The Montana Department of Natural Resources & Conservation

Montana Drought Outlook Report

Summer 2025

Cumulonimbus cloud over the prairie, near Augusta, MT **Photo: Michael Downey**

This report was prepared by the Montana Department of Natural Resources and Conservation (DNRC) on behalf of the Montana Drought & Water Supply Advisory Committee (DWSAC). Under § 2-15-3308(6), MCA, DWSAC must submit a report to the Governor's Office by July 1 each year evaluating the potential for drought for the remainder of the calendar year.

Key Takeaways

- Many regions in Montana are entering the fifth consecutive summer with abnormally dry or drought conditions. Exceptionally dry and hot conditions last fall greatly depleted soil moisture, leaving many areas with a significant moisture deficit entering the spring and early summer months.

- Above average temperatures and below average precipitation in April and May diminished snowpack at high elevations and accelerated run-off. Below average precipitation in June in western and north central Montana has resulted in the onset of drought conditions with abnormally dry and severe to extreme drought conditions advancing in these areas prior to the onset of the dry season.

- Streamflows in western and northern Montana are predominantly below to much below average at the end of June. Streamflows in the south central and southeastern regions are closer to average and are indicative of better snowpack and above average precipitation in April and May in those areas. The winter's low snowpack and drier than average spring in western Montana has greatly diminished streamflows by late June. Local conditions moving forward will depend on the influence of regional temperatures and summer precipitation.

- Surface water storage levels at state reservoirs are mostly average. Conditions at private reservoirs and dugouts vary by location. The area east of the Continental Divide along the Rocky Mountain Front is the most compromised and is already suffering shortages in most stock ponds and reservoirs including state and federal facilities.

- The outlook for significant wildfire potential is above normal across Montana. Lack of precipitation in April, May and June has accelerated the onset of significant fire potential in the Northern Rockies and Northern Great Plains. Continuing heat and dryness through the summer and early fall months is expected to extend the fire season through September.

- Approximately 59 percent of the state is currently in moderate to extreme drought and 15 percent indicate abnormally dry conditions at the onset of the dry season. With a high probability of above average temperatures and below average precipitation over the next three months, continued development of severe to extreme drought conditions during the summer and early fall is likely.

- These combined drought indicators offer a negative drought outlook for the remainder of the summer and early fall. Conditions could worsen quickly in the event of much above average temperatures and below average precipitation in the coming weeks.

Summary of Recent Conditions

The 2024 water year (Oct. 1, 2023 – Sept. 30, 2024) closed following a drier than average and record hot summer that resulted in extreme (D3) and exceptional (D4) drought conditions in western and eastern Montana. The year's record low snowpack translated into record low streamflow in the west, and low water coupled with high temperatures led to widespread fishing closures that lasted into the fall. Late summer rains in August and September brought relief to some; however, record heat and below average precipitation in October led to worsening conditions across Montana through the fall and early winter. The period from September through December was the warmest on record with temperatures exceeding the average by 5.5 degrees Fahrenheit statewide, with some areas reaching more than 10 degrees Fahrenheit above normal. The southeast was particularly hard hit, with a broad expansion of severe (D2) and extreme (D3) drought conditions that worsened through November and remained through late January.

Water levels in storage facilities on Dec. 31, 2024 varied widely with snowpack dependent reservoirs in the west, like Nevada Creek Reservoir, falling much below average at 47 percent of normal for that date. Other facilities, like Deadman's Basin in central Montana, were holding 120 percent of normal by year's end. Delay of the first killing freeze until late October extended last year's growing season. The extended growing season, coupled with hot and dry weather, severely depleted soil moisture. The impacts of the hot and dry fall and early winter were important precursors to the current low soil moisture values particularly in north central and eastern Montana this spring.

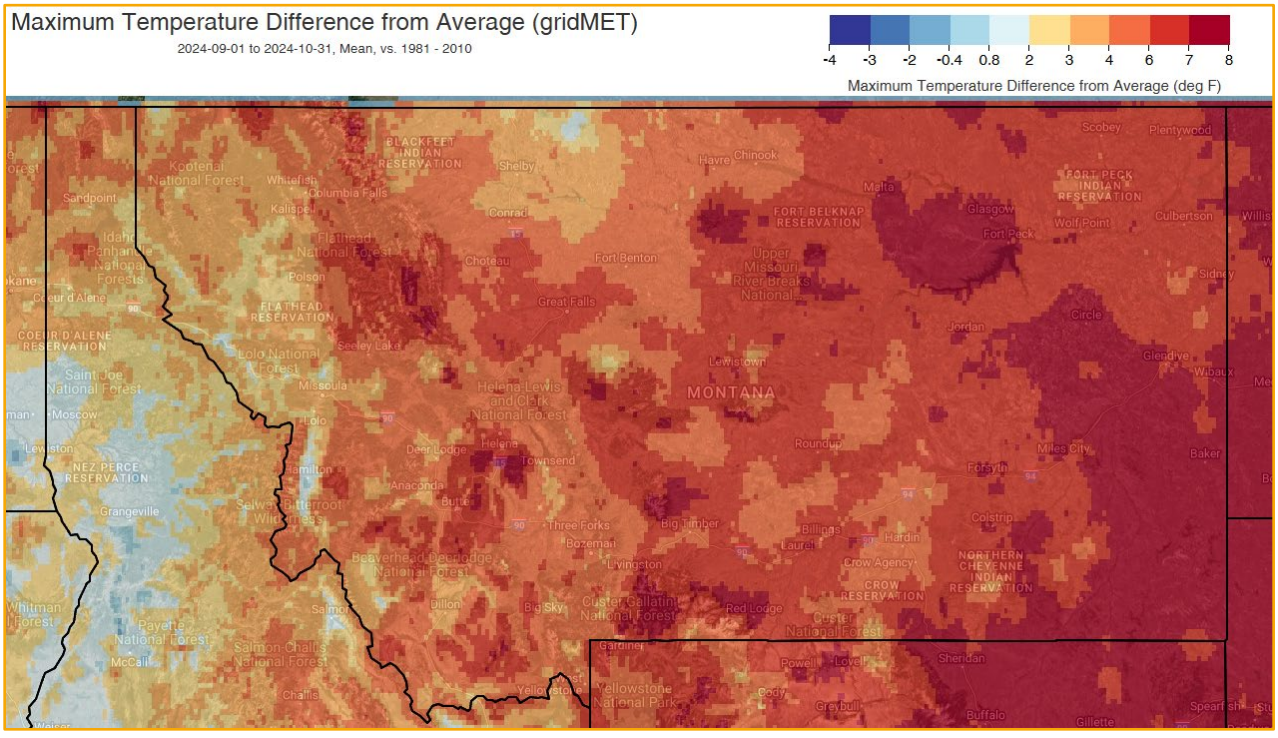

Figure 1- Temperature – Difference from Average 9/1/24 – 10/31/24 **Map generated by Climate Engine**

Precipitation at the beginning of 2025 got off to a slow start, with less than normal amounts in the west and east. Central Montana was the outlier with record accumulations in the Little Belt, Snowy, and Bears Paw ranges. Heavy snowfall on Jan. 13 and 14 brought more than two feet of snow to some areas.

February brought bitterly cold temperatures and above average snow accumulations to most of the state. Basins in the southwest received upwards of 180 percent of normal precipitation. The Upper Yellowstone basin, for example, typically receives about two inches of snow water equivalent (SWE) in the month of February. This February, the Upper Yellowstone received four inches of SWE. Accumulations in the northwest were closer to average.

Current Drought Conditions

Warm and dry conditions that persisted through December 2024 prevented widespread improvements in drought until late January and early February 2025, leaving central Montana mostly drought free by late February.

