National Significant Wildland Fire Potential Outlook

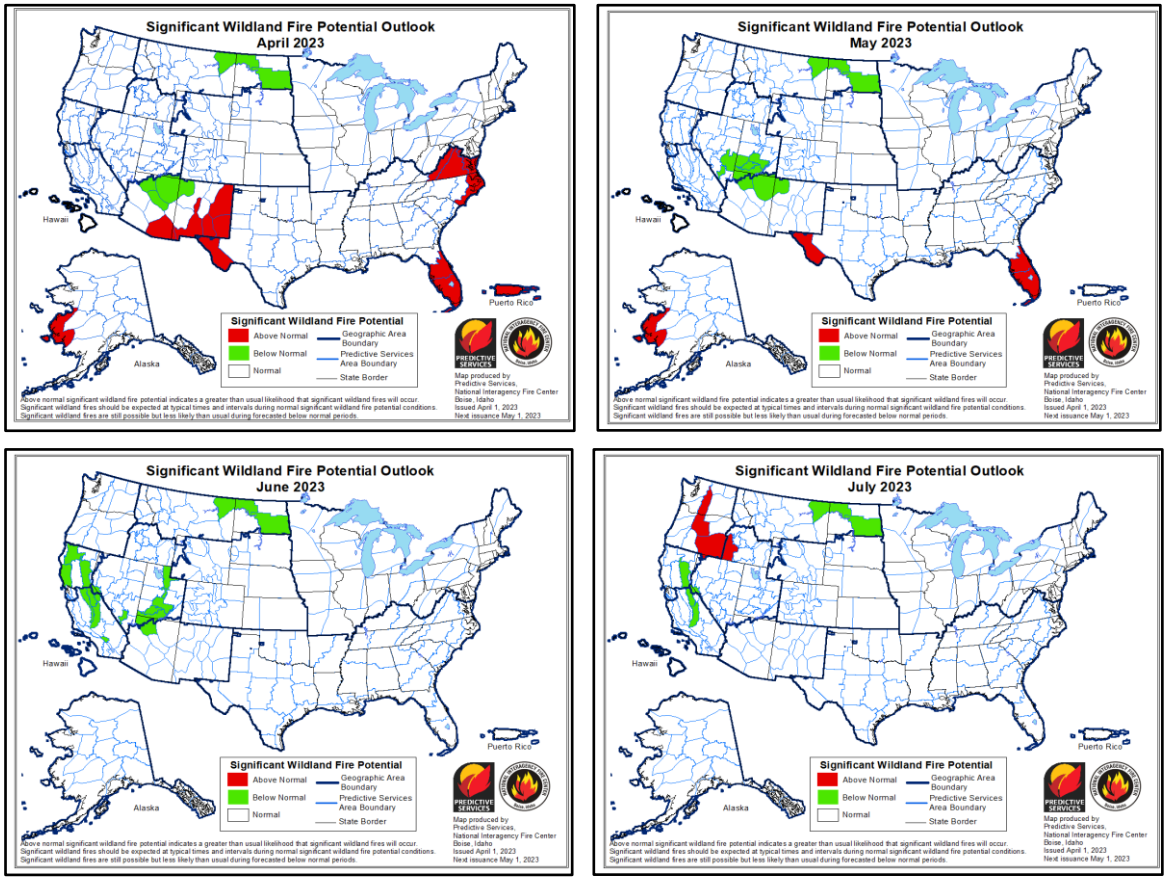
Predictive Services
National Interagency Fire Center

Issued: April 1, 2023
Next Issuance: May 1, 2023

Outlook Period – April through July 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 low across much of the US in March, but an increase of significant fires occurred in Southern, Southwest, and Rocky Mountain Areas. Increasingly receptive fuels were noted in the eastern Carolinas into the Mid-Atlantic, on the Florida Peninsula, and from Texas onto the southern and central High Plains and into southern and central New Mexico. Year-to-date acres burned for the US is 25% of the 10-year average, with a below average number of fires, near 79% of average.

Substantial precipitation and below normal temperatures continued in March across the West, with near to well above normal snowpack, including record high snow water equivalent (SWE) values in the Sierra, Nevada, Utah, and Arizona. Most of the Plains and the Florida Peninsula remained dry, with below average precipitation also observed along the Gulf Coast, in Texas, and the Carolinas into the Mid-Atlantic. Temperatures were above normal in the southeastern US and along the East Coast. Drought improved across most of the West, including two category

improvements in several areas, but drought emerged or worsened along the Gulf Coast, in Florida, and from the Carolinas to the Mid-Atlantic, with severe and extreme drought on portions of the southern and central Plains.

A pattern change is likely to transpire through the rest of spring into early summer, with near to below normal precipitation forecast for the West and near to above normal precipitation for much of the eastern US. Above normal temperatures are likely for the southern and eastern US and near to below normal temperatures are forecast for most of the West, northern Plains, and into the Midwest. Drought will likely increase in portions of the Pacific Northwest, northern Rockies, and Southwest, while continuing on much of the southern and central High Plains. However, drought improvement is likely across the rest of the Plains, along the Gulf Coast, and on the Florida Peninsula.

Above normal significant fire potential is expected from eastern North Carolina through Virginia, on the Florida Peninsula, in Puerto Rico, the US Virgin Islands, far west-southwest Alaska, and from southwest Texas through southern and eastern New Mexico and southeast Arizona during April. Above normal potential will continue in far west-southwest Alaska, southwest Texas, and the Florida Peninsula in May. Below normal significant fire potential is expected in northern Arizona in April spreading northward into portions of the southern Great Basin during May. In June, below normal potential will extend from northwest Arizona through the central Utah mountains and throughout the entire Sierra into northwest California. Below normal potential will continue in the Sierra through July, with northeast Montana into southeast North Dakota having below normal potential April through July. Some above normal potential is forecast in central Washington and Oregon through southeast Oregon and southwest Idaho due to forecast warmer and drier conditions and above normal fine fuel loading on rangelands.

