



Lessons Learned on the Revision of the North Carolina Forestry BMP Manual

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BMP Manual: http://www.ncforestservice.gov/water_quality/bmp_manual.htm

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North Carolina
Forestry
Best Management Practices
Manual

To Protect
Water Quality

Amended September 2006

Introduction

Forestry best management practices (BMPs) are measures that should be implemented to protect water quality from nonpoint sources of pollution and promote the conservation of soil resources. Forestry BMPs are site-specific, voluntary recommendations and are widely recognized as the primary accepted methodology to help forestry/silvicultural activities: (1) Achieve compliance with water quality standards, (2) Promote soil conservation, and (3) Sustainably harvest forest products.

Each state has the flexibility to develop, adopt, and monitor implementation of forestry BMPs that are suited to the specific attributes associated with that state. A periodic review and/or revision of forestry BMPs should be done to maintain relevancy of the recommendations and to incorporate new or additional practices that are deemed worthwhile to accomplish that state's goals or objectives. In addition, a periodic review allows for the replacement or removal of out-dated or ineffective BMPs.

Background

Prior to this revision, the forestry BMP manual for North Carolina was adopted in September 1989, which pre-dated the 1990 enactment of the statewide water quality regulations entitled *Forest Practices Guidelines Related to Water Quality* (defined in N.C. Administrative Code 15A NCAC 01I .0100 to .0209, herein abbreviated as FPGs). The FPGs are performance-based standards which apply to all forestry-related land disturbing activities in North Carolina. Compliance with the FPG regulatory standards is mandatory. Implementing appropriate forestry BMPs is promoted as a voluntary methodology that can help to achieve compliance with the FPG standards. North Carolina is distinctive, in that the concept of a forestry BMP is codified in state rule, excerpted below:

"Best Management Practice (BMP) means a practice, or combination of practices, that is determined to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals." [15A NCAC 01I .0102 (4)]

It is important to recognize that FPG compliance ultimately must be achieved regardless of the type, extent, or duration of BMP implementation. Just because a site has a BMP that is implemented as recommended in the state manual, there is no presumption of FPG compliance. Compliance with FPGs is based upon observations during site inspections and actual performance. A full citation of the FPG rules is available in NC Forest Service publication [Forestry Leaflet #WQ-1](#).

Attempts were made to revise forestry BMPs in North Carolina at times through the mid-1990's, into the early 2000's. By 2002 the NC Forest Service had secured additional funding and technical staff that could be devoted to accomplishing a thorough revision. At the request of the State Forester, this multi-year project was guided by the Forestry Technical Advisory Committee, an existing advisory group defined within N.C. [General Statute 113A-52.1\(c\)](#), consisting of 10 members, each of which represent a different discipline area associated with forestry, water quality or the natural environment. The final revised edition of the forestry BMP manual was approved in September 2006 and published. More information is available in the "[How To Use This Manual](#)" section of the NC forestry BMP manual.

Report Structure

The revised manual has been in effect for over four years. Now that people have had some experience using the manual, it seemed timely and appropriate to solicit feedback on the strengths and weaknesses of the manual and the BMP recommendations. An inquiry was made to the NC Forest Service District Forester supervisors and personnel who specialize in water quality issues. Additional inquiries were made to a group of individuals in the forest and logging industry, as well as a group of consulting foresters. In addition, the findings in this report are based upon contributions from agency personnel who participated in the revision process. This report on the 2006 BMP manual is structured along four primary themes:

1. What Went Well
2. What Needs Improvement or Did Not Work
3. Things We Did Not Do, But Would Consider Next Time
4. The Future

Additional lessons learned specific to the technical peer review process are described in a 2006 report prepared and submitted for the North Carolina Natural Resources Leadership Institute. That report is included as an Addendum.

1. What Went Well

Designated, knowledgeable, & empowered project manager

A project of this scope requires a single point-of-contact individual to be designated as the project manager to facilitate constructive input via the technical committee, contribute to the technical content of the manual, and provide technical-editing to assure consistency in how the information is delivered in the manual, without losing the technical merits of the recommendations. A considerable amount of this individual's time was required through the revision process, and functionally proved to be that person's primary workload accountability. The project manager also served as the technical editor prior to final publication, given the individual's technical knowledge of forestry BMPs as well as proficiency in technical writing. There was a great need for technical editing, given the numerous authors who contributed text for various chapters in the manual. Each author had his own writing style and the technical editor coalesced these different stylistic themes into one cohesive and flowing document while not losing the technical specificity of the BMP topic.

Multi-disciplinary technical committee

The Technical Advisory Committee (TAC) was actively engaged in the revision. The TAC contributed content for the BMPs in addition to serving as a conduit to provide comments, concerns, compliments and overall representation at the table from the constituency that each TAC member represented. The TAC served not only in the capacity of technical advisors, but also a de-facto stakeholder group which allowed the revisions to be constructively and efficiently vetted through the process.

In this instance, a forestry TAC already existed, albeit with some representative slots that needed to be filled prior to the BMP revision process, and at least two existing representatives that did not participate. If the TAC had to be created from scratch, or if the TAC was comprised of a larger number of individuals, it is believed that the revision process would likely have taken longer.

While the TAC Chairman served as the committee's appointed leader, the Chair also recognized the need for the NCFS designated project manager to assume a substantial role in convening, facilitating, and contributing to the discussions by the TAC during the several meetings that occurred during the revision. A close partnership and early mutual understanding of each other's roles between the TAC Chair and the Project Manager proved invaluable to the relatively unhindered revision process.

Reviewing other BMP manuals and references

Early in the process, and occasionally through the revision, the TAC and NC Forest Service reviewed existing forestry BMP manuals from other states, particularly neighboring states, as well as other forestry BMP references. In many cases the review focused on content for a specific recommendation; "how do they handle this issue in other states" was the question often asked when seeking reference to BMPs and related practices from other sources. Reference to BMP research and federal guidance also proved valuable. Given the inherent linkage between BMPs and the associated regulatory framework that governs forestry (silviculture) under multiple federal laws, a review of federal guidance/reference documents helped us to develop BMP recommendations that were in concurrence.

