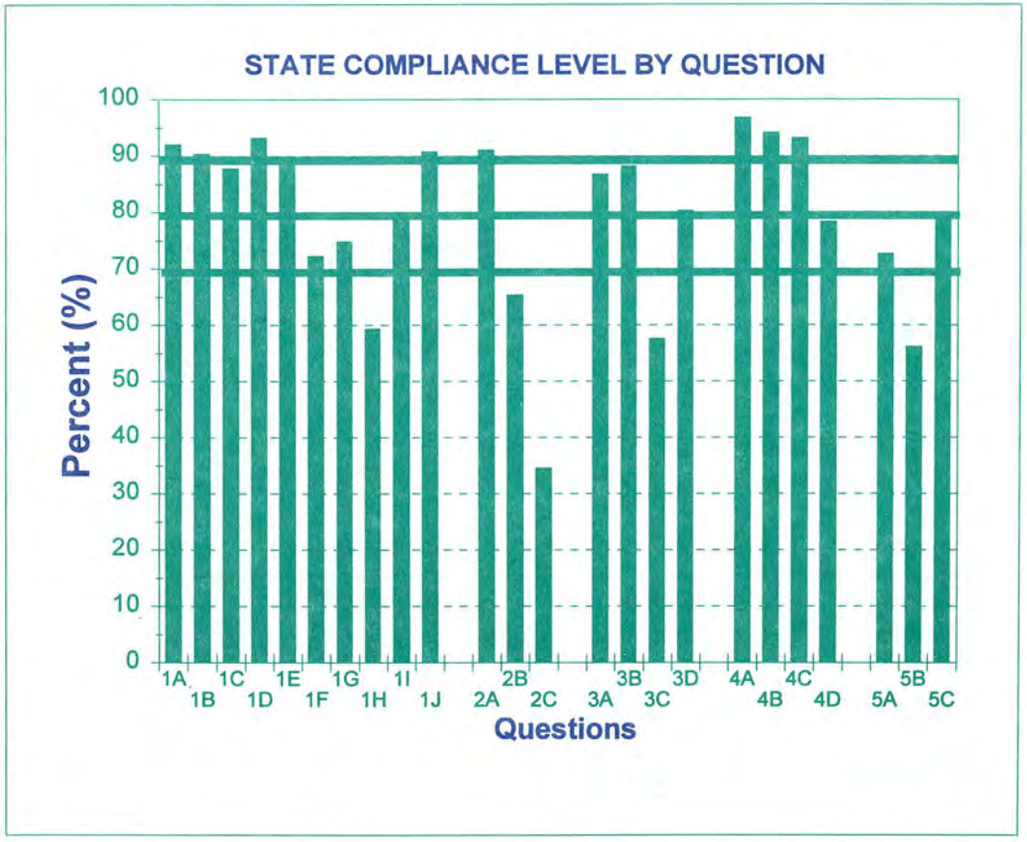
PHYSIOGRAPHIC COMPLIANCE BY QUESTION

QUESTION #	DESCRIPTION	PIEDMONT	L. COAS. PLAIN	U. COAS. PLAIN	MOUNTAINS	ALL REGIONS
SECTION 1	HAUL ROADS/ SKID TRAILS					
1A	LOCATION	92%	94%	91%	91%	92%
1B	HAUL ROAD GRADIENTS	94%	100%	67%	95%	90%
1C	HAUL ROAD DRAINAGE	98%	85%	89%	85%	88%
1D	CUT AND FILL SLOPES	100%	N/A	50%	99%	93%
1E	DRAINAGE OUTLETS	100%	84%	79%	95%	90%
1F	SKID TRAIL GRADIENTS	89%	100%	78%	49%	72%
1G	SKID TRAIL DRAINAGE	75%	94%	64%	54%	75%
1H	WATERBARS	58%	25%	59%	62%	59%
1I	RUTTING	84%	81%	76%	77%	80%
1J	ACCESS POINT PROTECTION	92%	95%	70%	93%	91%
	TOTAL 1	86%	89%	72%	80%	82%
SECTION 2	STREAM CROSSINGS					
2A	AMOUNT	88%	96%	78%	100%	91%
2B	DESIGN	48%	69%	70%	63%	65%
2C	ROAD DRAINAGE	20%	0%	36%	43%	35%
	TOTAL 2	71%	84%	65%	70%	75%
SECTION 3	STREAMSIDE MANAGEMENT ZONES					
3A	FOREST BUFFER RETENTION	89%	93%	80%	76%	87%
3B	SOIL EXPOSURE	91%	98%	76%	76%	88%
3C	SOIL REPAIR	47%	100%	58%	58%	58%
3D	LOGGING DEBRIS	86%	82%	73%	80%	80%
	TOTAL 3	86%	91%	73%	74%	83%
SECTION 4	LANDINGS/LOG DECKS					
4A	LOCATION	98%	96%	99%	96%	97%
4B	GRADIENTS	100%	100%	99%	83%	94%
4C	PONDING	96%	95%	90%	89%	93%
4D	LITTER	85%	77%	69%	84%	78%
	TOTAL 4	95%	89%	89%	88%	90%
SECTION 5	SOIL STABILIZATION					
5A	CUT AND FILL SLOPES	100%	N/A	36%	74%	73%
5B	SKID TRAILS	59%	100%	59%	50%	56%
5C	LANDINGS	97%	100%	81%	71%	79%
	TOTAL 5	74%	100%		65%	68%
	REGIONAL TOTALS	86%	89%	75%	78%	82%

