



Groundwater Restoration and Protection Strategies

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Minnesota Land of 10,000 Lakes, Headwaters of the Mississippi...



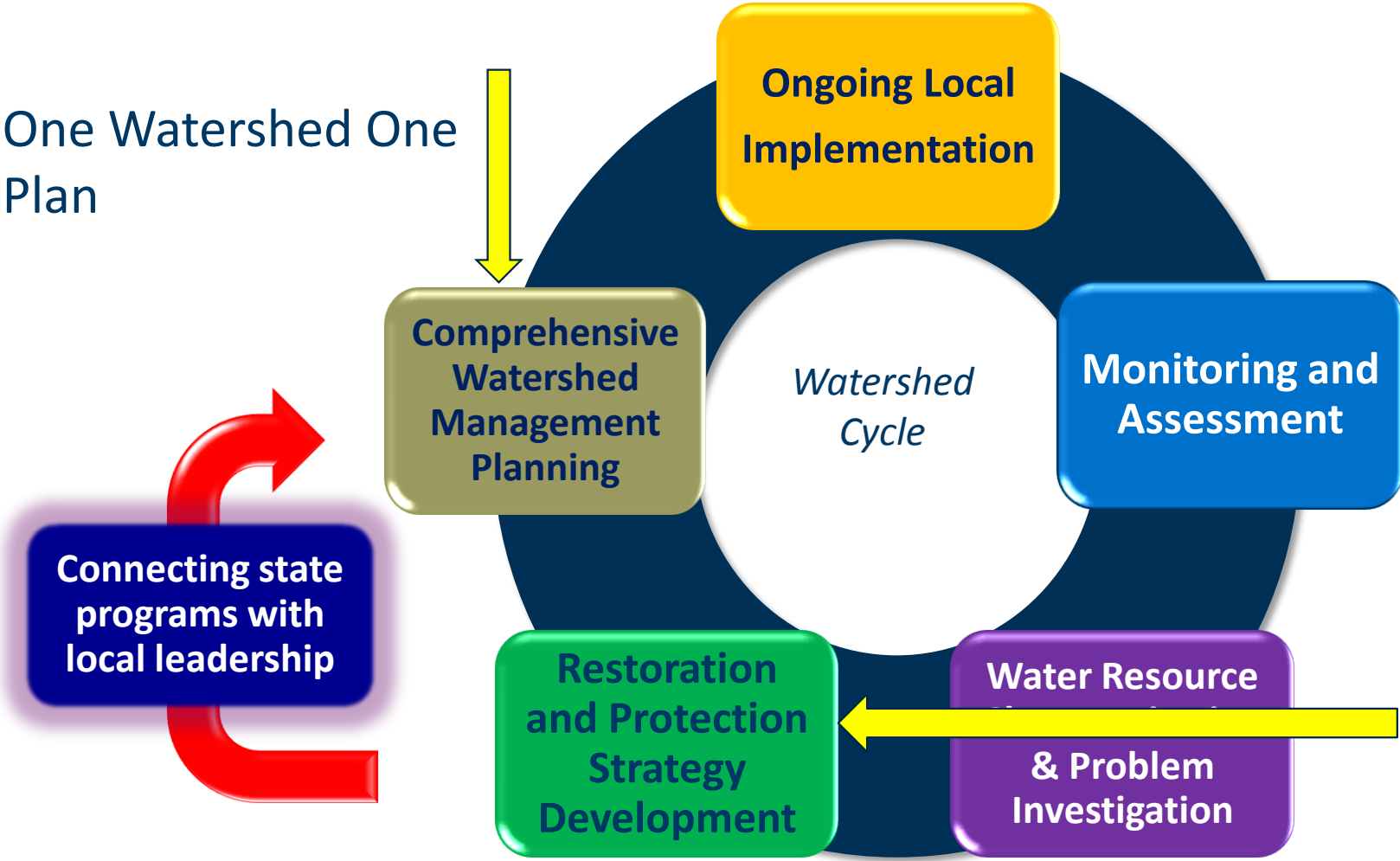
Clean Water Land and Legacy Amendment

2008 Legacy Amendment

- Increases the state sales tax by three-eighths of one percent
- Additional sales tax revenue is distributed into four funds
 - Clean water fund (over \$100 million/year)
 - Protect, enhance, and restore water quality
 - Protect groundwater from degradation
 - At least 5% to protect drinking water sources



