Water Supply Statewide Drought Management Plan

Greg Spoden, State Climatologist
Princesa VanBuren Hansen, Water Use Specialist
Interagency Pollution Prevention Advisory Team
May 24, 2012

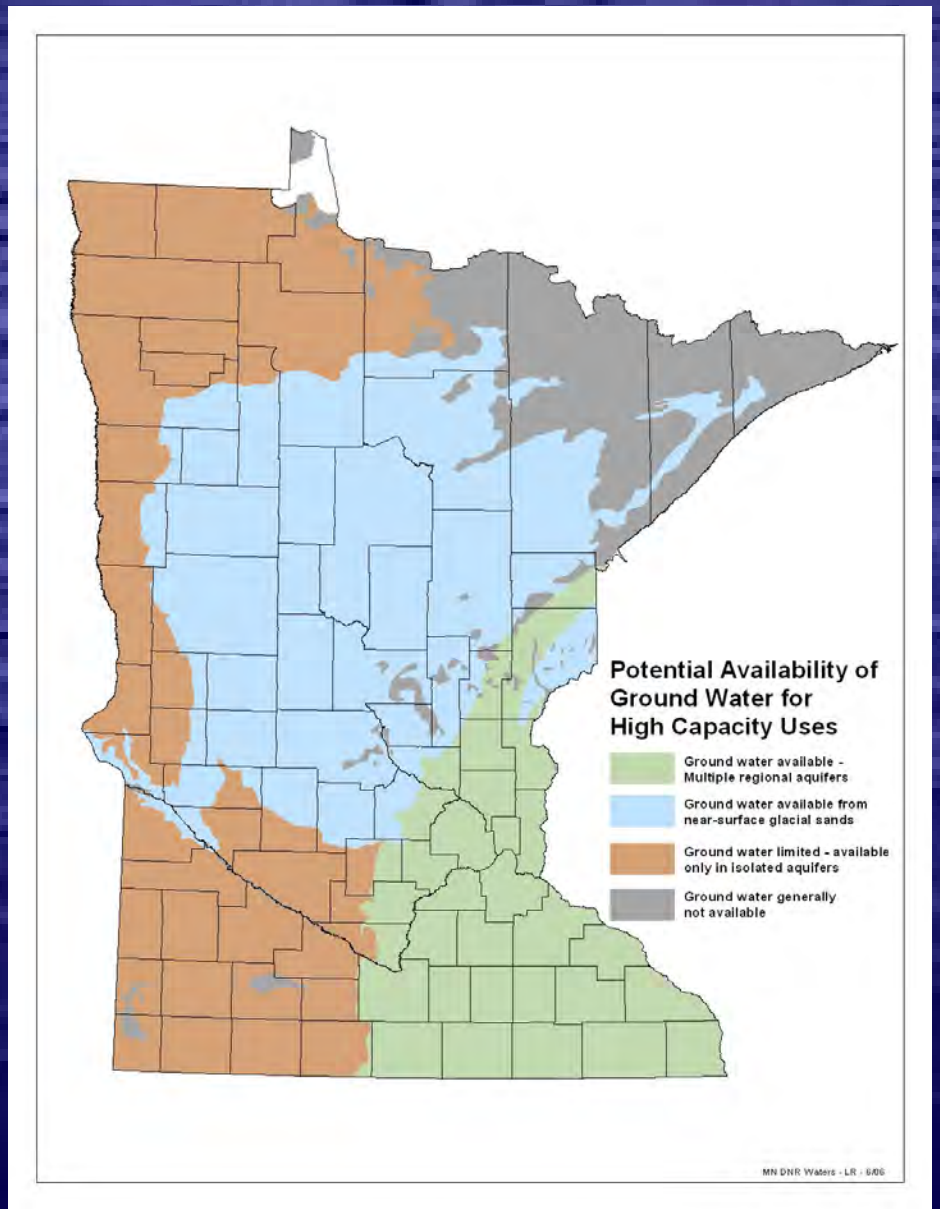
Greg

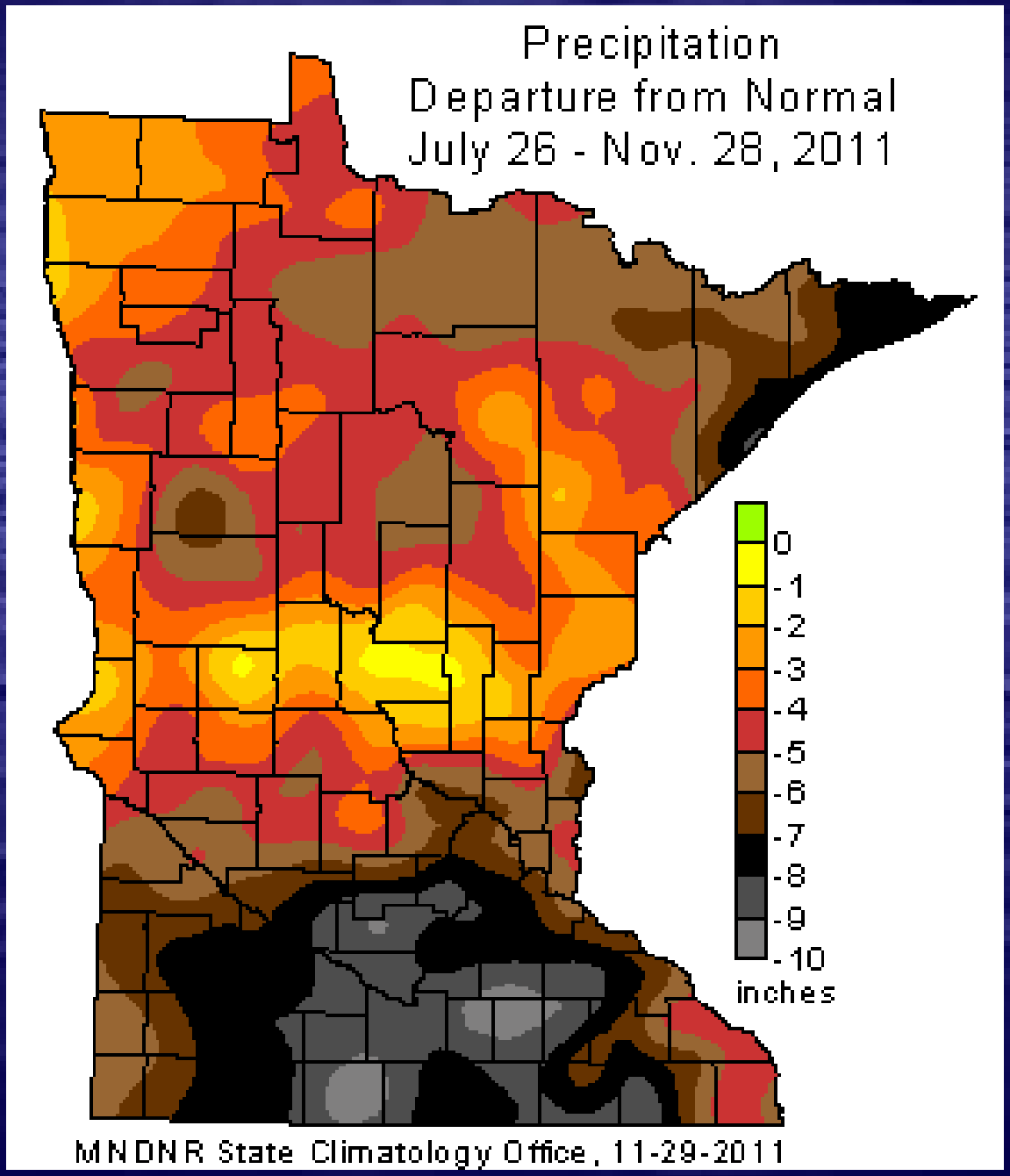
- State Climatologist
- 25 years
- Experienced, knowledgeable, highly regarded

Princesa

- Water Use Specialist
- 2 months, 3 weeks
- ?????

Talking Water in the Land of 10,000 Lakes




Precipitation
Departure from Normal
July 26 - Nov. 28, 2011
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
inches
MNDNR State Climatology Office, 11-29-2011


Possible record rainfall in May?

Presentation Overview

- Water permit program basics
- Climatology office & drought
- Drought planning & challenges
- Thinking about our future
- Action steps
- Take-away resources

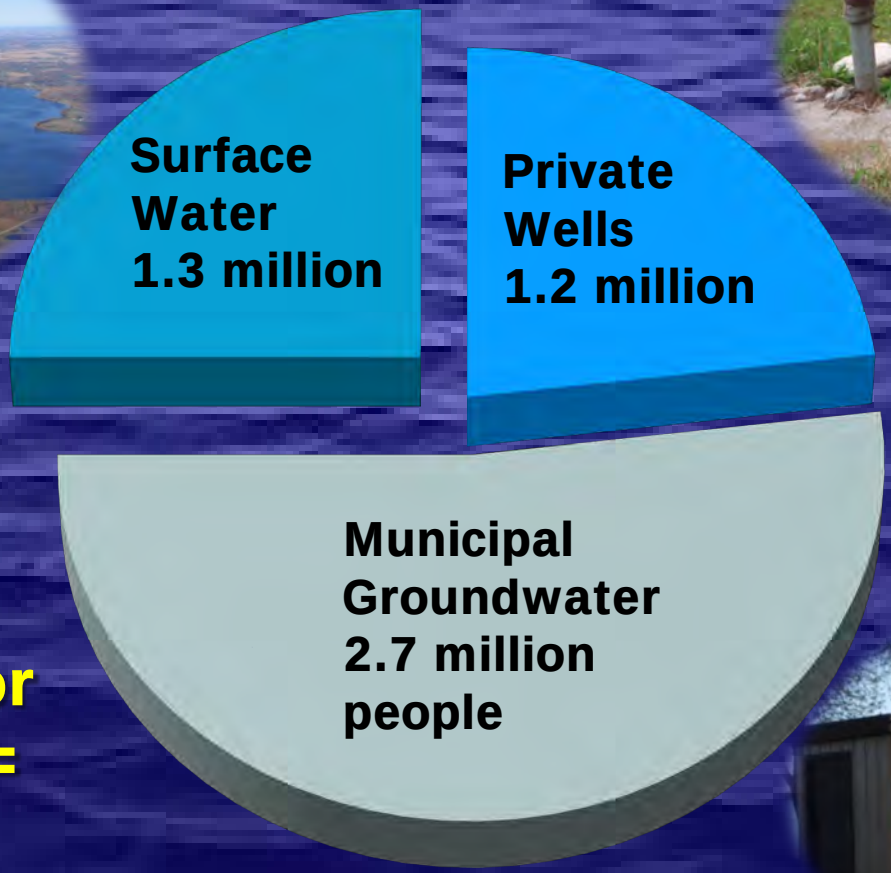
DNR's Water Appropriation Program

- Permit >10,000 gpd or 1,000,000 gpy
- Both surface water & groundwater
- Sustainable water resource management balances competing objectives
  - economic development
  - recreational use
  - natural resource protections

Regulations & Permits

- Permits must be consistent with state & local plans
- Must have riparian rights (i.e. everyone has the right to use water)

Where do we get our water?