OVERALL STATE COMPLIANCE RATINGS BY QUESTION

	COMPLIANCE	APPLICABILITY
EXCELLENT		
(4A) LANDING LOCATION	97%	93%
(4B) LANDING GRADIENT	94%	61%
(1D) CUT AND FILL SLOPES	93%	25%
(4C) LANDING DRAINAGE	93%	96%
(1A) HAUL ROAD LOCATION	92%	64%
(2A) NUMBER OF STREAM CROSSINGS	91%	66%
(IJ) SITE ACCESS POINT PROTECTION	91%	80%
(1B) HAUL ROAD GRADIENT	90%	37%
(1E) ROAD DRAINAGE OUTLETS	90%	43%
TOTAL APPLICABILITY		63%
GOOD		
(1C) HAUL ROAD DRAINAGE	88%	53%
(3B) SMZ SOIL EXPOSURE	88%	86%
(3A) SMZ FOREST BUFFER RETENTION	87%	86%
(3D) SMZ LOGGING DEBRIS	80%	86%
(1I) ROAD AND TRAIL RUTTING	80%	100%
TOTAL APPLICABILITY		82%
FAIR		
(5C) LANDING EROSION PREVENTION	79%	41%
(4D) LITTER DISPOSAL MEASURES	78%	99%
(1G) SKID TRAIL DRAINAGE	75%	96%
(5A) ROAD CUT/FILL SLOPE CONTROL	73%	22%
(IF) SKID TRAIL GRADIENT	72%	60%
TOTAL APPLICABILITY		64%
LOW		
(2B) STREAM CROSSING DESIGN	65%	42%
(IH) WATERBAR INSTALLATION	59%	44%
(3C) SMZ SOIL REPAIR	58%	26%
(5B) SKID TRAIL EROSION PREVENTION	56%	51%
(2C) TIMING OF STREAM CROSSING MEASURES	35%	17%
TOTAL APPLICABILITY		36%
CATEGORY		
(4) LANDINGS	90%	87%
(3) STREAM MANAGEMENT ZONES	83%	71%
(1) HAUL ROADS AND SKID TRAILS	82%	60%
(2) STREAM CROSSINGS	75%	42%
(5) SOIL STABILIZATION	68%	38%
TOTAL APPLICABILITY		61%

QUESTION	DESCRIPTION
1A	HAUL ROAD LOCATION
1B	HAUL ROAD GRADIENT
1C	HAUL ROAD DRAINAGE
1D	CUT AND FILL SLOPES
1E	ROAD DRAINAGE OUTLETS
1F	SKID TRAIL GRADIENT
1G	SKID TRAIL DRAINAGE
1H	WATERBAR INSTALLATION
1I	ROAD AND TRAIL RUTTING
1J	SITE ACCESS POINT PROTECTION
2A	NUMBER OF STREAM CROSSINGS
2B	STREAM CROSSING DESIGN
2C	TIMING OF STREAM CROSSING MEASURES
3A	SMZ FOREST BUFFER RETENTION
3B	SMZ SOIL EXPOSURE
3C	SMZ SOIL REPAIR
3D	SMZ LOGGING DEBRIS
4A	LANDING LOCATION
4B	LANDING GRADIENT
4C	LANDING DRAINAGE
4D	LITTER DISPOSAL MEASURES
5A	ROAD CUT/FILL SLOPE CONTROL
5B	SKID TRAIL EROSION PREVENTION
5C	LANDING EROSION PREVENTION



