Minnesota Department of Natural Resources
Division of Ecological and Water Resources

Hydrologic Conditions Report

July 2019

Previous reports at: https://www.dnr.state.mn.us/current_conditions/hydro_conditions.html

- Precipitation for July 2019 followed a familiar pattern for the year so far: wet in the south and normal to slightly below normal in the north. The wettest locations were in an area from Mankato to Wabasha County. The highest total from a National Weather Service Cooperative Observer was 10.17 inches near Theilman in Wabasha County. This is 5.79 inches above normal. One of the drier locations was at Leech Lake in north central Minnesota with 1.77 inches or 2.47 inches below normal. The July statewide average was 5.53 inches or 1.50 inches above normal. For 2019 through July 31, the Twin Cities International Airport recorded 24.81 inches. This is 6.94 inches above normal and the 5th wettest January-July on record for the Twin Cities back to 1871. The U. S. Drought Monitor map dated July 30 depicts 4.5% of the state in the Abnormally Dry category, confined to northeastern Minnesota. This is a reduction from June conditions. The U.S. Drought Monitor index is a blend of science and subjectivity where drought categories (Moderate, Severe, etc.) are based on several indicators.

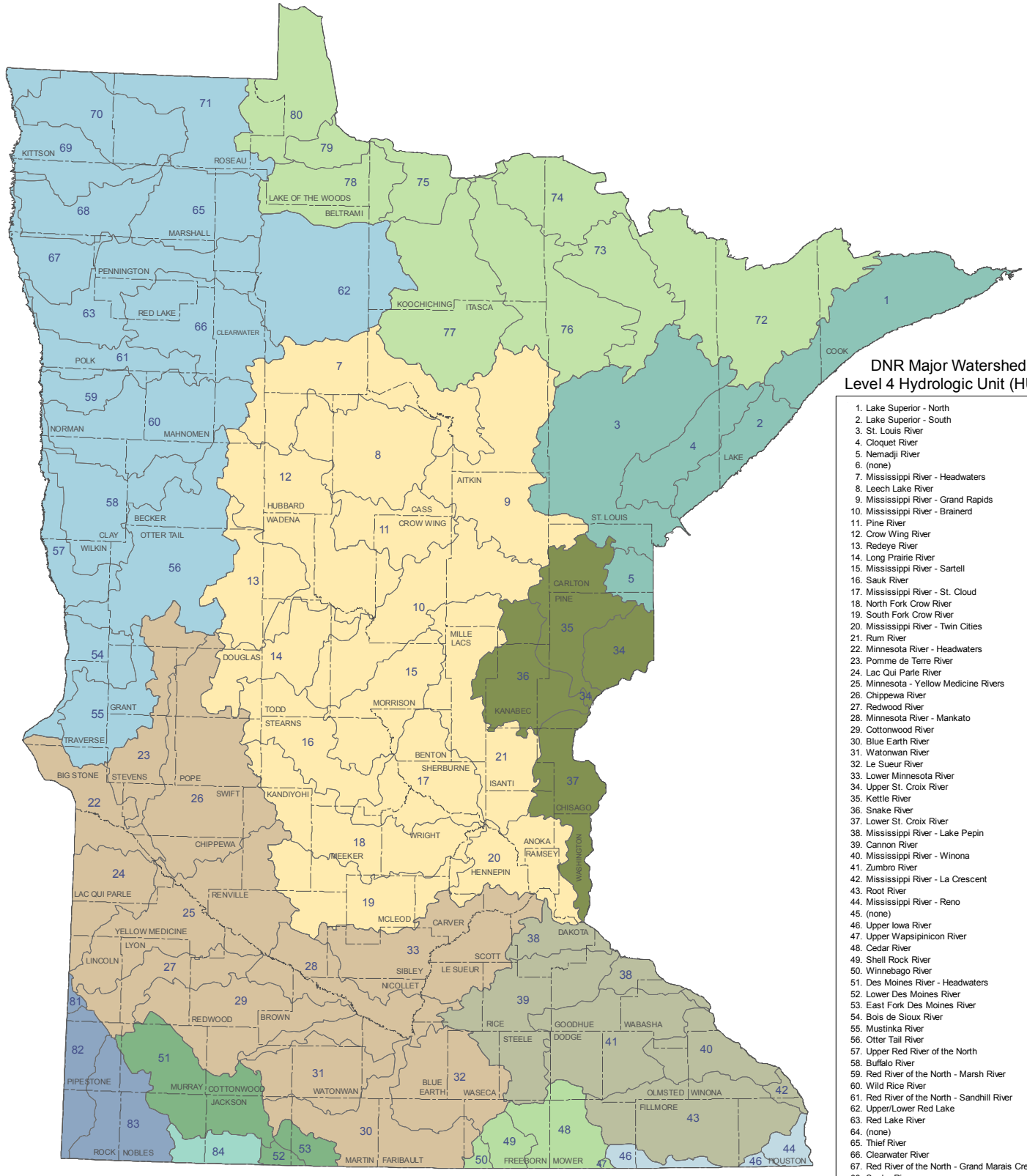
- The trend in stream flow conditions continues from June's values across the state. Higher than normal flows were measured in the south. There are mostly normal flows in the north. Watersheds 73, 74, and 76 in the Rainy River watershed are ranked at Below Normal (10-25th percentile). This area of the state was also noted as "Abnormally Dry" on the July 30 Drought Monitor.

