National Significant Wildland Fire Potential Outlook

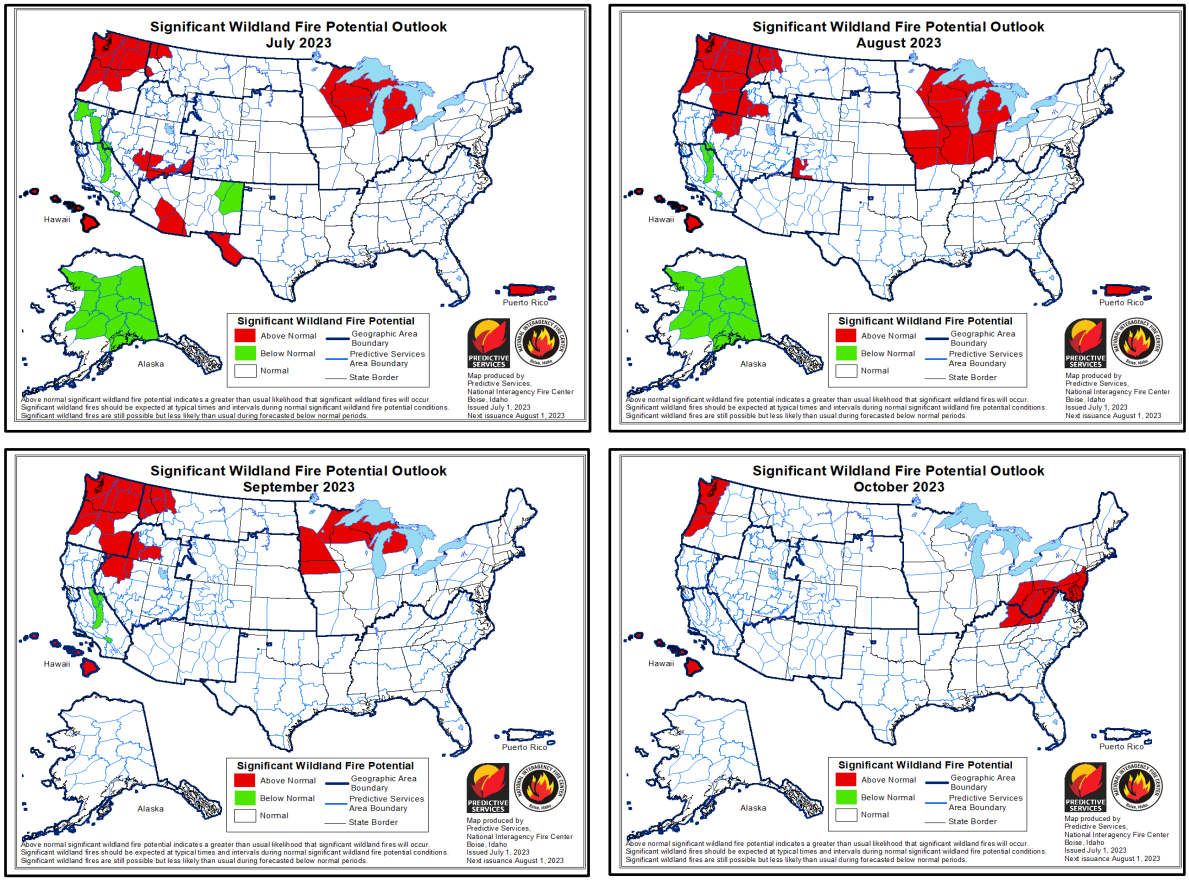
Predictive Services
National Interagency Fire Center

Issued: July 1, 2023
Next Issuance: August 1, 2023

Outlook Period – July through October 2023

Executive Summary

The significant wildland fire potential forecasts included in this outlook represent the cumulative forecasts of the ten Geographic Area Predictive Services units and the National Predictive Services unit.



Significant fire activity remained below normal across the US during June. Wildfire activity remained low in much of the Southern Area, with the West observing a gradual increase in activity, but hot and windy conditions at the end of the month saw a marked increase in activity in the Southwest, Colorado, and Texas. Alaska continued to have a very slow season, one of the slowest on record. Year-to-date acres burned for the US is 36% of the 10-year average, with a below average number of fires, about 88% of average.

Above normal temperatures continued across the northern tier of the US from Washington into the Dakotas, with above normal temperatures also observed in Texas, mainly due to a heat wave the latter half of June. Much of the US observed below normal temperatures, from California into much of the southern and central Rockies, then across the Appalachians and East Coast. Above normal precipitation was received in the Sierra, Great Basin, central Rockies, and northern Plains, but the Pacific Northwest, Midwest, and Great Lakes received below normal rainfall. The

Southwest was very dry in June, which is normal. Texas was also drier than normal for the month, especially at the end of the month when record heat was observed. Drought developed across portions of the country, notably in the Midwest, Great Lakes, Mid-Atlantic, and coastal Northwest. Moderate to extreme drought now covers 27% of the country, with extreme to exceptional drought in portions of Kansas, Nebraska, and Missouri.

Climate Prediction Center and Predictive Services monthly and seasonal outlooks depict likely above normal temperatures for the West, South, and East Coast through summer into early fall. Below normal precipitation is likely for the Southwest and likely into the broader Four Corners region as the North American Monsoon is expected to be below average this summer. Below normal precipitation is also forecast along and west of the Cascades in Washington and northern Oregon, and in the central Great Lakes. Areas of above normal precipitation are likely in parts of Montana, Wyoming, Florida, and the Plains during the summer.

Above normal significant fire potential is forecast across much of Washington and northern Oregon into the Idaho Panhandle and far northwest Montana in July. Due to recent and forecast warmer and drier than normal conditions, above normal potential is expected to expand into much of Oregon in August, and into more of northwest Montana. Above normal potential will also expand into northwest Nevada and southwest Idaho in August as fuels dry with above normal fine fuel loading. Above normal potential is forecast across the western Great Lakes in July expanding to include the Mid-Mississippi Valley in August before retreating to the northern Great Lakes, southwest Minnesota, and northwest Iowa in September.

Above normal fire significant fire potential is also forecast for portions of southeast Arizona, west Texas, and the southern Great Basin due to a delayed North American Monsoon in July, with above normal potential in southwest Colorado in August. However, below normal potential is forecast for northeast New Mexico in July with below normal potential in the Sierra, San Bernardino Mountains, and northwest California mountains. Below normal potential will continue in the southern Sierra and San Bernadino Mountains into September while northern California and northeast New Mexico return to normal potential.

