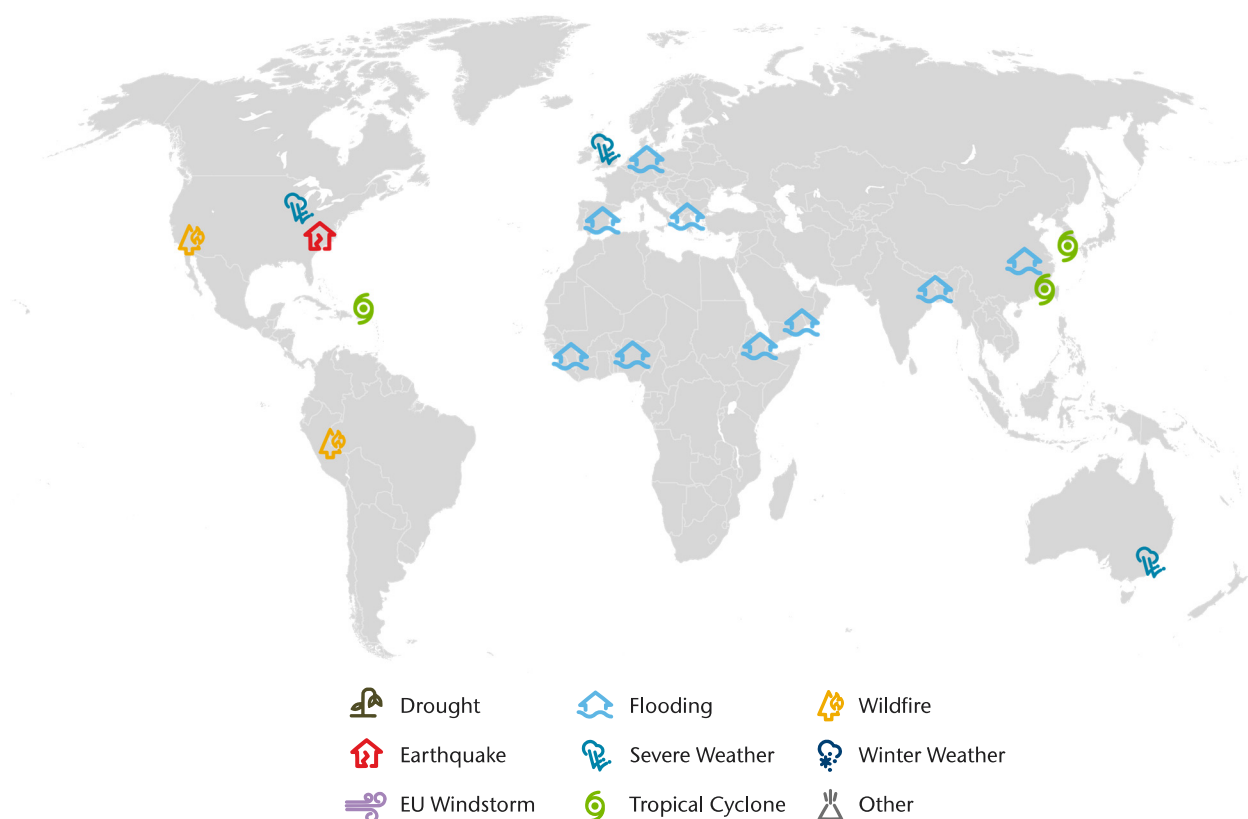




Weekly Cat Report

August 14, 2020

This Week's Natural Disaster Events



Event	Impacted Areas	Fatalities	Damaged Structures and/or Filed Claims	Preliminary Economic Loss (USD)*	Page
Severe Weather	United States	2+	Thousands	Billions	3
Typhoon Mekkhala	China	0	Thousands	10s of Millions	10
Tropical Storm Jangmi	South Korea, Japan	0	Thousands	10s of Millions	10
Flooding	Greece	8	3,000+	Millions	12
Severe Weather	Western & Central Europe	0	Hundreds	10s of millions	12
Flooding	Ethiopia, Sudan, Somalia	20+	3,500+	Millions	13
Flooding	Niger, Mali, Nigeria	19+	6,200+	Unknown	13
Flooding	Saudi Arabia	5+	Hundreds	Unknown	14
Severe Weather	Australia	0	Hundreds	Millions	15
Wildfire	Peru	8+	Dozens	Unknown	15
Earthquake	United States	0	Unknown	Millions	15
Flooding	Panama	11+	Dozens	Unknown	16
Wildfire	United States	0	Unknown	Millions	16