- Although most lakes decreased in elevation over the month, 52% of the lakes with reported lake levels are still High or Above Normal when comparing July 2019 lake levels to their entire historic record. Seventy-one percent of gaged lakes showed July lake elevations above their average lake level of the entire historic record. Over 68% of these "above average" lakes reported lake elevations more than ½ foot higher than their average. Lakes in Morrison, Pine, Washington, and Le Sueur Counties reached their highest reported lake level in July. Ten of the 23 selected lakes in this report showed High or Above Normal percentiles in July. Two lakes in NE Minnesota showed Below Normal and Low percentiles again for this month.

- Groundwater levels for July 2019 remain relatively high in our indicator well network across much of Minnesota. Above normal water levels are especially prevalent in the southern half of the state. Eight well locations report High (> 90th percentile) water levels, and all but two reporting locations show water levels at Normal (25-75th percentile) or higher level. One of those two, a bedrock well in St. Louis County reporting Below Normal (10-25th percentile) water levels, is located within the area the U.S. Drought Monitor has classified as Abnormally Dry (as discussed above). The second of those two wells is monitoring a buried artesian aquifer in Marshall County and is reporting Low (< 10th percentile) water levels. This well has shown seasonal drawdown during summer and fall months as well as a steadily declining trend over the last several decades. Several indicator wells in northwest Minnesota experienced declining water levels from June 2019 to July 2019. Meanwhile, in the southern half of the state, several indicator wells increased water levels from June 2019 to July 2019. These indicator wells are generally located in areas of the state that have received above average precipitation in July 2019, which can be seen in the Climatology portion of the July 2019 Hydrologic Conditions Report.

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 DNR Climatology Office: climate@umn.edu

Minnesota Counties and Major Watershed Index



DNR Major Watershed - Level 4 Hydrologic Unit (HUC8)

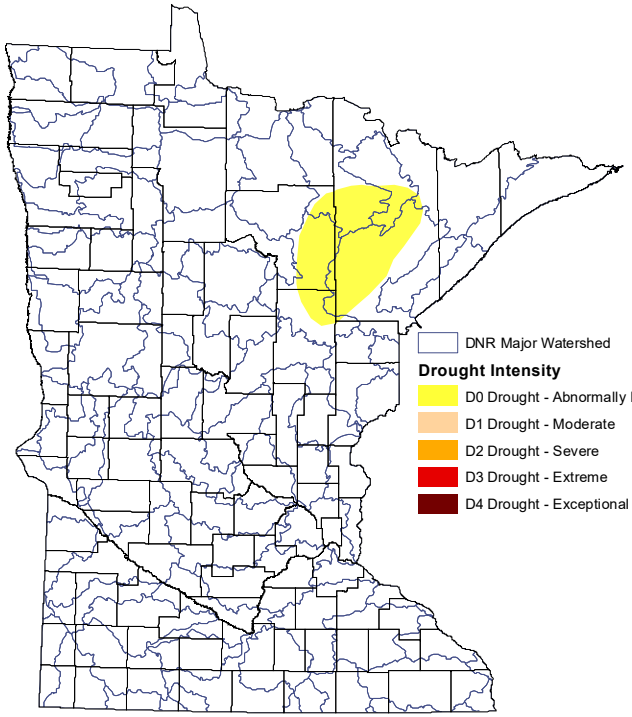
1. Lake Superior - North
2. Lake Superior - South
3. St. Louis River
4. Cloquet River
5. Nemadji River
6. (none)
7. Mississippi River - Headwaters
8. Leech Lake River
9. Mississippi River - Grand Rapids
10. Mississippi River - Brainerd
11. Pine River
12. Crow Wing River
13. Redeye River
14. Long Prairie 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