Well below normal potential will continue across Alaska through August as cool and moist weather is likely to continue. However, above normal potential is forecast in Puerto Rico and the US Virgin Islands through August due to ongoing drought and forecast drier than normal conditions. Hawai'i is also forecast to have above normal potential July through October due to above normal fine fuel loading and drought forecast to develop over the summer.

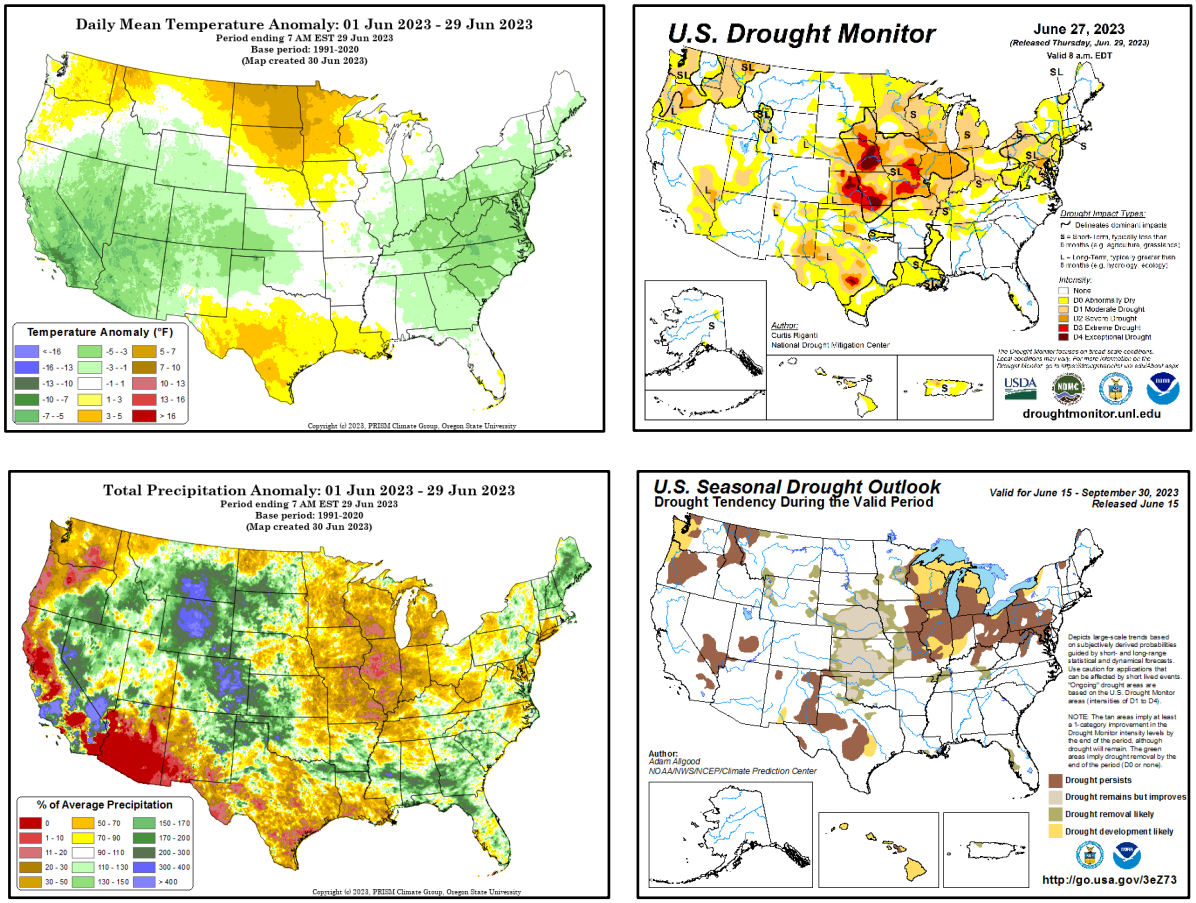
Past Weather and Drought

Upper-level troughs continued to affect the northwest quarter of the US during June with scattered showers and thunderstorms daily from the Sierra north and east through the Great Basin and Rockies into the High Plains. Above normal precipitation in the West was focused in these areas, but much of the Northwest, Idaho Panhandle, northwest Montana, and Southwest received well below normal precipitation. Much of the Midwest, Great Lakes, and Mississippi Valley were dry through mid-June, but rainfall returned to much of these areas in late June to alleviate the very dry conditions at least temporarily. Temperatures were above normal across the Northwest, northern Rockies, northern Plains, and Texas, with near to below normal temperatures from California through the Great Basin into the central Plains, then across much of the eastern US. A heat wave developed across much of the southern US in late June, with rapidly drying conditions and fuels in the Southwest, greater Four Corners area, and Texas.

Snowpack continued to melt in the West with most areas snow free by the end of the month. However, basins in the Sierra and portions of the Great Basin continue to hold onto snow much later than normal, especially at the higher elevations. Drought improved across the southern Plains, especially the High Plains, Colorado Front Range, and Florida. Drought developed across much of the Mid and Upper Mississippi Valley, Great Lakes, and Mid-Atlantic, with drought

intensifying in eastern Kansas, eastern Nebraska, and Missouri. Drought also developed near and west of the Cascades in Washington and northwest Oregon, with drought continuing in the Idaho Panhandle and northwest Montana.

