



Capitol Region Watershed District 2024 Climatological Summary



CRWD 2024 Climatological Summary

Saint Paul, Minnesota

Cover image: Crosby Farm Regional Park in Capitol Region Watershed District, June 2024.



2024 Climatological Summary

Contents

- 1 Introduction 4
 - 1.1 Purpose..... 4
 - 1.2 Background 4
 - 1.3 Goals 4
 - 1.4 Methods..... 4
- 2 Results..... 5
 - 2.1 Temperature 5
 - 2.2 Annual Precipitation 9
 - 2.2.1 Total Annual Precipitation 9
 - 2.2.2 Total Monthly Precipitation 11
 - 2.2.3 Daily Precipitation 11
 - 2.2.4 District Precipitation Monitoring Stations..... 11
 - 2.3 Total Annual Snow, Winter Snowpack, and Meteorological Winter Total Snow 16
 - 2.4 Growing Season Precipitation 19
 - 2.5 Water Year Precipitation 20
 - 2.6 Lakes 23
 - 2.6.1 Ice-In and Ice-Out 23
 - 2.6.2 Surface Water Temperature 23
 - 2.7 Notable Climatological Events 25
 - 2.8 Drought..... 26
- 3 Summary..... 27
- 4 References 28
- 5 Appendix..... 30

1 Introduction

1.1 Purpose

The purpose of this report is to summarize 2024 climatological data within the boundaries of Capitol Region Watershed District (CRWD) in Saint Paul, Minnesota.

1.2 Background

According to the Department of Natural Resources (DNR) State Climatology Office, Minnesota is already experiencing substantial winter and nighttime warming and more frequent extreme precipitation events as a result of climate change (DNR, 2025). These trends are expected to worsen along with increased summer temperatures and longer periods of drought. Climatological events directly impact District water resources, projects, and programs. Some examples of this include precipitation's effect on watershed loading to receiving water bodies, flooding and flood mitigation planning, and design and installation of stormwater best management practices (BMPs). CRWD uses climatological data to calculate total annual precipitation, runoff, and nutrient and pollutant loading, as well as to assess effects of drought and flooding in the District. It is important to document and analyze climatological data and other noteworthy climatological events to assess their impact and how they change over time due to climate change. Because of this, the District has begun analyzing temperature, growing season precipitation, anomalous weather events, drought, and other relevant climatological data to broaden our understanding of climate and climate change in the District.

1.3 Goals

The overall goal of the climatological summary is to act as a formal record of annual standard climatological data as well as notable and significant climatological events. Over time, the summaries will allow the District to assess how the local climate has changed, as well as how the District has responded physically, hydrologically, etc.

1.4 Methods

The District utilizes precipitation data collected by the University of Minnesota (U of M) St. Paul Campus Climate Observatory and from the National Weather Service (NWS) at the Minneapolis-St. Paul (MSP) International Airport. The U of M Climate Observatory records precipitation every fifteen minutes from an automatic rain gauge located in the northwest portion of CRWD. The U of M rain gauge was used as CRWD's primary precipitation monitoring station for rainfall when possible due to its location in the District. Rainfall totals (15-minute and daily) were recorded by CRWD from the MN DNR website (DNR, 2024a). The NWS weather station at MSP airport, located approximately six miles south of the CRWD office, records hourly rainfall and snow water equivalent. Because of this, NWS MSP data is used for precipitation totals from December through April to account for snowfall. These variables were recorded by CRWD from the National Oceanic and Atmospheric Administration (NOAA) public website (NOAA, 2024a).

Additionally, CRWD operates four precipitation monitoring stations at different locations throughout the District. These monitoring stations consist of automatic tipping bucket-style rain gauges that log precipitation at a 0.01-inch resolution and are typically installed April through October apart from one

rain gauge installed year-round at the CRWD office. Due to differences in rain gauge installation and removal dates in 2024, precipitation data from May through September was compared instead. There is also a manual rain gauge installed year-round at the CRWD office that is checked daily; precipitation totals from this rain gauge are entered into the Community Collaborative Rain, Hail and Snow (CoCoRaHS) Network website.

Daily climate data including maximum and minimum temperature, precipitation, snow, and snow depth is utilized from the U of M as part of the NWS Cooperative Observer Program (COOP); this data is recorded by CRWD from the DNR website (DNR, 2024b). All temperatures are recorded in degrees Fahrenheit (F). District lake ice-out dates are also accessed from the DNR website (DNR, 2024c). All Minnesota drought data are acquired from the United States Drought Monitor, a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture (USDA) and NOAA (U.S. Drought Monitor, 2024). Information on significant climatological events is provided by the DNR State Climatology Office (DNR, 2024d).

District lake data including surface water temperatures and additional lake ice-in and ice-out information are collected by Ramsey County Public Works (RCPW) and sent to CRWD as part of an ongoing lake monitoring agreement.

2 Results

2.1 Temperature

Table 1 shows 2024 monthly average temperatures, 30-year normal monthly average temperatures, and departure from normal. Figure 1 shows 2024 average daily temperatures as compared to 30-year normal monthly average temperatures. Figure 2 shows meteorological winter average daily temperatures compared to 30-year normal monthly average temperatures. Meteorological winter is defined as December through February and is different than astronomical winter, December 21 through March 21, which begins with the winter solstice and ends with the spring equinox (DNR, 2024e). On average, January was 2.7 degrees warmer than normal, having only experienced 11 days of below-normal temperatures mid-month, which also represented the coolest temperatures of the entire winter. February was much warmer than normal with a monthly average temperature over 10 degrees higher than normal and saw the warmest February day on record in the Twin Cities (DNR, 2024f). March had a much smaller departure from normal—0.50 degrees warmer than normal—but still experienced one day with a maximum temperature of over 70 degrees.

With the exception of May (0.60 degrees warmer than normal), April through August all had average monthly temperatures cooler than normal, due in part to the wet conditions during the spring and summer (DNR, 2024g). In fact, August in the Twin Cities only saw one day with a temperature of 90 or higher, and this was the only 90+ degree day of the entire year. This trend did not last long, however, and September marked a return to consistent above-normal daily temperatures. October and November also averaged warmer than normal, with October representing the second largest departure from normal in 2024 (5.5 degrees warmer) behind February. December saw a fairly normal average monthly temperature, but experienced multiple swings from very warm to very cool conditions.

Table 1: 2024 monthly average temperatures (F) at the U of M NWS station, 30-year normal monthly average temperatures, and departure from normal.

Month	2024 Average Temperature	30-Year Normal Monthly Average Temperature	Departure from Normal
Jan	18.9	16.2	(+) 2.7
Feb	31	20.6	(+) 10.4
Mar	33.8	33.3	(+) 0.5
Apr	46.6	47.1	(-) 0.5
May	60.1	59.5	(+) 0.6
Jun	67	69.7	(-) 2.7
Jul	71.3	74.3	(-) 3.0
Aug	69	71.8	(-) 2.8
Sep	67.5	63.5	(+) 4.0
Oct	55	49.5	(+) 5.5
Nov	36.8	34.8	(+) 2.0
Dec	22.1	22	(+) 0.1
Annual	48.3	46.9	(+) 1.4

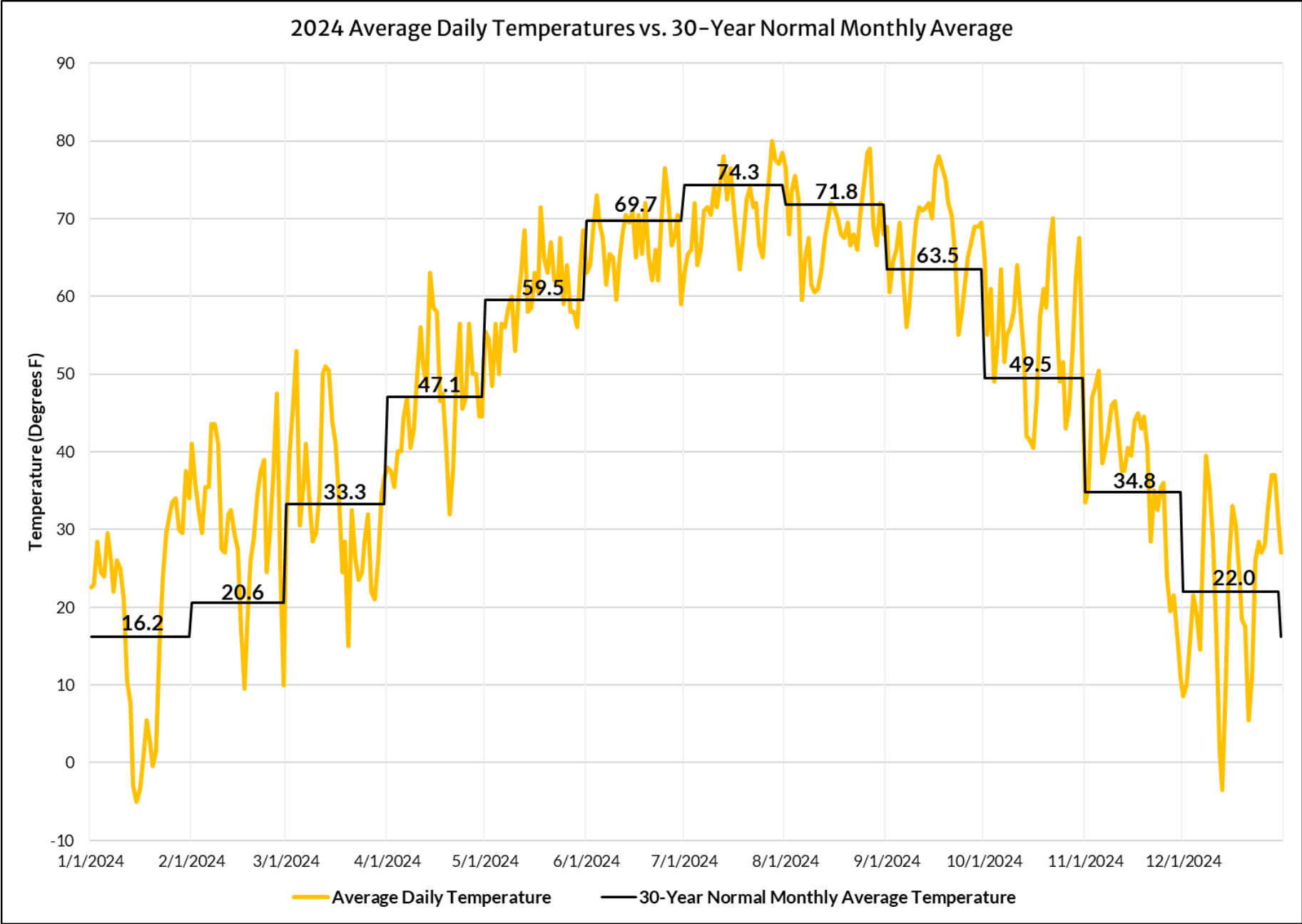


Figure 1: 2024 average daily temperatures at the U of M NWS station compared to 30-year normal monthly average temperatures (F).