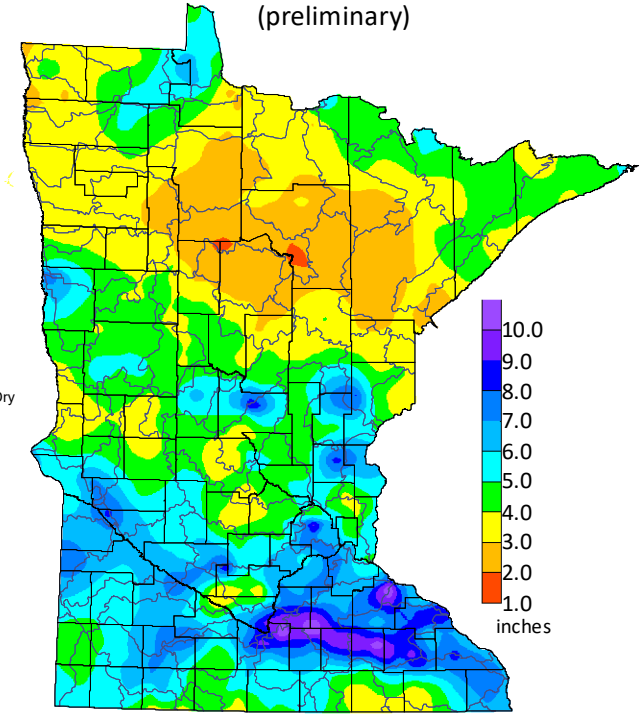
Climatology

U.S. Drought Monitor
July 30, 2019



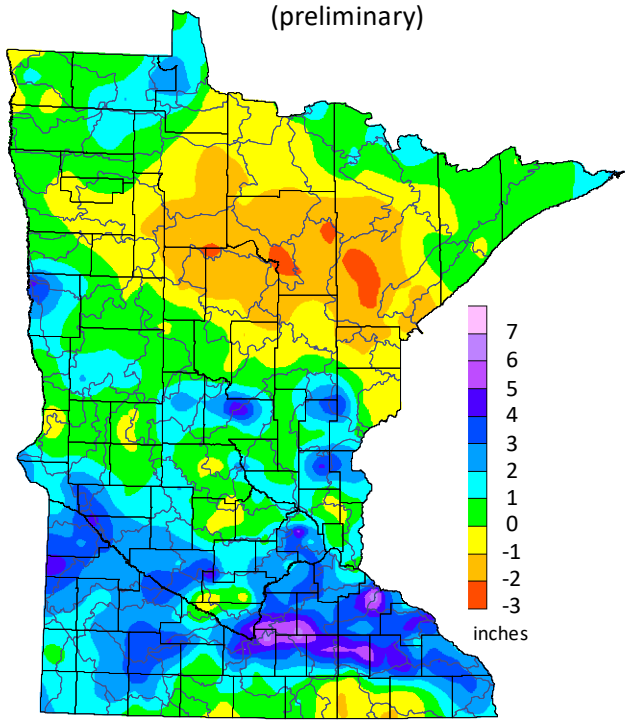
Total Precipitation
July 2019

(preliminary)

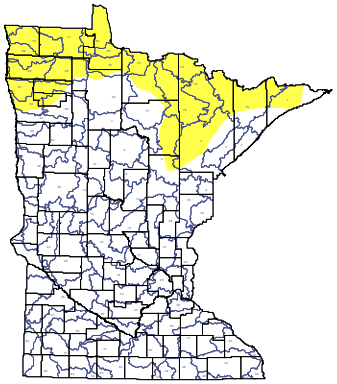


Total Precipitation
Departure from Normal:
July 2019

(preliminary)