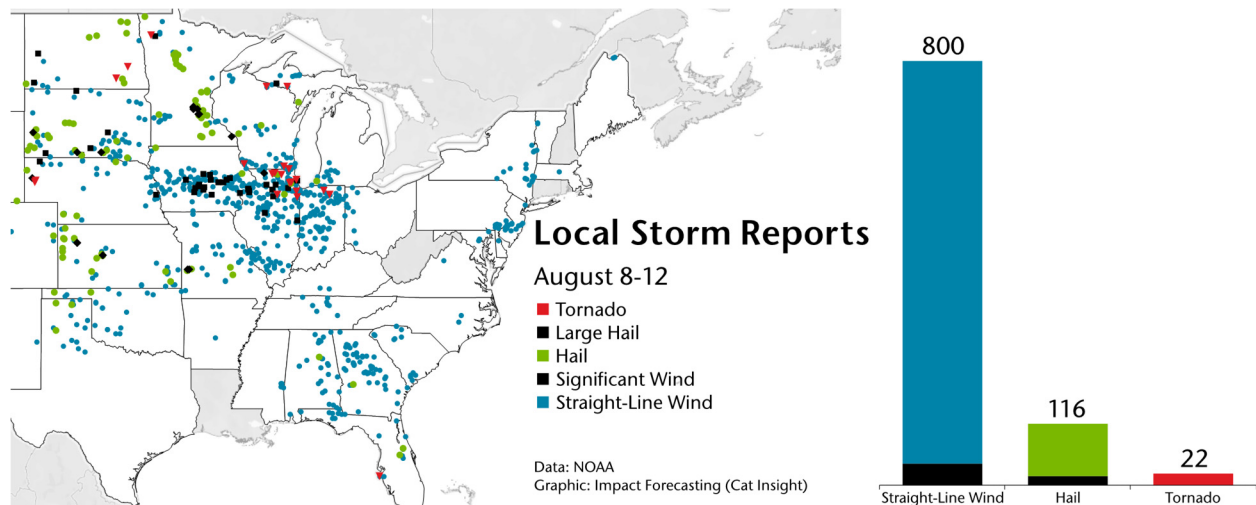
**Please note that these estimates are preliminary and subject to change. In some instances, initial estimates may be significantly adjusted as losses develop over time. This data is provided as an initial view of the potential financial impact from a recently completed or ongoing event based on early available assessments.*

Along with this report, we continue to welcome users to access current and historical natural catastrophe data and event analysis on Impact Forecasting's Catastrophe Insight website: <http://catastropheinsight.aon.com>

Active week of U.S. storms highlighted by major derecho

An active weather pattern aided by a strong upper level disturbance in central Canada resulted in several days of extensive severe weather across the eastern two-thirds of the United States from August 8-12. At least two people were killed. Most damage was incurred in parts of the Plains, Midwest, and the Mid-Atlantic. Impactful hail events initially occurred in the Black Hills of South Dakota on August 8 and the Minneapolis-Saint Paul metro region in Minnesota on August 9. The most catastrophic damage resulted from a dangerous derecho event that severely impacted Iowa and Illinois on August 10, producing peak wind gusts topping 100 mph (160 kph). A derecho is as a fast-moving cluster of thunderstorms that travels hundreds of miles and is marked by widespread straight-line wind damage. This event left at least 1 million customers without power, and had considerable impacts to property, vehicles, and agribusiness. Flash flooding later affected the Mid-Atlantic on August 12. Total aggregated economic damage to property, infrastructure, and agriculture during the stretch was likely to result in a multi-billion-dollar cost.