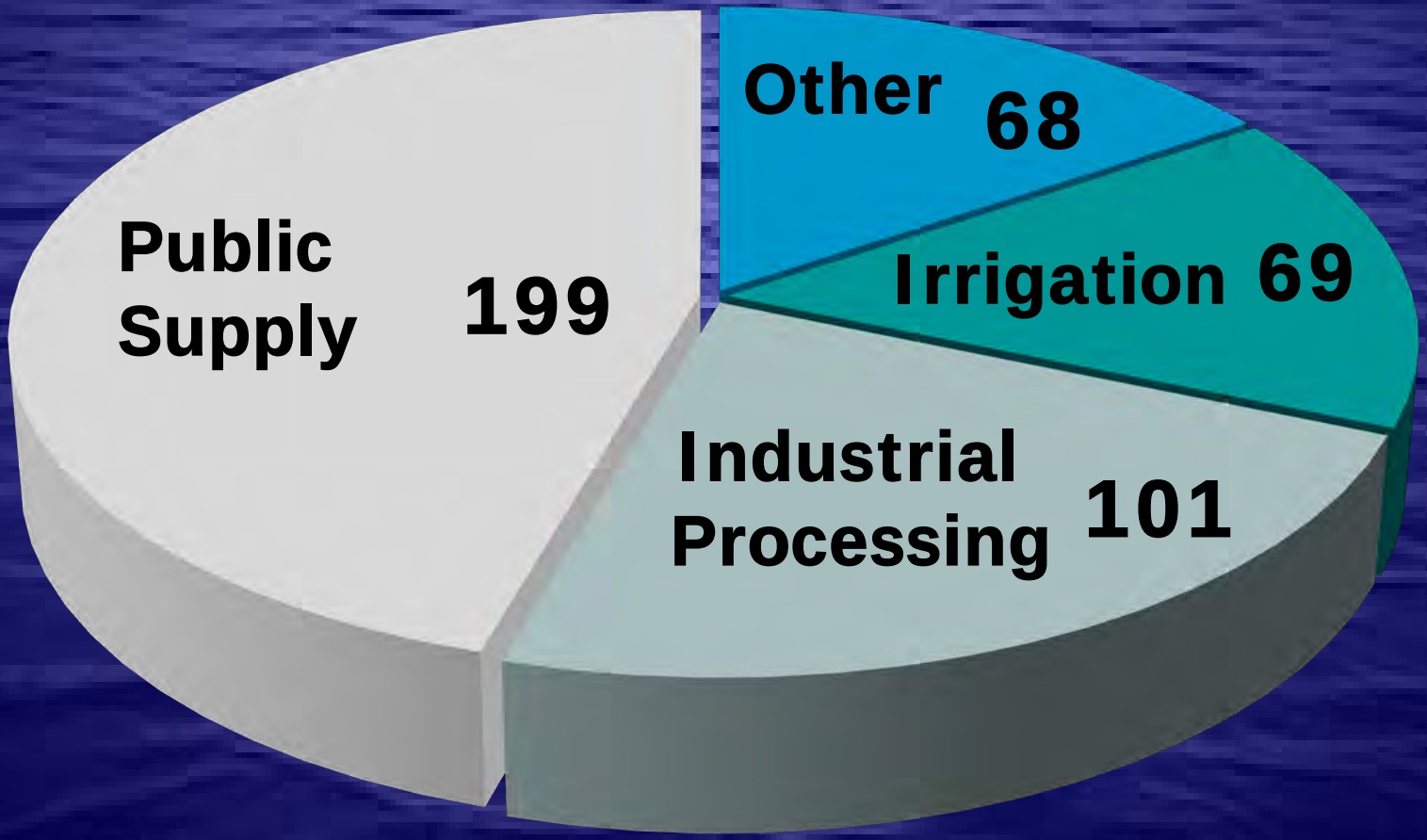


75% from groundwater

drought plan for surface water = groundwater

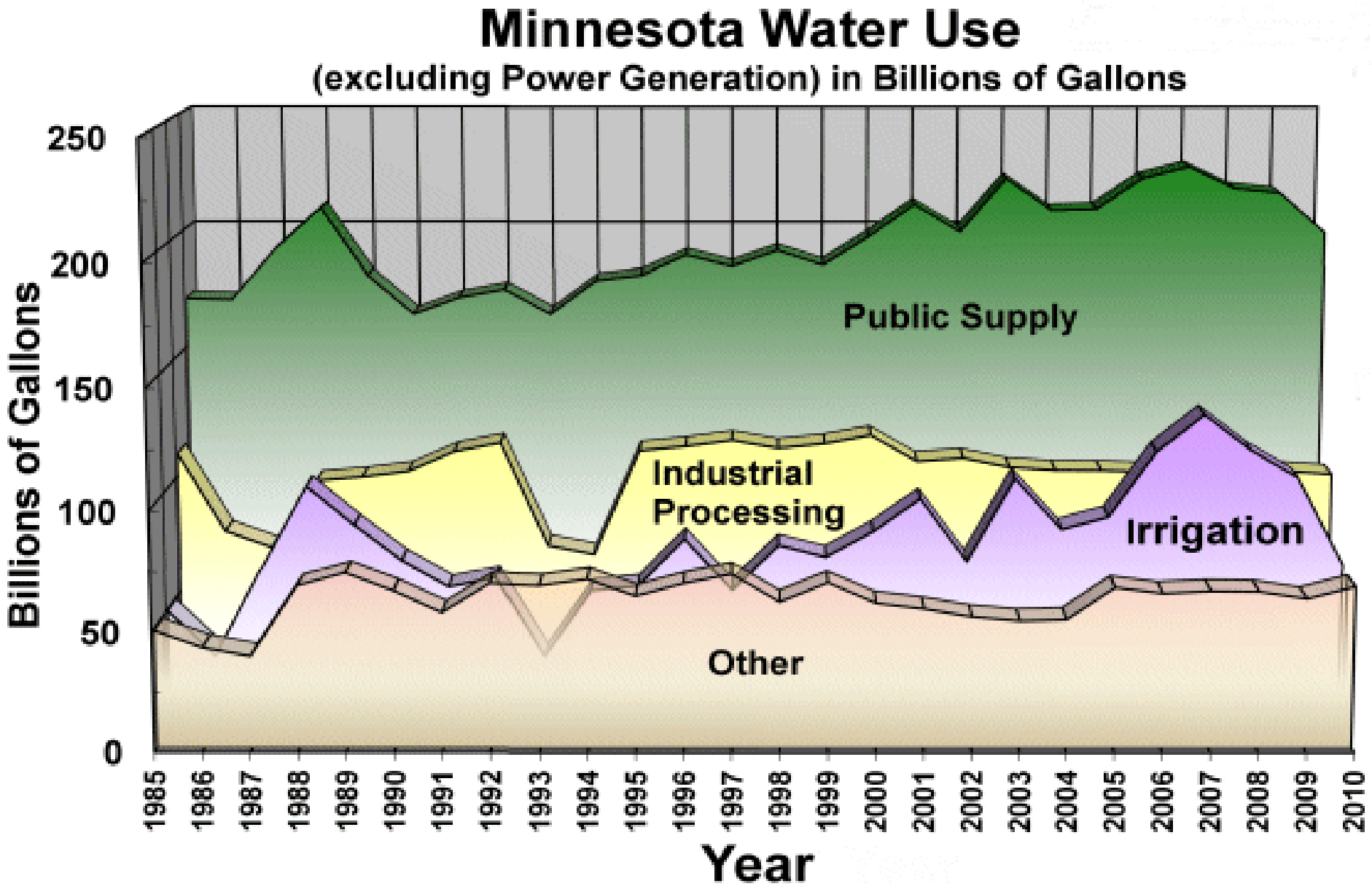
How do we use our water?

