Water Quantity Monitoring And Drought Response In Minnesota: Present and Future

Minnesota Department of Natural Resources

Division of Ecological and Water Resources
Cooperative Agency Water Monitoring Efforts

Federal, State and Local Governments: NWS, USGS, COE, DNR, PCA, MDA, Watershed Districts, CWPs, Counties, SWCDs and Cities
Minnesota Department of Natural Resources

Water Monitoring and Surveys Unit

- Ground Water Levels
- Lake Levels
- Survey Crew
- Climatology
- Stream Flow
298 actively monitored wells
Drought Response and Management
Minnesota Statewide Drought Plan

STATEWIDE DROUGHT PLAN MATRIX

DROUGHT WATCH PHASE
“Abnormally Dry”

DROUGHT WARNING PHASE
“Severe Drought”

RESTRICTIVE PHASE
“Extreme Drought”

EMERGENCY PHASE
“Exceptional Drought”
Surface Water: Stream Flow

Stream Flow Conditions
September 2012

▲ Designated major watershed gage

* Percentile ranking based on mean daily flows for the current month averaged and ranked with all historical mean daily flows for that month.
A watershed ranked at zero means that the present month flow is the lowest in the period of record; a ranking of 100 indicates the highest in the period of record.
A ranking at the 50th percentile (median) specifies that the present-month flow is in the middle of the historical distribution.

September Percentile *
- High Flows (>50th percentile)
- Above Normal Flows (75 - 90th percentile)
- Normal Flows (25 - 75th percentile)
- Below Normal Flows (10 - 25th percentile)
- Low Flows (<= 10th percentile)
- Rating being developed or revised

This map is based on provisional stream gage data from the USGS National Water Information System.
Accelerated Ground Water Monitoring
Continuous Water Level Monitoring at Over 200 Locations
SCADA System Integration
Ashely Creek Flow Loss (53%)
N.F. Crow River Flow Loss (85%)
Annual Minimum Water-Level Trends in Observation Wells
By Groundwater Province, 1993 - 2012

October 2013

DRAFT

Western Downward: 24%
Central Downward: 34%
Metro Downward: 56%

Annual Minimum Trend
- Upward
- None
- Downward

Aquifer Type
- Water Table
- Buried Artesian
- Bedrock

South-Central Insufficient Data
Southeastern Insufficient Data
Changing Hydrologic Conditions

Zero Flow Seasonal Changes
Pomme de Terre R. at Appleton 1931-2012

![Bar graph showing zero flow seasonal changes from 1931 to 2012 for Pomme de Terre R. at Appleton. The graph compares pre-1975 (red) and post-1975 (green) conditions.](image-url)
• Integrated Resource Data
• Automated Data Collection and Telemetry
• SCADA Data Acquisition
• Automated Data Processing
• Informed Decision Making