After reviewing BMP manuals from other states, we recognized the value in using existing resources (such as illustrations) or mimicking the work that had already been completed by others, while adapting or modifying their work for use in North Carolina. In cases when a specific item was desired for use in North Carolina, such as an illustration, we obtained permission from the source agency.

Focusing BMPs on water and soil

The recommendations in the BMP manual focus on those measures which can protect water quality, many of which also promote the conservation of soil resources. These two areas of focus (water and soil) are the foundation upon which forestry BMPs were originally conceptualized and developed. Many different professions outside of forestry or natural resource management now widely use the term "BMP", nearly to the point of compromising or corrupting the term from its original concept. The revision to this BMP manual specifically focused on those measures which would protect water quality from nonpoint sources originating from forestry activities, while inherently promoting the conservation of soil resources through erosion and sediment control. The TAC deliberated at length about whether or not the manual should include recommendations that specifically address soil productivity. Ultimately the decision was made to promote wise soil conservation practices that should, in most cases, lead to the continued productivity of the soil. The outcomes of these deliberations are found in the manual's title (with the inclusion of the phrase *To Protect Water Quality*) and in [Chapter 1](#) of the forestry BMP manual which describes the linkages between forestry BMPs and the conservation of soil resources.

Incorporating wetlands information

Prior to this revision, there were two forestry BMP manuals in North Carolina. One manual specifically addressed silvicultural activities in wetlands and the other manual considered other forestry sites. From the start, the TAC and the NC Forest Service recognized the need for one unified manual that would include BMPs for all forestry activities in the state. Creating a single reference manual simplifies the user's source of information while reducing duplication and the possibility of confusion or contradiction.

There were exhaustive and comprehensive deliberations on the development of the actual BMPs for activities in wetlands, and the extent to which guidance regarding forestry activities in wetlands should be included in the manual. However, throughout these deliberations there remained consensus that the

revised BMP manual should include all aspects of forestry activities, including those in wetlands, and that a single forestry BMP manual was the most desirable outcome of the revision process.

Plain-English text

An over-riding theme during the revision was to 'keep it simple' and this theme included the use of plain-English text as much as possible. Avoiding the use of forestry jargon and using simple declarative statements that were not overly prescriptive or restrictive proved challenging. The U.S. Securities and Exchange Commission has an excellent handbook that was routinely referenced, entitled *A Plain English Handbook: How to create clear SEC disclosure documents*, available from the SEC website: www.sec.gov/pdf/handbook.pdf. This handbook is highly recommended for technical writers.

Preharvest planning

The BMP manual now includes an extensive discussion of the merits to preharvest planning. The previous edition only briefly mentioned this topic, primarily addressing how to draw a harvest map. Successive [BMP Implementation Surveys](#) conducted by the NC Forest Service have shown that the rate of BMP implementation was significantly higher on harvest sites in which some degree of preharvest planning was accomplished or technical assistance was provided. The BMP manual describes preharvest planning as a fundamental BMP in-and-of itself, and provides a detailed preharvest planning checklist that can easily be photocopied and adapted for routine use in the woods.

Particular attention was paid to illustrating and describing how to use topographic maps, soil survey maps, and aerial photo imagery. Often these tools are mentioned in forestry BMP manuals, but the user is left wondering what-to-look-for, and how-to-use these valuable planning resources.

Black & white printing

Given the fixed amount of funding available for printing, the decision was made to only publish the Manual in black & white (b&w). This decision also allowed for more copies to be printed, since b&w printing is significantly less costly than full-color printing. In addition, b&w printing allows the manual's user to easily and cost-effectively print or photocopy pages from the manual without losing integrity of the photos or illustrations.

Photographs and illustrations

There are 50+ photos or illustrations in the BMP manual, a substantial increase over the previous edition. From the onset of the revision process, it was agreed-upon to incorporate meaningful photos and illustrations as much as possible, and to show "good" BMP implementation, as compared with showing a "bad" situation. The consensus was that everybody knows what a bad job looks like, so the manual's photos should emphasize properly implemented BMPs. The photos used for this revision were specifically chosen to illustrate a BMP in use, with special attention to assuring clarity of the photo when printed in black & white. Caption text is provided for each photo to help the reader understand what to look for in the photo.

Coil binding and cover protection

Binding the manual with coil/spiral binding assures ease of use while satisfactorily keeping the book bound together with minimal risk of losing pages or of the book not remaining open by itself. Initial thoughts were to bind the manual with a standard 3-ring binder. However, the project manager convinced the TAC and NCFS management that such a layout is not appropriate for use in the woods, or for easy storage in a vehicle or briefcase/work bag. Given the use of coil/spiral binding by nearly every other state for its respective BMP manual, this choice now seems obvious. The previous edition was perfect-bound with staples, which made the manual difficult to easily use or photocopy.

Incorporating a clear acetate sheet atop the manual's cover has proven to be a simple, yet beneficial addition. The acetate protects the book from exposure to minor soiling and moisture. The acetate added to the printing cost, but the extra protection it offers is considered to be worth the added cost.

Technical peer review

Two peer reviews of successive draft editions were conducted to obtain feedback from groups that were anticipated to be the primary users of the new manual. Unlike a public comment process, the peer review was structured to solicit targeted input regarding the technical merits and specifications of the BMP recommendations. Requiring the reviewers to use a structured format for contributing feedback, and directing the reviewers to stay within the bounds of the technical aspects of the content allowed the review process to be constructive and relatively efficient. The decision was made to not post the draft editions onto the NCFS website so as to maintain some degree of control over the content, since the manual was incomplete. Copies of both drafts were also provided to multiple state and federal natural resources and regulatory agencies for their review (including USEPA, USACE, NCDWQ, NCDLR, and NCWRC, among others). Copies of the drafts were provided to specific individuals and groups in order to obtain feedback from a broad spectrum of interests, but in a manageable manner. In addition, a copy of the draft was provided to any individual or group who requested a copy.

Roll-out of the new manual

Announcements of the newly revised manual, and its availability, were posted to the NC Forest Service newsdesk, Hot Topics, and via a subscriber-based email list ([NCForestryNPS](#)), as well as a formal news release provided through the Department. An article was written and submitted by the project manager, and published in the monthly newsletter of the North Carolina Forestry Association. Additional email notifications were made to agency employees.