Consumptive: 437 Billion Gallons Reported in 2010

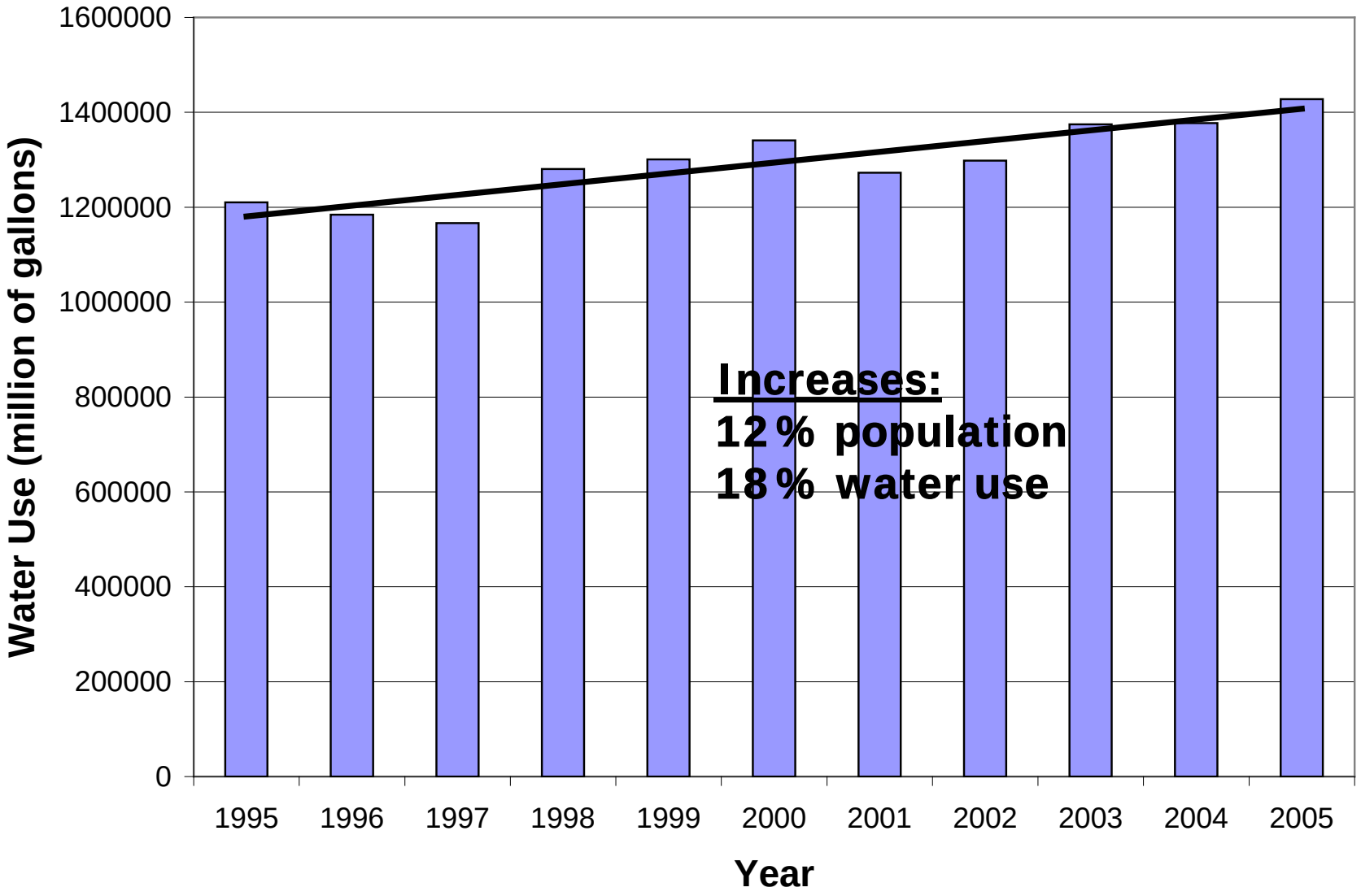


Non-Consumptive: Power Generation used 916 BG

Water Use in Minnesota



Annual Water Use Trends



Drought in Minnesota

Greg Spoden
State Climatology Office
Minnesota DNR
Division of Ecological and Water Resources

Drought Defined

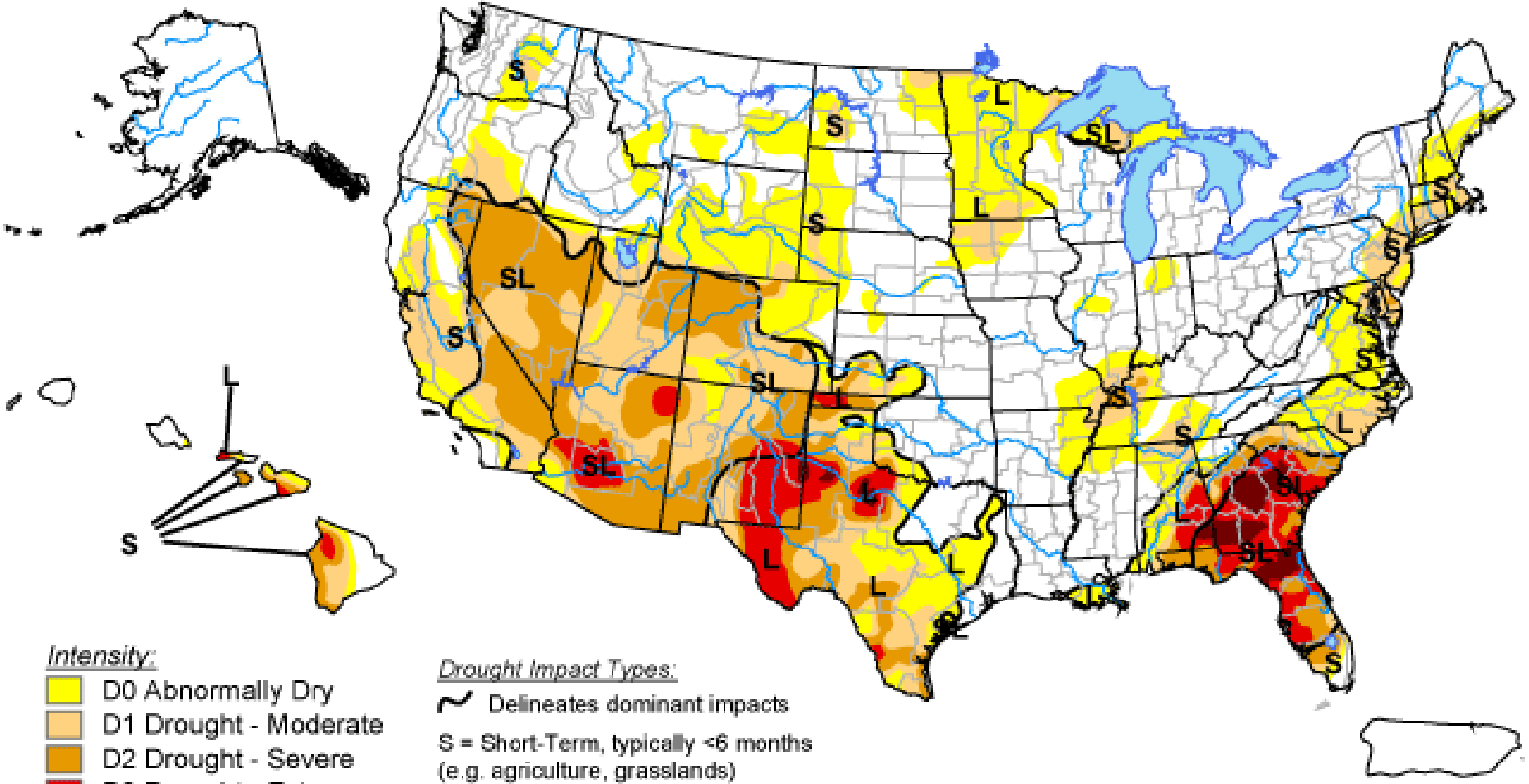
...abnormally dry and/or unusually warm weather sufficiently prolonged for the corresponding deficiency of water to cause a "serious hydrologic imbalance"

Highly subjective definition:

- **time scales – weeks to months to years**
- **sector impacted**

U.S. Drought Monitor

May 15, 2012
Valid 7 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically <6 months (e.g. agriculture, grasslands)

L = Long-Term, typically >6 months (e.g. hydrology, ecology)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu/

Released Thursday, May 17, 2012

Author: Brad Rippey, U.S.Department of Agriculture

Drought Severity Classification

key indicators from the hydrologic cycle

- precipitation*
- temperature (proxy for evapotranspiration)*
- stream discharge*
- lake levels*
- ground water levels*
- soil moisture

*monitored by the DNR

Minnesota
DEPARTMENT OF
NATURAL RESOURCES

U.S. Drought Monitor Categories

Drought is not an aberration. Categories based on relative rarity.

D0 – Abnormally Dry (one in two year occurrence)
Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or

D1 – Moderate Drought (one in five year occurrence)
Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested

D2 – Severe Drought (one in ten year occurrence)
Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested

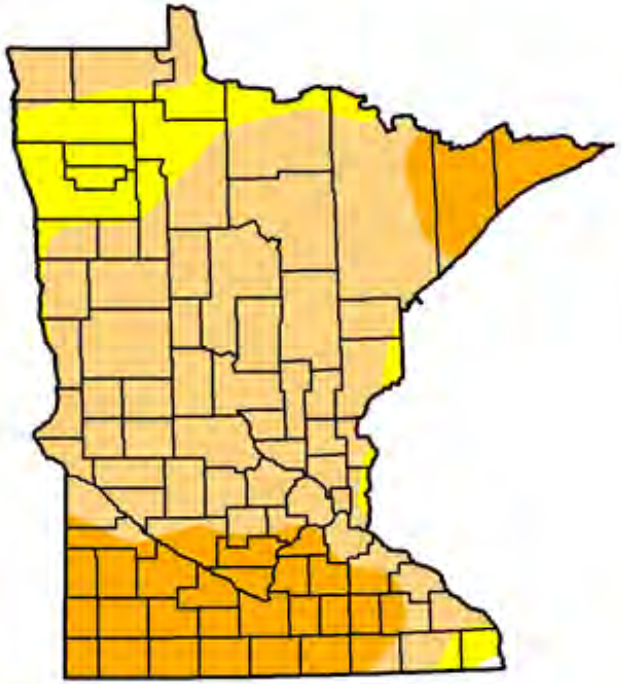
D3 – Extreme Drought (one in twenty year occurrence)
Major crop/pasture losses; widespread water shortages or restrictions

D4 – Exceptional Drought (one in fifty year occurrence)
Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

