

Forestry Water Quality & BMPs

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Adapted from a presentation developed by Tom Gerow.



What Are The Rules?

N.C. “Forest Practice Guidelines Related to Water Quality” (FPGs)

N.C. General Statutes (G.S.)

Petroleum Spill Notification

State ‘Riparian Buffer Rules’

Rules (“guidance”) in Wetlands



The Rules: FPGs

The FPGs are 9 performance standards:

- Goal-oriented, results-based, not prescriptive
- Each FPG section describes the desired outcome, not necessarily how to achieve it
- FPG compliance may be achieved by using *Best Management Practices* (“**BMPs**”), or some other suitable methods
- As long as the outcome/standard of the FPG is being achieved, any methods can be used



The Rules: FPGs

The 9 FPG standards: *(15A NCAC 01I .0100 - .0209)*

- .0201 Streamside Management Zone - SMZ**
- .0202 Prohibition of Debris Entering Streams and Waterbodies**
- .0203 Access Roads and Skid Trail Stream Crossings**
- .0204 Access Road Entrances**
- .0205 Prohibition of Waste Entering Streams, Waterbodies and Groundwater**
- .0206 Pesticide Application**
- .0207 Fertilizer Application**
- .0208 Stream Temperature**
- .0209 Rehabilitation of Project Site**



The Rules: FPGs

FPG Site Inspections & Quarterly Reports (“4808”)

- NCFS required to inspect active logging sites as we become aware of them in normal of course of work, or by request, or complaint.
- We fill out forms, and communicate with person who is in ‘operational control’ of that job, copies of forms provided.
- If follow-up work is needed to get in-compliance with FPGs, a deadline is provided (*flexibility may be available, but communicate!*)
- Each quarter, Raleigh staff produces FPG Quarterly Report that shows all inspections for that quarter including:
 - *Buyers in non-compliance & Operators in non-compliance & Referrals*

Most of the large paper / lumber / timber companies ask for a copy of this report.

They will check to see if any of their contracted loggers or buyers are on the “non-compliance” list...

They get audited periodically and have to demonstrate that their company is following environmental sustainability goals



Best Management Practices - BMPs

Are BMPs required by law in NC??

Technically, No*

....but activities must comply with the FPG rules

....(and all the other enviro rules)

* *Federal wetland BMPs **required**: 15 roads, 6 site prep*

* *BMPs **required** on cost-share sites: FDP, CRP, etc*

* *BMP Certification: SFI, FSC, Tree Farm, etc*

FPG's = “you have to” BMPs = “should do”

BMPs are the tools in the toolbox



Best Management Practices - BMPs

Skid Trails

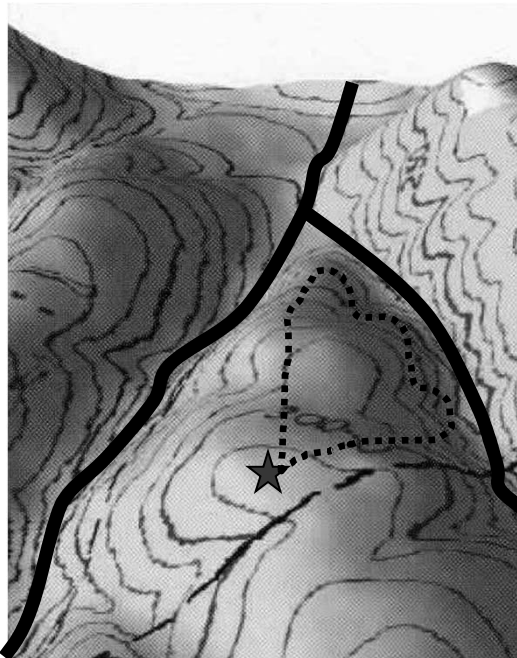
- Concentrate on as few trails as possible.
- Limit primary skid trails to 10% of working area.

Ex: 50 acre tract, 10%=5 ac: If primary skid trail is 15ft wide, limit length to 14,520ft (2¾ mile).

- Avoid widespread, random skidding with repeated passes.
- Minimize in ephemerals.
- Minimize soil gouges, trenches.
- Pack down leftover logging debris atop skid trails.

Log Decks

- Minimize size, area.
- Keep out of SMZs, ephemerals.
- Flat level ground, stable soils, with good drainage.
- **Pack down leftover logging debris atop deck.**



Laying out Skid Trails

Avoid “ephemeral streams”

This means hollows, gullies, ravines.

