Proceedings from the 12th Annual Nutrient Management Conference

12th Annual
NUTRIENT MANAGEMENT CONFERENCE

Sessions 9:00 a.m.-3:25 p.m.

**GENERAL SESSION**

8:30 a.m. Registration
9:00 a.m. Welcome
   Tom Rothman
   University of Minnesota
9:05 a.m. Lessons Learned in 2019, Opportunities for 2020
   Liz Stahl
   University of Minnesota
   Brad Carlson
   University of Minnesota
9:55 a.m. Importance of Urban and Non-Urban Nutrient Reductions
   Katrina Kessler
   Minnesota Pollution Control Agency
10:30 a.m. Break
10:45 a.m. Farmers Working To Reduce Nutrient Losses
   Brian Ryberg, Brian Biegler, Dan Coffman
11:45 Lunch

**BREAKOUT SESSION #1 - NUTRIENT REDUCTION STRATEGY TRACK**

12:45 p.m. Minnesota’s Nutrient Reduction Strategy- Progress Toward Milestone Goals
   Glenn Skuta
   Minnesota Pollution Control Agency
1:25 p.m. Urban Efforts to Reduce Nutrient Pollution
   Katrina Kessler
   Minnesota Pollution Control Agency
2:05 p.m. Potential for Cover Crops to Improve Nutrient Use Efficiency
   Axel Garcia y Garcia
   University of Minnesota
2:45 p.m. Tile Drainage, Cover Crops and Nitrogen Interactions
   Jeffrey Vetsch
   University of Minnesota

**BREAKOUT SESSION #2 RESEARCH TRACK**

12:45 p.m. Looking at Soil Health Tests
   Anna Cates, Liz Stahl
   University of Minnesota
1:25 p.m. Evaluating Biologicals
   Dan Kaiser
   University of Minnesota
2:05 p.m. Updating MN’s P Index
   Lindsay Pease
   University of Minnesota
2:45 p.m. Liquid Swine Manure - A Viable Nutrient Source for Sidedressing Corn?
   Melissa Wilton
   University of Minnesota
3:25 p.m. Adjourn

Thank you to all of our Supporters!

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Importance of Urban and Non-Urban Nutrient Loss Reductions

Dana Vanderbosch | Director, Municipal Division

February 4, 2020
Outline – Nutrients in waters

1. Why is it important to reduce nutrient losses?
2. Conditions and trends
3. Urban and ag sources
4. We’ve made progress, but there’s more we need to do
5. Minnesota’s Nutrient Reduction Strategy
Why important? Drinking water – local wells

Private Wells
110+ townships have over 10% of wells exceeding nitrate standard

Community water systems
13 with nitrate over 10 mg/l; 26 with nitrate 5-10 mg/l
Costs for safe drinking water

Inequities in what families have to pay to treat for nitrate
Why important? Drinking water – surface waters

City of Fairmont, Minnesota
Why important? Local lake & stream impairments

Effects:
- Less oxygen for fish
- Toxic blue-green algae
- Recreation/economic declines

693 lakes impaired
814 river miles impaired
Why important? Aquatic life nitrate toxicity

• Lab studies show some species harmed by 5 to 20 mg/l nitrate-N
• Levels commonly found in southern Minnesota streams
• Closely watching research from EPA
**Why important? Downstream algae blooms**

**Lake Pepin**
Need 35% P reduction*

**Lake Winnipeg**
Need 50% N & P reductions in Red River**

**Gulf of Mexico**
Need 45% N and P reductions to reduce hypoxic zone to 1/3 current size***

*from 2008-17 baseline

**from late 1990s baseline

***from 1980-96 baseline
Good reasons to care

Nutrient loss to our waters:

• Impacts human health/drinking water

• Lost nutrients to water = lost fertilizer value

• Costs to treat drinking water, replace wells, build onto water treatment plants

• Affects recreation and tourism in Minnesota and Canada

• Harms shell-fish industry in Gulf of Mexico
1. Why important to reduce nutrient losses?

