Calculating Phosphorus Reduction Credit for Leaf Management Programs

Amy Minser

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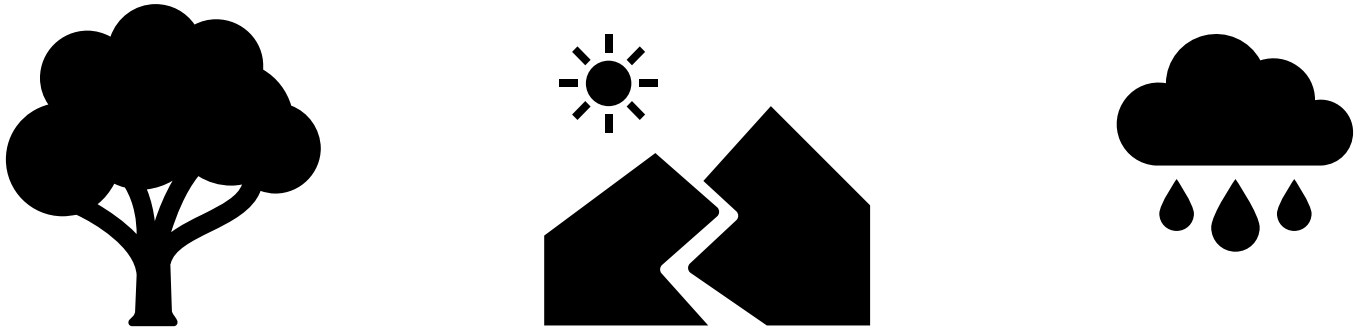
What is the problem?



All Good and Necessary Individually

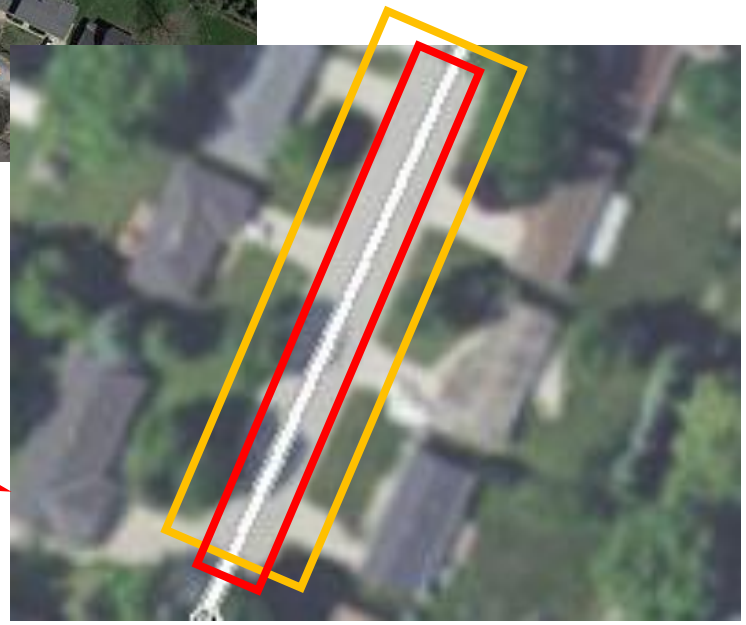
Combined they move phosphorus from trees to waterways

Source Control vs. Treatment

Take away source before it rains

Remove pollutants from water

Tree Density



NEW

- Average of one or more medium to large canopy street trees per 80 LF (no change)

OR

- 40% or greater leaf canopy over pavement

OR

- 45% or greater leaf canopy over the Right-of-way

Numeric Credit Option 1

- Bulk leaf collection 3-4 times per season followed by street cleaning within 24 hours
- 17% reduction in annual Total Phosphorus discharge

Numeric Credit Option 2

- Weekly sweeping with Regenerative Air sweeper
- Bulk leaf collection 3-4 times per season
- 25% reduction in annual Total Phosphorus discharge

