

# Beyond the Status Quo:

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## 2015 EQB Water Policy Report



# The Environmental Quality Board (EQB)



- Governor's office
- Five citizen members
- Board of Soil and Water Resources
- Department of Administration
- Department of Agriculture
- Department of Commerce
- Department of Employment and Economic Development
- Department of Health
- Department of Natural Resources
- Department of Transportation
- Metropolitan Council
- Pollution Control Agency





# Outline

- Minnesota's Water Technology Industry
- Report Framework
  - 4 Types of Solutions:
    - Voluntary, Regulatory, System change, More study
  - 4 Goals



# EQB Water Report Team



Minnesota Pollution Control Agency







*Minnesota*  
Department of Employment and Economic Development





# What is the water tech industry?

Types of Industries	Products & Services
 <p><b>Treatment Products &amp; Services</b></p>	Filtration/purification, disinfection, desalination, aeration, contaminant detection
 <p><b>Infrastructure Products &amp; Services</b></p>	Pumps, pipes, tile drainage, water & sewer line construction, agricultural water management
 <p><b>Efficiency Products &amp; Services</b></p>	Meters and controls, leak detection, water conservation, energy efficiency, low-flow fixtures
 <p><b>Public Water Utilities</b></p>	Water & wastewater treatment facilities, water quality monitoring, stormwater management, watershed districts



# Employment Findings



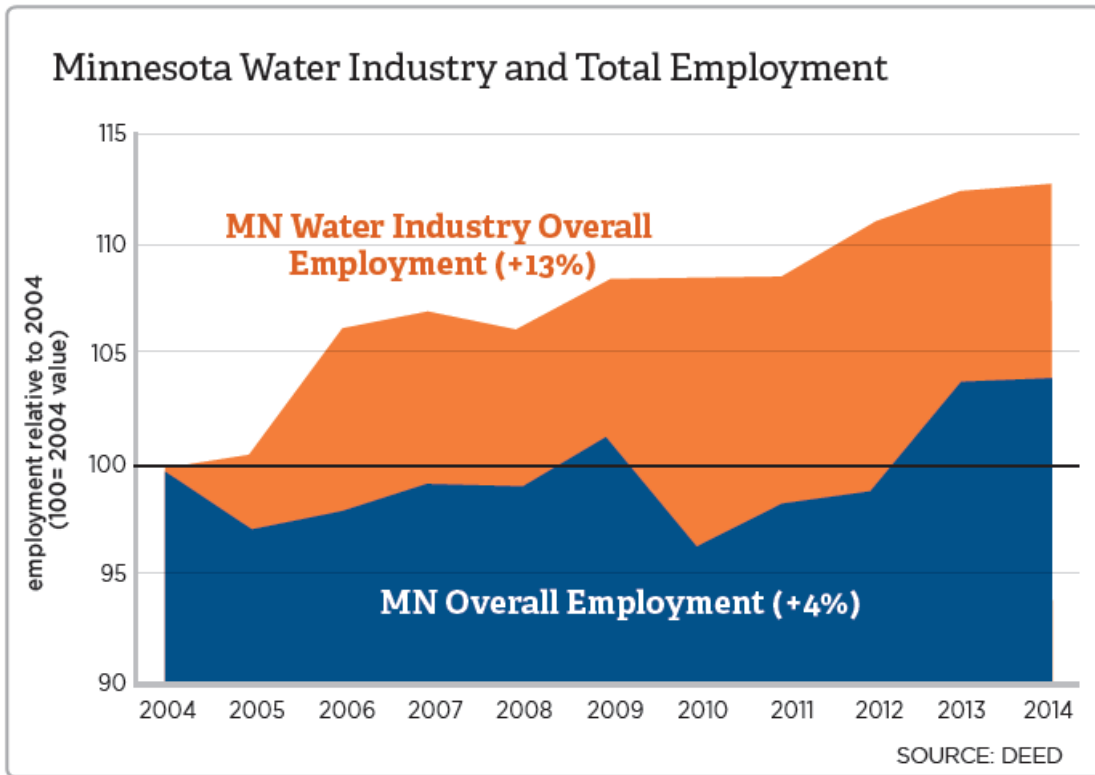
13,500

Water Industry Employees



\$885M

Water-Related Payroll



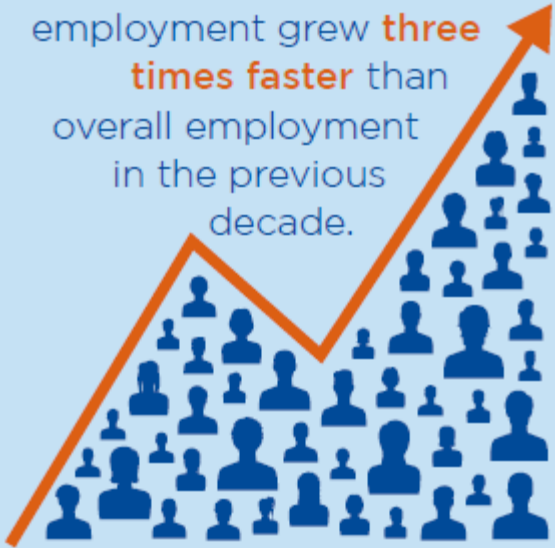
Average annual wages in the water technology industry were