Watershed Approach

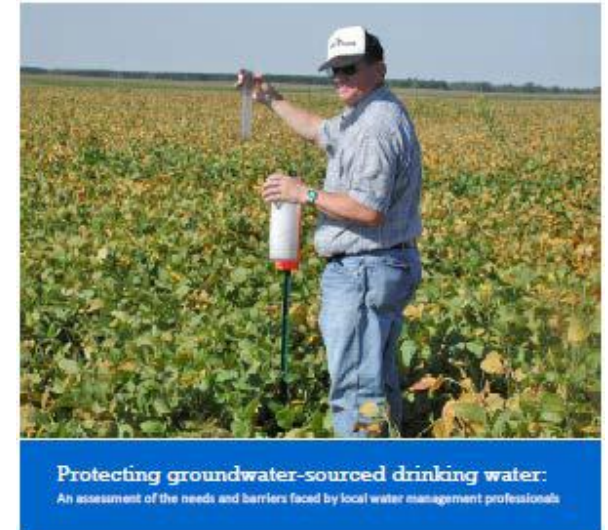


Watershed Restoration and Protection Strategies

Groundwater is Important

75% of Minnesotans use Groundwater

- Statewide survey to assess groundwater confidence
- Needs Assessment Survey on Drinking Water



Prepared by Freshwater Society
for the
Minnesota Department of Health
March 15, 2016



75% of SWCD's ranked drinking water protection as a priority, yet **74% spent 0-25%** of their time working on drinking water protection in the past year.

How do we fit Groundwater into the Watershed Framework?

- Assemble existing groundwater information (Maps cookie cutter cut to a watershed scale)
- Develop groundwater protection strategies (Table)



Groundwater Restoration and Protection Strategies (GRAPS)

GRAPS Content - Background

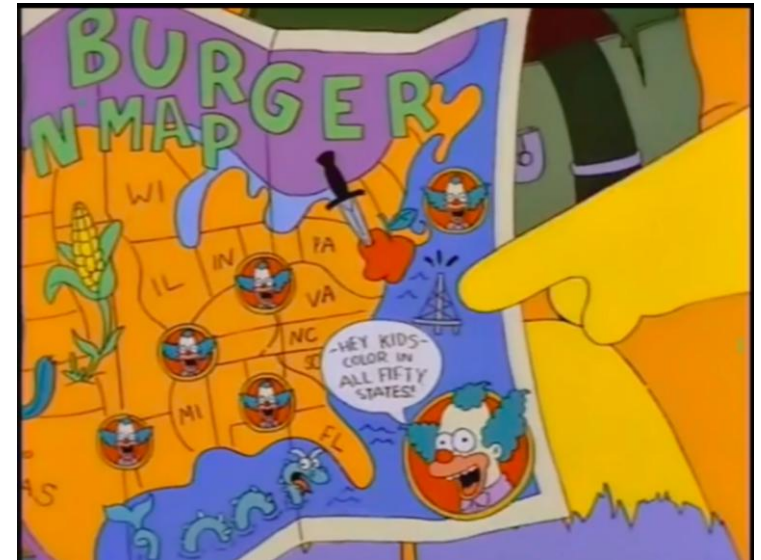
- Land Cover/Land Use
- Geology/hydrogeology
- Pollution Sensitivity (Aquifer Vulnerability)
- Wellhead Protection Areas and Vulnerability
- Water Use Trends
- Water Appropriations

Currently a Report



GRAPS Content - Groundwater Quality Information

- Nitrate
 - **New Well Samples From MDH**
 - **Township Nitrate Testing MDA**
- Arsenic – **New Well Samples**
- Pesticides
 - **Ambient monitoring MDA**
 - **Data from Township Testing in the future MDA**
- Animal Feedlots, SSTS
- Contaminant Sites
 - **Active Tank and Leak Sites PCA**
 - **Closed Landfills PCA**
- Contaminants of Emerging Concern - **Ambient monitoring PCA**



GRAPS Content - Groundwater Quantity Information

- Groundwater level trends – **Observation Well Data DNR**
- Groundwater Dependent Features **DNR**
 - **Trout streams**
 - **Fens**
 - **GW dependent lakes**