Example Here:

★ = log deck

Dotted line is skid trail.

Here, skid trail crosses 2 ephemeral streams and runs along the blue-line stream, close to SMZ.

HIGHER RISK SCENARIO



Laying out Skid Trails

Avoid “ephemeral streams”

This means hollows, gullies, ravines.

Example Here:
★ = log deck

Dotted line is skid trail.

Here, skid trail runs down atop the ridges and stays out of ephemeral stream gullies. Reduces contact with the blue-line SMZ.

LOWER RISK SCENARIO

Best Management Practices - BMPs

Effective BMP Usage.

Low Risk Management.

Main trail matted-down.

Low risk of soil damage or sedimentation

Granville Co

*Is This Skid Trail Using BMPs?
Risk Management?*

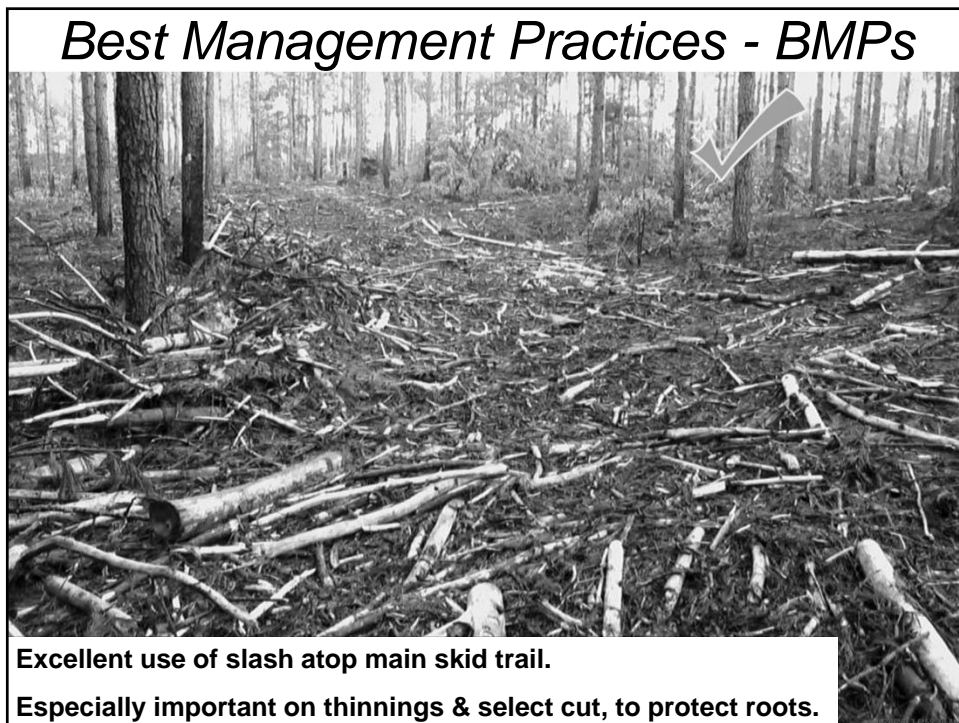


Rutted main trail. Look at all that slash on each side, could that have been applied atop of the trail??

Best Management Practices - BMPs



**Good use of slash & laps on logging deck.
Lower risk, little rehab needed.**



Best Management Practices - BMPs **Streamside Management Zone - SMZ**

Remember: A SMZ is required along certain streams & waters as described in FPG .0201:

Where is SMZ needed?

- **Intermittent Streams,... Perennial Streams,... and Perennial Waterbodies.**
- **NOT** ephemerals, **NOT** ditches, **NOT** beaver ponds
(but, sediment still must be kept out of these features)

Main goals of a SMZ:

- **Slow & filter surface runoff**
- **Capture sediment before reaching stream**
- **Provide shade**
- **Maintain streambank stability**
- **Buffering from other natural impacts (nutrients, bacteria)**



Best Management Practices - BMPs **Streamside Management Zone - SMZ**

Wrap the end of SMZ around the head of the stream.

Risk Management.... Lowers the risk of a problem.