Past Weather and Drought

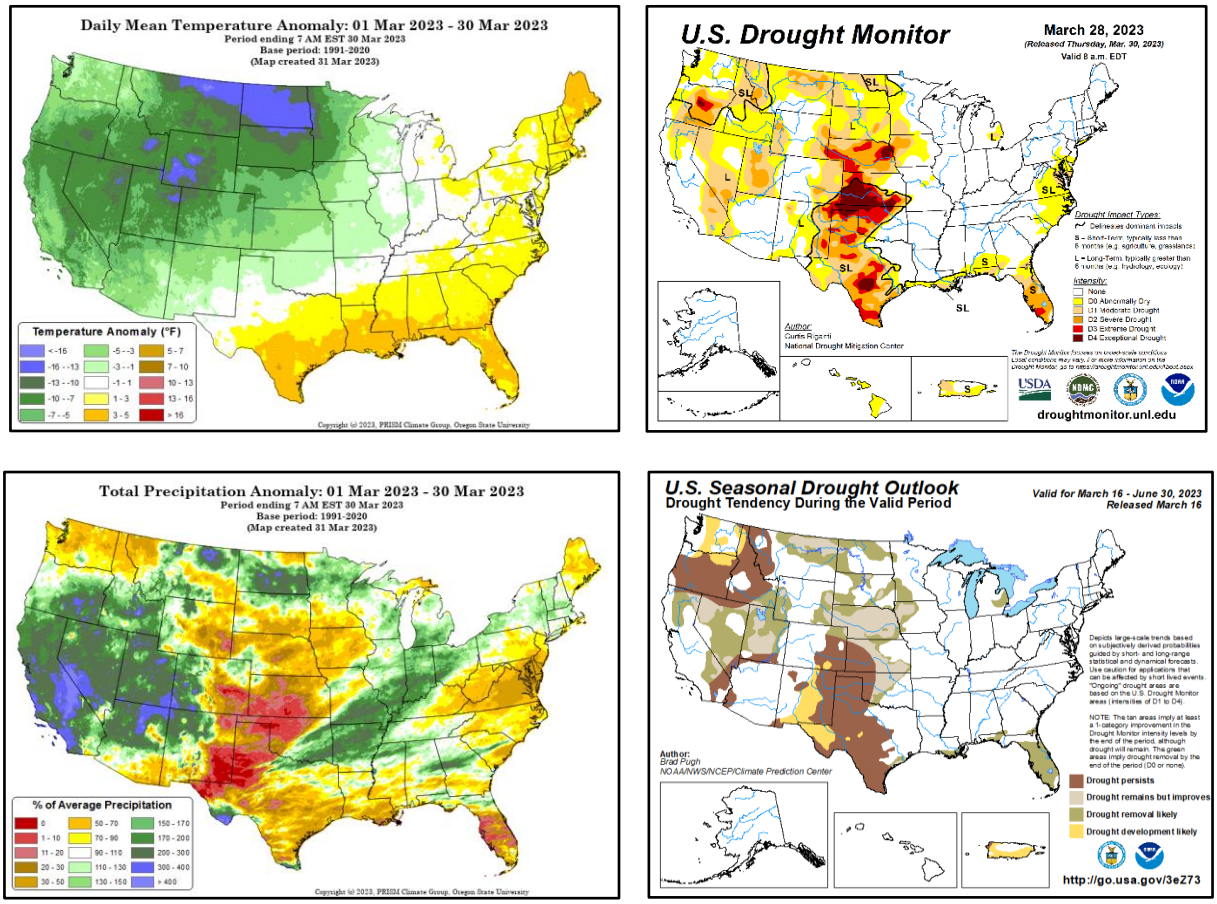
An active weather pattern emerged over the CONUS in March due in large part to a historically strong Madden-Julian Oscillation. Consistent upper-level trough passages moved across the West, with ample Pacific moisture leading to well above normal precipitation across most of the West except for portions of Washington, the Idaho Panhandle, northwest Montana, and southern portions of the Southwest. Much of the Plains had below normal precipitation except for portions of the northern Plains and near the Red River. The Mid/Lower Mississippi and Ohio Valleys had above normal precipitation, but the Mid-Atlantic, Florida Peninsula, and much of the Gulf Coast had below normal precipitation. Temperatures were generally below normal across the West and Plains into the Midwest, with above normal temperatures in the Southeast, East Coast, and along the Gulf Coast into Texas. Severe weather resulted in 26 deaths across Mississippi, Alabama, and Georgia late in March, with another high-end widespread severe weather event March 31 from the Midwest into the Southeast.

Snowpack and snow water equivalent (SWE) are well above average across much of the West, with values near average in Washington, the northern Rockies, and Alaska. Basins in the Sierra, Nevada, Utah, and Arizona are near or setting all-time record high SWE values. Multiple stations and ski resorts in the Sierra and Utah have recorded 700+ inches of snowfall this year, with widespread 500+ inches of snowfall observed or analyzed in the Cascades, Sierra, and Rockies.

Drought improved across most of the West, including two class improvements in most states, but drought did expand and intensify slightly in portions of northern Oregon and eastern Washington. Drought expanded and intensified in much of Texas, along the Gulf Coast, on the Florida Peninsula, and in portions of the Mid-Atlantic. Drought improved across the northern Plains and in Lower Michigan. Extreme to exceptional drought remains in portions of Texas, western Oklahoma, southern and western Kansas, and in portions of Nebraska.

Most of the fire activity was confined to Southern Area, including large fires in Texas, Oklahoma, Florida, and North Carolina. However, lower elevation and Plains fires emerged in the Southwest

and Rocky Mountain Areas, especially later in March. Several large fires emerged in Colorado and New Mexico March 30 and in Kansas and Oklahoma March 31 as strong winds and low relative humidity developed across much of the southern and central Plains into southern and central New Mexico and the Front Range.

