

THE 1989 GROUND WATER PROTECTION ACT

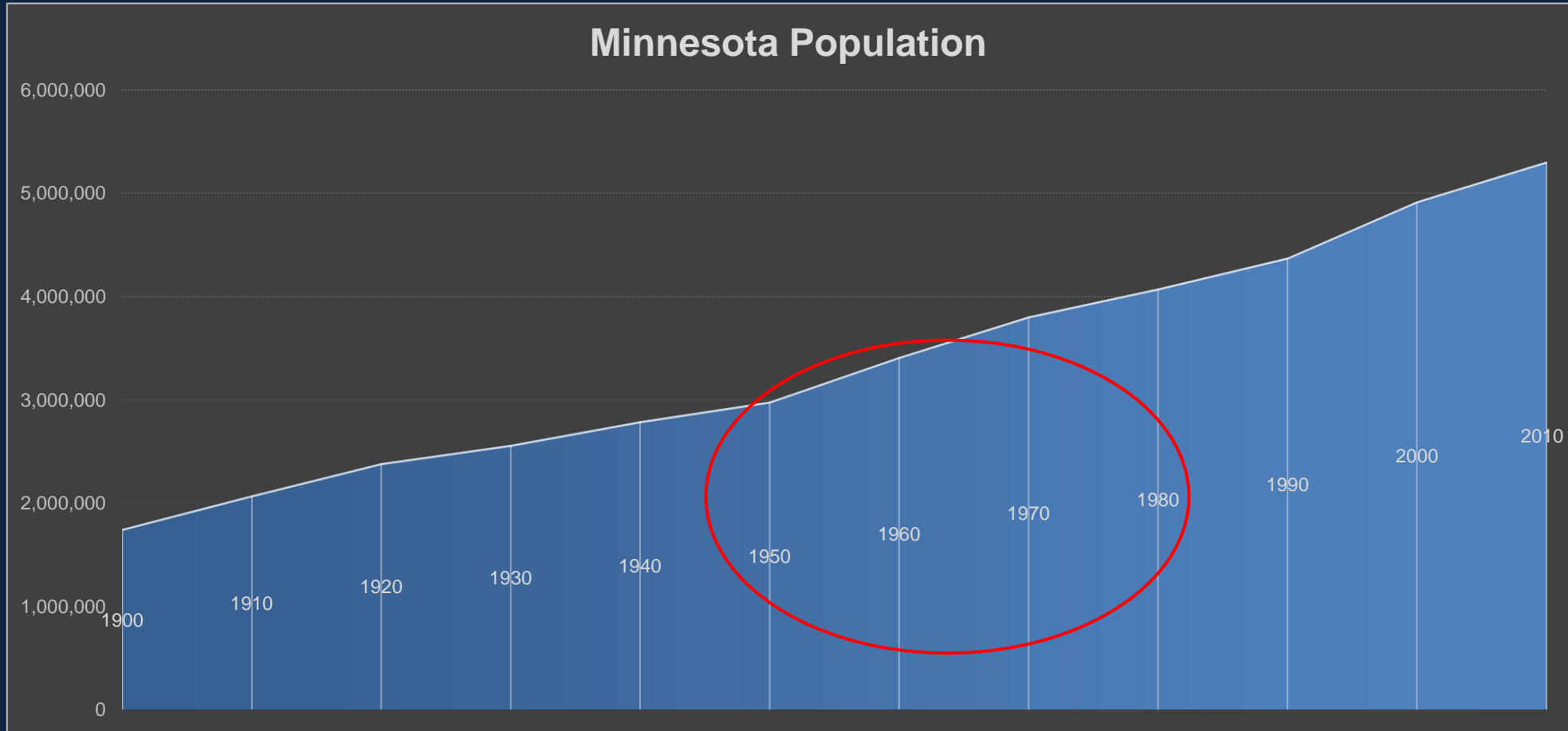


Setting the Stage...



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Minnesota growth rate steadily increases, but people move from farms and cities to growing suburbs



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Profound changes in farming practices:

- Tractors replaced horses
- Farms grew larger
- Practices were more intensive
 - Chemical fertilizers
 - Pesticides

1960 Four-wheel-drive tractors were introduced within the decade. Caterpillar expanded to manufacture in Brazil, which continues to the present day.

John Deere surpassed **\$1 billion** in sales for the first time. In the same year, the DICKEY-john Manufacturing Company electronic monitoring device for farmers launched to improve crop planting efficiency by monitoring seed numbers and spacing.



John Deere sales hit **\$2 billion**.

1963

1966

1973



The best-selling John Deere tractor of all time, the John Deere 4020, hit the market. Farmalls remained the top selling row-crop tractors until 1963.

An agricultural depression swept the

THE FIRST GAS POWERED TRACTOR IN THE US WAS INVENTED BY JOHN FROELICH

Froelich's steam-powered thresher left much to be desired. The machine was cumbersome and difficult to transport. Its basic use was costly, and it was also considerably dangerous—just one spark from the thresher boiler could set fire to a prairie on a windy day.



Source: farmcollector.com
Early Froelich Tractor

In 1890, Froelich embarked upon a new design. He and a blacksmith worked side-by-side to mount a one cylinder gasoline engine onto the thresher steam engine's running gear. Froelich was pleased to find that this rudimentary tractor could be drive safely at roughly 3 mph. Froelich and his crew brought the new machine on their annual harvest tour with successful results. The first

tractor required only 26 gallons of gas and threshed over 1000 bushels of grain a day without any safety issues. Froelich expanded to create the Waterloo Gasoline Traction Engine Company in 1849 with four prototype tractors. Froelich later branched out on his own, while Waterloo continues to produce tractor designs in the early 1900s. Waterloo Tractor Works is now owned by John Deere.

Thank goodness for the invention of the tractor. Froelich brought a new working concept into agricultural America. He

streamlined tedious processes to save farmers precious time and money spent on unnecessary manual labor.



Froelich was born in Iowa in 1849. Froelich was more than familiar with the American agricultural industry at the turn of the 19th century; he operated a mobile threshing service and grain elevator. He charged farmers a fee to thresh their crops at harvest time with the help of his crew and a steam-powered thresher machine.



Within the first few decades, tractor use was slow to catch on. Yet once farmers realized the benefits that could be had in tractor-driven farming, popularity soared. There was no need for cumbersome manual labor when a simple machine like a tractor could do the job for you. From 1910. 1970, tractor production drastically increased from 1000 tractors to nearly 5

million. Falling prices contributed to tractor to tractor growth. Early tractors cost as much as \$785 in 1920. Just two years later in 1922, a tractor could be purchased for only \$395. The price dropped by nearly half in just two years, making tractors an affordable piece of agricultural machinery for almost every farmer.

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

1950's Baby boom needed room –
suburbs came before sewers, so private wells and cesspools



New residential communities displaced old problems –
landfills, junkyards, industrial facilities

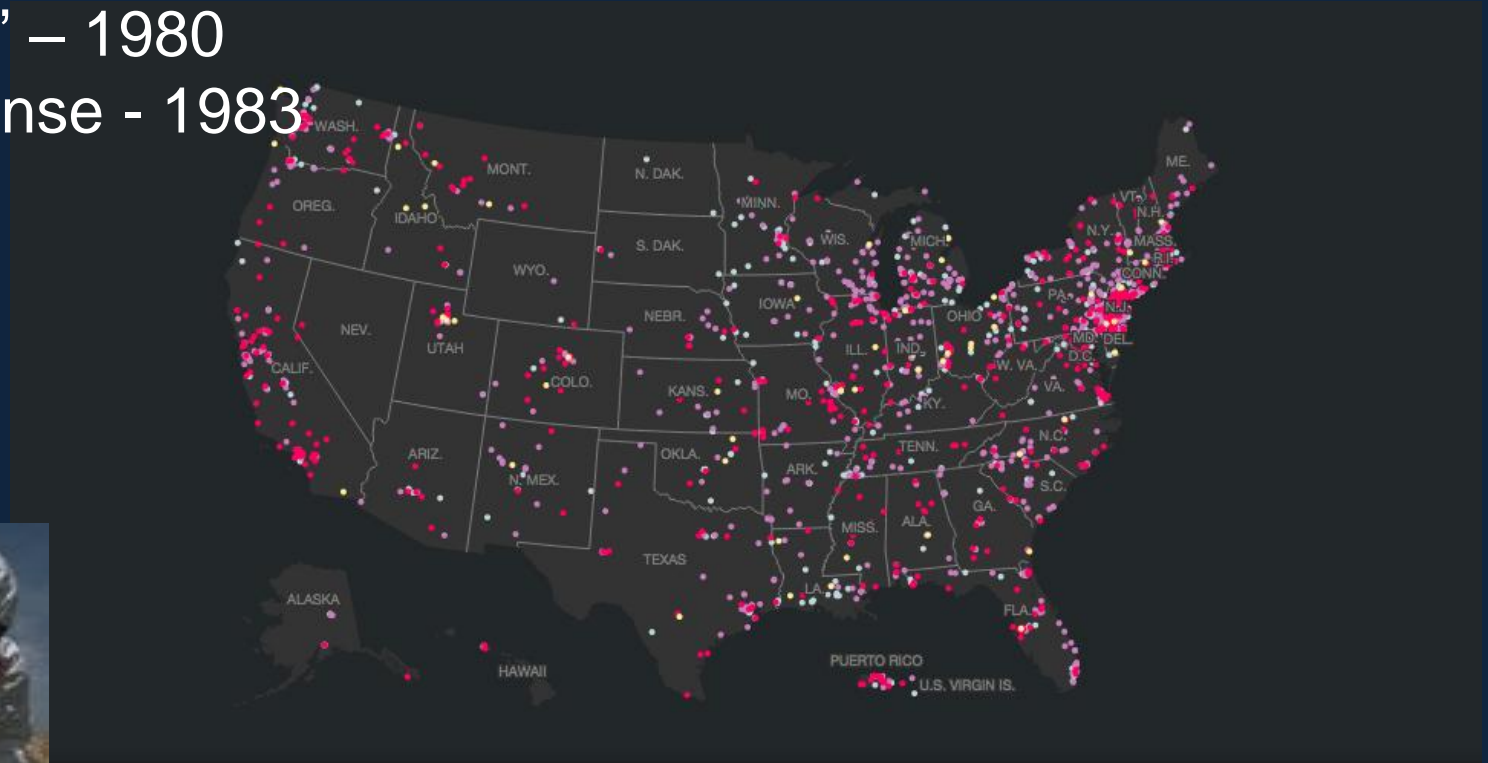
GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Toxic contamination of groundwater was a growing concern (Love Canal and it's Minnesota analogs)