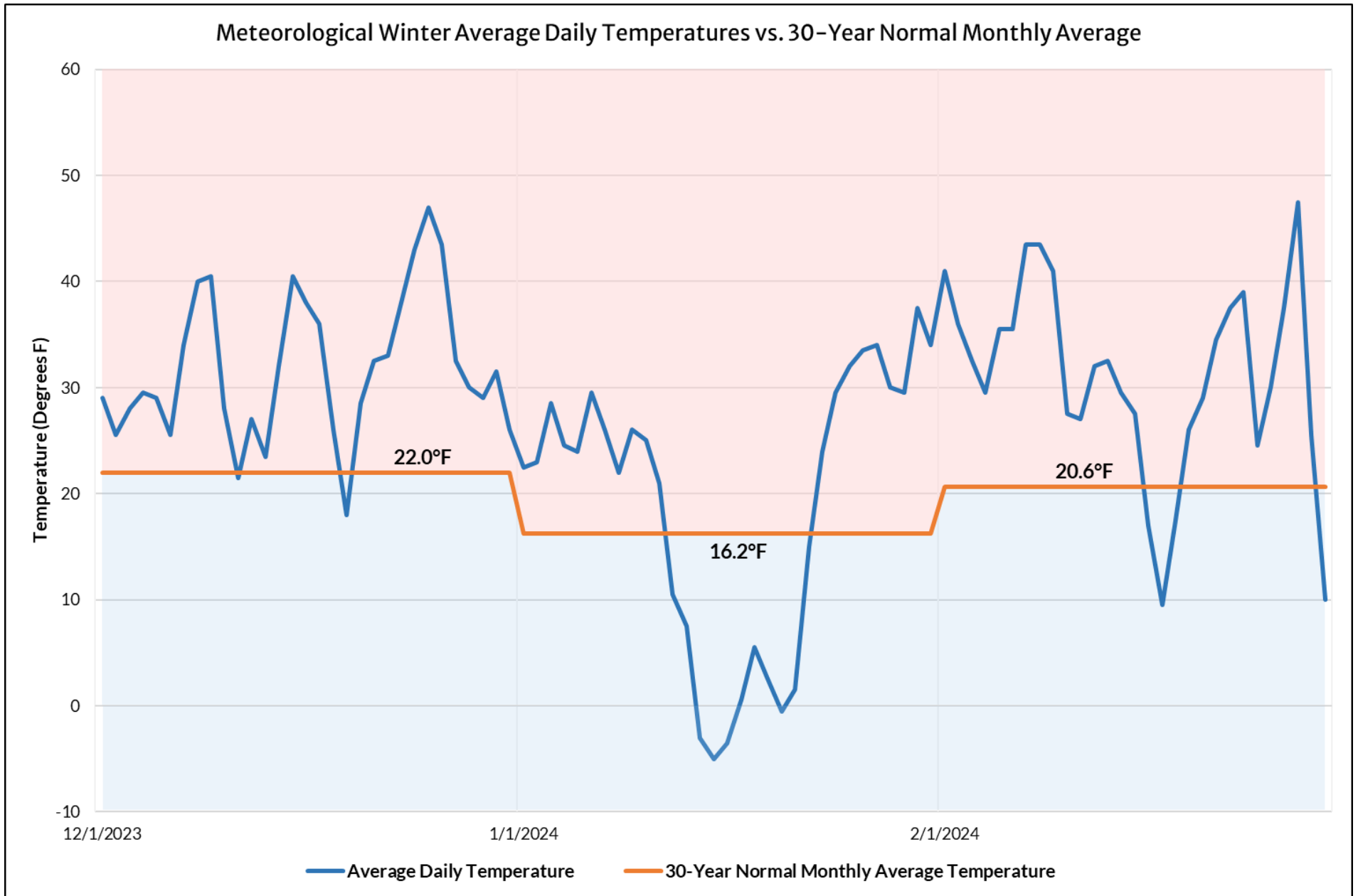


Figure 2: Meteorological winter (December 2023 – February 2024) average daily temperatures and 30-year normal monthly average temperatures.

2.2 Annual Precipitation

2.2.1 Total Annual Precipitation

The total amount of precipitation recorded in CRWD in 2024 was 32.12 inches, which is 0.50 inches more than the 30-year normal. Total precipitation includes both rainfall and snow water equivalent. The 30-year normal is recalculated every 10 years. In 2020, the annual 30-year normal was recalculated for 1991-2020 to be 31.62 inches (formerly 30.61 inches for the period from 1981-2010) (NOAA, 2024b). Annual precipitation data from 2010 to 2024 and departure from the 30-year normal can be seen in Table 2 and Figure 3.

Table 2: 2010-2024 annual precipitation in CRWD, 30-year normal, and departure from normal.

Year	Precipitation (inches)	Departure from 30-Year Normal
2010	36.32	(+) 4.70
2011	33.62	(+) 2.00
2012	30.26	(-) 1.36
2013	36.36	(+) 4.74
2014	35.66	(+) 4.04
2015	35.21	(+) 3.59
2016	40.66	(+) 9.04
2017	31.57	(-) 0.05
2018	29.59	(-) 2.03
2019	38.79	(+) 7.17
2020	21.99	(-) 9.63
2021	25.08	(-) 6.54
2022	22.01	(-) 9.61
2023	31.91	(+) 0.29
2024	32.12	(+) 0.50
30-Year Normal	31.62	--

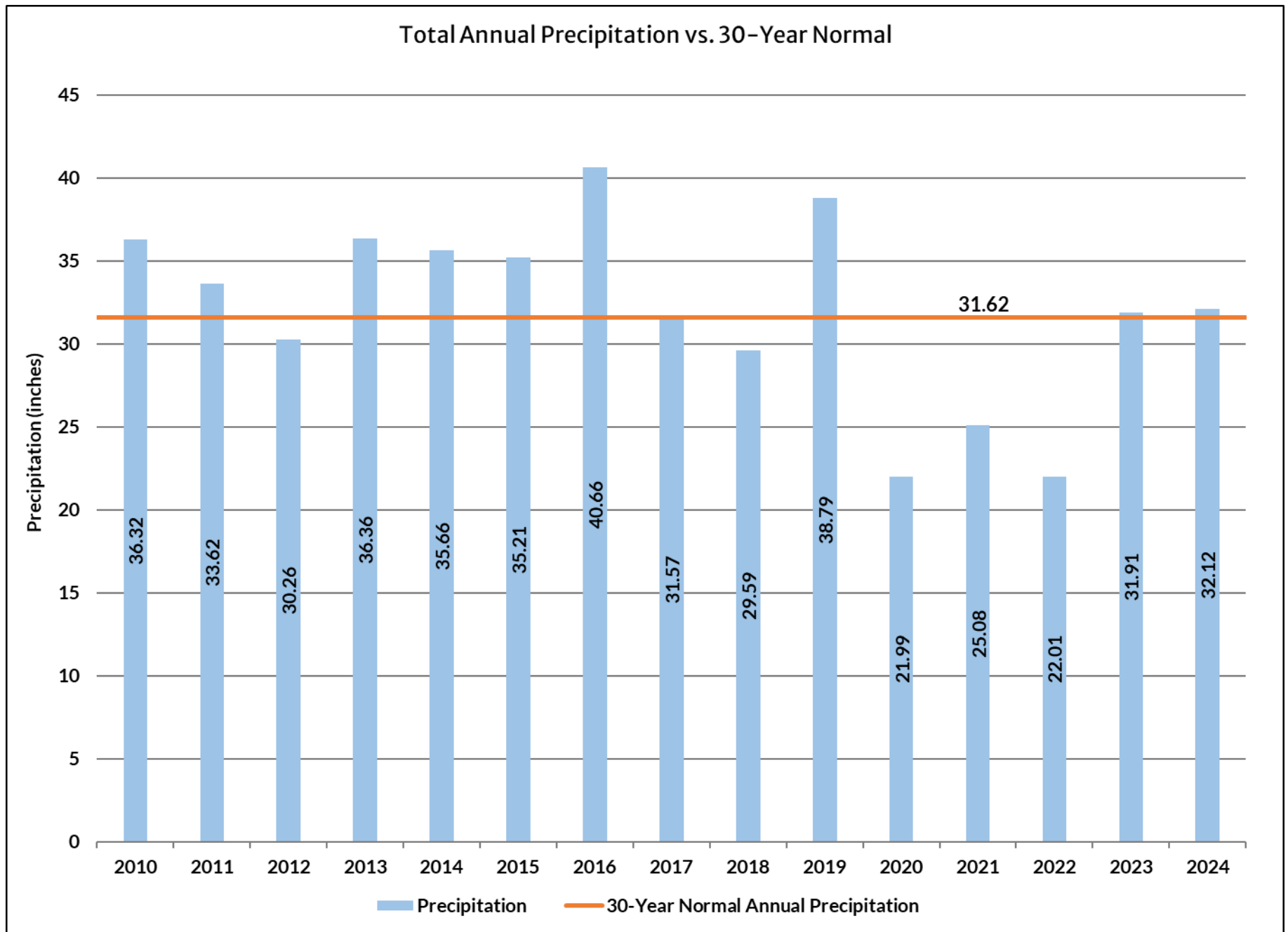


Figure 3: 2010-2024 annual precipitation in CRWD and 30-year normal annual precipitation.