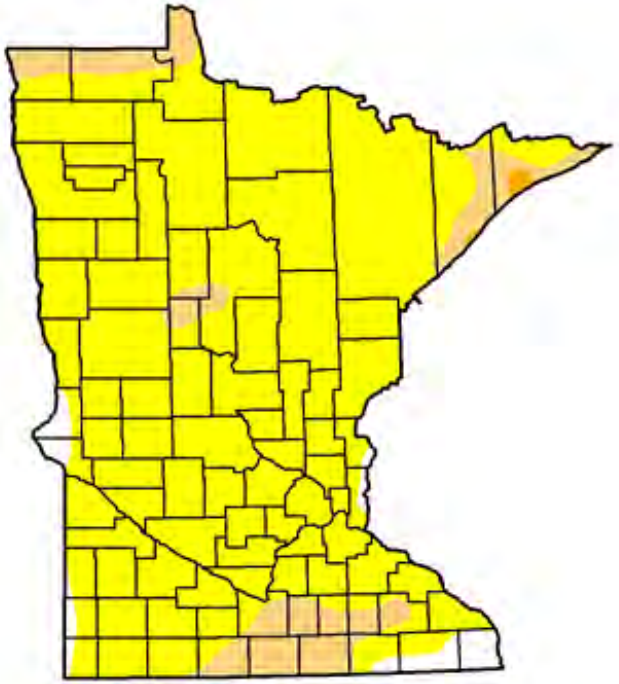
Minnesota

Drought Severity

- D0 - Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

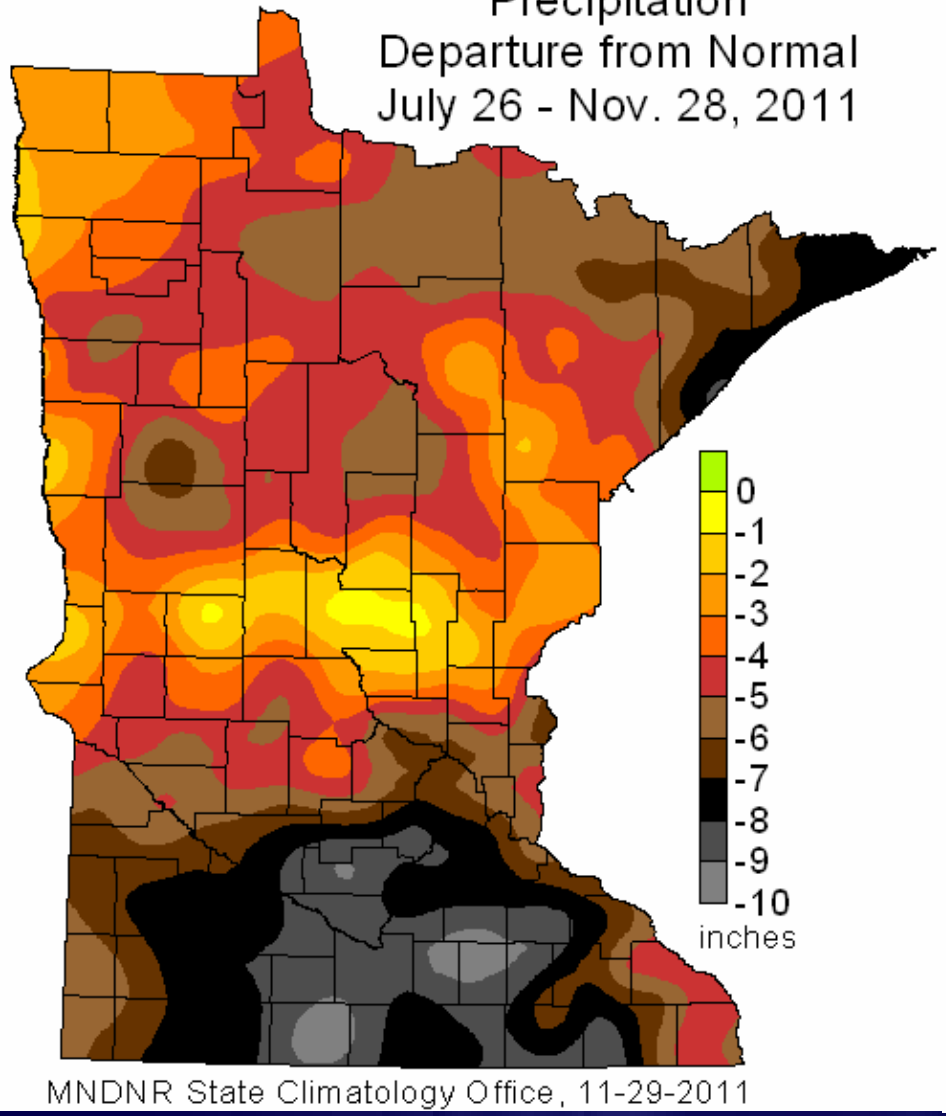


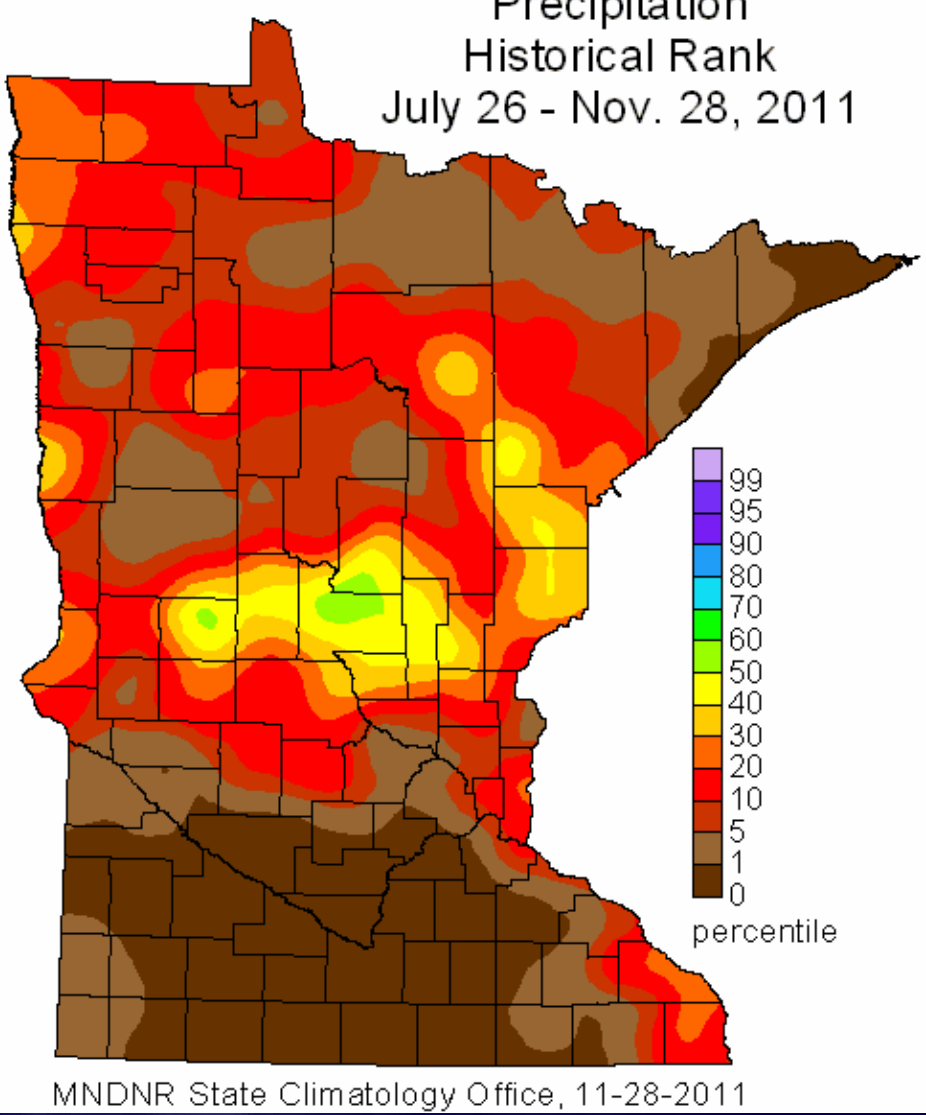
April 10, 2012

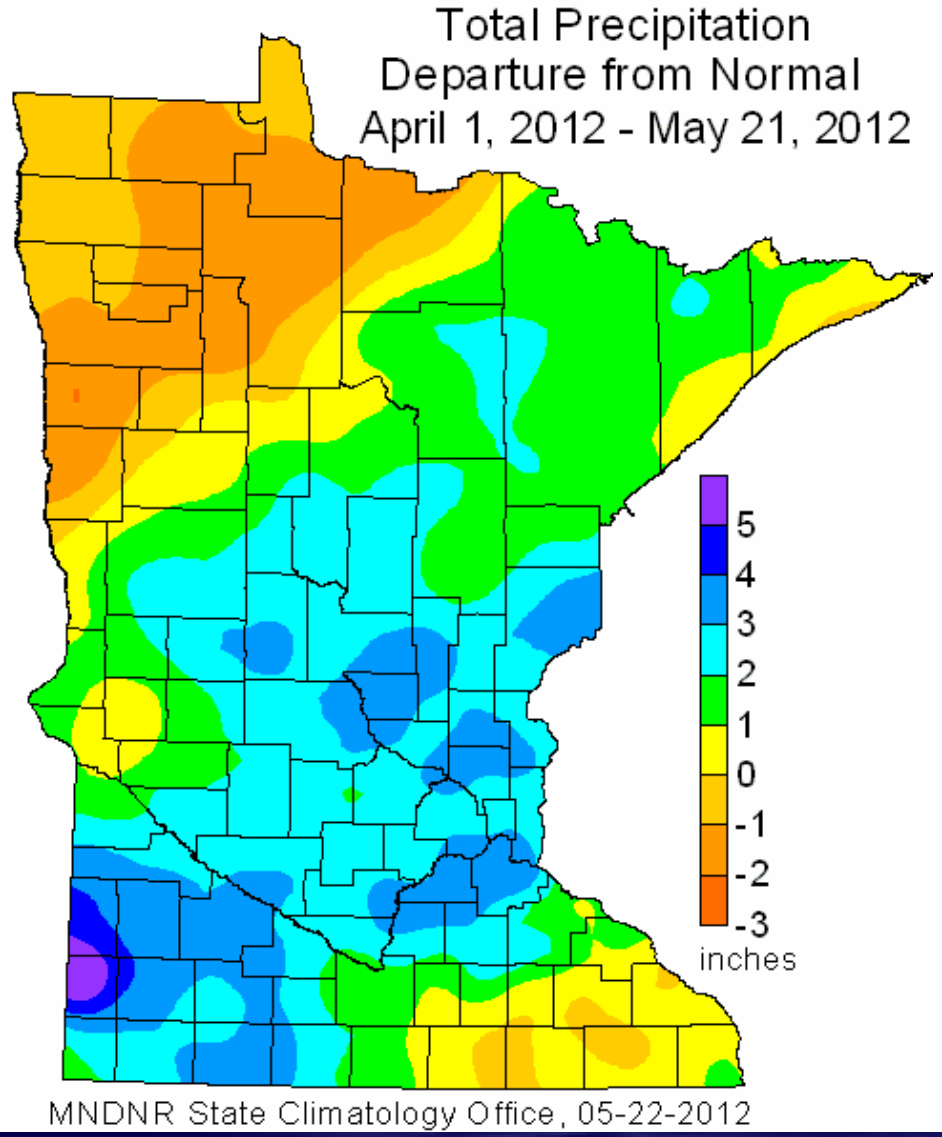


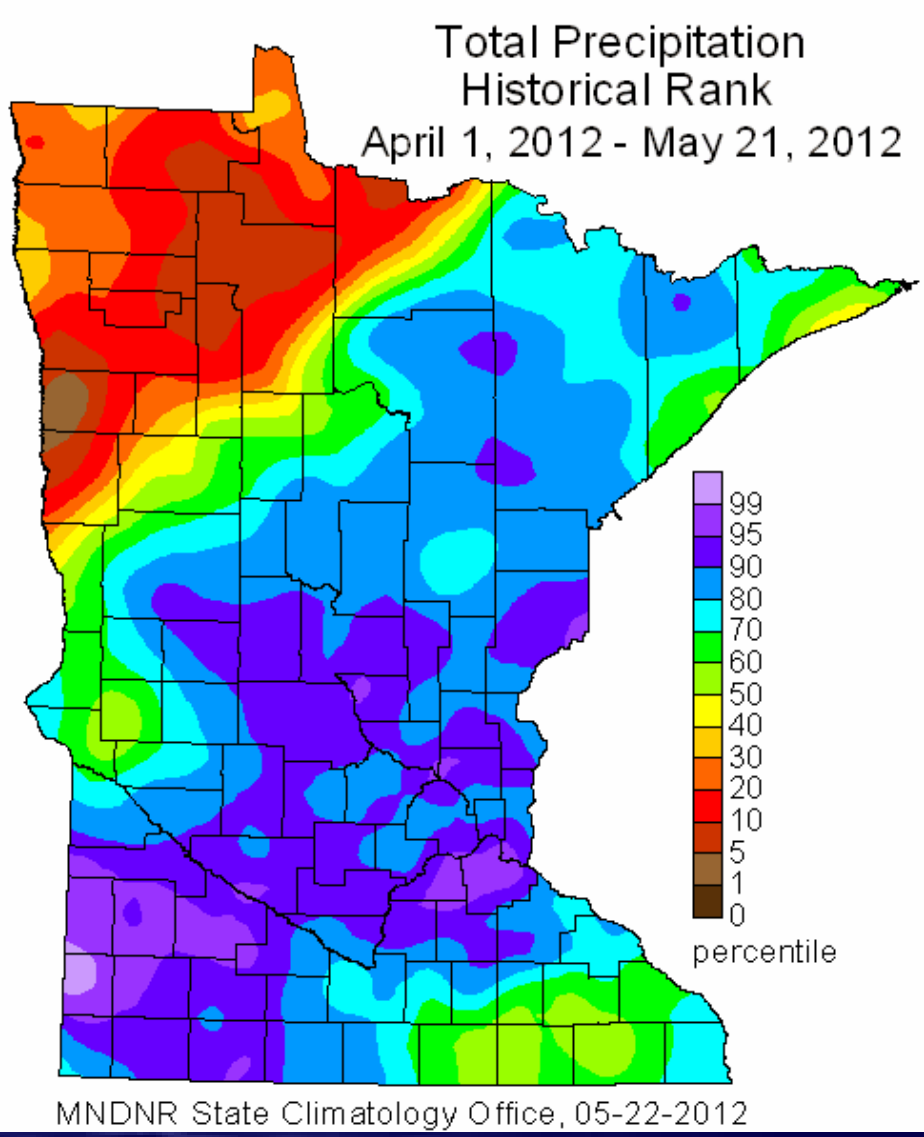
May 15, 2012

Week	Nothing	D0-D4	D1-D4	D2-D4	D3-D4	D4
April 10, 2012	0.12	99.88	86.75	24.95	0.00	0.00
May 15, 2012	2.74	97.26	10.05	0.29	0.00	0.00


Precipitation
Departure from Normal
July 26 - Nov. 28, 2011
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
inches
MNDNR State Climatology Office, 11-29-2011


Precipitation
Historical Rank
July 26 - Nov. 28, 2011
99
95
90
80
70
60
50
40
30
20
10
5
1
0
percentile
MNDNR State Climatology Office, 11-28-2011


Total Precipitation
Departure from Normal
April 1, 2012 - May 21, 2012
5
4
3
2
1
0
-1
-2
-3
inches
MNDNR State Climatology Office, 05-22-2012


Total Precipitation
Historical Rank
April 1, 2012 - May 21, 2012
99
95
90
80
70
60
50
40
30
20
10
5
1
0
percentile
MNDNR State Climatology Office, 05-22-2012

rainfall last 24 hours

Drought Challenges

- Emergency fire protection
- Natural resource protection
- Infrastructure requirements
- Inability to pump
- Water quality concerns