Meteorological Recap

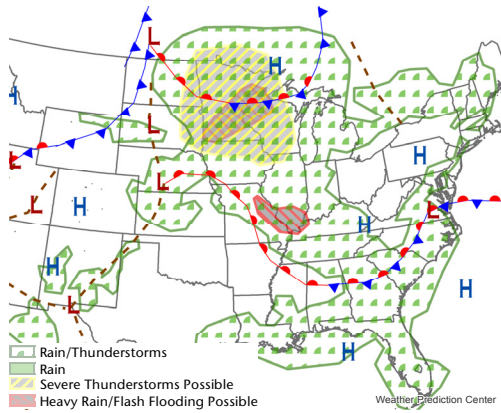


August 8

Situated between a large trough toward the west-northwest and a modest ridge to the east, southwesterly surface flow allowed for a warm and moist plume of air to establish across the Plains on August 8. These conditions prompted the Storm Prediction Center (SPC) to highlight a large portion of the Central and Northern plains for increased risks of severe weather, with an axis of Enhanced Risk (level 3 out of 5) extending southwest to northeast across central Nebraska toward eastern South Dakota. The environment ahead of an approaching surface front was characterized by very steep mid-level lapse rates (changes in temperature with height) along with favorable values of Convective Available Potential Energy or CAPE (which provides an approximation of the updraft strength within a thunderstorm). These conditions were advantageous for severe storm development with the greatest hazards being strong winds and large hail.

Initially discrete storms and supercells over western Wyoming quickly grew into a long lived severe thunderstorm cluster and Mesoscale Convective System (MCS) as it progressed across northern Nebraska and southern South Dakota. The initial discrete storms resulted in reports of hailstones approaching grapefruit size, 4.5 inches (11.5 centimeters) across portions of the Black Hills in southwestern South Dakota.

August 9-12



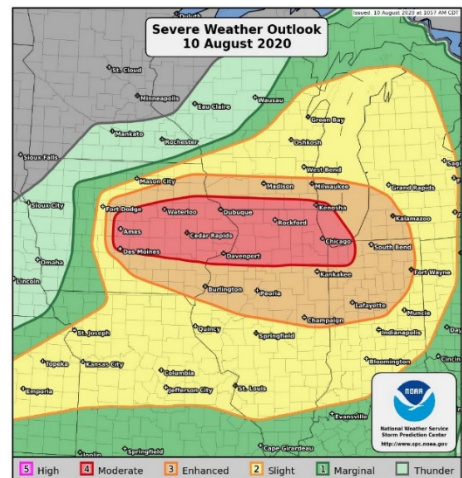
U.S. Surface Chart for August 9, 2020

A shortwave trough and well-defined surface cold front aided in enhancing severe storms across regions of the Northern Plains and Upper Midwest on August 9-10. Continued southwesterly flow ahead of this boundary enriched instability with dewpoints reaching into the lower 70s (°F). In the evening and overnight hours, clusters of severe storms affecting the Twin Cities (Minneapolis-Saint Paul) in Minnesota produced golf ball to baseball sized hail in the southwestern metro region, resulting in significant impacts.

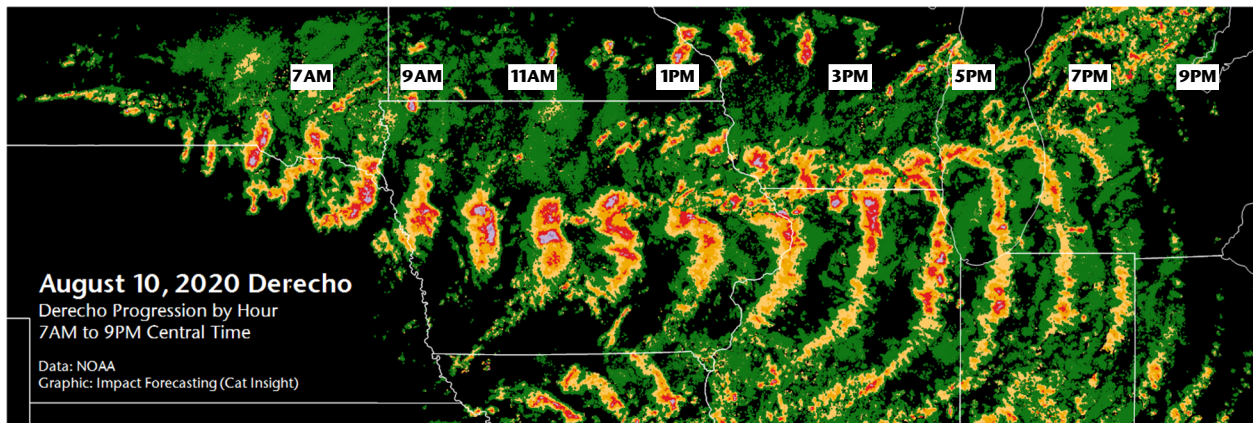
Throughout the morning hours of August 10, an upper level weather disturbance aided in initiating an east-southeastward progressing cluster of storms across the Dakotas.