PHYSIOGRAPHIC REGIONAL COMPLIANCE LEVEL BY SITE

	TOTAL (100%)	EXCELLENT (90-99%)	GOOD (80-89%)	FAIR (70-79%)	LOW L(<70%)	# Sites	Compliance
Lower Coastal Plain	3	25	4	3	3	38	89%
Upper Coastal Plain	1	6	6	2	8	23	75%
Piedmont	2	10	3	2	2	19	86%
Mountains	0	4	6	4	5	19	78%
Total	6	45	19	11	18	99	82%

LOW COMPLIANCE BY PHYSIOGRAPHIC REGION

Lower Coastal Plain (38 Sites)	7.9%
Upper Coastal Plain (23 Sites	34.8%
Piedmont (19 Sites)	10.5%
Mountains (19 Sites)	26.3%
TOTAL (99 Sites)	18.2%

COMPLIANCE LEVEL BY ACRE SIZE OF HARVEST

ACRES	TOTAL (100%)	EXCELLENT (90-99%)	GOOD (80-89%)	FAIR (70-79%)	LOW (<70%)	TOTAL	COMPLIANCE
10-25	1 (2)	20 (53)	6 (16)	5 (13)	6 (16)	38	83.2%
26-50	3 (10)	13 (42)	4 (13)	3 (10)	8 (26)	31	80.5%
51-100	1 (7)	6 (43)	3 (21)	2 (14)	2 (14)	14	84.2%
101-300	1 (6)	6 (37.5)	6 (37.5)	1 (6)	2 (12.5)	16	83.2%
TOTAL	6	45	19	11	18	99	82%

( ) = % OF SIZE RANGE TOTAL

HARVEST SIZE BY PHYSIOGRAPHIC REGION IN ACRES

REGION	SITES	TOTAL	AVE.	MEDIAN	HIGH	LOW
Lower Coastal Plain	38	2374	62	30.5	214	12
Upper Coastal Plain	23	1155	50	40	180	10
Piedmont	19	532	28	22	60	10
Mountains	19	1534	81	50	300	15
TOTAL	99	5595	57	35	300	10

BMP Operator Survey (108 Survey Responses) *VS.* BMP Landowner Survey (50 responses)

Trade	#	%
Logger	42	39
Firewood	41	38
Sawmill	39	36
Veneer	11	10
Tree Service	3	3
Chipper	2	2
Multiple Trades*	29	27
No Response	3	3

* also listed individually above

Landowner Type	#	%
Private	43	86
Industrial	2	4
No Response	5	10

Counties of Operation*

Central Region		
Carroll	15	9
Baltimore	14	8
Harford	11	6
Howard	6	3
Cecil	7	4
Montgomery	4	2
Totals	**57**	**33**

West Region		
Garrett	18	10
Allegany	14	8
Washington	11	6
Frederick	8	5
Totals	**51**	**29**

East Region		
Queen Anne's	9	5
Talbot	8	5
Caroline	7	4
Somerset	5	3
Kent	5	3
Wicomico	4	2
Dorchester	4	2
Worcester	3	2
Totals	**45**	**26**

South Region		
St. Mary's	5	3
Charles	5	3
Prince George's	4	2
Anne Arundel	5	3
Calvert	3	2
Totals	**22**	**13**

*42 respondents did not indicate county(s) of operation

Forest Location

Central Region		
Carroll	4	7
Baltimore	3	5
Montgomery	1	2
Howard	0	0
Cecil	0	0
Harford	0	0
Totals	**8**	**14**

West Region		
Washington	5	9
Garrett	5	9
Allegany	2	4
Frederick	1	2
Totals	**13**	**23**

East Region		
Wicomico	6	11
Dorchester	4	7
Caroline	3	5
Worcester	3	5
Somerset	3	5
Queen Anne's	2	4
Kent	1	2
Talbot	1	2
Totals	**23**	**41**

South Region		
Anne Arundel	4	7
Prince Georges	3	5
Charles	3	5
Calvert	2	4
St. Mary's	0	0
Totals	**12**	**21**