July 2, 2019



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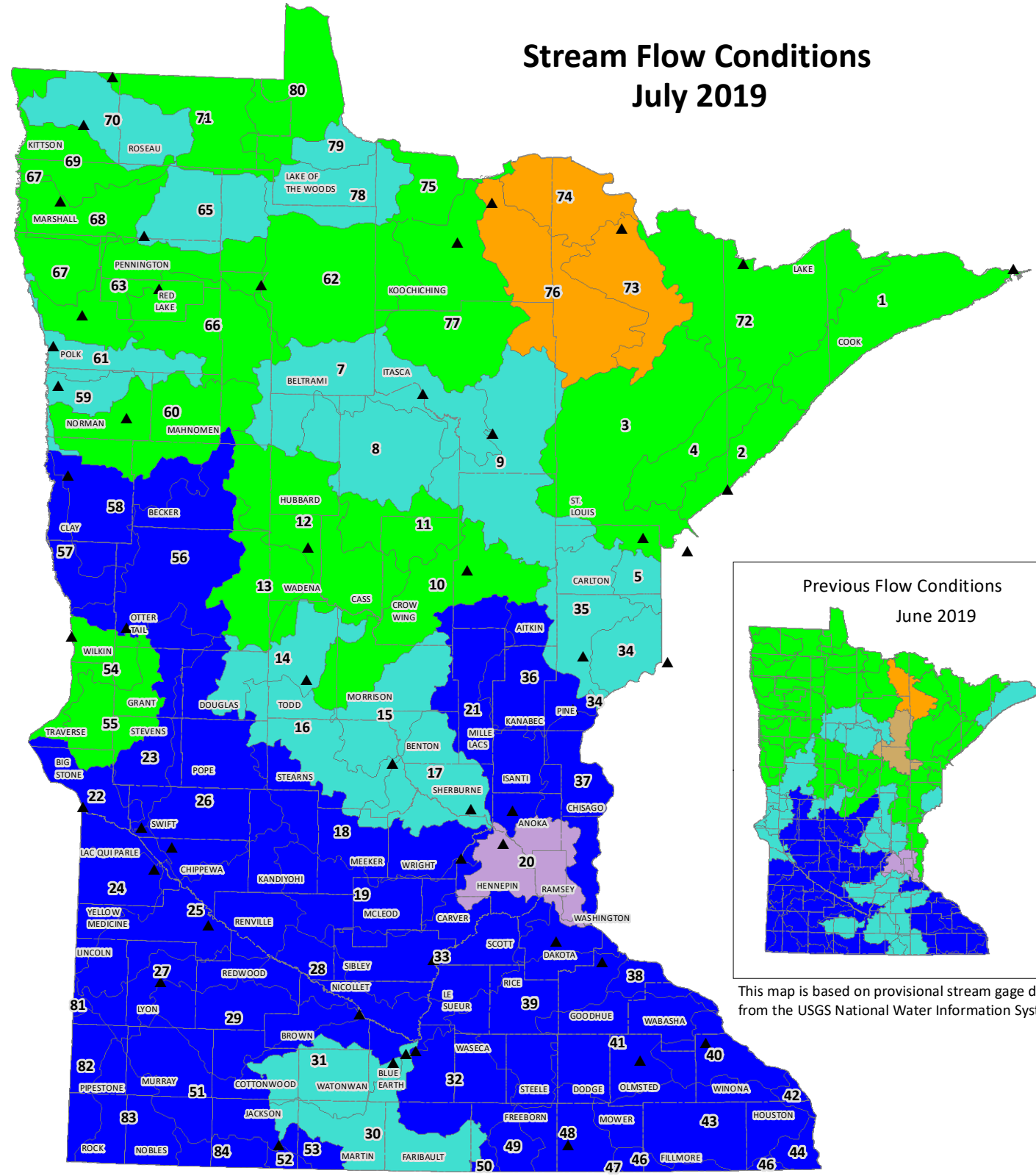
