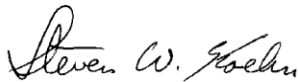


# Procedures for Reporting Forest-related Practices for the Chesapeake Bay Watershed Model

Maryland Department of Natural Resources  
Forest Service

580 Taylor Ave., E-1  
Annapolis, MD 21401  
410-260-8531

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## Objectives

The Maryland DNR Forest Service has defined mission, goals, and objectives, and supporting the Chesapeake Bay restoration goals is an important and explicit part of them (<http://www.dnr.state.md.us/forests/mission.html> ). Forest practices support both water quality and living resource goals. This document references the data collection procedures that are used to supply information to the Chesapeake Bay Model, which produces information on nutrient reductions for water quality benefits.

**Mission:** The Forest Service restores, manages, and protects Maryland's trees, forests, and forested ecosystems to sustain our natural resources and connect people to the land.

### **Goals and Objectives:**

#### **Goal 1: Restore, manage, and protect Maryland's trees, forests, and forested ecosystems to sustain our natural resources.**

- Retain Maryland's existing forest land base and promote establishment of new forests to support healthy populations of native plants and animals across diverse and ecologically functional landscapes
- Promote sustainable forestry management including compatible economic uses on Maryland's private and public forest lands.
- Minimize negative impacts to the State's forest and tree resources from wildfire, insect and disease, land conversion, and other natural disturbance agents.
- Support the restoration goals of Maryland's Chesapeake Bay strategy and promote sustainable forestry to provide clean water, soil and nutrient stabilization, and sequestration of carbon through actively growing forests and tree biomass.

#### **Goal 2: Connect people to the land.**

- Support the maintenance of diverse forest economic activities and the forest products industry to provide for ecological and economic benefits of the state's forests.
- Provide comprehensive and balanced conservation education on forest sustainability to landowners, teachers, students, communities, organizations, and government.
- Utilize working partnerships to increase and protect tree canopy cover in urban areas and improve community fire protection for Maryland's natural resources.

### **Goal 3: Maintain efficient and effective operations.**

- Enhance delivery of forestry services to stakeholder groups through innovative technology, proactive policy communication/implementation, efficient use of resources, and professional development of personnel
- Maintain sound fiscal position of the Unit through managerial responsibility and accountability.

The Special Rivers project is funded through ongoing Chesapeake Bay Implementation Grants, and contributes primarily to riparian forest buffer planting and upland tree planting. Some work occurs with sediment and erosion control plans for timber harvesting BMPs.

#### Forest-Related BMPs

There are six BMP categories that are currently reported for Maryland for the Chesapeake Bay Model:

- 1. Forest Conservation-** Acres of existing forest that are placed under long-term agreement (easement or deed restriction) to remain in forest land use, attributable to Forest Conservation Act or other development requirements.
- 2. Tree Planting on mixed land uses (non-riparian)-** Acres of newly planted forest, usually to mitigate for existing forest cleared, attributable to Forest Conservation Act or other development requirements. Prior land uses are in the pervious urban category.
- 3. Tree Planting on agricultural land (non-riparian)-** Acres of newly planted forest, attributable to cost-share or other technical or financial assistance programs. Tracked through PMAS reporting, includes cost-share programs like CREP Highly Erodible Land (HEL), Wildlife Habitat Improvement Program (WHIP), or the state Woodland Incentive Program (WIP).
- 4. Riparian Forest Buffers on urban land-** Acres of trees planted adjacent to streams, shorelines, or other waterways out to 300 feet in areas deemed urban (within municipal boundaries and with watershed impervious surfaces over 25%); can include areas where existing trees are adjacent to water but buffer is less than 35 feet in width. Tracked through the RFB database.
- 5. Riparian Forest Buffers on agricultural land-** Acres of trees planted adjacent to streams, shorelines, or other waterways out to 300 feet outside of urban areas; can include areas where existing trees are adjacent to water but buffer is less than 35 feet in width. Tracked through the RFB database, also reported in MD Dept. of Agriculture MACS cost-share acres.
- 6. Harvesting BMPs used on timber harvests-** Acres of forest harvested following required sediment and erosion control practices. Tracked through state land harvesting,

quarterly reports from project foresters through the PMAS activity reporting system, and when available, summaries from Soil Conservation District reports.