BMP Operator Survey Responses by Category

	Firewood Operators(41)		Sawmill Operators (39)		Loggers (42)		All Operators (108)	
	#	%	#	%	#	%	#	%
Opinion on BMP Necessity								
Yes	34	83	29	74	33	79	84	78
No	5	12	7	18	6	14	16	15
No Response	1	2	1	3	2	5	4	4
Not Applicable	1	2	0	0	0	0	1	1
Depends	0	0	2	5	1	2	3	3
Opinion on BMP Stringency								
Too Strict	7	17	10	26	9	21	22	20
Adequate	27	66	25	64	27	64	67	62
Too Lenient	1	2	2	5	2	5	4	4
Not Sure	5	12	2	5	2	5	9	8
Depends on Site	0	0	0	0	2	5	3	3
No Response	0	0	0	0	0	0	2	2
Not Applicable	1	2	0	0	0	0	1	1
Date of Last Harvest								
Within last 6 months	25	61	27	69	32	76	10	9
6 to 12 months ago	11	27	7	18	7	17	19	18
12 to 18 months ago	3	7	0	0	1	2	6	6
More than 18 months ago	1	2	1	3	0	0	1	1
Not Applicable	1	2	3	8	1	2	6	6
No Response	0	0	1	3	1	2	2	2
Source of BMP Education								
Logger seminar	8	20	18	46	24	57	42	39
State Service Forester	12	29	11	28	12	29	29	27
Consulting Forester	7	17	10	26	11	26	23	21
Soil Conservation District	8	20	6	15	9	21	22	20
Fellow Forest Product Operator	12	29	3	8	7	17	19	18
Other Sources	5	12	5	13	3	7	11	10
No Response	3	7	0	0	0	0	4	4
Not Applicable	1	2	0	0	0	0	1	1
Initiator of Last Sale								
Outside Source	18	44	14	36	22	52	51	47
Self	21	51	17	44	16	38	44	41
No Response	1	2	4	10	4	10	7	6
Not Applicable	1	2	4	10	0	0	6	6
Approacher for Last Sale								
Private Landowner	14	34	5	13	10	24	27	25
Consulting Forester	1	2	4	10	3	7	9	8
Industrial Forester	0	0	1	3	4	10	6	6
Sawmill Operator	0	0	0	0	2	5	2	2
Private Contractor	1	2	0	0	0	0	1	1
Pulpwood Dealer	0	0	0	0	1	2	1	1
Firewood Dealer	1	2	0	0	0	0	1	1
More than one Source	3	7	3	8	1	2	4	4
Not Specified	0	0	1	3	1	2	2	2

	Firewood Operators(41)		Sawmill Operators (39)		Loggers (42)		All Operators (108)	
	#	%	#	%	#	%	#	%
Size of Average Harvesting Operation								
less than 5 acres	1	2	0	0	1	2	3	3
5 to 20 acres	25	61	13	33	12	29	40	37
21-50 acres	4	10	8	21	8	19	20	19
51-100 acres	3	7	9	23	14	33	23	21
101-250 acres	0	0	2	5	3	7	4	4
251-500 acres	1	2	3	8	1	2	3	3
more than 500 acres	1	2	0	0	2	5	3	3
Not Applicable	2	5	4	10	0	0	7	6
No Response	4	10	0	0	1	2	5	5
Type of Harvest Normally Conducted								
Partial (e.g. thinning)	29	71	27	69	34	81	76	70
Regeneration (e.g. clearcut)	7	17	2	5	3	7	13	12
Both types above	1	2	5	13	4	10	8	7
No Response	4	10	1	3	1	2	6	6
Not Applicable	0	0	4	10	0	0	5	5
Status on Advice Sought for Last Sale								
Not Sought	29	71	9	23	21	50	49	45
Sought	10	24	21	54	18	43	46	43
No Response	2	5	3	8	3	7	8	7
Not Applicable	0	0	4	10	0	0	5	5
Assistance Received on Last Sale								
Consulting Forester	12	29	18	46	13	31	35	32
None	18	44	7	18	12	29	33	31
State Service Forester	10	24	10	26	15	36	29	27
Industrial Forester	0	0	8	21	8	19	16	15
Written Contract Status on Last Sale								
Contract exceeded legal requirements	15	37	25	64	28	67	56	52
No Contract	15	37	4	10	7	17	25	23
Legal Contract	5	12	4	10	2	5	12	11
No Response	4	10	2	5	3	7	8	7
Not Applicable	2	5	4	10	2	5	7	6
Types of BMP Used on Last Operation								
Landings	13	32	27	69	30	71	60	56
Haul Roads & Skid Trails	15	37	25	64	32	76	58	54
Stream Management Zones	15	37	21	54	32	76	57	53
Soil Stabilization	14	34	23	59	25	60	52	48
Stream Crossings	10	24	21	54	19	45	38	35
Other Types	0	0	1	3	0	0	1	1
Don't Know	11	27	0	0	0	0	12	11
No Response	7	17	1	3	23	55	12	11
Not Applicable	4	10	4	10	0	0	4	4