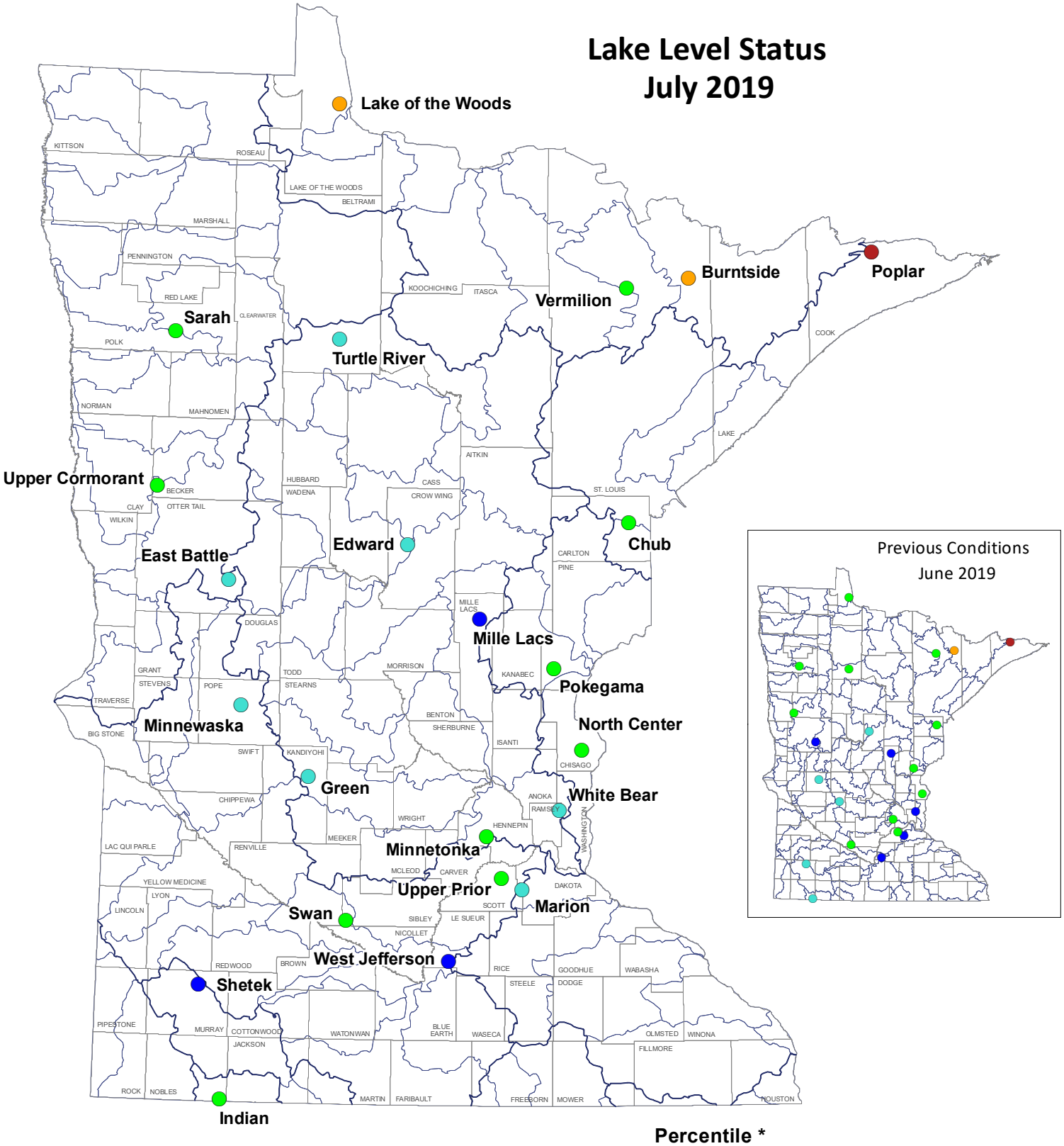
Surface Water: Stream Flow