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

CERCLA – US “Superfund” – 1980
MERLA – Minnesota response - 1983



Proposed

Sites have been studied, and cleanup plans proposed.



Active

Cleanup facilities have not yet been completed.



Construction Completed

All the facilities necessary for cleanup have been built. They may need to be operated and maintained indefinitely.



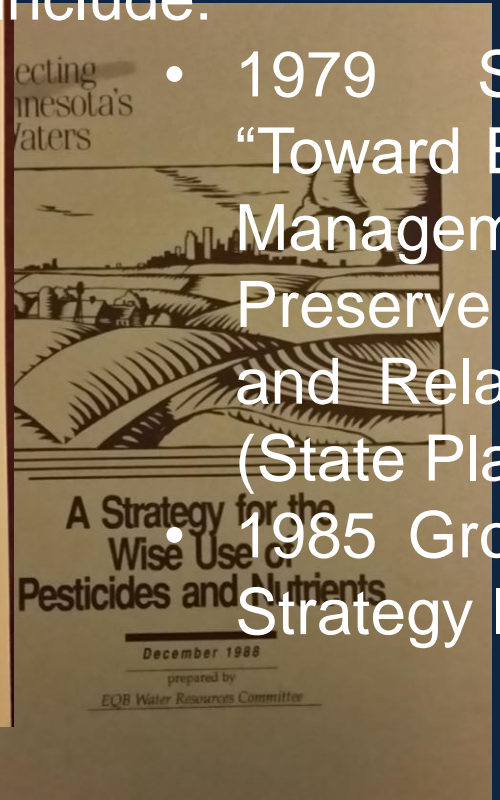
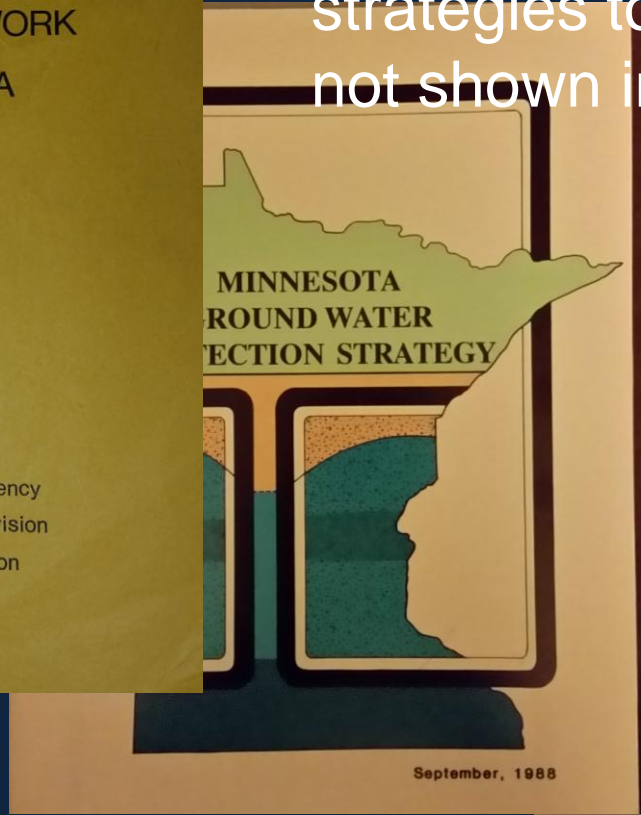
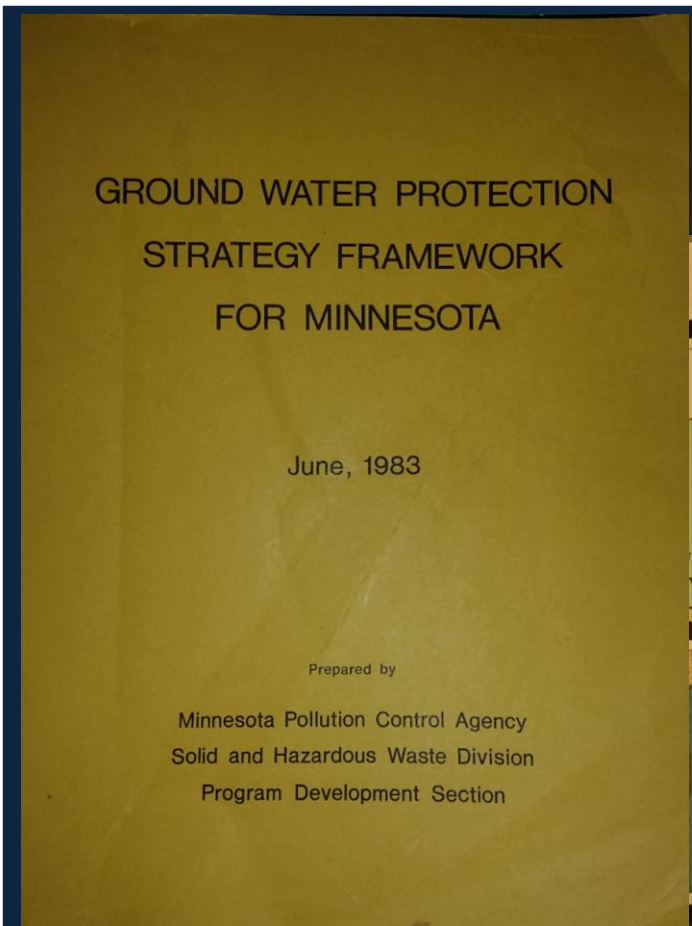
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All cleanup efforts have been completed and the site removed from the National Priorities List.

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

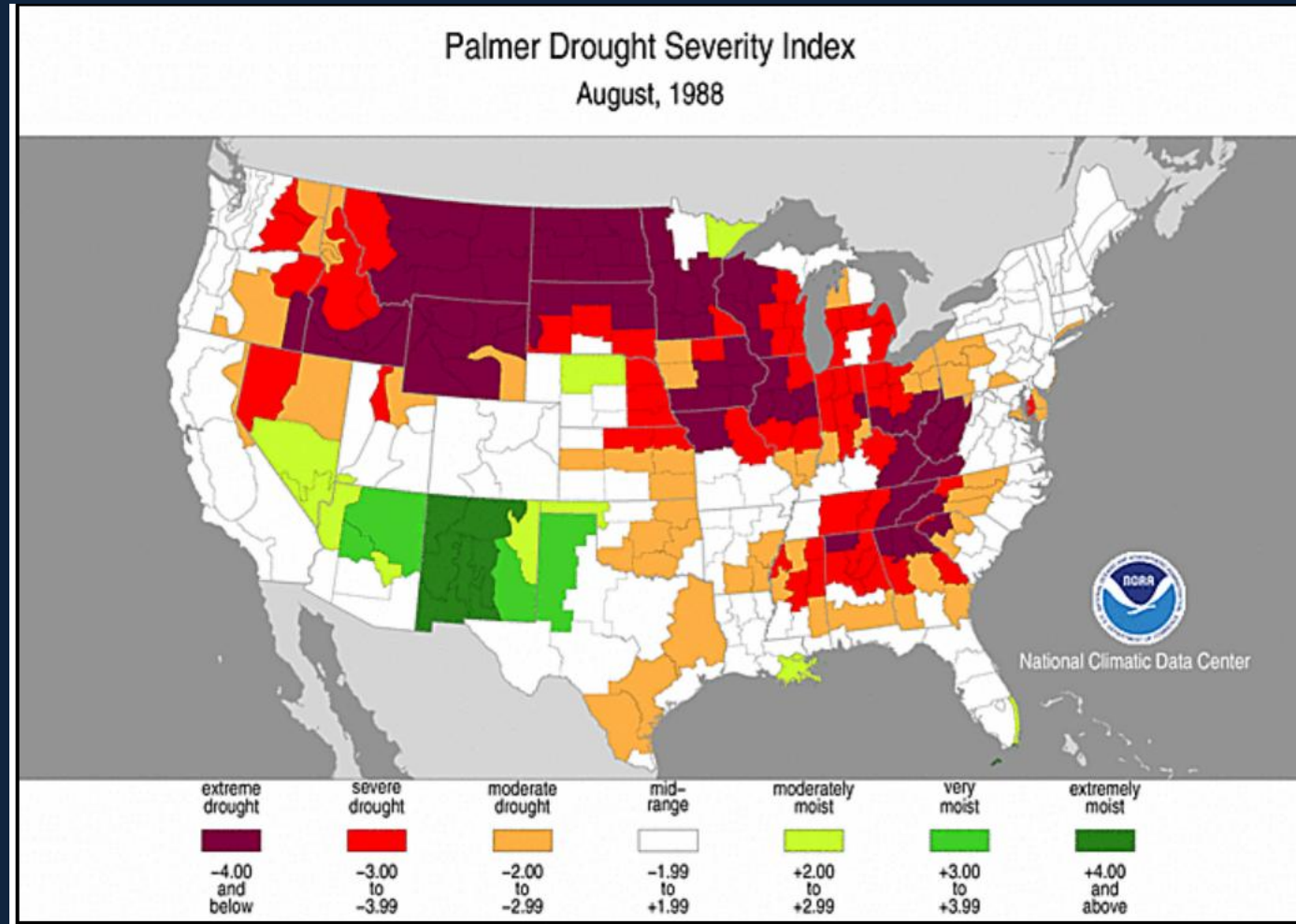
Awareness of wide-spread ground water problems grew... and Minnesota agencies worked to develop strategies to help address the problem. Reports not shown include:

- 1979 State Water Plan, "Toward Efficient Allocation and Management: A Strategy to Preserve and Protect Water and Related Land Resources" (State Planning Agency)
- 1985 Ground Water Protection Strategy Issue Team Report



Ground Water Strategy and Ground Water Protection Act

And nothing raises water awareness like a drought...



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

All this came together in the 1989 Ground Water Protection Act

The Ground Water Bill

From these strategies and all the public input provided in review and comment on the strategies, a ground water bill was drafted by the state water program professionals and proposed to the Governor for inclusion in his environmental package. Differing versions of the bill worked their way through both bodies of the Minnesota Legislature, resulting in over 30 hours of hearings in the final conference committee to arrive at a final package.



Minnesota legislators were concerned about the widespread incidence of pesticides in groundwater, and the growing evidence that it was the every day activities of Minnesotans that was causing this contamination. Didn't we have a duty to protect groundwater for future generations?

- Senator Steve Morse

Ground Water Strategy and Ground Water Protection Act

Caveats on this talk ...
(I'm not a historian)

Ground Water Strategy and Ground Water Protection Act

Sources –
the pile of old books in the
dusty old closet ...

Online resources....



The screenshot shows a web browser window displaying the Minnesota Revisor of Statutes website. The page title is "1989 Minnesota Session Laws". The URL is <https://www.revisor.mn.gov/laws/?year=1989&type=0&doctype=Chapter&id=326>. The page content includes a navigation menu with options like "Retrieve by number", "Laws", "Statutes", "Rules", "Court Rules", "Constitution", and "Search Law by Keyword". Below the navigation, there is a section for "1989 Minnesota Session Laws" with a key: "(1) language to be deleted (2) new language". The main content area displays "Laws of Minnesota 1989" and "CHAPTER 326-S.F.No. 262", followed by a description of the act: "An act relating to protection of groundwater; protecting sensitive areas; promoting and requiring certain best management practices; providing financial assistance for certain groundwater protection activities; authorizing local government groundwater and resource protection programs; establishing a legislative water commission; providing for determination of water research needs; developing a..."

Ground Water Strategy and Ground Water Protection Act

Items from former colleagues' dusty old closets (and recycle bins)

STATEMENT ON THE
MINNESOTA GROUND WATER PROTECTION ACT OF 1989

By
Linda Bruemmer
Section Chief of Program Development Section
Ground Water and Solid Waste Division
Minnesota Pollution Control Agency

Before The
U.S. Senate Subcommittee on
Superfund, Ocean and Water Protection

August 1, 1989
Washington, D.C.



Ground Water Strategy and Ground Water Protection Act



Senate testimony by
former Senator Steve Morse,
April 16, 2018



Ground Water Strategy and Ground Water Protection Act

Elements of the 1989 Ground Water Protection Act – Degradation Prevention Goal

- Degradation prevention goal – **first time in statute**
 - Includes ALL groundwater
 - Applies to all practices and
 - To the extent practicable

Ch. 326, Art. 1

LAWS of MINNESOTA for 1989

2222

ARTICLE 1

CHAPTER 103H

GROUNDWATER PROTECTION

Section 1. [103H.001] DEGRADATION PREVENTION GOAL.

It is the goal of the state that groundwater be maintained in its natural condition, free from any degradation caused by human activities. It is recognized that for some human activities this degradation prevention goal cannot be practicably achieved. However, where prevention is practicable, it is intended that it be achieved. Where it is not currently practicable, the development of methods and technology that will make prevention practicable is encouraged.

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

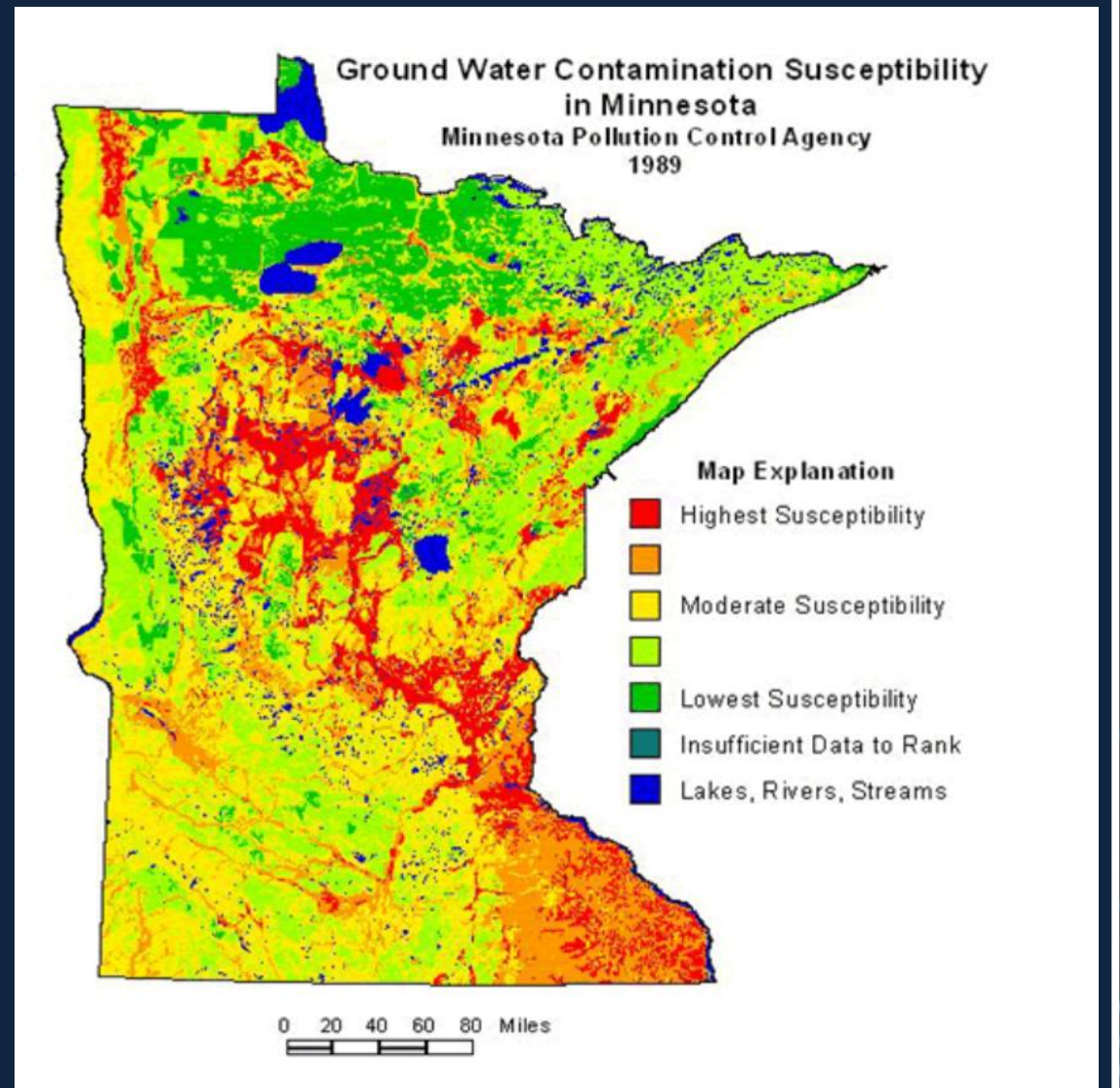
Elements of the 1989 Ground Water Contamination Susceptibility in Minnesota

DNR to develop criteria

- Sensitive areas to be identified and mapped
- Local government notified that special protective measures are to be taken