**27% higher**

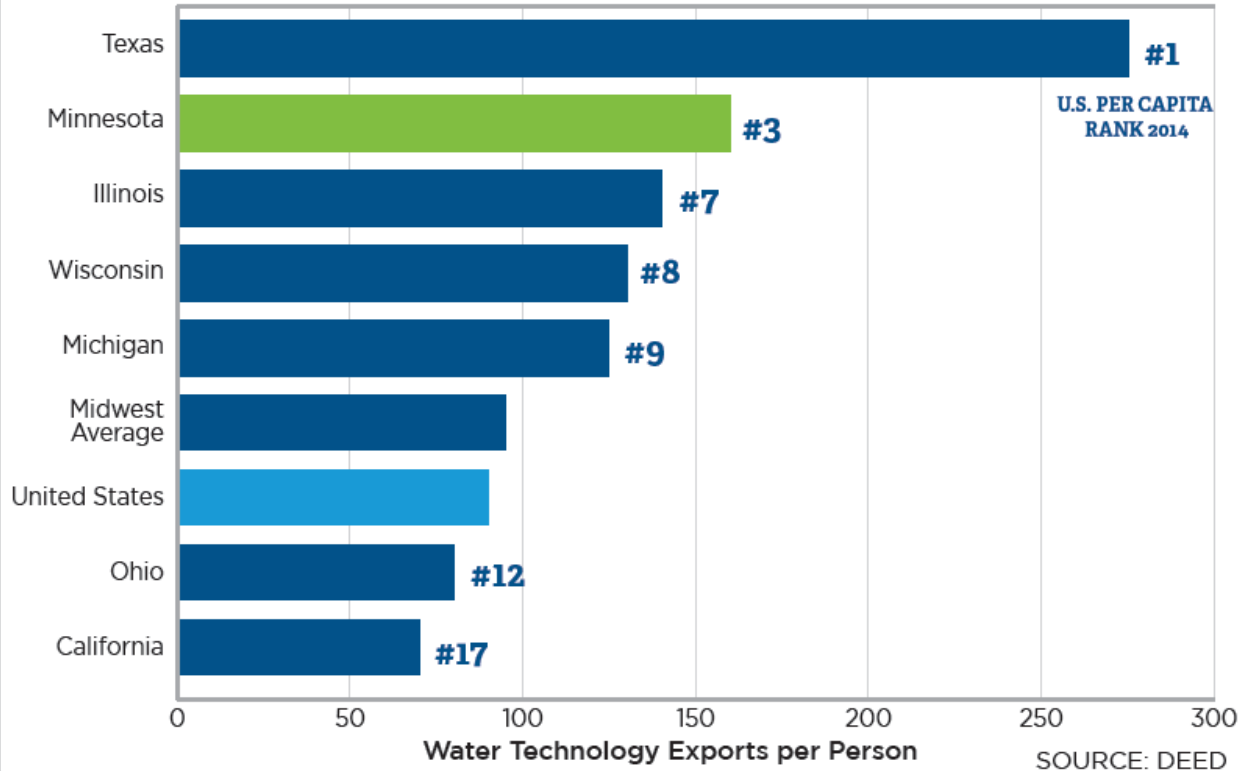
THAN THE STATE AVERAGE.

# Water-Tech Exports

Water technology industry employment grew **three times faster** than overall employment in the previous decade.



### Water Technology Exports per Capita (2014)



**10th**  
Nationally in  
Water Patents



Minnesota had more than  
**\$870 million**  
in water-related  
technology exports.





# Report Outline

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# What do solutions look like?

**Voluntary** Put the tools and resources into the hands of Minnesotans. These solutions often include incentives, outreach to encourage voluntary action or public discussion of trade-offs and goals.

- Incentives
- Outreach to encourage voluntary action
- Public discourse to engage the community



# What do solutions look like?

**Regulatory** Create laws, regulations and/or guidelines. Implementation includes permit requirements, monitoring, codes and standards.

- Laws/Ordinances
- Regulations - Permits
- Guidelines
- Monitoring requirements
- Codes and standards



# What do solutions look like?

**System change** Identify and work to change the status quo through market forces, cultural expectations, governance models and management structures.

- Market forces
- Cultural expectations
- Governance models
- Management structures



# What do solutions look like?

**More study** Propose additional research or monitoring where more information is needed. Studies could include developing new technology, monitoring water or land use, or social science to understand cultural barriers.

- Additional Research
- Monitoring
- Social Science - Cultural Barriers
- New Technologies

# Goal #1: Promote Sustainable Water Use

## Sustainable groundwater use:



prevents drawdown of contaminants from the surface or from shallower aquifers into deeper ones