- Adverse impacts to the aquifer
- Well interferences
- Water use conflict

Water Use in Minnesota

- Annual reporting of monthly water use & metering to 10% accuracy
- Public water suppliers serve >1,000
- Required to have water supply plans (WSPs)
- WSPs need to address drought contingency planning
- DNR staff also work with small community suppliers

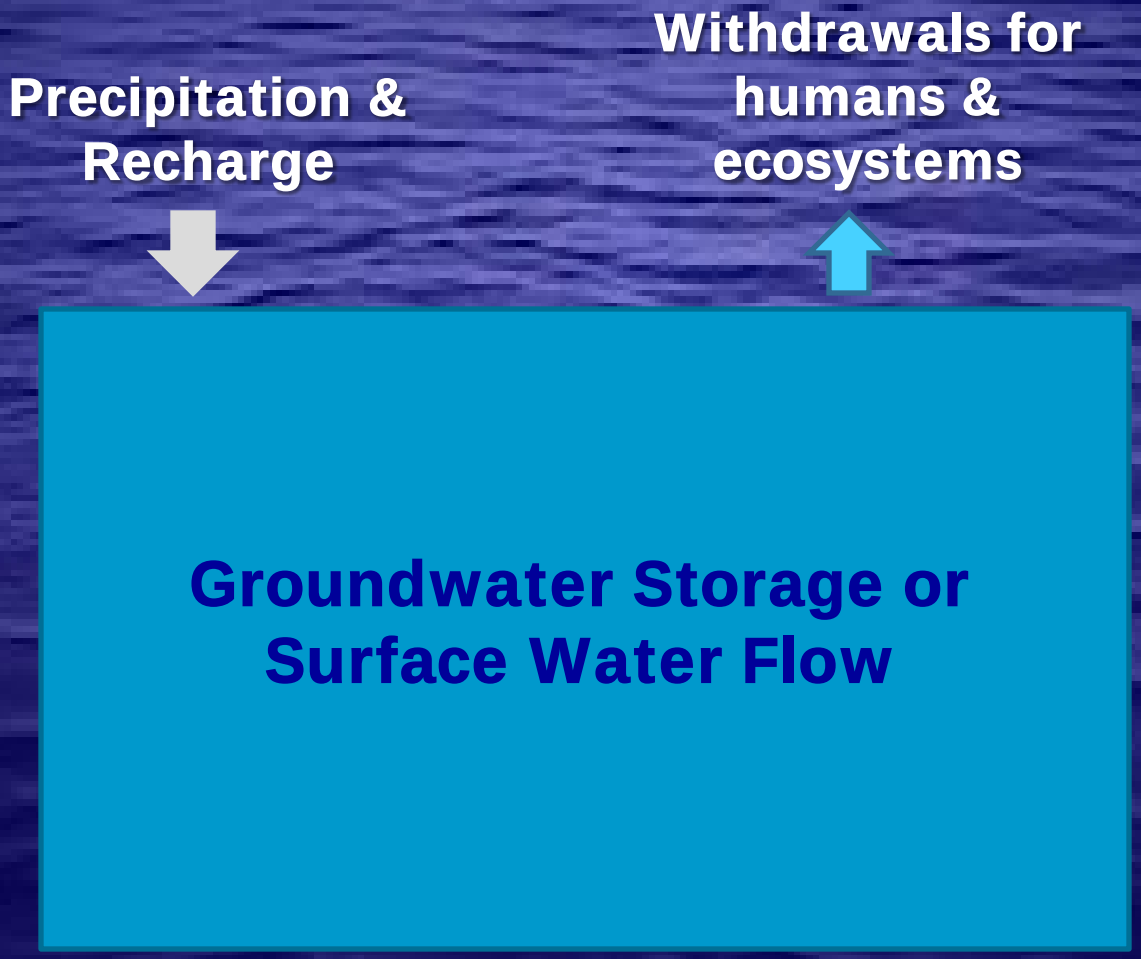
Drought Plan Matrix - Handout

Drought Phases	State & Federal Actions	Water User & Supplier Actions
Non-drought phase	Monitor GW, SW, precip & quality	WSPs, alternate supplies, efficiency
Watch phase	Inform Drought Task Force (DTF), public awareness, monitoring	Monitor potential conflicts, share conservation info & request voluntary action
Warning phase	Convene DTF, notify water suppliers, increase public awareness, MI R. low flow	Implement water use restrictions, conserve, 50% above Jan., MI R. plan
Restrictive phase	Notify water suppliers, focus on river flows, cont. drought awareness	Allocation restrictions, 25% above Jan., conserve, minimize non-essential use
Emergency phase	Advise Governor, implement Emergency Plan, engage USACE	Mandatory water use restrictions, Jan. levels, follow M.S. priorities, alternate water sources