Accelerated county atlases

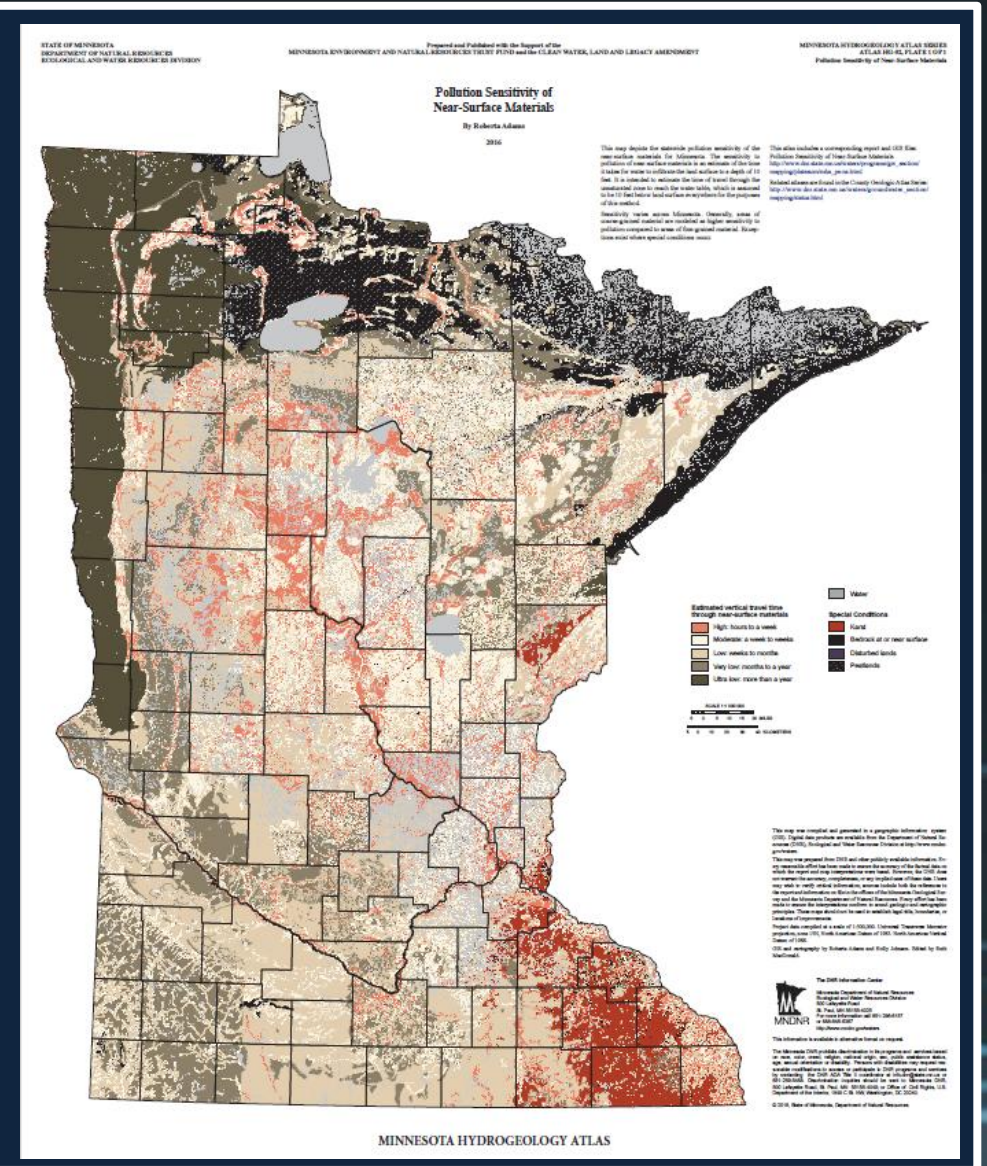
- First atlases were Winona and Scott County



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

How this has been implemented today:

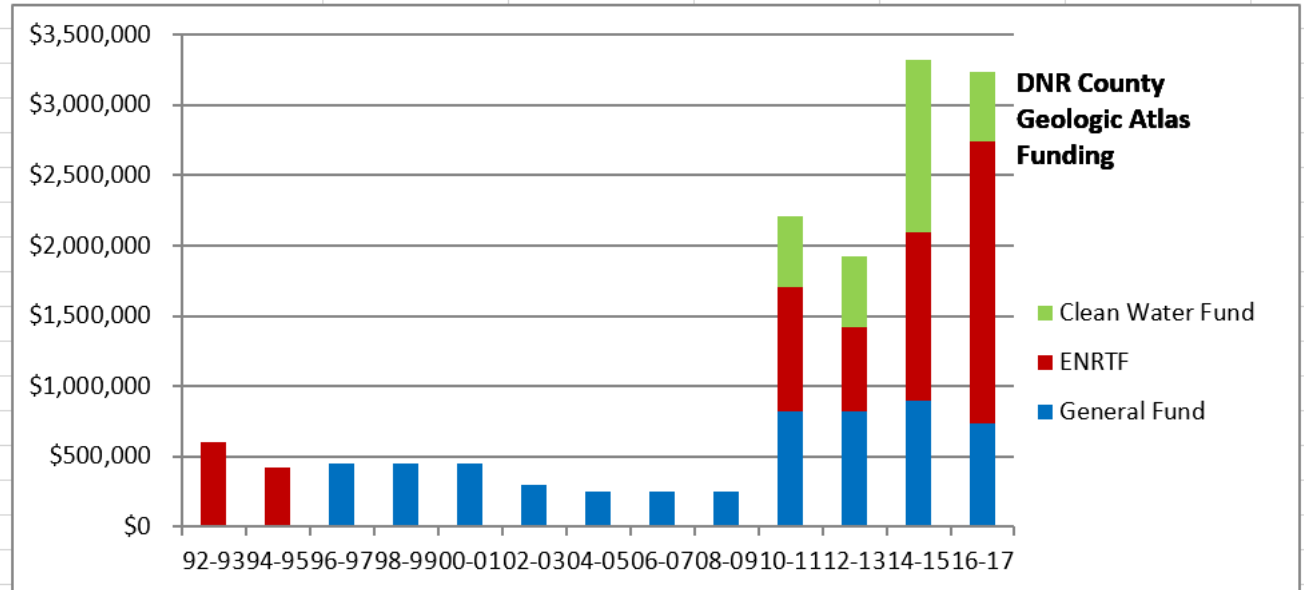
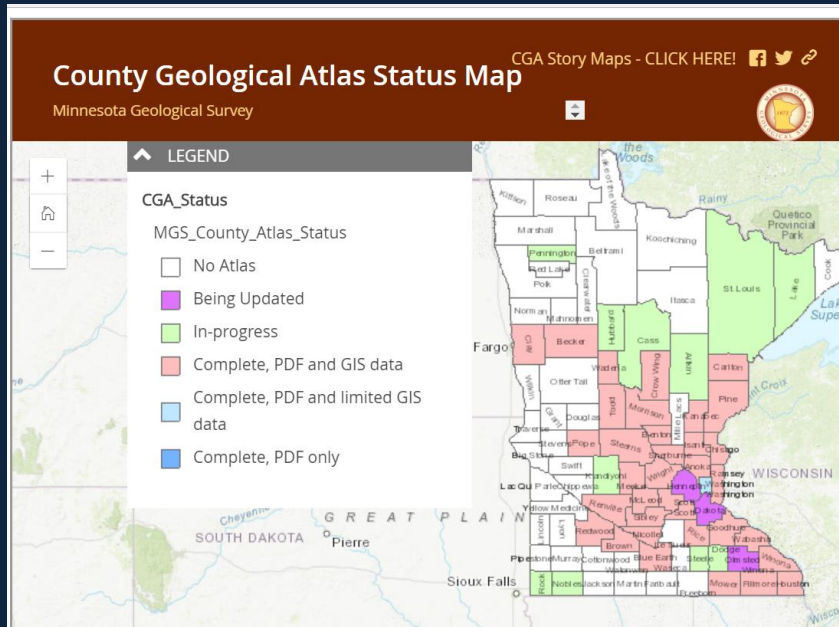
- Sensitive areas
 - DNR criteria
 - Sensitive areas identified and mapped
- GIS layers to be used in studies and decision making
- Growing body of data



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

How this has been implemented today:

- County atlases program accelerated
- Legacy funding really kicked it into gear



note: General funding in chart does not show \$200,000/year to MGS to support Part A atlas work

County atlases tie surface and groundwater together, providing detailed evaluation for local decision-makers. - Jan Faltisek

Ground Water Strategy and Ground Water Protection Act

Elements of the 1989 Ground Water Protection Act – Health Risk Limits

Development of Health Risk Limits - MDH

- Adds tool for private water supplies
- Also advises for public water supplies where no federal limit
- Based on compounds detected in water

MDH review is requested when compounds are detected
MDA for ag chemicals, MPCA for others

MDH to publish this guidance so people can gauge risk and behave accordingly.

How this has been implemented today:

When multiple substances are present MDH risk assessment methods require evaluation of the potential risk from the combined exposure. Information from the water guidance table below and a calculator for exposures to multiple chemicals is available for download: [MDH Water Guidance and Additivity Calculator \(Excel\)](#).