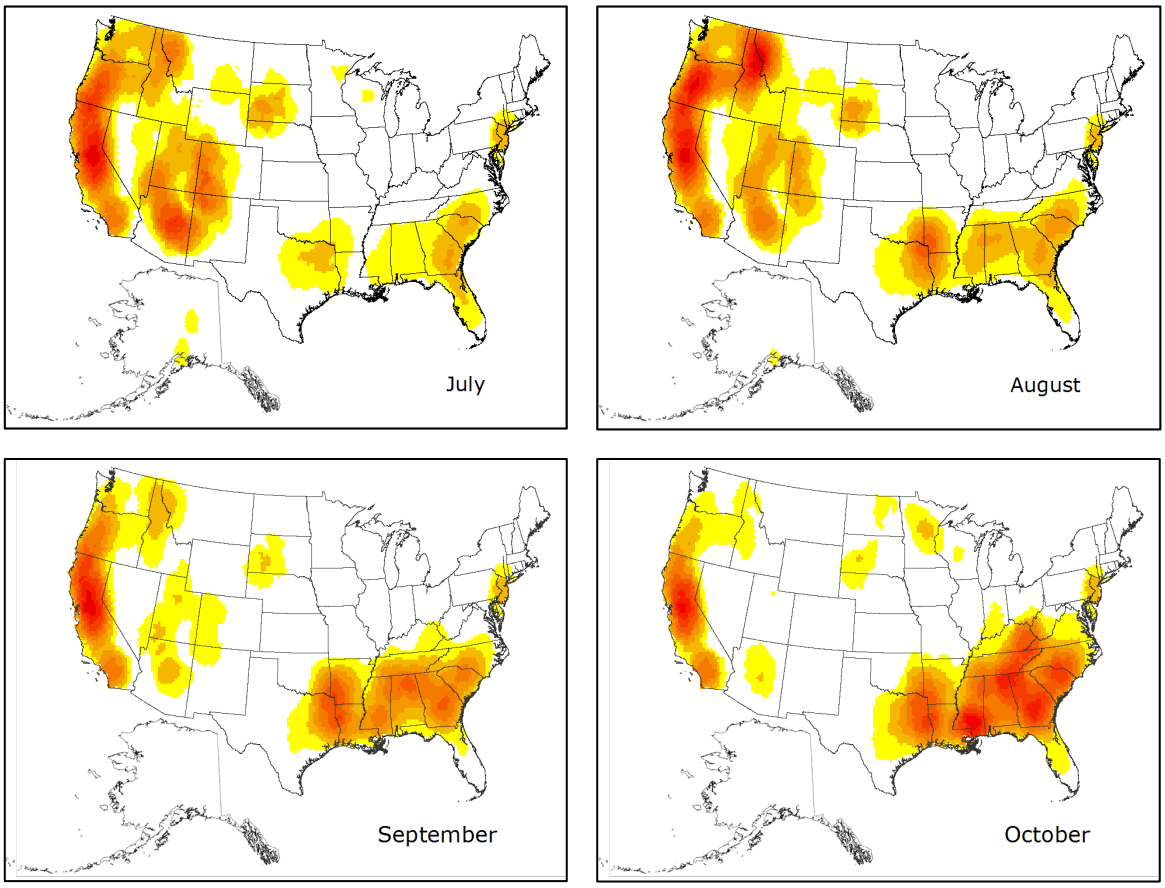
Fire activity remained below normal much of the US in June, with year-to-date fire activity in both number of fires and acres burned remaining well below normal. Above normal activity was noted in the Great Lakes in June due to a prolonged dry period since May. Above normal cool season precipitation and snowpack along with periodic precipitation since May helped to slow fuel curing across California, the Southwest, Great Basin, and Rockies. However, strong high pressure at the end of the month, with well above normal temperatures, resulted in rapidly increasing fire activity in the Southwest, Colorado, and Texas. Fire activity also gradually increased across the rest of the West in June, with the greatest increase in the Northwest which has received only light precipitation since May 1. Alaska remained cool and wet during June, with fire activity well below normal.



Left: Departure from Normal Temperature (top) and Percent of Normal Precipitation (bottom) *(from PRISM Climate Group, Oregon State University).* **Right: U.S. Drought Monitor (top) and Drought Outlook (bottom)** *(from National Drought Mitigation Center and the Climate Prediction Center).*

Weather and Climate Outlooks

El Niño has developed in the equatorial Pacific Ocean, and rapid warming continues in much of the ENSO region, especially in the central Pacific with continued anomalous warmth off the coast of South America. Above normal sea surface temperatures are observed in all ENSO regions. Most forecast guidance depicts continued warming through summer, with El Niño conditions forecast to continue into winter. The Climate Prediction Center forecasts a greater than 95% chance of El Niño conditions continuing into winter, with a 56% chance of a strong El Niño developing this fall. Other teleconnection patterns, such as the Madden Julian Oscillation (MJO), Pacific Decadal Oscillation, and Pacific-North American Pattern may influence weather and climate during the outlook period, but El Niño will be the main driver.



Normal fire season progression across the contiguous U.S. and Alaska shown by monthly fire density (number of fires per unit area). Fire size and fire severity cannot be inferred from this analysis. (Based on 1999-2010 FPA Data)

Alaska

Below normal significant fire potential is expected for mainland Alaska in July and August. Typical wildfire potential is expected in September and October, a time of year when minimal activity is the norm.

No areas of Alaska are currently in drought status, although the US Drought Monitor shows local areas of abnormally dry conditions in the Upper Yukon Valley and near Anchorage. Ample rainfall in May and June has prevented any meaningful drought from developing.

The El Niño now in place suggests a slight tendency for warm weather in July and August. The signal regarding precipitation is less clear, implying typical precipitation for Alaska through the late summer and into the fall. Late July and August are typically wet for mainland Alaska.

To date Alaska has had, functionally, no fire season. The total area burned across the state through the end of June is less than 2,000 acres, by far the lowest tally observed since detailed mapping of wildfire perimeters began in 1993. As of the end of June, there are no staffed fires in Alaska.

The sub-surface duff layer is comparatively cool and wet across the state with local exceptions in the Upper Yukon and Tanana Valleys. Under such conditions, wildfires are typically receptive to control. Fine fuels on the surface are burnable in some areas, implying that the primary threat remains only wind-driven grass fires.

Given the diminished burnability of sub-surface fuels and the complete absence of active wildfires at the end of June, the prospect of warmer than normal temperatures produced by El Niño will not be influential enough to facilitate a meaningful uptick in wildfire behavior for the remainder of Alaska's active wildfire season in July and August. Typical conditions are anticipated in September and October, generally a very quiet time of year concerning wildfires.

Northwest

June began with a heat wave that drove temperatures upward to near record high values early in the month. That was followed by a cooling trend that brought record cool temperatures in the third week of the month. The cooling trend also brought welcome precipitation to much of the geographic area over a three-day period. Otherwise, most of the geographic area was quite dry in June except for southeast and south-central Oregon (PSAs NW07 and NW12), where precipitation was well above average due to low pressure centers aloft that produced frequent showers and wet thundershowers through the month.

Drought designations are expanding in area and severity week by week in western Oregon, western Washington, and southeastern Washington.