2.2.2 Total Monthly Precipitation

Monthly precipitation totals and their comparison to 30-year normal precipitation can be seen in Figure 4. January and February were both below normal, however March through August were all above normal and particularly April through June saw the highest precipitation surpluses of the year. June had the highest positive departure from normal, with a total precipitation of 6.13 inches, 1.55 inches more than the 30-year normal of 4.58 inches. September and October were significantly drier, with September representing the largest departure from normal overall, at 2.43 inches below normal precipitation. Precipitation evened out in November and December, which both saw near-normal precipitation totals.

2.2.3 Daily Precipitation

Daily, monthly, and annual precipitation totals and their comparison to 30-year monthly and annual normal precipitation, and departure from normal can be seen in Table 3. Figure 5 shows daily precipitation and cumulative precipitation for 2024. The largest single-day precipitation total was on May 21st, with 1.96 total inches of precipitation.

2.2.4 District Precipitation Monitoring Stations

Figure 6 shows May through September precipitation totals for CRWD precipitation monitoring stations. The District experienced differing precipitation totals across the District, emphasizing the spatial variability of precipitation, even on a local scale. The western and southern portion of the District received the highest precipitation totals: 27.97 inches at the CRWD Office rain gauge in the west, and 27.35 inches at the Victoria Park rain gauge along the southern edge of the District. The Upper Villa rain gauge in the northern portion of the District had the next highest total (25.93 inches), followed by the eastern portion of the District, which received 22.63 inches of precipitation at the Trout Brook Nature Sanctuary rain gauge.

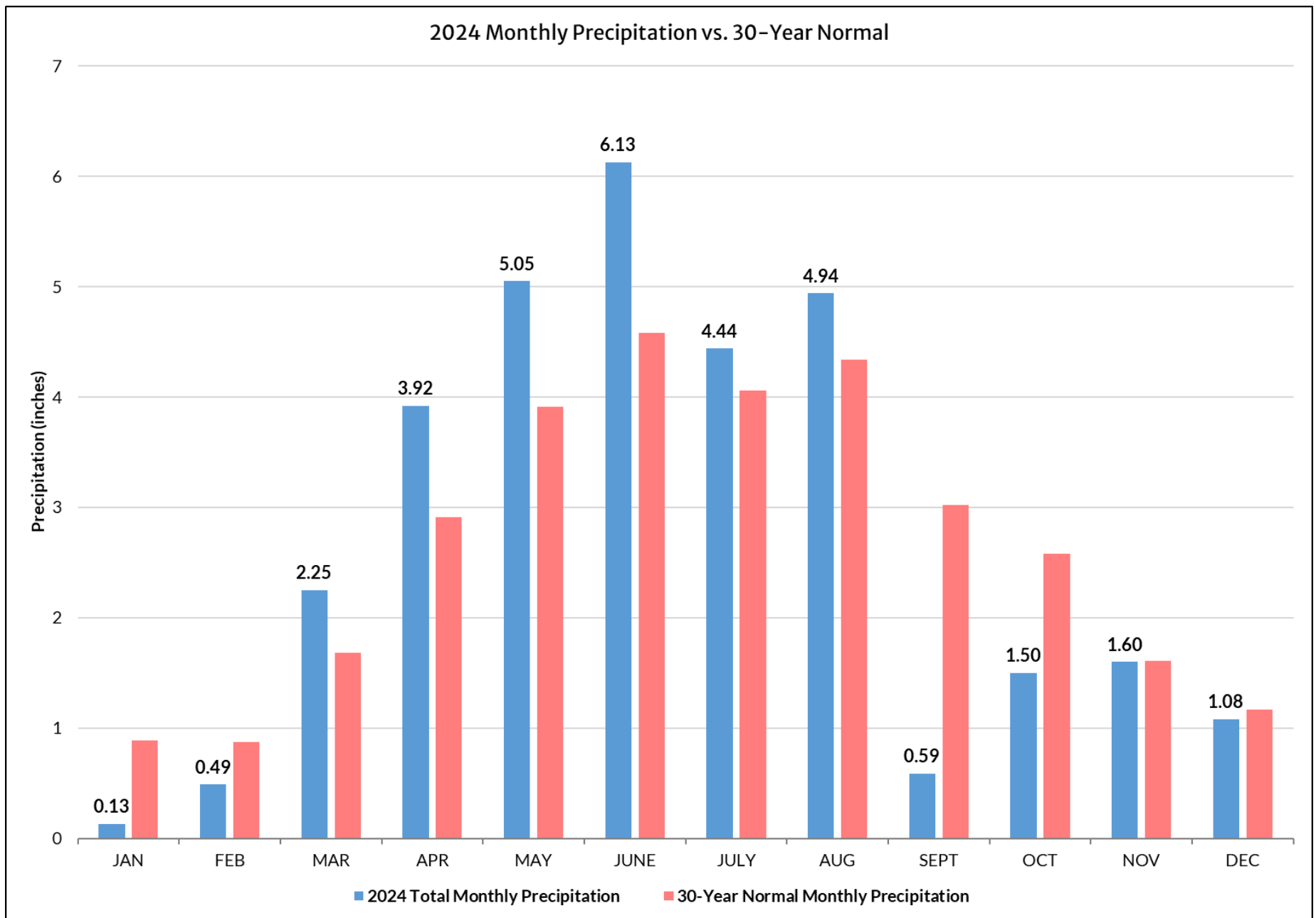


Figure 4: 2024 monthly precipitation totals in CRWD and 30-year normal monthly precipitation, in inches.

Table 3: 2024 daily, monthly, and annual precipitation totals in CRWD; 30-year normal monthly and annual precipitation, and departure from normal.

Day	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
1	0	0	0	0	0	0.06	0	0.58	0	0	0.01	0	
2	0	0	0	0.03	0.6	0.06	0.38	0	0	0	0	0.05	
3	0	0	0	0	0	0.32	0	0.06	0	0	0.02	0	
4	0	0	0	0	0.28	0.27	0.5	0	0	0	0.13	0	
5	0.01	0	0	0	0	0.08	0.01	1.48	0	0	0.31	0	
6	0.01	0	0	0	0	0	0	0	0.16	0	0	0	
7	0	0	0	0.59	0.42	0	0	0.02	0	0	0	0	
8	0.03	0.19	0	0.2	0	0.1	0.4	0.05	0	0	0	0	
9	0	0	0	0	0	0	0	0	0.00	0	0.06	0	
10	0.01	0	0	0	0	0	0	0	0	0	0.07	0	
11	0	0	0	0	0	0.07	0	0	0	0	0	0.03	
12	0.05	0	0	0	0	0.58	0	0	0	0.01	0	0	
13	0.01	0	0	0	0	0	0.2	0	0	0	0.05	0	
14	0	0.29	0	0	0	0	0.37	0	0	0	0	0.05	
15	0	0.01	0	0	0.12	0.84	0.07	0.56	0	0	0	0	
16	0	0	0	1.24	0	0.72	0	0.14	0	0	0	0	
17	0	0	0	0.29	0.27	0.64	0	0.05	0	0	0	0	
18	0	0	0	0	0.03	0.56	0	0	0	0	0.75	0	
19	0.01	0	0	0	0	0	0	0	0.04	0	0.2	0.2	
20	0	0	0	0	0.28	0.04	0	0	0	0	0	0.01	
21	0	0	0.13	0	1.96	0.33	1.51	0	0.39	0	0	0	
22	0	0	0.06	0	0.06	0.76	0.45	0.19	0	0	0	0	
23	0	0	0	0.05	0	0	0	0	0	0	0	0	
24	0	0	0.58	0	0.19	0	0	0	0	0.45	0	0	
25	0	0	0.78	0	0	0	0	0	0	0	0	0	
26	0	0	0.7	0.08	0.03	0	0	0.73	0	0	0	0	
27	0	0	0	0.28	0.24	0.02	0	0.76	0	0	0	0.62	
28	0	0	0	0.74	0.08	0.68	0.28	0	0	0	0	0.12	
29	0	0	0	0.08	0	0	0.03	0.32	0	0	0	0	
30	0		0	0.34	0	0	0	0	0	0	0	0	
31	0		0		0.49		0.24	0		1.04		0	Totals
Monthly Total	0.13	0.49	2.25	3.92	5.05	6.13	4.44	4.94	0.59	1.50	1.60	1.08	32.12
Monthly Normal	0.89	0.87	1.68	2.91	3.91	4.58	4.06	4.34	3.02	2.58	1.61	1.17	31.62
Departure from Normal	-0.76	-0.38	0.57	1.01	1.14	1.55	0.38	0.60	-2.43	-1.08	-0.01	-0.09	0.50
	Data supplied by NWS-MSP												
	Data supplied by UMN												
	No data												