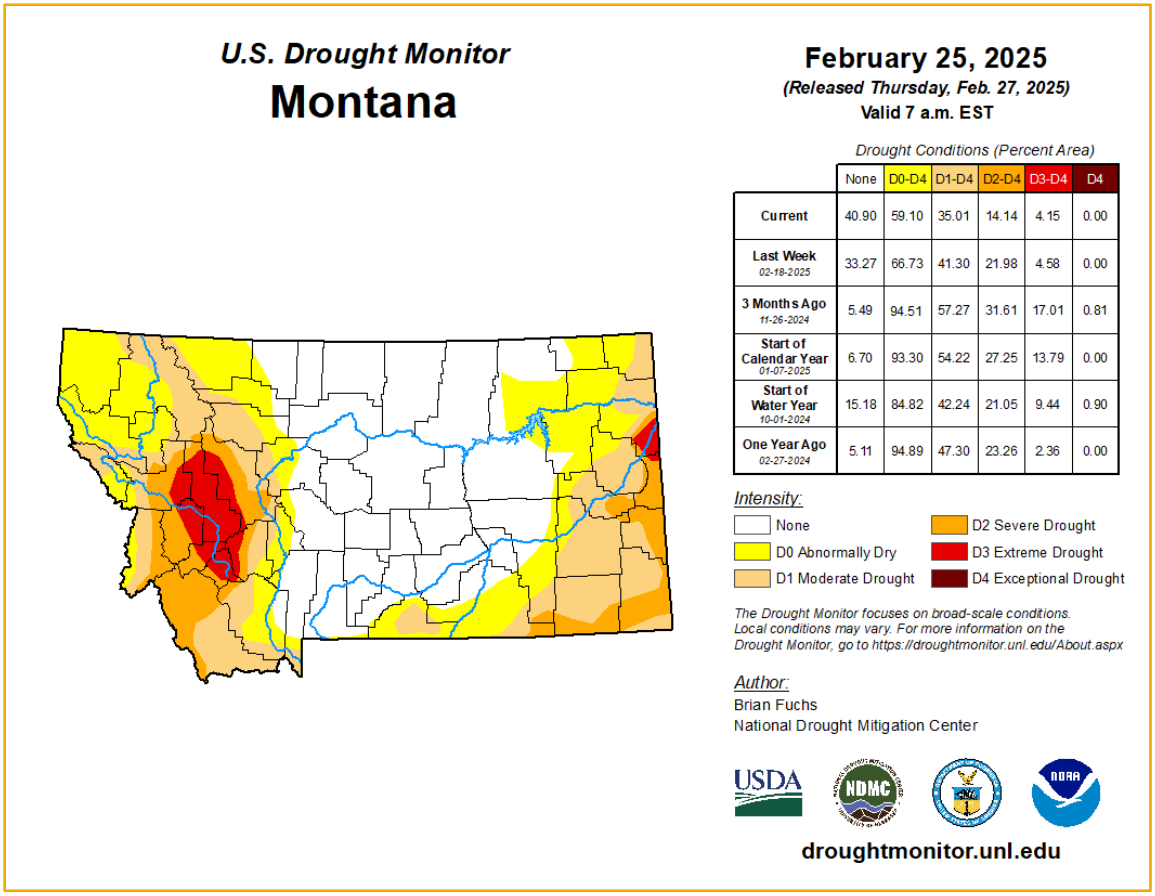

Figure 2 – Drought Categories, February 25, 2025

April, May and June are typically some of Montana's wettest months, and the hope was for above average precipitation and cooler temperatures during this period to prevent the onset and spread of severe drought. Unfortunately, April, May and June were warmer and drier than average in most areas leading to worsening drought conditions across the state. A large storm system in mid-May and again in late June eased extreme drought conditions in the Blackfoot watershed and severe drought conditions in the west from Helena to Dillon. Unfortunately, the benefits of this event were regionally limited. The combination of deficits in April, May and June has left western and northern Montana much behind average and unlikely to catch up. Carbon, Big Horn, Stillwater and Yellowstone counties are the outliers receiving above average precipitation for this period. The widespread variability in

storm extent and precipitation this spring and early summer have complicated this assessment. For example, Helena had its fourth driest April on record followed by its fourth wettest May, followed by zero measurable precipitation in the first ten days in June, Helena's wettest month of the year.

By the end of June, abnormally dry (D0) to severe (D2) and isolated extreme D3 drought conditions have taken hold in western and north central Montana with conditions improving in the southeast. July, August and September are typically hot and dry months. Apart from locally significant summer rain showers, after July 15 Montana is unlikely to receive a season-changing weather event until September or October. Figure 3 shows current drought conditions as of June 24, 2025. Figure 4 shows the change in drought categories since October as compared with current conditions.

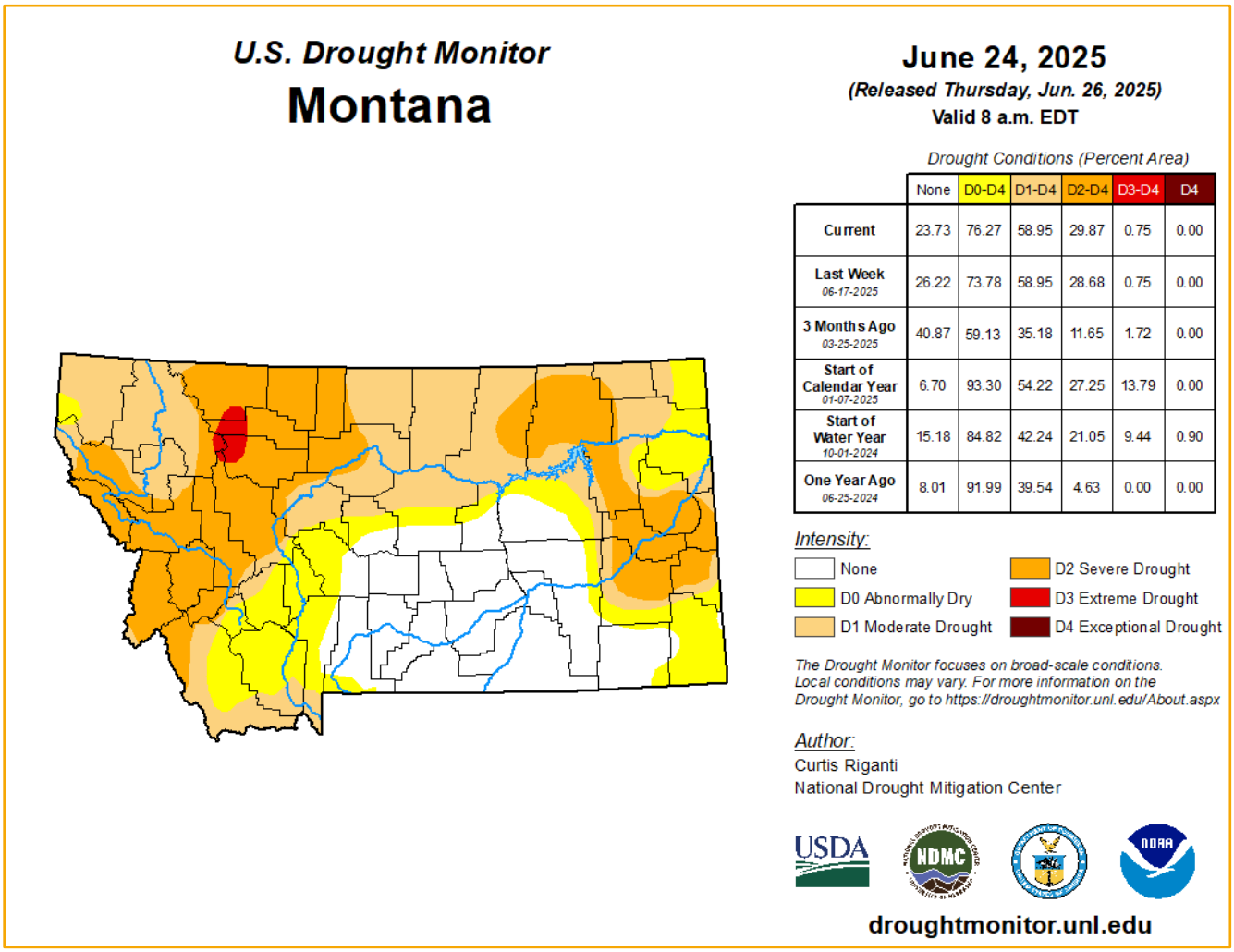

Figure 3 – Current Drought Categories

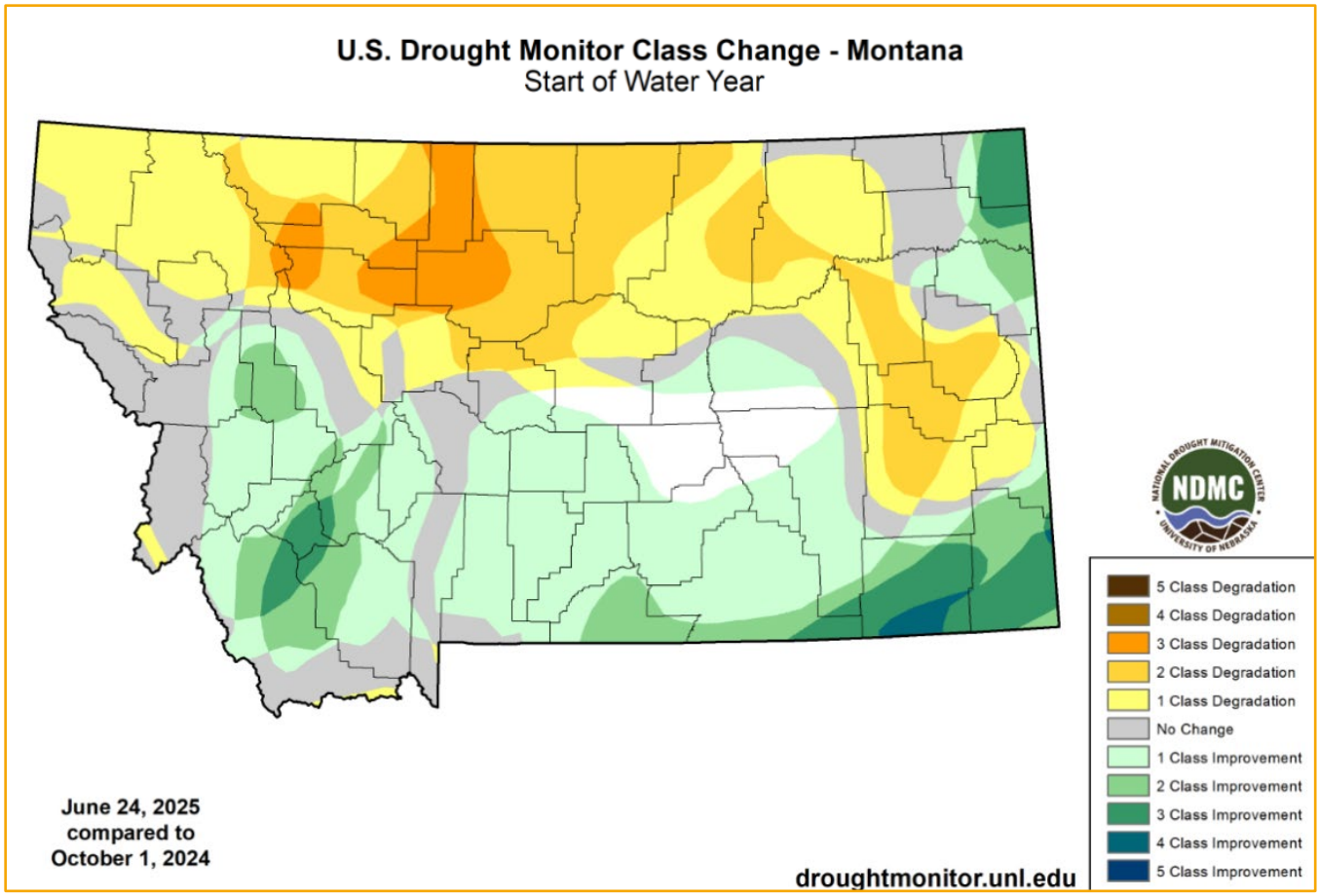

Figure 4 – Change in Drought Categories since the end of September 2024

Near-Term Drought Forecast

Late June to early July typically marks the end of Montana's high precipitation months with the onset of the hot and dry summer season. Above average temperatures in April and May quickly stripped the high elevation snowpack and increased evaporative demand, particularly in the northwest. Some basins like the Two Medicine, Teton, Marias, Sun and Dearborn watersheds lost snowpack even more quickly this year than 2024's record low.