does not interfere with other users



does not affect surface waters



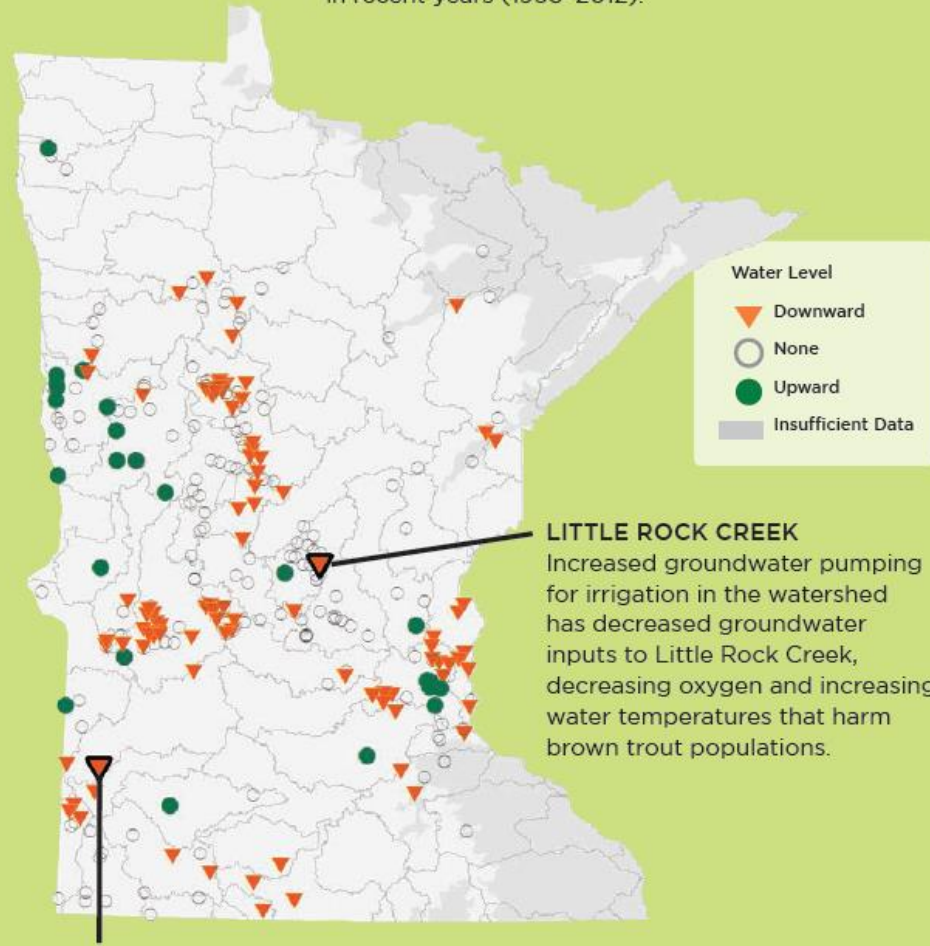
does not harm aquatic ecosystems



meet current and future needs

## Well Water Level Trends

While not all of Minnesota has water supply issues, numerous wells have shown a decrease in water level in recent years (1993–2012).



SOURCE: MNDNR



# Goal #1: Promote Sustainable Water Use

## Voluntary

# Improve industrial water use efficiency

- Recycle water, reduce leaks, evaluate processing inefficiencies...

## Water Saved From Increased Industrial Efficiency

	Gedney Pickles	Federal Cartridge	Northern Star Foods
2012 water use (gal)	94,666,800	87,156,500	121,656,000
Minnesota Technical Assistance Program-identified annual water savings (gal)	6,400,000	30,600,000	7,000,000
Annual water savings as % of total use	6.8%	35.1%	5.8%
Annual \$ savings	\$94,800	\$57,480	\$166,300



# Goal #1: Promote Sustainable Water Use

## Regulatory

Update plumbing codes and treatment standards to allow for safe and practical water reuse