Timing Guidance

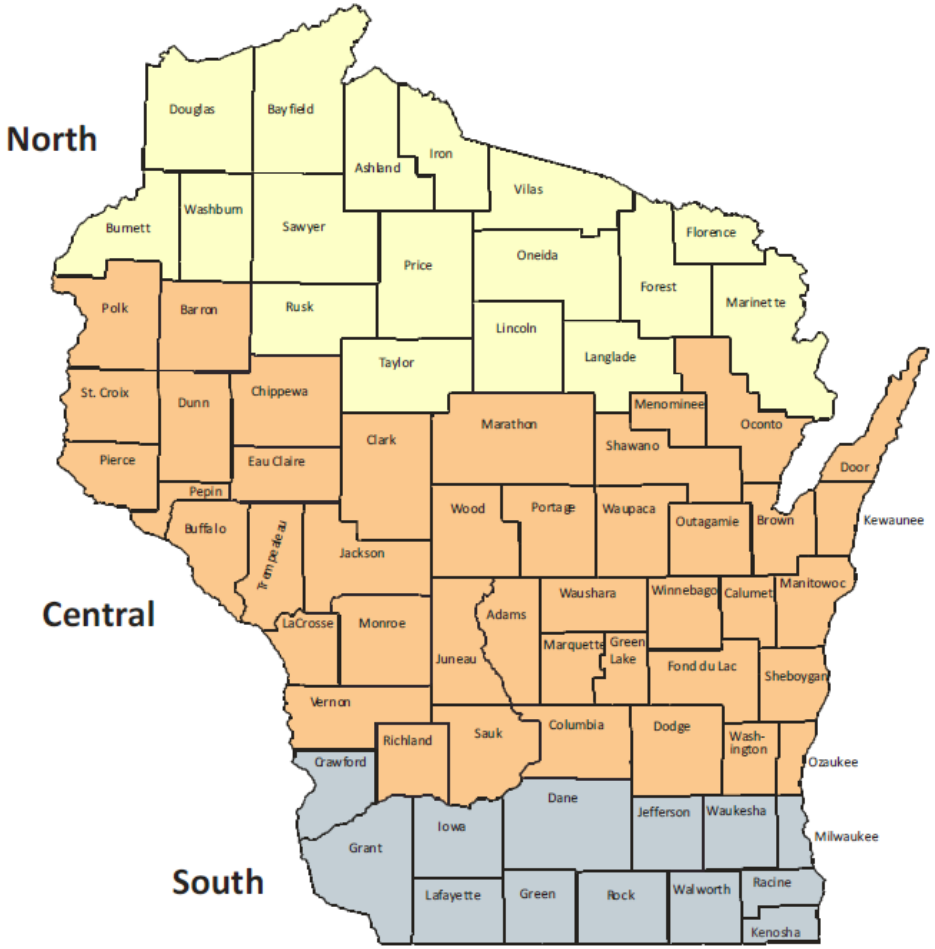
NEW

Start street cleaning when…

Timing Guidance

Start bulk collection when…

Start-by Dates



September 23

October 1

October 7

Map from USDA Technical Note 5

Key Updates

- All residential land uses now eligible
- Additional option for higher credit
- Options for canopy density determinations
- Timing guidance
- Sample calculations appended to guidance

Calculating the credit

- Identify the areas where the requisite conditions are met
- Identify the option to be implemented
- Calculate average annual no-controls phosphorus loads using WinSLAMM or P8

Hartsookville DA 1

- 80 acres MDRNA
- 20 acres Strip Commercial
- BMP: Vacuum Sweeper 1 x/4 weeks
- BMP: Compliant Leaf Management Program-Option 1

WinSLAMM Output:

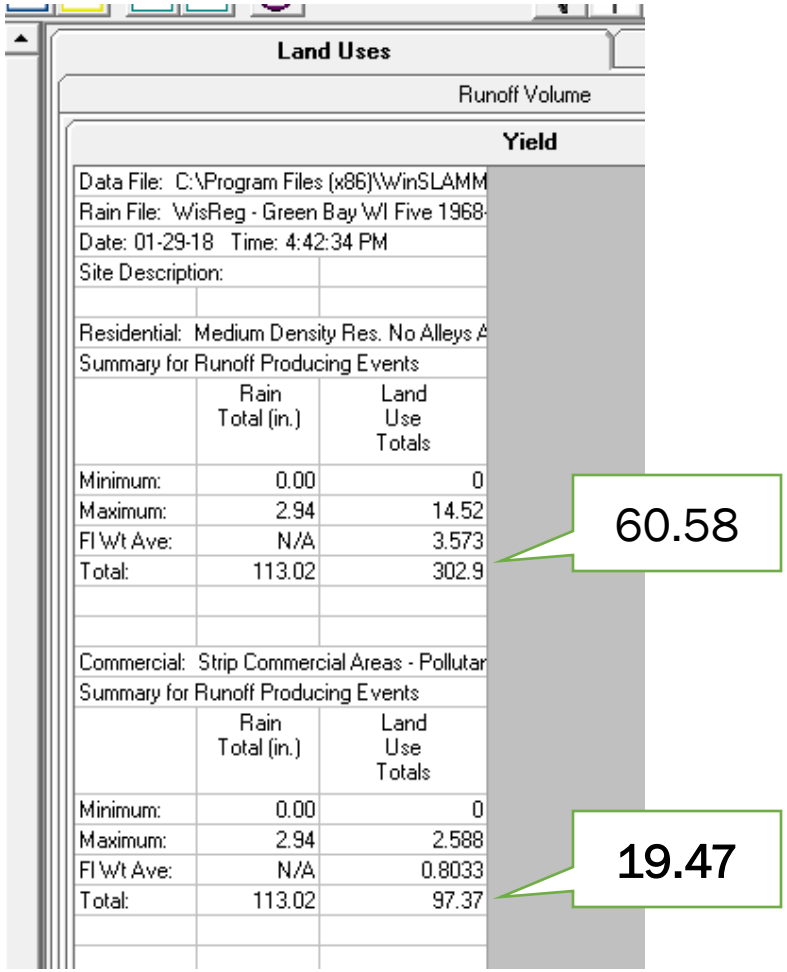
Pollutant	Pollutant Yield No Controls (lbs/yr)	Pollutant Load With Controls (lbs/yr)	Percent Yield Reduction
Particulate Solids	27,439	23,976	12.6
Total Phosphorus	87.08	80.06	8.1 < 17%