BMP Landowner Survey

	Private landowners (43 responses)		All Landowners (50 responses)	
	#	%	#	%
Acres Owned				
5-20	3	7	3	6
21-50	19	44	23	46
51-100	4	9	4	8
101-250	10	23	11	22
251-500	5	12	5	10
>500	2	5	4	8
BMP Guidelines Awareness				
Yes	33	77	39	78
No	10	23	11	22
Mandatory Wetland BMP Awareness				
Yes	28	65	34	68
No	15	35	16	32
BMP Knowledge Source(s)				
Consultant Forester	17	40	20	40
State Forester	15	35	16	32
Logger	8	19	9	18
Soil Conservation District	8	19	9	18
Other Non-governmental Source	1	2	3	6
Other Government Source	2	5	2	4
Not Applicable	2	5	2	4
Not Known Until Received Survey	2	5	4	8
Non-Professional	1	2	2	4
Landowner Seminar	1	2	1	2
No Response	1	2	1	2
Opinion on BMP Necessity				
Yes	34	79	39	78
No	4	9	5	10
Depends	2	5	3	6
Don't Know	2	5	2	4
No Response	1	2	1	2
Opinion on BMP Guideline Stringency				
Not Strict Enough	0	0	0	0
Adequate	18	42	23	46
Too Strict	10	23	12	24
Don't Know	12	28	12	24
No Response	3	7	3	6
Time of Last Harvest Operation				
<6 months ago	13	30	16	32
6 to 12 months ago	17	40	21	42
12 to 18 months ago	13	30	13	26
Sale Objective(s) From Last Harvest				
Income	34	79	40	80
Initiate Forest Renewal	14	33	19	38
Salvage Damaged Timber	16	37	18	36
Wildlife Habitat Improvement	14	33	14	28
Forest Management Plan Compliance	12	28	13	26
Aesthetic Improvement	8	19	8	16
Land Use Change	2	5	3	6
Lumber For Barn	1	2	1	2
Improve Standing Timber	1	2	1	2
No Response	1	2	1	2

	Private Landowners (43 Responses)		All Landowners (50 Responses)	
	#	%	#	%
Type of Last Harvest				
Partial	29	67	34	68
Regeneration	12	28	13	26
Both of Above	2	5	3	6
Size of Last Harvest in Acres				
5 - 20	12	28	14	28
21-50	18	42	21	42
51-100	5	12	7	14
101-250	7	16	7	14
251-500	0	0	0	0
>500	1	2	1	2
Kind(s) of BMP Used in Last Harvest				
Streamside Management Zones	23	53	29	58
Landings	18	42	24	48
Soil Stabilization	19	44	23	46
Haul Roads & Skid Trails	14	33	19	38
Stream Crossings	11	26	14	28
Not Completely Known	10	23	10	20
No Response	2	5	2	4
Satisfaction with Last Harvest Operation				
Yes	40	93	47	94
No	3	7	3	6
Initiator of Last Sale				
Self	31	72	36	72
Outside Party	12	28	13	26
Not Applicable	0	0	1	2
Approacher For Last Sale				
Logger	6	14	6	12
Consulting Forester	2	5	3	6
Sawmill Operator	2	5	2	4
More than one source	2	5	2	4
Status on Advice Sought for Last Sale				
Sought	32	74	39	78
Not Sought	10	23	10	20
Not Applicable	1	2	1	2
Assistance Received on Last Sale				
Consulting Forester	21	49	24	48
State Service Forester	17	40	18	36
None	10	23	10	20
Industrial Forester	2	5	5	10
Written Contract Status on Last Sale				
Contract Exceeded Legal Requirements	26	60	31	62
Legal Contract	13	30	15	30
No contract	4	9	4	8

PHYSIOGRAPHIC BMP SUMMARY COMMENTS - POSITIVE

	LOWER COASTAL PLAIN	PIEDMONT	UPPER COASTAL PLAIN	UPLANDS	TOTAL
Use of pre-existing assets	12	18	40	6	76
Very good job	15	4	7	12	38
Minimal buffer disturbance	20	0	6	1	27
Good drainage measures	2	17	3	4	26
Natural plant regeneration supported	1	1	13	7	22
Good job, despite circumstances	4	12	1	3	20
Good seeding job	2	8	2	0	12
Good stream crossing measures	7	0	3	0	10
Good road and trail system	0	9	0	1	10
Good access points	4	5	0	0	9
Good SMZ BMPs	2	7	0	0	9
Good landings	0	6	1	1	8
Minimal erosion	2	2	0	4	8
Good rutting control	4	0	0	0	4
Gradient problems well avoided	0	0	1	0	1
No noticeable litter remaining on site	1	0	0	0	1
Total positive comments	76	89	77	39	281
Total evaluations	170	105	97	105	477
Positive comments/evaluation	0.45	0.85	0.79	0.37	0.59