50-foot wide is the general BMP recommendation:

However..... for those who want to be flexible:

Sediment Control	30 to 150 feet
Nutrient Management	15 to 200 feet
Streambank stability	25 to 55 feet
Wildlife / Aquatics	25 to 300 feet



Best Management Practices - BMPs Streamside Management Zone - SMZ

General BMPs for Forestry Operations in SMZ

- Keep skid trails, roads, decks at least 10 feet away from the edges of the stream or waterbody
- Maintain 50% (“half”) of pre-harvest shade
- No more than 20% evenly distributed bare soil
- Do not use SMZ as a de-limbing gate
- Minimize soil gouging from skidded logs / trees
- Service & refuel equipment out of SMZ.
- Avoid high intensity prescribed burns in the SMZ.
- Minimize heavy equipment usage within SMZ (site prep).



Best Management Practices - BMPs Streamside Management Zone - SMZ

SMZ: Special Cases

Braided Streams

- Try to stay out of these areas.
- Harvest when dry.
- Often these are also wetland areas, so be aware.

Hydrologically-Connected Ditches

- Ditches that outlet to a stream system.
- No SMZ width recommendations.
- Protect ditchbank integrity and minimize heavy equipment use.

Ephemeral Streams / Drainages

- No SMZ width recommendations.
- Minimize heavy equipment use, decks, skid trails, roads.
- Wrap SMZ around stream head to include transition area.



Best Management Practices - BMPs



Granville Co

SMZ left in place during a logging job

Best Management Practices - BMPs

SMZ flagged.
Trees cut & removed away from stream.
Some soil disturbance, but not extreme.
Slash / tops piled along edge of slope.



Best Management Practices - BMPs
Stream Crossings

Avoid installing new crossings at all cost.
Minimize the number & overall size of crossings
Rehab right away once crossing is not needed

On skid trail crossings:

- **Pack down slash atop of the approachways while being used...not just later for rehab**
- **Use bridgemats**

On logging road crossings:

- **Keep soil from washing into the stream**
- **Consider a bridge or ford, instead of a culvert**



Best Management Practices - BMPs



- **Bridgemats butted tight together**
- **Road approachways stabilized with stone**





Bridgmat Skid Trail Crossing
Bare soil, rutting on approach ways. No slash applied.
Even on flat ground, BMPs & Risk Management are important.

**Log pole crossing
in a dry ditch,
Northampton Co.**



**Ford crossing,
ample ballast
on each
approachway
and side banks
grassed-over,
Franklin Co.**

Best Management Practices - BMPs

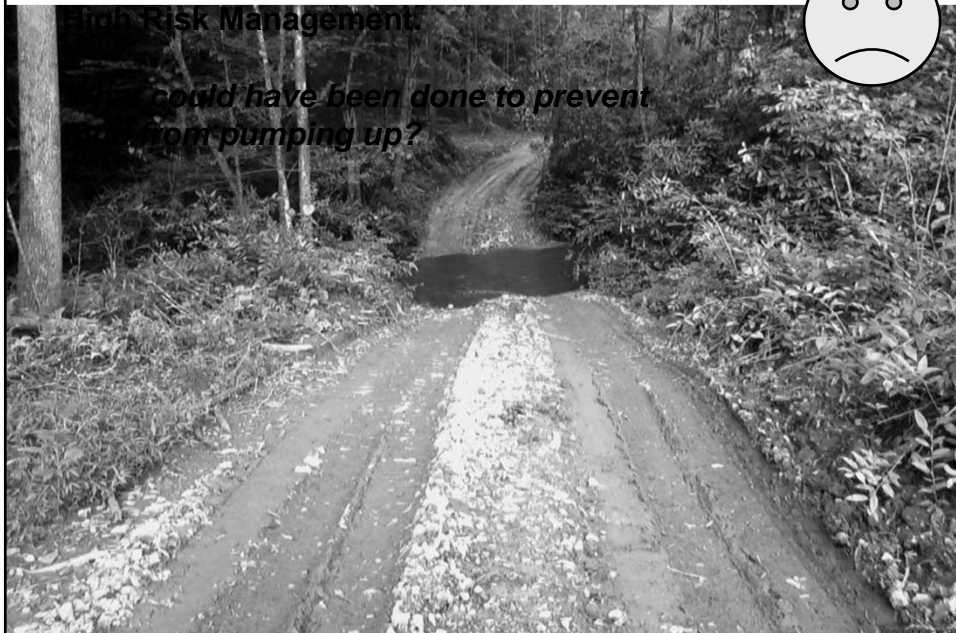
**Ford Crossing:
Well Done BMPs.
Low Risk Management.**



**Ford Crossing.
Poorly Implemented BMPs.**

High Risk Management.