2. Conditions and trends

3. Sources – ag and urban important

4. We’ve made progress, but there’s more we need to do

5. Minnesota’s nutrient reduction strategy addresses both urban and agricultural sources
River condition, trends - phosphorus

Highest phosphorus in west and south

P concentrations decreasing or non-significant trend

Trend methods correct for river flow variability

2008-2017
River condition, trends - nitrate

Highest nitrate in southern Minnesota

Nitrate increasing or no significant trend

2008-2017

Trend methods correct for river flow variability
1. Why important to reduce nutrient losses?
2. Conditions & trends
3. Sources – urban and ag important
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Statewide sources to rivers differ for N & P

**Nitrogen**
- Cropland tile drainage: 37%
- Cropland groundwater baseflow: 30%
- Forests: 7%
- Atmospheric: 9%
- Wastewater: 9%
- Cropland runoff: 5%
- Urban Stormwater: 1%
- Septic: 2%
- Feedlot runoff: <1%

**Phosphorus**
- Cropland Runoff & drainage: 37%
- Streambank erosion: 14%
- Septic/feedlots: 6%
- Forest & grasses: 8%
- Urban & road runoff: 8%
- Atmospheric: 10%
- Wastewater point sources: 17%
- Source: MPCA & UMN 2013
- Source: MPCA et al., 2014
Sources and pathways vary by region

Nitrogen to rivers

**Minnesota River Basin**
- Cropland Tile Drainage: 67%
- Cropland Groundwater: 18%
- Crop Runoff: 4%
- Atmospheric: 3%
- Point Sources: 5%
- Other NPS: 2%
- Forest: 1%

**Lower Mississippi River Basin**
- Cropland Groundwater: 57%
- Cropland Tile Drainage: 23%
- Crop Runoff: 9%
- Forest: 2%
- Atmospheric: 2%
- Point Sources: 5%

From MPCA et al 2013
Important to reduce **Urban** sources of N & P

**Phosphorus**

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- Wastewater point sources: 17%
- Atmospheric: 10%
- Urban & road runoff: 8%
- Forest & grasses: 8%
- Septic/feedlots: 6%
- Streambank erosion: 14%

**Nitrogen**

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- Feedlot runoff: <1%
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Source: MPCA & UMN 2013
Important to reduce **Cropland** N & P losses

**Nitrogen**
- **Cropland tile drainage**: 37%
- **Cropland groundwater baseflow**: 30%
- **Forests**: 7%
- **Urban Stormwater**: 1%
- **Septic**: 2%
- **Wastewater**: 9%
- **Atmospheric**: 9%
- **Feedlot runoff**: <1%
- **Cropland runoff**: 5%

**Phosphorus**
- **Cropland**: 37%
- **Streambank erosion**: 14%
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Source: MPCA & UMN 2013
Source: MPCA et al., 2014
1. Why important to reduce nutrient losses?

2. Conditions and trends

3. Sources – urban and ag important

4. We’ve made progress, but there’s more we need to do

5. Minnesota’s nutrient reduction strategy addresses both urban and agricultural sources
BMPs adopted through governmental programs

www.pca.state.mn.us/water/healthier-watersheds
Agricultural progress

- Conservation reduces phosphorus:
  - 48% agricultural P reduction to Minnesota River Basin during decades prior to 2006 (CEAP)
  - 23% modeled agricultural P reduction statewide 1997-2013 (NRS)

- Nitrogen use efficiency for corn increased by over 40% since early 1990s (MDA)

- MN Agricultural Water Quality Certification
  - More than 500,000 acres certified, and growing
Wastewater nutrient discharges

2000-2018

Phosphorus

Nitrogen

>70% reduction
Stormwater reductions

- Lawn fertilizer phosphorus restricted since 2004
  - Turf N and P fertilizer ~ 2% of all fertilizer used
- Urban stormwater runoff programs:
  - Thousands P lbs reduced
  - 2,000-2,500 construction projects per year

Afternoon breakout session
1. Why important to reduce nutrient losses?
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How many new BMP acres to reach 2025 milestone?

- Reduced tillage & soil conservation: 4.9 M
- Crop nutrient management efficiencies: 6.3 M
- Drainage water storage/treatment: 0.6 M
- Perennials - fuel, forage, food, buffers & set-aside: 0.5 M
- Cover crops - relay, intercrop, winter annuals: 1.9 M

Plus advance:
- Urban wastewater
- Urban runoff
- Septic systems

Million acres of cropland affected
Working together for Waverly Lake

Waverly Lake – impaired and today
Questions?