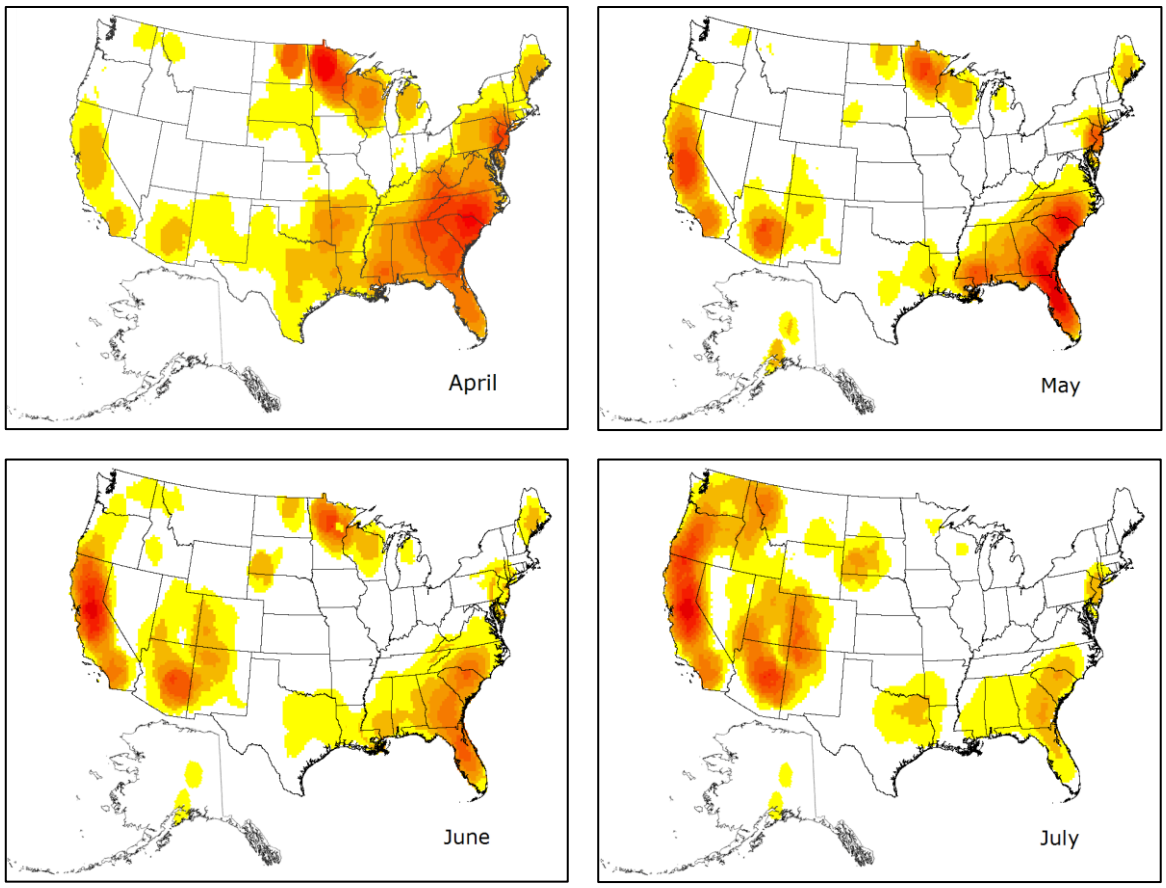


Left: Departure from Normal Temperature (top) and Percent of Normal Precipitation (bottom) *(from PRISM Climate Group, Oregon State University).* **Right: U.S. Drought Monitor (top) and Drought Outlook (bottom)** *(from National Drought Mitigation Center and the Climate Prediction Center).*

Weather and Climate Outlooks

El Niño Southern Oscillation (ENSO) neutral conditions are now observed in the equatorial Pacific Ocean, ending the nearly three-year long, triple dip La Niña. However, the tropical Pacific atmosphere is still consistent with a weak La Niña. Rapid warming has been observed in portions of the ENSO region, especially just off the northwest coast of South America, leading to above normal sea surface temperatures in the ENSO 3 and 1+2 regions. Most forecast guidance depicts continued warming through spring into summer, with El Niño conditions possible if not likely by the end of summer. While some climate models forecast El Niño conditions by the end of spring, the Climate Prediction Center (CPC) and most models forecast neutral conditions to continue through early summer. Other teleconnection patterns, such as the Madden-Julian Oscillation (MJO), Pacific Decadal Oscillation, and Pacific-North American Pattern are likely to influence weather and climate during the outlook period. Multiple active phases of the MJO this winter into spring, including a very strong MJO in March, have significantly affected weather and climate across the US, especially the western US.

Geographic Area Forecasts



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

Normal significant fire potential is expected in Alaska April through July, except for the Yukon-Kuskokwim Delta, where above normal potential exists in April and May. April will bring the first early-season human ignitions to low-lying areas of the state as the snowpack retreats and exposes dead fuels. In May, the threat of more significant wildfires will increase toward the end of the month, and by June the season will be moving into the busiest part of the fire season, which is normal.

Ample precipitation has fallen across much of Alaska during the fall and winter, and no areas of the state are in drought status as of late March. However, the Yukon-Kuskokwim Delta has below normal snowpack as much of its winter precipitation came in the form of rain instead of snow.

Spring is typically dry across Alaska. The Climate Prediction Center forecasts no strong signal for precipitation through mid-summer. The picture is similar for temperatures, except for a slight tilt toward warmer conditions for northern Alaska. The anticipated transition from La Niña to El Niño by summer could increase wildfire potential for Alaska this year. More active fire seasons in Alaska are generally paired with El Niño summers, but this correlation is weak at best.

With no wildfire activity in the state, Alaska is out of fire season as of late March. Fuels across the state are snow-covered. Areas with little snow are generally coastal with cool and damp conditions, so fuel burnability is very low statewide.

In April, the snow will begin to melt at lower elevations, cured fine fuels from the previous season will be exposed, and wind-driven grass fires become possible. By the end of May, the snowpack will retreat to the North Slope and the highest elevations of the Interior, setting the stage for mid-June to be the start of the busiest part of the fire season, which is normal for Alaska.