*What could have been done to prevent
this from pumping up?*

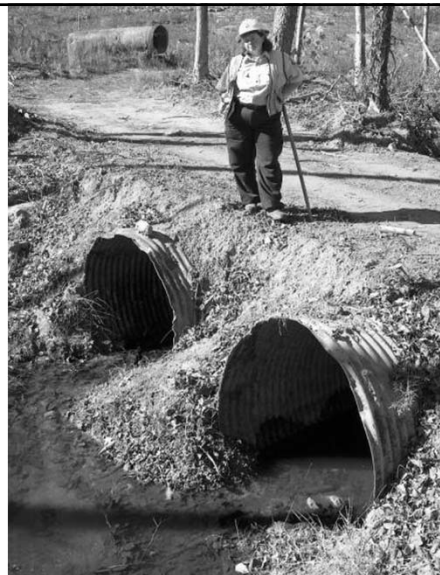


Best Management Practices - BMPs

Lay down geotextile
(filter fabric) before
applying stone.



Tree tops in stream for skid trail crossing.
Blocking water?
Hard to rehab & remove.
High Risk Situation.



Large culverts. Big enough?
Bare soil exposed, washing away.
High Risk Situation.

Best Management Practices - BMPs

Erosion & Sediment Control: 3 steps to success

1: Prevent accelerated erosion & concentrated runoff:

- *Ground cover, soil structure, SMZ*

2: Control runoff before it gets out hand:

- *Slow it down...& Spread it out...*
- *Establish a 'break in the grade' = divide slopes into short sections*

3: Capture sediment & runoff:

- *Keep it out of the stream, ditch, wetland*

BMP Tools to Control Runoff

- Broad-based dip
- Turnout
- Cross Drainage
- Waterbars
- Inside Ditchlines
- Road Insloping, Outsloping, Crowning



BMP Tools to Capture

Sediment

- Filter Areas
- Silt Fence
- Brush Barrier
- Sediment Trap/Pit
- Hay / Straw Bale
- Check Dam

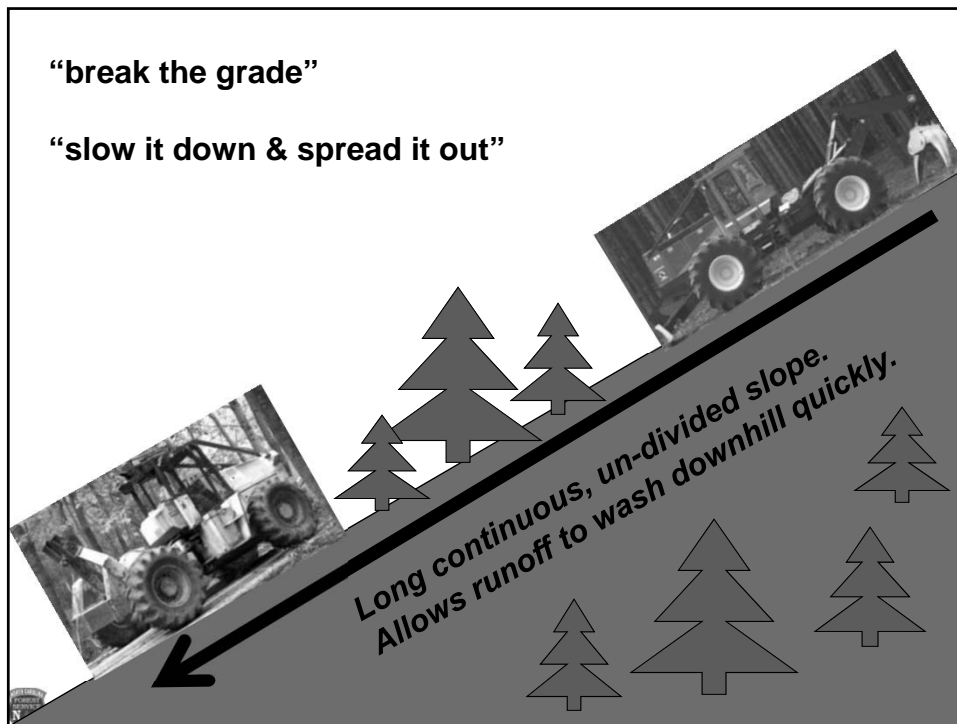
BMPs: Erosion Control Tools (new options)