Drought Task Force

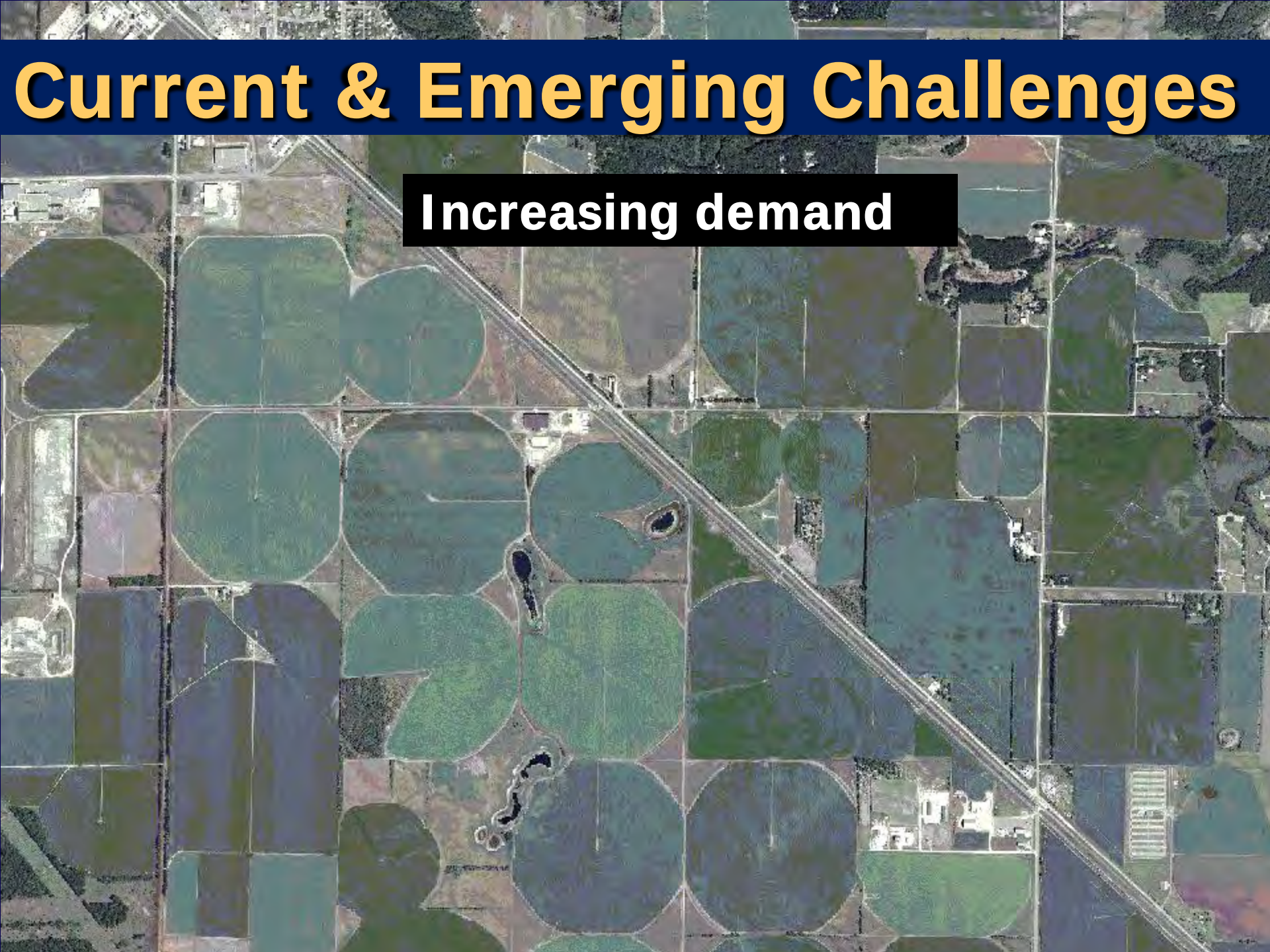
- Includes members from
  - State agencies
  - University
  - Federal partners
  - Local government
  - Business sector
- Convened April 2012
- Previously convened in 2006 & 2007