Much like last season, the low snowpack in the Yukon-Kuskokwim Delta may lead to increased potential for a busier early fire season there, with human starts the most likely source of new ignitions. However, early-season lightning may lead to ignitions in more remote areas of far western Alaska, creating more challenging fire management considerations during the time of year that resources are readying. Overall, expect a normal fire season across Alaska through July, with the chance for above normal conditions in the Yukon-Kuskokwim Delta in April and May.

Northwest

Near normal significant fire potential is expected for the Northwest Geographic Area until July when areas of central and southeast Oregon and central Washington are forecast to have above normal significant fire potential.

A succession of weather systems moving mainly through California and the Great Basin during March brought rain and snowfall that accumulated at or above average for most of Oregon except for regions east of the Cascades near the Columbia River. Accumulation of rain and snow in Washington was generally below normal in March. Temperatures were well below average in most of Oregon and below average in Washington.

At the upper elevation snow reporting basins, snow water equivalent (SWE) accumulated to well above normal values in Oregon during March due to the cold temperatures and frequent storms. SWE is near normal for Washington, and well above normal in southern Oregon. Drought designations diminished slightly in central Oregon and remained unchanged in Washington during March. Severe or exceptional drought continues to be a persistent feature in central Oregon since 2022, but it has diminished in size and intensity since late 2022. Moderate drought coverage has expanded in western Oregon since late 2022.

A 20-acre fire was reported in the northern Oregon Cascades in mid-March. Otherwise, wildfire activity was minimal with prescribed fires continuing on both sides of the Cascades. Fuels remain too moist to support any elevated risk of significant fires. However, in some areas limited fire danger reporting and drought maps suggest drier-than-typical conditions for late March, mainly in central Oregon.

Climate outlooks beyond April suggest a transition to warmer conditions than usual in late spring to early summer for the Pacific Northwest. The northwest will remain colder and wetter than typical through spring.

Normal (i.e., very low) risk of significant fires is expected over the Northwest Geographic Area until July when areas of central and southeast Oregon and central Washington are forecast to have above normal potential for significant fires. Standing dead light fuels buildup reported in central Washington and southeast Oregon are considered substantial enough to warrant the elevated significant fire risk beginning in July. Ongoing extreme drought in central Oregon will also contribute to above normal potential.

Northern California and Hawai'i

Significant fire potential is projected to be normal for April and May. Historically during April and May, less than one large fire occurs for each Predictive Services Area (PSA) therefore very limited significant fire activity occurs. Near to below normal significant fire activity is projected for June and July, with some of the mountain PSAs in the below normal category. During June, between one to two large fires typically occur per PSA and during July, one to three large fires typically occur per PSA, although the Bay Area usually has less than one. Hawaii's significant fire potential is forecast to be near normal April through July.

The weather pattern during March was moist and cool due to several Pacific trough passages, including three weak to moderate atmospheric river events. Precipitation was above to well above normal, and average temperatures were below to well below normal. Thus, dead fuel moistures were unusually moist during the month except for the Far Eastside PSA where precipitation events were less impactful. Lightning was associated with many of the trough passages and amounted to over 1,500 cloud to ground lightning pulses, which was nearly double the monthly average based on data from 2012 to 2022. Semi-dry northerly or easterly wind events were limited to about two days during the month with a moderate event on the March 1. A visible herbaceous green-up remained below 2,500 to 3,000 feet, with some accelerated development the last week of March, although cooler soil temperatures held back the potential for more growth. Consistent snowpack was found above 3,000 to 4,000 feet, although snow levels at times lowered to around 500 feet. Water locked up within the snowpack rose from 150% to 190% of normal on Feb 28 to 190% to 230% on March 29, and the values were in the near or above record territory for the northern and central Sierra.

Live fuel moisture samples indicated moistening across the lowlands as green-up became more noticeable in the shrubs and brush. Oak leaf emergence was more noticeable, although still in its initial stages during the latter half of March and more typical if not a little late for the season. Last year's oak leaf emergence started a whole month ahead of schedule. Fire business was light with most days reporting two or less initial attack fires. Prescribed burning, mainly piles, was severely impacted due to the conditions being too moist or the active weather limiting access to the project areas.

The weather outlook for April through July calls for mixed temperature and precipitation anomalies. The cool and unsettled weather pattern that impacted March is expected to transition into April, although a drier trend is expected to eventually take hold and produce near to below normal precipitation, which should last into May. Temperatures during April and May should be near to below normal. The June and July weather pattern projections are uncertain right now due in part to uncertainties in how quickly the El Niño Southern Oscillation (ENSO) changes from neutral to El Niño conditions. If the eastern equatorial Pacific were to quickly transition to El Niño by early summer, then a warmer scenario would be more possible.

Very little, if any, meaningful flammable fuel alignments are expected during April thanks to a robust green-up across the lower elevations and snow or melting snow across the mid and upper elevations. Herbaceous fuels across the lowlands will cure during May and June and could align with some lower dead fuel moistures in a few locations. However, widespread flammable fuel alignments are not anticipated as the brush fuels should contain higher than normal moisture levels. The mid and upper elevations will be under the influence of transitional green-up or the near record snowpack during May through July. Long-term drought conditions remain across some central and eastern areas, particularly favoring the Modoc Plateau and Far Eastside, but have drastically been reduced in both spatial coverage and intensity compared to a year ago. Tree mortality from the previous significant drought years will remain a local consideration plus vertical fuel arrangement or enhanced laddering due to significant blow-down and snow crush following all the strong atmospheric river events observed this winter.

Any lightning that does occur from April through June is not likely to be impactful and is unlikely to be very impactful across the higher elevations during July other than creating some small, multi-strategy fires. North-northwest wind events will be possible during April otherwise normal wind patterns are projected. Significant fire potential is forecast to be normal for April and May, and this is a period when very little if any large fires occur. Based on the set-up conditions and current weather projections, near to below normal significant fire potential is forecast for June and July across North, with the mid and upper elevations favored for the below normal potential.