The project manager made the effort to personally arrange and deliver bulk quantities of the new manual across the state to several NC Forest Service District Offices, as well as directly to forest industry employees who then distributed copies to loggers, timber procurement personnel, and land/resource managers. This effort assured timely delivery of the new manual to the core user groups, without adding this burden to NC Forest Service field offices or incurring bulk mailing costs.

Several workshops and presentations were conducted by the project manager to internal & external users during the ensuing months after distribution of the new manual. A statewide presentation was conducted in May 2007 via the [NCSU FEOP](#) satellite video conferencing system that reached nearly 200 individuals across the state. In addition, the [NCFA ProLogger Program](#) produced a 2-½ hour video with NC Forest Service personnel that was used for the 2007-2008 annual continuing education training module for ProLogger participants, reaching an estimated 1,500 loggers across North Carolina.

Outreach opportunities with forest owners and consulting foresters were not as well organized and planned as those associated with loggers and forest industry personnel. Some consultants participated in local presentations by NC Forest Service personnel, and via the video conference. Forest owners are typically a challenging constituency group to reach due to their large numbers and diversity of interests (including a lack of interest by some). Continued effort to reach out to these two groups is important for BMPs and many of the NC Forest Service's programs.

Funding for free distribution

Thanks to the work of the Forestry Nonpoint Source unit supervisor, adequate funding was secured for the initial printing production run so that the new BMP manual could be distributed as a free publication without the need to charge a fee to recoup the NC Forest Service's printing costs. Given the large size of the new manual, and the degree of "new-ness" of this first-ever revision, there was a

strongly desired to keep this as a free publication and was successful in doing so. The initial printing run was for 6,000 copies. An additional 500 copies were printed in 2010 to maintain an ongoing inventory.

Signature page

The page with signatures of those TAC members who participated in the revision, along with other key contributors, illustrates the unity and implicit sanctioning of the recommendations and guidance provided in the manual.

"How To Use This Manual" section

This brief section in the front of the manual outlines the document's page-layout and guides the user on how to quickly locate information. This section also establishes the bounds of the technical content within the BMP manual, essentially offering a disclaimer. The manual's user has the flexibility to implement appropriate and effective management measures as they see fit, even if those measures are not exactly prescribed or described in the NC forestry BMP manual. Incorporating this "how to use" section can also be valuable to discourage inappropriate or unwarranted interpretations or usage of the information found within the document.

Select excerpts of feedback received

- *"I believe that the BMP manual is well done and captures what is needed, and this is from someone who has looked through several BMP manuals as part of a previous job. The one area that I believe we can improve on, and this goes for most state BMP manuals, is fire rehabilitation part. Other than that, from a lessons learned standpoint, good job at capturing what is needed."*
- *"Providing for the peer reviews allowed those on the operations side to critique and comment on the draft. Ample time was allowed in the comment period for those reviewing to do a complete read through and submit responses; ditto on the second peer review. The process worked very well and allowed for the peer groups to feel that they had part ownership in the manual."*
- *"The Sidebar column with the **FPG** and other tags draws the user's attention directly to topics of high importance...The topic layout of the manual is well organized. The 'Rules Related To' and 'FPG' text boxes are useful references to the law. The 'start - end citation' application to the topics is helpful. Most of the photos of BMP application help to clearly show the practice."*

2. What Needs Improvement, or Did Not Work

Elapsed time until revision

The gap of time between North Carolina forestry BMP manuals was 18 years (1989 to 2006). This length of time was too long, and did not offer the ability to refine or update BMPs to address new issues or implement new technology. While other state forestry agencies have conducted multiple (almost annual) revisions of their BMPs over recent years, we do not feel that such an accelerated schedule of revisions is warranted or constructive. However, waiting another 18 years until the next revision is not desirable, either.

Flexible BMPs versus prescriptive BMPs

A high level of effort went into word-smithing the BMP recommendations in a manner that offered flexibility given the site's conditions, while not being overly-prescriptive. Some individuals assert that the resulting revised BMPs are vague and watered-down; conversely, others claim that the BMPs offer performance-based flexibility. Nonetheless, the upcoming 3rd-cycle of BMP Implementation Surveys will be the first time that the 2006 BMP manual has been intently reviewed and evaluated. The outcomes of this survey and the degree of difficulty or ease of evaluating implementation of a specific BMP will help to guide the future course of BMP syntax if further revisions are made to the manual.

Regardless of how a BMP is written, it should be clear, relatively practical to assess for monitoring implementation, and reduce the need for further interpretation or guidance that spells out “what does this BMP mean”. Such clarity will minimize case-by-case determinations of whether or not a specific action performed on the ground meets the intent of a specific BMP recommendation.

Rules & regulations appendix

This BMP manual includes an appendix with citations of numerous rules and laws pertaining to water quality and forestry. The intent was to create a single-source forestry reference manual, eliminating the need to locate and maintain multiple sources of information that may be needed when working in the woods. While we believe that this intent remains viable, we also quickly recognized that the degree to which regulations are changed, updated, and added has made this manual’s appendix functionally out of date as soon as it was printed. An alternative may be to maintain the appendix of rules only as a Web-based document that could more easily be kept updated as rules change and provide live web-links to other documents or references. Removing this appendix would reduce the number of pages (thus reduce printing cost), but would eliminate the convenience of a single-source reference manual.

Soil stabilization seeding table

The project manager took the lead in developing [this chapter of the manual \(Ch.11\)](#). This proved to be a challenging section of the manual to compile, given the project manager’s lack of intimate knowledge and experience on the subject matter. While several highly regarded experts were consulted, it seemed that none of the experts could consensus on seeding recommendations. In fact, at times the information provided by the subject matter experts was contradictory. The resulting BMP seeding table came largely from one of the experts who willingly invested time and effort to field trial most (if not all) of the recommendations. While the groundcover species in the table may not be applicable to every site in North Carolina at all times of the year, it is hoped that the seeding table is a starting place for the BMP manual, building upon their local knowledge and experience.