The number of new fire starts for June was above average. Over 500 fires were reported for the month with over 35,500 acres burned. Several large grass and shrub fires were reported in the middle of June with the largest growing to 16,816 acres in the Columbia Basin while the Olympic Peninsula reported a fire just under 100 acres. A series of wet lightning events passed over most the geographic area bringing an uptick in new starts towards the end of the month.

Dead fuel moistures fell as conditions dried at the end of June. On the west side of the Cascades, the dead fuel moisture is below average while the east side is near or above average. Live fuels are cured at lower elevations and curing will gradually increase in middle elevations. Moderate precipitation accompanied thunderstorms delaying drying at the higher elevations and over much of southeastern Oregon.

Energy release component (ERC) values were above average and rose steadily for the first week of June. Cool and wet conditions returned ERCs close to average values the second week. ERCs are gradually increasing in response to warmer and drier conditions and are expected to rise above average by the end of June.

NOAA and other outlooks for July are mixed but warmer and drier than typical conditions are assumed in Washington for July. For Oregon in July, drier than typical is expected west of the Cascades with no precipitation anomaly foreseen east of the Cascades. For August through October, warmer and drier than typical conditions are the most likely scenario for the entire geographic area.

All of Washington and much of northern Oregon is expected to be in above average significant fire potential for July. For August and September all of Washington and most of Oregon is expected to be in above average fire potential. For October, elevated significant fire potential will shift west of the Cascades, mainly in Oregon.

Northern California and Hawai'i

Significant fire potential is projected to be near to below normal for July and near average August through September. Historically during July between 1 to 3 large fires occur per PSA ramping up to 2 to 6 large fires per PSA during August then lowering to 1 to 3 per PSA during September. The exception to the average large fire numbers is found across the Bay Area PSAs where less than 1 occurs. During October, all PSAs generally average 1 or less. Hawaii's significant fire potential is above normal for July through October with expanding potential with each passing month.

The weather pattern during June was mainly low pressure or trough impacts with periods of warm and dry ridging. Precipitation was generally above to well above normal across the Modoc Plateau and east of the Sierra Crest while near to below normal elsewhere. Average temperatures were generally near to below normal. Dead fuel moisture values were generally near to above normal most of the month across most of the area with the exception being across portions of the North Coast PSA where precipitation, compared to normal, was lacking. Herbaceous fuels were mostly cured below around 2500 feet by the end of June with peak green-up found between 3500 to 4500 feet and noticeable green-up as high as 7500 feet. The abundant snowpack was generally found in the sheltered slopes and areas above 6500-7000 feet towards the end of the month and most of the stations reported at least 300% of normal. Some shrub fuels reached peak moisture conditions during June with curing being noticed in chamise and sage the latter half of the month, although values remained near to above normal. Shrubs and tree canopies across the mid elevations were generally taking on moisture and remained a significant barrier to fire spread. Record amounts of lightning were observed during June with nearly 43,000 strikes through the 27th. The average total for June is nearly 3,600 cloud to ground lightning strikes based on the 2012 to 2022 period. The yearly average is just shy of 30,000 which makes June's lightning totals quite remarkable. A weak northerly and easterly wind event coupled with low humidity occurred during June 15th and 16th, otherwise no other notable dry wind events occurred. This event led to the first two 100-acre fires of the season in oak woodland with mostly cured herbaceous fuels. Fire business trended higher during June compared to May with marginal growth during some of the fires across the lowlands, and over 160 lightning ignitions occurred favoring the mountains, although they were all small. Prescribed burning remained active with several broadcast and pile burns conducted.

The weather outlook for July is for a transition from the cooler semi-moist pattern observed during June to a warmer one with periods of lightning and extended onshore flow. Temperatures should be near average with mixed precipitation anomalies but generally near normal on average across northern California. Positive heat anomalies are expected to become more common during August and September with lightning and outflow winds becoming more of an issue for ignition and growth versus strong organized dry offshore or onshore wind events. There is high confidence for a muted North American Monsoon this summer but moisture and instability fueling thunderstorms will come from other source regions like the tropics (i.e., east Pacific) and very weak and orphaned low-pressure areas aloft. The flavor of the lightning is expected to be drier compared to last summer. Early indications suggest a warmer and drier October with a return of some more organized gusty offshore wind events but there are some mixed modeling signals on how dry, plus it is too early to say whether the offshore wind events will be unusual or not.

Critical flammable alignments in the live and dead fuels are not likely to occur for an extended period or across larger portions of the region until August and September. Therefore, near to below normal large fire activity is expected for July, with fuel ingredients such as a pronounced green-up, higher elevation snowpack, and previous large fire footprints of the past 3 to 5 years being a spread limiter across the more mountainous locations. An average threat is expected from August through October as the abundant moisture found within the woody shrubs lowers to more flammable levels outside of the highest elevations. Heat could become more problematic within the dominant dead fuel moisture regimes and help to initiate drought across the far north by late summer. Herbaceous fuels during the growing season experienced near to above normal growth and should be an ingredient for large fire activity during July across the low and some mid elevations as the fuels continue to cure. The less sheltered areas found across the far east and northeast could experience some flammable shrub and herbaceous fuel alignments by late July while cheat grass will be flammable much earlier.

Sea surface temperature (SSTs) anomalies surrounding the Hawai'ian Islands are near to a little above normal. Average temperatures during June were mixed but generally near normal on average. Precipitation was generally below normal although some moist signals showed up along the southern tier of the Big Island. El Niño became established across the eastern equatorial

Pacific during June and is likely to strengthen during the outlook period. There is a higher likelihood of it becoming strong during fall. Precipitation is likely to be below normal during the four month period with mixed signals possible in areas due to tropical storms. Tropical cyclones can also bring a gusty and dry wind period depending on how they approach the island chain and can exacerbate fire growth conditions. Average temperatures should be near to above normal. The previous wet season was unusually moist in most areas and has led to abundant herbaceous growth and notable curing now exists across the leeside areas. This is especially evident on Maui, where moderate drought conditions are most notable and at least two 100 acres fires occurred. Drought will likely expand and intensify during the coming months and help to drive above normal significant fire activity. The above normal signature will start out smaller during July and August and mainly be relegated to the leeside areas but will expand further during September and October as the dryness takes a toll on more of the island chain.