Two other BMP categories could be potentially reported:

**Stream Restoration** is a listed practice on the tracking sheets, but most of the streamside work completed by DNR Forest Service falls into the riparian forest buffers category. Acres for stream restoration are rarely generated through the forestry activities, although other units in DNR are involved in the in-stream practices that would typically be listed under this category.

**Urban Tree Canopy** is a potential practice that will be tracked following documentation of associated nutrient reduction benefits, based on reduction in stormwater runoff associated with increased tree canopy cover. Urban Tree Planting is a defined practice.

### Data Sources and Reliability

Reporting on forestry practices is derived from reporting systems developed for the Forest Conservation Act, the USDA Forest Service performance reporting, dedicated riparian forest buffer reporting forms, and sediment and erosion control plans required for forest harvesting.

**Forest Conservation Act** reporting is required by statute, and an annual report is delivered to the legislature once a year summarizing progress by county, municipality, and state programs. Summary reports are prepared every five years to identify progress and trends. The Forest Conservation Act identifies required reporting items to be summarized for projects under local jurisdiction programs and on state lands, including forests retained on-site following development, areas planted on-site or off-site to mitigate for forests cleared above the limit, and areas planted on-site to bring parcels up to minimum standards for forest cover. For Chesapeake Bay Model BMPs, FCA reporting is the source of acreage data for forest conservation and tree planting on mixed land use/pervious urban lands. The percent of jurisdictions actually submitting reporting on an annual basis ranges from 50-90%, with higher submission rates for the five year summaries, so annual data are an underestimate of actual conservation and tree planting.

Data reliability: Summary data in reports from jurisdictions and through state review are derived from acreages on approved plans measured using standard measurement techniques on scaled drawings and maps. Estimates are considered to be accurate to the nearest acre. From the approved plans, bonds are required to assure that planting is completed and successful for at least the first year (sometimes two years or more). Data are not accepted if they do not have a listed acre measurement. Categories of data are mutually exclusive, and no other avenues of reporting this information for Model BMPs are known.

Data handling process: The Forest Conservation Act Coordinator sends out requests for data annually to local jurisdiction Forest Conservation Act contacts. Jurisdictions supply the required data in hard copy or electronic form to the Central Region Urban Forester in Bel Air. Typically, data are supplied by the planning department with professional staff, and are summed from forms that ask for the required information with each plan submission. The Central Region Urban Forester sums the data, organizes it into a summary table, and supplies the tabular information as a digital spreadsheet to the Forest Conservation Act Coordinator. The Urban Foresters for each of four regions sum the acreages of conserved and planted lands on state land projects within their regions, and submit the regional summary to the Coordinator for statewide tables. Tasks for vacant positions are covered by other staff as needed. Separate tables are prepared for Counties, Municipalities, and State Land Projects. Analysis for reporting consists of simple summation, typically done in spreadsheets, which avoids mathematical error and allows for quick review for data accuracy (no extra digits, double entries, etc.). Data are routinely backed up on the Forest Service central server. Starting in 2010, digital data and map shapefiles are being collected; methods vary by jurisdiction. The presence of digital data should improve geographic tracking over time as georeferenced reporting becomes more wide-spread.

**USDA Forest Service Performance Measurement Accountability System (PMAS)** reporting is the basis for reporting state progress on mutual goals for forestry practices and certain grant deliverables, especially for technical assistance on private forest lands, including preparation of forest stewardship plans, buffer planting plans, and assistance in afforestation or reforestation. For Chesapeake Bay Model BMPs, PMAS reports are the source of acreage for non-riparian plantings on agricultural land.

Data reliability: Acres reported for plan development or practice implementation are taken from the plan documents prepared by the state service foresters, who have specialized training through forestry degrees as well as in-house training in standards for plan preparation. Planting practices can be supervised by foresters or rangers, natural resource technicians with a minimum of two-year degrees and in-house training on techniques. Maps are prepared according to written standards (Appendix A), and measurements are typically taken from to-scale maps or spatially rectified Digital Ortho Quarter Quads (DOQQs). Measurements are considered accurate to the nearest acre, although some are measured to the 10<sup>th</sup> acre or finer, particularly on smaller parcels, or for planting practices, where precise acreage is needed to accurately calculate number of trees to be ordered for the planned density of seedlings/trees. GPS units are used for in-field area measurements on some projects, although this is not yet routine, limited by staff time and equipment function and availability (tree canopy and hillsides can block satellite signals).