Sidebar column

As the TAC discussed BMP content revisions, a common theme began to emerge in which the TAC agreed that several recommendations are “good ideas” to implement, but the recommendation may not have a direct connection to water quality or soil conservation. In addition, the TAC identified other information thought to be “nice to know” by the reader. The creation of the sidebar column on each page was thought to be a way to layout the document in a way that allows the reader to quickly identify what information is of value. As it emerged, the sidebar column creates a cluttered appearance of each page, which can appear intimidating at first glance to a new user. On a positive note, the sidebar column provides a location to offer information specifically aimed at forest owners, and flag important FPG reminders, both of which were lacking in the previous edition.

Pole Crossings

The installation and use of pole crossings (logs placed within a water channel) is discussed in the manual. There was discussion among the TAC and NCFS staff about whether or not to include this type of crossing in the manual. There are compelling arguments for and against the use of this type of crossing, in limited situations. While the BMP manual describes situations which are considered suitable for pole crossings (and situations where they are not), this caveat may be overlooked by the casual reader. The prevailing decision during the revision process was that pole crossings have been, and likely will continue to be used. Therefore it seemed appropriate to develop and promote BMPs related to their proper installation and use. Nonetheless, future revisions may need to re-visit the bonafide use of pole crossings and consider how they can be effectively used without creating nonpoint source pollution or water quality issues.

Clearly-Defined User

The revision attempted to broaden the applicability of the BMP Manual to those outside of the traditional forestry community. The manual can also serve as an educational and reference resource suitable for many different groups or individuals to use. To put it plainly, the 2006 version not only describes "what" or "how" to do a BMP, but also explains the "why" and "how come" aspects behind the BMP recommendation, as well as the regulatory foundation or institutional knowledge that led to those recommendations. The prior manual basically just described "how" to implement a BMP, with minimal explanation. Including this additional information is one reason the 2006 Manual is much larger than the older edition. Striking a balance is important when considering who the core user group is for a forestry BMP manual.

Select excerpts of feedback received

- *"The nature of some of the regulatory information is that it becomes out-of-date, and that new ordinances and rules are continually being added. Appendix 1 is very cumbersome and a disclaimer should be added on Page 138 to this effect. A website or other direction to a place where ordinances / laws are updated should be included there also."*
- *"The manual needed a clearly defined end user. This would reduce eliminate unnecessary information and reduce publishing costs. Examples are: Chapter 1 is written as a text book oriented to students and landowner. The 'Introduction to Best Management Practices and Soil Factors' could be reduced...[and chapter 3]...could be a separate manual available as a PDF file on the internet or by limited publication."*
- *"We have a lot of trouble with pole crossings and loggers always go back to 'the BMP manual says they're ok...they're legal.' Obviously they're not ok if they cause sedimentation, which many do. It would make things much easier if the pole crossing subject matter were removed from the BMP manual altogether. Most loggers don't really read the details regarding pole crossings, or anything else for that matter. I have seen pole crossings work fine in flat land though. Maybe a clear distinction should be made for flat land crossings vs. mountain/slope crossings or wet vs. dry pole crossings. I'm not sure the best way to handle but it needs addressing."*
- *"The seedling table really is geared towards wildlife, and not to keeping the soil in place on a really tough site. I've had to pretty much put together my own prescriptions for this area, because those BMP recommendations just won't cut it up here. I understand where they're coming from, but ultimately the BMPs need to really provide erosion control first, and then other considerations, second."*

3.Things We Did Not Do, But Would Consider Next Time

Full TAC participation

Despite repeated inquiries, there were two members of the Forestry TAC that did not participate in the process to revise the forestry BMP manual. These two members were repeatedly solicited for their participation at the onset of the process. However, once the project began to pick up momentum and move forward, no further inquiries were made. The project manager failed to make a legitimate effort to either replace these individuals on the TAC with persons who would participate, or seek qualified alternate representatives from their respective constituency. The two absentee members represented the Forest Landowner category and the Marine Fisheries category. A process should be developed, with consensus of the TAC, to replace or substitute non-participating members. Since the completion of this manual's revision, several of the TAC members have relinquished their membership or otherwise been replaced by the current roster of participants on the forestry TAC.

Seek input from landowners and loggers

It was not until the peer review that a concerted effort was made to reach-out to forest owners and loggers to receive their input on the proposed revisions to the BMP manual. While the TAC representative for the Forest Industry fully participated in the revision process, this individual was not a logger. We must recognize that loggers are, fundamentally, the people who will implement many of the BMPs on the ground. Forest landowner perspectives were at times represented by other members of the TAC who themselves owned land, managed land, or worked closely with forest owners. Nonetheless, future revisions should engage active participants who can represent loggers and forest owners. These two essential groups of individuals bear significant responsibility for protecting water quality and conserving soil resources through their acceptance and willingness to implement forestry BMPs, often also bearing the bulk of the associated out-of-pocket costs to implement BMPs.

Topic and chapter outline

As basic as this element may seem, the revision process stumbled at the beginning as TAC members and chapter authors began developing content before a chapter outline had been agreed-upon. Ultimately an outline began to emerge as authors compiled their chapters, but the revision process would have progressed faster and smoother if an outline had been developed from the start.

Subject index

There is not a detailed subject index in the manual, although the Table of Contents and document's numerical Chapter/Section layout is intended to provide some ease-of-access to subject matter. Given the abundance of information within the manual, an index would improve the ability of a user to quickly locate the topic of interest.

FPG rule standards

Considering the frequency with which the state FPG rules are referenced, and the inherent linkage between BMPs and FPGs, some users have commented that the layout of the manual makes it difficult to quickly locate and reference the FPG rules. An effort was made in sidebar column by use of a **FPG** notation when a BMP recommendation is considered to be inherently linked to a specific FPG rule. Conversely, complimentary feedback was received highlighting the use of the FPG labels throughout the Manual as a way to point the user's attention to these important topics.