Guidance Table

CAS Number	Chemical	Value Type	Exposure Duration	Value (µg/L)	Health Endpoint(s)
Find chemicals beginning with: A-C D-E F-M N-S T-Z					
83-32-9	Acenaphthene Toxicological Summary for Acenaphthene (PDF) Information Sheet: Acenaphthene in Drinking Water (PDF)	HRL ₉₃	Chronic	400	Liver system
		HBV ₁₅	Acute	ND	--
			Short-term	ND	--
			Subchronic	200	Adrenal; Liver system
			Chronic	100	Adrenal; Liver system
			Cancer	N/A	--
103-90-2	Acetaminophen Toxicological Summary for Acetaminophen (PDF)	HRL ₁₅	Acute	200	Liver system
			Short-term	200	Liver system
			Subchronic	200*	Liver system

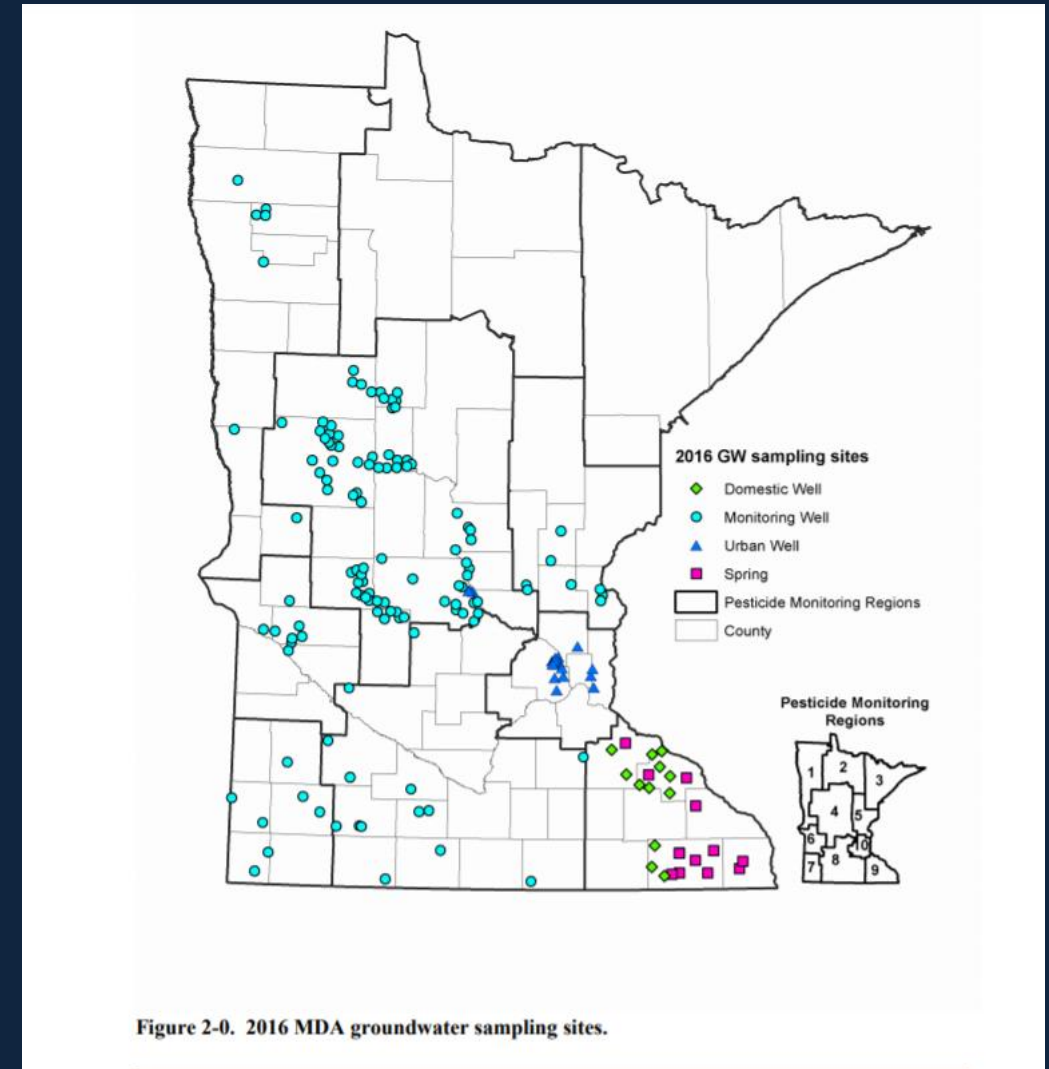
How this has been implemented today:

Example – Atrazine and degradates

Atrazine is an herbicide used on about 25% of the corn grown in MN (USDA)

MDA monitors groundwater through a network of wells and springs

Atrazine and its degradates were found at low levels in about 25% of the samples in this network.



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT



Risk Assessment

[Risk Assessment Home](#)[About](#)[Programs/Services](#)[Chemicals Under Review](#)[Guidance](#)[Rules](#)[Studies/Assessments](#)[Links](#)[Contact Health Risk Assessment](#)

Related Topics

[Chemicals/Hazards](#)[Reducing Exposures](#)[Clean Water Fund](#)

Atrazine Human Health Assessment

[Background](#)[The Assessment](#)[Response to Public Comments](#)[In the Future](#)[For More Information](#)

Background

MDH completed a human health assessment of the herbicide atrazine. This assessment was conducted at the request of the Minnesota Department of Agriculture (MDA) to support MDA's special registration review of atrazine. The atrazine review is part of a larger process initiated by MDA to select and review pesticides and, if necessary, consider additional state-specific restrictions, limitations on use as a condition of registration, or registration without state-specific restrictions. MDA selected atrazine as the first pesticide to go through this registration review process. MDH's participation in the atrazine review was in addition to the Department's on-going efforts to develop and establish Health

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Questions?

Please contact:

health.risk@state.mn.us



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Home > Ag Chemicals & Fertilizers > Pesticides > Atrazine Information > Special Registration Review

Atrazine Special Registration Review

The Minnesota Department of Agriculture (MDA) together with partners at the Minnesota Department of Health (MDH) and the Minnesota Pollution Control Agency (MPCA) have concluded the special registration review of the corn herbicide atrazine for the State of Minnesota. This review determined that no modifications to atrazine regulation are required in Minnesota at this time. Elements of atrazine registration and regulation may need revision if emerging science or EPA evaluations reach new conclusions about human health and environmental impacts of atrazine and its benefits to farmers.

- 11/18/2010 - [Commissioner Determination memo \(PDF: 64 KB/ 1 page\)](#)

On January 19, 2010, the MDA issued a *Notice of Comment Period* in the State Register regarding the completion of a special state registration review of the herbicide atrazine. The MDA made available a summary of the review along with five agency-sponsored comments. The MDA accepted comments on the atrazine registration review documents for 60 days.

Comments received in response to the "Notice of Comment Period for Atrazine Special Registration Review" published in the Minnesota State Register on 1/19/2010 (by date received):

- 1/28/2010 - 2/19/2010 - [Letters from Private Citizens \(PDF: 426 KB/ 7 pages\)](#)

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For current information, click on the EPA logo to visit epa.gov.**

U.S. ENVIRONMENTAL PROTECTION AGENCY

Pesticides: Reregistration

You are here: [EPA Home](#) » [Pesticides](#) » [Regulating Pesticides](#) » [Reregistration](#) » Pesticide Reregistration Status



**Pesticide
Chemical Search**
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Note: EPA no longer updates this page.

Refer to Chemical Search for the latest information.



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Pesticide Reregistration Status

Reregistration Status

- [All Chemicals](#)
- [Carbamates](#)
- [Chloroacetanilides](#)
- [Organophosphates](#)
- [Triazines](#)

- [Definitions](#): REDS, IREDs, TREDs

The table below shows the status of each chemical in the reregistration review process, and provides links to a chemical's Web page and any decision documents or fact sheets that are available. Information that may be available on a chemical Web page include the Chemical Review Manager contact information, Docket ID number, decision and fact sheet documents, Federal Register notices, and related documents.

Documents related to EPA's reregistration review of these pesticides may be found at [Regulations.gov](#) in the docket identified for each chemical indicated.

You will need the free Adobe Reader to view files on this page, and for documents provided within the chemical Web pages. See [EPA's PDF page](#) to learn more.



[Pesticides Home](#)

[Regulating Pesticides Home](#)

[Reregistration Home](#)

[About Reregistration](#)

[Product Reregistration](#)

[Public Participation](#)

[Reregistration Status](#)