Hartsookville DA 1

- 80 acres MDRNA @ 0.82 lbs TP/ac/yr No Controls
- 20 acres Strip Commercial-Balance of No Controls TP/ac/yr

Land Use	TP Yield No Controls (lbs/yr)	TP Load With Controls (lbs/yr)	TP Percent Yield Reduction
MDRNA	65.60		
Strip Commercial	21.48		

Hartsookville DA 1



- Output/Land Uses/Pollutants/Yield
- Divide by 5 years
- Use With Controls Strip Commercial for Street Cleaning

Applying the Credit

Pollutant	Pollutant Yield No Controls (lbs/yr)	Pollutant Load With Controls (lbs/yr)	Percent Yield Reduction
Particulate Solids-DA1	27,439	23,976	12.6
Total Phosphorus from MDRNA	65.60	54.45	17% From Leaf Management
Total Phosphorus from Strip Commercial	21.48	19.47	9.4% from Street Cleaning
Total Phosphorus DA1	87.08	73.92	15.1%

Hartsookville DA 2

- 80 acres MDRNA
- 20 acres Strip Commercial
- BMP: Regional Pond and Compliant Leaf Management Program

WinSLAMM Output:

Pollutant	Pollutant Yield No Controls (lbs/yr)	Pollutant Load With Controls (lbs/yr)	Percent Yield Reduction
Particulate Solids	27,439	15,685	42.8
Total Phosphorus	87.08	60.34	30.7

> 17%

Use Pond TP Reduction for DA2

Hartsookville DA 3

- 100 acres HDRNA
- BMP: Compliant Leaf Management Program-Option 2

WinSLAMM Output:

Pollutant	Pollutant Yield No Controls (lbs/yr)	Pollutant Load With Controls (lbs/yr)	Percent Yield Reduction
Particulate Solids	27,280	27,280	0.0
Total Phosphorus	98.00	98.00	0.0

< 25%

Apply Leaf Management to entire DA

No Controls Loads from WinSLAMM 10.1.1

Abbreviation	TSS lbs/acre/yr			TP lbs/acre/yr			Description
	Clay	Silt	Sand	Clay	Silt	Sand	
HDRNA	272.8	261.4	241.9	0.98	0.90	0.77	High Density Residential without Alleys
HDRWA	317.4	291.2	271.2	1.09	0.96	0.81	High Density Residential with Alleys
MDRNA	215.7	200.8	175.0	0.82	0.73	0.55	Medium Density Residential without Alleys
MDRWA	270.4	237.9	213.2	0.97	0.80	0.63	Medium Density Residential with Alleys
LDR	157.4	144.2	113.6	0.68	0.58	0.36	Low Density Residential
DUPLEX	222.6	209.3	184.4	0.85	0.76	0.58	Duplexes
MFR/MFRNA	275.2	265.6	247.6	0.91	0.84	0.72	Multiple Family Residential
HRR	344.9	339.9	329.2	0.99	0.96	0.87	High Rise Residential
MOBH	206.6	198.4	180.4	0.73	0.67	0.54	Mobile Home Park
SUBR	113.1	99.0	64.1	0.58	0.47	0.22	Suburban

Applying the Credit

Basin	TSS Yield No Controls (lbs/yr)	TSS Load With Controls (lbs/yr)	TSS Percent Yield Reduction	TP Yield No Controls (lbs/yr)	TP Load With Controls (lbs/yr)	TP Percent Yield Reduction
DA1	27,439	23,976	12.6	87.08	73.92	15.1
DA2	27,439	15,685	42.8	87.08	60.34	30.7
DA3	27,280	27,280	0.0	82.00	68.06	25.0
Total	**82,158**	**66,941**	**18.5**	**272.16**	**206.41**	**24.2**

Without the Credit

Basin	TSS Yield No Controls (lbs/yr)	TSS Load With Controls (lbs/yr)	TSS Percent Yield Reduction	TP Yield No Controls (lbs/yr)	TP Load With Controls (lbs/yr)	TP Percent Yield Reduction
DA1	27,439	23,976	12.6	87.08	80.06	8.1
DA2	27,439	15,685	42.8	87.08	60.34	30.7
DA3	27,280	27,280	0.0	98.00	98.00	0.0
Total	**82,158**	**66,941**	**18.5**	**272.16**	**238.4**	**12.4**

Next Steps

- Weekly sweeping with mechanical broom sweeper and terrace leaf collection 3-4 times/season
- Leaf management in series with wet pond

CONNECT WITH US

Amy Minser

Amy.minser@wisconsin.gov

/WIDNR

@WIDNR

@WI_DNR

/WIDNRTV

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OFF THE RECORD"