Southern California

The potential for significant fires will be below normal across the higher elevations and near to a little below normal across the lower elevations through September. All areas will be near to a little below normal in October.

A series of closed low pressure areas moved into California from the Pacific Ocean through June 16. These low-pressure areas brought well below normal temperatures to the entire area and isolated to scattered showers and thunderstorms mainly to the Sierra and northern deserts each day. On a few days, these showers and thunderstorms covered much of central California. The marine layer was deep every morning, with low clouds and fog making it well up the coastal mountain slopes. This deep marine layer brought measurable drizzle to many locations of southern California, from the coastal mountain slopes westward. From June 17 through the end of the month, the closed lows were centered farther north over the Pacific Northwest and northern California, with southern California under an open trough. The deep marine layer remained intact over the coastal areas, but isolated shower and thunderstorm activity was limited to the Sierra, and only on a couple days. There were strong westerly winds through the desert passes most of the month. Temperatures remained well below normal across the region. For the month, maximum temperatures were well below normal across the entire region while precipitation was near to well above normal across most of the area. The high elevations Sierra snowpack remains in many areas, and is between 20% and 30% of the April 1 normal which is when the snowpack is normally at its deepest. It is very unusual to have a measurable snowpack left by July.

There was no change to drought in June. Most of the region continues to have no drought, but abnormally dry to moderate drought continues across the deserts. The cool and humid conditions caused the 1000-hr and 100-hr dead fuels to remain above normal most of June. The grass across the lower elevations is now fully cured. Some of the brush across the lower elevations has cured, but there is still quite a bit of green. The live fuel moisture remains mainly between 80% and 150% and is well above normal for this time of year.

The sea surface temperatures in the Gulf of Alaska and off the West Coast are continuing to warm. The sea surface temperatures in the Gulf of Alaska and just off the California Coast are now a little above normal. These above normal sea surface temperatures will likely cause high pressure to become the dominant weather feature in July and the center will wobble back and forth between the Desert Southwest and California. As sea surface temperatures continue to warm off the West Coast, expect high pressure to move further north and migrate between the Four Corners Area and the Great Basin in August and September. Temperatures will likely be above normal through September. There will be likely be below normal monsoonal shower and thunderstorm activity in July as the center of high pressure is farther south than normal. As the center of high pressure moves northward, the monsoonal shower and thunderstorm activity will become above normal in August and September. This is due to more moisture being available due to projected above normal sea surface temperatures over the subtropical Pacific Ocean and Gulf of Mexico. The marine layer will likely be shallow through September and only move over

the coastal areas as high pressure dominates. Below normal large fire activity is still forecast across the higher elevations and near to a little below normal large fire activity across the lower elevations through September. Moderate to strong El Niño conditions will likely cause a significant rainfall event to occur early in the fall. The large fire threat will be near to a little below normal across the region in October, but as time gets closer and confidence grows, below normal significant fire potential may be added across the lower elevations.

Northern Rockies

Significant wildland fire potential in the Northern Rockies Geographic Area (NRGA) for July through October is expected to be normal except for portions of northern Idaho and northwestern Montana where activity will be above normal starting in July and August, then lasting into September. The area of above normal activity is where moderate to severe drought is expected to persist into the summer and mountain snowpack has dissipated ahead of schedule. The remainder of the NRGA does not have strong signals which support a deviation from normal fire season forecasts.

Compared to the May drought monitor, the current chart shows a two class improvement in drought for almost all drought areas in central and eastern Montana, a two class degradation in Yellowstone NP, and patchy areas of improvement and degradation in northern Idaho, northwestern Montana, and North Dakota. This leaves moderate to severe drought in northern Idaho and northwestern Montana, moderate to severe drought in Yellowstone NP, a small area of moderate drought in southeastern Montana, and a small area of drought in northeastern North Dakota. The current Climate Prediction Center seasonal outlook calls for drought removal in Yellowstone and southeastern Montana. The drought in northeastern North Dakota is not reflected in the outlook but has received 1 to 6 inches of rainfall since the last drought monitor was published, making drought improvement likely. This leaves drought in northern Idaho and northwestern Montana as we head into July.

Temperature anomalies have generally been above normal across the area. Mean daily temperatures have been at or slightly below normal in southwestern Montana and above normal elsewhere. This is the result of below normal maximum temperatures in southern and southwestern Montana, as minimum temperatures have been uniformly above normal.

Except for the high country, snow cover has receded across the Northern Rockies, allowing drying of dead fuels to begin. Most PSAs show dryness and Energy Release Components (ERCs) near or below normal levels, but northern Idaho and northwest Montana continue to stand out due to persistent higher than normal temperatures and sporadic but less than normal precipitation. Specifically, NR01 (Northern Panhandle of Idaho), NR02 (Northwest Montana) and NR05 (Camas Prairie of Idaho) are beginning to show above normal ERCs. Higher elevations and green vegetation are helping to moderate fire potential in NR07 (Glacier NP-Flathead NF), but this area has been trending abnormally dry with little precipitation (both snow and rain) and higher than normal temperatures. Precipitation, albeit sporadic, melting snow, and above normal temperatures have also supported the greening up of live fuels across the entire NRGA, which should decrease fire potential for now into the middle of July especially for mid to high elevations. However, it is likely that the unseasonable heat, especially in northern Idaho and western Montana, has pushed the greening up ahead of schedule, which will allow live fuels to start curing earlier in the summer. Without precipitation to moderate dead fuel moisture and delay curing of live fuels, the forecasted higher than normal temperatures will help to dry out fuels and fire season in the Northern Rockies will commence quickly thereafter.

Light initial attack was reported for most days. The largest fire reported in the last month was 22 acres. Prescribed fire has been ongoing though precipitation events and high humidity have limited burning opportunities. No prescribed fires have been proposed in the last week.

Normal fire activity is expected for most of the NRGA for July through October with two exceptions. PSAs 1, 2, and 5 are expected to have above normal fire activity starting in July and continue through September, while PSAS 3, 4, and 7 are expected to have above normal fire potential in August and September.

The July outlook shows above normal precipitation for southern Montana and southern North Dakota, with equal chances for above or below normal temperatures throughout the area. The July through September outlook is similar to the June outlook, with above normal precipitation still shown in southern Montana and southern North Dakota. However, in the seasonal outlook, above normal temperatures are forecasted for northern Idaho and western Montana. This forecast supports the above normal fire danger outlook for PSAs 1, 2, and 5 in July spreading to PSAs 3, 4, and 7 for August and September.