Sea surface temperature (SST) anomalies surrounding the Hawai'ian Islands are near to a little above normal. Average temperatures during March were near to above normal, with the warmest anomalies across the northern tier of islands. There were less significant precipitation events

during March compared to February, with near to below normal precipitation across the northern half of the islands and near to above normal across the southern half. Maui served to be the cut off between the below and above normal areas. Despite the drier conditions, drought has not been designated for any portion of the islands as of the third week of March.

The four-month weather outlook calls for near to above normal temperatures and near to below normal precipitation as the region transitions to the typical dry season period. La Nina has transitioned to ENSO neutral conditions and there is some debate whether El Niño conditions appear as early as the summer. Enhanced trade winds are less likely to occur during the non-La Niña ENSO states so more normal wind flows are anticipated. Herbaceous fuels will initially act as a fire spread barrier but could provide some flammable fuel alignments along the leeward sides towards the end of the outlook period. Normal significant fire potential is forecast April through July but will be monitoring the potential for above normal for some leeward sides as the summer progresses.

Southern California

Below normal significant fire potential is forecast across much of the Sierra in June and July for South Ops. Below normal significant fire potential is also likely in eastern and northern portions of the Transverse and Peninsular Ranges, respectively.

A favorable long wave pattern allowed several atmospheric river storms to reach California in March. These storms, aided by a strong jet stream and favorable low-level flow, unleashed heavy rain, hail, strong winds, and a few tornadoes this past month.

Rainfall in March was over 400% of normal in many locations. The greatest departure from normal occurred over central California, which saw the heaviest rainfall due to orographic lift. The subtropical origins of the moisture resulted in some very high snow levels, with many areas in the Sierra seeing rainfall up to 9,000 feet from one particularly wet storm. Only the low deserts eastward to the Colorado River saw average to below average precipitation last month.

The hydrological condition across California continues to improve markedly. The widespread nature of the precipitation across many watersheds has resulted in groundwater recharge in the San Joaquin Valley. Reservoir storage levels continue to climb quickly as well. Some northern California dams have released water early from their reservoirs, which is a sharp contrast to the near record low levels seen prior to the start of the rainy season.

Typically, a negative El Niño Southern Oscillation (ENSO) condition (i.e., La Niña) results in a greater chance of a drier than average winter, especially in southern California. Despite this being the third consecutive winter of a La Niña, it has not been the case this year. A potential cause of the high frequency of the storms this season could be attributed to an unusually strong jet stream, which has been present much of the winter. This jet has allowed the storms to intensify rapidly before moving ashore as well as allow already existing storms to move through the eastern Pacific ridge. This jet will undoubtedly weaken as winter gives way to spring, but until then, the potential for additional wetting rains may continue for a few more weeks. Rainfall should begin to wane by the middle or latter half of April, which is several weeks later than usual.

March was another cool, wet month that allowed all fuel types to retain moisture very effectively. The grass crop continues to mature, and most grasses are currently seeding out. Other lower elevation fuel types are showing significant growth and flowering at the current time. Live fuel moisture should remain well above normal in April before grasses begin to cure toward the end of the month. The curing should begin on south aspects and across open areas while shadier areas remain green. The seasonal grasses' high amount of fuel moisture should preclude any risk of large fires in April. Heavier live fuels should retain enough moisture to be resistant to fire spread well into May.

Snowpack numbers remain at record high levels across much of the Sierra. If it were not for a pair of storms that brought heavy rain to higher elevations last month, snowpack numbers would be even higher. We have likely reached our snowpack peak for the season and a slow melt should begin in April. Higher elevations and shady regions may not be snow free until June, which should keep most of these areas out of fire season until late summer at the earliest.

The very sudden warming of sea surface temperatures (SST) over Niño Regions 1+2, 3, and 3.4 have resulted in the dissolution of the La Niña, which had previously shown unprecedented staying power. Except for a brief break in the summer of 2021, negative ENSO conditions have continued since July 2020. This may not have a direct impact on this summer's weather, but a reversal to El Niño may have implications on the weather this fall or next winter.

Most long-term model guidance is depicting near to slightly above normal temperatures the next four months, with the greatest departure from normal likely occurring across inland areas. Precipitation in May through July is expected to be near normal. A slightly above normal monsoon season may occur over the Southwest, but persistent troughing off the coast may keep the moisture axis shifted well to our east. A repeat of last year's extremely wet monsoon is not expected, and the number of thunderstorm days should be near normal in June and July.

A heavier than normal grass crop does raise the specter of a higher-than-normal number of grass fires once grasses cure out in May. However, the last 20 years have not shown a strong correlation between a wet winter and a busy grass fire season. There may be an increase in starts and initial attack due to the high availability of fine dead fuels, but without strong winds, such fires have an excellent chance of being picked up by local resources or within the first two burn periods. Offshore wind events are expected to be near or below normal this spring, which would likely lead to fewer opportunities for grass fires to spread rapidly or into other fuel types.

Higher elevations will likely see a significant delay to normal fire potential due to heavy snowpack above 6,000 feet. Once melt occurs in lower elevations, fire potential will climb to near normal levels by July. Higher elevations in the Sierra may not see much fire potential this summer. In 2011, fires tended to show much less activity above 8,500 feet which may also be the case this season.

Northern Rockies

Significant wildland fire potential in the Northern Rockies Geographic Area (NRGA) for April through July is expected to be normal except for portions of northeast Montana and western and central North Dakota where potential will be below normal. There has been continual snow cover since mid-December for the above-mentioned areas, which has slowly allowed significant snow water equivalent (SWE) to build, and this will prevent a pre-green-up fire season from occurring and lead to possible flooding during late spring. Trends are not as obvious for the western part of the NRGA where the variability of strong storm tracks make forecasts less confident. There is a portion of northwest Montana and north Idaho that will be monitored closely because snowpack is tracking slightly below normal and drought indicators are carrying over from last fall.