The storms progressively organized into a linear system with a distinct bowing segment as they propagated eastward through regions of drought stricken central Iowa, producing numerous reports of damaging straight-line winds and heavy rainfall. These conditions prompted the SPC to upgrade an east to west corridor extending from central Iowa through northern Illinois and extreme southern Wisconsin and into northwestern Indiana to a Moderate Risk (level 4 out of 5) for severe weather, surrounded by a broader region of an Enhanced Risk (level 3 out of 5). Additionally, a Particularity Dangerous Situation (PDS) severe thunderstorm watch was issued – this was only the 53rd PDS since 1988.

The environment ahead of the ongoing derecho was marked by a strongly unstable airmass exhibiting significant values of Convective Available Potential Energy or CAPE (which provides an approximation of the updraft strength within a thunderstorm), very steep lapse rates (changes in temperature with height), and ample surface heating. A well-developed rear inflow jet, which aids in tilting the updrafts - allowing storms to expand in coverage and persist for multiple hours, was observed as the storms accelerated through Iowa. Dangerous wind gusts between 70 and 100 mph (112 to 160 kph) were common across central and eastern Iowa. Enhanced by interactions with the surface cold front, the derecho expanded as it trekked into southern Wisconsin and northern Illinois throughout the afternoon hours.



As the north end of the line of storms progressed through northern Illinois, including Chicago, the bow-echo structure remained intact producing wind gusts of 70 to 80 mph (112 to 128 kph), as multiple tornado warnings were issued for potential embedder spin-up tornadoes. The southern end of the line extended southwestward through central Missouri. A brief EF1 tornado was reported in the northern suburbs of Chicago, the first tornado in the City of Chicago since September 2018. By the early evening hours, the bowing line of storms was pushing east-southeastward at 45 mph (72 kph) while continuing to bring severe wind gusts to portions of Michigan, Indiana, southern Illinois, and Missouri before diminishing in an increasingly less favorable environment. Several additional brief tornadoes were confirmed in northern Indiana.



According to the SPC the derecho traveled approximately 770 miles in 14 hours while producing numerous wind gusts topping hurricane intensity – 74 mph (120 kph) – with several spots in excess of 90 mph (145 kph) in central Iowa. Preliminary filtered SPC storm reports show multiple measured wind gusts exceeding 80 mph (150 kph) across Iowa and Illinois, with a maximum gust of 112 mph (180 kph) measured near Midway, Iowa.

Location	Wind Gust (mph)	Location	Wind Gust (mph)
Midway, Iowa	112	Glen Ellyn, Illinois	90
Le Grand, Iowa	106	Davenport Airport, Iowa	86
Forreston, Illinois	100	Urbandale, Iowa	85
Marshalltown Airport, Iowa	99	Elkhart, Iowa	85
Dixon, Illinois	92	Prairie City, Iowa	85
Cedar Point, Illinois	91	Moline, Illinois	85
Chelsea, Iowa	90	Lincoln Square (Chicago), Illinois	85
Blairstown, Iowa	90	Plainfield, Illinois	84
Atkins, Iowa	90	Jefferson, Iowa	83
Somonauk, Illinois	90	Iowa City Municipal Airport, Iowa	82

