Forest Harvesting BMPs- Revised Recommendations

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Evaluation of Potential Changes for Phase 7

1. Base loads from harvested forests
2. Efficiency rates of forest harvest BMPs
3. Credit duration for forest harvest BMPs

Harvested forest in Phase 6

Forest N loads were reduced in Phase 6 to reflect research demonstrating declining atmospheric nitrogen deposition

Justin Hynicka (MD DNR) and TetraTech conducted literature reviews to develop average agricultural and forest land use loading rates

Nutrient loading factors for harvested forest were supposed to represent average increases for three years after harvest

- Currently harvested forest reverts back to true forest after 1 year (erroneously)
- **Incorrect loading ratios were used for TN and TSS (erroneously)**

Phase 6 Loading Rates

Land Use	TN Loading Rate Ratio	TN Loading Rate (lbs/acre/yr)	TP Loading Rate Ratio	TP Loading Rate (lbs/acre/yr)	TSS Loading Rate Ratio	TSS Loading Rate (lbs/acre/yr)
True Forest	1	1.68	1	0.08	1	0.07
Harvested Forest (CAST)	7.07	11.88	3.12	0.24	10	0.6
Harvested Forest (Hynicka)	7.03		3.12		3.05	

Current Forest Harvest BMP in CAST:

Forest Harvest BMPs decrease total loads by:

- Total Suspended Solids (TSS) – **60%**
- Total Nitrogen (TN) – **50%**
- Total Phosphorus (TP) – **60%**

- Determined via 2009 report by Pamela Edwards & Karl Williard
- No differentiation in BMP type
- 1-year credit duration
- More information in the BMP Guide, Page 162

Impact of current BMP efficiencies

	Original recommended loading rate ratio	Current forest harvesting BMP efficiency	Loading rate ratio after BMP application	% of additional loads over True Forest removed by BMPs
TN	7.03	50%	3.52	58%
TP	3.12	60%	1.25	88%
TSS	3.05	60%	1.22	89%

Research Methodology

- Published 2009 – Present
- Within the CBW or neighboring states
- Eastern mixed deciduous and pine forests
- Interview with experts
- Initial review looked at TN, TP and TSS. Re-focused on TN given already high efficiencies for TP and TSS
- Focused on research evaluating impacts on TN loads (not concentrations)
  - Loads measure the total amount of a pollutant entering a waterway over a period of time (accounting for changes in streamflow)

Evaluation of impacts on TN loads

Reference	Key Findings
Marchman et al. 2013	"All nutrient loads and yields increased following silvicultural treatments because of the increase in streamflows". Given the high variability in TN loads between years and between sites (including upstream ag influences in the treatment watersheds) we were unable to quantify the effects of harvest on TN loads relative to control watersheds.
Boggs et al. 2015	An analysis using their data showed a 198% increase in TN loads from harvest sites with BMPs over modeled no harvest loads.

Expert consultation suggested that forest harvest BMPs are highly efficient, capturing most nutrients entering waterways with proper BMP usage.

Revised efficiency rate calculations

	Loading Rate Ratio
True Forest	1
Harvested Forest with BMPs (based on Boggs et al. 2015)	2.98
Previous harvested forest ratio (without BMPs)	7.03
Efficiency rate required to achieve loading rate ratio from Boggs et al. 2015	57.6%

*Literature reviewed by Edwards and Williard found a 60-80% efficiency for TN loads (Wynn et al. 2000)

Recommendations

1. Recommend **correcting the loading rate ratios** of harvested forests for TN and TSS (TN=7.03, TSS= 3.05)
2. Recommend changing the efficiency rates of forest harvest BMPs to:
   - **TN from 50% to 60%**
   - **Maintain efficiencies for TP and TSS**
3. Recommend changing the **credit duration for forest harvest BMPs to three years.**