March has continued general cool winter trends, and 60-day temperature anomalies are below normal across the NRGA, which has prevented much of the snow across the area from melting. Snowpack has increased to above normal for parts of southwest Montana and central Idaho. A notable exception to monitor is present over parts of northwest Montana and north Idaho where snowpack is reported to be 80 to 90 percent of normal. SWE in the snow cover over western and central North Dakota and northeast Montana is approaching five to six inches of liquid, which will take time to erode, and lead to high soil moisture content when it retreats, continuing to abate dryness concerns.

Drought indicators for most of the region have trended towards improvement with only two areas indicating severe drought: around the Bitterroot National Forest and along the Milk River in north-

central Montana. Drought levels are expected to improve along the Milk River and in north-central and northeast Montana, but drought will be maintained over western Montana and north Idaho.

Fuels are tracking near normal for the latter part of winter months and are largely snow covered. The spring fire season is driven by a window between snow retreat and green-up, and this window is expected to be shorter than normal this year. Evaporative Drought Demand Index values show that most of the moisture that has fallen the last few months has likely been retained. It is expected that sufficient moisture will be available to support green-up. A few initial attack fires have been reported, usually five acres or less. Prescribed fire has been limited due to site access in many areas.

Normal fire activity is expected for most of the NRGA for April through July. PSAs 15 and 18 are expected to have below normal significant fire potential as snow cover will be slow to melt preventing a pre-green-up fire season, with an almost immediate transition to flooding concerns. Spring and early summer weather is usually highly variable across the NRGA and with the La Niña breaking down, there are no dominant signatures to lead to expectations of a particular weather pattern dominating.

Great Basin

Fire activity remains low across the Great Basin, which is normal for this time of year. A near-record snowpack along with above normal winter precipitation will significantly delay fire season in the southern Great Basin as well as across the High Sierra. Above normal carry-over fuels across southwest Idaho brings the threat of above normal significant fire potential by July.

Temperatures over the last thirty days have been well below normal across much of the Great Basin, while precipitation has been above normal across most of the geographic area, except for parts of southern Nevada. The snowpack, already well above normal at the start of the month, has reached new record high levels in much of the higher terrain south of the I-80 corridor. Snowpack is currently 200-300% of normal across much of Nevada, Utah, and Arizona, and snowpack ranges from 100-140% farther north into Idaho and Wyoming. The wetter conditions over the last six to nine months have improved drought conditions significantly, with most areas improving by one drought category in the past month. The drought is expected to continue improving through spring.

Fuel moisture is above normal across the Great Basin due to consistent storms and heavy precipitation. 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 likely has compacted any carryover fine fuels due to the long period the snow remained on the ground. This is expected to decrease fine fuel load in these areas heading into the spring. Significant new fine fuel growth is likely this year due to abundant winter and spring precipitation, but the carryover component is expected to be lower. The only exceptions are over far northwest Nevada into southwestern Idaho, where above normal carryover may still exist as lower elevation snowfall in these locations was not as significant as areas farther south. Fine fuel growth will be determined by weather and soil moisture heading into the germination period in April and May, and this will be closely monitored.

Normal significant fire potential is expected through April in all areas, which typically means minimal fire activity. Below normal fire potential is expected in most of the higher elevations of southern areas of the Great Basin in May and June due to high snowpack. Below normal fire potential is forecast across the High Sierra in June and July as well. Some areas of the Ely District in Nevada may have more significant grass growth in the lower elevations due to abundant precipitation over the winter and that will continue to be monitored. Areas farther north will continue with normal fire potential into early summer. Above average carryover fuels across portions of southwest Idaho will bring above normal fire potential by July. 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 resulting in normal precipitation for the northern two-thirds of the Great Basin that winter.

Southwest

Normal significant fire potential is anticipated for many areas of the geographic area into early summer. Areas of above normal significant fire potential will be limited overall but are expected in April across the southeastern New Mexico plains and south-central New Mexico mountains into the Lower-Middle Rio Grande River Valley. Far southern New Mexico into southeastern Arizona could also see areas of above normal significant fire potential in April. All these areas are expected to drop back to normal significant fire potential by later in April into May due to a wetter and unseasonably humid weather pattern. Below normal significant fire potential is anticipated across most of northern Arizona April into June.

The overall trend for nearly from late fall into the early spring has been for below normal temperatures and wetter than normal conditions focused along and west of the Continental Divide, with drier and milder conditions generally focused along and east of the New Mexico central mountain chain. These past conditions will play a major role in shaping the significant fire potential forecast through early summer as will the evolving El Niño Southern Oscillation (ENSO) situation. Mountain snowpack is above to well above normal across the northwestern half of the geographic area, with below average snowpack primarily limited to the south-central mountains of New Mexico. Last summer's robust monsoon produced an abundance of fine fuel buildup across many areas, although across much of the northern portions of the Southwest, many of the fine fuels have been compacted by the above normal snowfall and snowpack. Some of these dead fuels are likely to be available to burn this spring into summer.

Through spring into early summer, the expectation is that an active weather pattern will continue with storm systems driving semi-frequently from west to east over the Southwest. Some of these systems, especially early in the forecast period, will be responsible for areas of critical winds and low relative humidity focused across the southeastern part of the geographic area. Mild temperatures will combine with breezy to windy and dry conditions across these areas that have above normal fine fuel loading and continuity. Although milder periods will become more regular area-wide this spring, expect a continued tilt to wetter and cooler conditions focused on northwest portions of the geographic area and warmer and drier conditions to the southeast into April. The northern one-third to half of Arizona will continue to maintain above normal snowpack levels well into spring this year, which will lead to below normal significant fire potential.