Great Basin

Fire season has been delayed due to the melting and runoff of the snowpack, cooler temperatures in June, and near daily showers and thunderstorms over the northern half of the Great Basin. Above normal carry-over fuels across southern Idaho into far northwest Nevada allowed for late spring fires that grew to several hundred or a few thousand acres before running into uncured fuels. Fires mainly in the carryover grasses will continue into July before surrounding fuels cure out. Drier conditions have been the main story over southern areas of the Great Basin, where grasses are mostly cured in the lower elevations. However, live fuel moisture in the sagebrush is still well above normal across most of the Great Basin and has not dropped to critical levels. Much warmer temperatures heading into July are expected to accelerate the curing process, but it will still take a few weeks. The monsoon may develop in July but is likely to be weaker with more sporadic bursts of moisture than normal. Therefore, above normal fire potential is possible over the lower elevations of southeast Nevada into southern Utah and the Arizona Strip in July. Above normal fire potential may need to be extended into August in these areas, depending on the weather pattern and the monsoon due to above normal fine fuel growth. Above normal fire potential is also expected in northwest Nevada into southern Idaho due to carryover fine fuels combined with cured new growth by August, as July will be a month of drying and curing of fuels before fire activity really increases to above normal.

record snowpack across the southern two thirds of the Great Basin along with above normal winter precipitation significantly delayed the start of fire season in the higher elevations of the southern and central Great Basin, as well as across the high Sierra. Temperatures over the last 30 days have been below normal across the Great Basin, with the constant presence of West Coast troughs. Precipitation has been above normal across most of the region, with nearly daily showers and thunderstorms over the northern half of the Great Basin. Precipitation in the last 30 days has even been above normal in the far south due to a few days of showers and thunderstorms. Some exceptions to the above normal precipitation are eastern Utah, parts of the Arizona Strip, and parts of south-central Nevada which were below normal. The snowpack has continued to decrease from the April peak due to the drier and warmer weather in some areas and the uptick in showery weather throughout June. Flooding has been a concern throughout May and June but will subside through July and August as the snowpack continues to decrease. The wetter conditions over the last 6 to 12 months have improved drought conditions significantly, with most areas improving by up to two drought categories or more in the past several months. The only remaining area of drought is over southern Nevada and parts of southern Utah, where moderate to severe drought will likely continue. Otherwise, most areas of Nevada, northern and eastern Utah, and southern Idaho have no lingering drought conditions.

Fuel moisture is still above normal across the Great Basin due to consistent storms and precipitation in the northern half of the region and overall cooler temperatures in the south, which prolonged green-up and delayed the curing process through June. Curing is at least 2-4 weeks behind schedule in most areas. Heading into July, grasses are cured out in the south, and in various states of curing further north. Sagebrush fuel moisture peaked a few weeks late and is

now on the downward trend. Fine fuels were above normal last year across the Snake River Plain and far northwest Nevada but were near or below normal elsewhere. The snowfall earlier this winter down to valley floors in much of Nevada and Utah compacted any carryover fine fuels due to the extended period the snow remained on the ground. However, significant new fine fuel growth occurred this year due to winter and spring precipitation bringing above normal fuel loading, despite the carryover component being lower in most areas. The only exceptions are over far northwest Nevada into southwestern Idaho, where above normal carryover fine fuels exist as the lower elevation snowfall in these locations was not as significant as areas further south. There are also multiple crops of cheat grass being reported in parts of Nevada and possibly into Utah with the return of wetter weather in late May and June. Soil moisture is well above normal across the Great Basin with the snow melt and runoff, despite the recent drier weather in the south. Fuels are likely to dry out more rapidly through July as very hot weather develops along with a decrease in showers and thunderstorms.

Fire activity remains low across the Great Basin for the time of year. However, we have been getting smaller fires almost daily in the lower elevations, and occasionally a fire will grow to several hundred acres or a few thousand acres in the dead carryover fine fuels in the lower elevations of southern Idaho. However, these fires have been easily controlled due to higher fuel moisture in the surrounding fuels and continued higher humidity and showers. Fire activity will increase throughout July as hot and drier weather returns and fuel moisture drops more rapidly.

Below normal fire potential is expected in the high Sierra in July and August as the snow continues to melt and fuel moisture gradually decreases. The weather pattern heading into July still looks to allow more low-pressure troughs to periodically move through the Great Basin giving the region off and on chances of wind, cooler temperatures, higher humidity, and showers. However, the month will start out very hot and drier than recent weeks, and this will accelerate the drying of the fuels. The southwest monsoon is still delayed, and when it does arrive later in July it is likely to be weaker than normal. This increases the likelihood that fire season will continue longer in southern areas and peak later than normal in July and possibly even August. Therefore, above normal fire potential was added to southern areas of the Great Basin for July, and this may need to be extended into August, depending on the monsoon. Fire activity has remained relatively low in the northern and western half of the Great Basin due to nearly daily showers and thunderstorms in June. However, hotter, and drier weather will start out July and fuels will finally start curing faster in these areas. It will likely take 2-3 weeks for fuels to really get dry enough to support significant fire growth, therefore July may be more of a ‘normal’ month in the north. Above normal fire potential was removed for July in northwest Nevada and southern Idaho, but will remain for August, and could continue into September. Of note, years coming out of drought tend to lead to an increase of fires and acres burned in the lower elevations of Nevada and western Utah, especially when a very wet year follows an average or a wet winter the year before. The fall and winter of 2021-2022 had a wet October and December which resulted in near precipitation across the northern two thirds of the Great Basin that winter. The potential will exist this year, but the wetter weather pattern in June has delayed the start of fire season. Therefore, fire season will start later, and either be shorter than normal, or extend later into September. Confidence is still low on the September period.

Southwest

Normal significant fire potential is anticipated for most of the eastern half of the region for the summer. Areas of above normal significant fire potential are expected during July for both southern and southeastern Arizona due to the anticipated unusually dry conditions associated with a weak monsoon push combined with hot temperatures and rather widespread fine fuel availability and continuity. Other portions of western Arizona and some areas close to the divide region could also become active in areas where fine fuel loading and continuity are significant and combine with above normal temperatures and a prolonged period of dryness. Areas of below normal significant fire potential are anticipated for most of northern and northeastern New Mexico for July.