Data handling process: PMAS reports are prepared quarterly, and sum activity by region and county or project area (usually a two-county area) for the quarter. Acreages are supplied from each Forest Service employee to the Regional Forester for each of four regions. The Regional Forester reviews data for each county and enters it into a formatted Excel spreadsheet. The spreadsheet is emailed to the Stewardship Program

Manager, who combines each region's data into a statewide summary by region and county for each quarter. The PMAS spreadsheets are backed up on the Forest Service central server to allow access to reporting information to authorized users, and the server is routinely backed up by the IT Division. Summary reports are available to the staff that submitted the data, so there is an opportunity to correct information if needed. Typically, performance evaluation criteria for forestry staff include meeting numeric goals associated with one or more items from PMAS reports, which encourages attention to accuracy in reporting.

**Riparian forest buffers** (RFBs) are tracked separately to collect individual spatial information, a point location, on each project. RFB tracking forms were developed in 1997, and have been modified in format periodically, but always including the core information of project location, acreage, length in feet, average width in feet, and planting date. Buffers are tracked by single side of the stream or waterway to account for the potential of differing property ownership on either side. An alternative data source is the on-line reporting form with interactive mapping location developed by the Chesapeake Bay Program in 2003. This has the core information, with location taken from the mapping feature, but does not collect other data available from the state tracking form, like species, prior existing buffer, and prior land use.

**Reliability:** RFB data submitted through the DNR forestry staff have the same advantages listed under PMAS tracking, including specialized education and in-house training, as well as review by Regional Foresters. Acreages are typically accurate to at least the nearest acre, with most being measured to the nearest 10<sup>th</sup> or better. Buffer length is also measured on the ground for small sites or measured on scaled maps for larger sites to an accuracy of 10 feet or better; this data does not contribute to the Bay model, but is used to track progress towards Chesapeake Bay forest buffer goals. Staff also follows up with survival checks, and assists with reinforcement planting where needed. Practices cost-shared through programs like CREP typically have a 10% subsample taken to assure that practices remain in place and successful. Statewide assessments of survival have found more than 80% meeting minimum standards of 200 trees/acre, and replanting efforts have continued on some, but not all, of the substandard planting areas. Natural regeneration also contributes to the buffer stocking; where plantings have not met standards but are not actively being cleared/mowed, trees seeded in from adjacent areas can form the basis for development of a buffer, albeit more slowly than from planting, and with lower likelihood on pasture sites.

At least two areas of double-counting for the Bay model could occur. Projects reported through the state tracking form could also be reported by a planting project partner through the CBP on-line tracking tool, although this has not yet been seen due to the low volume of information submitted through that venue so far. This is avoided by having the state RFB coordinator check entries from the CBP system against the existing database for duplicate entries, based primarily on location, date, acreage, and length of projects. Another source of double-counting is tracking done through cost-share practices such as Maryland Agricultural Cost-Share (MACS) program, which helps fund many but not all of the buffers planted in coordination with the Conservation Reserve

Enhancement Program. Double-counting is avoided at the state level by counting the MDA acreage for CREP/CP-22, and reporting non-CREP acreage to MDE from the DNR Forest Buffer Database. MACS acres are likely to be entered one year after the RFB database acres, since MACS payments are made after a survival check at the end of the growing season. Duplicates within tracking forms submitted to the database (e.g., more than one forester involved in the planting) are avoided by the duplicate-checking routines set up within the Access database.

Data handling process: Forms are filled out by the foresters or rangers involved with the planting projects and submitted by June 30<sup>th</sup> to the state RFB Coordinator. The tracking form is currently a Word form file, and the Access database is set up to automatically upload the form files into the database, avoiding any additional data entry error. Tracking forms received in paper format are entered through the data entry form within the database, which includes bounding checks on some fields like geographic coordinates within the selected county. Copies of forms are typically also sent to the Regional Forester for an opportunity for review. State summaries are sent out via email to all field staff, allowing an opportunity for correction of any data entry errors or omissions like misplaced forms. The RFB coordinator or other state personnel check geographic coordinates for accuracy to assure the coordinates are not transposed and are consistent with the county and watershed listed. Errors are corrected by matching the multiple sources of geographic information (MD Grid northing and easting, and/or ADC map location and number, and/or tax map and parcel number, and nearest town, and county, and watershed, and waterbody) to identify the correct Maryland Grid Coordinate.