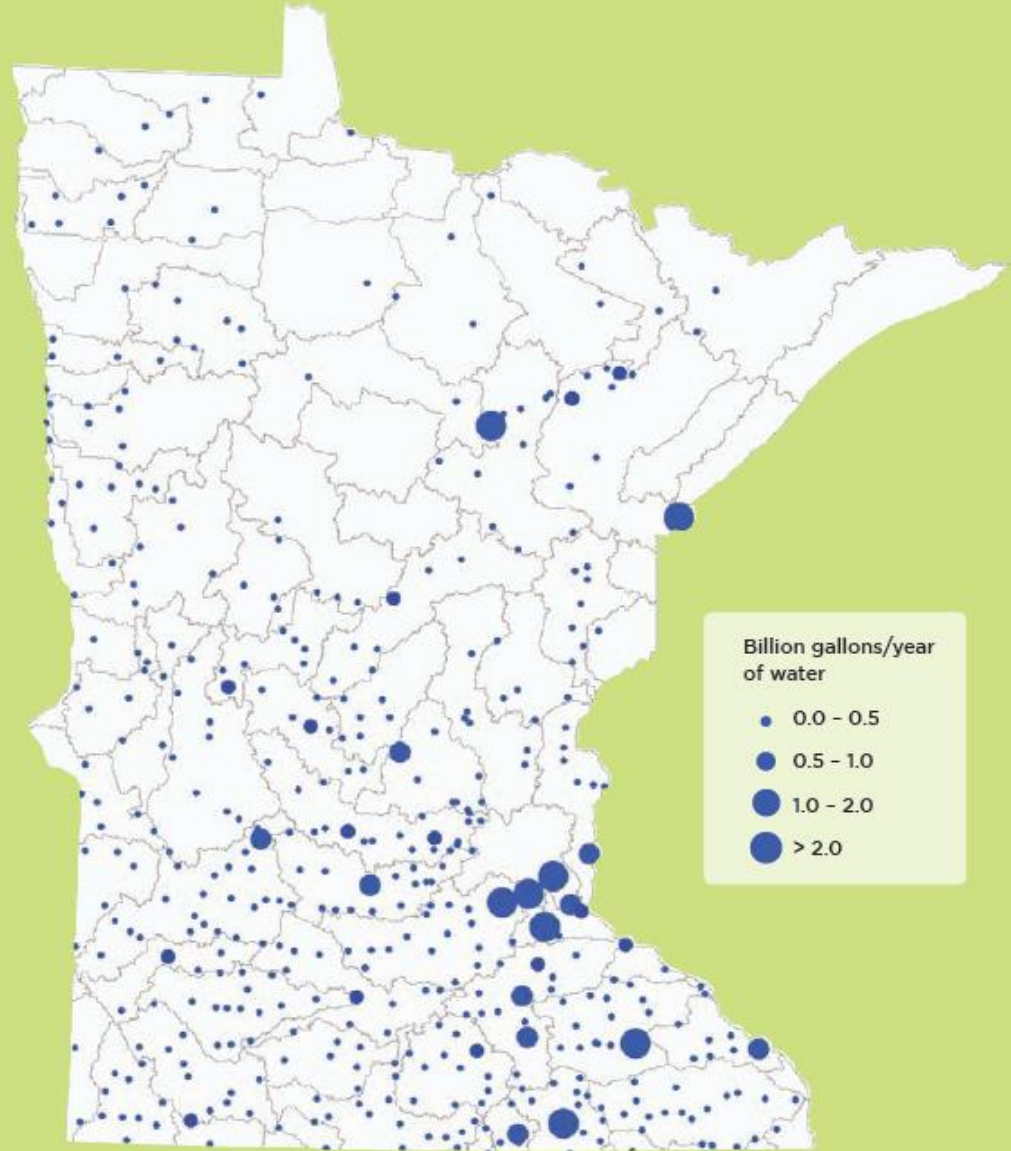




More Study

## Discharge of Groundwater Into Surface Water

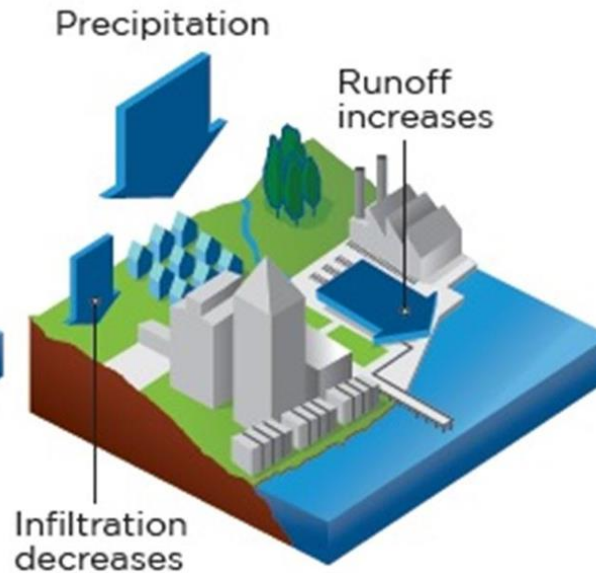
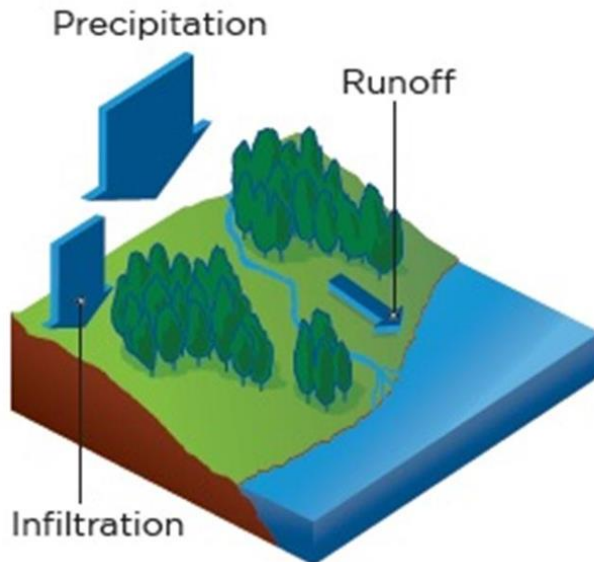
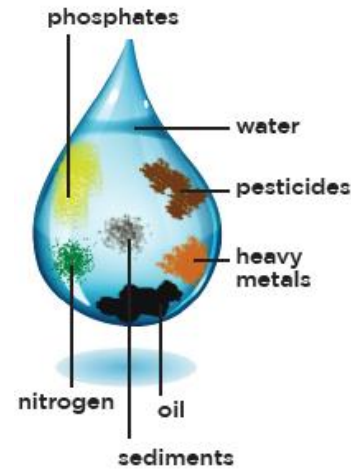
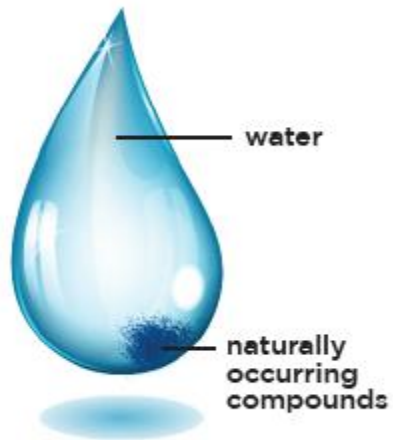
Pumped groundwater is used once, treated at wastewater facilities, and then it is discharged into surface waters (2009 - 2011).



Is the amount of groundwater we discharge as treated wastewater sustainable?