COMMENT SUMMARY

	East	Central	South	West	Total
Negative Comments/Evaluation	1.28	1.75	1.91	1.74	1.61
Positive Comments/Evaluation	0.43	0.89	0.72	0.43	0.59
Total (Neg.+Pos.) Comments/Evaluation	1.71	2.64	2.63	2.17	2.2
Net (Neg.-Pos.) Comments/Evaluation	0.85	0.86	1.19	1.31	1.02

PHYSIOGRAPHIC BMP SUMMARY COMMENTS - NEGATIVE

	LOWER COASTAL PLAIN	PIEDMONT	UPPER COASTAL PLAIN	UPLANDS	TOTAL
Haul Roads/Skid Trails					
Waterbars/Dips	0	28	22	38	88
Rutting	38	25	7	3	73
Seeding	1	16	15	29	61
Gradients	1	12	9	28	50
Erosion/Stabilization	7	9	16	3	35
Drainage/Ponding	13	0	7	13	33
Planning/Design	2	9	2	2	15
Cut and Fill Slopes	0	0	9	4	13
Access Points	5	6	0	0	11
Maintenance	0	8	1	1	10
Turnouts	0	2	1	1	4
Litter	4	0	0	0	4
Regeneration	3	0	0	0	3
Total Trails	74	115	89	122	400
Stream Crossings					
Planning/Design	18	4	4	1	27
Litter	9	5	4	0	18
Amount	3	7	7	0	17
Drainage/Turnouts	4	3	5	4	16
Erosion/Stabilization	3	3	0	0	6
Protection	0	5	0	0	5
Unapproved	0	0	4	0	4
Seeding	2	0	0	0	2
Rutting	1	0	0	0	1
Total Crossings	40	27	24	5	96
Stream Management Zones					
Logging Debris	23	19	20	4	66
Trails	6	2	13	7	28
Width	4	2	5	5	16
Retention	5	0	4	2	11
Maintenance	4	1	1	0	6
Seeding	0	3	1	2	6
Landings	4	0	1	1	6
Erosion/Stabilization	0	3	1	0	4
Planning/Design	0	2	0	0	2
Total SMZ	46	32	46	21	145
Landings/Log Decks					
Litter	25	2	9	7	43
Seeding/Mulching	2	5	4	8	19
Gradient	0	0	0	11	11
Ponding	4	1	0	0	5
Rutting/Compaction	3	0	1	1	5
Location	1	0	0	1	2
Erosion	0	0	1	0	1
Total Landings	35	8	15	28	86
Miscellaneous					
Tax Ditches	19	0	0	0	19
Poor Overall Job	1	0	7	2	10
Cut Too Severe	0	1	2	0	3
Residual Stand Damage	0	1	0	2	3
Inneffective BMPs	0	0	0	3	3
Poor Harvest Timing	2	0	0	0	2
Ethics	0	0	1	0	1
Owner Dissatisfaction	0	0	1	0	1
Forester Advice Needed	1	0	0	0	1
Total Misc.	23	2	11	7	43
Total Criticisms	218	184	185	183	770
Total Evaluations	170	105	97	105	477
Rate of Criticism/ Evaluator	1.28	1.75	1.91	1.74	1.61

FIELD SURVEY TEAM MEMBERSHIP

FIELD SURVEY TEAM MEMBERSHIP

Project Grant Administration - Steven W. Koehn, Associate Director, Maryland Department of Natural Resources, Forest Service, Annapolis, Maryland.

Field Survey Project Coordinator - Jeffrey Grizzel, former State Forest Hydrologist, Maryland Department Natural Resources, Forest Service, currently Watershed Hydrologist, Washington Department of Natural Resources, Bellingham, Washington.