The period from mid-May through the middle of June was exceptionally dry and warmer than average. The western half of Montana received only 25 to 50 percent of normal precipitation as shown in Figure 5. Dry soil and below average precipitation throughout June have all but assured the continuation of widespread drought across Montana this summer. With a July forecast trending hotter than average with below average precipitation, the probability for improved conditions in the next month is waning by the day. Approximately 59 percent of the state is currently in moderate to extreme drought and 15 percent indicate abnormally dry conditions at the onset of the dry season. With a high probability of above average temperatures and below average precipitation over the next three months, continued development of severe to extreme drought conditions during the summer and early fall is very likely.

Large areas of Montana have experienced nearly continuous drought since the spring of 2020. The extended depletions in these areas are expected to deepen this summer's drought and worsen impacts. Likely impacts include diminished forage and crop production, declining surface water

availability, increased grasshopper infestations, wildfire risk, health impacts due to excessive heat and smoke, reduced recreational opportunities due to forest and fishing closures among others. Montanans could experience a dry challenging summer.

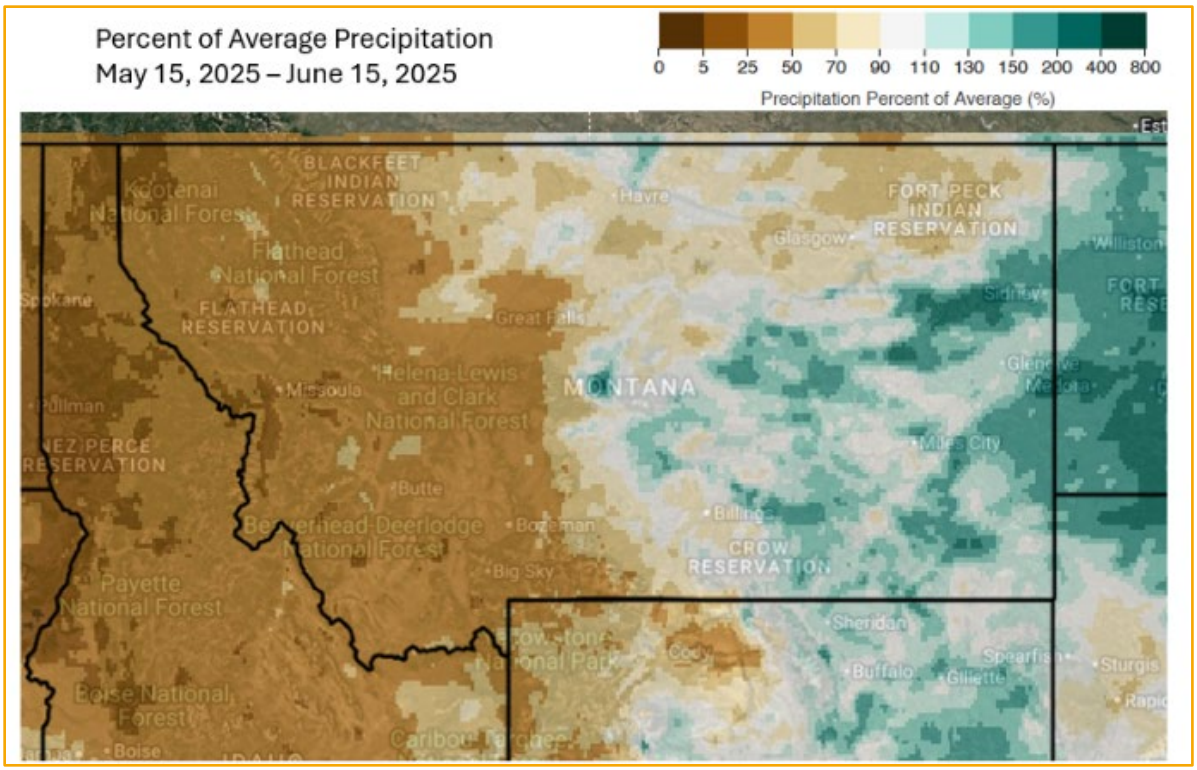

Figure 5 – Percent of Average Precipitation 5/15/25 – 6/15/25 **Generated by Climate Engine**

While the potential for significant summer precipitation diminishes in the coming weeks, regionally significant summer precipitation can materialize as late as mid-July. After that, summer precipitation is mostly limited to smaller storm cells which can be locally significant. The abundance or absence of summer rainstorms and the prevalence of daytime temperatures exceeding 90 degrees Fahrenheit will play an important role in determining the severity of drought conditions locally this summer. July and August are typically hot and dry in Montana, but late summer storms are important for sustaining crops, wildlife, stockwater ponds and for suppressing wildfires.

On June 19, Montana Fish Wildlife and Parks (FWP) instituted its first Hoot Owl Fishing Restriction of the season, restricting fishing between the hours of 2 p.m. to 12 a.m. on the Madison River between Hebgen Reservoir and the Yellowstone River National Park Boundary. Increasing summer temperatures and declining streamflows suggest additional management measures ahead. Stay up to date on current restrictions on FWP's website at: https://fwp.mt.gov/news/current-closures-restrictions/waterbody-closures

Last year's hot and dry summer and fall, average to below average winter, and below normal precipitation in April, May and June have resulted in diminished greenness as evidenced by the Vegetative Health Index (a satellite-based product) which shows a negative response statewide. While not as severe as in 2021 at this date, the indicator, in Figure 6, shows substantially diminished vegetative health on this date as compared with 2019, 2020, 2022, 2023. Figure 7 shows last year's reading on this date. Green to blue colors indicate a positive trend and yellow to pink colors indicate more compromised conditions.

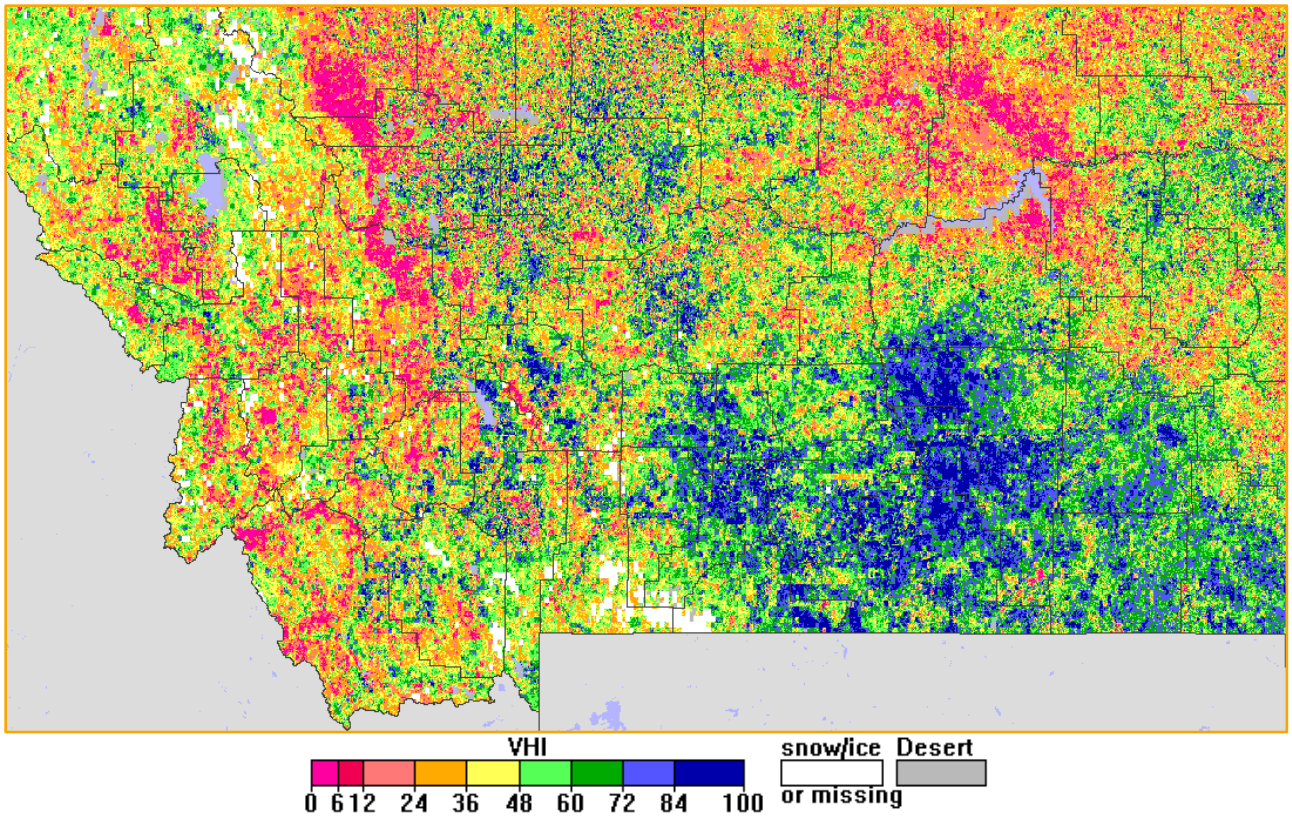

Figure 6 - Montana, Vegetative Health Index, week 24 – June 17, 2025 - Center for Satellite Applications and Research, NOAA