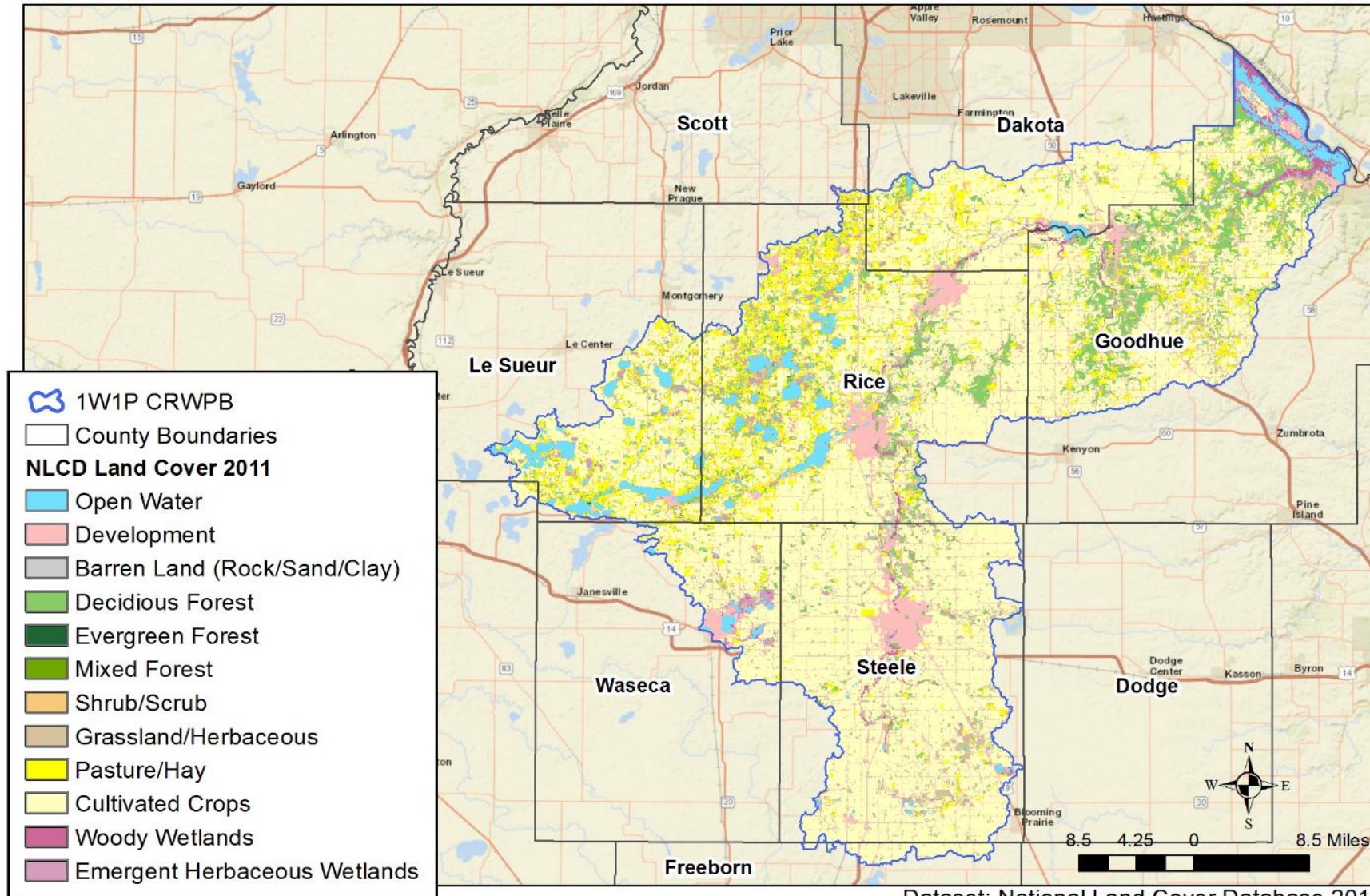


GRAPS Content - Strategies

Goal	Supporting Strategy	Recommended Groundwater Actions	Target Goodhue Co.	Target Dakota Co.	Target Scott Co.	Target Rice Co.	Target Le Sueur Co.	Target Blue Earth Co.	Target Waseca Co.	Target Steele Co.	Target Freeborn Co.	HUC-10s Involved	Lead Agency that can assist	Tip(s) for Targeting & Helpful Maps	Benefit: Habitat	Benefit: GWCNF	Benefit: Soil Health	Benefit: Erosion	Benefit: Carbon	Ben. Nutrient Runoff
Protect Groundwater and Drinking Water Quality: Nitrate	Nutrient Management Education and Outreach	Promote the adoption of cover crops for scavenging nutrients under irrigated row crops.	X	X		X				X		Lower Cannon Chub Middle Cannon Prairie Upper Cannon Straight	MDA Pesticide & Fertilizer Division	Focus on irrigators in areas with high pollution sensitivity, karst geology, and vulnerable DWSMAs. <i>Pollution Sensitivity Map (Figure 7)</i> <i>Geologic Sensitivity Wells (Figure 10)</i> <i>DWSMA Vulnerability Map (Figure 12)</i> <i>Nitrate in Wells Map (Figure 17)</i> <i>Township Testing Map (Figure 18)</i> <i>Water Use Map (Figure 16)</i>	X		X	X	X	X
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Cannon River GRAPS