Drought as a Surrogate for Future Growth



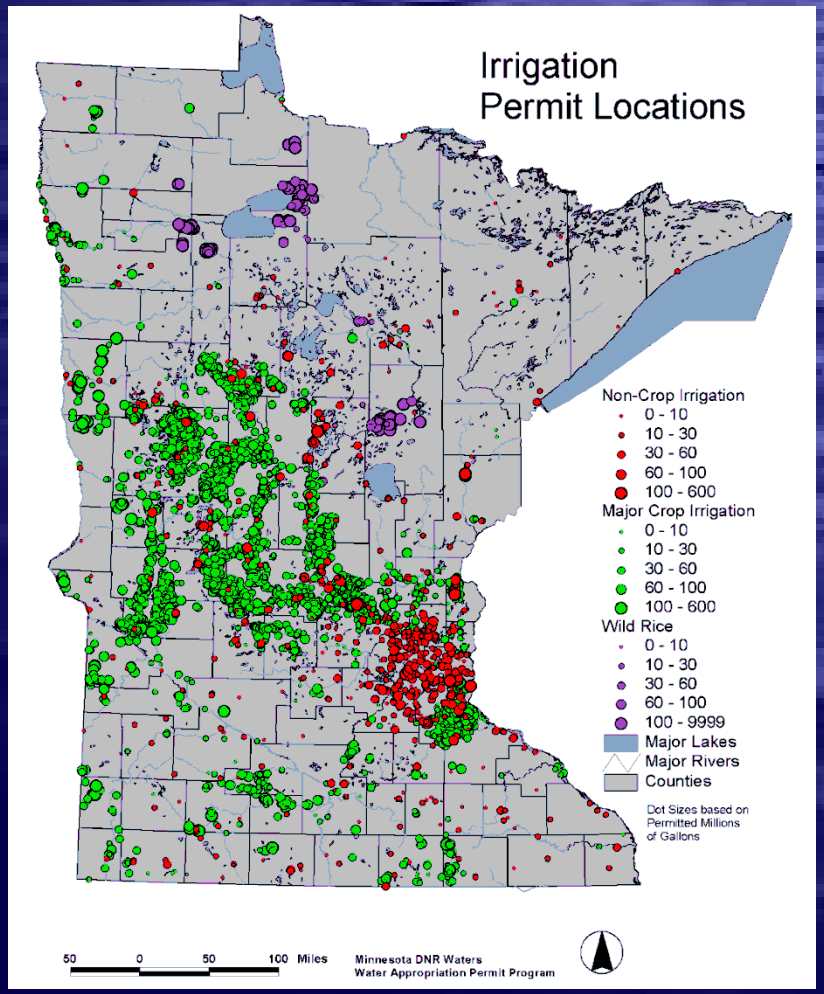
Sustainable when equal

Current & Emerging Challenges

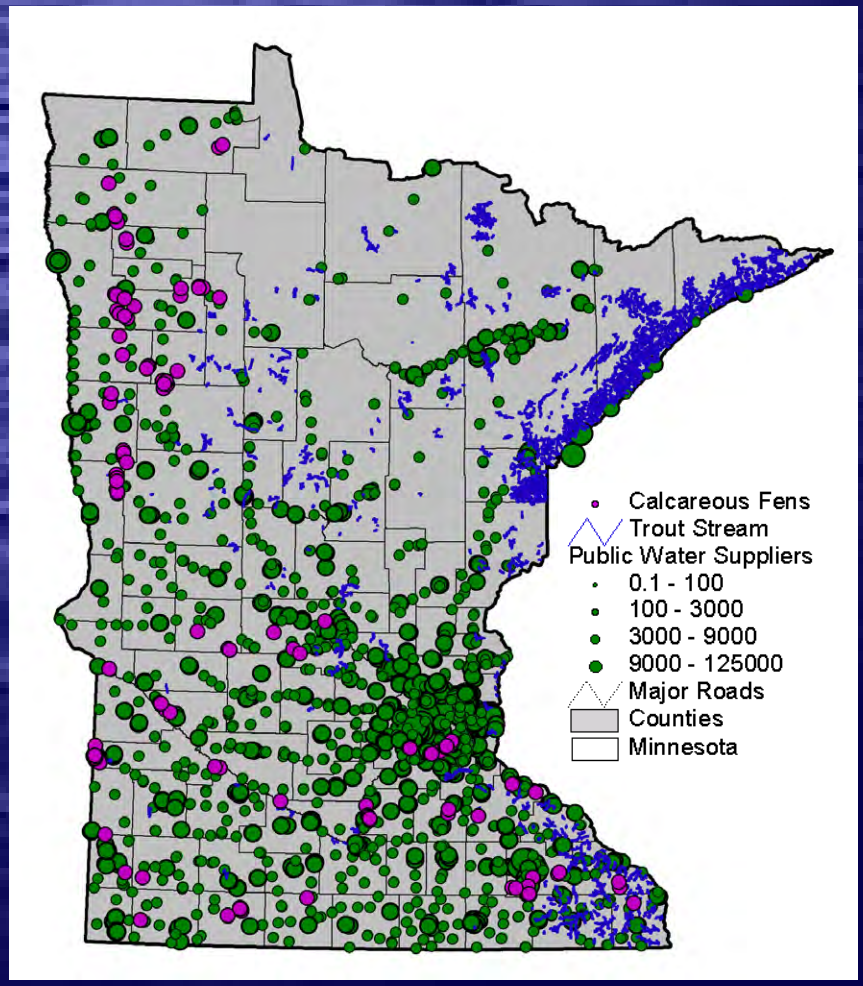


Current & Emerging Challenges

Irrigation Permits
Major Crop- Non-Crop - Wild Rice

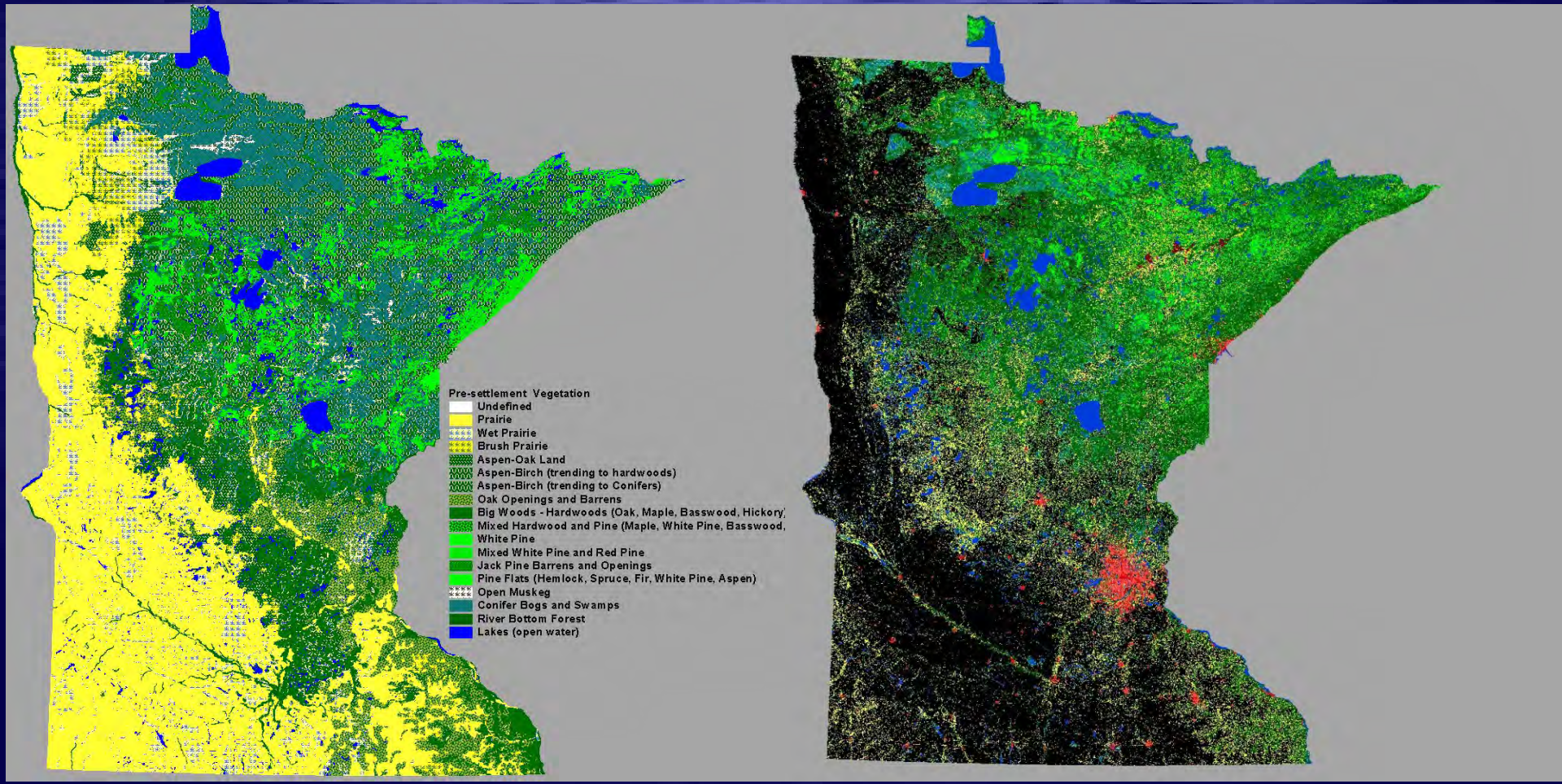


Public Water Supply Permits
Proximity to Trout Streams & Calcareous Fens



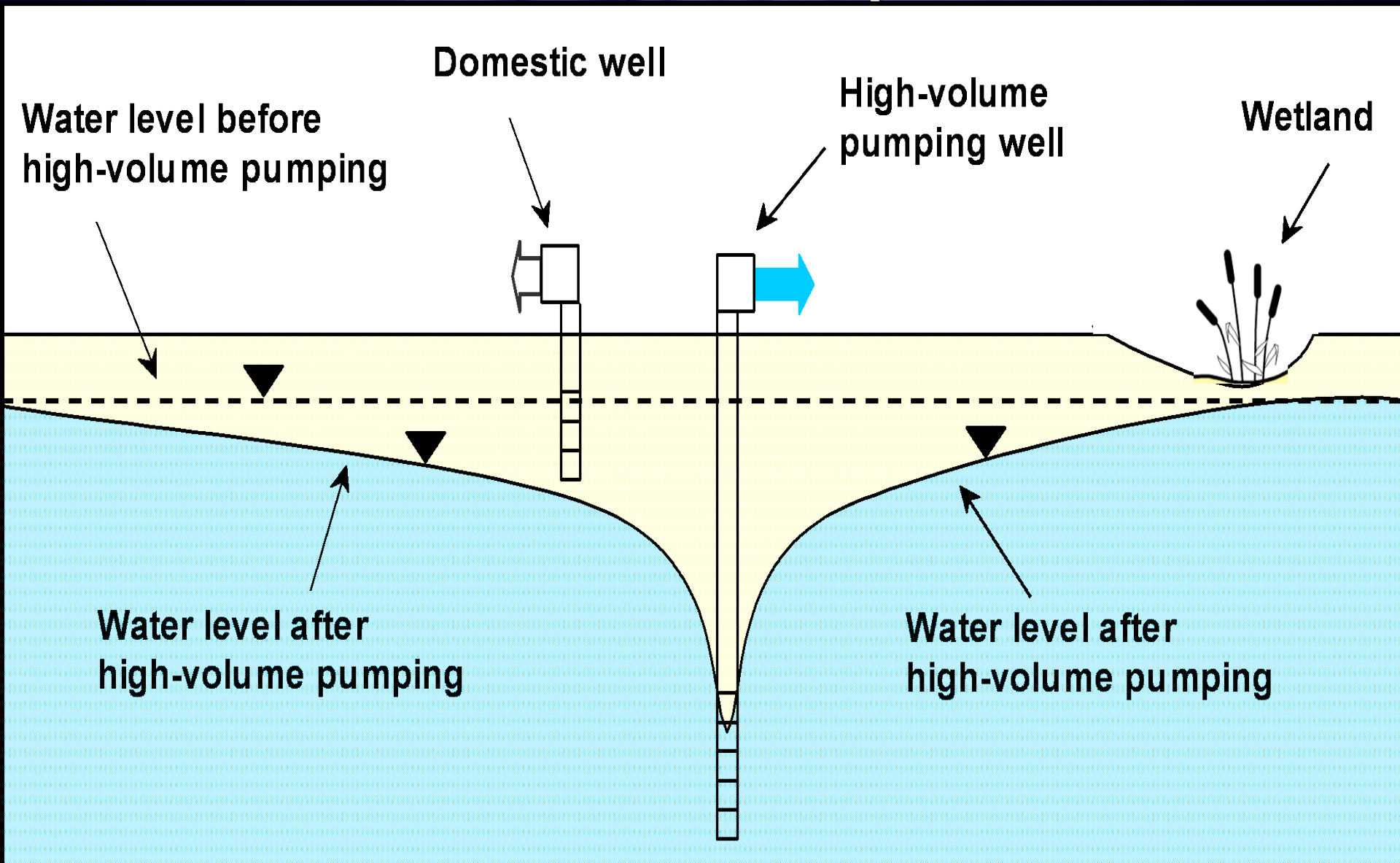
Current & Emerging Challenges

Land use changes



Current & Emerging Challenges

Surface water impacts



Current & Emerging Challenges

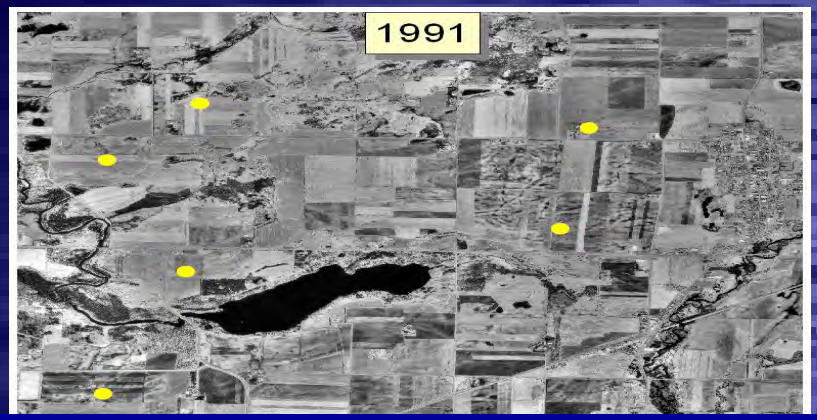
Surface water impacts

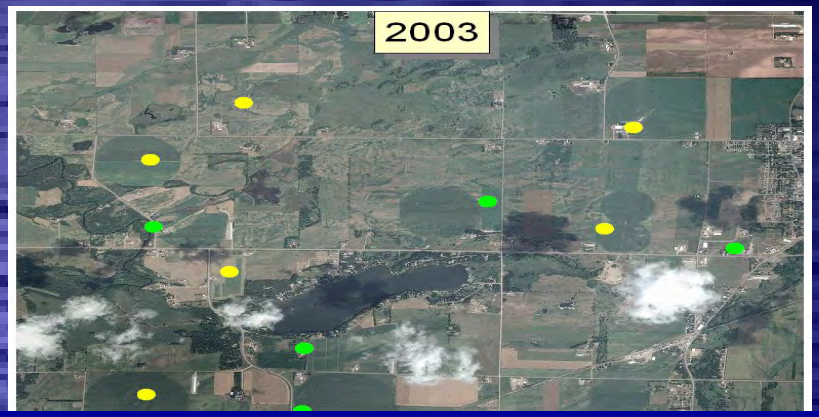
1976

2000

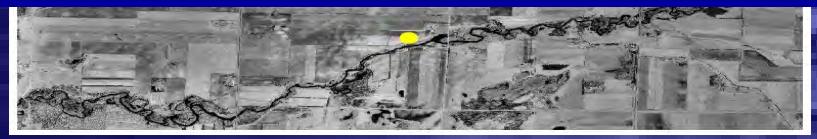
Current & Emerging Challenges

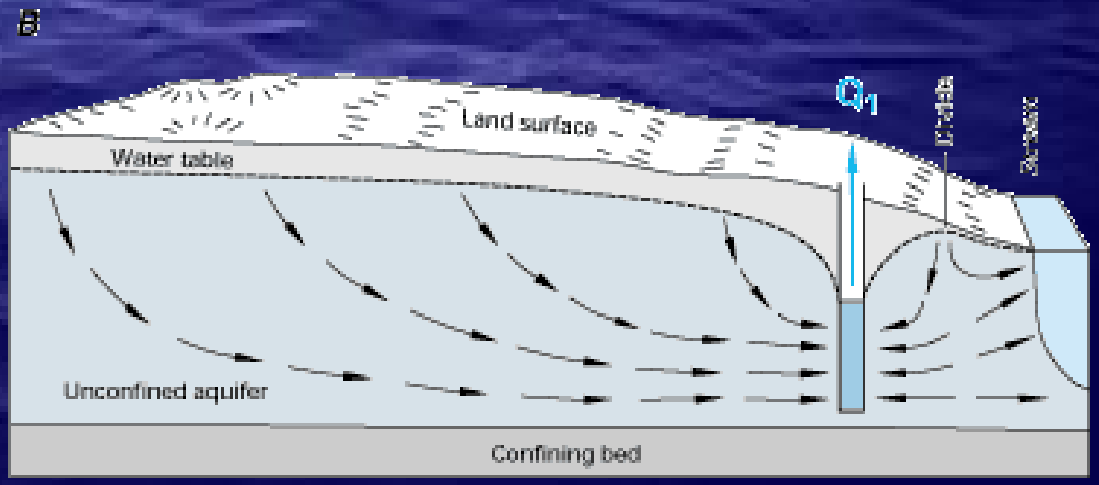
Water quality impacts





Remember – Contaminants of Emerging Concern





Current & Emerging Challenges

From a sustainability perspective, the key point is that pumping decisions today will affect surface water and groundwater availability; however, these effects may not be fully realized for many years

Current & Emerging Challenges

Demand for improved permitting efficiencies

- January 2011: Governor's Executive Order 11-04
  - Issue permits more efficiently
- March 2011: MN Session Law Chapter 4
  - Make permitting application process more efficient
- April 2011: DNR's Permits Transformation Task Force
  - Identified options to improve natural resource outcomes associated with permitting programs

Thinking About the Future…

Resources challenges exist today
2020?
2030?
2050?

Climate change
Water quality challenges

Action Steps – Indoor Use

- Check for and repair leaks
- Install water efficient fixtures & appliances
- Food service practices; fleet service practices; other high water using activities
- Educate on personal practices – showers, brushing teeth, washing clothes, washing dishes

Action Steps – Outdoor Use

- Water only in early morning or evening
- Use moisture monitoring equipment
- Avoid watering concrete
- Water less frequently (<1” a week)
- Let your lawn go dormant
- Plant native vegetation (e.g. DNR)
- Don’t clean sidewalks or driveways with water – use a broom!

What does this mean for IPPAT?

- Summarized well in EO 11-13
- "Operation of Minnesota state government impacts pollution, energy and climate issues"
- Inside & outside practices, education for staff

Ideas for IPPAT

- Define water sustainability goals
- Incorporate water efficiency in your sustainability plan
- Track water use trends
- Consider water use policies, future technologies & staff engagement

Water conservation…

- Protects water from depletion
- Prevents degradation

Take-Away Resources - DNR

- Current information on our resources
  http://mndnr.gov/waters
- Drought information website
  http://mndnr.gov/climate/drought
- Water conservation
  http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/conservation.html

Take-Away Resources - Other

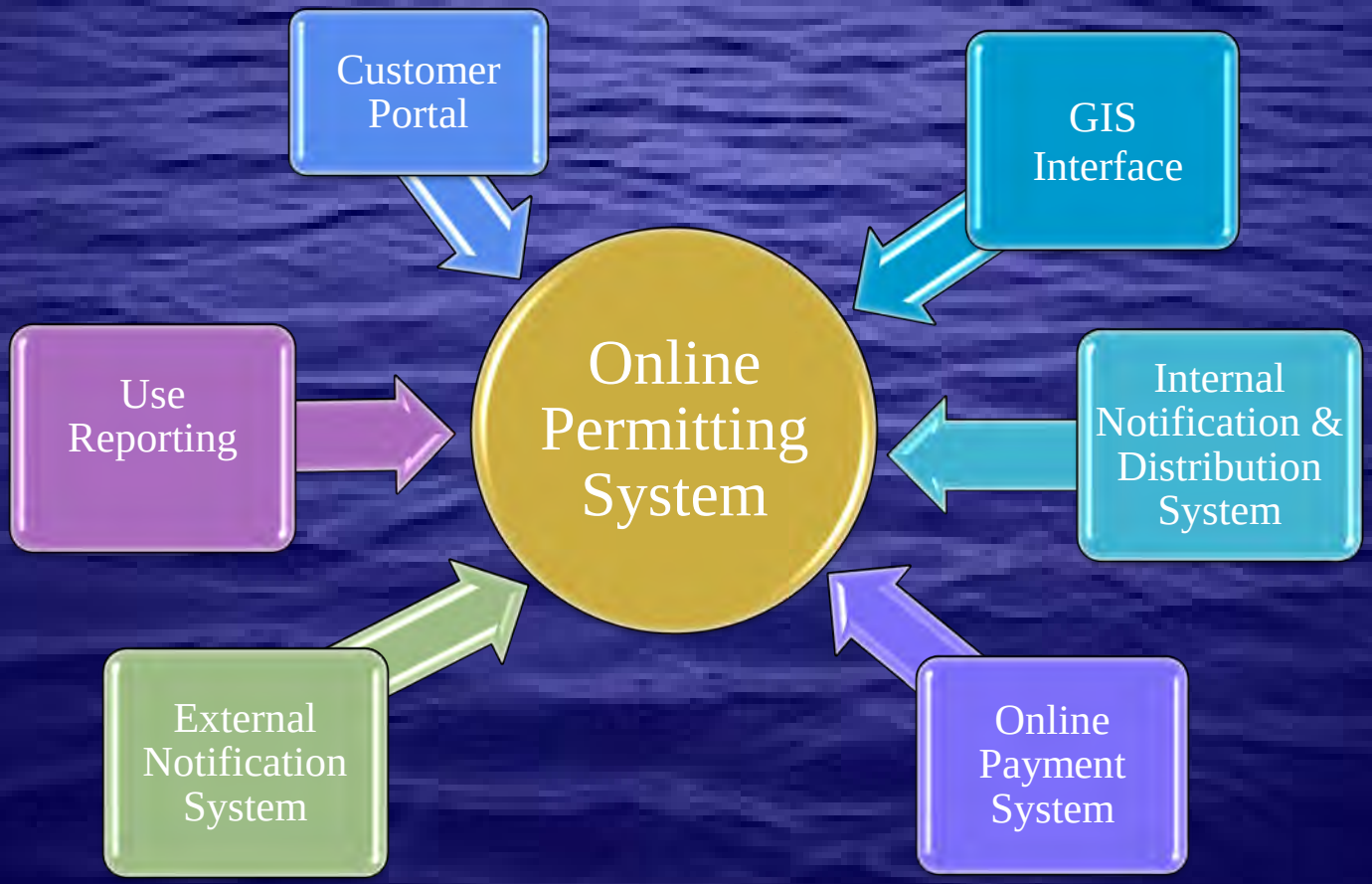
- National Drought Mitigation Center
  drought.unl.edu
- American Water Works Association
  awwa.org
- Met Council Water Conservation Toolbox
- EPA Water Sense


Thank you!

Online Permitting System Project

- Customers apply for permits and track status
- Report water use and other data
- Pay fees
- Request changes to permits

Online Permitting System Project



Water Allocation Priorities

1. 

Domestic water supply

2. 

Consumptive <than 10,000 gallons/day

3. 

Agricultural irrigation & processing

4. 

Power production

5. 

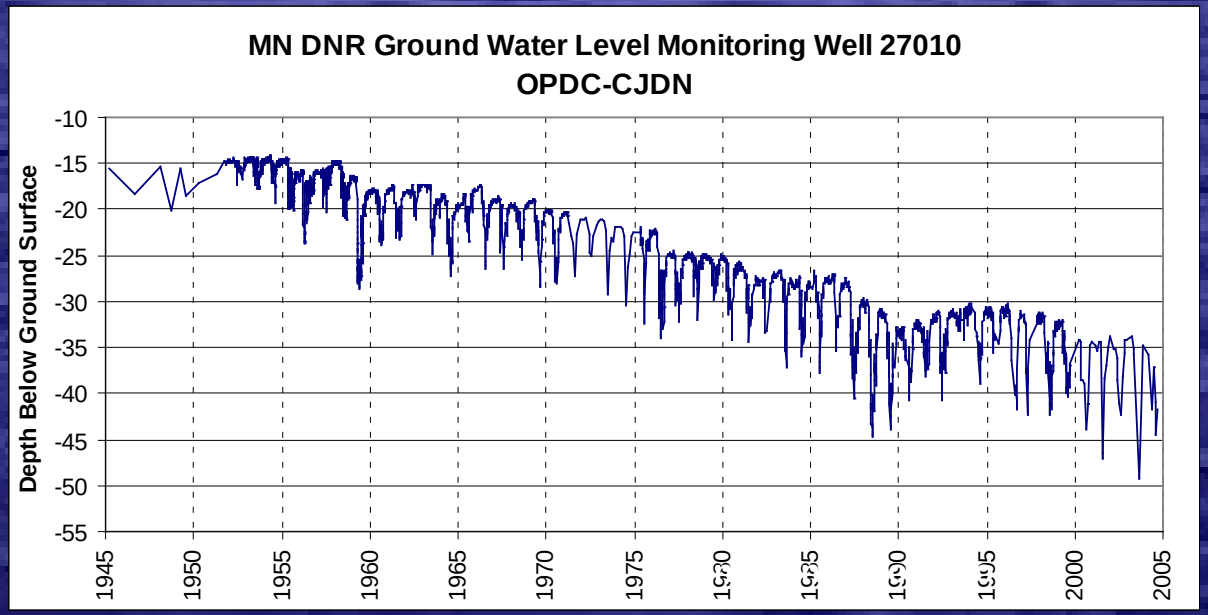
Consumptive uses >10,000 gallons/day

6. 

Non-essential uses

Measuring Water Use

DNR monitors groundwater levels and makes this information available to local governments for wise water use planning



- **Demand for water resources in Minnesota is increasing at a rate greater than population growth**
- **Without water supply planning, shortages may occur during periods of drought or if use continues to increase in rapidly developing areas**