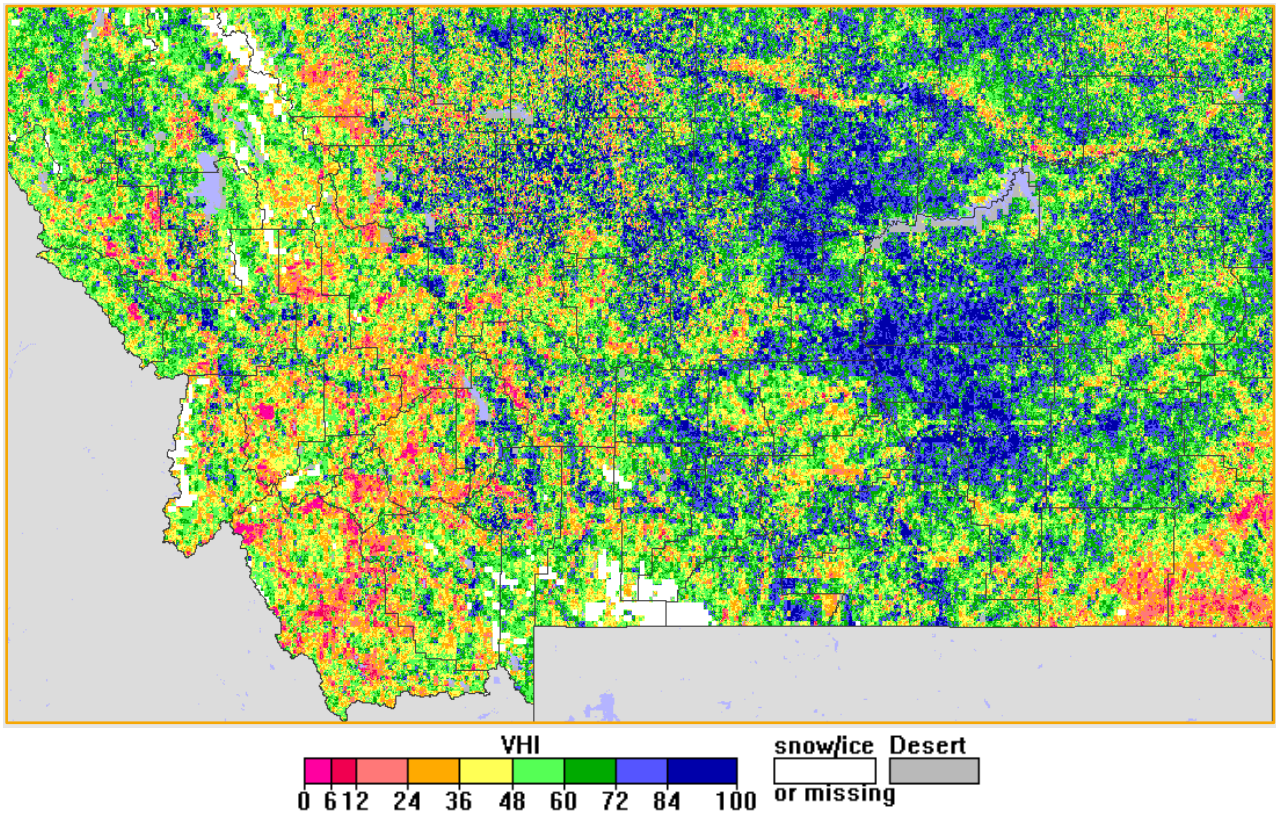

Figure 7 - Montana, Vegetative Health Index, week 24 – June 16, 2024 - Center for Satellite Applications and Research, NOAA

As we enter Montana's dry period, the drought outlook has degraded since spring. As shown in the map in Figure 8, drought is likely to persist in much of western, north central and eastern Montana with drought expanding in all areas except central Montana.

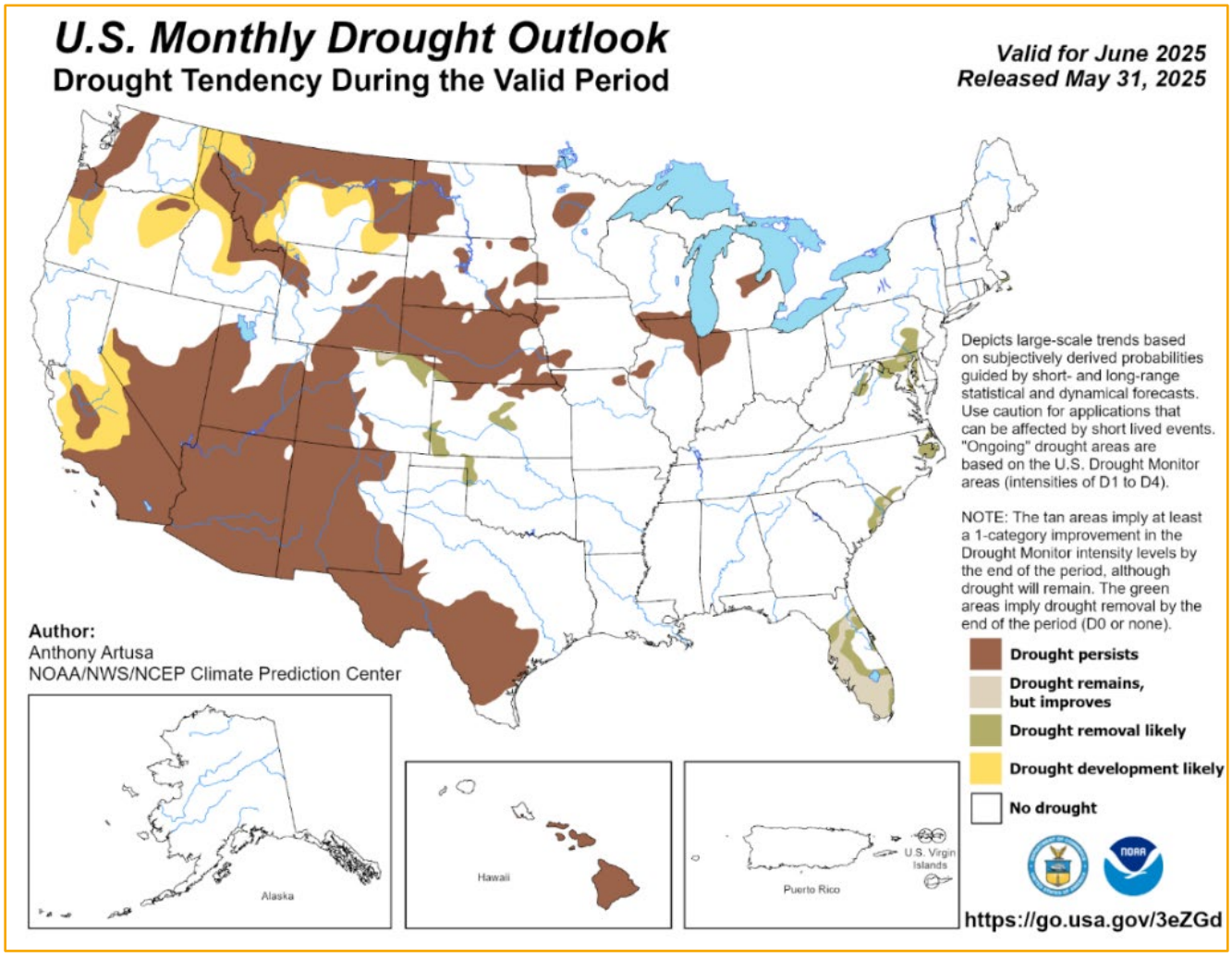

Figure 8 – U.S. Monthly Drought Outlook – Climate Prediction Center, NOAA

Spring Snowpack and Precipitation Overview

The June, Natural Resources Conservation Service (NRCS) Snow Survey Report offers a good summation of the conclusion of the season's snowpack. Several storms brought significant snow accumulations to the mountains in early May, although much of it melted as quickly as it arrived. Above average May temperatures led to earlier than normal snowmelt statewide. Snowpack percentages decreased from approximately 75 to –110 percent of median statewide on May 1 to around 50 to 70 percent of median on June 1. The Upper Missouri Basin near Helena and the Sun/Teton/Marias and Shields watersheds were completely melted out on June 1 with 0 percent of normal. By June 1, near normal snowpack was limited to the highest elevations in only a handful of watersheds. While the 2025 snowpack was substantially better than in 2024, only a few basins achieved peak snowpack this year and warmer temperatures in May resulted in an earlier melt-out than we have seen since 2021. The maps in Figures 9 and 10 show snow water equivalent on April 15 and June 1 as compared to the median for that day. The percentages displayed do not represent the snowpack percentage for the season.