Cannon River - Land Cover



Dataset: National Land Cover Database 2011

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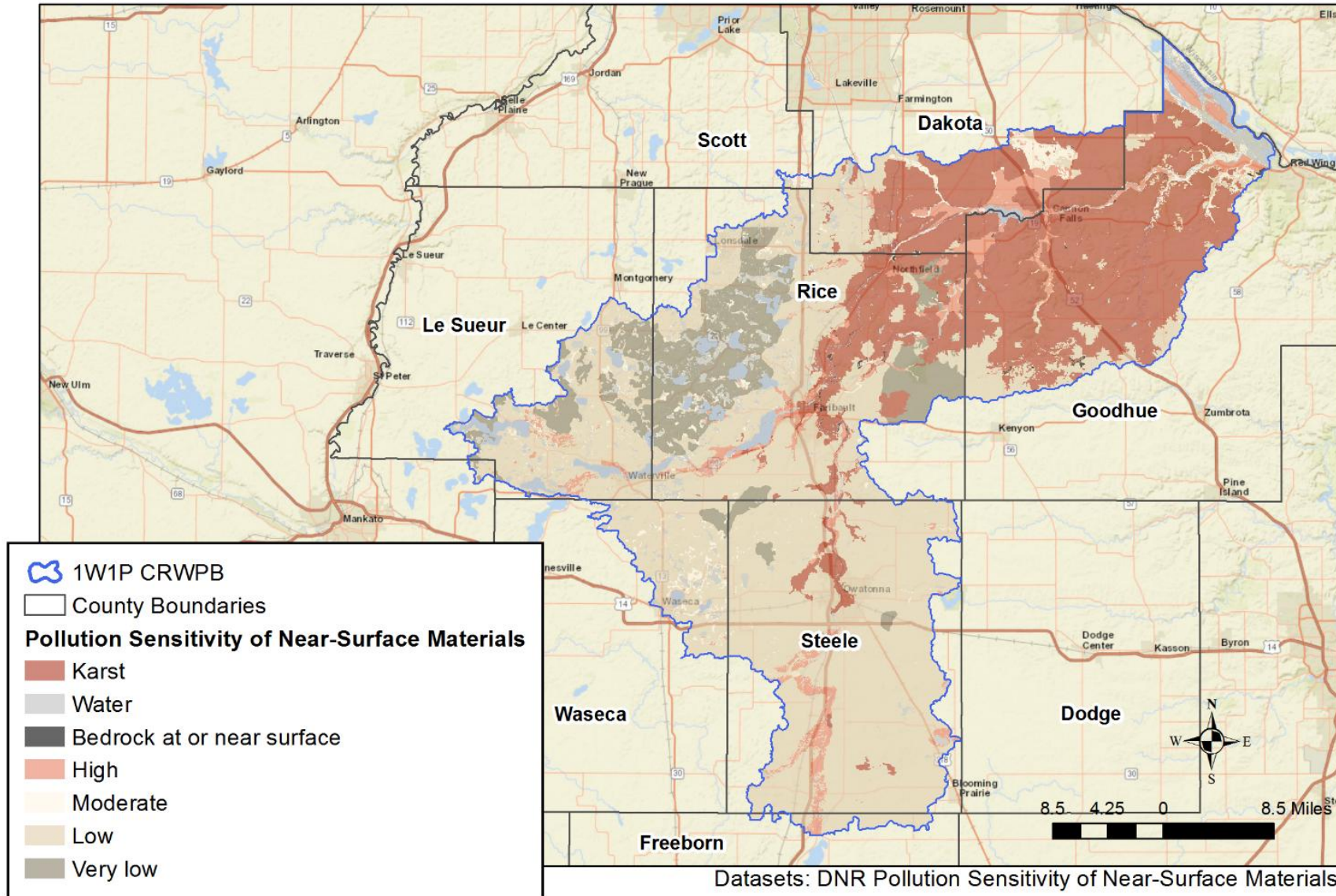