# Goal #2: Manage Runoff in the Built Environment



# Institute Minimal Impact Design Standards



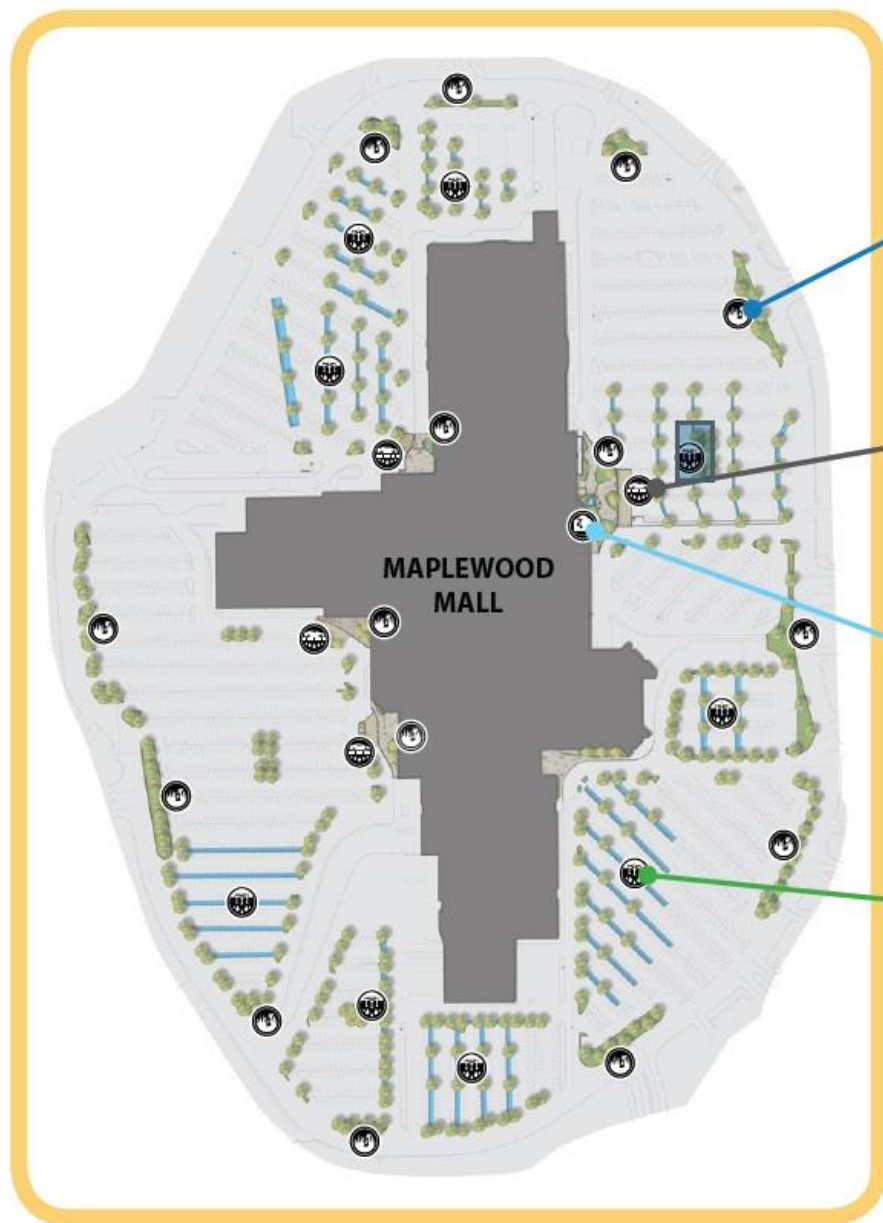
## Minimal Impact Design Standards

for enhancing stormwater management in Minnesota

Stakeholder-driven process led to:

- Performance goals
- Calculator
- Design specifications
- Ordinance guidance

# Goal #2: Manage Runoff in the Built Environment



## Features & Benefits



**55**  
RAINWATER  
GARDENS

*They filter  
9 million  
gallons of  
runoff\**



**6,733**  
SQ FT. OF  
PERMEABLE PAVERS

*They infiltrate  
260,000  
gallons  
of runoff\**



**1**  
CISTERN

*It holds 5,700  
gallons of  
roof runoff*



**375**  
TREES

*11.2 million  
gallons of  
runoff brought  
into the tree  
trenches\**

*\*\*\* in a typical year*

*Location of features within the 35-acre footprint*

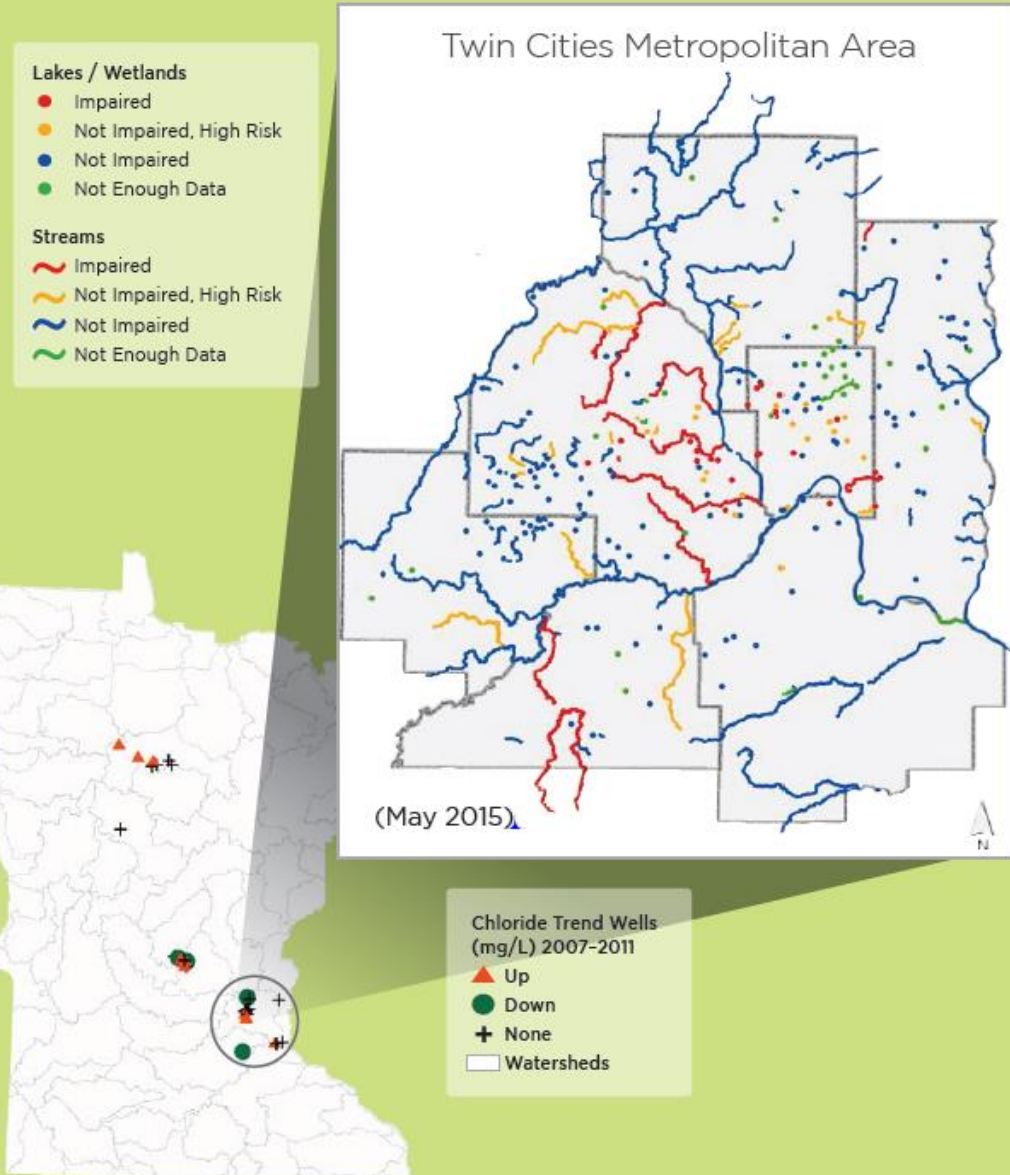


# An emerging issue in management of runoff in the built environment is chloride.

Some 349,000 tons of chloride in the form of winter deicing chemicals are applied in the Twin Cities metropolitan area each year.