Data summaries are produced through standardized reports within the Access database. Data analysis is comprised of simple summaries and averages. Summaries by county or watershed are supplied for the Chesapeake Bay Model, whichever is requested that year. Data on individual buffers are supplied to the Chesapeake Bay Program GIS unit for the regional tracking of Chesapeake Bay goals and inclusion in the watershed mapping products (buffers restored by watershed). Data fields include state, latitude and longitude in decimal degrees, acres, length in feet, width in feet, and planting date. The Access database and Word form file are stored on the central server for the Forest Service. Forest Service staff has permissions set to read the file. Permissions to modify the file are limited to the RFB Coordinator and supervisors.

**Forest Harvesting BMP** data are obtained from state forest harvest contract acres and Sediment and Erosion Control (SEC) Plan approvals for private land. Sediment and Erosion Control plans are required for timber harvesting in Maryland, and are obtained through DNR FS County Offices, either through on-site visits or in coordination with the Soil Conservation District or local County offices, depending on the delegation of responsibility from MDE.

Data reliability: Data for state acres are taken from GIS systems and timber sale layout work, and are considered accurate to the nearest acre. Data for private harvests are as accurate as the SEC forms, or the acreage reported reviewed by the DNR foresters, both of which estimate harvest area to the nearest acre. Harvest permits are valid for 2

years and there is no consistent means of determining completion of harvests, so not all acres approved for harvest are necessarily cut, especially not in the year permitted. In addition, areas too wet or steep to harvest may not be cut at all, although they may have been included in the permit acreage. In the infrequent years where additional funding has been obtained to hire staff to collect all timber harvest permits granted from each jurisdiction, the total approved acreage could be an overestimate of timber harvesting activity. The Stewardship Program Manager is now requesting timber harvesting summaries from DNR FS offices, and the thoroughness of reporting is increasing. Most years, data are not reported from all counties, so the actual acreage known to have been permitted is a substantial underestimate of harvesting activity in the state. Acreage is further reduced by applying an average implementation rate, detailed below.

Data handling process: State forest harvest contract acres are counted as using BMPs fully, supervised by state staff on State Forests. On-site visits of BMP implementation are routinely made by state forestry staff during harvests, and documentation of the visits is increasing as forest certification requires proof of monitoring. Harvesting on State lands now requires that the operator be a certified Master Logger, a program that requires additional training in sediment BMPs and safety measures, coordinated by Maryland Forest Association. Master Logger also requires ongoing education and site visits. The Master Logger BMP checklist is one tool used to document BMP compliance on state lands. Acreage is taken from GIS layers and timber sale layout work using in timber sale planning. Data are housed at field and headquarter offices. For private land harvests, when funded, the Maryland Cooperative Extension prepares a quarterly report of timber stumpage prices, and includes a summary of SEC plans reported as summed acreage information from the districts or counties that chose to submit information on request. Where quarters cross fiscal years, the quarterly values are pro-rated for the time covered. When the Extension report is not available, harvest acreages are taken from the harvest plan reviews reported by DNR foresters on the PMAS forms, which represent voluntary reviews in counties where forms allow landowners to sign off on DNR technical assistance, and Critical Area, where District Forestry Boards have harvest plan oversight. The private acres reported as using BMPs are calculated by multiplying the permitted acreage by the average BMP implementation rate found in the most recent statewide study (MD DNR unpublished data, 2007 from 2004/2005 field work). The 81% implementation rate is similar to the 82% rate found in the previous study (Koehn and Grizzell, 1995). For 2000-2006, all private harvest plan approvals were assumed to have an 82% BMP implementation rate across all BMP categories. 2007 and later use 81% to calculate harvest acres with BMPs.

Prepared by Anne Hairston-Strang

Koehn, S. W. and J. D. Grizzell. 1995. Forestry Best Management Practices: Managing to Save the Bay. An Assessment and Analysis Report on Forestry BMP Implementation in Maryland. Maryland DNR Forest Service, Annapolis, MD. 32p.