Select excerpts of feedback received

- *"Outreach to landowners and consultants so they know to request/require the use of BMPs during harvest, especially in the mountains. I do not know if NCDNR had any good mechanisms to target the audience of landowners and consultants."*
- *"...[because] of thoroughness of content and length of manual, I would like to see an index to make locating info easier."*
- *"...references to FPG performance standards [should] be mentioned more often in the major BMP categories of the manual.....The FPG Performance Standards should be easy to find, i.e. in the very front or back instead of buried in the middle."*
- *"...we would recommend adding at least one industrial forestry member and/or logger member to the TAC from each of the 3 geographical BMP regions in the state. By adding members from the operational point of view to the TAC, it would result in an improved balance of technical and operational input prior to the printing of the drafts and issuing for peer reviews."*

4. The Future

At the time of this report, there are no immediate plans or expectations to revise North Carolina's forestry BMPs. The 3rd-cycle of BMP Implementation Surveys is scheduled to begin in the summer of 2011 and last for about two years. This will be the first time that the revised BMP manual will be evaluated for implementation. Ideally, any further revisions would occur after the results of this 3rd-cycle BMP Survey are known, so as to not prematurely make changes without having a base of knowledge of what elements may need revising, or what new BMPs may be warranted.

There are special interests regarding BMPs for specific forestry activities or forestry-related objectives in North Carolina, and abroad. The political, regulatory, social, or market-driven scrutiny of these interests may escalate to the point that forestry BMPs may need to be re-visited in the relatively near term (say, within the next 4 to 5 years). The most notable of these interests are listed below:

- Utilization of forest-derived woody biomass for energy or fuel production.
- Timber harvesting in wetlands, specifically within bottomland hardwood and/or cypress swamps.
- Continued evolution of market-driven forest certification programs. These programs typically include stipulations on the use of BMPs.
- Litigation and subsequent court rulings regarding how silvicultural-related activities are regulated as a nonpoint source of pollution via the Clean Water Act, or other federal laws.
- Ongoing work at the federal level regarding the definition of Waters of the U.S., and associated impacts regarding the jurisdictional status of wetlands and of undetermined bodies of water.
- Results of ongoing research and monitoring conducted by the NC Forest Service, USDA-Forest Service, and other institutions regarding the effectiveness of BMPs on timber harvests; and the results from periodic BMP Implementation Surveys which attempt to quantify a range of SMZ widths that appear to functionally protect water quality.
- Continued rule-making by the State of North Carolina that institutes mandatory riparian buffers within geographically-specific regions or watersheds.
- Expansion of TMDL-driven regulations to help restore impaired waters, or TMDL-reporting standards that demand a more accurate accounting and/or implementation methodology of BMPs.
- Periodic, recurring interests to require official notification of timber harvests in North Carolina.
- Emergence of ecosystem services markets that monetize the multiple environmental benefits derived from forests including water quality, water quantity, and soil conservation.
- Effects of climate change and/or sea-level rise on the potential for changes in average precipitation, soil drainage, and water quality conditions found in North Carolina's forests.

Select excerpts of feedback received

- *"The question came up...about how to deal with old field erosion gullies and BMPs. They are clearly channels where water has flowed, but since forests were reestablished they have been checked. They can cover almost into 90% of an old field. Is there a publication on how to deal with them?"*

- "On future revisions of the manual and field guide, we recommend adding 'Revision Icons' in the sidebar column and in the [field] guide so users can pinpoint changes from the older version to the new."
- "While I think the idea of regen based BMPs confuses the issue with respect to water quality, etc., I do think we need to look at the 'Floodplain BMPs' from Georgia and the Mat Logging BMPs in Florida's document and see how/if we need to address these topics. I believe that may provide us with some clarification on how to handle situations such as [turbidity problems]..."
- "In Chapter 5, Part 3 Stream Crossings topic BMPs for Bridgemats, page 70 of the manual says 'Minimize the amount of over-hang from logs, trees or trucks/trailers that may disturb the channel or approaches.' This subject needed greater development since the issue is so important. The manual does not offer a BMP to address the issue."

5.Addendum

The following report is an overview of the peer review process that was used during the revision, including lessons learned on the actual process used to conduct the peer review and consider the input that was received.

North Carolina Natural Resources Leadership Institute Leadership Project Final Report
Facilitating the Peer Review to the Revision of the North Carolina
Forestry Best Management Practices Manual

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Abstract:

The first-ever revision of North Carolina's forestry Best Management Practices (BMPs) Manual by the multi-stakeholder Technical Advisory Committee required the facilitation of a peer review process. Two draft documents were produced and peer reviewed, with this writer facilitating the entire process including the distribution of the documents; summarization of the review remarks; and leading the Committee's analysis of the remarks. While some challenges faced the overall project, the facilitation techniques utilized during the peer review process contributed to a consensus building environment. The lessons learned from this project are expected to translate well into future projects. It is expected that, once completed and adopted for use, the revised BMP Manual will provide the necessary elements that allow working forestlands to continue as a preferred management option for protecting water quality.

1: SITUATION BEFORE PROJECT

Implementing Best Management Practices (BMPs) before, during and after forestry operations is a proven and time-tested method of protecting water quality. The federal Clean Water Act requires each state to develop BMPs for the major categories of land-use activities that contribute to nonpoint source pollution, including forestry. In North Carolina, forestry BMPs are defined as:

A practice, or combination of practices, that is determined to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals. [Source: NC Forest Practices Guidelines Related to Water Quality (15A NCAC 01I .0102 (4))]

For the sake of convenience, BMPs are often compiled and summarized into a user's manual. North Carolina's most recent 'forestry BMP manual' was adopted in 1989, and remains as the

only forestry BMP manual across the southeastern United States that has not undergone at least one revision.

During the mid- to late-1990's there were two failed attempts within the NC Division of Forest Resources ("Division") to revise BMPs for forestry operations in North Carolina. As I understand it, these historical attempts did not include a stakeholder process.

Beginning in 2002, the addition of technical staff led to the establishment of the Forestry Nonpoint Source Unit within the Division. This additional staff has allowed the Division to undertake a concerted effort with the N.C. Forestry Technical Advisory Committee (TAC) to resurrect the mission of updating North Carolina's forestry BMPs. The TAC is a standing 10-member group established and defined under N.C. General Statute [GS Ch.113A, 52.1(c)], with each member representing a different sector or interest related to forestry or water quality. The Secretary of the NC Department of Environment and Natural Resources appoints each TAC member.