Erosion Control Matting
slopes & stream banks



Coir / Fiber Logs, or "Wattles"
fiber check-dam, instead of rip-rap





Best Management Practices - BMPs

Forest Roads

- **Don't build a new road unless needed.**
 - *Can the old logging road be “freshened up” and used ??*
- **Take extra care at stream crossings.**
- **Follow the contour. Don't dig any more soil than needed.**
- **Only install as much road as needed.**
 - *Minimize length, width, and soil excavation.*
- **Install diversions. Control the runoff. Maintain the road.**
 - *.....slow it down & spread it out.....*
- **Daylight strip to let the sun shine down.**
- **In lowlands (wetlands), keep road height at a low profile.**
 - *Avoid creating a berm or dike. Install plenty of cross-drain culverts or bypass dips.*

Best Management Practices - BMPs

Forest Roads: Which Is Using BMPs to Manage Risk?



Best Management Practices - BMPs Site rehabilitation (rehab) & stabilization

REQUIRED under section .0203 & .0209 of FPG's!

- **Critically important, especially at:**
 - Stream crossings
 - Along or within SMZ's & buffers
 - Along steep slopes that lead towards the water

- **Most common rehab work:**
 - Remove debris from streams
 - Install water diversions on plowlines, trails, roads
 - Reshape roads, firelines to prevent funneling of runoff
 - Re-cover bare soil nearby streams (*esp. approachways*)

Best Management Practices - BMPs



Best Management Practices - BMPs

Stream crossing rehab'd.
Some grass established.
Brush piles set on slope.



So.... How Are We Doing?



BMP Performance Report Card

NC Forest Service conducts periodic detailed logging job site surveys. These are in addition to our standard FPG inspections.

BMP site surveys are intended to see what BMPs are being used, and if the BMPs are working as intended.

Most recent data is from 212 active logging jobs we evaluated between 2006 & 2008.

Some results that we found....



BMP Performance Report Card

- Statewide, BMPs were implemented 85% of the time where they were applicable.
- Regionally, the numbers vary widely:
 - Mountains 66%, Piedmont 88%, Coastal Plain 91%
- When BMPs were used, there was no risk to water quality nearly 100% of the time.
 - This tells us that when BMPs are used, they work!
- When BMPs were not used, there was a risk to water quality 54% of the time.
- High BMP % use = High FPG % compliance.

Best BMP implementation statewide rates:

Waste: 92%, SMZ: 91%, Stream temp: 90%



BMP Performance Report Card

STREAM CROSSINGS ARE A PROBLEM

Worst statewide average BMP usage rate was at stream crossings, with 72% implementation:

- Mountains 52%, Piedmont 77%, Coast 78%
- The most frequent FPG rules violations we see year after year also occur at stream crossings (.0203)
- This is why we talk so much about BMPs & bridgemats & rehab & avoiding stream crossings

----- Stream Crossing Methods -----

We looked at the types of crossings and risk to water quality when BMPs were not used:

- Risk to water quality from Bridgemats: 9%
- Risk from Culverts 49%, Poles 23%, Fords 27%



BMP Performance Report Card

Take home points (*things you already know?*)

- Logging in the mountains, on steep slopes is very, very challenging.... Much more BMP work is needed.
- Stream crossings are a problem, avoid them at all costs
- Bridgemats are the best BMP option, lowest risk to WQ
- BMPs that give you the most reward:
 - Stream Crossings, Rehab, Debris in Streams, Skid Trails, SMZ, Roads
- SMZ's less than 10 feet don't work.
 - Between 35 feet & 50 feet should be sufficient most of the time
 - Take extra precautions when logging in the SMZ
- Rehab, Rehab, Rehab.... as soon as possible.
- Technical assistance, harvest planning, and ProLogger ARE WORKING....



MOU between NCFS & DEMLR

Improve Communication

- **NCFS is lead agency in determining FPG Compliance**
- **DEMLR is lead agency in determining if the activity is forestry**
- **Work together on questionable tracts**
- **Improve follow-up paperwork flow and share findings**

Interagency Training

- **Plan regional meetings with personnel to ensure everyone is on the same page**
- **Visit sites to gain understanding of what each agency is seeing and thinking on sites**



NCFS Contacts

Typical hierarchy

- **County Office – County Ranger or Assistant CR**
- **District Office – District Forester, Assistant DF, Water Quality Forester**
- **Regional Office – Assistant Regional Forester**
- **Central Office – Water Quality and Wetland Staff Forester**

Common exceptions

- **Districts with Water Quality Foresters: That forester commonly becomes a main contact for tracts with problems or potential problems**
- **Disagreement with an office's decision**