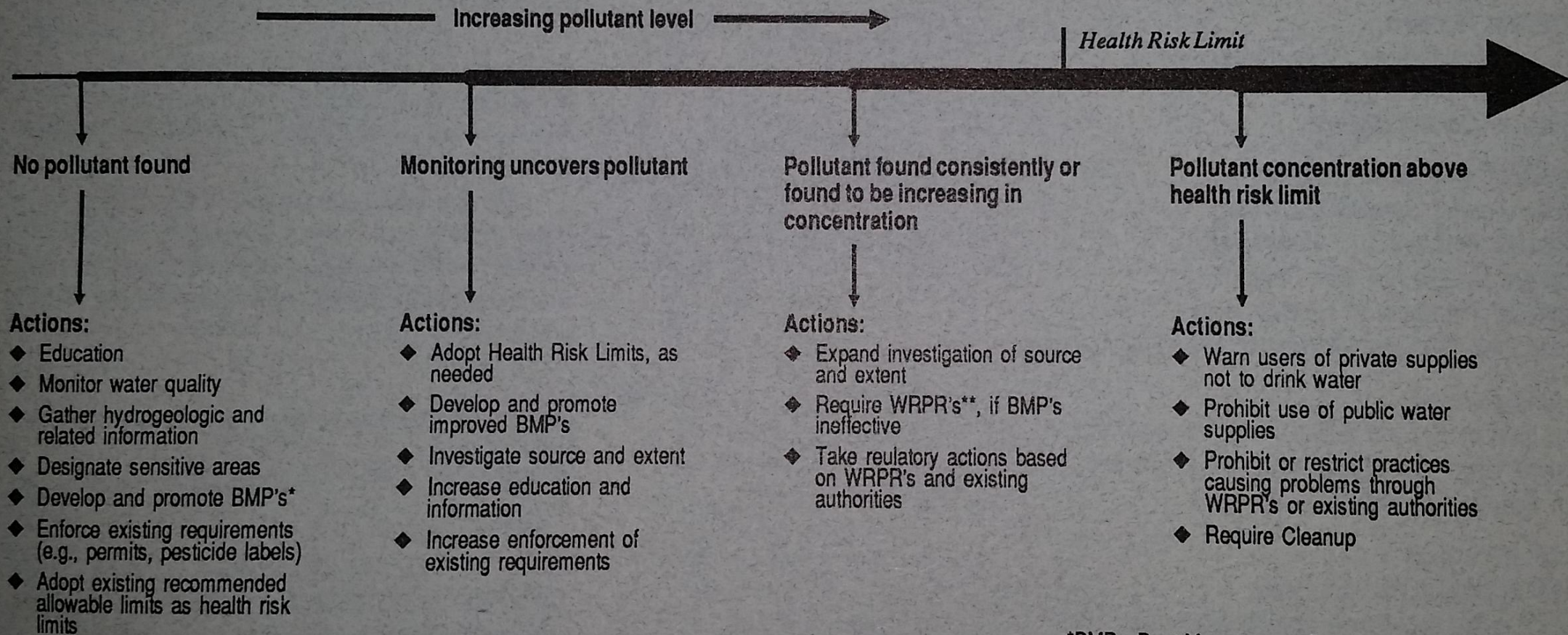
[Progress & Status Reports](#)

Elements of the 1989 Ground Water Protection Act – Addressing Contaminants

- Process for addressing nonpoint source contamination (MS 103H.001)
 - BMPs (Best Management Practices)
 - MDA for ag chemicals
 - MPCA for other land uses
 - Voluntary
 - WRPSs (Water Resource Protection Requirements)
 - To be implemented where BMPs were not enough
 - Includes liability protection if BMPs are followed

Ground Water Pollution Management

State Agency Actions




*BMP - Best Management Practice (voluntary)

**WRPR - Water Resources Protection Requirement

How this has been implemented: Nitrogen Fertilizer Management Plan 2015

Home > Ag Chemicals & Fertilizers > Fertilizers > Nutrient Management > 2015 Nitrogen Fertilizer Management Plan

Minnesota Nitrogen Fertilizer Management Plan



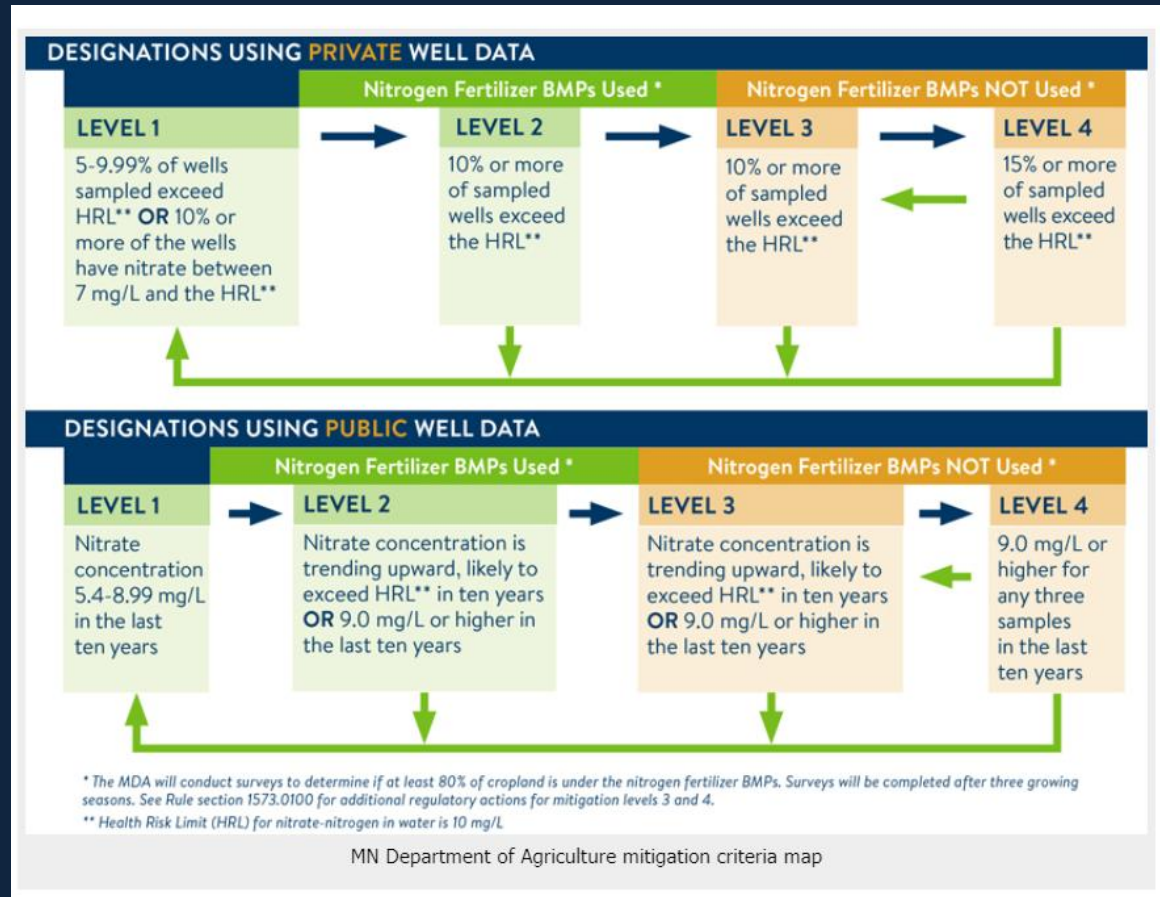
WORKING *Together*
to address nitrate in groundwater

About	Nitrogen Management	Well Testing & Evaluation	Prevention	Mitigation	Draft Rule
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The Nitrogen Fertilizer Management Plan is the state's blueprint for preventing or minimizing impacts of nitrogen fertilizer on groundwater.

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

How this has been implemented: MDA Draft Rule for Nitrogen – June 2017



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

How this has been implemented: Revised Nitrogen Fertilizer Rules to be open for comment Monday, April 30, 2018 – Legislative battle ensues now

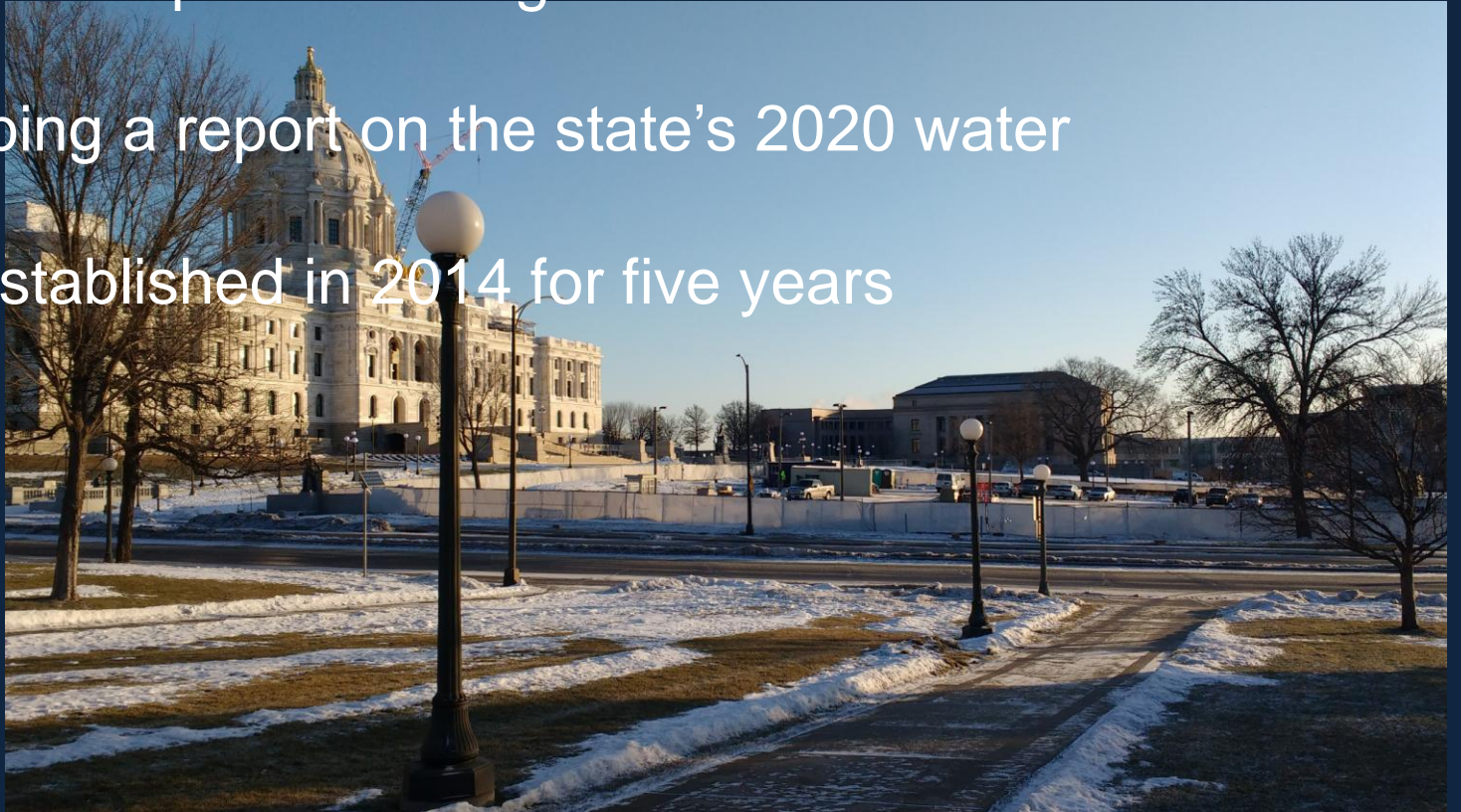
What has changed from Draft #1 to Draft #2 of the rule?