## MARYLAND DEPARTMENT OF NATURAL RESOURCES

### FOREST SERVICE

Operation Order 2003-302  
Maryland

Annapolis,

TO: Regional Foresters and Project Managers  
2003

Effective: June 1,

#### FOREST STEWARDSHIP PLAN FORMAT

##### General

This order supersedes Operation Order 93 - 303 dated June 1, 1993. The objective is to update the management planning process. The purpose is to reduce the time spent in writing of management plans, improve plan quality while providing the landowner with the necessary information for the management of their forest lands. This order will be effective June 1, 2003.

##### Exact Instructions

Stewardship Plan Format the format for all stewardship plans prepared by all Forest Service personnel will be as follows:

- A. Title Page - the title page shall include the following:
  - 1. Landowner name, address and phone number unless it is unlisted.
  - 2. Location of property (include MD Grid)
  - 3. County
  - 4. Acres (Breakout woodland, agricultural fields, idle fields and marsh)
  - 5. Author(s)
  - 6. Date: original and revised date if applicable
  - 7. Forester's Stamp - lower right corner with signature
  - 8. Stewardship Sticker - upper right corner
  
- B. Maps  
The maps shall conform to the following:
  - 1. Appropriate scale: 330, 660, 1320
  - 2. Appropriate detail of adjacent property
  - 3. Standard orientation of North arrow
  - 4. Acres match what is on title page (to tenths of acres)
  - 5. GIS generated stand management map and or aerial photo showing property location, maps may be combined.
  - 6. Soils, wetlands, topographic or other maps as appropriate
  
- C. Landowner Objective / Property Overview  
This section shall include the landowner's primary and secondary objectives that shall conform with the four established stewardship

objective that are: Fish & Wildlife, Natural Heritage and Recreation, Soil & Water and Forest Products. A brief overview of the physiographic and vegetative nature of the property is required.

- D. Stand Description and Recommendation Overview  
 This section is optional for properties. This table is a useful reference tool for comparing stands. Here is an example.

**STAND DESCRIPTION AND RECOMMENDED PRACTICES**

**FOREST MANAGEMENT AREAS**

**OBJECTIVES:** Primary - \_\_\_\_\_  
 Secondary - \_\_\_\_\_

Stand #	Acres	Dominant Species	Development Stage	Age	Stocking	% Des. Trees	% Undes. Trees	Site Growth Potential	Recommendations Practices

*(See reverse side for definitions)*

DNR-335-A (Revised 8/92)

- E. Stand Description and Recommendations  
 Each stand shall have a separate page listing the following information, which describes the composition of the stand and the recommendations for treatment. Recommendations should be in narrative form and as specific as possible. For example, if a thinning is recommended, the basal area to remain should be spelled out.

1. Stand Number
2. Area (Acres)
3. Dominant Overstory Species
4. Dominant Understory Species
5. Developmental Stage

6. Age (if even, give age)
7. Stocking/Basal Area
8. Site Growth Potential
9. Soil Type

F. Additional Information

This section shall be used to supply additional information not included elsewhere in the plan.

Plan needs to address regulatory issues relating to forestry that include: critical area law, forest conservation act, best management practices, wetlands, sediment & erosion control plans and sensitive species protected resource areas.

Required practices or activities that involve the entire property include monitoring for insects and diseases, boundary line maintenance, fire protection, maintain roads and trails to reduce erosion and to maintain emergency access and protection of riparian forest buffers.

Other optional useful information includes nursery seedling ordering, consultant referrals if applicable, and tax incentive programs.

G. Practice schedule

This section shall give the suggested schedule (month & year) for practice implementation. The schedule should not include administrative activities such as applying for the FCMA program or inspections for FCMA or Tree Farm Certification. An asterisk shall be placed next to a practice that is cost-sharable. Plan shall have a completion date of not more than fifteen years, ending date and a re-examination date as final plan practice.

H. Appendix

This section shall include any appropriate management inserts.

This operation order shall remain in effect until revisions or modifications are necessary.

\_\_\_\_\_  
Steven W. Koehn  
Director / State Forester

6/1/03  
Date