EASTERN REGION

	COMMENTS
Maryland DNR-Forest Service	
John Bidwell 4329 Golden Hill Rd Church Creek, MD 21622	Project Manager for Dorchester and Wicomico Counties
John Jordan 10990 Market Lane Princess Anne, MD 21853	Project Forester for Somerset and Worcester Counties
Randy Blass 6095 60-Foot Road Parsonsburg, MD 21849	Project Forester for Dorchester and Wicomico Counties
Rob Clarke Nassawango Work Center 6572 Snow Hill Road Snow Hill, MD 21863	Project Forester for Somerset and Worcester Counties
Scott Daniels 4329 Golden Hill Road Church Creek, MD 21622	Project Forester for Dorchester and Wicomico Counties
Kip Powers 201 Baptist Street Salisbury, MD 21801	Regional Forester, Eastern Region
Maryland Department of the Environment	
Alan Hatton Water Management Administration 2500 Broening Hwy Baltimore, MD 21224	Sediment Control Inspector
Bill Villaume MDE Water Management Administration 2500 Broening Hwy Baltimore, MD 21224	Sediment Control Inspector
Chris Westergard Water Management Administration 2500 Broening Hwy Baltimore, MD 21224	Sediment Control Inspector
Soil Conservation Districts	
Dan Rider RC&D 8133 Elliott Road Suite 201 Easton, MD 21601	Forester, Eastern Shore Rural Conservation & Development Board, representing Eastern Shore SCDs
Kevin Keenan Wicomico Co. SCD 2322 B Goddard Pkwy. Salisbury, MD 21801	Wicomico County Soil Conservation District
Maryland Forests Association	
Bill Day Chesapeake Forest Products PO Box 300 Pocomoke City, MD 21851	Logging Supervisor, Chesapeake Corp.
George Jones Chesapeake Forest Products PO Box 300 Pocomoke City, MD 21851	Logging Supervisor, Chesapeake Corp.
Pete Alexander Glatfelter Pulp Wood Co. PO Box 1971 Salisbury, MD 21802-1971	Logging Supervisor, Glatfelter Pulp Wood Co.
Jack Brodie Spicer, Inc 3445 Golden Hill Road Church Creek, MD 21622	Vice President, Wood Procurement, Logging Supervisor
Ace Parker Parker Forestry Service PO Box 2171 Salisbury, MD 21802	Consulting Forester, Logging Supervisor
Steve Ecleston J.V. Wells PO Box 520 Sharptown, MD 21861	Wood Procurement , Logging Supervisor

CENTRAL REGION

Maryland DNR-Forest Service	
Rodney Riffle 17400 Annapolis Rock Road Woodbine, MD 21797	Chief Ranger for Howard and Montgomery Counties; formerly Forest Supervisor for Doncaster Demonstration Forest
Stephanie Smith 17400 Annapolis Rock Road Woodbine, MD 21797	Special Rivers Watershed Forester

Rob Northrop
130 McKinneytown Rd
North East, MD 21901
Central Region Watershed Forester

Bill Bond
17400 Annapolis Rock Road
Woodbine, MD 21797
Project Manager for Howard and Montgomery Counties

Beth Trickett
328A E. Nicodemus Rd
Westminster, MD 21157
Forest Ranger for Carroll and Baltimore Counties

Brenda Belensky
9405 Old Harford Road
Baltimore, MD 21234
Forest Stewardship Wildlife Biologist

Chris Stuhlinger
9405 Old Harford Road
Baltimore, MD 21234
Project Forester for Carroll and Baltimore Counties

Steve Koehn
580 Taylor Avenue
Annapolis, MD 21401
Associate Director, Forest Stewardship

Frank Lopez
2 S Bond Street
Bel Air, MD 21014
Project Forester for Harford and Cecil Counties

Tom Frederick
130 McKinneytown Rd
North East, MD 21901
Project Forester for Harford and Cecil Counties

Maryland Department of the Environment

Maria Warburton
Water Management Administration
2500 Broening Hwy.
Baltimore, MD 21224
Sediment Control Inspector

Chris Westergard
Water Management Administration
2500 Broening Hwy
Baltimore, MD 21224
Sediment Control Inspector

Soil Conservation Districts

Bryan Snyder
Carroll Co. SCD
1004 Littlestown Pike SB2
Westminster, MD 21157
Carroll County Soil Conservation District

Patrick Jones
Harford Co. SCD
1208 Churchville Road S201
Bel Air, MD 21014
Harford County Soil Conservation District

Eric Weberking
Cecil Co. SCD
126 East High Street
Elkton, MD 21921
Cecil County Soil Conservation District

Gary Davis
Harford Co. SCD
1208 Churchville Road S201
Bel Air, MD 21014
Harford County Soil Conservation District

Maryland Forests Association

Paul Maslen
Parkton Woodland Services
17409 Evna Road
Parkton, MD 21120
Consulting Forester, Logging Supervisor

Joe Young
Sheble Forestry Consulting, Inc.
RD 1 Box 1536
Brodbecks, PA 17329
Consulting Forester, Logging Supervisor

Tim Brooks
Rising Sun Log Corp.
791 Biggs Hwy.
Rising Sun, MD 21911
Logging Operator