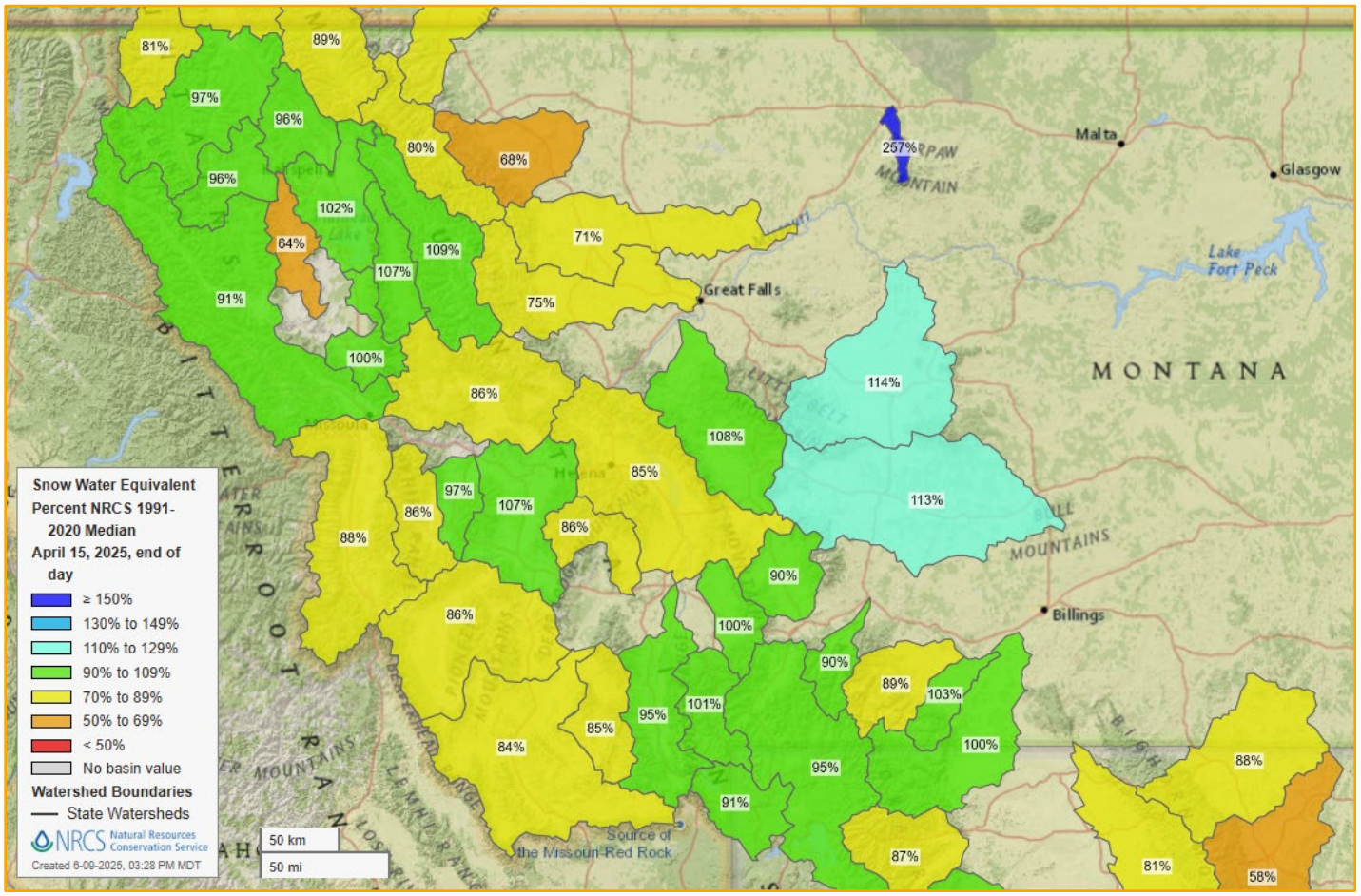

Figure 9 – Snow Water Equivalent as a percentage of median by basin on April 15, 2025, USDA – NRCS – Snow Survey Program

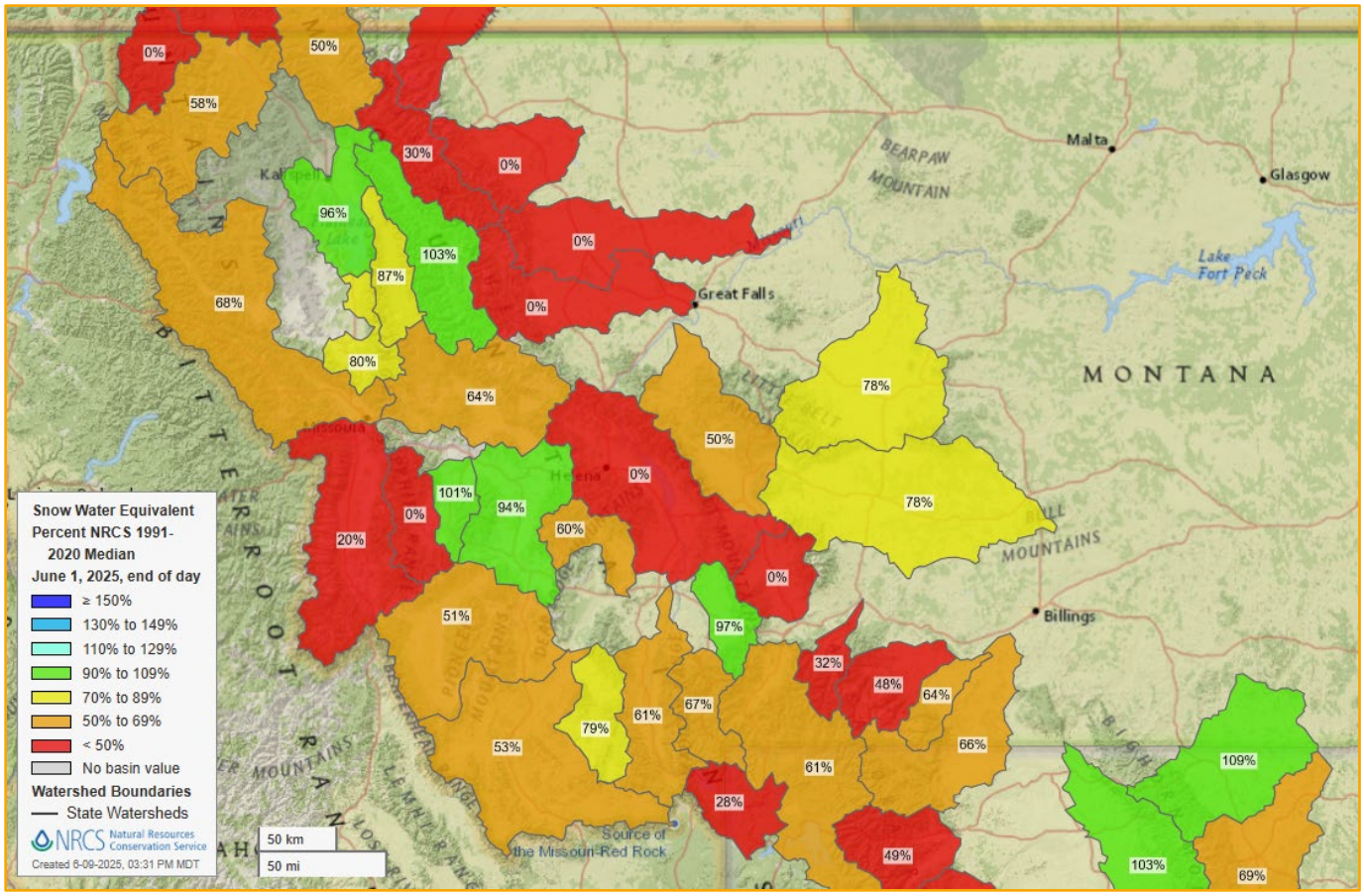

Figure 10 – Snow Water Equivalent as a percentage of median by basin on June 1, 2025, USDA – NRCS – Snow Survey Program

Streamflow (DNRC/USGS/Gaging Stations, USGS Water Watch, Missouri Basin River Forecast Center)

According to the NRCS, the water supply forecasts for June 1 fell at almost all forecast points in Montana and northern Wyoming compared to May 1. Warm temperatures accelerated snow melt leaving little snowpack to support streamflow later into the summer. Only the Little Bighorn River near Hardin remains forecasted above median due to higher-than-average May snowfall in the northern Bighorns. The Little Bighorn expects 120 percent of normal streamflow volumes in June and July. All other forecast points in the region are predicted to be near or below median. Forecast points around the Mission and Swan Ranges are the most likely to experience near normal stream flow with forecasts ranging from 89 to –95 percent of normal. However, the Flathead River, near Polson, will likely fall much below median streamflow due to low precipitation and snowpack totals along the headwaters of the North and Middle Forks of the Flathead. To the east of the continental divide, the Dearborn, Sun, Teton, Marias and Two Medicine drainages are all expected to produce extremely low runoff values with forecast points ranging from 30 to 50 percent of normal. The Yellowstone region ranges from 70 to –100 percent of median stream flow in June and July. Southwest Montana can expect a wide range of run-off values with the Blackfoot and Bitterroot rivers running particularly low and currently approaching 30 percent of the median. Figure 11 shows the 14-day average streamflow for June 25, 2025. The map indicates that the Teton, North Fork of the Sun, and Dearborn rivers were all at record low flows on that day.