## Chloride in Our Waters

Chloride concentrations in wells, lakes, streams and wetlands are trending up in many parts of the state.



# Goal #2: Manage Runoff in the Built Environment

## Regulatory

**Reduce liability for applicators who attend training on best management practices**



## Goal #3: Increase Living Cover

**Living plant cover helps filter contaminants and sediment out of water, and it holds water on the landscape.**

Perennial crops:



Wetlands:



Cover crops:



Forests:



Prairie and Grasses:

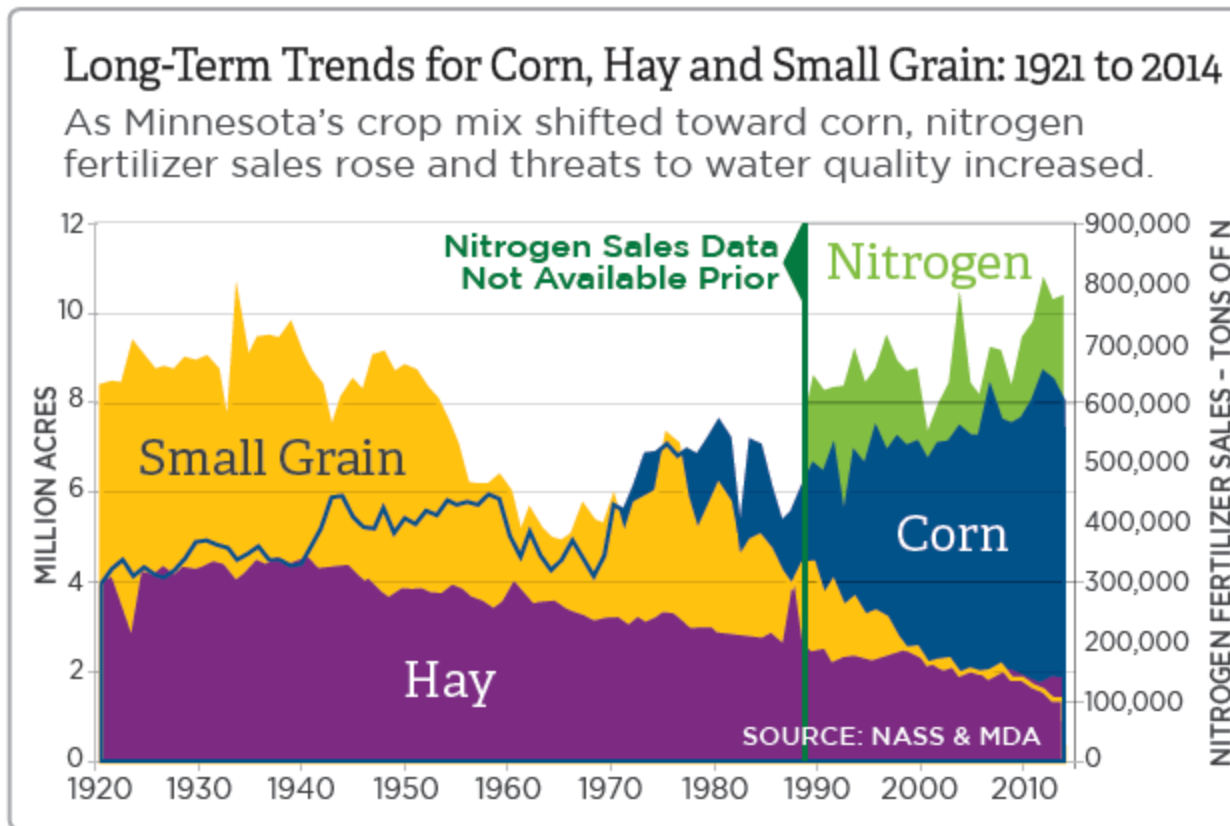


No till/  
Minimum till:



## Goal #3: Increase Living Cover

# Long-Term Trends for Corn, Hay and Small Grains: 1921-2014

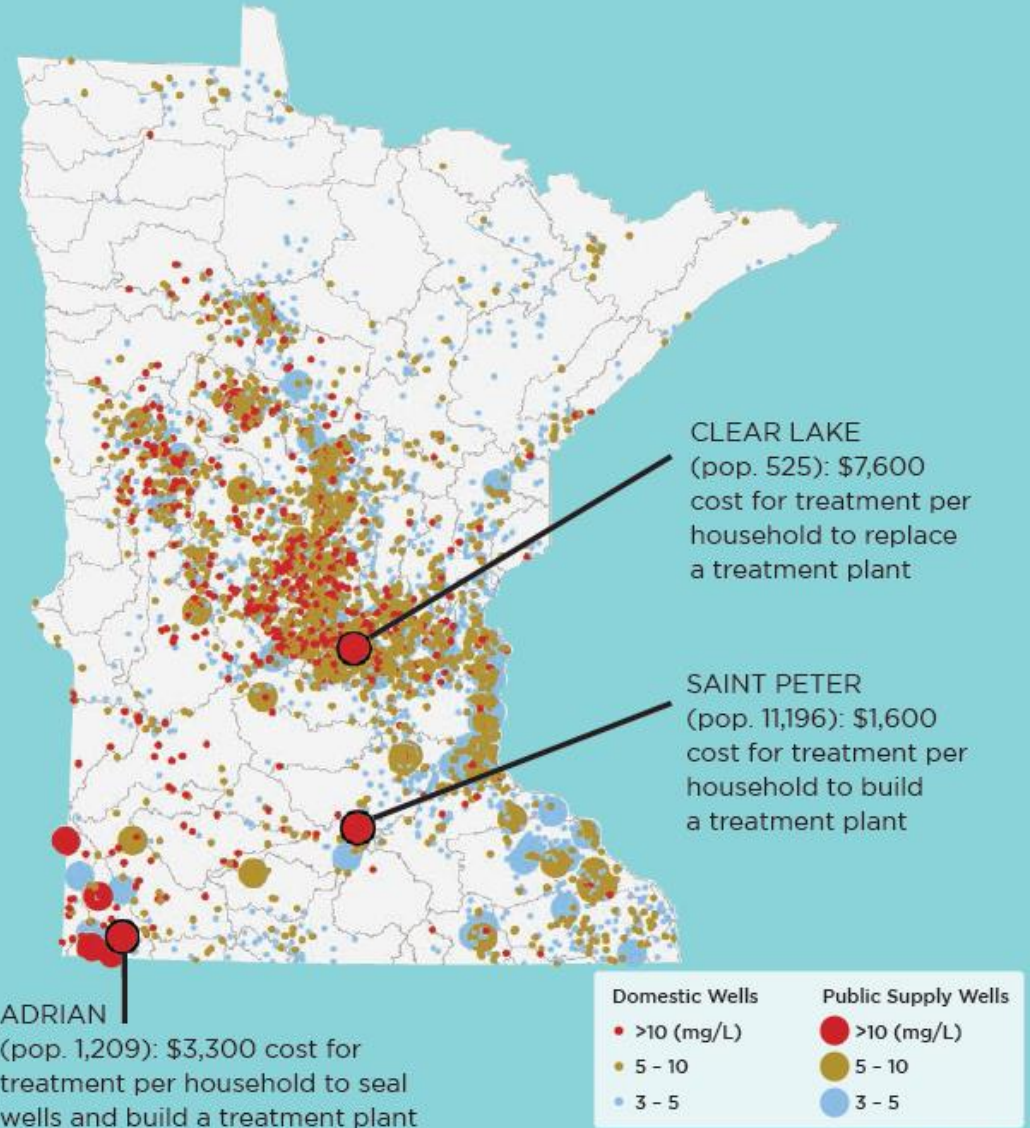




# The Cost of Nitrates in Public and Domestic Wells

## Maximum Nitrate–Nitrogen Concentrations in Public and Domestic Wells

The map shows three categories of contamination in mg/L: showing human influence (3–5), of concern to state agencies (5–10), and above the federal safe drinking water standard (>10). (1990–2015)





# Goal #3: Increase Living Cover

## Regulatory

# Use living cover around wellheads to prevent groundwater contamination

- Acres in MN = 50+M
- Well areas = 1.22M
- Vulnerable acres = 360K



### SUCCESS STORY

#### Wellhead Protection

Contaminants easily move from the land surface into shallow sand and gravel aquifers that provide drinking water to Perham, a hub for business and agriculture in Otter Tail County. In the late 1990s, city wells approached the safe drinking water threshold for nitrate, so the city began to work on wellhead protection to reduce nitrate contamination. Through citizen engagement and education, the community built momentum in 2005 to convert 285 acres of row crop agriculture on the wellhead area to other uses with lower water impacts. This change reduced nitrate levels to meet drinking water standards.

## Goal #3: Increase Living Cover

System Change

# Enhance existing markets for perennial-fed beef and dairy products and bioenergy from perennial crops

Factors Driving Crop Choices

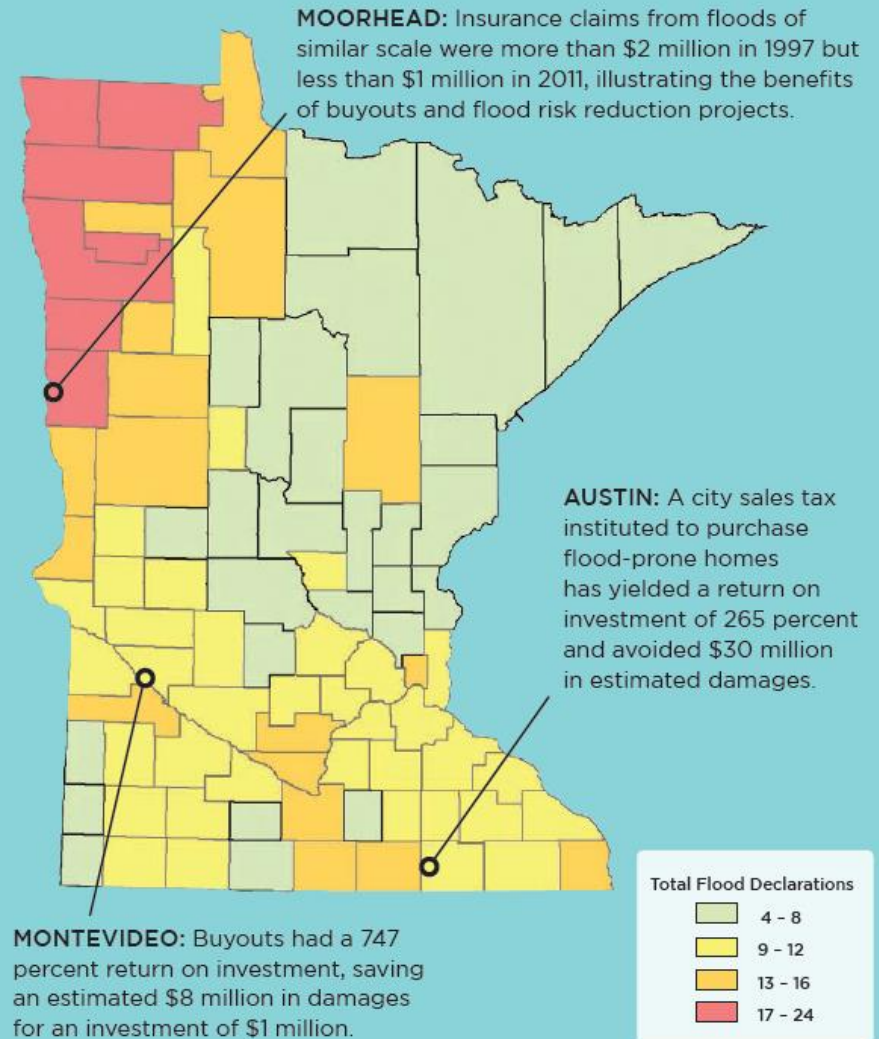


# Goal #4: Ensure Resilience to Extreme Rainfall

Extreme rainfall has increased during the past century in Minnesota. This combined with our activities on the land, make our infrastructure and communities vulnerable.