		June 2017	March 2018
Part 1 Statewide Restrictions on Nitrogen Fertilizer Application in the Fall and on Frozen Soil	Vulnerable Groundwater Area Definition	Areas with vulnerable groundwater were defined using a method that measured how water moved through a 5 foot soil profile (Ksat) and karst geology	Areas with vulnerable groundwater defined based on USDA NRCS soil maps and karst geology
	Field Determination Criterion	Used full sections of land to determine if Part 1 of the rule applied to individual fields	Uses quarter-sections of land to determine if Part 1 of the rule applies to individual fields
	County-level exclusions	Provided no county-level exclusions	Excludes counties based on their low risk for nitrate contamination in groundwater due to climate and minimal row crops
Part 2 Mitigation Efforts	Eligibility Criterion	Applied to both townships and DWSMAs	Applies to DWSMAs

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Elements of the 1989 Ground Water Protection Act - Legislature

- Established Legislative Water Commission
- Core of legislators with deeper knowledge
- Bi-partisan
- Charged with developing a report on the state's 2020 water needs (due in 1991)
- Disbanded, then re-established in 2014 for five years



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Elements of the 1989 Ground Water Protection Act – Monitoring and Data

- Monitoring and information management
 - Increased monitoring of public water supplies to meet Clean Water Act requirements
 - Data guidelines established - compatibility
 - Pesticide use monitored, both urban and rural
 - EQB to develop a water monitoring plan



Elements of the 1989 Ground Water Protection Act - Pesticides

- Evaluation and management of pollutants
- Pesticide Management Plan
- Storage, handling, distribution and disposal (covers pesticides and fertilizers)
- Waste pesticide container collection
- Chemigation permit requirements strengthened
- Pesticide registration fees increased
- Pesticide and fertilizer facility fees increased
- Pesticide applicator education and training strengthened
- Integrated Pest Management approach laid out by 1990



Elements of the 1989 Ground Water Protection Act – Ag Chem Cleanups

- Agricultural Chemical Liability, Incidents and Enforcement
 - MDA authority for enforcement increased
 - Reimbursement for polluted wells
 - Farmers exempted from liability if follow label directions
- Agricultural Chemical Incident Payment and Reimbursement
- ACCRA funded by surcharges on pesticides and fertilizers
- Administration of Superfund shifted from PCA to Dept of Finance
 - MDA has equal access to cleanup fund
 - Projects ranked according to risk

How this has been implemented today:

Dan Stoddard, Assistant Director, Pesticide & Fertilizer Management Division

“The GWPA has been a great success for addressing pesticides in groundwater, both for point and non-point source contamination. This success is primarily because these program were adequately funded by a fee on pesticides when the act was first passed. Pesticides in groundwater were a major concern when the act first passed. There were high concentrations in a number of city wells and they were found at levels above the health standards in rural monitoring wells. Since then, point sources have been significantly addressed and pesticide levels in rural monitoring wells have been greatly reduced.”



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

How this has been implemented today:

- Agricultural Chemical Response and Reimbursement Account (ACRRA) and program was created, the first and still one of the very few dedicated agricultural chemical (pesticide and fertilizer) facility clean-up programs in the nation which has been highly effective at cleaning up hundreds of contaminated sites. A point source cleanup unit at MDA addresses these sites.
- Strengthened ag chemical bulk storage requirements to reduce spillage and incidents.



GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Elements of the Ground Water Protection Act – Drinking Water

Water well changes

- New fees for wells (\$50 - \$100)
- Permit fees for non-drinking water wells
- Disclosure of wells at time of sale
- DNR must seal wells on state lands
- MDH can order sealing if imminent threat and no action
- A person who's well is polluted may sue the polluter
- Advisory Council on Wells and Borings established

Plus significant new funding to implement the Safe Drinking Water Act

How this was implemented today:

- Grants to local governments for well sealing
- Thousands of wells sealed
- Yes, there are probably thousands more...

Well Disclosure Statement

- Required at time of sale
- Must show location of all known wells on property

The seller is liable for false disclosure



PROTECT OUR PRECIOUS WATER: Sealing Your Unused Well



PROTECT OUR PRECIOUS WATER: Sealing Your Unused Well

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Elements of the 1989 Ground Water Protection Act – Water Conservation

- Water allocation priorities in time of shortage changed
- Essential power production included in first priority
- DNR to study the impacts of consumptive water use
- Water use fees revised:
 - \$.005 per 1000 gpd for the first 50 million gallons
 - \$.01 per 1000 gpd over 50 million gallons
- No new permits for once-through cooling – fees and phase out
- Once-through cooling water
 - \$.05 per 1000 gpd until 12/31/91
 - \$.10 per 1000 gpd until 12/31/96
 - \$.15 per 1000 gpd after 1/1/97

How this has been implemented today:

DNR has new tools to assist water suppliers:

Beginning January 1, 2018, there will be a new supplement to the annual water use report in Minnesota Permitting and Reporting System (MPARS) called the **Water Conservation Reporting System**

The new system will provide:

robust dashboards for analyzing key water conservation measures

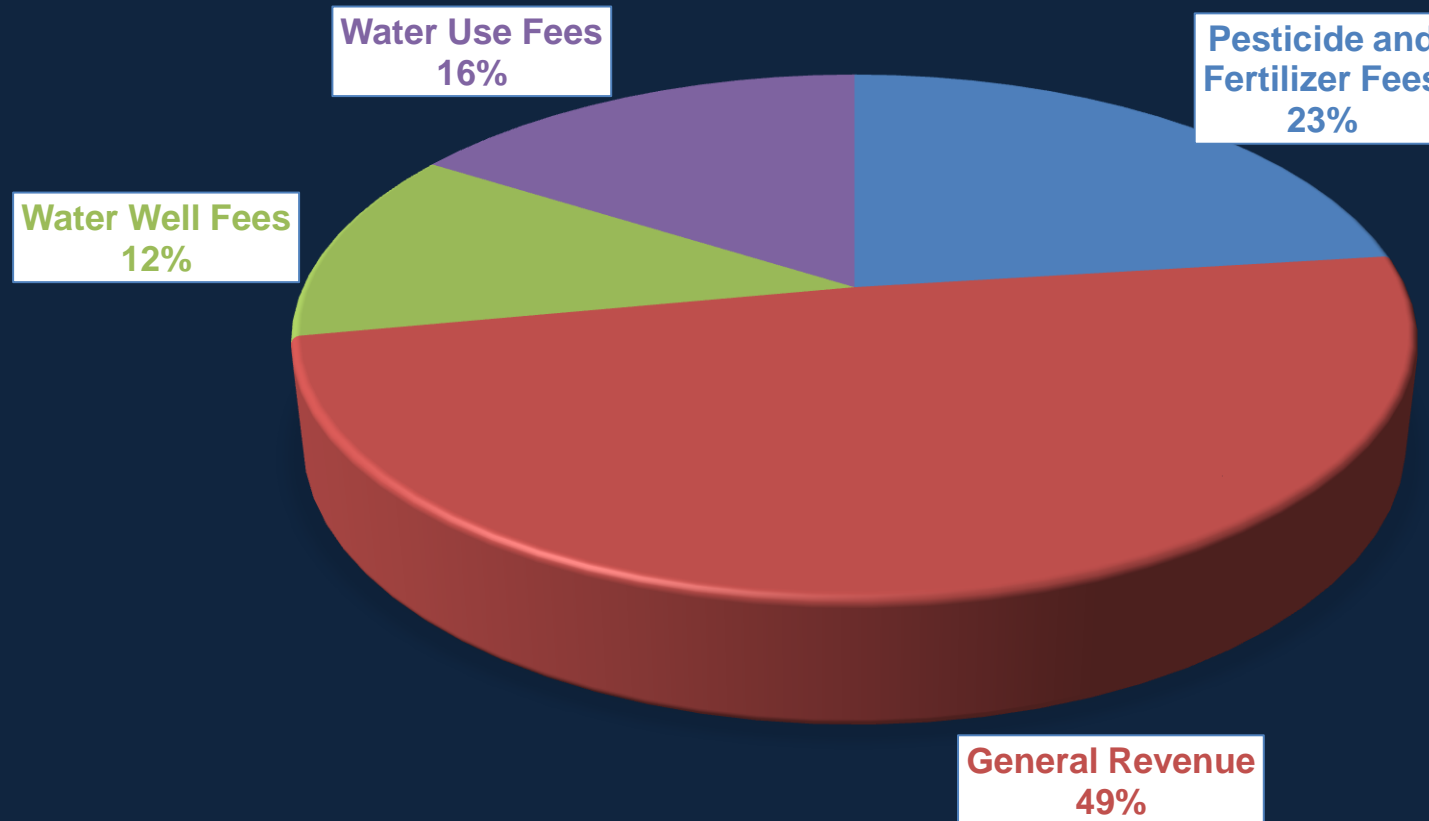
data year after year for trend analysis, and