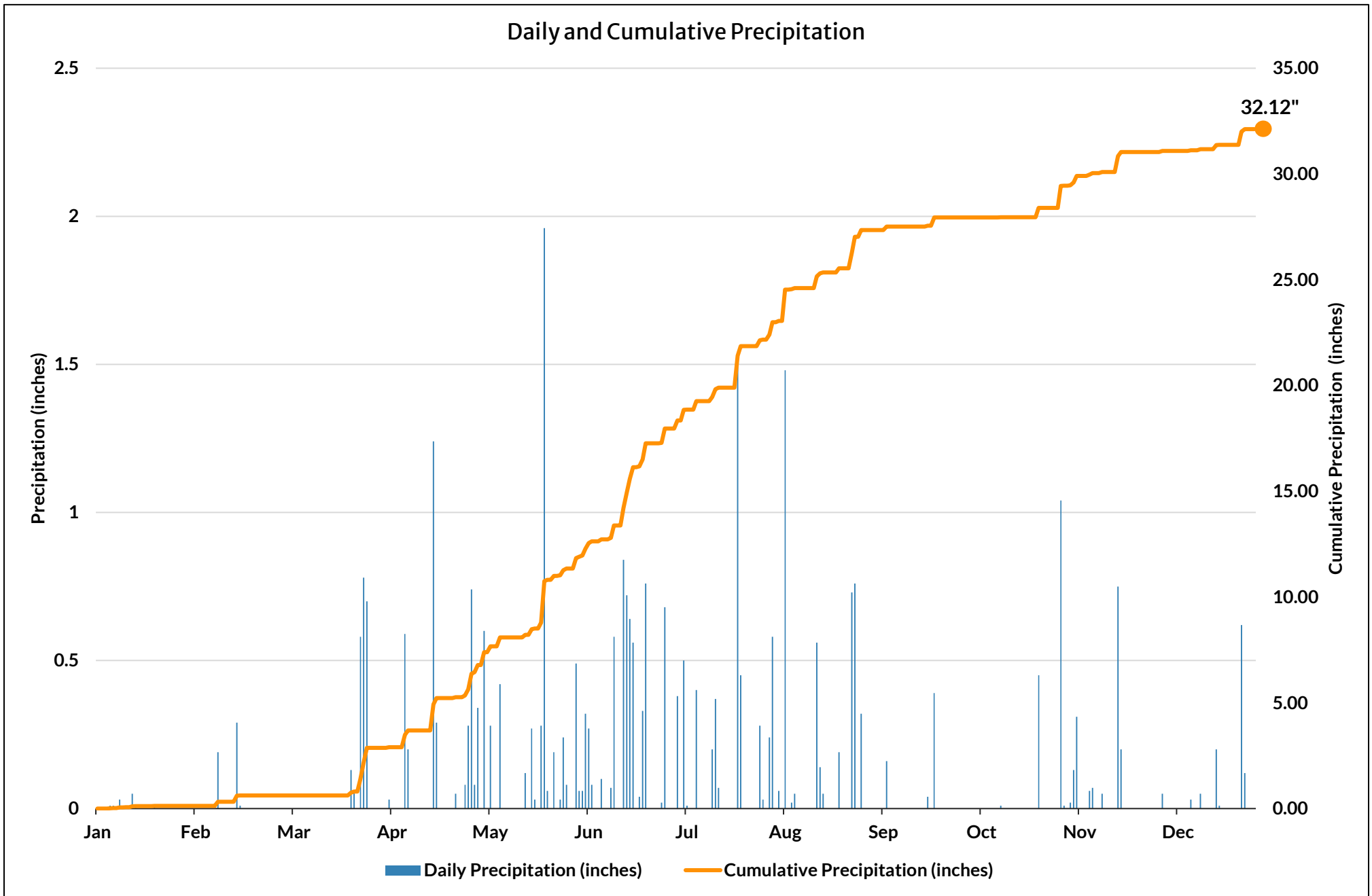


Figure 5: 2024 daily and cumulative precipitation in CRWD.

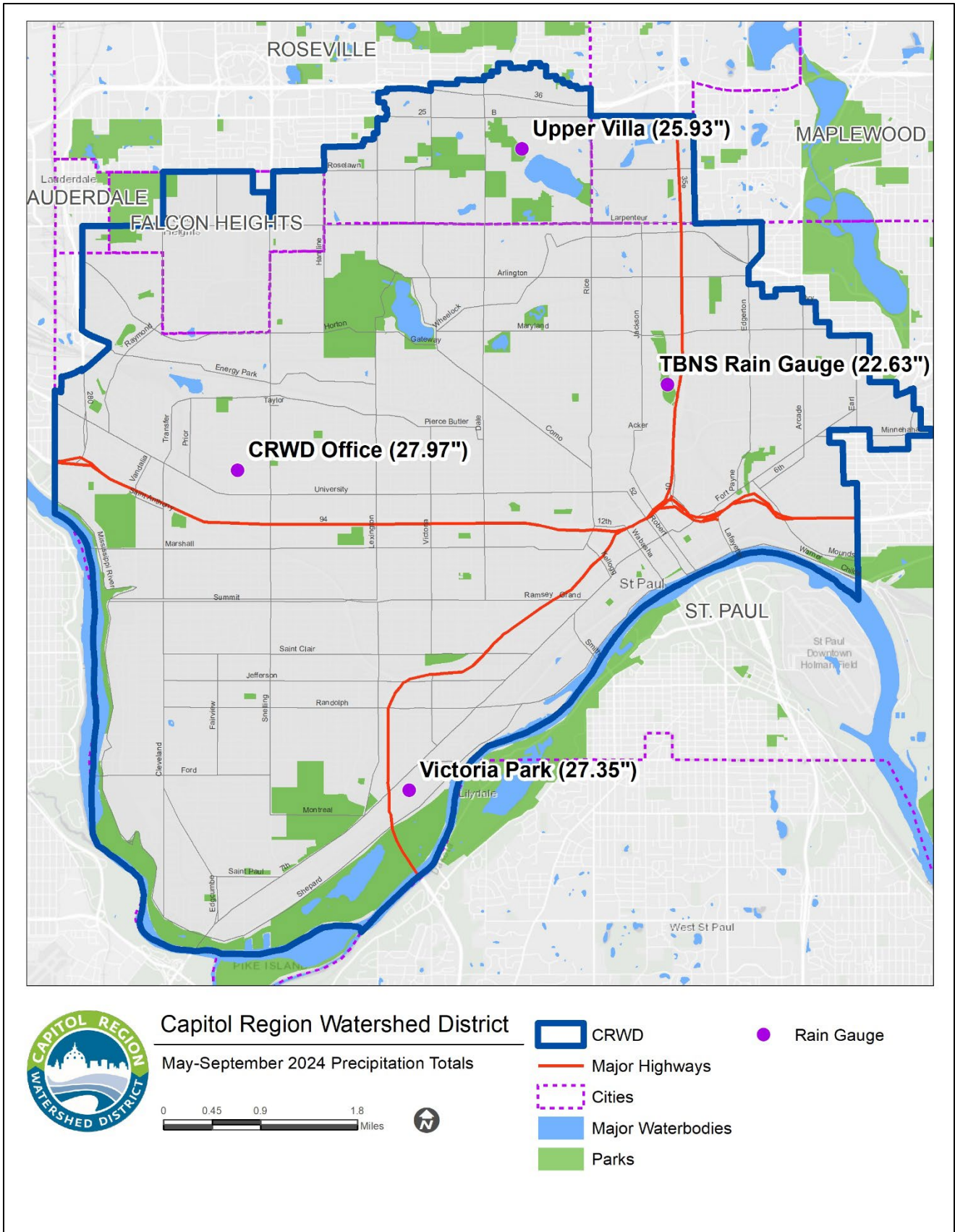


Figure 6: CRWD precipitation monitoring stations and May-September 2024 precipitation totals.

2.3 Total Annual Snow, Winter Snowpack, and Meteorological Winter Total Snow

Total annual snow in the District can be seen in Table 4. CRWD experienced 31.50 inches of snowfall in 2024, 19.70 inches below the 30-year normal. From October 2023 to April 2024, 28.30 inches of snow fell, a stark difference from the previous year, which saw 82.70 inches of snow during the same timeframe. Snowpack depth and maximum daily temperature is shown in Figure 7. Snowpack depth peaked on March 25th with 7 inches of snow, which was totally absent by April 1st. Figure 8 shows total meteorological winter snow going back to 2013-2014, as well as the 30-year normal meteorological winter snow. The total meteorological winter snow for December 2023 through February 2024 was 10.2 inches, which is 21.7 inches below the 30-year normal of 31.9 inches.

Table 4: 2010-2024 annual total snow in CRWD, 30-year normal, and departure from normal.

