## **Reducing Fall P Loads - Three Pathways to a Final Answer**



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Quantifying Benefits of Selected Leaf Management Benefits

- 1. Measure P Loads by Season.
- 2. Monitor Changes in P Load for Selected Leaf Management Approaches

Extrapolate Measured Values to Determine Average Benefits Using WinSLAMM

Demonstrate Potential for Social Marketing to Help Keep Leaves Out of Street

Keep Leaves on Terrace
Put Leaves in Bags



Leaves Out of the Street Campaign – Encouraging People to Use Leaf Bags

#### **Social Marketing Effort in 2015**

- 1. Letters sent to homes in both areas
- 2. Volunteers distributed free leaf bags to all homeowners in pilot study area.
- 3. Volunteers went door to door in control area encourgaging people to buy bags and use them.

### Demonstration of Social Marketing on a Pilot Project Scale











#### Oct 5 -Orchard

#### Oct 26 - Orchard



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#### Oct 10 - Charles



## Goal of Survey Before Every Pickup – Missed One

Date	Leaf Pickup Date	Date of Survey	Days Before Pickup
Oct. 16	Pickup		
Oct 17		Survey	3
Oct 20	Pickup		
Oct 26		Survey	
Nov 4		Survey	0
Nov 4	Pickup		
Nov 10		Survey	2
Nov 12	Pickup		
Nov 16		Survey	3
Nov 19	Pickup		
Dec 7		Survey	1
Dec 8	Pickup		

## Up and Down Each Street Twice – Number of Bags and Then Type of Curb (Spread Sheet – Susan Frett)

Address	Leaves in Street	# of Bags on Terrace
602 Piper	0	8
606 Piper	0	17
610 Piper	1	11
614 Piper	0	17
618 Piper	0	25
622 Piper	0	
626 Piper	0	
630 Piper	0	
634 Piper	0	
4709 Sherwood	0	20
645 Piper	0	0









## Nov 4, 2015

Street Name	Total Number of Homes on Each Block	Number of Homes Bagging Their Leaves	Percent of Homes Participating
Piper Dr.	23	16	70
Orchard Dr.	32	19	59
Charles Ln.	29	18	62
Totals	84	53	63



## **Total Number of Bags for Each Counting Event**



Date of Count

Before We Could Calculate Leachable P for Leaves On the Streets, We Had to Develop a Visual Method for Estimating Weight of the Leaves in Curbs

#### Work Done By Badger Volunteers

- 1. Tare compostable bags with plastic chute
- 2. Select curbs with different amounts of leaves.
- 3. Rake and broom leaves into piles
- 4. Transfer leaves into compostable leaf bags
- 5. Weigh bags with postal scale.

#### **Badger Volunteers at Work**









### A Value of "0" Put in Spread Sheet





Zero or Very Little Amount of Leaves in Curb

A Value of "1" Put inSpread Sheet

Some Leaves in Curb – Curb Type 1. Leaves Weigh About 5 lbs.



### A Value of "2" Put in Spread Sheet



Leaves Fill Curb – Type 2 Curb. About 14 Ibs.

### A Value of 3 Put in Spread Sheet



Estimate of the Amount of Phosphorus Leached from Leaves in the Pilot Area During the Fall of 2015

Leachable P for Each Type of Leaf, ug/gm

- Silver Maple 233
- Green Ash 188
- Norway Maple 80
- Average 167

(Dorney, 1986)

Leachable P for Each Curb Type, gm

Number of grams. 5 lbs X 453.6 gm/lb = 2268

Amount of Leachable P 2268 gm X 167 ug/gm = 0.38 gm

#### Estimates of Leachable P in Streets

Type Curb	Net Weigl	ht of Leaves Ibs.	s by Site,	Average Net	Leachable P in
	Site 1	Site 2	Site 3	Weight, Ibs.	Curbs, gm
Type 1	4.3	5.3	NA	5	0.38
Type 2	15.7	10.3	15.9	14	1.06
Туре 3	25.5	NA	NA	26	1.97









# Estimate of Phosphorus Leached from Leaves in the Pilot Area During the Fall of 2015

Rain Date	Survey Data	Leachable	P by Curb Type	es, grams	Total Lea	chable P
		Type 1	Type 2	Туре 3	Grams	Pounds
Oct 23	Oct 26	14	14	8	36	0.08
Oct 24	Oct 26	14	14	8	36	0.08
Oct 27	Oct 26	14	14	8	36	0.08
Oct 31	Oct 26	14	14	8	36	0.08
Nov 5	Nov 4	12	2	0	14	0.03
Nov 11	Nov 10	11	2	0	13	0.03
Nov 17	Nov 16	5	5	4	14	0.03
Nov 23	Dec 7	0.4	0	0	0.4	0
Totals		84	65	36	185	0.41

## Demonstration of Social Marketing on a Pilot Project Scale

- About 16% of the 87 homes used bags in the control area as compared to an average of 63% for the 84 Homes in the pilot study area.
- They used a total of 56 bags as compared to 829 for the pilot study area.



## Number of Each Curb Type for the Control Area by Date



## Number of Each Curb Type for the Control Area by Date



#### **Pilot Study Area**

#### Oct 5 - Orchard

#### Oct 26 - Orchard





# Estimate of Phosphorus Leached from Leaves in the Control Area During the Fall of 2015

Rain Date	Survey Data	Leachable	P by Curb Typ	es, grams	Total Lea	chable P
		Type 1	Type 2	Туре 3	Grams	Pounds
Oct 23	Oct 23	18	22	6	46	0.1
Oct 24	Oct 23	18	22	6	46	0.1
Oct 27	Oct 23	18	22	6	46	0.1
Oct 31	Oct 30	8	34	53	95	0.2
Nov 5	Nov 6	20	13	12	45	0.1
Nov 11	Nov 6	20	13	12	45	0.1
Nov 17	Nov 13	12	15	8	35	0.08
Nov 23	Nov 20	6	1	0	7	0.02
Totals		120	142	103	365	0.80





#### **Conclusions for Social Marketing**

- 1. A large number of people appear to be willing to bag their leaves after an intensive social marketing effort and the city provides free bags.
- Lower levels of participation can be expected with only a minimal social marketing effort and the homeowners are asked to buy their own bags.
- 3. When a large number of homeowners put their leaves in bags, it appears to reduce the number of leaves in the curbs.
- Homeowners can play an important role in reducing the amount of leaves in the street.
- 5. Efforts should continue improve homeowner participation and the most beneficial pickup methods for the city.

## **Reducing Fall P Loads - Three Pathways to a Final Answer**



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Quantifying Benefits of Selected Leaf Management Benefits

- 1. Measure P Loads by Season.
- 2. Monitor Changes in P Load for Selected Leaf Management Approaches

Extrapolate Measured Values to Determine Average Benefits Using WinSLAMM

Demonstrate Potential for Social Marketing to Help Keep Leaves Out of Street

Keep Leaves on Terrace
Put Leaves in Bags