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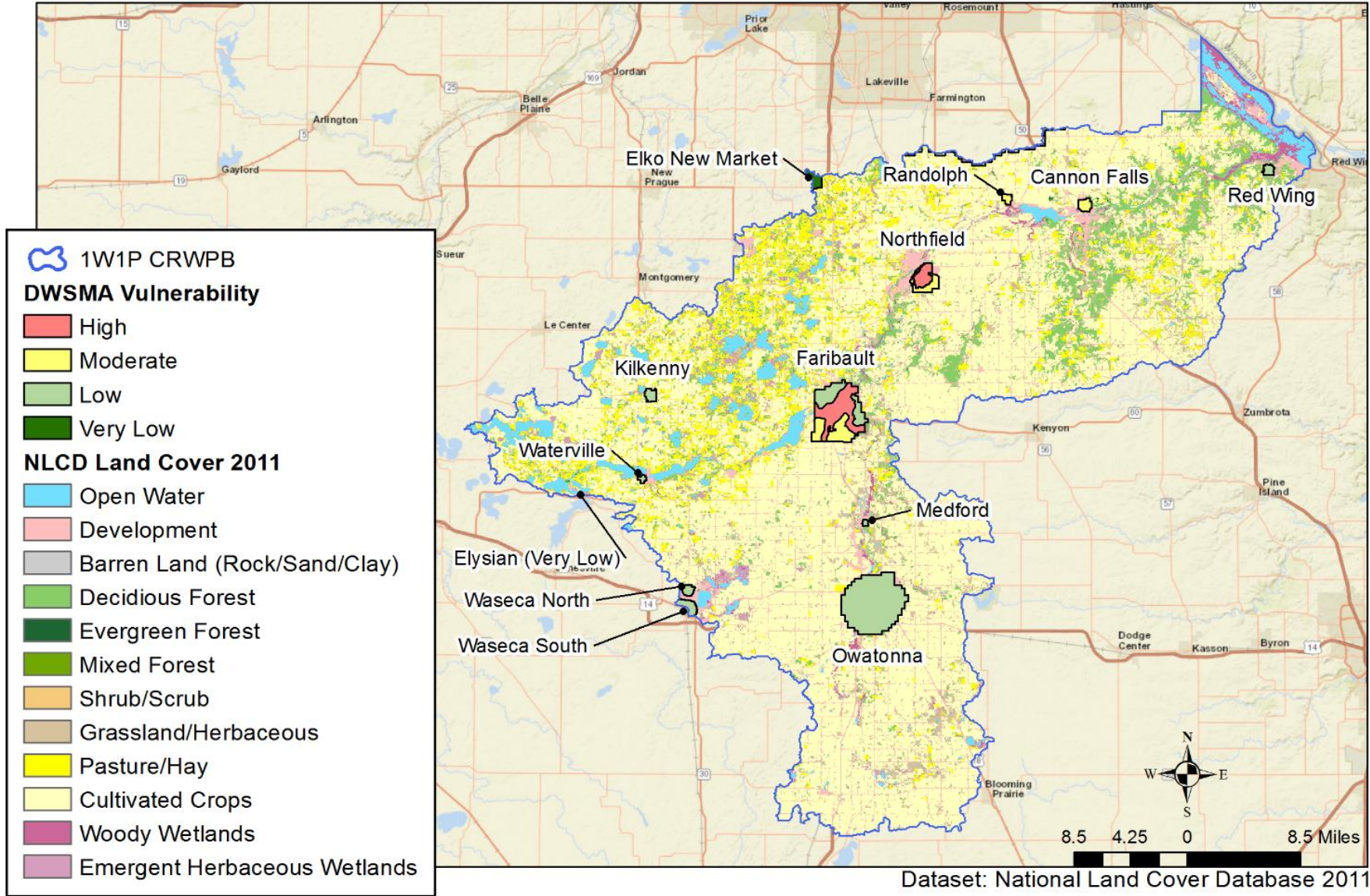
Cannon River - Pollution Sensitivity of Near-Surface Materials