Year	Total Snow (inches)	Departure from 30-Year Normal
2010	60.20	(+) 9.00
2011	52.00	(+) 0.80
2012	30.80	(-) 20.40
2013	73.00	(+)21.80
2014	76.20	(+) 25.00
2015	34.31	(-) 16.89
2016	37.70	(-) 13.50
2017	25.90	(-) 25.30
2018	80.70	(+) 29.50
2019	86.90	(+) 35.70
2020	23.90	(-) 27.30
2021	31.10	(-) 20.10
2022	59.70	(+) 8.50
2023	54.40	(+) 3.20
2024	31.50	(-) 19.70
30-Year Normal	51.20	--

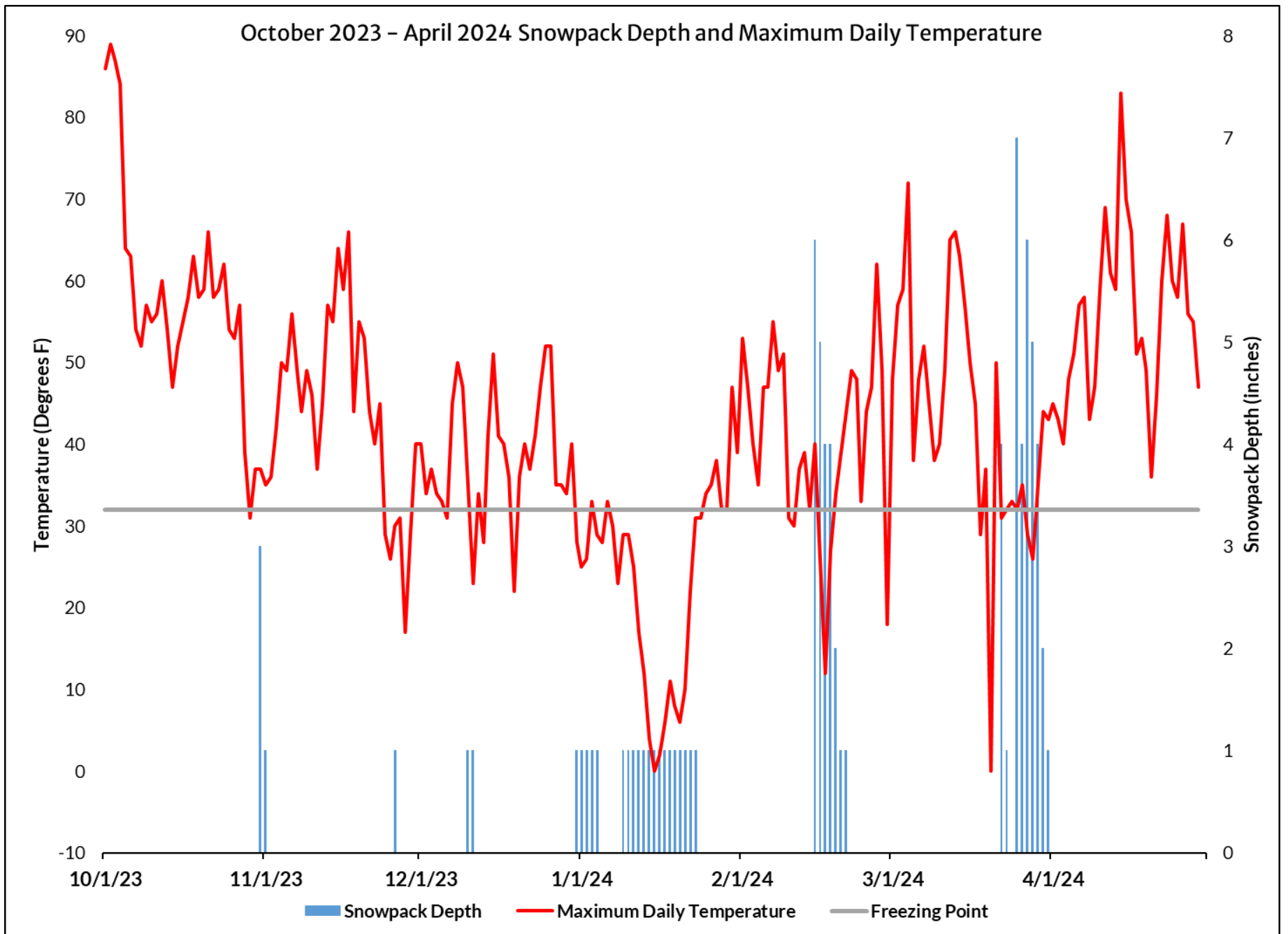


Figure 7: October 2023 through April 2024 snowpack depth, maximum daily temperatures, and freezing point (32 degrees F).

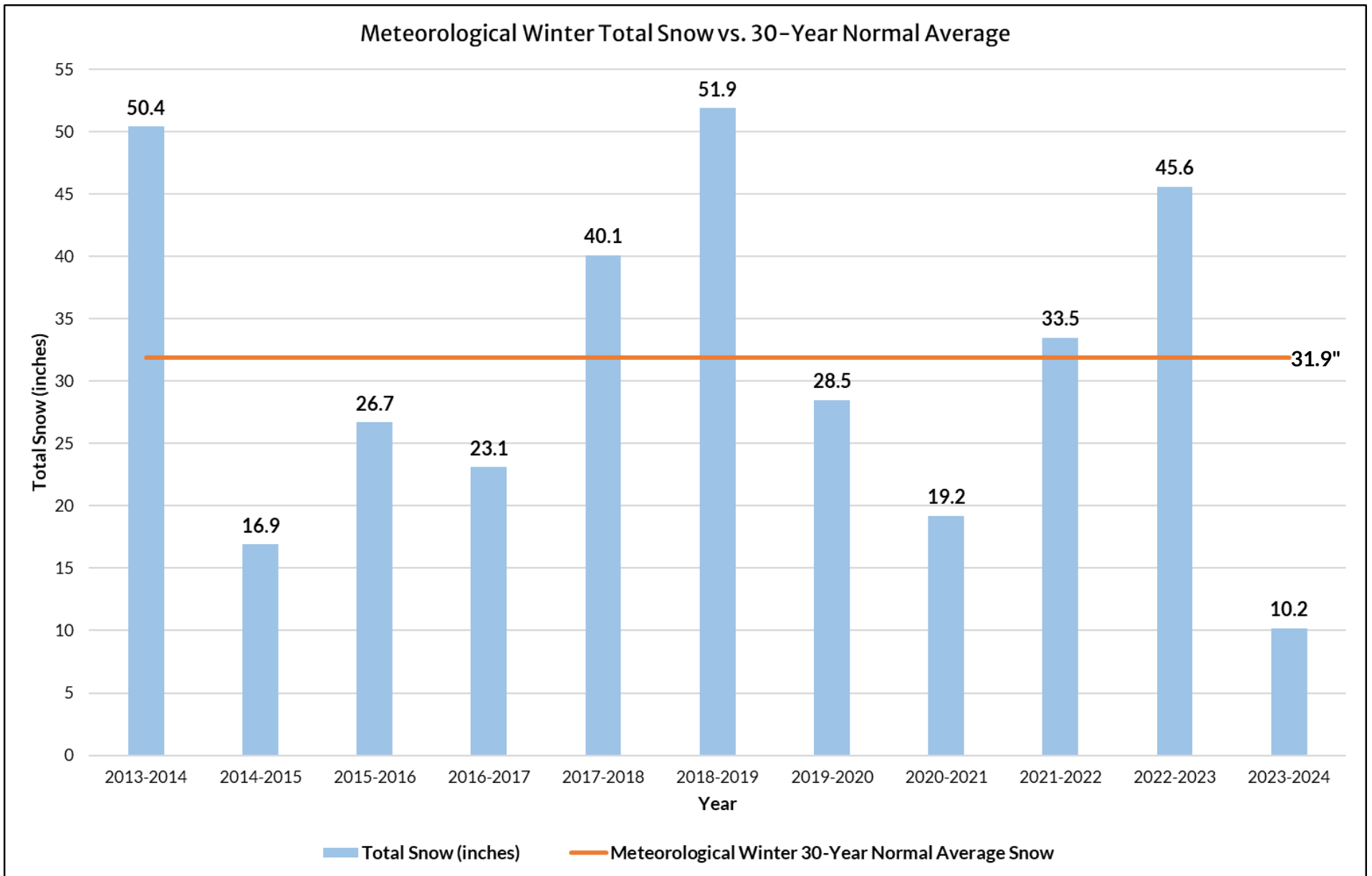


Figure 8: Meteorological winter (December – February) total snow and 30-year normal average meteorological winter snow.

2.4 Growing Season Precipitation

The growing season is determined by the last spring freeze and the first fall frost, but in Minnesota is typically from May through September. It is important to characterize precipitation during the growing season in Minnesota since most of the District's tree and plant growth occurs during this timeframe. According to the U.S. Department of Agriculture (USDA), climate change has caused growing seasons to become longer, however it has also caused a change in precipitation patterns and more frequent and severe extreme precipitation events. Precipitation changes due to climate change can cause excess precipitation during off seasons and limited water availability during critical plant growth periods (USDA, 2025). 2017 through 2024 growing season precipitation in CRWD and departure from normal can be seen in Table 5. Growing season precipitation event totals and maximum daily temperatures are shown in Figure 9.

After four consecutive years of below-normal growing season precipitation, the 2024 growing season in CRWD finally bounced back, totaling 22.64 inches of precipitation, 2.73 inches more than the normal of 19.91. Despite a dry winter, wet conditions that began in spring persisted throughout the majority of the growing season and pulled the state fully out of drought for the first time since June of 2022 (U.S. Drought Monitor, 2024). At least 95% of the state experienced above-normal precipitation in May, with many areas receiving precipitation that was over 50% more than normal (DNR, 2024g). The UMN rain gauge saw 17 total days of rain in the month of June, with at least part of the state seeing rain fall on average about every two days (DNR, 2024h). July and August had the second and third highest 24-hour precipitation totals of 2024 respectively, with 1.51 inches of rain falling on July 21st and 1.48 inches falling on August 5th; both events also had the highest 15-minute precipitation totals of the year.

The wet growing season ended abruptly in September. Warm weather and abundant sunshine allowed drought to return again and led to the driest September on record in the Twin Cities (DNR, 2024i). According to the DNR, many stations recorded less than 5% of their normal precipitation from September 1st through October 23rd (2024i).

Despite dry and even drought conditions during winter, spring, and fall, the 2024 growing season was very wet and brought an end to the multi-year growing season deficits that have impacted tree and plant growth the past several years.

Table 5: 2017-2024 growing season precipitation in CRWD and departure from normal.

Growing Season (May-September)	Inches of Precipitation	Departure from Normal
2017	19.75	(-) 0.16
2018	20.51	(+) 0.60
2019	22.88	(+) 2.97
2020	14.24	(-) 5.67
2021	13.88	(-) 6.03
2022	10.05	(-) 9.86
2023	16.47	(-) 3.44
2024	22.64	(+) 2.73
Normal	19.91	--

2.5 Water Year Precipitation

In addition to calendar year precipitation, the Minnesota State Climatology Office also uses water year precipitation, which runs from October 1st to September 30th of the following year. The water year is used by hydrologists because water levels are typically lowest near October 1st. The water year is defined by the year in which it ends, for example, the 2024 water year begins on 10/1/2023 and ends on 9/30/2024. Thus, the water year represents the beginning of the season of soil moisture recharge and ends with season of maximum soil moisture utilization, according to the American Meteorological Society (AMS) (AMS, 2025). Water year precipitation totals for 2015 through 2024, and 30-year normal annual precipitation are shown in Figure 10. The 2024 water year precipitation total in CRWD was 36.07 inches, which is 4.45 inches above the 30-year normal annual precipitation of 31.62.

