

Water Quantity Monitoring In Minnesota: Present and Future

Minnesota DNR
Division of Ecological and
Water Resources



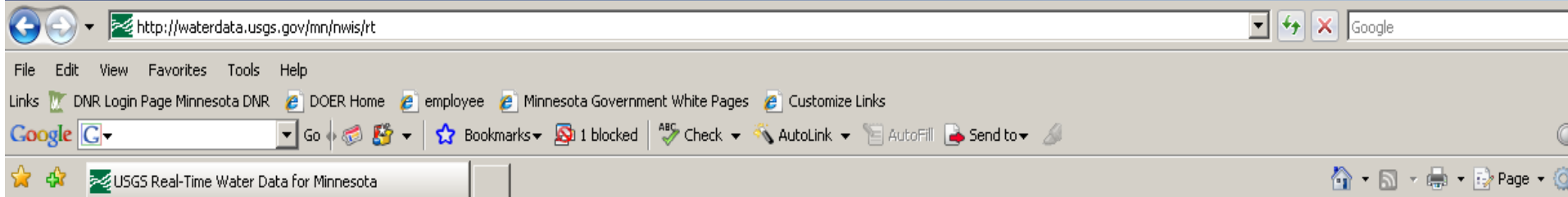
Greg Kruse



Cooperative Agency Water Monitoring Efforts

Federal, State and Local Governments:
NWS, USGS, COE, DNR, PCA, MDA,
Watershed Districts, CWP's, Counties, SWCDs
and Cities





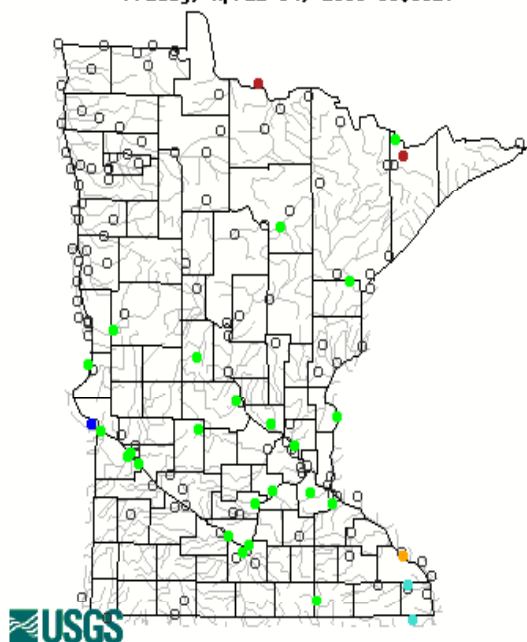
USGS Real-Time Water Data for Minnesota

--- Predefined displays ---	Group table by	Select sites by number or name
Introduction	-- no grouping --	<input type="text"/> go

Daily Streamflow Conditions

Select a site to retrieve data and station information.

Friday, April 04, 2008 06:30ET



The colored dots on this map depict streamflow conditions as a

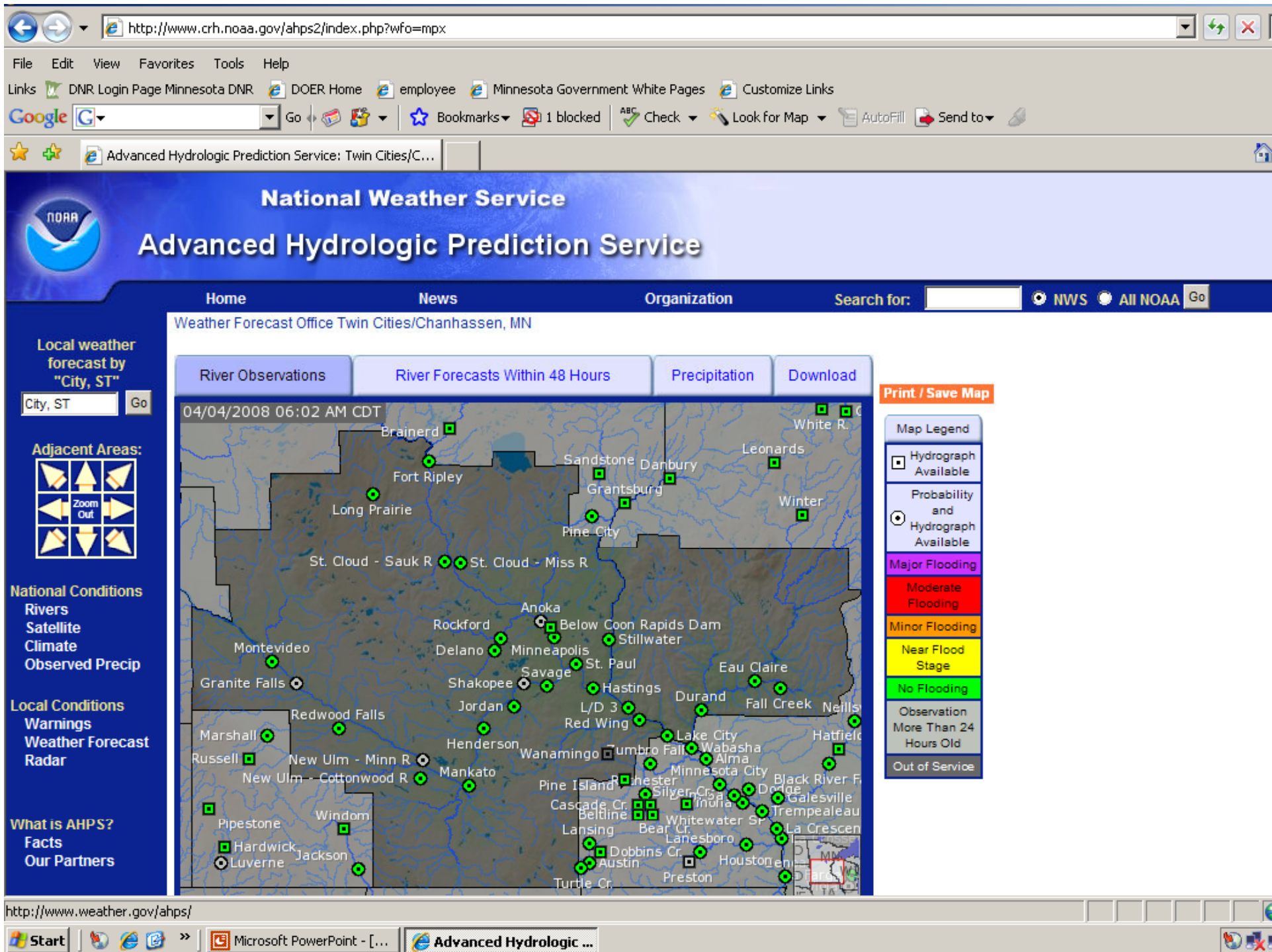
[Statewide Streamflow Table](#)

[Statewide Precipitation Table](#)

[Statewide Ground-Water Table](#)

Real-time data typically are recorded at 15-60 minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours, depending on the data relay technique used. Recording and transmission times may be more frequent during critical events. Data from real-time sites are relayed to USGS offices via satellite, telephone, and/or radio and are available for viewing within minutes of arrival. All real-time data are **provisional and subject to revision**.

Build Table	Build a custom summary table for one or more stations.
Build Sequence	Build a custom sequence of graphical or tabular data for one or more stations.



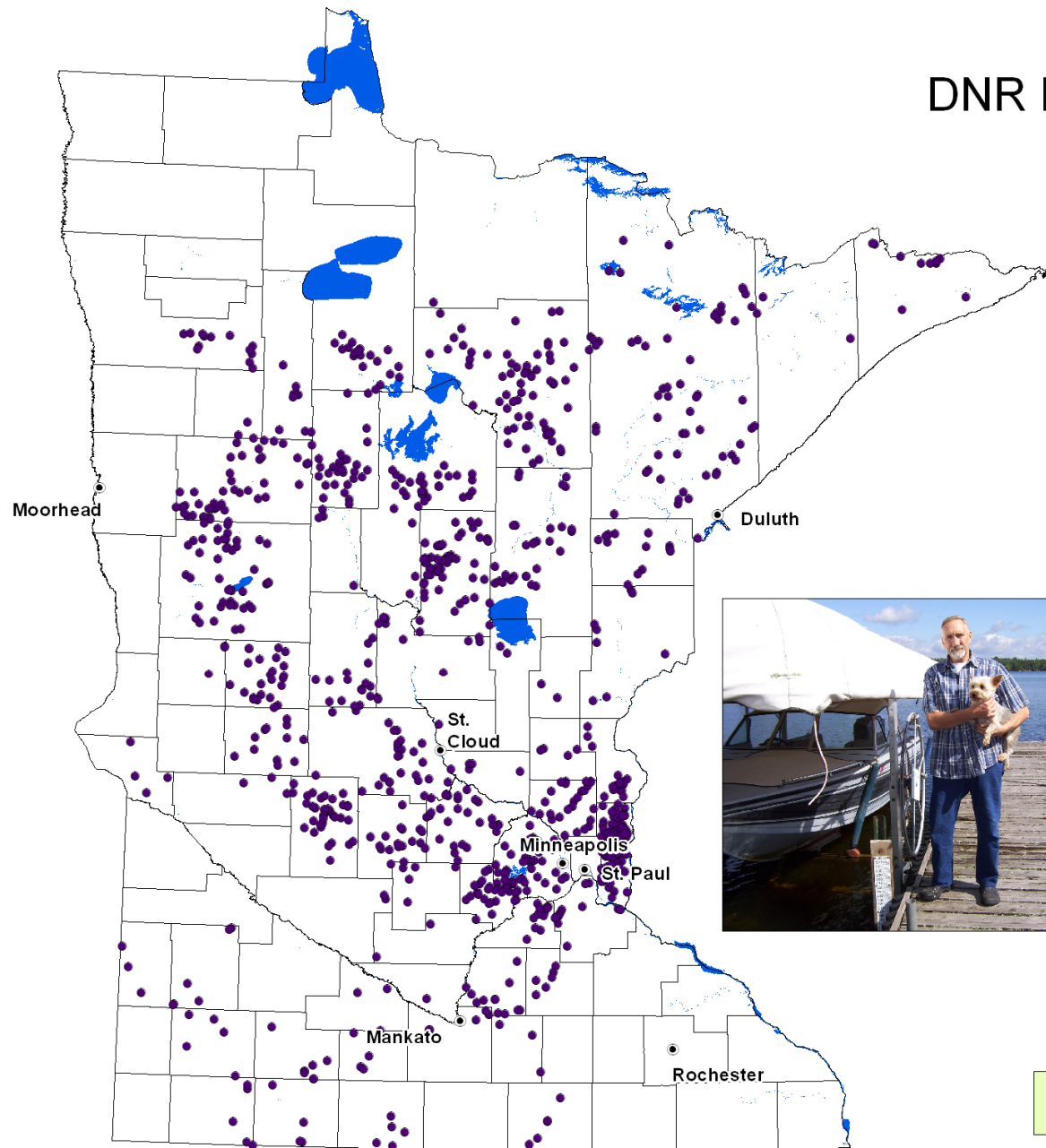
Minnesota Department of Natural Resources

Water Monitoring and Surveys Unit

- **Ground Water Levels**
- **Lake Levels**
- **Survey Crew**
- **Climatology**
- **Stream Flow**



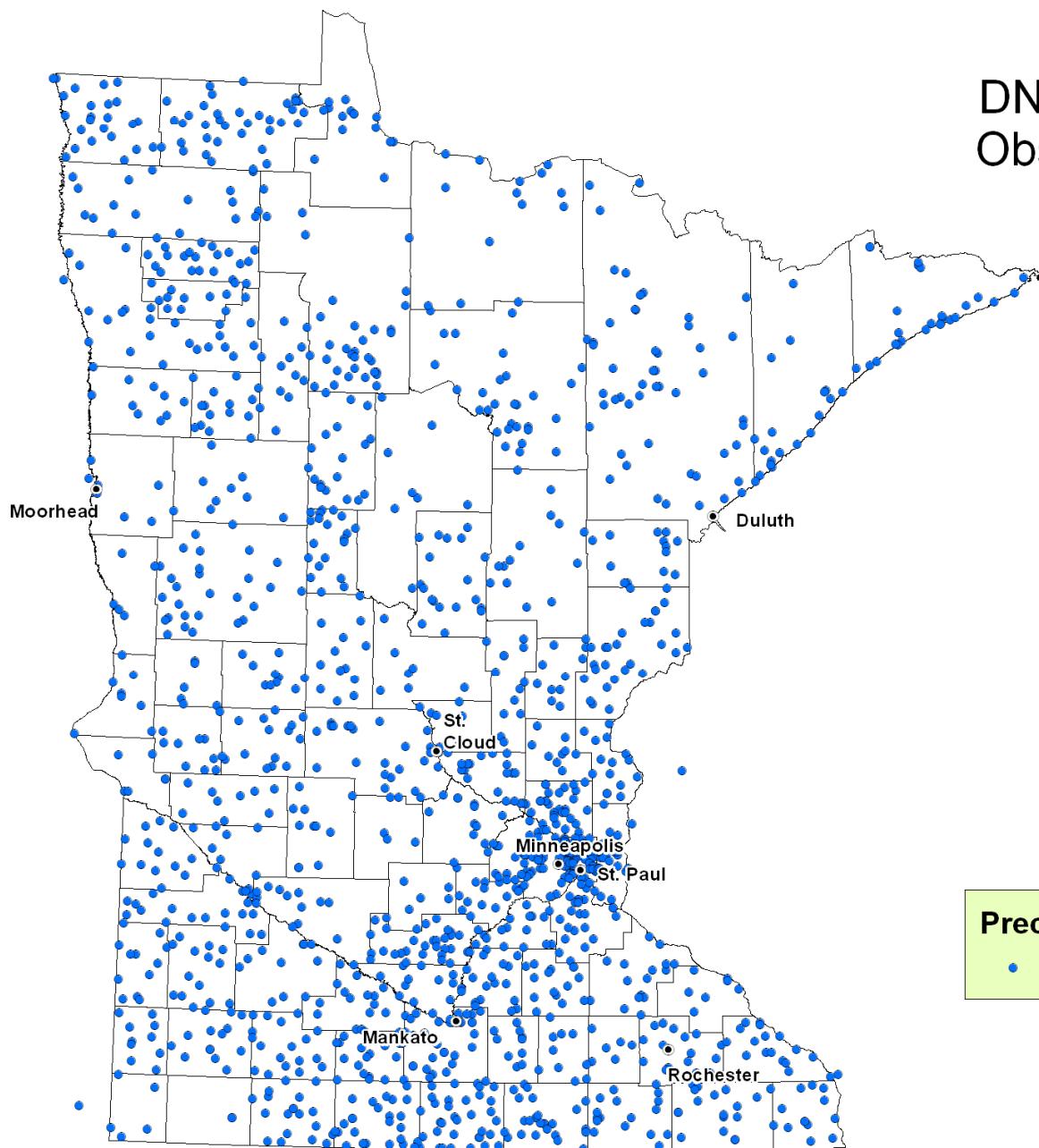
DNR Lake Gage Network



• DNR Lake Gages



DNR Precipitation Observer Network

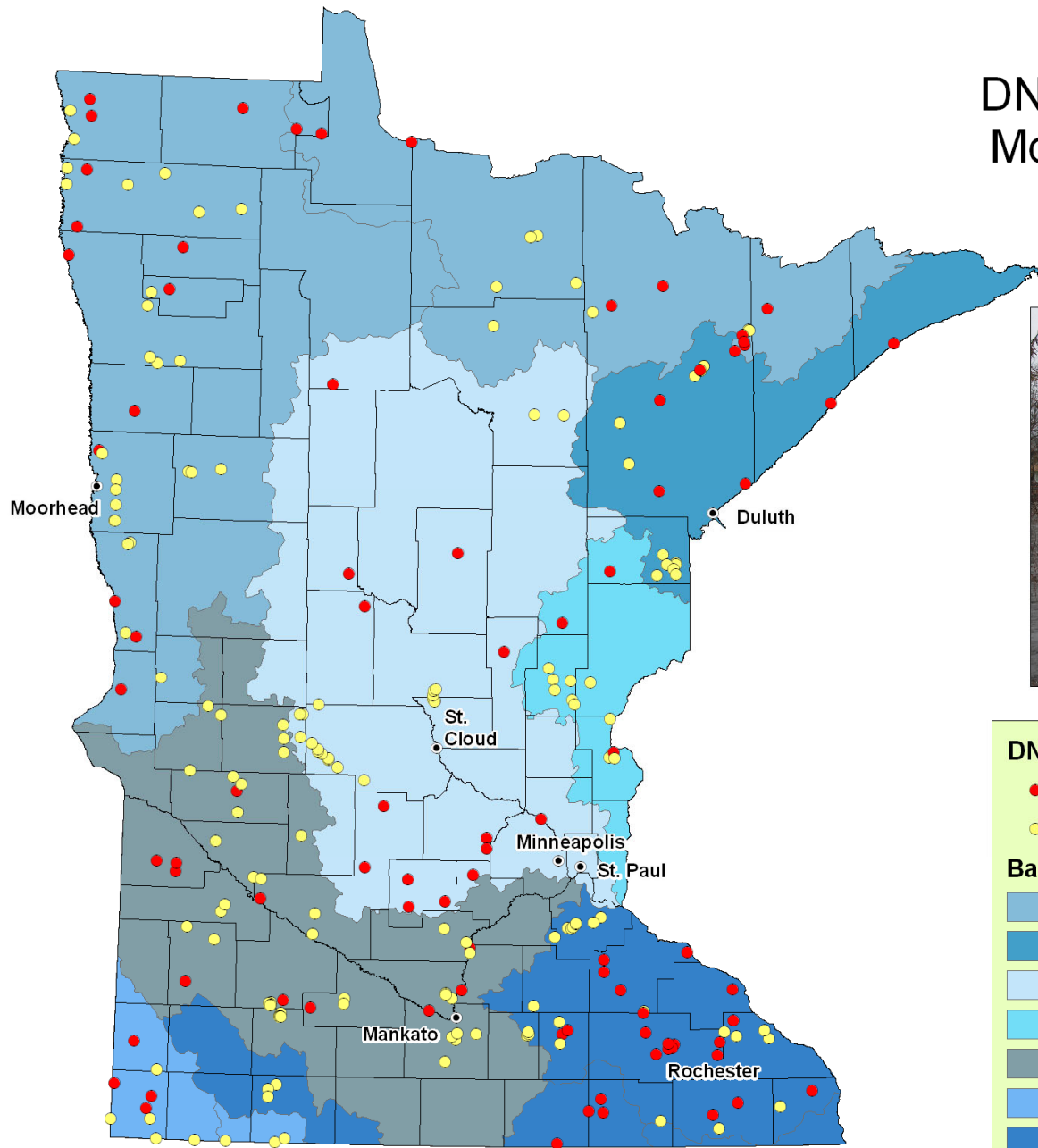


Precipitation Observer Network

- reporting locations from July 2011



DNR Surface Water Monitoring Network



DNR work locations

- Telemetry, live-feed data (86)
- Non-telemetered data (152)

Basin

- Rainy/Red River Basin
- Lake Superior/Great Lakes Basin
- Mississippi Headwaters
- St. Croix River Basin
- Minnesota River Basin
- Sioux/Missouri River Basin
- Lower Mississippi River Basin

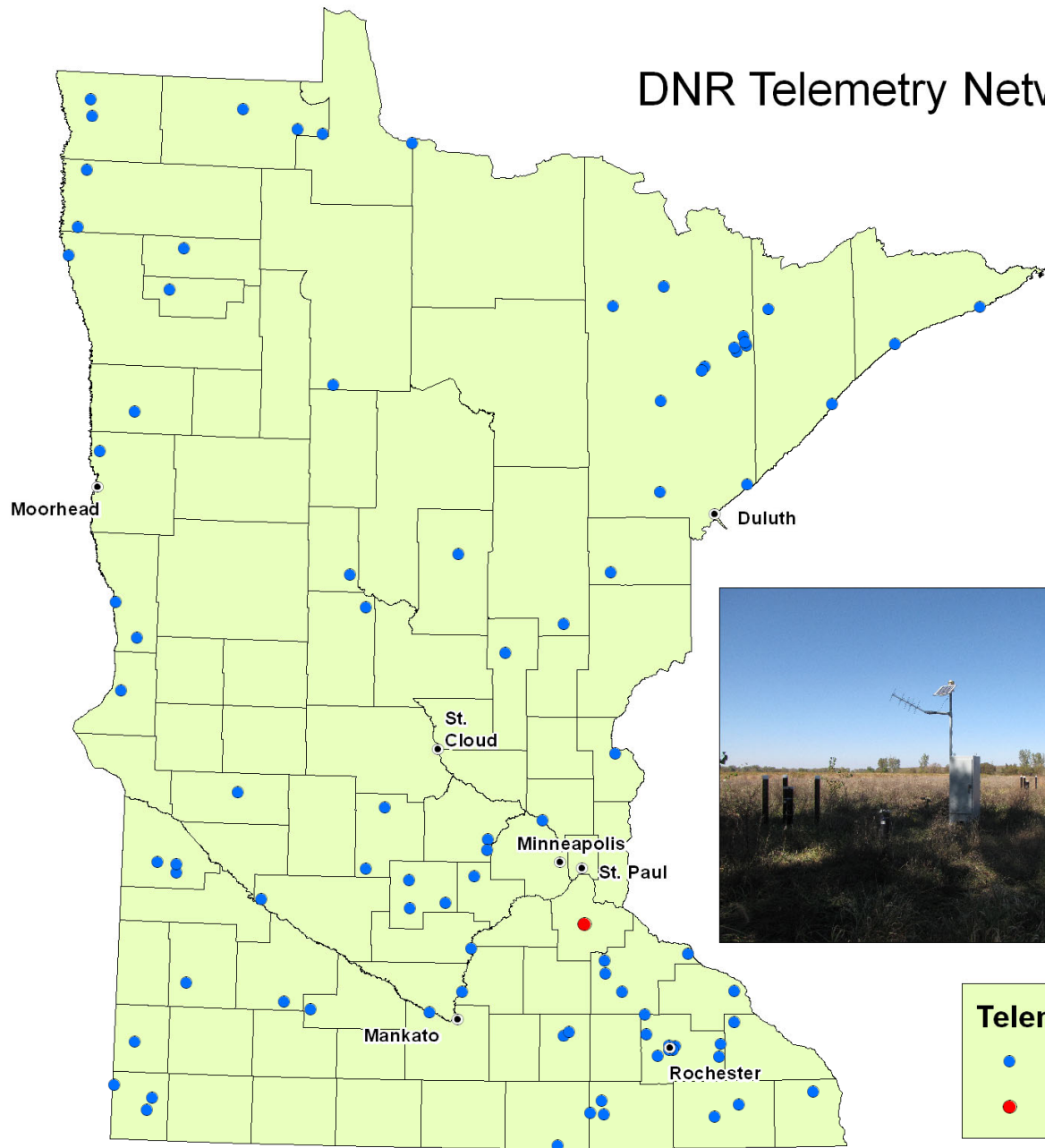




Clean Water Amendment Sites

- Install permanent stream gages at the outlet of each of the 81 major watersheds
- Provide water quantity data for water quality, flooding and low flow frequency analyses and to monitor changes within the watersheds.
- Multiple use gages

DNR Telemetry Network

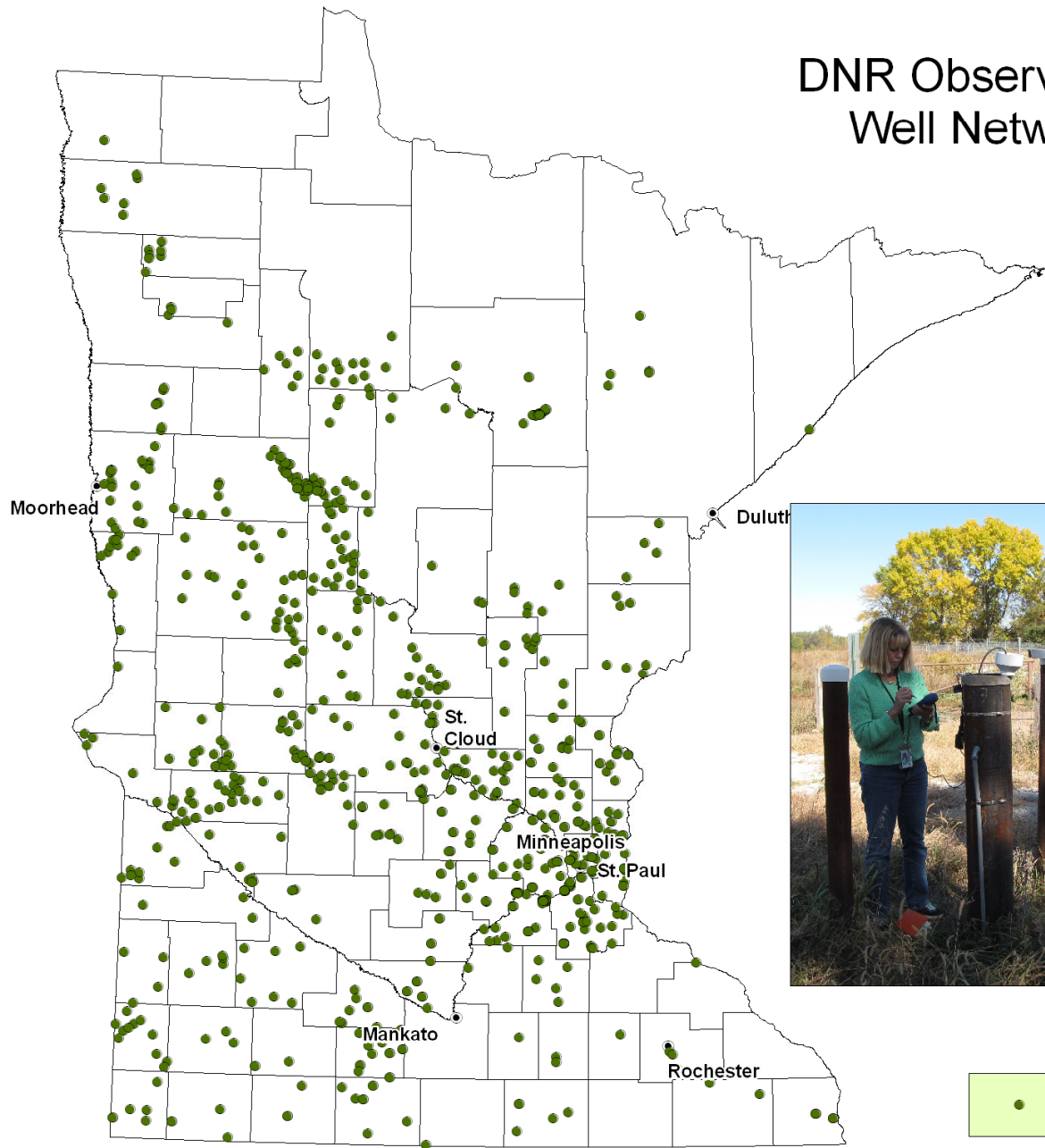


Telemetry Gages

- Surface Water (88)
- Ground Water (1)



DNR Observation Well Network



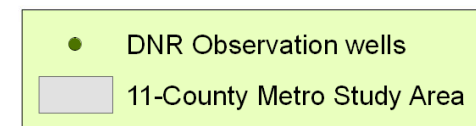
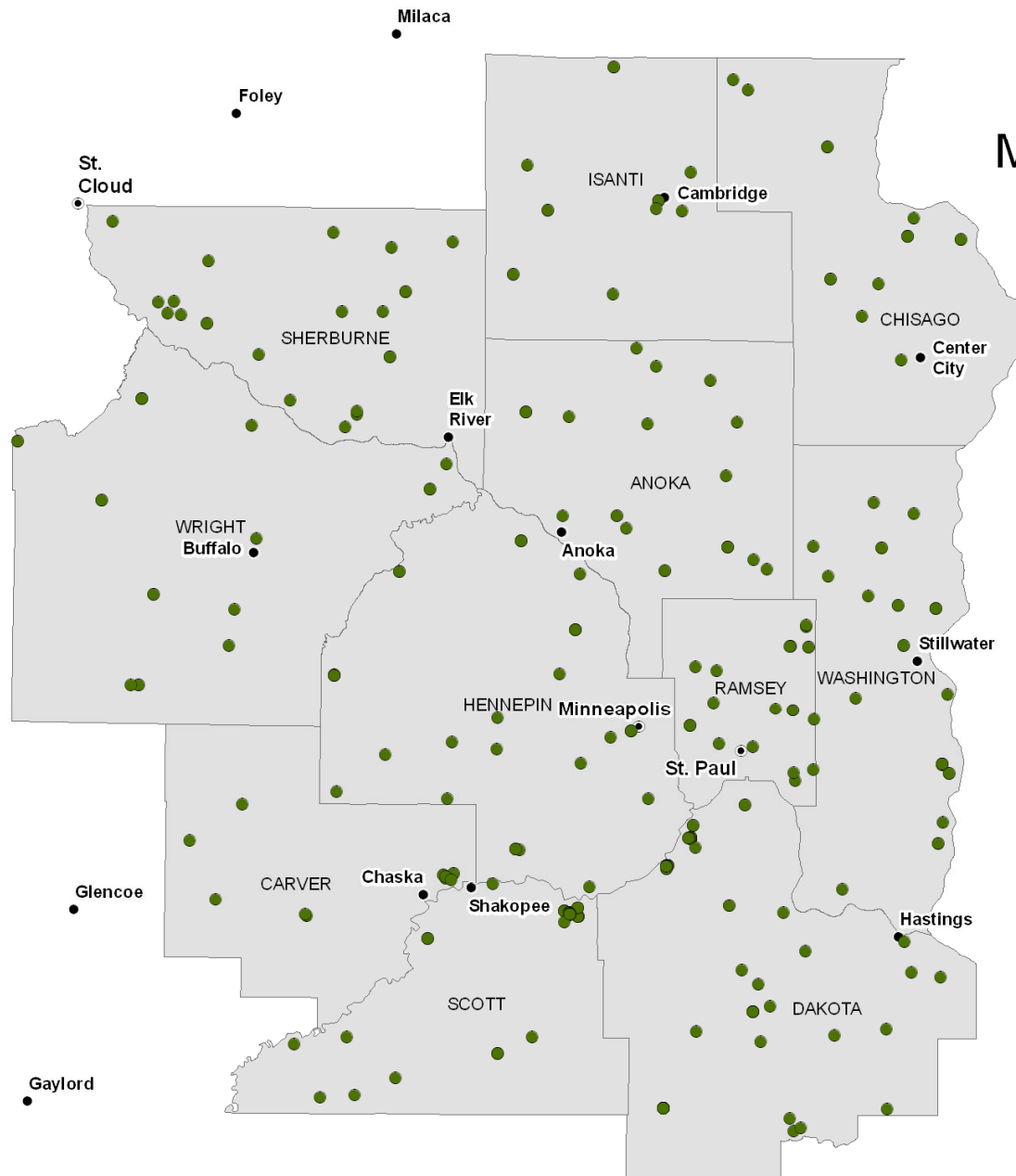
• DNR Observation wells



Accelerated Ground Water Monitoring



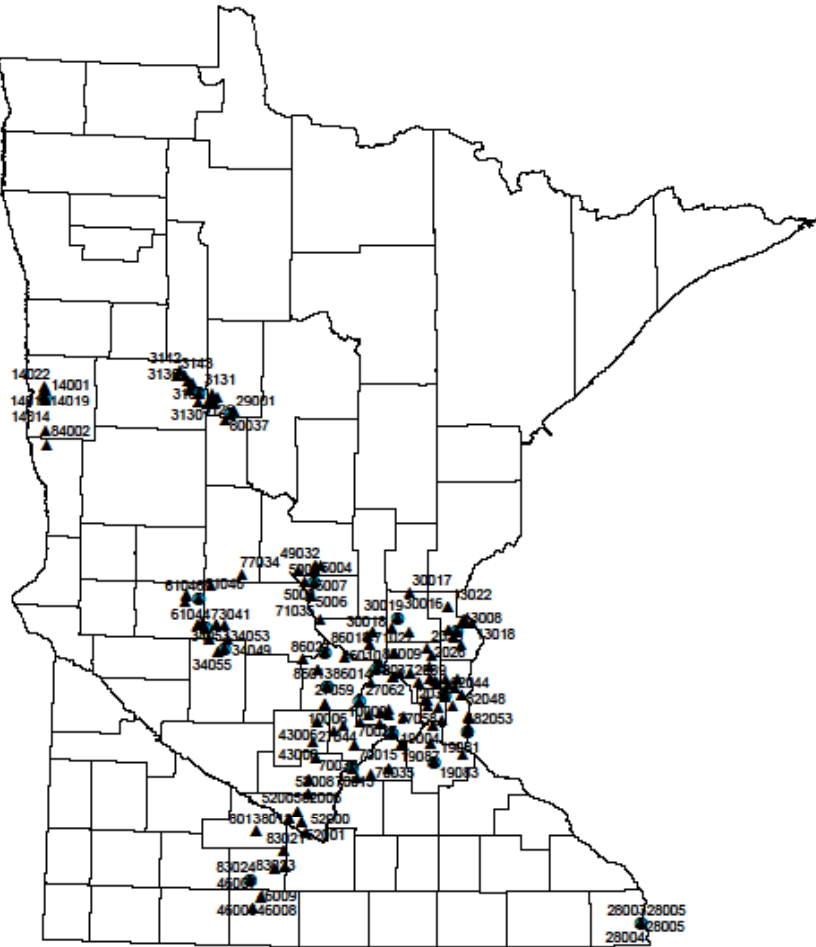
11-County Metro Monitoring Well Network



Continuous Water Level Monitoring at Over 200 Locations



Aug 30 2012

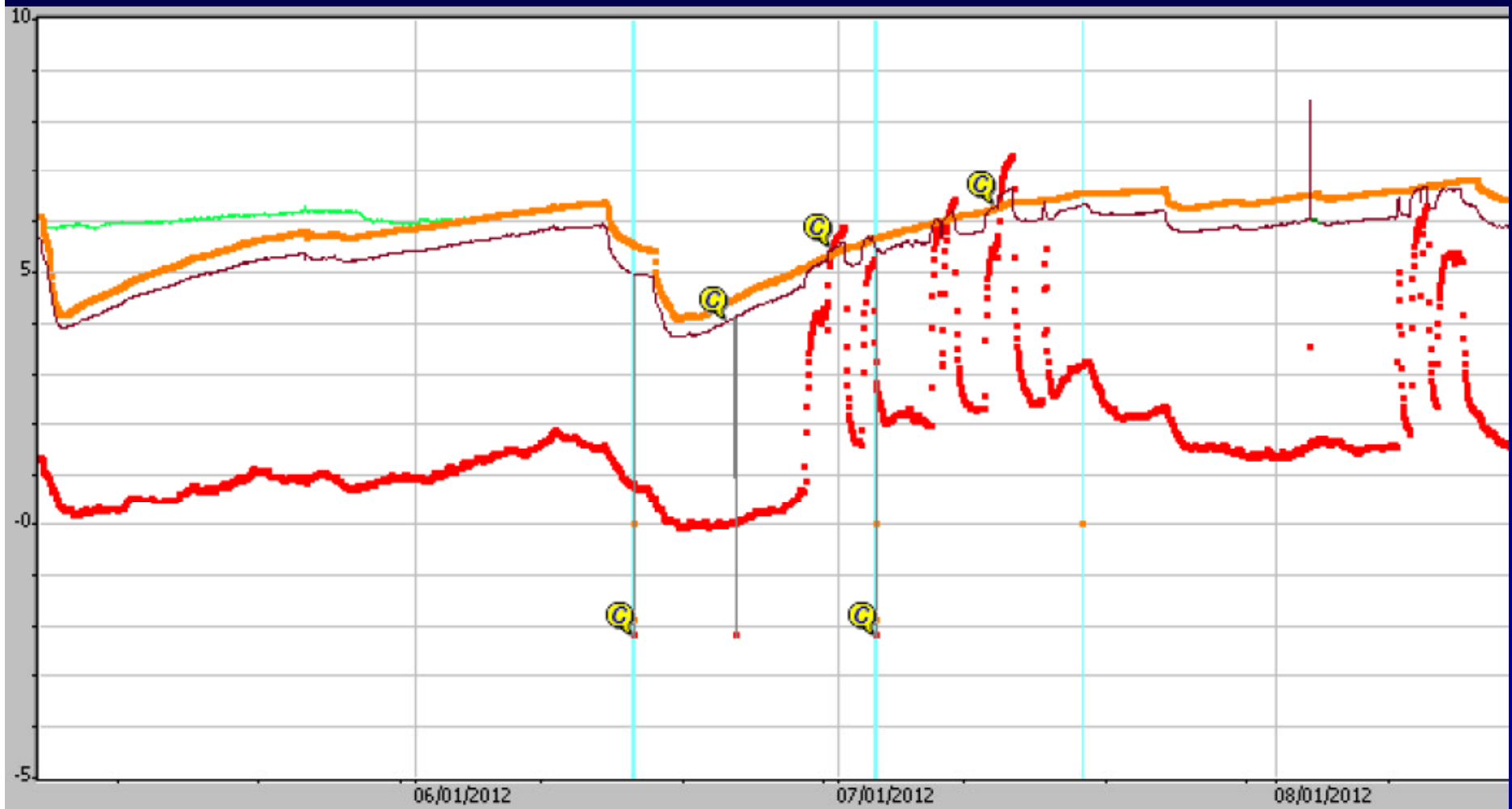


- ▲ Transducer
- Barometer









SCADA System Integration





MPCA/DNR Cooperative Stream Gaging



Minnesota Pollution Control Agency

HYPLOT V132 Output 09/11/12

Period 4 Month Plot Start 00:00_06/01/2012

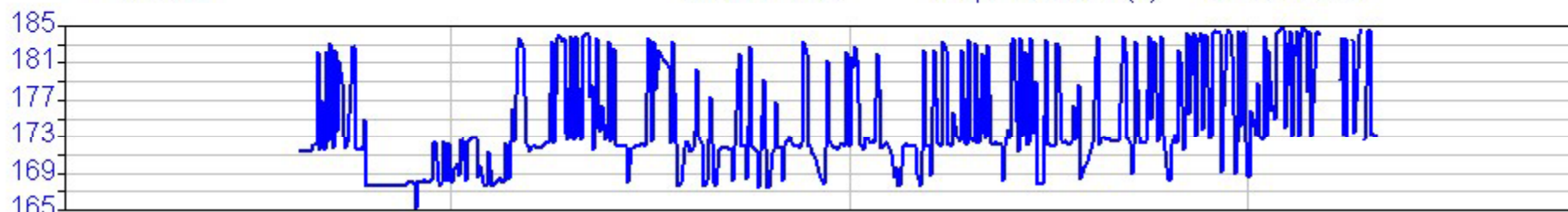
Interval 4 Hour Plot End 00:00_10/01/2012

— 206792

236.09 Inst.

Depth to Water (ft)

Uncorrected

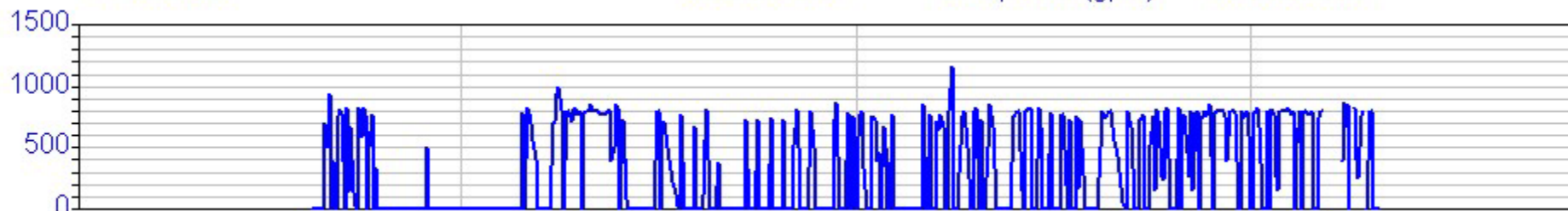


— 206792

885.09 Inst.

Pump Rate (gpm)

Uncorrected

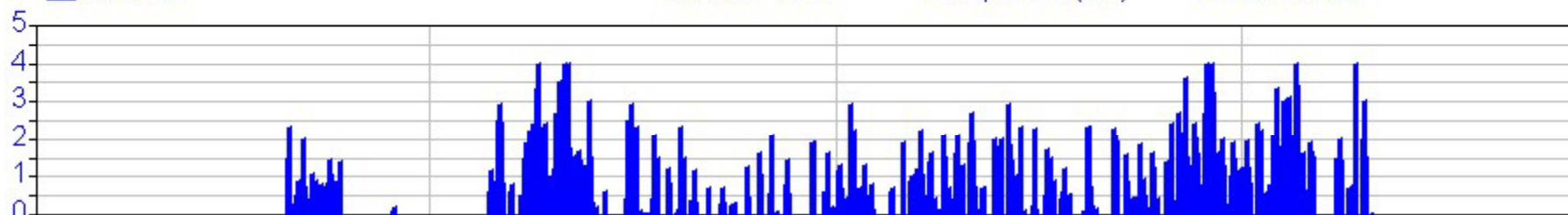


□ 206792

873.09 Total

Pump Time (hrs)

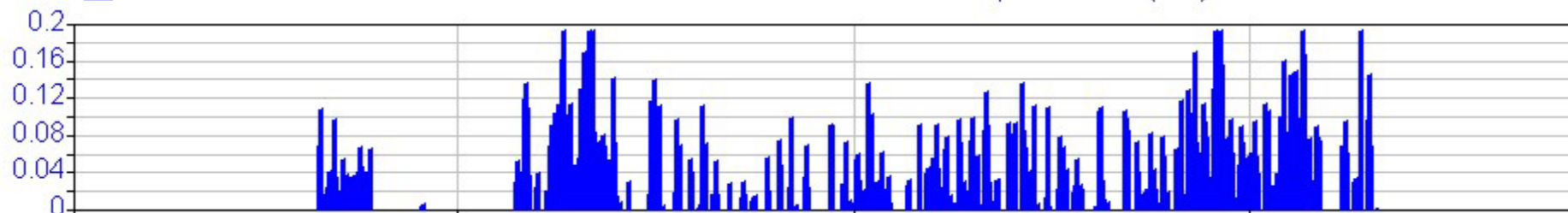
Uncorrected



□ 206792

892.09 Total

Pumped Volume (mG) Uncorrected





MPCA/DNR Cooperative Stream Gaging



Minnesota Pollution Control Agency

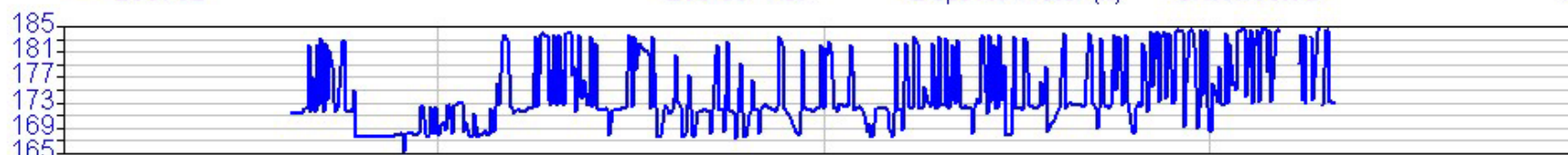
HYPLOT V132 Output 09/11/2012

2012

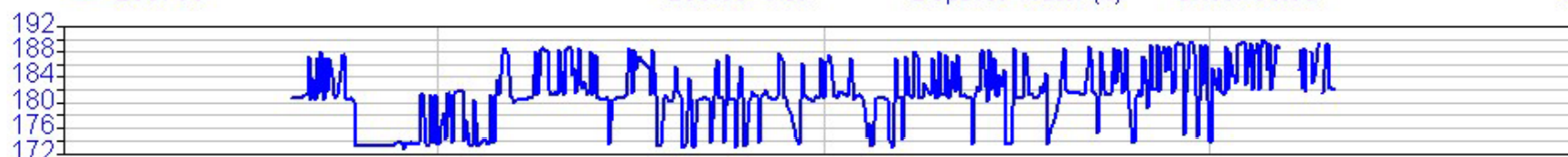
Period 4 Month Plot Start 00:00_06/01/2012

Interval 4 Hour Plot End 00:00_10/01/2012

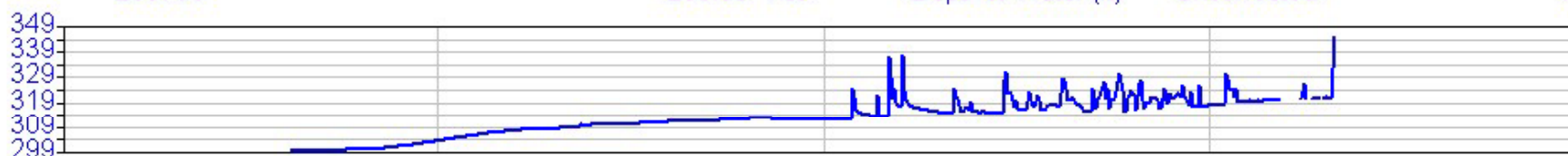
— 206792 236.09 Inst. Depth to Water (ft) Uncorrected X



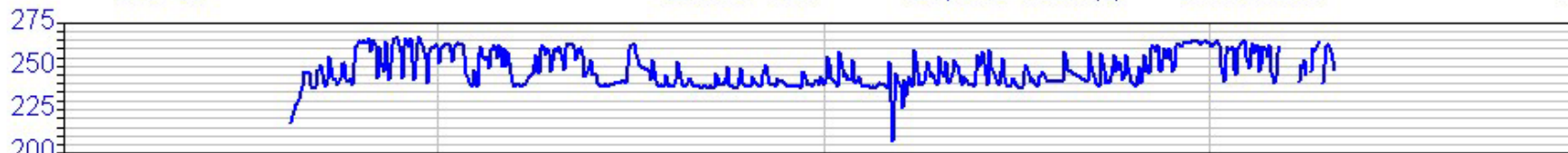
— 206793 236.09 Inst. Depth to Water (ft) Uncorrected X



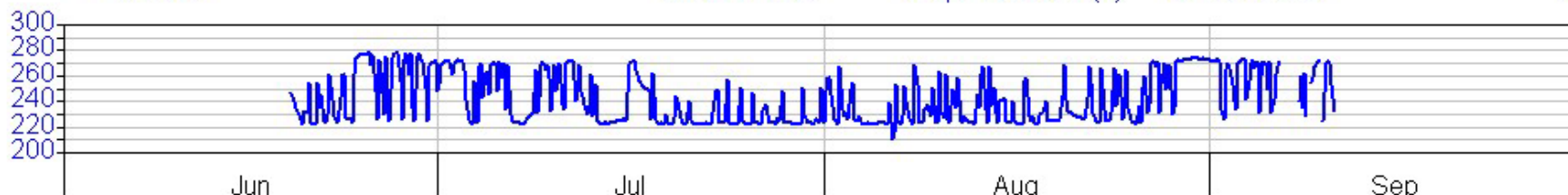
— 206795 236.09 Inst. Depth to Water (ft) Uncorrected X



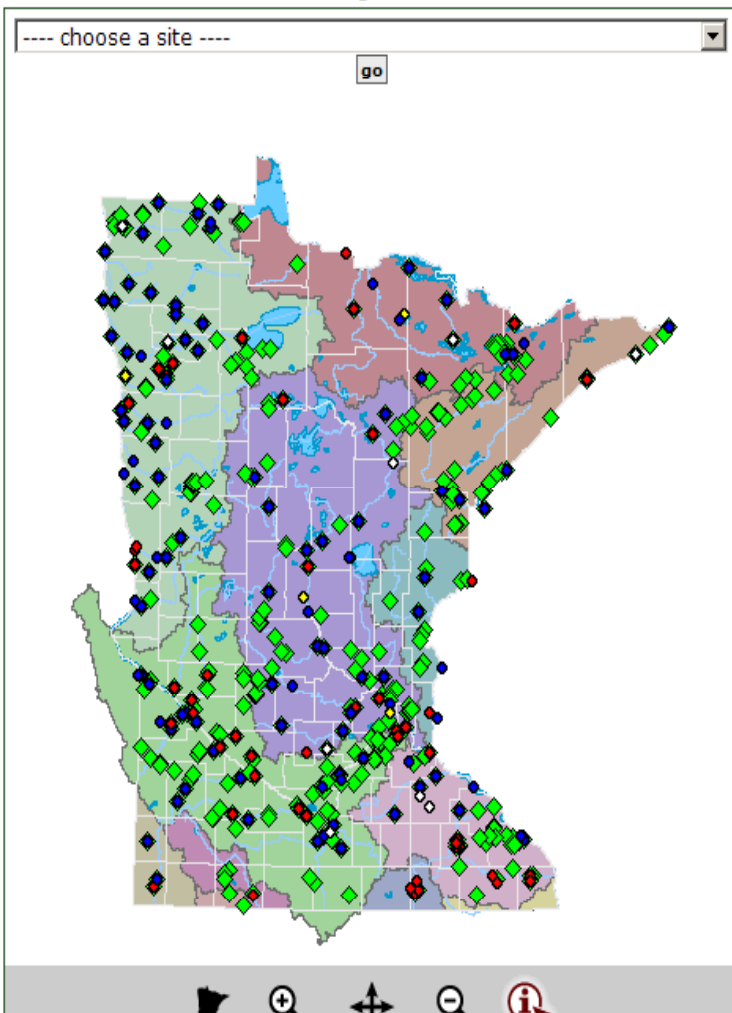
— 206796 236.09 Inst. Depth to Water (ft) Uncorrected X



— 206797 236.09 Inst. Depth to Water (ft) Uncorrected X



DNR/MPCA Cooperative Stream Gaging



Welcome to the Cooperative Stream Gaging website. This site provides access to near real-time preliminary and historical stream level and/or quantity data from around the state. Users can select gage sites in several ways (see Navigating below). Once you select a site, a variety of information is available, including hydrographs, cross sections, maps, river condition photos and downloadable data.

The sites depicted on the map to the left are also available in a [sortable tabular format](#).

Lake information is available by selecting them (📍).

About the map: The map to the left is showing 24-hour trends for gage level readings. The most recent data is compared to data from 24 hours previous and a general trend is depicted by the change in colors.

Navigating: Move the cursor around the map and choose gage sites or lakes directly, or use the watershed and county Quick Zooms to see what sites may be available. Use the identify tool (📍) to pick any gage for more detail.

Definitions of [commonly used hydrologic terms](#) are also available.

Quick Zooms:

by county:

-- choose a county --

go

by major watershed:

-- choose a watershed --

go

Site Legend

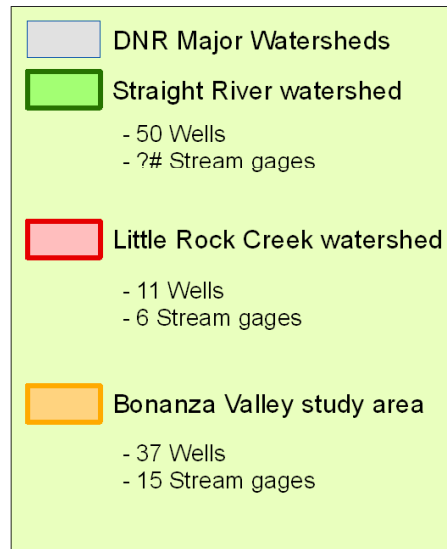
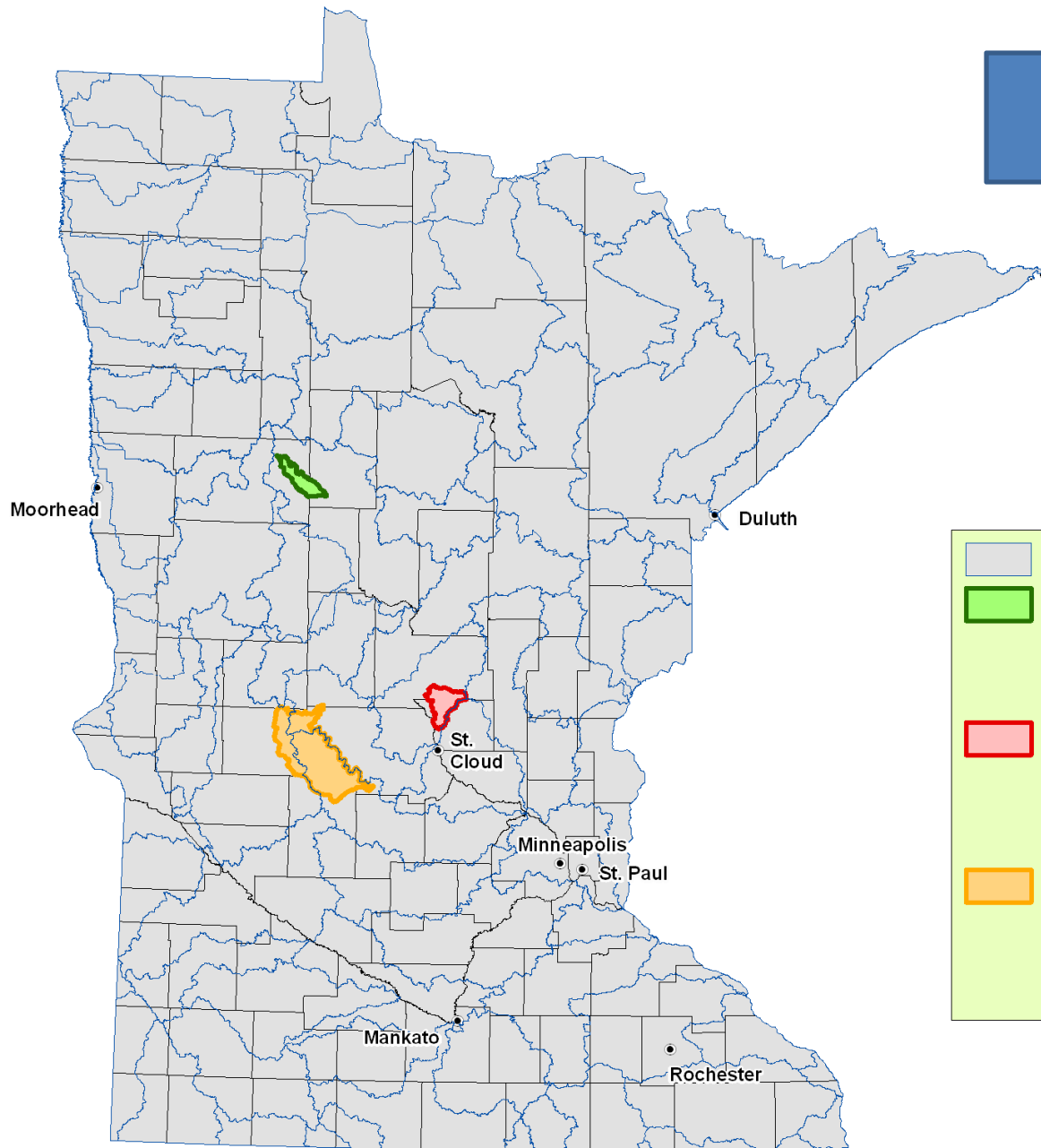
- Missing/incomplete data
- Increasing
- Decreasing
- No change
- ◆ Historical data available

[watershed legend](#)

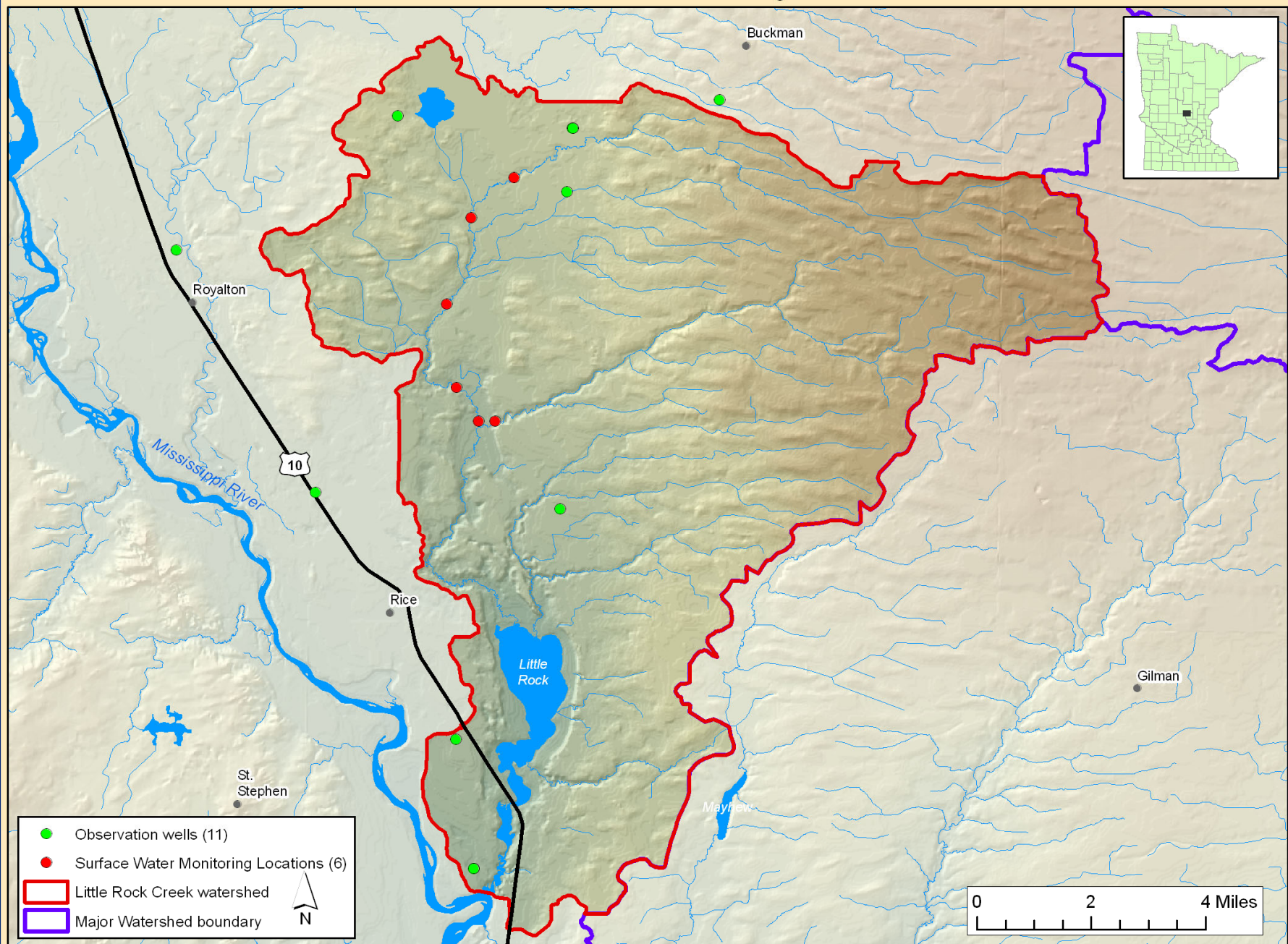


Minnesota Pollution

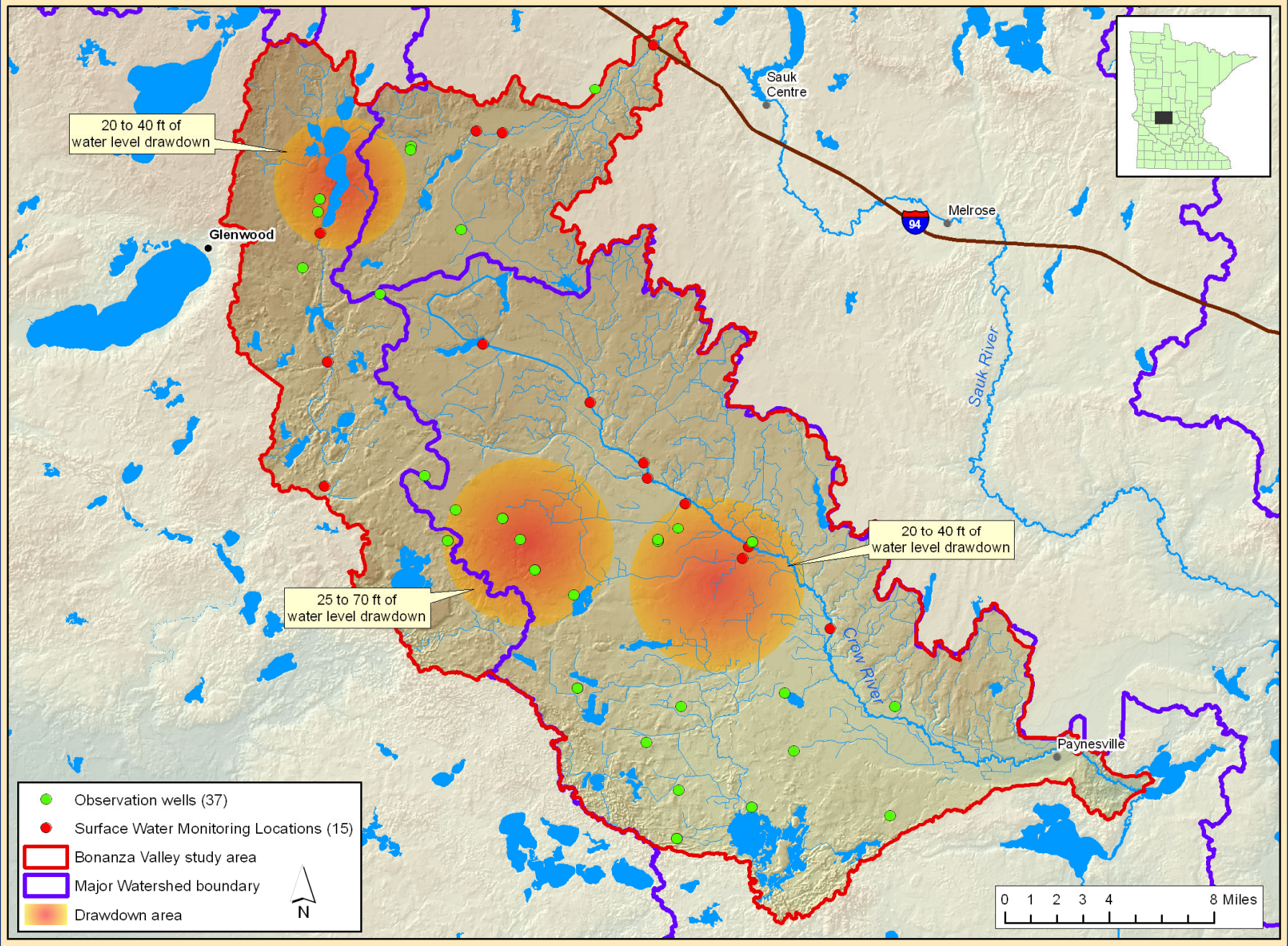
Areas of Elevated Concern



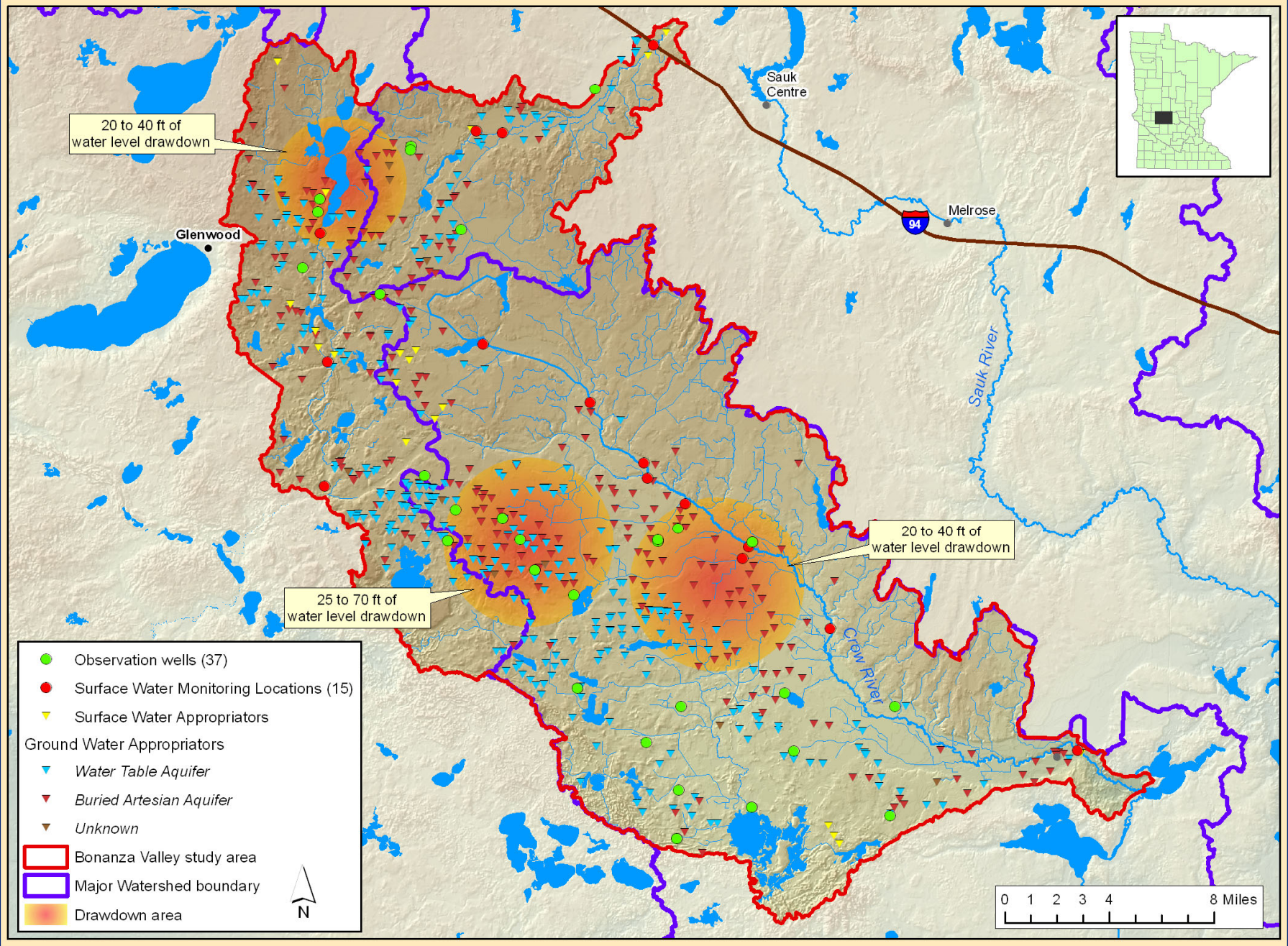
Little Rock Creek



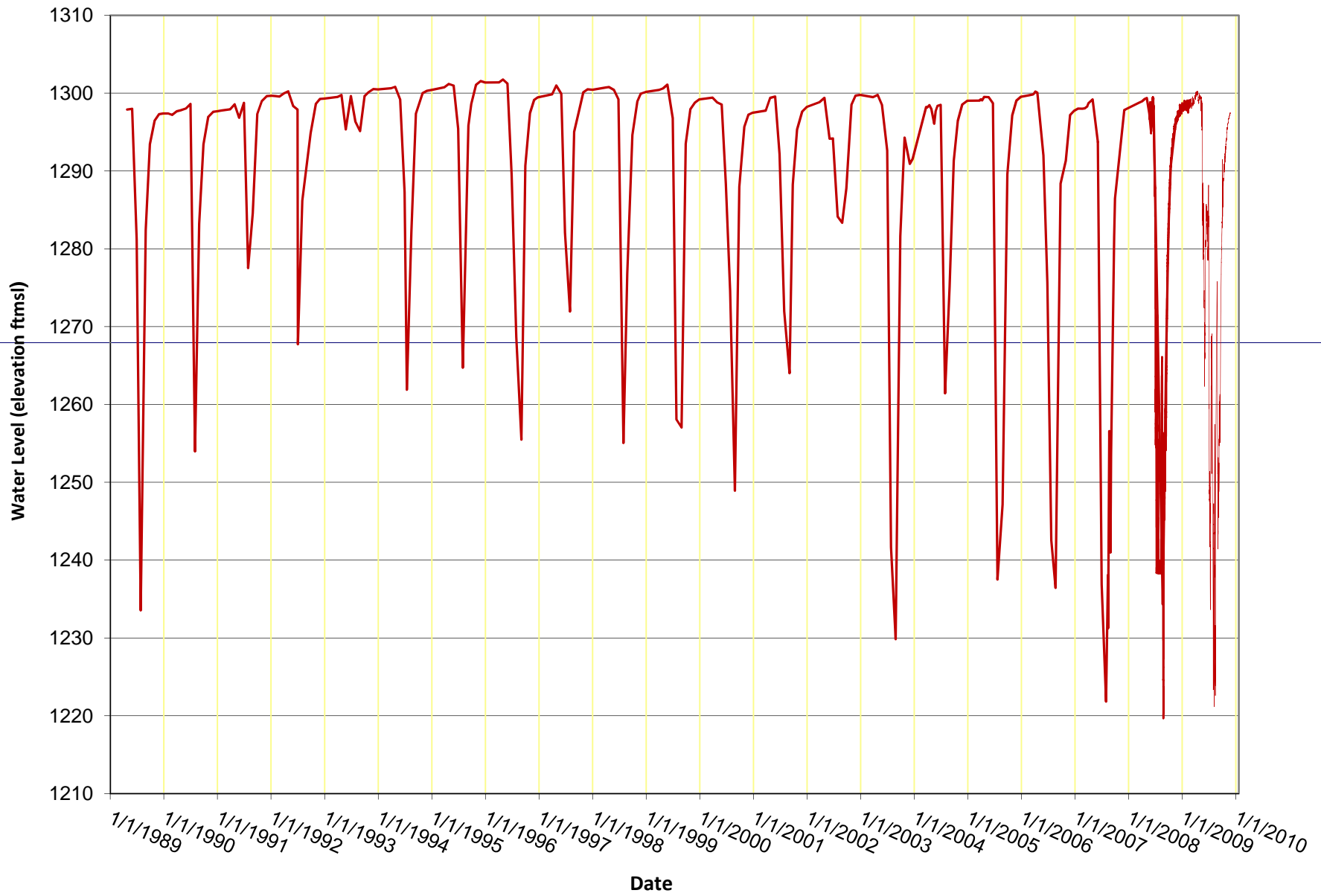
Bonanza Valley



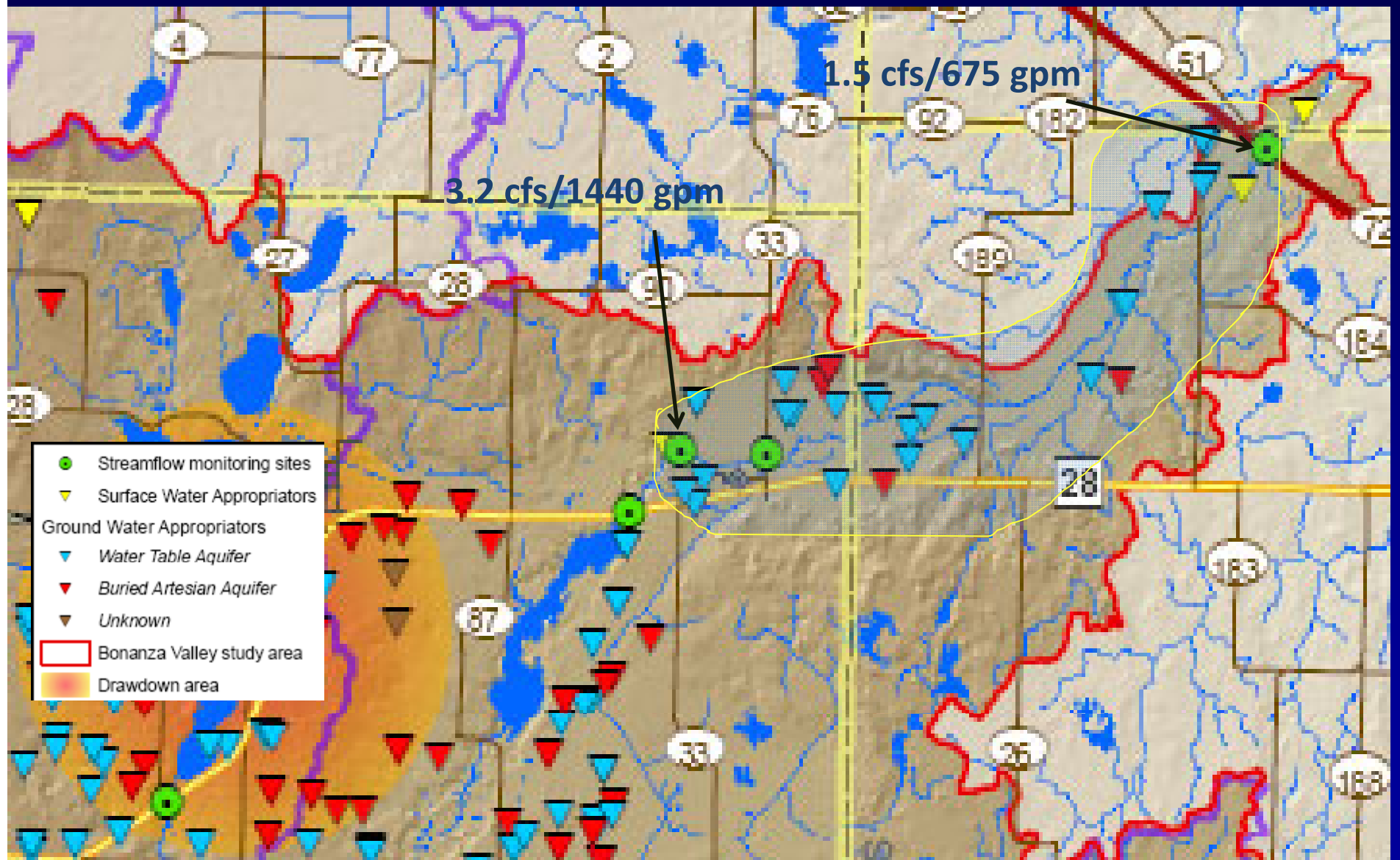
Bonanza Valley



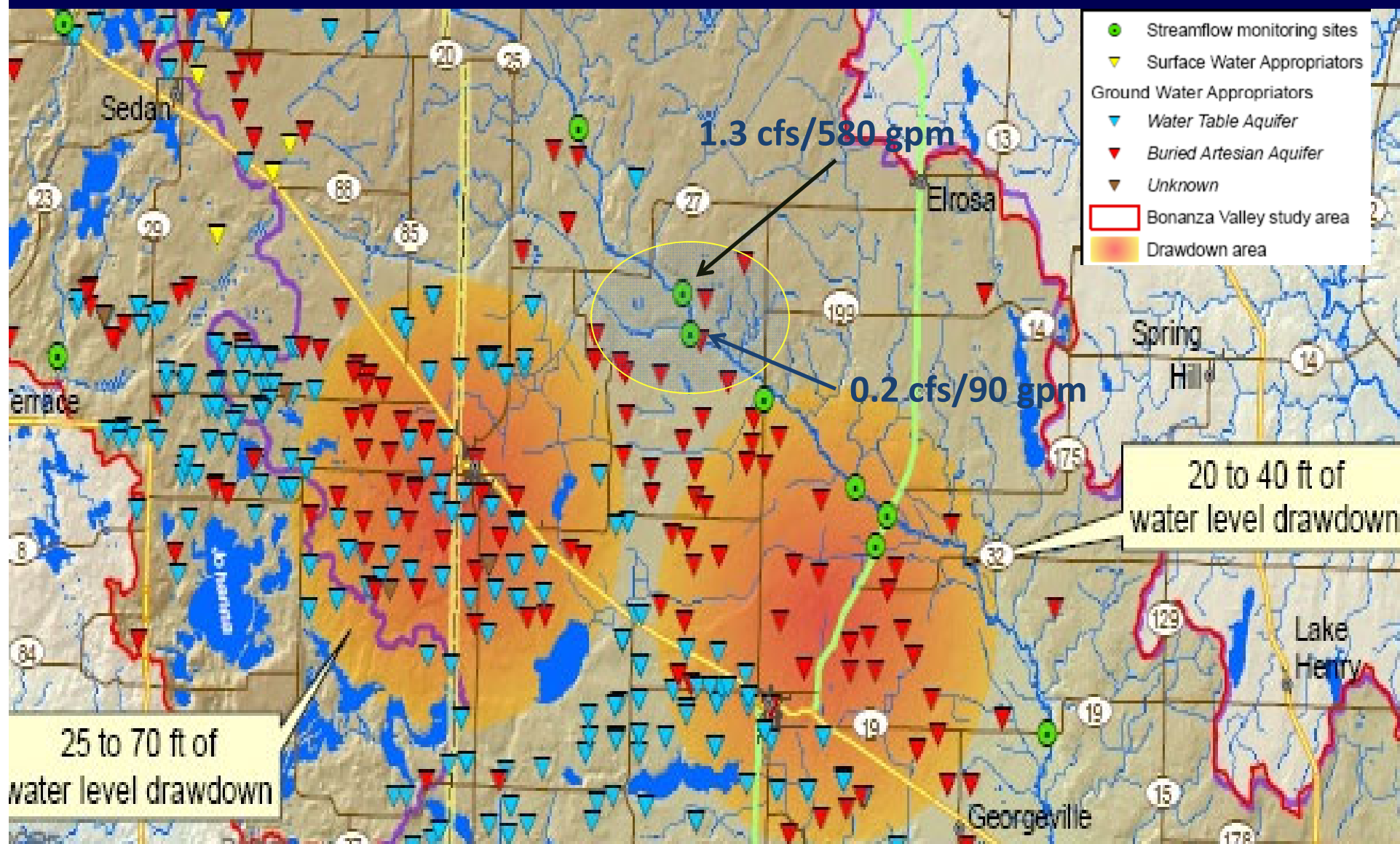
61037 QBAA



Ashely Creek Flow Loss (53%)



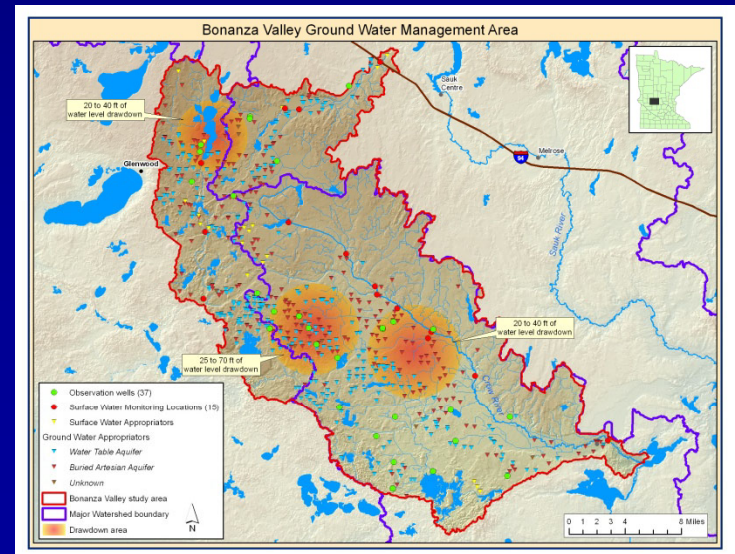
N.F. Crow River Flow Loss (85%)





- Integrated Resource Data
- Automated Data Collection and Telemetry
- SCADA Data Acquisition
- Automated Data Processing
- Informed Decision Making

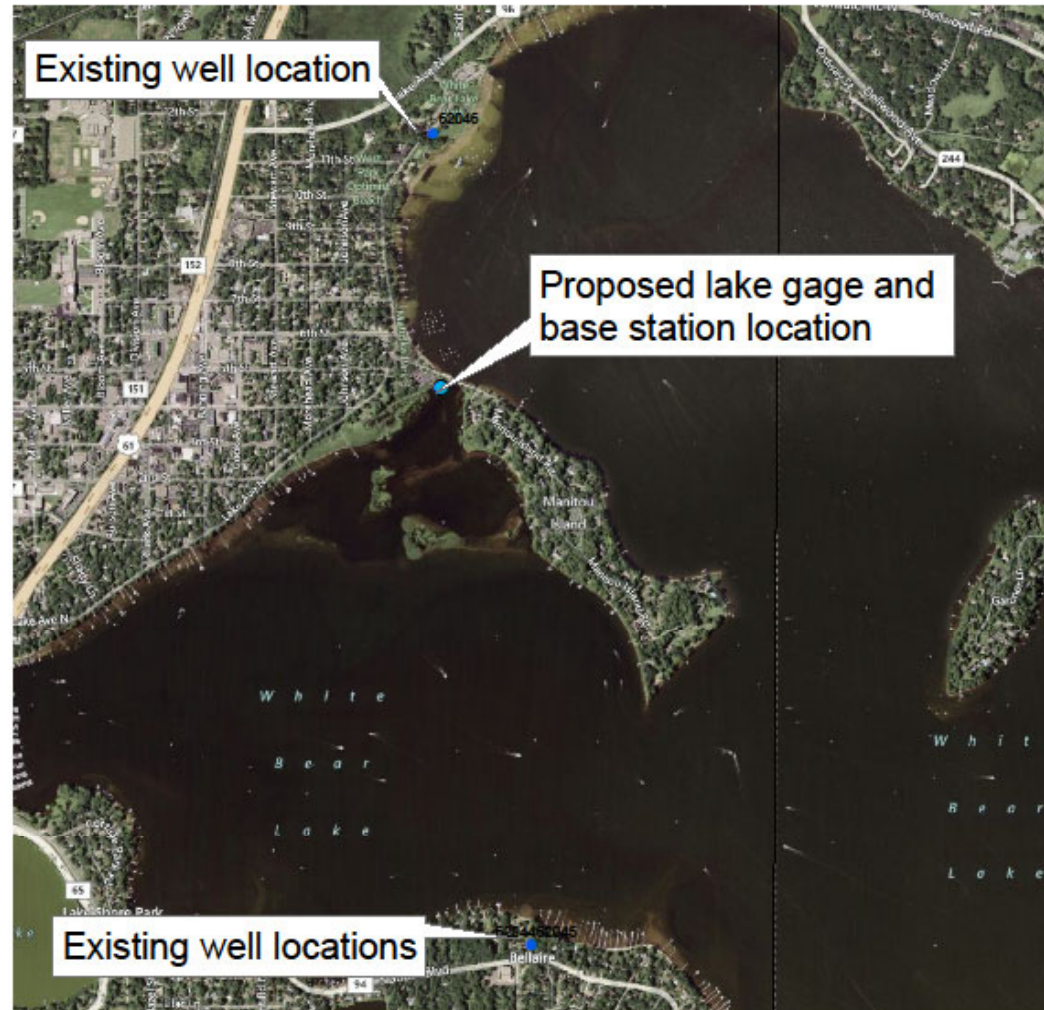








DNR Observation Well Locations
White Bear Lake MN
Minnesota Department of Natural Resources
August 2012



Distance between north site and base station = 0.5 miles
Distance between south site and base station = 1.1 miles

42