The TAC convened regularly beginning in 2003 to voluntarily undertake the revision of North Carolina's forestry BMP manual with full support from the Division Director's Office and assistance from its technical and administrative staff.

In January 2005 the 258-page first draft of the proposed revision to the forestry BMP manual was made available for a peer review. The TAC and Division staff reviewed the feedback generated by this first draft. After making appropriate changes and improvements, an edited 234-page draft was made available for a final round of peer review in December 2005. This report focuses on the peer review process.

2: SITUATION AS IT EXISTS

The TAC and Division staff has considered the feedback submitted during both rounds of peer review. The draft document is being prepared for a final review by the chapter authors. Upon receipt of each chapter from the authors, the completed draft will be finalized and submitted for Division and Departmental approval and adoption. The timeframe for distribution of the new Forestry BMP Manual is the fall of 2006.

3: PROJECT DETAILS

3a) Actions Taken or Activities Conducted

By January 2005, a first draft of proposed revisions was available for critical review. Due to the technical nature of the document's recommendations, and the specificity as they apply to forestry operations, both the TAC and Division felt that a structured external 'peer review' would be the most appropriate method for obtaining constructive feedback that may result in an improved BMP manual.

A procedure for submitting peer review feedback was developed by Division staff and the TAC. This procedure includes a pre-formatted template of how feedback remarks were to be submitted. This structured process was instituted in the hopes that reviewers would focus their remarks in a manner that provided worthwhile feedback that was specifically tied to the draft's technical content. The procedure and template are included with this report, for further reference.

Each TAC member was requested to provide names and contact information of those individuals that they felt would be appropriate to conduct this peer review. In addition, Division staff provided a copy of the draft revision to any individual that requested one.

Initially, only one peer review opportunity was planned. However, during the initial peer review, several impassioned requests for a second round of peer review were received from multiple interest-sectors. After considering these requests, the Division's management, collectively with the TAC Chair, agreed to a second, final round of peer review after the TAC had the opportunity to edit the first draft, based upon the feedback received from the first round of peer review.

For the first draft of January 2005, a fifty-four day review period was provided, with 116 copies of the document distributed, resulting in 54 individuals or groups contributing peer review feedback. The final draft revision of December 2005 allocated a sixty-four day review period, with 94 copies distributed, resulting in 12 contributors providing feedback.

3b): Stakeholders involved

From its beginning in 2003, this project has been overseen by the TAC at the request of the Division's Director. The TAC is a multi-disciplinary group of professionals, and its membership is defined in NC General Statutes. Three of the TAC members are primary authors for at least half of the draft revision, with the remaining chapters authored by Division staff. There are ten TAC members, each one representing a different interest-sector, as detailed below (alphabetically):

- Academic Community
- Conservation Community
- Consulting Forester
- Erosion and sedimentation control (Chair)
- Forest Products Industry
- Marine Fisheries Management
- Private Forestland Owner
- USDA Forest Service
- Water Quality
- Wildlife Management

Additional stakeholders that contributed significantly throughout this revision include North Carolina's forestry liaison with the USDA-Natural Resources Conservation Service, and staff of the Division of Forest Resources.

Early in this project, the TAC members recognized the value of their representation 'at the table.' It was incumbent upon TAC members to communicate within their respective constituency sectors of the project's potential effects, and serve as the collective 'voice' to represent the interests of that sector.

In an effort to assist the TAC members' communication within their constituency sectors, the Division staff recorded detailed meeting minutes throughout the entire revision project. The minutes from each meeting were posted on the Division's Web site: www.dfr.state.nc.us/water_quality/wq_tac.htm. These minutes record the deliberations and discussions within the TAC regarding the development and peer review of the revisions. It is hoped that this lasting record of the process will satisfy any inquiries as to how the revision and peer review process occurred.

3c) Facilitator's role

I facilitated the peer review feedback process on behalf of the Division, with agreement from the TAC. It should be noted that my facilitator role was supplemented by my role as primary author on four of the manual chapters.

While my facilitator role encompasses the entire BMP manual revision project, the accounts described herein focus on the peer review process. The major tasks accomplished with each peer review included:

i) Distributing the documents

I prepared a cover letter for inclusion with each copy of the draft document for distribution. To promote the unified efforts that contributed to the project, I secured the approval of the letter's content and signatures from both the Division Director and TAC Chair.

In addition, I created a master list of recipients for each draft document as a convenient way to determine the level of participation from the major interest sectors during the peer reviews.

Throughout the process, copies of the draft documents and contributed feedback were provided to Division and Departmental management. This was done to keep them informed of the project's status and the degree of stakeholder participation.

During preparation of the December 2005 draft, I developed a summary table that compared the current 1989 Manual with each version of the two proposed drafts. A number of TAC members and reviewers indicated that this summary table was a valuable tool for quickly understanding the major revisions between the drafts. This table is included with this report for further reference.

ii) Collecting and summarizing the feedback

The TAC was faced with the challenge of how to handle the expected large volume of feedback from each peer review. Upon my offering a solution, the TAC agreed to have

me collect and summarize the feedback in a manner that focused on technical issues of merit.

Each feedback remark that was deemed to be technical in nature was highlighted in the draft document, to be brought to the attention of the TAC at follow-up meetings. Any feedback remarks of an editorial or grammatical nature would be left to the discretion of Division staff to consider.

After reading through the feedback remarks, I summarized my findings in a memo and provided copies of all of the feedback remarks to each TAC member. This allowed the TAC to fully evaluate the feedback within the overall context of the draft document.

iii) Facilitating the analysis and discussion

Prior to the subsequent TAC meeting, I discussed my role as facilitator with the TAC Chair, and obtained his support in my leading the discussions with the TAC. The TAC Chair shared my intentions with the group, and they willingly gave their 'buy-in' to having me lead the analysis of the peer review feedback during the meetings.

Using a facilitation technique that I had seen in past Division meetings, the draft document was projected upon a wall screen using a LCD projector. This technique allowed the entire group to see the text revisions as they were being proposed during the TAC's deliberations. This efficient process works well to gain consensus from the group, since the text revisions are seen by all, and in context of the entire document. As needed, more extensive text changes and revisions were made by each author after the TAC meetings, and submitted to me for compilation into the final draft document.