The overall trend through the first six months of 2023 has been for cooler temperatures nearly areawide and wetter than normal conditions focused along and west of the Divide and across the northern tier of New Mexico. The southeastern tier of New Mexico has been both drier and milder than normal for most of 2023 so far. Over the past month drier conditions have taken hold across much of Arizona into southwestern and southern New Mexico with continued cooler than normal temperatures overall minus the far southeastern section of New Mexico.

Mountain snowpack has melted substantially over the past two months with little snow remaining except at the highest elevations across the northwestern half of the region. Last summer's above normal monsoon contributed to an abundance of fine fuel buildup across many areas of the region. Despite an unusually moist May for portions of the region and the continuation of near to slightly below normal temperatures through much of June focused along and west of the divide, these dead fuels will be available to burn this summer. The anomalous above normal precipitation across sections of the region this spring into early summer continues to play a role and adds another complex element to the evolving situation with the recent green-up of various fuel types. Fuels have remained much greener for much longer than usual this late spring and early summer. How rapidly these finer fuels cure in areas that remain dry this summer will be an important component to the forecast.

The recent arrival of weak El Niño conditions and likely further intensification over the next few months will likely have a big influence on the weather and climate for the forecast period. Historically, this points towards the setup of weather systems moving east-northeast from off the California coast and sliding eastward across the northern tier of the country. Weather systems sliding eastward to the north will frequently drop backdoor cold fronts into the region acting as one of the main moisture sources into the region. This will be the story probably much of the summer as the subtropical ridge will struggle to stretch northward with regularity. This type of pattern keeps high temperatures close to or above normal focused west of the Divide and tends to pull moisture into New Mexico from the Plains and Gulf of Mexico. This reverse monsoon setup is typically wet for much of New Mexico but drier for most of Arizona overall. More areas of above normal significant fire potential could result during the second half of the summer due to the weak monsoonal flow and prolonged warmth. Some other areas west of the Divide could be added to above normal significant fire potential in subsequent outlooks. Large fire season could be prolonged until sometime in late summer or early fall when moisture from the Gulf of Mexico arrives with vigor across eastern sections of the region as the mid-upper level high center is suppressed back southward over old Mexico.

Rocky Mountain

Most of the Rocky Mountain Area (RMA) will have normal fire potential through the outlook period. A portion of southwestern Colorado is expected to see above normal potential for August due to a late or limited monsoon season, but these areas will return to normal potential for September through October. Year over year drought indicators continue to show improvement for nearly all the geographic area except for portions of Kansas and Nebraska. Long-term outlooks forecast above normal temperatures for the western half of the geographic area with near normal moisture, with the aforementioned weak monsoon forecast for August. The reduction in drought across the region is expected to offset the bulk of the impact of above normal temperatures.

The general weather pattern continued a more southerly flow, supporting moisture traveling north from the Gulf of Mexico. The well above normal precipitation from shower and thunderstorm activity resulted in continued drought index reductions for eastern Colorado and Wyoming. Elsewhere across the geographic area saw near normal to slightly above normal precipitation. This precipitation was not enough to offset the warmer than normal temperatures, so eastern South Dakota down through eastern Kansas did see some increase in drought conditions. Late in June the pattern began to shift back towards southwesterly flow out of the southwestern US, bringing drier air into southwestern Colorado.

Temperatures were three to five degrees below normal for most of Wyoming, Colorado and western Kansas, while most of South Dakota, eastern Nebraska and Kansas was three to nine degrees above normal. The higher elevations in Colorado and Wyoming continued to hold on to decent snowpack through much of the month, while the remaining snowpack has melted out in other areas.

The continued cooler and wetter conditions have generally kept low to moderate fire danger over much of the geographic area. The recent wetter than normal conditions have supported fuel growth and lead to higher than normal fuel loading. Eastern South Dakota, Nebraska, and Kansas, with less precipitation and warmer temperatures, did see fuel moisture starting to drop below normal for this time of year and the fire danger charts followed accordingly. While seasonal outlooks indicate above normal temperatures but near normal moisture, with no rapid change to critical dryness widely expected across the geographic area, there will be pockets of dryness that will develop, especially across southwestern Colorado.

Through most of June large fire activity was not observed. However, with recent dry and windy conditions across southwestern Colorado, a few large fires developed the last week of June. Prescribed fire activity has continued in areas where fuels support burning.

Seasonal precipitation outlooks are normal for most of the RMA. There is a small area of southwest Colorado where the monsoon is expected to be weaker, with less precipitation forecast. PSAs 16 and 19 will see above normal fire activity for August. Temperature forecasts are trending above normal for Colorado and Wyoming and normal for the rest of the geographic area. These trends are consistent with the expected development of El Niño.

The outlook for the RMA depicts normal significant fire potential across the most of geographic area through October. The one exception will be southwestern Colorado where above normal fire potential is expected by August. The improvement in drought indices indicates there should be resiliency in the landscape even though above normal temperatures and below normal moisture are favored during the summer for the higher elevations. The above normal snowpack and above normal precipitation for May and June, will continue to be a major offset against the summer forecasts. There may be pockets of enhanced fire activity based on local fuel conditions, but the larger scale picture favors normal significant fire potential.

Eastern Area

Near normal significant fire potential is forecast for most of the eastern half of the Eastern Area July into October 2023. Above normal fire potential is expected to persist across the central and eastern tiers of the Great Lakes through September. Above normal fire potential may develop over the southeastern Mid-Atlantic States heading into October.

Negative precipitation anomalies were indicated toward the end of June 2023 across portions of the Great Lakes and much of the Mid-Mississippi Valley. Longer term drought remained in place across the southeastern Mid-Atlantic States and the Mid-Mississippi Valley. Negative 30 to 90-day soil moisture and precipitation anomalies were in place across much of the Mississippi Valley towards the end of June 2023 with near to above normal soil moisture across the remainder of the Eastern Area.

The Predictive Services weather outlooks forecast below normal precipitation across the eastern Great Lakes, the northeastern tier of the Mid-Mississippi Valley, and the Mid-Atlantic States in July and over the eastern tier of the Eastern Area later this summer into October. Above normal precipitation is likely to develop across the eastern Great Lakes in August and over the Mid-Mississippi Valley heading into the fall of 2023. According to the NOAA Climate Prediction Center long term outlooks, near to above normal precipitation trends are forecast across the southwestern tier of the Eastern Area through the summer of 2023 into early fall.