The recent arrival of ENSO-neutral conditions and likely tilt into at least weak El Niño conditions over the next few months are more than likely going to have a big influence on the weather and climate for the forecast period. Historically, this points towards a shift in the weather pattern by later in April into May with weather systems tracking farther south across the West and northern Mexico. Many of these systems tend to slow down or become cut off from the main jet stream. In addition, the subtropical jet stream can become quite active during this type of pattern. Normally this type of pattern keeps high temperatures close to or even below normal west of the Divide region and has a tendency to spread moisture into the Southwest both the from west-southwest but also from the Gulf of Mexico via New Mexico.

Admittedly, numerous uncertainties exist with the timeliness of this type of pattern evolution. However, the present view is that this will have a limiting potential on the severeness of the significant fire potential for most areas this spring revolving around frequent periods of near to below normal temperatures, higher relative humidity values, and periods of rain and high elevation snow occurring during what is normally a drier timeframe. The summer monsoonal pattern could be delayed and will more than likely be wetter east of the Divide and either close to normal or drier farther west. It's possible that some areas west of the Divide could see increasing significant

fire potential by summer associated with the weaker monsoonal flow into this part of the geographic area.

Rocky Mountain

Normal fire potential is expected across all Predictive Service Areas (PSAs) in the Rocky Mountain Area (RMA) for the outlook period. Pre-green-up in early spring will bring short-lived episodes of elevated fire potential in the lower elevations, especially along and east of the Front Range Foothills and southeast Colorado into western Kansas during dry and windy periods. Long-term drought in dormant carry-over fuels from last season's growth in these areas will also be a factor in early spring. Snow will continue to accumulate in the mountains into April, with low fire potential in the high country where fuels remain snow-covered and high soil moistures, especially on north aspects.

Beginning last fall and continuing through early spring, the mountains have benefitted from frequent and abundant snowfall that has been maintained with colder-than-average temperatures and several outbreaks of cold, Arctic air since late December. Snowpack exceeded the normal peak two to four weeks earlier than average in most hydrologic basins and has continued to rise since. This will lead to well-above average fuel moisture going into the core fire season. Considerable snowpack remains on the ground at lower elevations east of the Divide in Nebraska and the eastern half of South Dakota where there is typically a more active freeze/thaw cycle. This is due to the cooler temperatures that persisted in January, February, and March. The snow water equivalent (SWE) is 130 to 160 percent of average across the Rocky Mountain Area, except for the Arkansas River Basin in southeast Colorado where it is close to average for the period.

Infrequent precipitation and lack of snow cover persists in southeast Colorado and western Kansas, with moderate to severe drought and extreme to exceptional drought, respectively. The US Drought Monitor depicts little change elsewhere, but modest improvements in Colorado. Recent and expected precipitation on the Plains is anticipated to bring noticeable improvements to the drought situation there, especially for the remainder of spring into summer.

Ongoing satellite and snow depth analyses indicate that most of the RMA has received enough snow to compact fine fuels, and mostly eliminate any vertical arrangement of carry-over fuels for fire spread. Southeast Colorado and western Kansas remain snow-free. but carry-over from last year's vegetation growth is not considered to contribute a substantial fuel-load because production was only 25% of average. Nevertheless, fire danger and significant fire potential are somewhat concerning in those fuel beds, especially when low relative humidity combines with warm, downslope winds or wind events associated cold frontal passages. However, it is not expected to be critical for long periods because humidity recovery has been adequate and there have been a few extended periods of fog with upslope "back door" fronts that brought stratus clouds and drizzle.

Lightning ignitions will increase with convective storms in May, but since most fuels are in green-up, most ignitions will continue to be from human activity. Notably, the spring season is climatologically the wettest and snowiest time of year in the Rocky Mountain Area, especially along the Front Range where most fuels are in the 1-hour to 10-hour size classes.

Favorable conditions continued to provide opportunities for prescribed burns, but there has also been an uptick in wildfire starts in southeast Colorado, Kansas, and southern Nebraska. These ignitions primarily occurred during pre-cold frontal conditions with temperatures into the mid-60s and very strong, drying winds. Notably, the Arrowhead Fire in Larimer County, Colorado on March 19 and the Manvel fire in Prowers County, Colorado on March 22 required increased resources.
From a large-scale climate perspective, a third consecutive La Niña has ended, and NOAA's Climate Prediction Center favors this period to flip towards El Niño. In other words, the equatorial Pacific Ocean Sea surface temperature anomalies indicate that we are now in ENSO neutral conditions, but El Niño is anticipated to develop in June or July if not sooner. Another extremely

active phase of a Madden-Julian Oscillation (MJO) brought colder than average temperatures and several atmospheric rivers to the western US in late March.

Although there is still some uncertainty about how abruptly the ENSO state may transition, the rest of this spring and early summer could be cooler and wetter than the official outlooks currently portray. That may favor a slower melt-off of the high-elevation snowpack with soil moistures benefitting at the root zone of the fuels. This would also be beneficial for a robust green-up later than usual. There is also some indication that the Plains will get substantial relief from the ongoing drought, with return flow from the Gulf of Mexico bringing in higher than average precipitation this spring and summer, prior to the onset of what could be a late or weak monsoon in July. Despite this possibility, the western half of the Rocky Mountain Area is poised to see normal fire potential through the period based on last year's monsoon, abundant snowpack, and the expectation for a gradual melt off due to cooler-than-average temperatures.

The outlook for the RMA depicts normal significant fire potential across the geographic area for the remainder of spring and into July. Due to the persistent drought across portions of the Plains, fire potential may be elevated at times during the outlook period, especially in the eastern half of the RMA's Front Range Foothills and adjacent Plains of eastern Colorado and western Kansas during warm, dry, and windy weather events. Statistically, there is an increase in fire activity and large fire occurrence across the Plains prior to green-up in April, which is considered normal within the geographic area fire history. The rest of the RMA is anticipated to see normal green-up following the gradual melting of the spring snowpack, which may be later than average. Climate patterns suggest drought improvement for the Plains, following a three-year cycle. Although that means more vegetation growth this year, it is expected to mitigate fire danger there, at least until fuels are cured and dormant in the late summer and fall.