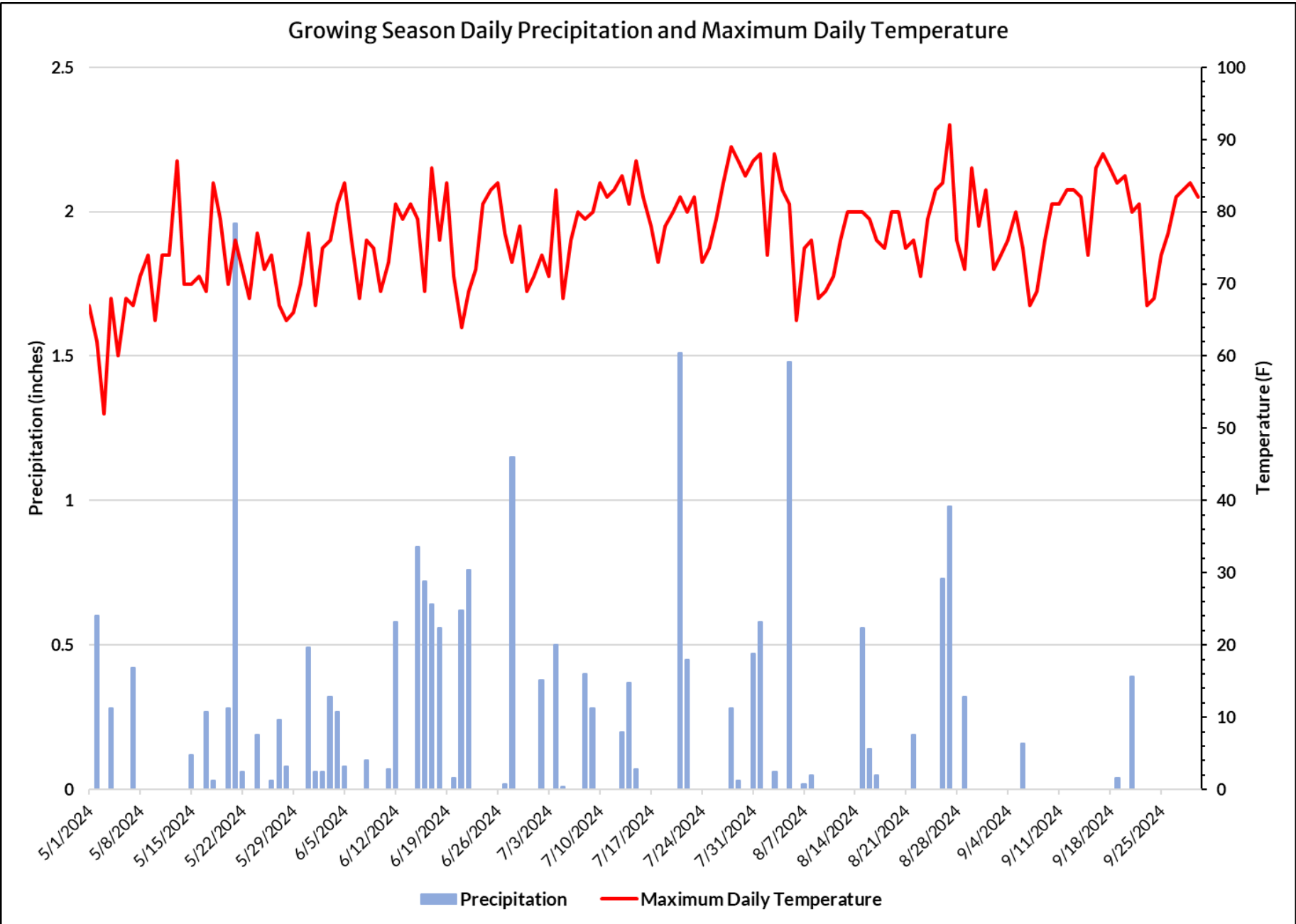


Figure 9: 2024 daily growing season (May-September) precipitation in CRWD and maximum daily temperatures at the U of M NWS station.

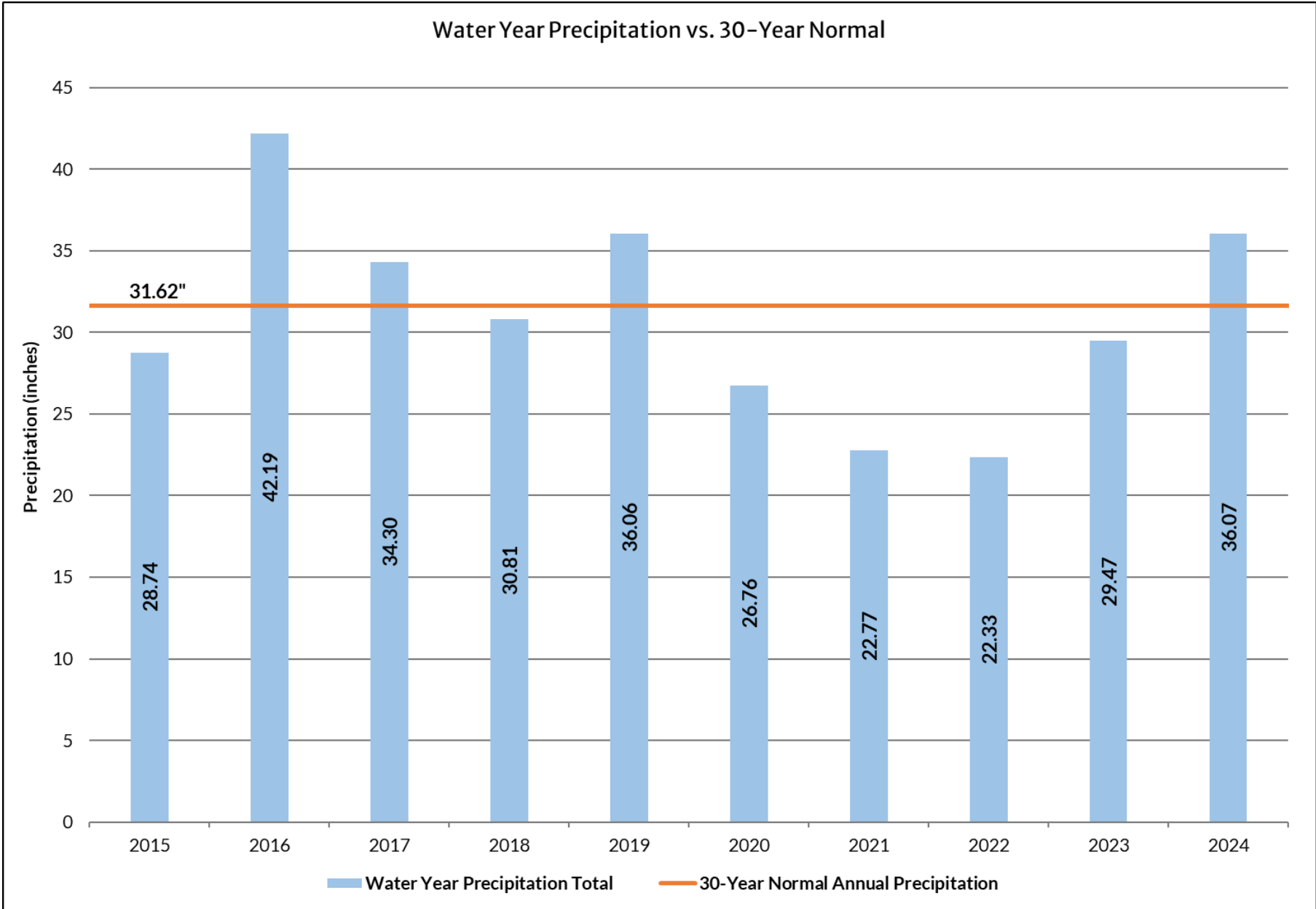


Figure 10: Water year (10/1/23-9/30/24) precipitation total in CRWD and 30-year normal annual precipitation.

2.6 Lakes

2.6.1 Ice-In and Ice-Out

Winter 2023-2024 represented a unique year for lake ice. Como Lake saw an initial ice-in date of November 28th, 2023, but then experienced ice-out on December 25th, 2023 due to warm December temperatures and rain. Como Lake had a second ice-in date that corresponded with Lake McCarrons' ice-in date: January 2nd, 2024. Both lakes had an ice-out date of March 3rd. The total number of days with ice cover for Como Lake was 88 days. The average number of days with ice cover for Como Lake is 117 and the median ice-in date is December 6th. The shortest season of ice cover was 84 days in 2015-2016 and the longest season of ice cover was 148 days in 2018-2019.

2.6.2 Surface Water Temperature

Average, minimum, and maximum surface water temperatures as compared to 2023 maximum surface water temperatures for district lakes from May through September 2024 can be seen in Table 6. Biweekly surface water temperatures for CRWD lakes as measured by RCPW and maximum daily air temperatures can be seen in Figure 11. The highest surface water temperature was 82.70 degrees Fahrenheit at both Loeb Lake and Lake McCarrons on July 31st. Despite overall milder summer temperatures in 2024, three out of five District lakes had higher maximum surface water temperatures than in 2023.

Table 6: May-September average, minimum, and maximum surface water temperatures from RCPW in degrees F for five CRWD lakes.