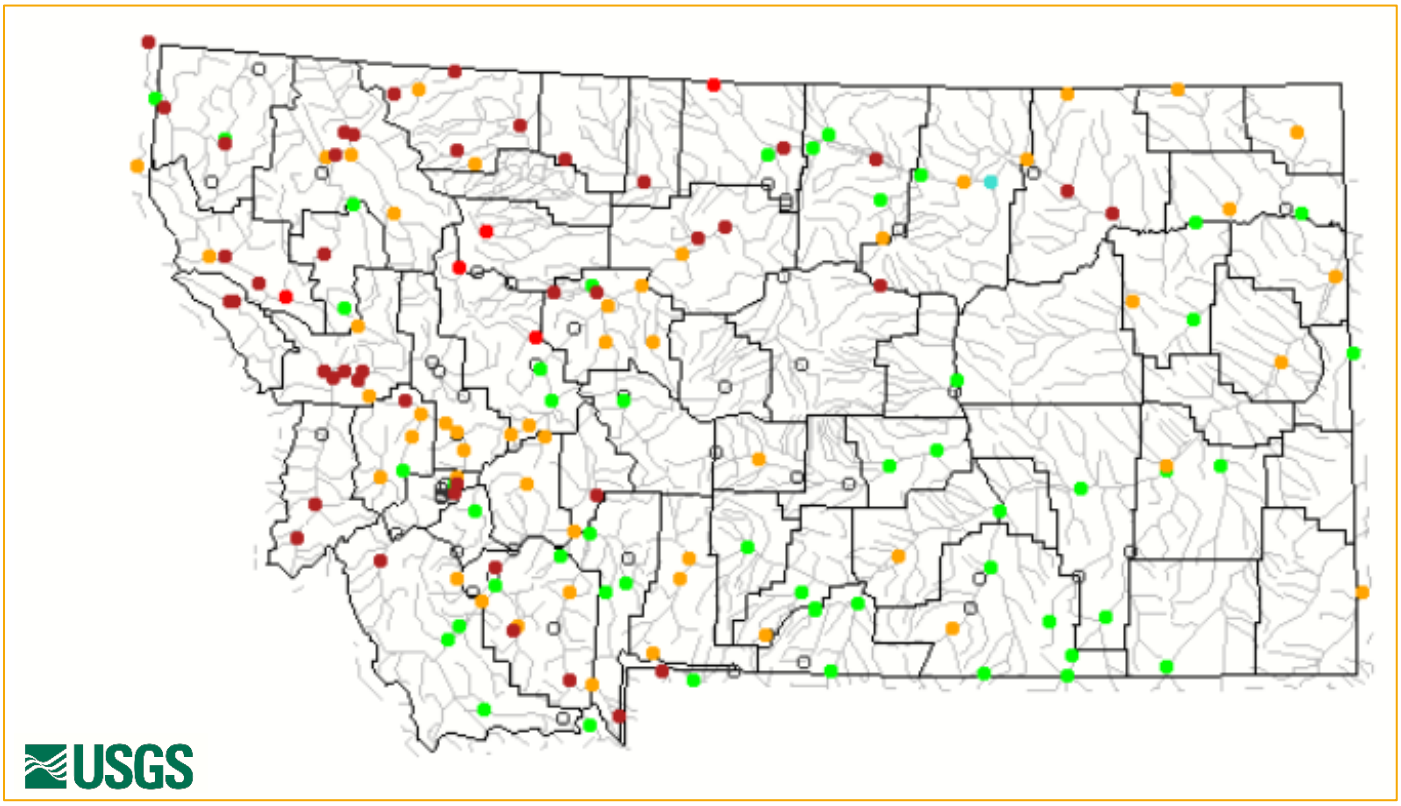

Figure 11 – 14-day average streamflow as compared to historical streamflow for Tuesday June 24, 2025, USGS, WaterWatch

Reservoirs (Bureau of Reclamation Reservoirs, State Reservoirs)

Water elevations at most state operated reservoirs across Montana are close to average for this time of year. Reservoirs in central Montana are currently above average while some in the west, like Nevada Creek, and Nilan reservoirs on the Rocky Mountain Front, are considerably below average. Some of the higher reservoir pools this spring are partly due to warmer than average temperatures in March and April, and early May that accelerated spring run-off. As we enter the fifth consecutive year of drought, water managers have become adept at shifting management strategies to accommodate uncertainties presented by a low water year amid an ongoing drought. This spring, dam tenders have been effective at retaining run-off in anticipation of diminished inflows due to last summer and fall's hot temperatures and diminished inflows.

The Bureau of Reclamation (USBOR) and Army Corps of Engineers (USACE) are actively managing large reservoir projects across the state. Hungry Horse, Lake Kootenai, and Flathead Lake should see improved inflows as compared to last year, but below average run-off of 70 to 75 percent is forecasted for the region. The Missouri headwaters and mainstem reservoirs are average to below average given the low snowpack and poor accumulations this spring. Despite the siphon failure on the St. Mary's diversion last summer, the mild winter along the Rocky Mountain Front enabled the United States Bureau of Reclamation (BOR) to make continued progress on those repairs through the winter. Barring unforeseen obstacles or setbacks, the BOR anticipates completing repairs by late July which would enable water transfers in 2025 to support the irrigation season in 2026.

Soil Moisture

Soil moisture indicators from satellite generated soil moisture maps and station data from Montana's Mesonet Soil Moisture Monitoring Network indicate diminishing soil moisture values in all but a handful of locations. Summer soil moisture values are heavily influenced by carry-over from last summer and fall, in addition to accumulations this spring. Not surprisingly, conditions in central Montana are the most promising with the western, northern and eastern regions of the state falling short to extremely short for this time of year. Last year's poor snowpack, a record hot and dry summer and fall have combined to leave large areas of Montana severely depleted of soil moisture as shown in Figure 12. Near surface soil moisture has improved somewhat since early June, but mid-depth levels remain compromised. The Mesonet network is still in the early stages of build-out, and many stations have less than five years of monitoring data. This shorter period of record means those sites are less reliable as indicators of average soil moisture but are useful as near-term indicators of changes in soil moisture due to factors such as recent precipitation and the impacts of evaporation from wind, temperature and plant transpiration. Upon completion in 2027 the Montana Mesonet Network will host the densest collection of soil moisture monitoring stations anywhere in the world.

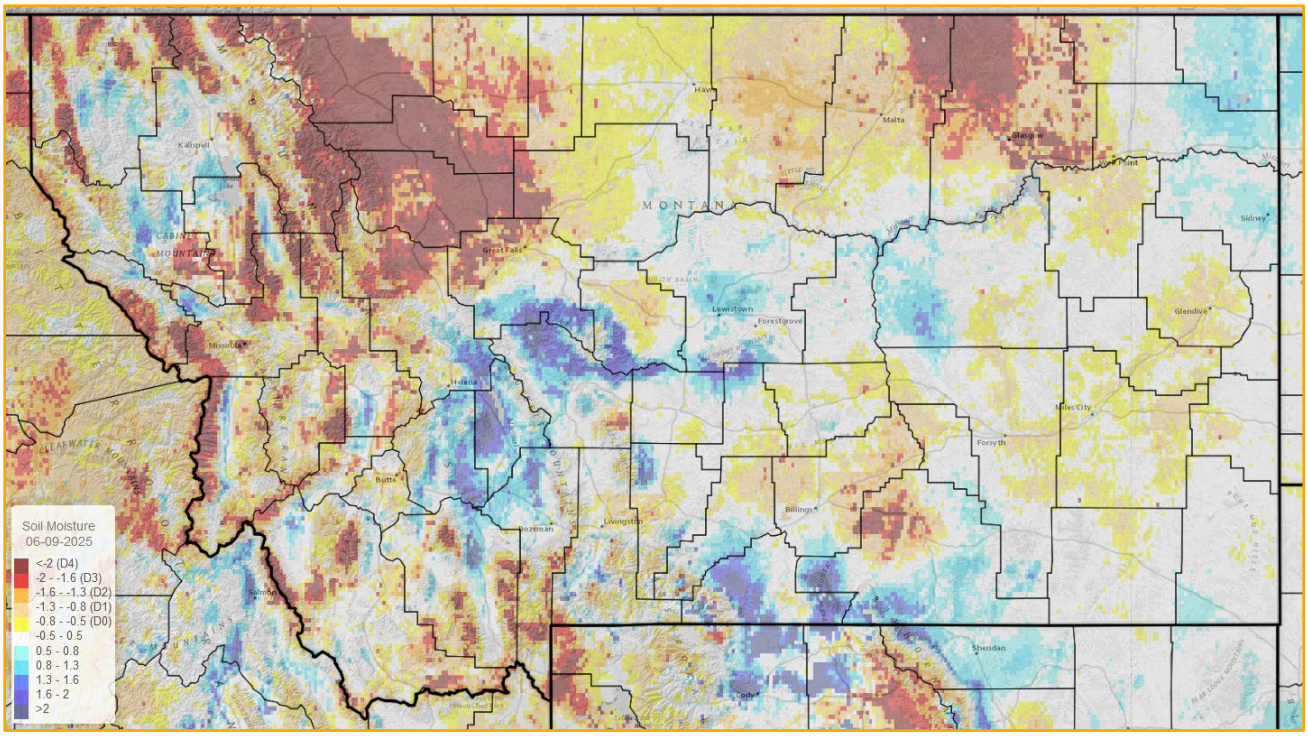

Figure 12 – SPoRT Soil Moisture Model – 6/9/25 **UMRB Drought Indicators Dashboard - MT Climate Office**

Seasonal Drought Outlook

Extreme variability in temperature, precipitation accumulation, and spatial extent over the last 12 months have diminished Montana's water supply and increased the severity of drought as we enter the summer season. This variability coupled with four years of above average temperatures and below average precipitation in many locations has resulted in drought conditions that vary from abnormally dry (D0) to extremely dry (D3) statewide. While conditions improved considerably across central Montana in 2024 and 2025, the onset of drought conditions in western, north central, and eastern Montana started earlier than usual this year due to multi-year precipitation deficits and highly variable winter temperatures that depleted the low and mid-elevation snowpack. Looking ahead, record high

temperatures and much below average precipitation last fall may prove critical as the impacts of depleted soil moisture and diminished shallow aquifers have reduced the water supply and suppressed forage and crop growth. These short-term deficits are compounded by long-term shortages as Montana enters its fifth consecutive year of drought. Below average precipitation in April, May and June has assured the onset and continuation of severe to extreme drought in western, north central and northeast regions of Montana. As Montana enters the dry summer period, temperature becomes the primary variable affecting drought severity. Current forecasts indicate a 50 to 60 percent chance of above normal temperatures through August.