Eastern Area

Near normal significant fire potential is forecast across the majority of the Eastern Area April through July.

Negative precipitation anomalies were indicated across portions of western Minnesota and northwest Iowa February into March. Shorter term drying developed over portions of the southeast Mid-Atlantic States and northeast New England. Longer term drought remained across the southeast Lower Peninsula of Michigan towards the end of March. Thirty to ninety-day soil moisture and precipitation anomalies were near to above normal across the remainder of the Eastern Area. Snowpack containing high water content was in place across parts of the Upper Mississippi Valley, which may lead to spring flooding issues depending on the timing of the melt-off.

According to the NOAA Climate Prediction Center and Predictive Service's long-term outlooks, above normal precipitation is forecast across the majority of the Eastern Area in April. Drier than normal conditions may develop over parts of the Mid-Mississippi Valley in May, with this trend shifting northward towards the Upper Mississippi Valley in June.

Below normal temperatures are expected over the western and southern tiers of the Eastern Area into April. Above normal temperatures are expected across portions of the Mid-Mississippi Valley in May, expanding north and east into much of the western and central tiers of the Eastern Area June and July.

Periods of below normal fuel moisture may occur over the drier portions of the Eastern Area through spring 2023 if conditions do not improve. Near normal significant fire potential is expected across the majority of the Eastern Area through spring into summer.

Southern Area

The Florida Peninsula will continue with a forecast of above normal significant fire potential through at least May, due to worsening drought, above normal temperatures, and forecast below normal rainfall. The early green-up has accelerated the depletion of water left behind from 2022's hurricanes, with National Aeronautics and Space Administration (NASA) Short-term Prediction Research and Transition Center (SPoRT) data indicating that soil moisture is below the 10th percentile over a good part of the central and southern peninsula down to 2-meters. Confidence in when conditions across the Sunshine State become wetter is low, and any delay in the rainy season may prolong above normal significant fire potential later into the summer. North Florida and coastal Georgia were removed from above normal significant fire potential from recent outlooks due to increasing frequency of wetting rain in recent weeks, reflected by near normal water levels from USGS streamflow data. Large fires will be possible in these areas, climatologically normal, especially if a prolonged period of dry and hot weather returns.

Continued dryness across much of Virginia and eastern North Carolina has led to drought development in recent weeks, which may only worsen through the first part of April given an expected very warm and drier than normal pattern. The Short-term Objective Drought Blend Equivalent from the National Drought Mitigation Center indicates the equivalent of extreme to exceptional drought in some of these areas, with longer-term dryness going back to 2022 in eastern North Carolina. The near-record early green-up in these areas followed by a hard freeze in mid-March have also returned some finer fuels to dormancy. Portions of the Virginia mountains also experienced several ice storms this winter, especially at Shenandoah National Park, which may contribute to fuel loading. All of this, along with historically low water levels across Virginia and the recent Last Resort Fire on state and federal lands in North Carolina, are more than enough to sway things toward above normal significant fire potential during April. Most of the Appalachians were considered for above normal potential during April due to the addition of at least some freeze-cured fuels and a quick increase in fire activity behind recent rainfall events. These areas are likely to be near the edge of above and below normal rainfall the next few weeks, while sources of ignitions may increase due to agricultural burning, debris burning from high wind events the past several weeks, and increased hunting activities. Most of the Appalachians remain at a climatological maximum into April; thus, normal significant fire potential is forecast across eastern Kentucky and Tennessee into western North Carolina. Dry frontal passages may be especially problematic for most northeastern portions of the geographic area the next few weeks before a wetter pattern eventually develops later in April or early May.

Fuels across the south Texas PSAs largely remain dormant due to lack of rainfall in recent weeks, and extreme drought continues to expand across the area. Despite this, robust Gulf of Mexico moisture recovery has quickly followed any drier air intrusions through much of March, and there is little indication this pattern will end any time soon. Large fires will remain possible across south Texas the next few weeks, especially when windy conditions occur over a multi-day stretch of low relative humidity, but overall normal significant fire potential is forecast. The large-scale pattern in early to mid-April appears highly conducive to fire-effective weather across all west Texas and Oklahoma, with less opportunity for overnight humidity recovery that may have limited activity so far this spring. That said, fuels remain discontinuous over most of the Plains due to the multi-year drought and agricultural grazing. Instances of critical to extreme fire weather may very well produce significant wildfires, especially when winds align with canyons and other drainages, but normal activity is forecast due to widespread below normal fuel loading. Meanwhile, the Trans Pecos have picked up scattered areas of rain and snow during March, but with moderate drought ongoing and still dormant above normal grass loading in the mountains, fuels remain available. Extreme wind events capable of leading to arcing powerlines and increases in lightning potential later in April and especially May could provide sources of ignitions to these areas.

Worsening drought across portions of Puerto Rico and the US Virgin Islands has some potential to ease in the coming weeks, but forecast guidance remains unsteady on a potential pattern change there. Multiple difficult-to-control fires in recent weeks and high Keetch-Byram Drought

Indices (KBDIs), along with low fuel moisture are all indications that fire activity may continue in the absence of a pattern change. Though confidence is admittedly not the highest, above normal significant fire potential is forecast for the islands in April, and this risk may linger later into spring and summer should the rainy season fail to materialize. Confidence continues to increase in a developing El Niño later this summer, which is typified by warmer and drier than normal rainy seasons in the Caribbean.

Conditions by summer are highly uncertain region-wide due to the potential rapid development of El Niño. That said, prior year analogs for a quick La Niña to El Niño transition suggest the Lower Mississippi Valley could see an abnormally hot and dry summer. Ongoing drought in southern Louisiana may worsen if a similar scenario unfolds this year, and lingering impacts to fuels from Hurricanes Laura and Ida remain a concern. Portions of Louisiana and southern Mississippi may be included in above normal potential in subsequent outlooks. These same analogs are supportive of drought relief across much of Texas and Oklahoma, which could make for a drastically quieter fire season this summer than in 2022.

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