DEPARTMENT OF NATURAL RESOURCES

Climate trends affecting lakes and rivers

Aside from typical year-to-year variations, the main climate trends affecting shorelands and floodplains are:

- More frequent and extreme precipitation events.
- Increasing water temperatures.

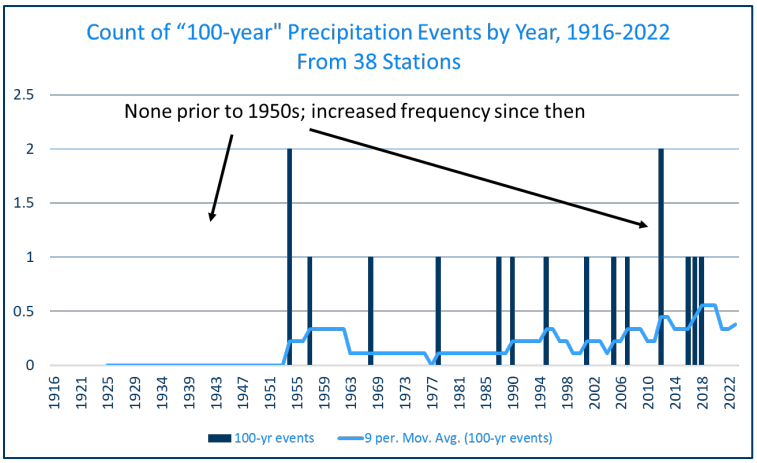
These trends increase the risks of flooding, contribute to algae and aquatic plant growth, and reduce water clarity. They also result in changes to lake and river ecosystems over time, affecting fish and wildlife. Human development near water has always carried these risks, and climate trends are amplifying them. Public waters and their shorelands and floodplains are statewide resources that are especially vulnerable to climate trends. They are also valuable assets for local community health, safety and prosperity.

Rate of change is accelerating

Long-term data for air temperature and precipitation show that the rate of change (measured per decade) from 1970 to present is significantly higher than the rate of change from 1895 to 1969.

More frequent and extreme rain events

Minnesota is experiencing more extreme rainfall events with greater frequency than any time on record.



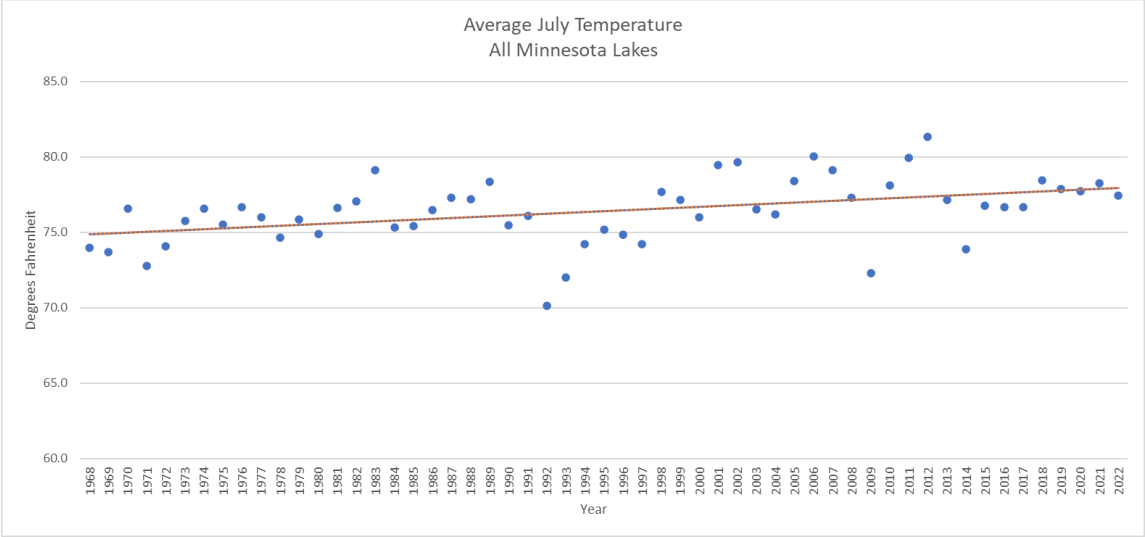
- Since 2000, widespread rains of more than six inches are four times more frequent than in the previous three decades in Minnesota.
- Long-term observation sites in Minnesota have seen dramatic increases in one-inch rains, three-inch rains, and the amount of the heaviest rainfall of the year.

Lakes are getting warmer

Rising air temperature in Minnesota are causing Minnesota lake temperatures to warm and lake ice season to shrink.

- Minnesota lake surface temperatures have warmed during all seasons and throughout the entire state. During July and August, Minnesota lakes are about 3.06 – 3.78° Fahrenheit warmer now, on average, than 50 years ago. Each dot in Figure 1 is the average July surface water temperature of all Minnesota lakes sampled for each year since 1968.

- Minnesota lakes have lost an average of 10 to 14 days of ice cover in the past 50 years.



Data resources for local governments

Local governments can explore climate data for their communities with these two online resources:

Minnesota Climate Explorer. This DNR-developed web tool allows users to view, graph and download historical and projected future data for average, minimum and maximum temperature, and precipitation statewide, as well as at the county, watershed and other management levels.

Surface Water and Climate Data Viewer. This MPCA-developed web tool allows users to view, graph and download surface water temperatures for lakes and streams, individually or grouped by county, region or statewide.

The Minnesota DNR – Your climate and natural resource partner

Housing the State Climatology Office and many natural resource research and management programs, the DNR has significant technical resources on climate and natural resources to share with local governments to support land use decisions that sustain these resources and local community prosperity.