methods to measure and record if the state is achieving water conservation goals

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

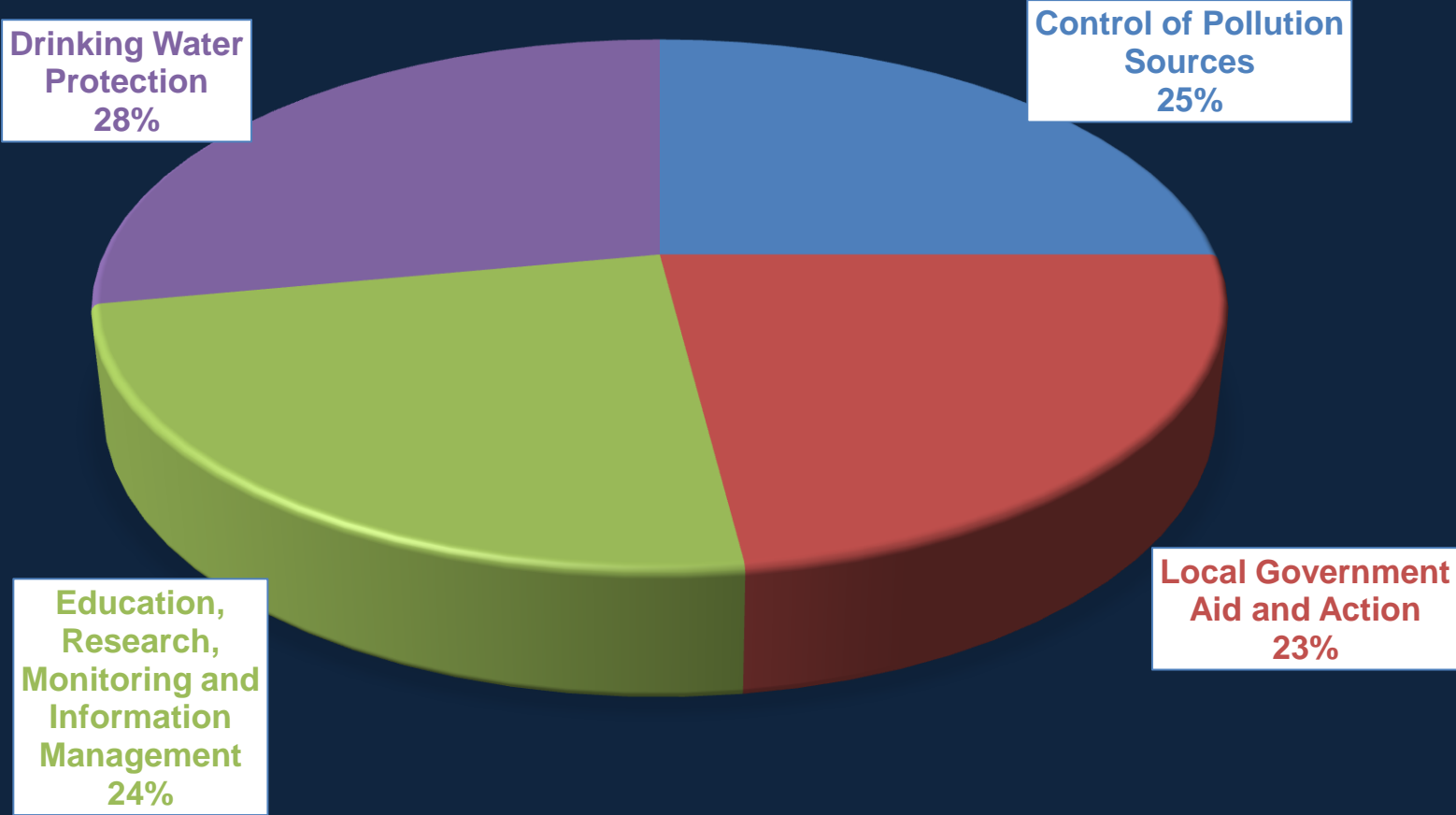
Elements of the Ground Water Protection Act - Revenue Sources

\$17million over two years

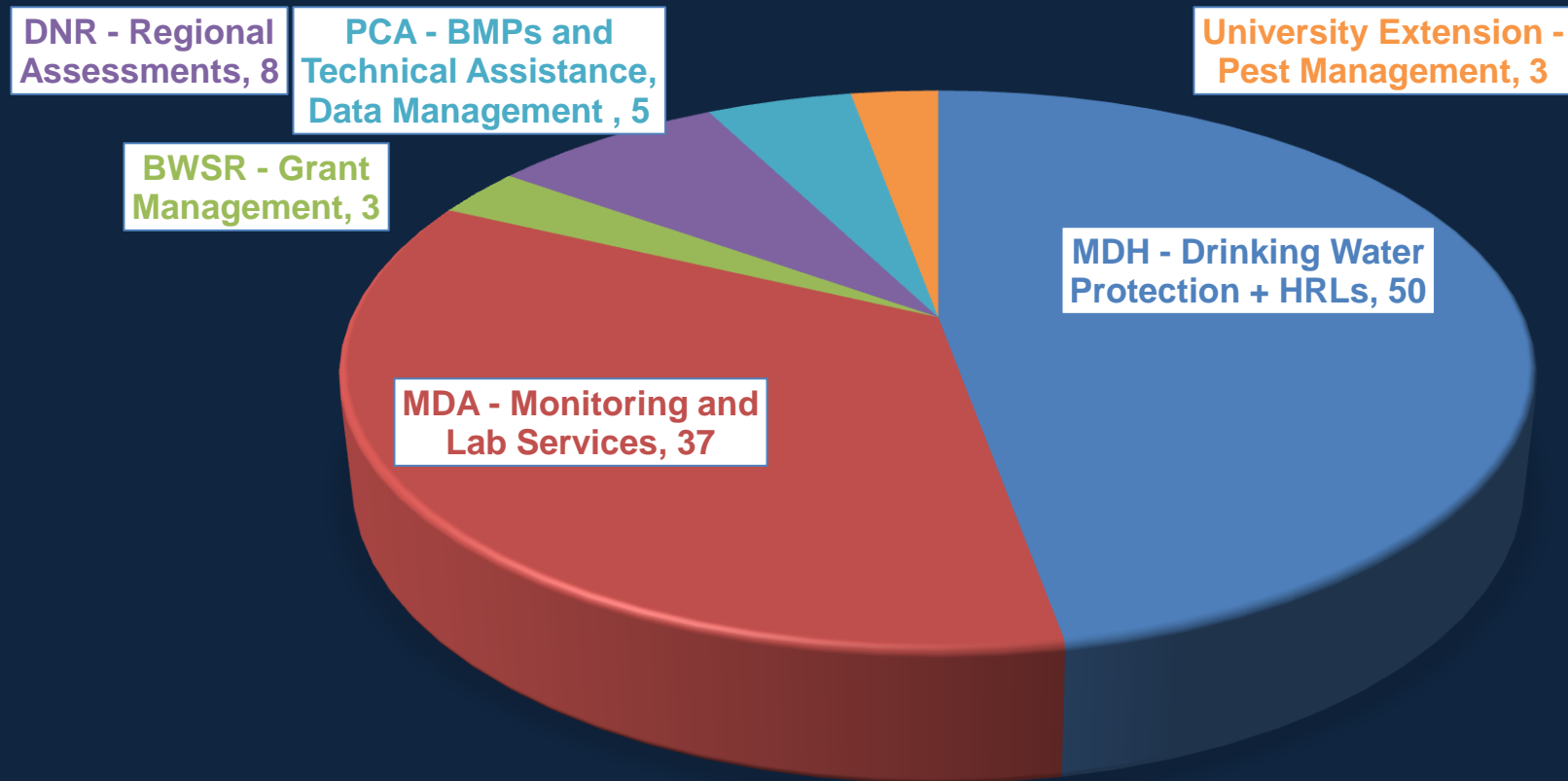


GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

Elements of the Ground Water Protection Act - Spending



Elements of the Ground Water Protection Act - Positions Funded



106 Positions in Total!

GROUND WATER STRATEGY AND GROUND WATER PROTECTION ACT

THE 1989 GROUNDWATER PROTECTION ACT

This sweeping legislation changed groundwater regulation Minnesota.

Still controversial!



Addressed:

- Non-degradation goal
- Mechanism for addressing nonpoint sources
- Increased conservation
- Implementation of Clean Water Act
- Data and information

Increased cooperation among water agencies is a side benefit.