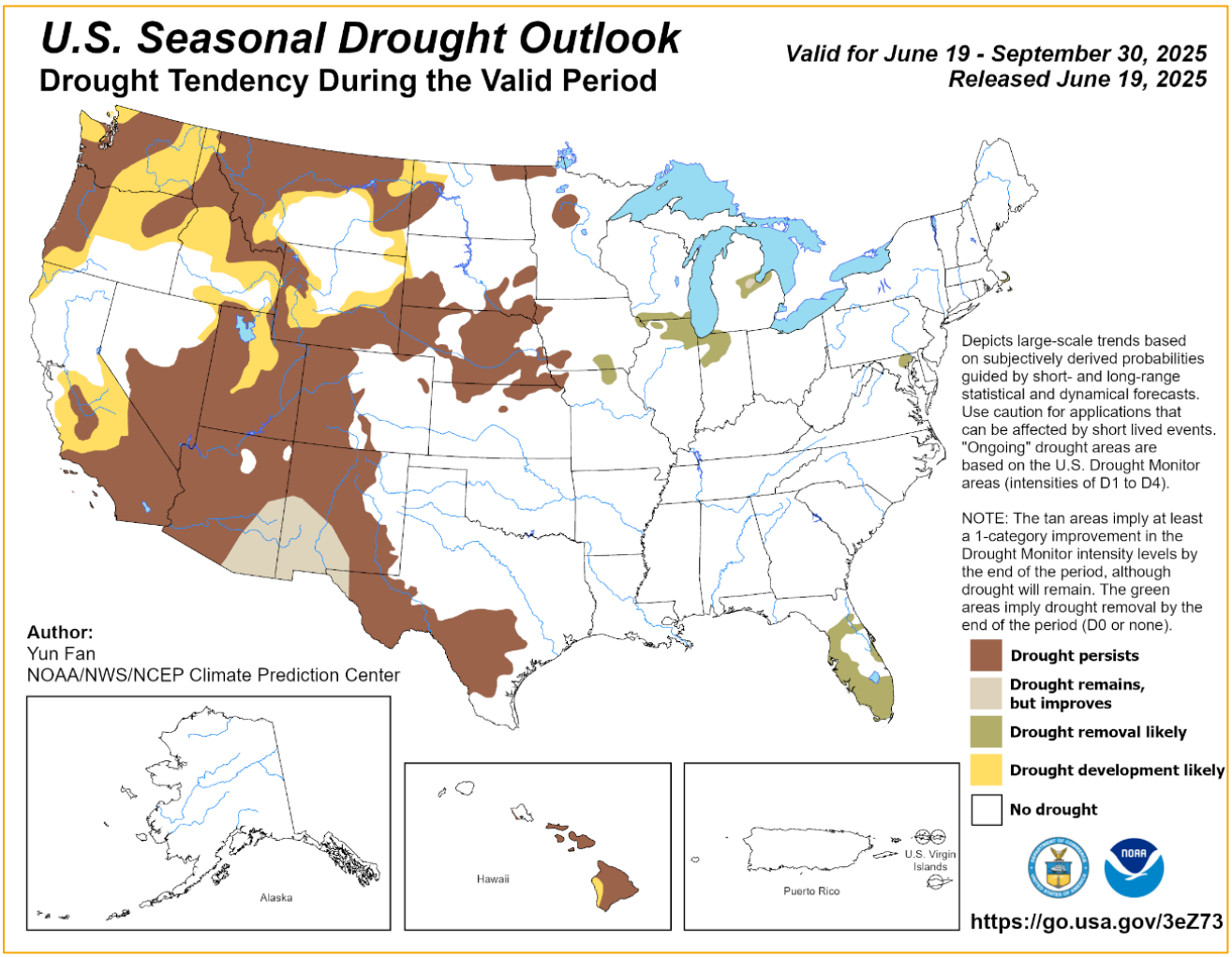

Figure 13 – Seasonal Drought Outlook June 19 – September 30 **Climate Prediction Center-NOAA**

Long-term Forecast

Climate Prediction Center's monthly weather forecast for July indicates a 50 to 70 percent chance for above average temperatures and a 50 to 70 percent chance for below normal precipitation. The three-month outlook also indicates probabilities for above average temperatures and below average precipitation across most of Montana. The three-month outlook offers a 40 to 60 percent chance for above normal temperatures across Montana this summer. The long-term precipitation forecast indicates a 40 to 50 percent chance for below average precipitation. This forecast is a slight improvement over guidance issued on May 31, 2025, that indicated a chance of even drier conditions in north central Montana.

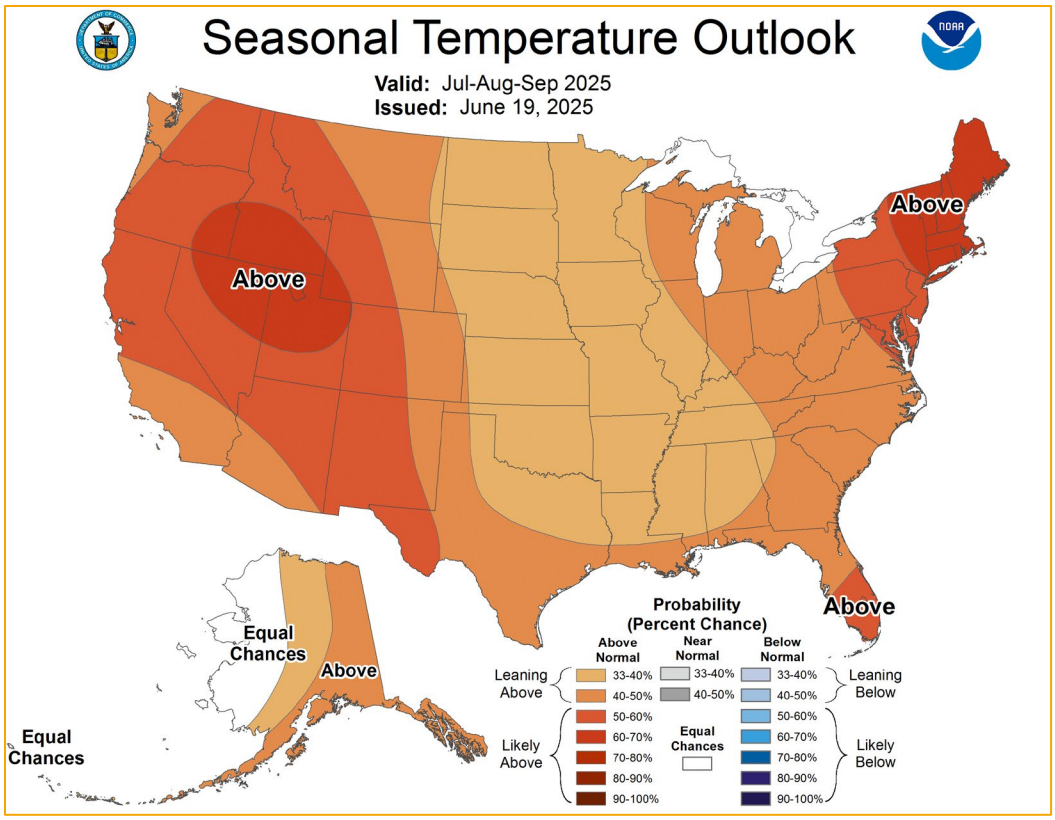

Figure 14 – Seasonal Temperature Outlook July 1 – August 31 Climate Prediction Center, NOAA

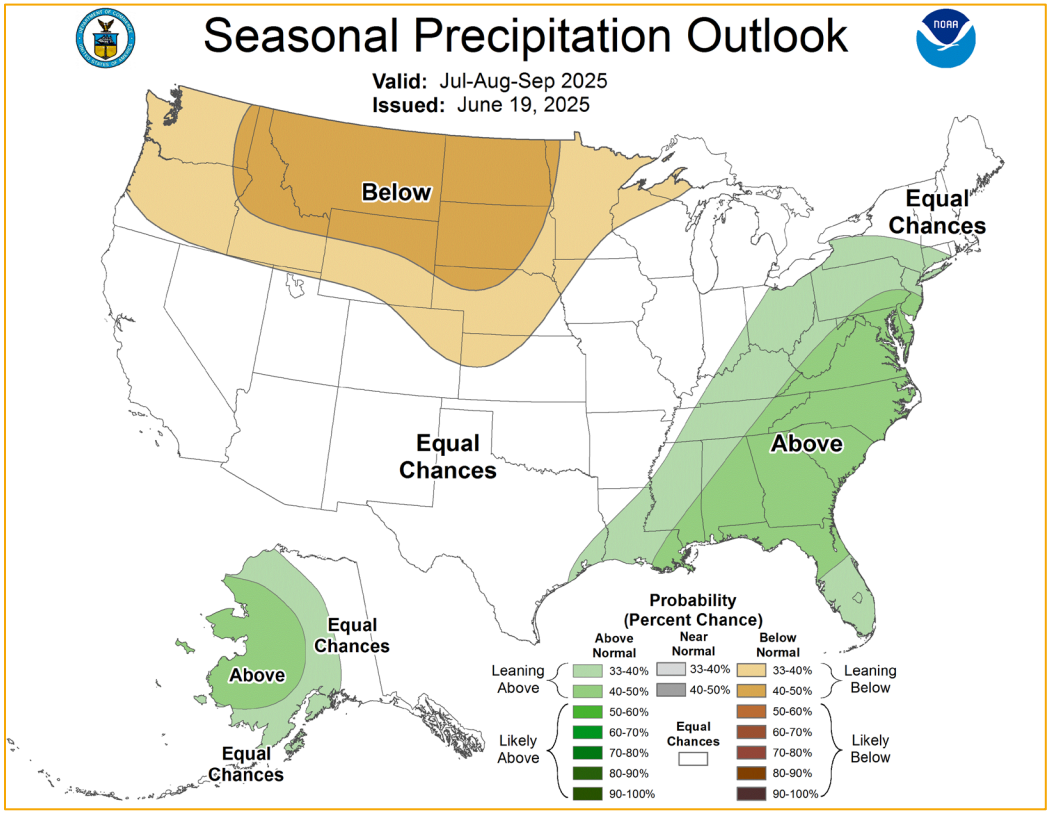

Figure 15 – Seasonal Precipitation Outlook July 1 – August 31 Climate Prediction Center, NOAA

Wildfire Outlook

The combination of multi-year drought, below average precipitation in April, May and June and a weather forecast for hot and dry conditions has resulted in above normal wildfire potential for Montana this summer. This area is forecasted to expand in August and September across all the Northwest, the northern Great Basin, much of Idaho and nearly all of Montana.