## Minnesota Has Experienced Numerous Floods

Number of flood disasters by county (1964-2014).



# Goal #4: Ensure Resilience to Extreme Rainfall



RUSHFORD FLOOD



June 20, 2014  
Copyright Erdahl Aerial Photos



# Goal #4: Ensure Resilience to Extreme Rainfall

## Voluntary

Reduce risks by removing homes and businesses from floodplains

Flood hazard mitigation in the wake of the 1997 flood reduced the risk of future harm to homes in East Grand Forks.



East Grand Forks  
BEFORE



East Grand Forks  
AFTER

### SUCCESS STORY

#### East Grand Forks on the Red River

Since 1997, there have been six floods in the Red River at the 50-year flood elevation or higher, with three near or exceeding the 100-year flood elevation. The private and public costs have been extremely high, and it has taken months, and in some cases years, for life to return to normal. East Grand Forks completed many buyouts and installed a flood barrier that can be put into place with impending flooding. Residents filed more than \$32 million in flood insurance claims in 1997. Due to flood risk reduction efforts, they have filed less than \$10,000 in flood insurance claims since then.

## Goal #4: Ensure Resilience to Extreme Rainfall

More Study

# How vulnerable are we to extreme rain?

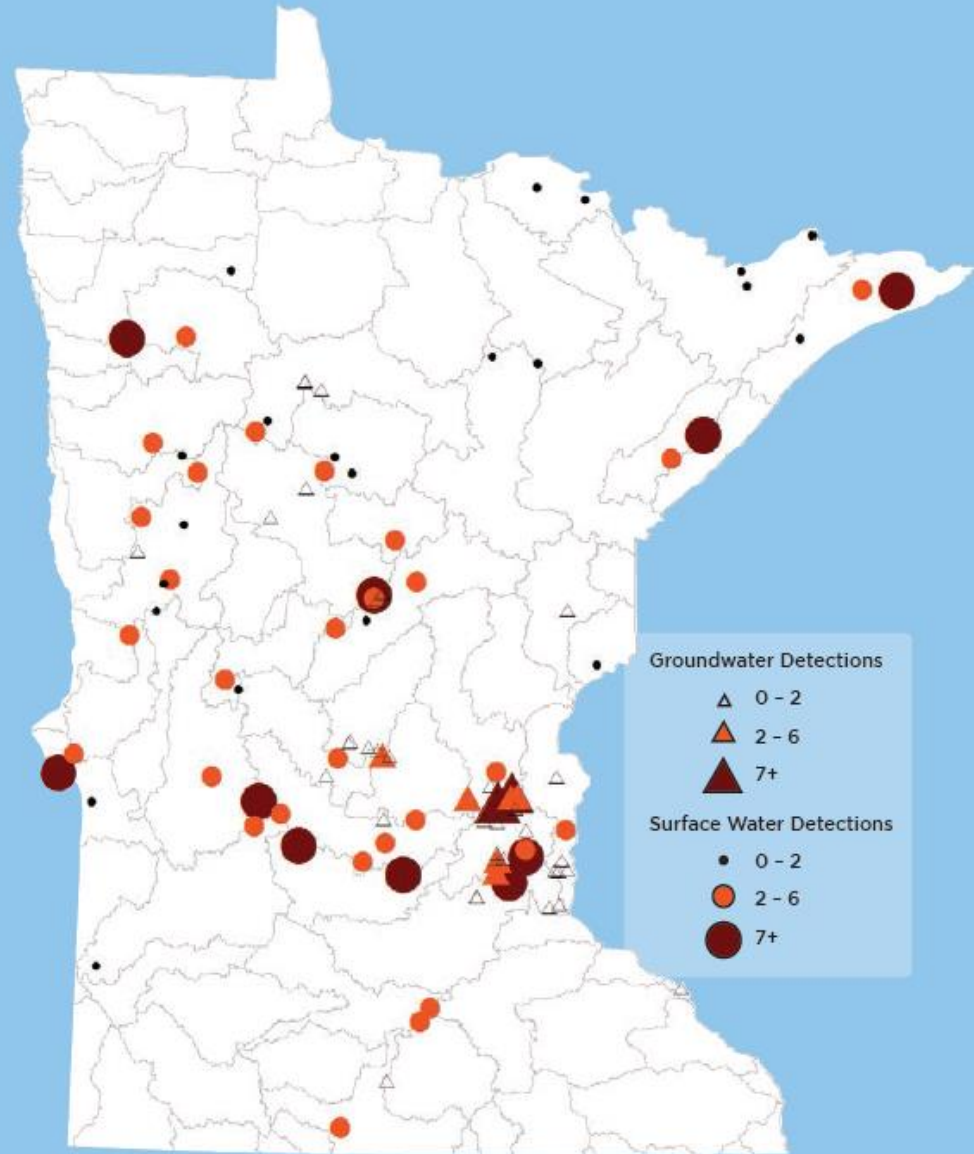




We need to protect drinking water and ecosystems from harmful levels of contaminants of emerging concern.

## Locations Where Contaminants of Emerging Concern Were Detected in Groundwater and Lakes

The size of the symbol indicates the number of contaminants detected each sampling location. (2012 & 2013)





Thank you

Anna Henderson  
Erik Cedarleaf Dahl