3d) Problems or challenges encountered and actions to resolve

At this point, it appears that the facilitation of the peer review process worked well. However, in light of the scope of this project, it is appropriate to consider a few examples in which challenges were faced in the overall revision process:

- *Lack of meeting attendance and participation by two of the TAC members*
Throughout this process and continuing at this stage, two of the ten TAC members have not participated in this project; the member representing Private Forestland Owners, and the member representing Marine Fisheries Management. Repeated informal conversations at the beginning stages between Division staff and these two individuals were not successful in securing their participation. As a good-faith gesture, one participating TAC member took it upon himself to weigh his own contributions to the project in a manner that would likely reflect that of a forestland owner, in addition to his own interest-sector. For the remaining non-participatory member, no arrangements were made to formally involve that area of interest. The TAC felt comfortable that the peer review process would provide adequate opportunity for those within that interest-sector to provide feedback on the draft documents.
- *Lack of specific subject outline for each chapter*
A generic topical outline for the entire manual was agreed upon by the TAC at the beginning stages of this project. However, it was not until the completion of the first round of chapter writing that it became evident that a specific, detailed subject outline for each chapter may have accelerated the overall writing / reviewing / revision process within the TAC. If each author had an outline to follow, the release of the first peer review draft may have occurred earlier.
- *Unapproved sharing of an incomplete chapter draft with regulatory agency staff*
An unfinished draft copy of at least one chapter was received from unknown sources by staff of a regulatory agency. While this unapproved sharing of an incomplete chapter was not well received by the TAC, the outcome did not corrupt or disrupt the project's status to an appreciable degree. The chapter's author met with the regulatory agency staff soon afterwards, and received significant and worthwhile input for inclusion with the chapter. This same agency staff also contributed detailed feedback during both subsequent rounds of peer review.

3d1, 3d2) Least effective strategies; Non-supporting involvement

In the case of the two non-participating TAC members, the informal conversations from Division staff were not successful. Perhaps a more direct approach would have been a more

effective strategy, with communication coming from either the Division Director's Office, or encouragement from the Department Secretary's Office.

3e) Approaches that assisted the peer review process

Three key elements were particularly helpful during the peer review process:

i) Formatted template for contributing feedback remarks

Requiring the contributed feedback remarks to adhere to the defined procedures and formatted template greatly enhanced the TAC's ability to quickly analyze the feedback, and determine a course of action. This formatted template was also instrumental in assuring that reviewers stayed focused on specific, technical issues at hand, and did not stray off-course when providing feedback. The importance of keeping reviewers and contributors focused was a lesson learned from previous attempts to revise forestry BMPs in North Carolina.

ii) TAC members soliciting peer review participants

Having a pre-determined list of peer review participants already established by the TAC expedited the preparation and distribution of the draft documents. This pool of reviewers also brought with it an immediate level of credibility that may not have otherwise existed had the document been made available for a broader review, without consideration of its stakeholders.

iii) Facilitation technique of on-screen text changes

The facilitation of the follow-up TAC meetings went very well by projecting the text for the entire group to see (as described earlier under 3c,iii). This method of conducting a meeting was new to virtually everyone in the TAC, and several commended the relative ease with which the meetings progressed.

3e1, 3e2) Most effective strategies; Encouraging solutions

Forest industry was a very active contributor during the peer reviews. Face-to-face meetings during the entire revision process, including the peer reviews, proved valuable in further explaining the intent behind the feedback remarks that were submitted by various industry reviewers.

A representative from a forest industry sustainability committee attended at least one TAC meeting, during the first round of peer review consideration. This representative reinforced with her colleagues the diligence with which the TAC was analyzing and deliberating the technical merits of the draft document. During the second round of peer review, two additional industry representatives met with Division staff and the TAC Chair to provide their support for the work undertaken on this project. This meeting provided a better mutual understanding of each other's interests and positions.

4: BUDGET & EXPENDITURES

A conservative estimate of the budget and expenditures related to the peer review are provided in the table below:

<i>Description</i>	<i>Funding</i>	<i>Fund Source</i>	<i>Direct or In-kind</i>	<i>Actual or Estimate</i>
Printing costs of two peer review drafts • NRLI contributed \$200 of the total	\$1,344	NCDFR, NRLI	Direct	Actual
TAC member and other participants' meeting time investment value ^A	\$82,600	(matching)	In-kind	Estimate
Division staff meeting time investment value ^B	\$34,125	NCDFR	In-kind	Estimate
Administrative costs (travel, food, mail, etc) ^C	\$3,671	NCDFR	Both	Estimate
<i>Total</i>	\$121,740			

^A Calculated 59 man-hours x 5 hours/meet x 7 meets x \$40/hour

^B Calculated 39 man-hours x 5 hours/meet x 7 meets x \$25/hour

^C Estimated from actual expenditures and estimated costs

5: OUTCOMES

5a) Immediate Outcomes

For this report, the immediate outcomes will focus on the peer review process undertaken on this revision project. The following section (5b) addresses the long-term outcomes as they relate to the entire project.

5a1) Desired situation achieved

The peer review process was a success, based upon commendations and personal communications with Division staff, management, and some TAC members. The success can be measured by these results:

- Receipt of feedback on two drafts from across North Carolina within the allotted review period
- Detailed and constructive feedback received from forest industry, who are the primary BMP practitioners, and likely have the most at stake regarding BMP implementation
- Considerable investment of time and contribution of detailed feedback from staff of a key regulatory agency
- Absence of intense scrutiny or inquiry from Division and Departmental management regarding the peer review process, which hopefully will translate to a relative ease with which the final document is approved and adopted

5a2) Examples of change: Stakeholders & Self

Conducting the facilitation during the TAC meetings allowed me to pull from some of the experience and knowledge gained during previous NRLI work sessions. The importance of assuring a consensus on a matter, before moving forward, was an often-used tool. In addition, implementing ground rules and fostering constructive input from all participants proved fruitful. These are skills that I expect to use on future projects that involve multiple stakeholders and/or are committee-driven.