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.

Surface Water: Lake Levels



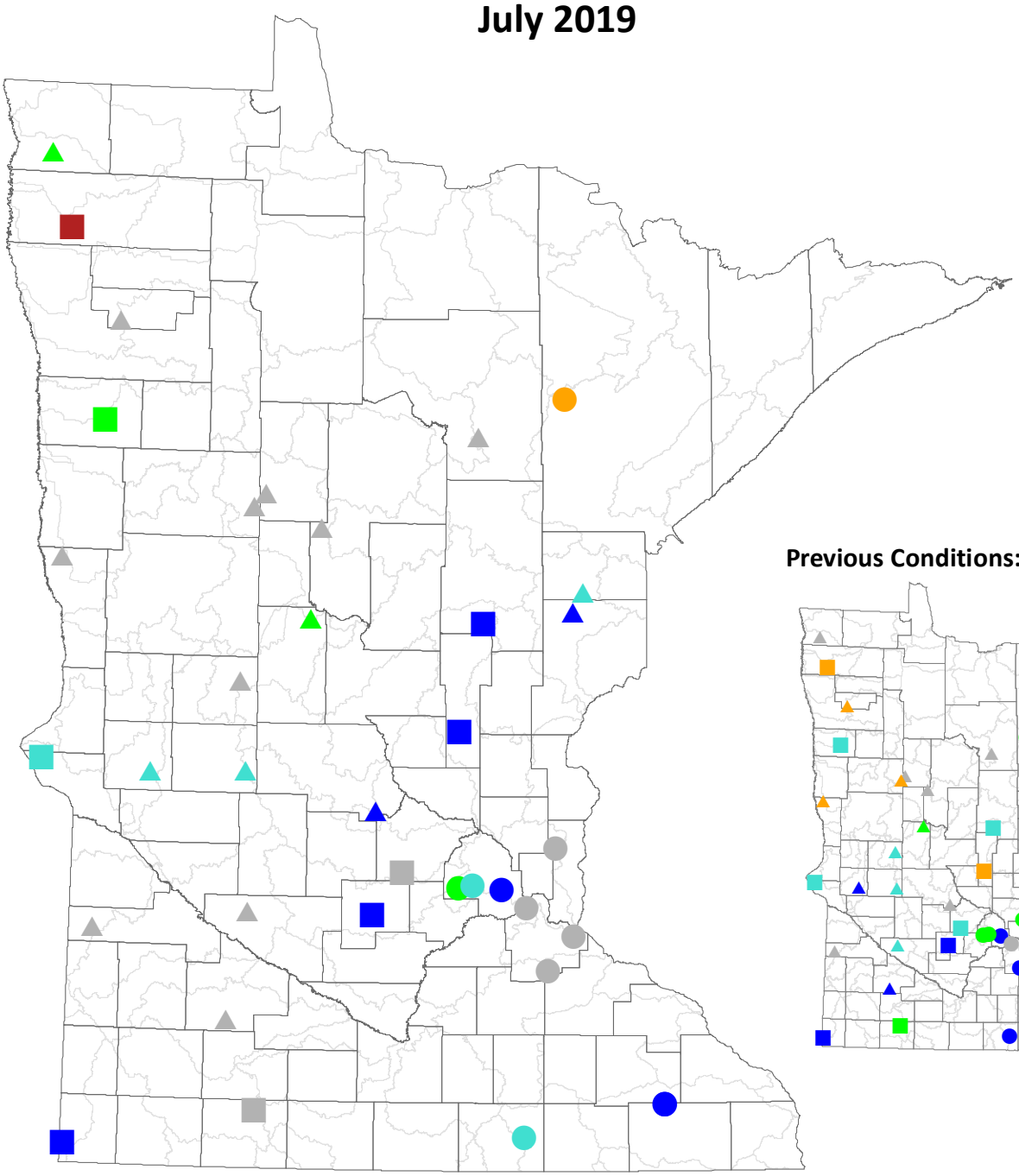
Percentile *

- High Water Levels (>90th percentile)
- Above Normal Water Levels (75 - 90th percentile)
- Normal Water Levels (25 - 75th percentile)
- Below Normal Water Levels (10 - 25th percentile)
- Low Water Levels (<= 10th percentile)
- No reading available
- Level 2 Hydrologic Unit
- DNR Major Watershed

* 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.

Source data from: MN DNR Waters Lake Level Minnesota Monitoring Program

Groundwater Level Historical Rankings
July 2019



Previous Conditions: June 2019

* 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 is in the middle of the historical distribution.

Source data from: MN DNR Groundwater Level Monitoring Program

Percentile *

- High Water Levels (>90th percentile)
- Above Normal Water Levels (75 - 90th percentile)
- Normal Water Levels (25 - 75th percentile)
- Below Normal Water Levels (10 - 25th percentile)
- Low Water Levels (<= 10th percentile)
- No reading available

Aquifer Type

- Water Table
- Bedrock
- Buried Artesian