Lake	Average Surface Water Temperature (F)	Minimum Surface Water Temperature (F)	Maximum Surface Water Temperature (F)	2023 Maximum Surface Water Temperature (F)
Como	71.2	53.9	82.6	78.9
McCarrons	71.8	52.5	82.7	79.4
Loeb	72.4	56.4	82.7	79.6
Crosby	71.3	58.2	79.1	80.7
Little Crosby	72.0	59.0	80.1	81.7

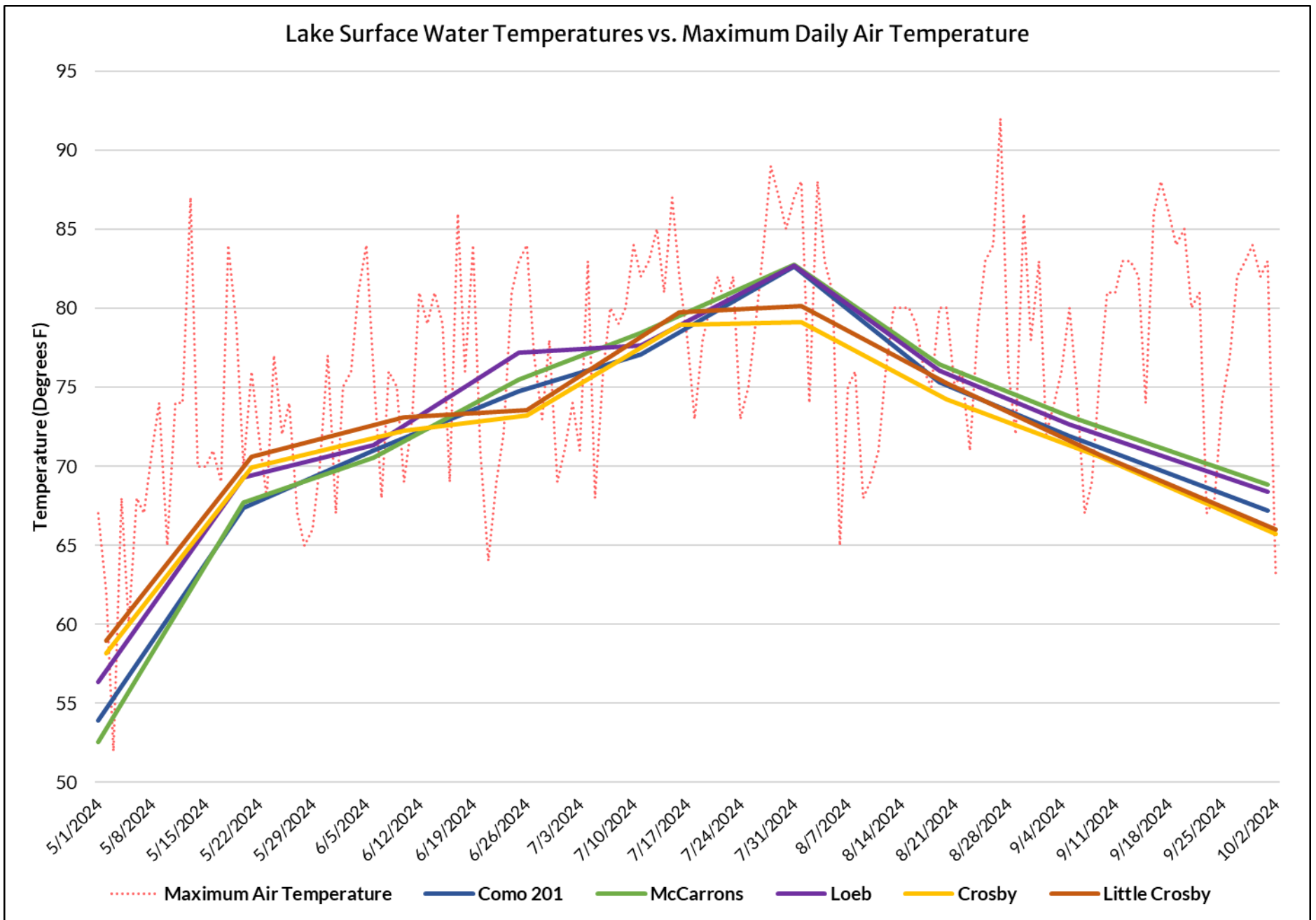


Figure 11: 2024 May-September biweekly surface water temperatures of CRWD lakes from RCPW and maximum daily air temperatures (F).

2.7 Notable Climatological Events

Table 7 shows the three most intense rain events in 15-minute, 1-hour, and 24-hour intervals during 2024. These events were compared to the Atlas 14 precipitation frequency ratings to estimate the average recurrence interval of events (NOAA, 2024c). The most intense rainfall was on July 21st, with 0.63 inches of precipitation in fifteen minutes, resulting in an Atlas 14 frequency rating of 2 years.

Table 7: 2024 rainfall intensity statistics for 15-minute, 1-hour, and 24-hour events.

Time Period	Rainfall Intensity		Atlas 14 Rating
	Date & Event End Time	Amount (in)	Frequency (yr)
15-minute	7/21/2024 9:00	0.63	2
	8/26/2024 18:45	0.61	2
	7/21/2024 8:45	0.60	2
1-hour	7/21/2024 9:00	0.71	1
	8/26/2024 18:00	0.71	1
	7/21/2024 8:00	0.67	1
24-Hour	5/21/2024	1.96	1
	7/21/2024	1.51	1
	8/5/2024	1.48	1

Similar to 2023, 2024 experienced numerous anomalous and record-breaking weather events. According to the DNR, the 2023-2024 meteorological winter set the record for the warmest winter statewide (2024e). The warm winter temperatures were, in part, due to a record-setting January thaw that saw 24 consecutive days of high temperatures above 32 degrees that lasted well into February (DNR, 2024j). A snowstorm on February 14th brought 6.9 inches of snow to MSP Airport, setting a new daily record, and was the largest snowfall of the season for many Minnesota weather stations (DNR, 2024k). The DNR reports that even after this snowfall, most areas of the state were still running 50-75% below normal for snow and had seen 30 to 70 days with no snow on the ground since December 1st (2024e), emphasizing the warm, dry winter (2024k). 2024 also saw the warmest February day—February 26th—on record in the Twin Cities at 65 degrees (DNR, 2024f). March experienced a 74-degree high on March 3rd, which became the earliest reading on record of 70 degrees or higher (DNR, 2024l).

June 2024 was the 4th wettest June and 5th wettest month overall on record in the state (DNR, 2024h). A thunderstorm on July 31st produced “historically massive hailstones”, measuring up to 5 and 6 inches across in some areas of the state (DNR, 2024m). A prolonged warm spell during the middle of September with large departures from normal helped make it the warmest September on record on a statewide basis (DNR, 2024n). According to the DNR, a 34-day dry spell from September 20th through October 23rd became the second longest streak without measurable precipitation on record dating back to 1871, tying with a late winter dry spell from February 16th through March 20th (2024o). Due to spatial variation in precipitation, the UMN rain gauge recorded 0.59 inches of rain in September, while MSP Airport only saw 0.06 inches, setting a record for the driest September on record in the Twin Cities (DNR, 2024i). October 29th in the Twin Cities set a new record high of 80 degrees, which was last set in 1922 at 78 degrees, and

became the latest 80-degree temperature on record since 1950 (DNR, 2024p). Overall, meteorological autumn (September through November) was the warmest in the 130-year record in Minnesota, and October and November were the 6th and 9th warmest October and November on record, respectively (DNR, 2024q).

2.8 Drought

According to the U.S. Drought Monitor, 2024 finally saw the entire state free of all drought after three years of prolonged and often high-level drought in Minnesota (2024). Although the drought outlook after the dry and warm winter might have been bleak, a very wet spring and summer pulled the state out of dry conditions for several months. The effect was short-lived, however, and September and October saw a return of drought conditions after long stretches of far-below normal precipitation and warm weather. Drought in the Twin Cities began to ease up toward the end of November, and as of December 31st, the Twin Cities and a portion of east-central Minnesota were without drought while other areas of the state remained in ranges of “abnormally dry” to “severe drought”. Minnesota drought maps for January 2nd, April 2nd, July 2nd, October 1st and December 31st can be found in the Appendix.

3 Summary

A summary of 2024 climatological data and events can be seen in Table 8.

Table 8: 2024 climatological data summary.

2024 Climate Summary			
Variable		Normal/Average	Notes
Days over 90 degrees F	1	13	12 less than normal
Total Precipitation (inches)	32.12	31.62	0.50" more than normal
Water Year Precipitation (inches)	36.07	31.62	4.45" than normal
Growing Season Precipitation (inches)	22.64	19.91	2.73" more than normal
Total Snow (inches)	31.5	51.2	19.70" less than normal
Last Significant Snowfall	3/27	N/A	
Last Spring date with greater than 1" snowpack	3/30	3/31	1 day earlier than normal
Winter Ice-In Date (Como)	11/28	Median: 12/6	8 days earlier than normal
Spring Ice-Out Date* (Como)	3/3	Median: 3/31	28 days earlier than normal
Total number of ice-in days (Como)	88	117	29 days less than normal

*Como Lake saw mid-winter ice-out on 12/25/23 and second ice-in on 1/2/24.