According to the Predictive Service and NOAA Climate Prediction Center outlooks, near to above normal temperatures are forecast over much of the Eastern Area through the rest of the summer into the fall of 2023.

The potential for above normal fire activity is forecast to persist over the central and eastern Great Lakes into September 2023. Rainfall occurring across the Great Lakes towards the end of June reduced the water deficit but will only temporarily flatten trends in the drought code with below normal precipitation forecasted for July. These flat trends are occurring while values are near historic maximums and the overall effect can be thought of as delaying the drying. Large surface fuel moistures (1000-hour fuels) were still significantly below average and at or below historical lows for this time of year at select RAWS (Remote Automated Weather Stations) across portions of the central and eastern Great Lakes. The amount of consumption of these large fuels reported on wildfires and prescribed burns through June was not typical for the beginning of summer across the Great Lakes. The area experienced a short spring, switching rapidly from winter conditions to summer-like conditions and although green-up occurred on time, live fuels are experiencing drought stress. Precipitation in the form of showers and thunderstorms will increase chances for lightning caused fires and holdovers outside of the precipitation. Areas of sandy or rocky soils dry out quickly and are of concern, especially across the northeastern Great Lakes. The potential will continue to exist into September across the central and eastern Great Lakes for above normal fire activity, with the potential for long-term or deep-burning fires increasing as long as precipitation coverage remains spotty and infrequent. Forecasted above normal precipitation in August could provide some relief, but normal to below normal precipitation forecasted in September could reverse any gains.

Significant fire potential is forecasted to exist in August in the agricultural middle tier of Eastern Area as drought continues with below normal precipitation forecasted in July prior to or during the beginning of harvest season.

The potential exists for increasing fire potential across the eastern tier of the Eastern Area progressing through the fall 2023 season. Warmer and drier than normal trends are forecast over these areas according to the Predictive Services climate outlooks.

Southern Area

After a wet May and early June, an extreme reversal has taken shape across southwestern portions of the geographic area the past couple of weeks, driven by record-setting heat, poor overnight relative humidity recovery, mostly sunny, and dry weather. This excess evaporative demand has been most pronounced through west and south Texas into western and southern Louisiana. After a dry start to June along the East Coast, much-needed rain has brought significant relief to Virginia and North Carolina. Long-term dryness continues, especially from coastal North Carolina into eastern and northern Virginia. The Caribbean has observed an exceptionally hot and dry month, and portions of Puerto Rico, where Keetch-Bryam Drought Indices (KBDIs) are approaching 700, will likely end up with one of their warmest months on record.

The high pressure ridge responsible for excess heat in late June is expected to quickly break down; however, fuels are expected to remain dry into early July over portions of the Texas mountains, and from parts of coastal and southeast Texas into southwest Louisiana. A lackluster Southwest monsoon appears likely this year, with the focus for monsoonal moisture farther east than normal, including over portions of Texas and Oklahoma. This may leave the Texas mountains near the edge of appreciable moisture, with resulting thunderstorm activity possibly leading to an uptick in ignition potential there, especially given the state of fuels to start off the month. Most guidance points towards a return of abnormally hot and dry weather in this area later in the summer, which could mean an extension of above normal significant fire potential there in subsequent outlooks. Meanwhile, flash drought development is explicitly forecast by NOAA for coastal Texas into much of Louisiana, but another high pressure ridge

aloft over the Atlantic is forecast to build west towards the Gulf of Mexico early in the month. This pattern typically brings increasing Caribbean and Gulf moisture into the region, eventually allowing for an increase in sea-breeze-driven showers and thunderstorms. If this wetter pattern fails to materialize, as is often the case during developing moderate to strong El Niño events, then the western and central Gulf Coast could see an increase in significant fire potential during any heat waves that may develop later in the summer. KBDIs and water levels in Florida have improved significantly, but some long-term dryness is still evident along much of Florida's Gulf Coast. Any concerns associated with that have mostly been alleviated by heavy rain the past several weeks. Note that hurricane-impacted fuels may also factor in across Louisiana and southwest Florida this year, adding a bit of uncertainty.

The summer of 2015 appears to be an excellent analog for what to expect in the Caribbean this year. The hot and dry start to meteorological summer there is favored to continue, in large part due to the burgeoning El Niño. That summer featured an increase in significant fires later in July and August. Given areas of moderate to severe drought for Puerto Rico and severe to exceptional drought across the Virgin Islands, it seems prudent to follow the El Niño climatology closely. A tropical cyclone could easily reverse dryness at any time, but these are less likely to occur in El Niño years given above normal wind shear across the Atlantic basin.

Conditions across the remainder of the geographic area may be highly variable from July through September, resulting in low confidence in any significant fire potential outside of the longer-term dry areas. Forecast guidance is not in the best agreement, while multiple analogs favor worsening drought in parts of the Ohio and Tennessee Valleys, Appalachians, and portions of Virginia and North Carolina. Relying on analogs has proven useful with the quick transition from La Niña to El Niño, and these are currently given more weight than any long-range model guidance. While the peak intensity of this year's El Niño is still uncertain, it seems increasingly likely that a deep trough of low pressure could produce earlier than normal freezes for northeastern parts of the region this autumn. This, combined with long-term drought and forecasts for a drier than normal end to summer over the central Appalachians, is reason enough to include the mountains of eastern Kentucky and western Virginia in above normal significant fire potential during October. An expansion to include more of Virginia into North Carolina cannot be ruled out, especially if long periods of dry weather persist this summer and tropical clones avoid the East Coast.

Outlook Objectives

The National Significant Wildland Fire Potential Outlook is intended as a decision support tool for wildland fire managers, providing an assessment of current weather and fuels conditions and how these will evolve in the next four months. The objective is to assist fire managers in making proactive decisions that will improve protection of life, property, and natural resources, increase fire fighter safety and effectiveness, and reduce firefighting costs.

For questions about this outlook, please contact the National Interagency Fire Center at (208) 387-5050 or contact your local Geographic Area Predictive Services unit.

Note: Additional Geographic Area assessments may be available at the specific GACC websites. The GACC websites can also be accessed through the NICC webpage at:
http://www.nifc.gov/nicc/predictive/outlooks/outlooks.htm