Pollution Sensitivity



Cannon River - DWSMA Vulnerability and Land Cover

DWSMA Vulnerability



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Groundwater Sustainability: Water Conservation	Education and Outreach	Provide education on water conservation practices to adopted in people's homes and businesses. Use the Met Council's Water Conservation Toolbox.	X	X	X	X	X	X	X	X	X	All	DNR Ecological & Water Resources			X					
Groundwater Sustainability: Water Conservation	Land Use Planning and Management	Assist communities serving over 1,000 people with water conservation measures outlined in their DNR municipal water supply plans.	X	X	X	X	X	X	X	X	X	All	DNR Ecological & Water Resources			X					
Groundwater Sustainability: Water Conservation	Land Use Planning and Management Education and Outreach	Assist farmers applying for a water appropriate permit by developing a water resource plan that identifies water conservation measures that improve water use efficiencies and reduce water demand.	X	X		X				X		Lower Cannon Chub Middle Cannon	DNR Ecological & Water Resources	Prioritize areas of high water use intensity by agricultural irrigators. <i>Water Use Map (Figure 16)</i>		X					X

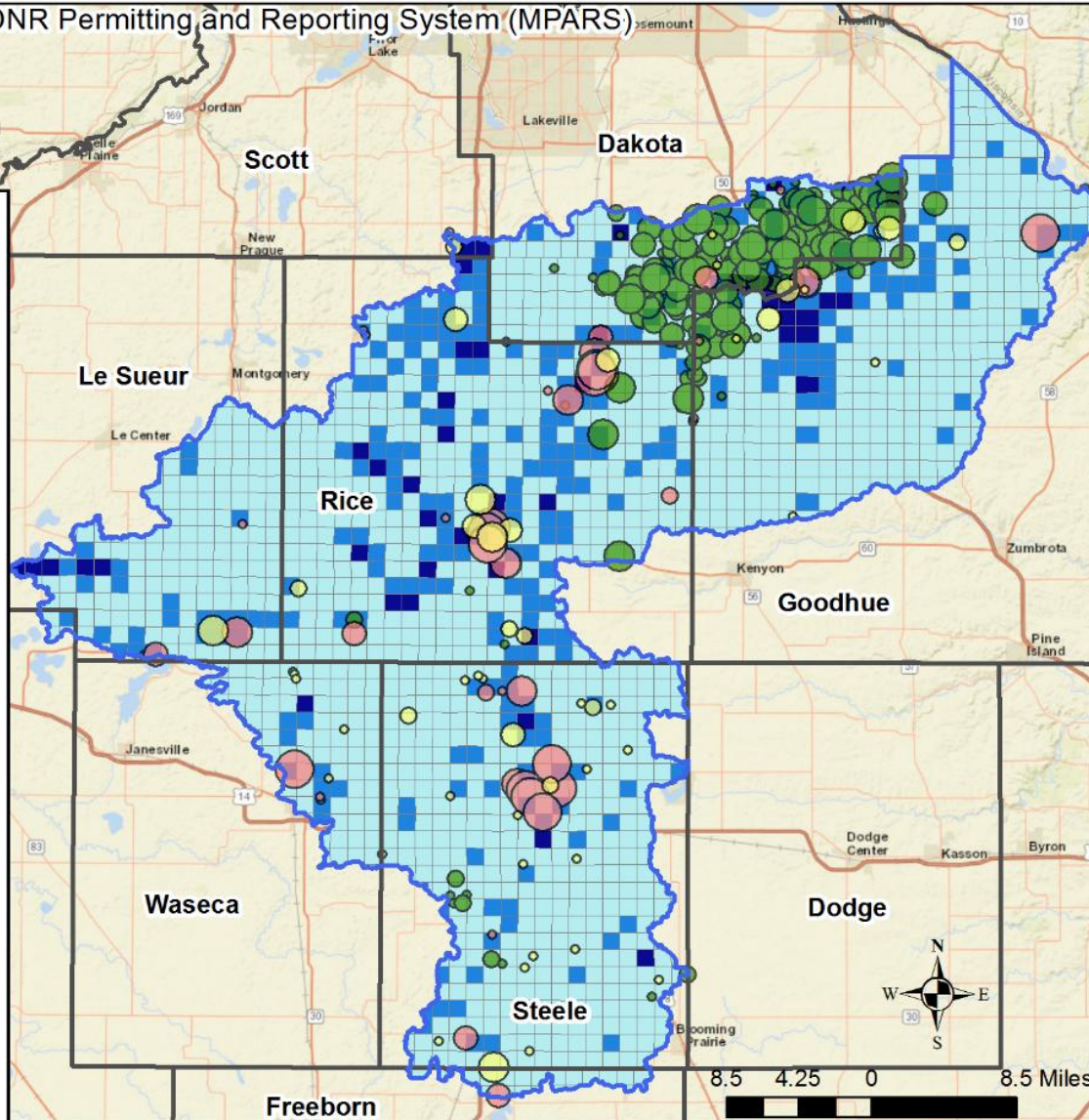
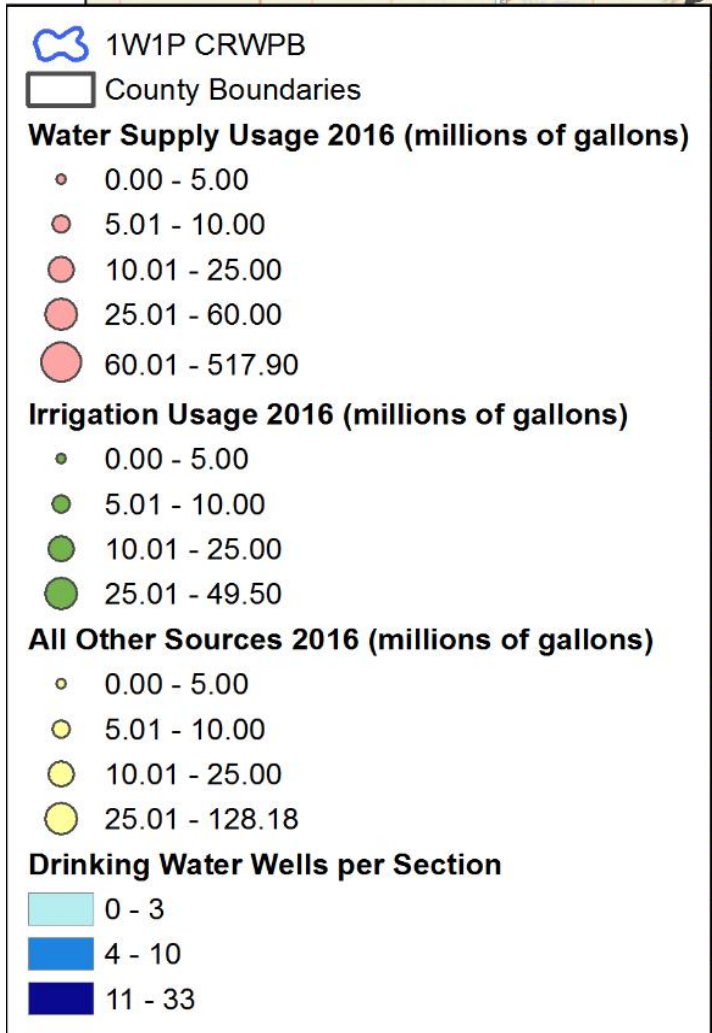
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	& Water Resources	
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Cannon River - Density of Drinking Water Wells and 2016 Pumping Data

Datasets: County Well-Index (CWI) and MN DNR Permitting and Reporting System (MPARS)



Water Appropriations

What does the Future Look Like?

No more reports! - Tools

- Watershed Health Assessment Framework DNR (online maps)
- Strategies Table
- Some clever way to connect them



Thank you!

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