Forest Harvesting Practices BMP Update

LORENZO CINALLI & ALANNA CROWLEY

How Forests Improve Water Quality

Surface Trapping of sediments (and bound phosphorus)

Denitrification (particularly in riparian areas with fluctuating saturation and organic sources of C)

Dilution of pollutants by groundwater recharge

- Forests have high infiltration rates

Uptake of nutrients by vegetation

Soil protection- Forest floor/litter acts as a sponge

- Canopy intercepts water and air pollutants

Forest Harvest BMPs

Forest Harvests use a wide variety of practices to minimize water quality impacts including:

- Water bars
- Culverts
- Maintaining forest buffers (also highly effective for N removal)
- Stream crossings where necessary (many harvests aim to avoid crossings)
- Avoiding depositing organic material from harvest in streams

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)

Phase 6 Loading Rates

Land Use	N Loading Rate Ratio	N Loading Rate (lbs/acre/yr)	P Loading Rate Ratio	P Loading Rate (lbs/acre/yr)	SS Loading Rate Ratio	SS Loading Rate (lbs/acre/yr)
True Forest	1	1.68	1	0.08	1	0.07
Harvested Forest	7.07	11.88	3.12	0.24	10	0.6
Mixed Open	1.46	2.45	5.69	0.43	1	2.35

Current Forest Harvest BMP in CAST:

Forest Harvest BMPs decrease 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

Research Methodology

- Published 2009 – Present
- Within the CBW or neighboring states
- Eastern mixed deciduous and pine forests
- Interview with experts

Literature Review

Reference	Sediment	Nitrogen	Phosphorus
Hawks, Bolding et al. (2022)	64%	/	/
Hawks, Aust et al. (2022)	83%	/	/
Lakel et al. (2009)	97%	/	/
A.J. Lang et al. (2022)	88.2%	/	/
Dangle et al. (2019)	100%	/	/
Cristan et al. (2019)	75.6%	/	/
Maine FS (2021)	“Not measurable”	/	/
Witt Et al. (2016)	“Low impact”	“Low impact”	/
DaSilva et al. (2012)	/	“No significant increase”	“No significant increase”
Marchman et al. (2013)	/	“Statistically insignificant”	“Statistically insignificant”
Boggs et al. (2015)	/	“No significant increase”	“No significant increase”
Average	**85%**	**/**	**/**
Edwards & Williard Average	**67%**	**51%**	**72%**
Current CAST Efficiencies	**60%**	**50%**	**60%**

Recommendations

1. Recommend **no changes to base loading rates** of harvested forests.
2. Recommend changing the efficiency rates of forest harvest BMPs to:
   - **TSS from 60% to 85%**
   - **TN from 50% to 90%**
   - **TP from 60% to 85%**
3. Recommend changing the **credit duration for forest harvest BMPs to three years.**