5a3) Examples of change: Group

The peer review process appears to have fostered an enhanced mutual respect within the TAC, for each other's positions and interests. The TAC chair has personally noted the tremendous amount of knowledge he has gained regarding the forest sciences, and the challenges facing loggers, landowners, and forest managers in an ever-changing marketplace for forest products.

5a4) Examples of change: Organization

It remains to be seen what changes may come from the successful peer review process. Division management recognizes and has applauded the efforts invested throughout the process, from both their staff and the TAC.

The lack of participation by two of the TAC members was evident during the peer review process. I would hope that the Division will aggressively pursue full involvement by all TAC members on future projects of this magnitude, even if that means a replacement of a member on the committee.

5a5) Examples of change: Community

Within the forestry community, the forest industry sector has been particularly active as an interested stakeholder throughout this project. The level of activity from this sector is driven through the self-adopted policies within many companies that forestry operations they control will meet or exceed BMP usage, even if BMP implementation is not required by law.

An enhanced level of communication between these companies and the Division has resulted in a better appreciation of the challenges faced by all parties. This communication improvement was evident during the final round of peer review, in which an industry-member committee provided summarized feedback from its participants, rather than having several different industry-members contributing essentially a 'chain letter' feedback, such as what occurred during the first round of peer review.

5b) Long term outcome

While the initial outcome of a completed peer-reviewed draft revision has been accomplished, a final product that is ready for adoption and publication remains to be completed. The projected timeline for this phase of the project is detailed in Part 6 of this report.

The manner and process by which this revision has taken place should lend credence to the recommendations provided in the final manual, upon its completion and adoption for use in North Carolina.

5b1) Desired situation not achieved

Does not apply

5b2) Anticipated changes: Stakeholders and Self

Never before have I been challenged with such a committee- and stakeholder-driven project. The lessons learned should certainly continue through to other collaborative efforts. A key lesson for anyone is to be sure that you are committed and passionate about a project prior to taking on such an integral role in its execution. Having only a casual interest or stake in such a project may not result in the degree of satisfaction of having accomplished such a significant piece of work.

5b3) Anticipated changes: Group

Several of the individuals who are members of the TAC are either already retired, or have announced their intent to retire in the near future. As a result, the composition of the TAC, while still following the prescribed 'sector interests' defined by law, is expected to experience a wholesale turnover, including the Chair. The same cooperative effort exhibited from the current TAC in collaborating on this BMP manual revision will be expected of any new TAC member on their future assignments. This project should be viewed as a model of how to approach a complex task that effects the entire forestry community in North Carolina.

5b4) Anticipated changes: Organization

A change (addition) to the Division's staffing allowed the dedicated assignment of this project to its technical staff, through the Nonpoint Source Unit. Without this full-time staff availability, the workload associated with this project would likely have delayed or crippled the ability of such a comprehensive revision to occur. It is hoped that the success of this project will further substantiate the value in permanently establishing the Nonpoint Source Unit within the Division.

In addition, this project's increased level of activity and communications with the TAC only reinforced the value of the Division's TAC liaison. This project's lessons will likely result in a more proactive and responsive liaison staff support than that provided by previous staff members.

5b5) Anticipated changes: Community

Along with other BMP-focused projects within the Division, such as a statewide implementation survey and effectiveness monitoring study, this BMP manual revision has brought to light several areas that may require, or have required, additional focus by the Division and/or TAC. In essence, there were/are a number of related issues that 'spun out' from the main objective of revising the BMP manual. Some of these issues have been already satisfactorily addressed, while others will be pursued as time allows. A few examples of related issues:

- Publishing information on the extent of forest roads suitable for use in wetlands
- Clarifying the federal permit exemption for silvicultural activities in wetlands
- Developing and field testing recommendations of non-invasive vegetation for soil stabilization
- Reviewing and studying the effectiveness of forested riparian buffers
- Enhancing training on stream and ditch obstructions and recommending appropriate BMPs
- Explaining in detail how the Division conducts water-quality site inspections
- Following up on previous proposals regarding stream definition and identification methods

5c) Resource Impacts

The revised BMP manual will continue as the guiding foundation upon which recommendations are made for protecting water quality during forestry operations. While these recommendations are expected to remain voluntary, the forest sustainability certification programs subscribed to by much of the forest industry requires that each member company meet or exceed the BMPs on sites in which they have control over. This market-based solution to protecting water quality will undoubtedly benefit from a more comprehensive and revised BMP manual that was developed with broad stakeholder governance.

5d) Other Anticipated Benefits

It is hoped that the extensive peer review process and stakeholder input that contributed to the breadth and detailed content of this revised BMP manual will serve as a strong indicator that forestry operations need not be further restricted by regulatory actions in order to protect water quality. As the expansion of the federally-mandated TMDL (Total Maximum Daily Load) program progresses in North Carolina, the forestry community should strongly promote and vigorously implement BMPs in an effort to preclude working forests from further regulations that may or may not be founded upon documented water quality benefits. This comprehensive revision to the BMPs for North Carolina provides a solid foundation upon which to continue forest management as a preferred land-use practice for protecting water quality.

6: FUTURE ACTIONS

The next major progress point will be the compilation of a final proposed draft to be submitted to the Division and Department for approval and adoption. Printing and distribution of the new BMP manual is targeted for completion during the fall of 2006.

The corresponding field guide will be developed primarily by Division staff once the revised 'comprehensive' edition is completed. The TAC will be provided with an opportunity to review the final draft of the field guide, and contribute their input. This lag time between the release of the comprehensive (desktop) and field (pocket) guides results from the extensive graphic layout and artwork that will be required for the field guide. This graphic work will require the expertise of in-house Division staff that must balance this project with several other projects within the Division not exclusively related to water quality or BMPs. It was agreed upon by the TAC and Division staff that the comprehensive edition would be distributed as soon as possible, rather than keep our customers waiting any longer than necessary.

Rollout and distribution of both documents will require extensive travel across the state. The Division is in the planning stages for workshops and/or training seminars on 'how to use' the new BMP manuals to meet the anticipated requests from Division field offices and the forestry community.