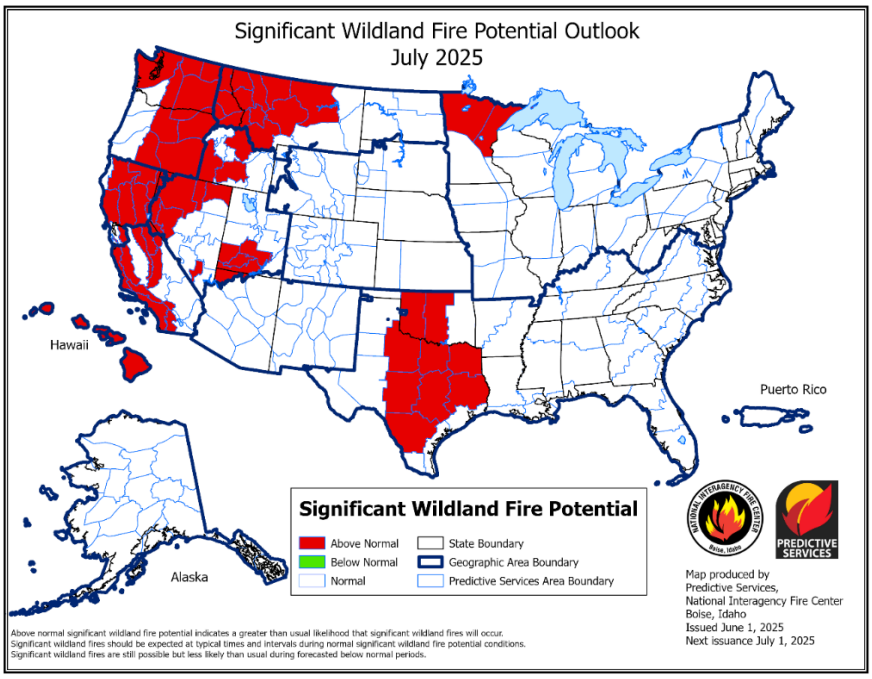

Figure 16 – Significant Wildland Fire Potential Outlook, July
National Interagency Fire Center

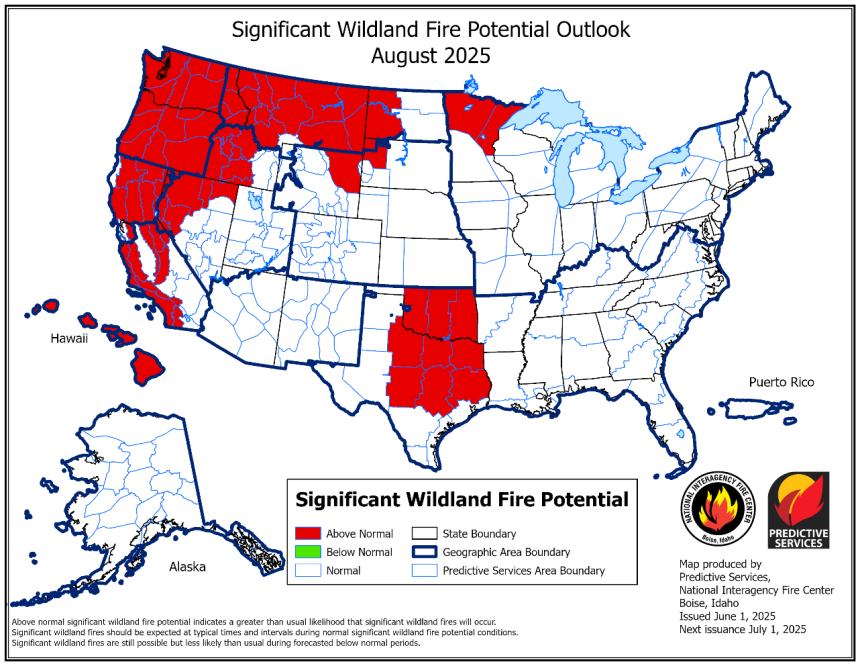

Figure 17 – Significant Wildland Fire Potential Outlook, August,
National Interagency Fire Center

USDA Drought Disaster Declarations:

The secretarial natural disaster designation allows the United States Department of Agriculture (USDA) Farm Service Agency (FSA) to extend much-needed emergency assistance to producers recovering from natural disasters through emergency loans and other aid. Assistance can be used to meet various recovery needs including the replacement of essential items such as equipment or livestock, reorganization of a farming operation, or to refinance certain debts. Producers should contact their local FSA representative for more information.

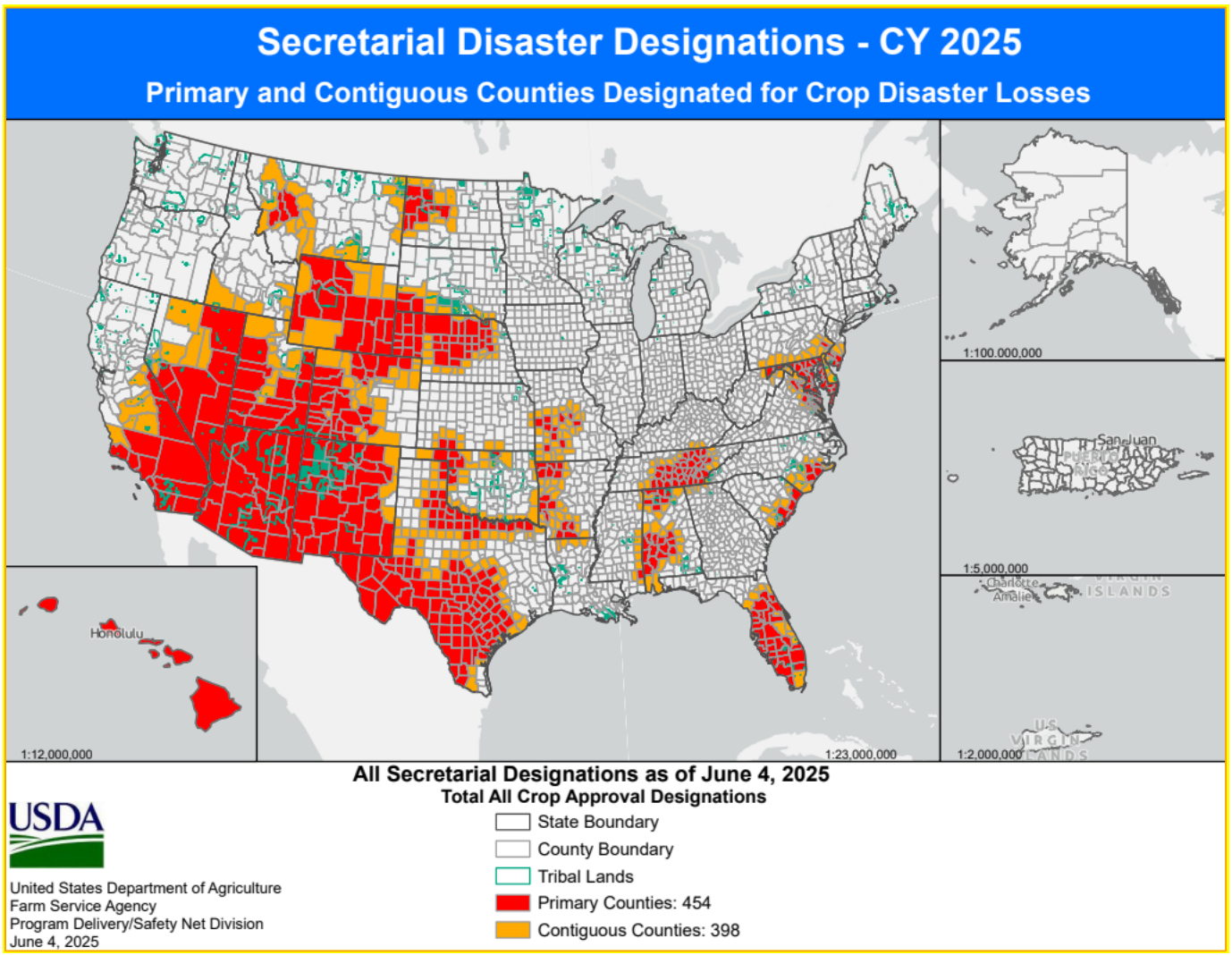

Figure 18 – Drought Disaster Declarations as of June 4, 2025. **Farm Services Agency, USDA**

Montana counties designated as a drought disaster area for Crop Year 2025 as of June 4, 2025. Primary: Granite, Powell and Lewis and Clark.

Secondary: Big Horn, Broadwater, Carbon, Cascade, Deer Lodge, Fallon, Flathead, Gallatin, Jefferson, Meagher, Missoula, Park, Ravalli, Richland, Roosevelt, Sheridan, Teton and Wibaux.

Drought Evaluation Tools and Resources

The following resources provide useful tools that DNRC and their partners use to evaluate drought and water supply conditions on a weekly basis across Montana.

- Upper Missouri River Drought Indicators Dashboard
- Montana Drought Impacts Reporter
- NRCS Interactive Precipitation Portal
- NOAA/Climate-At-A-Glance
- USGS Water Watch Dashboard
- Montana Mesonet Dashboard

The DNRC has compiled this Summer Water Supply and Drought Outlook on behalf of the Montana Drought and Water Supply Advisory Committee (DWSAC). This report provides a synopsis of statewide conditions gleaned from multiple sources and offers links to additional resources with more in-depth information.

In partnership with other state and federal agencies and Tribes, experts in climate science, snowpack, streamflow and weather information collect and evaluate drought and water supply data on a weekly basis year-round. This information is distilled into weekly recommendations to the U.S. Drought Monitor which tracks drought conditions nationally. Much of the information contained in this report comes from the Montana Climate Office, NRCS Water Supply Outlook Reports, U.S. Drought Monitor, Climate Prediction Center, National Integrated Drought Information System and others. Please contact Michael Downey, at DNRC (mdowney2@mt.gov) if you have any questions or feedback about any of the information contained in this report.

This report would not be possible without the ongoing participation and contributions of our local, university, state, Tribal and federal partners, some of which are listed below:

This report was developed by DNRC on behalf of the Drought & Water Supply Advisory Committee pursuant to MCA 2-15-3308(5).