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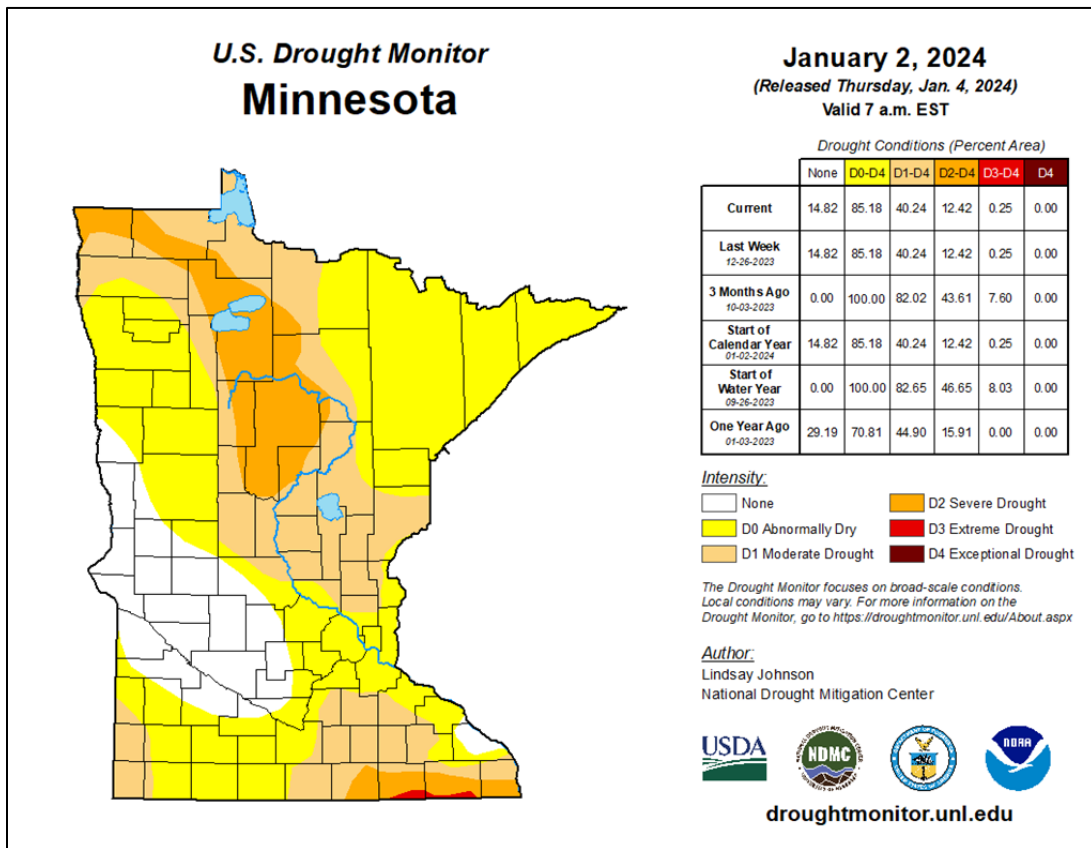
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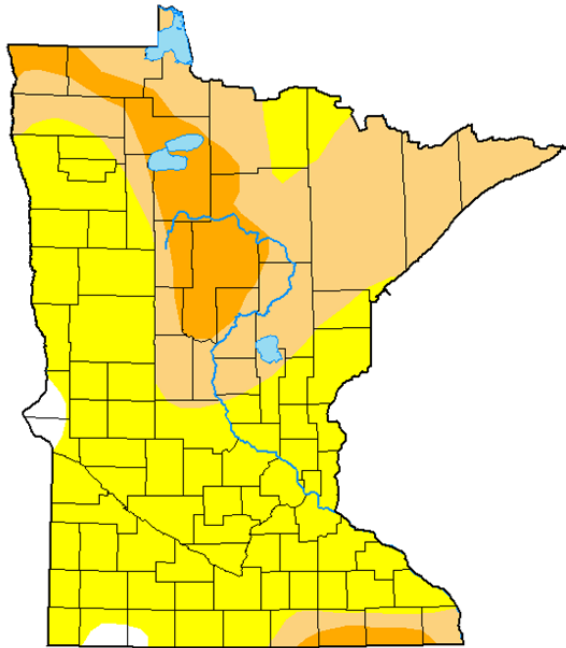
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5 Appendix



U.S. Drought Monitor Minnesota

April 2, 2024
(Released Thursday, Apr. 4, 2024)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.39	98.61	43.37	11.43	0.00	0.00
Last Week 03-26-2024	1.38	98.62	43.37	11.43	0.00	0.00
3 Months Ago 01-02-2024	14.82	85.18	40.24	12.42	0.25	0.00
Start of Calendar Year 01-02-2024	14.82	85.18	40.24	12.42	0.25	0.00
Start of Water Year 09-26-2023	0.00	100.00	82.65	46.65	8.03	0.00
One Year Ago 04-04-2023	49.48	50.52	9.55	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

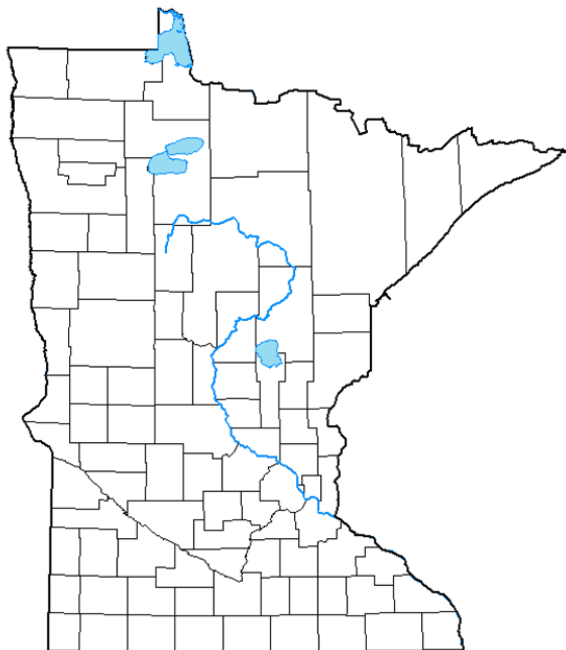
Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

U.S. Drought Monitor Minnesota

July 2, 2024
(Released Wednesday, Jul. 3, 2024)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week 06-25-2024	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 04-02-2024	1.39	98.61	43.37	11.43	0.00	0.00
Start of Calendar Year 01-02-2024	14.82	85.18	40.24	12.42	0.25	0.00
Start of Water Year 09-26-2023	0.00	100.00	82.65	46.65	8.03	0.00
One Year Ago 07-04-2023	1.98	98.02	56.73	8.48	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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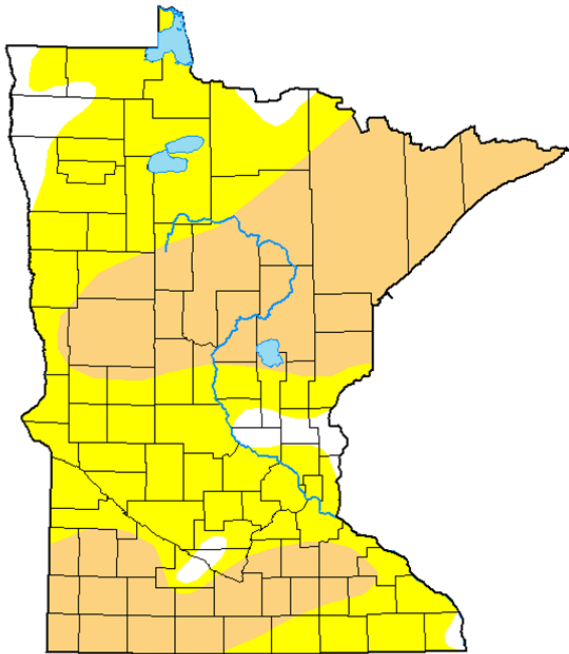
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U.S. Drought Monitor Minnesota

October 1, 2024

(Released Thursday, Oct. 3, 2024)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	6.04	93.96	43.28	0.00	0.00	0.00
Last Week 09-24-2024	19.66	80.34	15.59	0.00	0.00	0.00
3 Months Ago 07-02-2024	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-02-2024	14.82	85.18	40.24	12.42	0.25	0.00
Start of Water Year 09-26-2023	0.00	100.00	82.65	46.65	8.03	0.00
One Year Ago 10-03-2023	0.00	100.00	82.02	43.61	7.60	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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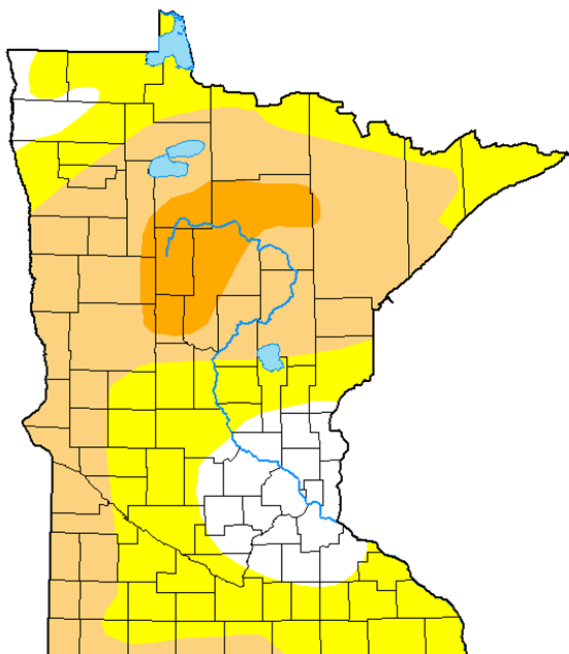
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U.S. Drought Monitor Minnesota

December 31, 2024

(Released Wednesday, Jan. 1, 2025)

Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	12.28	87.72	49.40	7.47	0.00	0.00
Last Week 12-24-2024	10.97	89.03	53.13	7.47	0.00	0.00
3 Months Ago 10-01-2024	6.04	93.96	43.28	0.00	0.00	0.00
Start of Calendar Year 01-02-2024	14.82	85.18	40.24	12.42	0.25	0.00
Start of Water Year 10-01-2024	6.04	93.96	43.28	0.00	0.00	0.00
One Year Ago 01-02-2024	14.82	85.18	40.24	12.42	0.25	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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