SOUTHERN REGION

Maryland DNR-Forest Service

Jack Perdue
580 Taylor Avenue
Annapolis, MD 21401
Program Supervisor, Development

David Gailey
PO Box 2746
LaPlata, MD 20646
Project Manager for Charles County

David Plummer
Huntington Community Ctr.
13022 8th Street
Bowie, MD 20720
Special Rivers Watershed Forester

Rob Northrop
120 McKinneytown Rd
North East, MD 21901
Central Region Watershed Forester

Bill Brumbley
Huntington Community Ctr.
13022 8th Street
Bowie, MD 20720
Project Manager for Prince George's and Anne Arundel Counties

Kenneth Jolly
Huntington Community Ctr.
13022 8th Street
Bowie, MD 20720
Program Supervisor, Public Land Forest Stewardship

Maryland Department of the Environment/ Local County Jurisdiction

Mark Ecker
MDE
Water Management Administration
2500 Broening Hwy
Baltimore, MD 21224
Sediment Control Inspector

Scott Burroughs
Anne Arundel Co Planning & Zoning
PO Box 6675
Annapolis, MD 21404
Sediment Control Inspector

Soil Conservation Districts

Alan Cruikshank
Charles Co. SCD
500 E. Charles Street
PO Box 269
LaPlata, MD 20646

Charles County Soil Conservation District.

Maryland Forests Association

Jeff Hoko
Glatfelter Pulpwood Co.
Rt 1 Box 1317A
Port Tobacco, MD 20672

Wood Procurement, Logging Supervisor, Glatfelter Pulp Wood Co., Chairman, Maryland Tree Farm Committee

Dave Chessler
Chessler Forestry Services
550 Barstow Rd
Prince Frederick, MD 20678

Consulting Forester, Logging Supervisor, member Maryland Tree Farm Committee

WESTERN REGION

Maryland DNR-Forest Service

Phil Pannill
1260 Maryland Ave Suite 130
Hagerstown, MD 21740

Western Region Watershed Forester

Jack Perdue
580 Taylor Avenue
Annapolis, MD 21401

Program Supervisor, Development

Donald VanHassent
580 Taylor Avenue
Annapolis, MD 21401

Program Supervisor, Private Land Forest Stewardship

Bob Webster
3 Pershing Street
Cumberland, MD 21502

Regional Forester, Western Region

Bernie Zlomek
3 Pershing Street
Cumberland, MD 21502

Project Manager for Allegany County

Wade Dorsery
Route 6 Box 1990
Oakland, MD 21550

Project Forester for Garrett County

Maryland Department of the Environment

William Murphy
Water Management Administration
2500 Broening Hwy
Baltimore, MD 21224

Sediment Control Inspector

Brad Metzger
Water Management Administration
2500 Broening Hwy
Baltimore, MD 21224

Sediment Control Inspector

Soil Conservation Districts

Bernie Connor
Allegany SCD
Route 3 Box 4-M
Cumberland, MD 21502

Allegany County Soil Conservation District

Craig Hartsock
Allegany SCD
Route 3 Box 4-M
Cumberland, MD 21502

Allegany County Soil Conservation District

Derek Isensef
Frederick Co. SCD
92 Thomas Johnson Dr.
Frederick MD 21702

Frederick County Soil Conservation District

Elmer Weibley
Washington Co. SCD
1260 Maryland Ave Suite 101
Hagerstown, MD 21740

Washington County Soil Conservation District

Shaun Sanders
Garrett Co. SCD
Courthouse Room 355
Oakland, MD 21550

Garrett County Soil Conservation District

Maryland Forests Association

Jeff Bracken
Westvaco
99 Cold Run Valley Rd
Berkeley Springs, WV 25411

Forester, Cooperative Forestry Management , Westvaco Corp., member Maryland Tree Farm Committee

Pete Miller
Westvaco
PO Box 599
Grantsville, MD 21536

Forester, Wood Procurement , Westvaco Corp., President, Maryland Forests Association

Kenneth Roberts
Westvaco
729 Illinois St
Cumberland, MD 21502

Forester, Wood Procurement, Westvaco Corp., member Maryland Tree Farm Committee.

Ken Gibbs
Westvaco
729 Illinois Street
Cumberland, MD 21502

Forester, Wood Procurement , Westvaco Corp.

John Forman
Wood Products, Inc
PO Box 128
Oakland, MD 21550

Wood Procurement, Logging Supervisor

Randy Bernard
Wood Products, Inc
PO Box 128
Oakland, MD 21550

Wood Procurement, Logging Supervisor


STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES