Minnesota Department of Natural Resources

Division of Waters

# Hydrologic Conditions Report

September 2009


Summary

This is the third installment of the monthly Hydrologic Conditions Report. For comparative purposes please reference the previous 2009 reports at:
http://mndnr.gov/current_conditions/hydro_conditions.html

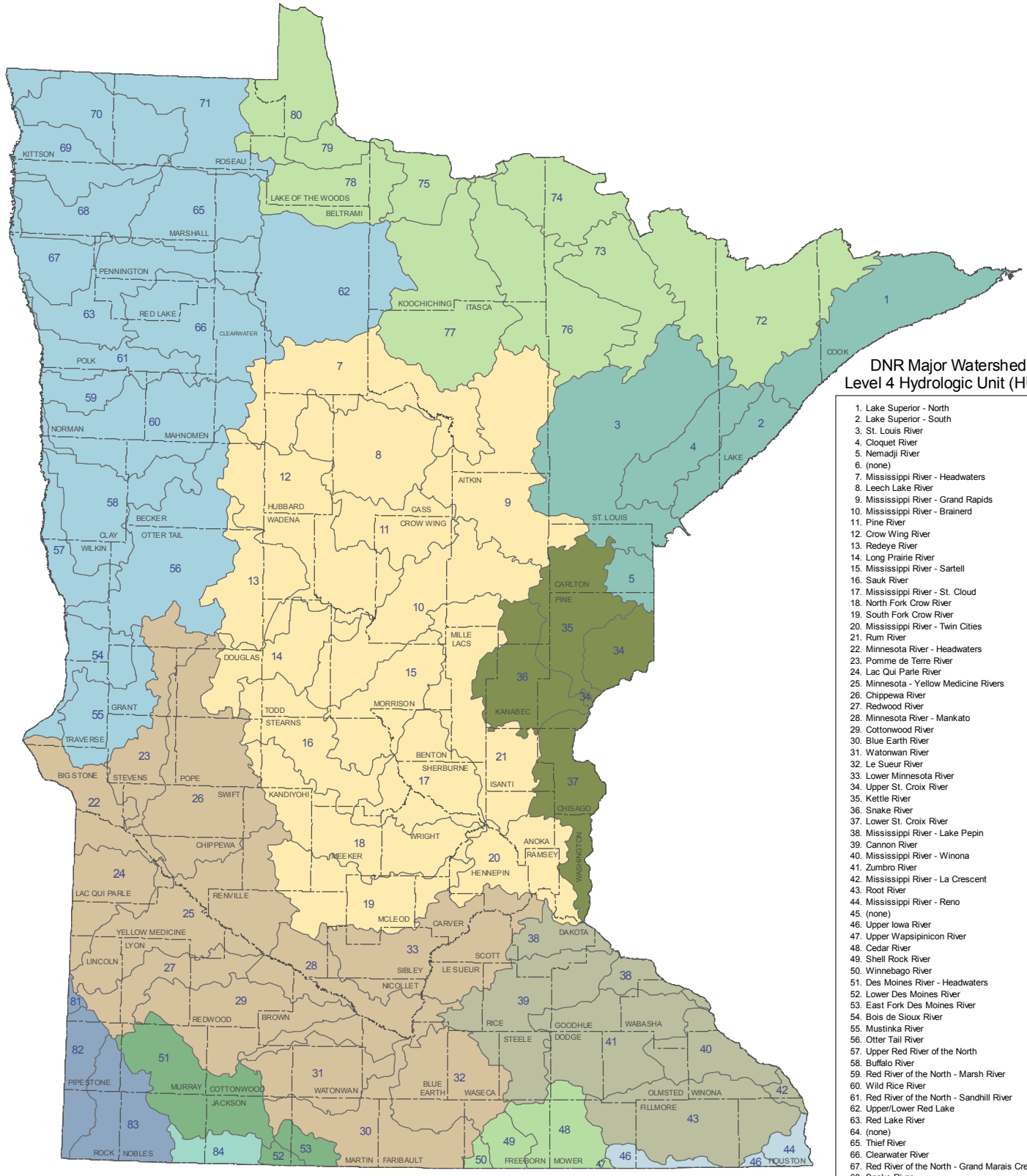
The significant rains in August were followed by the one of the warmest and driest Septembers in the modern record. Precipitation for the growing season (April through September) fell short of normal by five or more inches in many locales.

- By late September, 30% of Minnesota's landscape was placed in "Moderate", "Severe", or "Extreme" drought categories by the U.S. Drought Monitor. In many counties, the 2009 growing season ranked among the 10 driest ever.
- Stream flows in September declined through much of the state. Flows in the central part of the state, upper Mississippi River basin and the southeast fell to below normal or less with flows at some indicator gages below the 10$^{th}$ percentile when compared to historical flows for September.
- Indicator lakes remained below normal in the metro, south central and eastern part of the state. Water levels at White Bear and North Center lakes were the lowest historically recorded in the month of September. Water levels were generally normal to high in the northwest and in the normal range in the northeast part of the state.
- Ground water indicator wells continue to show declining conditions in the metro area. Levels in the southwest rose to the normal range, while levels in indicator wells in the central and northeast part of the state remained in the normal to high range. Ground water levels in wells in the northwest fell to the normal to low water ranges when compared to historical levels.


*The information in this report is provided by DNR through long term programs committed to recording and tracking the long term status of our water resources. The current conditions of precipitation, stream flows, lake levels and ground water levels in this report provide valuable information for natural and economic resource management on a state, county and watershed level.*


*If you have questions on the content of this report please contact Greg Spoden**: 651-296-4214,***
*greg.spoden@state.mn.us*

# Minnesota Counties and Major Watershed Index




## DNR Major Watershed - Level 4 Hydrologic Unit (HUC8)

1. Lake Superior - North
2. Lake Superior - South
3. St. Louis River
4. Cloquet River
5. Nemadji River
6. (none)
7. Mississippi River - Headwaters
8. Leech Lake River
9. Mississippi River - Grand Rapids
10. Mississippi River - Brainerd
11. Pine River
12. Crow Wing River
13. Redeye River
14. Long Prairie River
15. Mississippi River - Sartell
16. Sauk River
17. Mississippi River - St. Cloud
18. North Fork Crow River
19. South Fork Crow River
20. Mississippi River - Twin Cities
21. Rum River
22. Minnesota River - Headwaters
23. Pomme de Terre River
24. Lac Qui Parle River
25. Minnesota - Yellow Medicine Rivers
26. Chippewa River
27. Redwood River
28. Minnesota River - Mankato
29. Cottonwood River
30. Blue Earth River
31. Watonwan River
32. Le Sueur River
33. Lower Minnesota River
34. Upper St. Croix River
35. Kettle River
36. Snake River
37. Lower St. Croix River
38. Mississippi River - Lake Pepin
39. Cannon River
40. Mississippi River - Winona
41. Zumbro River
42. Mississippi River - La Crescent
43. Root River
44. Mississippi River - Reno
45. (none)
46. Upper Iowa River
47. Upper Wapsipinicon River
48. Cedar River
49. Shell Rock River
50. Winnebago River
51. Des Moines River - Headwaters
52. Lower Des Moines River
53. East Fork Des Moines River
54. Bois de Sioux River
55. Mustinka River
56. Otter Tail River
57. Upper Red River of the North
58. Buffalo River
59. Red River of the North - Marsh River
60. Wild Rice River
61. Red River of the North - Sandhill River
62. Upper/Lower Red Lake
63. Red Lake River
64. (none)
65. Thief River
66. Clearwater River
67. Red River of the North - Grand Marais Creek
68. Snake River
69. Red River of the North - Tamarac River
70. Two Rivers
71. Roseau River
72. Rainy River - Headwaters
73. Vermilion River
74. Rainy River - Rainy Lake
75. Rainy River - Black River
76. Little Fork River
77. Big Fork River
78. Rapid River
79. Rainy River - Baudette
80. Lake of the Woods
81. Upper Big Sioux River
82. Lower Big Sioux River
83. Rock River
84. Little Sioux River

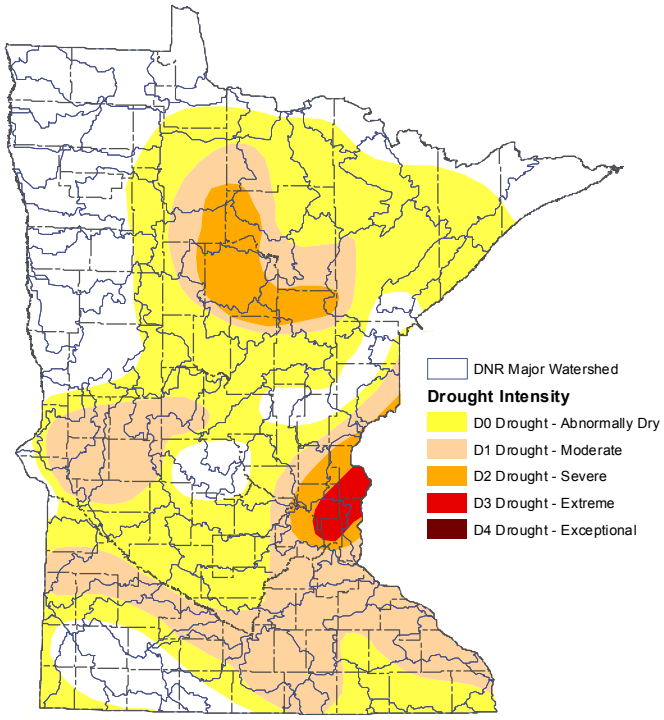
## Level 2 Hydrologic Unit (HUC4)

- Cedar River
- Des Moines River
- Lower Mississippi River
- Minnesota River
- Mississippi - Upper Iowa Rivers
- Mississippi River - Headwaters
- Missouri - Big Sioux Rivers
- Missouri - Little Sioux Rivers
- Rainy River
- Red River of the North
- St. Croix River
- Western Lake Superior

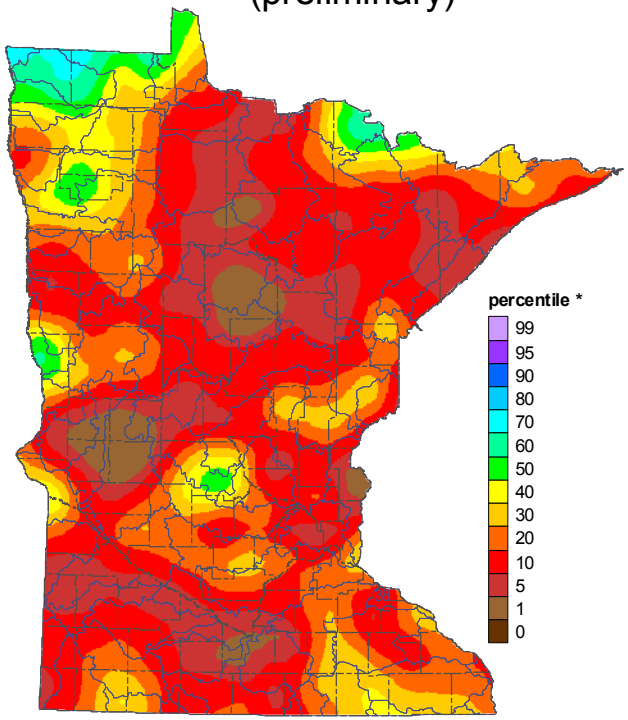
DNR Waters

# Climatology

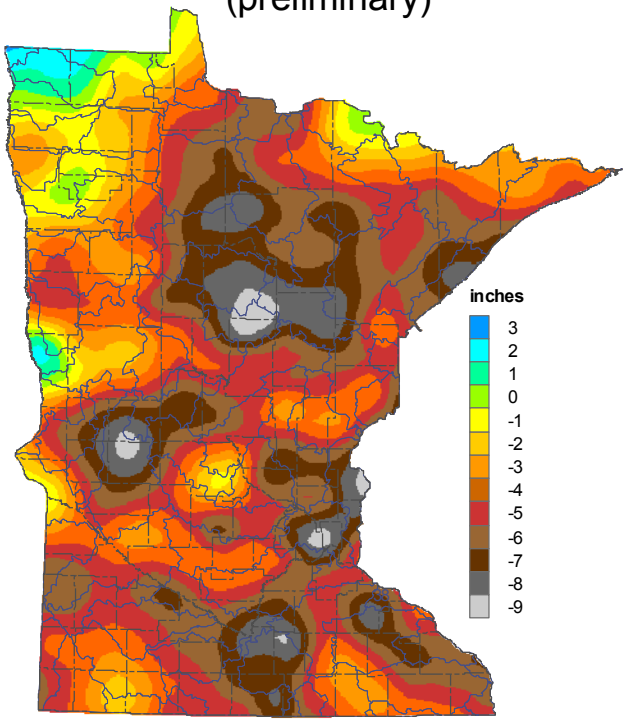
## U.S. Drought Monitor
## September 29, 2009




## Precipitation Ranking
## April 1, 2009 - September 28, 2009
## (preliminary)

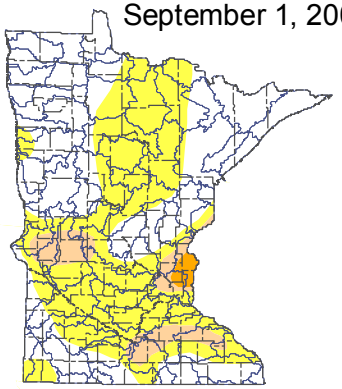



## Total Precipitation
## Departure from Normal
## April 1, 2009 - September 28, 2009
## (preliminary)




State Climatology Office - DNR Waters

## September 1, 2009



Notes:
- September 2009 was one of the warmest and driest Septembers in the modern record.
- By late September, 30% of Minnesota's landscape was placed in "Moderate", "Severe", or "Extreme" drought categories by the U.S. Drought Monitor.
  In many counties, the 2009 growing season ranked among the 10 driest ever.
  Precipitation during the season fell short of normal by five or more inches in many locales.
- Large sections of the southern two-thirds of Minnesota received at least one inch of rain during the first few days of October. More early-October rainfall was expected as of this writing.
  Should the forecasts verify, significant improvements in the soil moisture situation are expected.
  Larger hydrologic systems will be slower to respond.

* Percentile maps compare current-year seasonal rainfall totals with the long-term climate record.
This percentile (ranking) statistic allows the season's rainfall totals to be described using historical context.
A location ranked at zero means that the present-year seasonal rainfall total is the lowest found in the historical record; a ranking of 100 indicates the highest on record.
A ranking at the 50th percentile (median) specifies that the present-year seasonal rainfall total is in the middle of the historical distribution.

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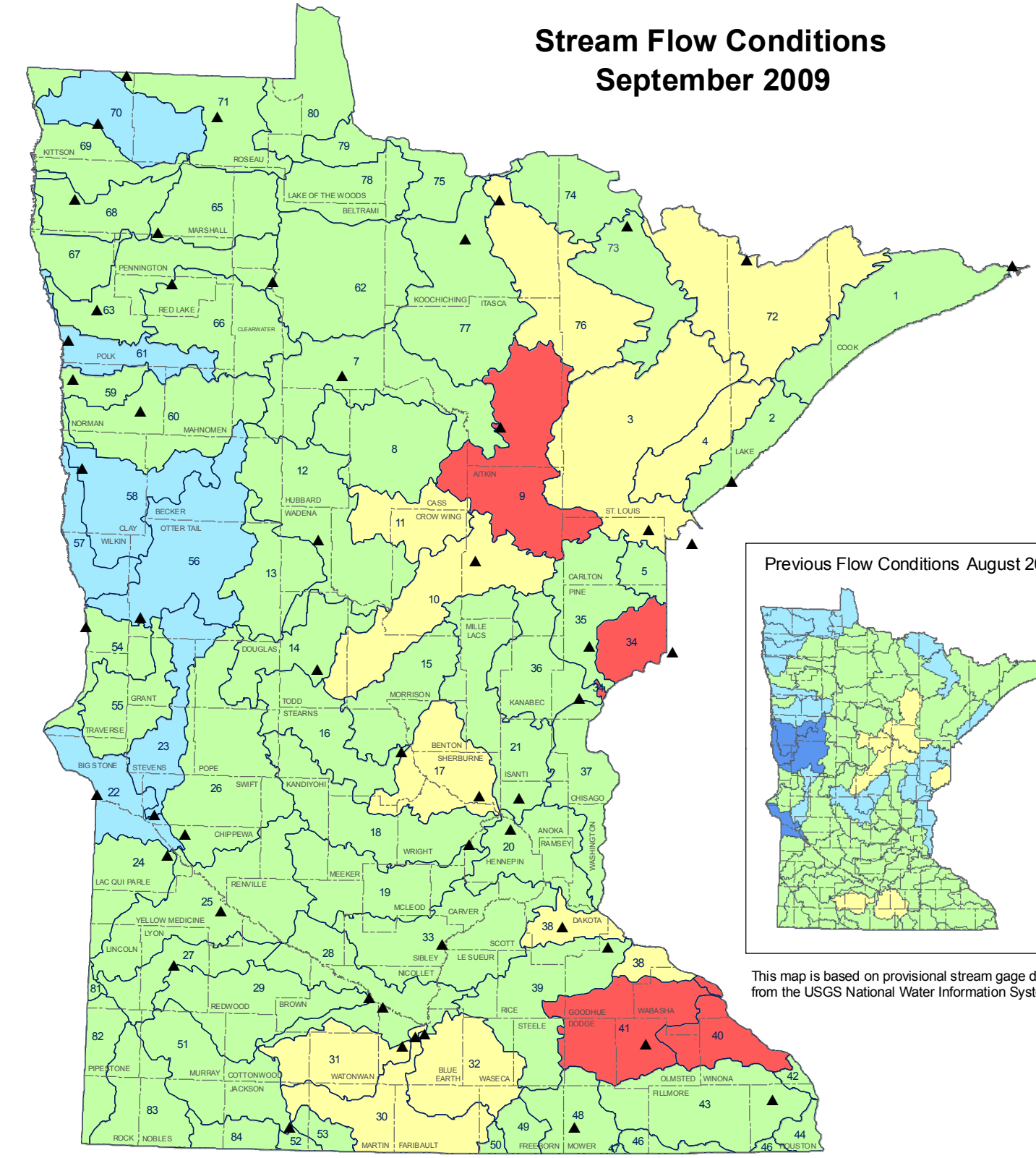
# Surface Water: Stream Flow

## Stream Flow Conditions
## September 2009




Previous Flow Conditions August 2009



This map is based on provisional stream gage data from the USGS National Water Information System

* 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.

Data are current through 9/29/2009.

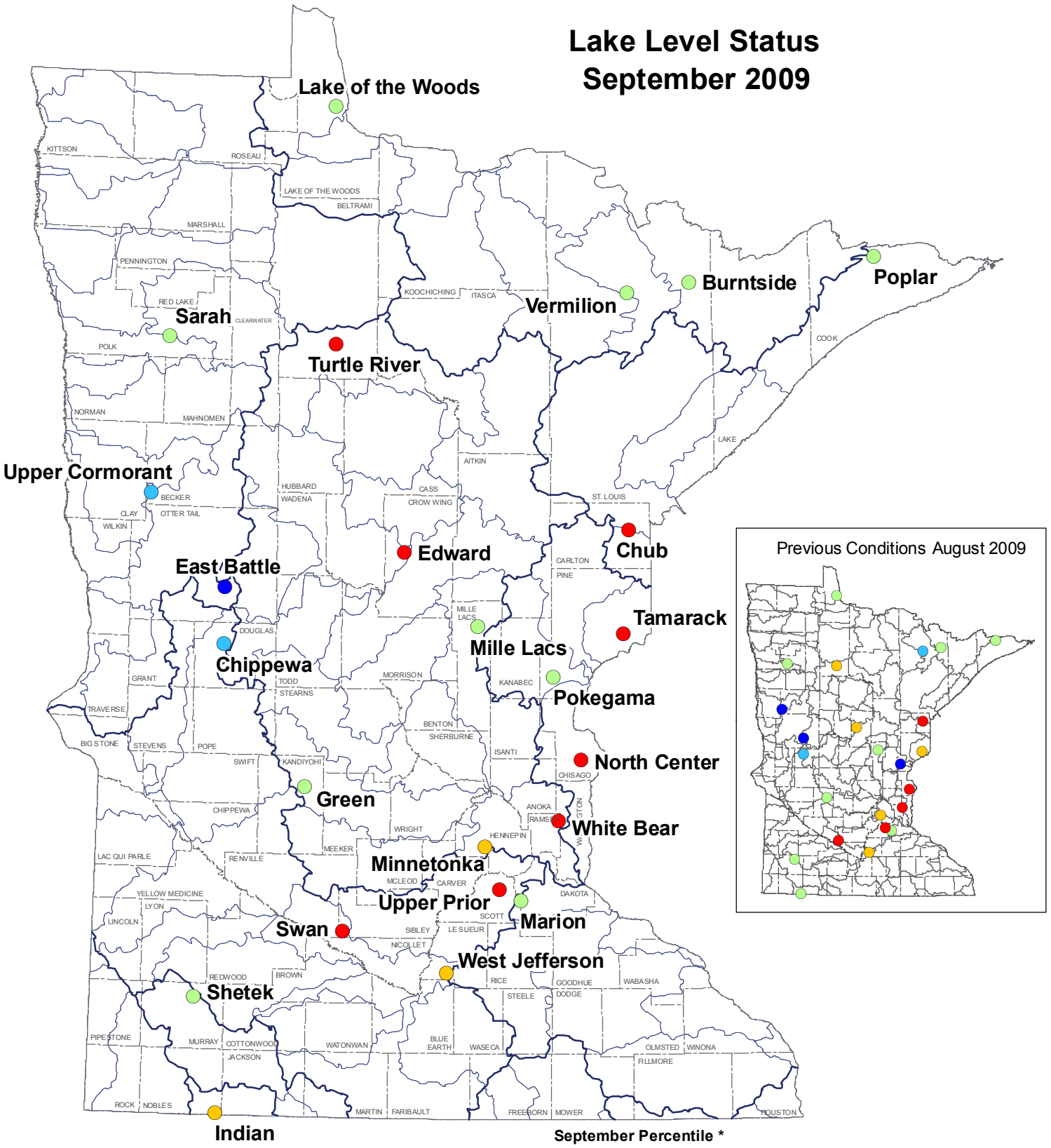
▲ Designated major watershed gage

**September Percentile ***

- High Flows (>90th percentile)
- Above Normal Flows (75 - 90th percentile)
- Normal Flows (25 - 75th percentile)
- Below Normal Flows (10 - 25th percentile)
- Low Flows (<= 10th percentile)

DNR Waters

# Surface Water: Lake Levels

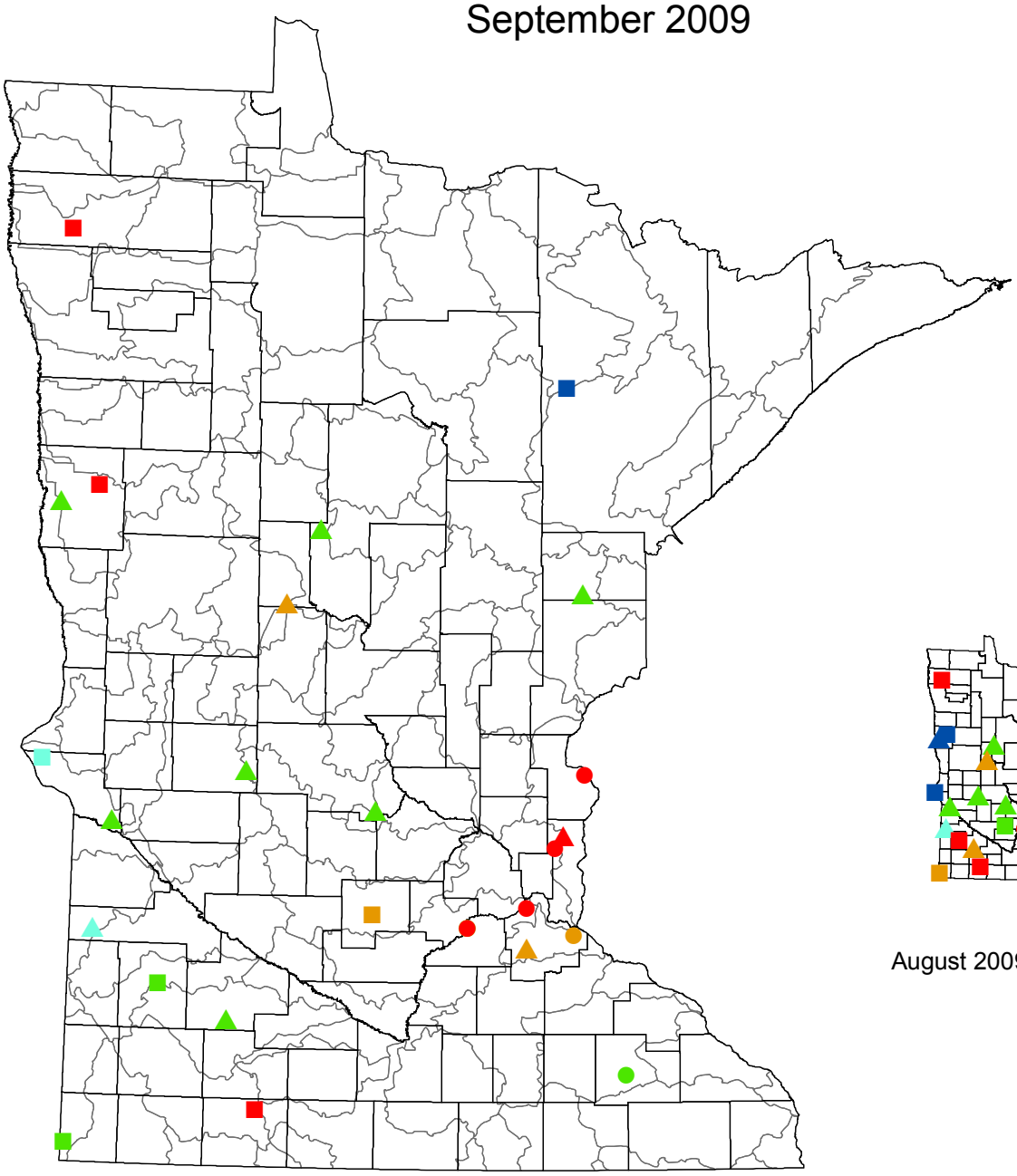


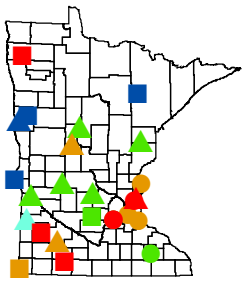

* Percentile ranking based on last reported reading for the current month compared to all historical reported levels for that month.
A lake ranked at zero means that the present reported level is the lowest in the period of record; a ranking of 100 indicates the highest in the period of record.
A ranking at the 50th percentile (median) specifies that the present-month reported lake level is in the middle of the historical distribution.

Data are current through 9/30/2009.
Source data from: MN DNR Waters Lake Level Minnesota Monitoring Program

# Ground Water

## Ground Water Level Historical Rankings
## September 2009





August 2009 Indicator Wells

### Aquifer

- △ Water Table
- □ Buried Artesian
- ○ Bedrock

### Water Level

- High Water Levels (> 90% percentile)
- Above Normal Water Levels (75% - 90% percentile)
- Normal Water Levels (25% - 75% percentile)
- Below Normal Water Levels (10% - 25% percentile)
- Low Water Levels (< 10% percentile)

* Percentile ranking based on last reported reading for the current month compared to all historical reported levels for that month.
A water level ranked at zero means that the present reported level 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 reported water level level is in the middle of the historical distribution.

Source data from: MN DNR Ground Water Level Monitoring Program

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