On August 12, a quasi-stationary frontal boundary draped from the Ohio Valley into the Mid-Atlantic was the focus for locally heavy rainfall across portions of eastern West Virginia, central and northern Virginia, and Maryland. Localities south of the frontal boundary exhibited considerably unstable and moist conditions marked by dewpoints reaching into the 70s (°F), coupled with weak mid and upper level winds. These factors created a conducive environment for the formation of disorganized, slow-moving storms, with the potential to produce heavy rainfall, creating a significant flooding threat. By the evening hours, nearly stationary storm complexes, some of which were severe and produced a considerable number of lightning strikes, resulted in multiple flood and flash flood warnings for portions of Maryland, Washington D.C, and Virginia. In many regions, storm initiation was enhanced by colliding outflow boundaries from previous storms. Counties near Baltimore (Maryland) and areas surrounding Washington D.C. reported significant flooding events where at least 3 to 4 inches (75 to 100 millimeters) fell on already saturated soils over a short period of time.

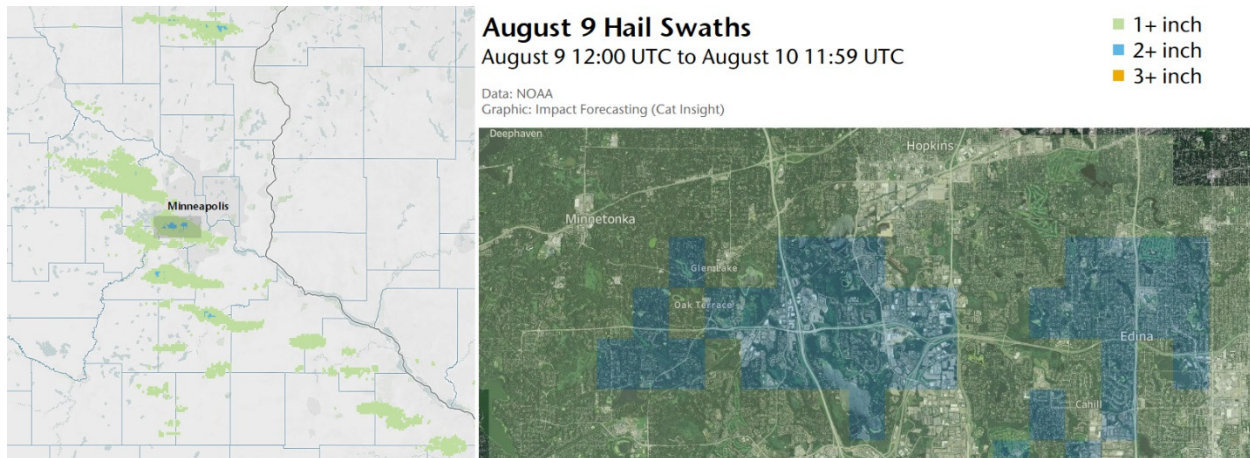
Event Details

August 8

There were at least 96 instances of severe weather reported on August 8, of which 29 were for hail. Hailstones in South Dakota (Pennington County) near the Pactola Reservoir in the Black Hills approached 4.5 inches (11.5 centimeters), while to the south 2.5-inch (6.4-centimeter) hail were observed in Nebraska (Sioux County). Straight-line wind gusts approached and exceeded 60 to 70 mph (96 to 112 kph), with a maximum gust of 83 mph (134 kph) measured in Nebraska (Dawes County). The storms resulted in downed trees and power lines, in addition to minor structural damage.

August 9-10

A series of severe storms affecting Minnesota in the evening and overnight hours on August 9-10 produced multiple reports of significant and damaging hail. Hail 2.0 inches (5.1 centimeters) or larger were reported in Carver, Wright, Hennepin, and Winona Counties. Significant impacts occurred southwest of the Twin Cities metro region where hailstones from golf ball to baseball size were observed, along with straight-line wind gusts approaching 60 mph (112 kph). In Lakeville (Dakota County), three people were injured when lightning struck a shelter. The Bloomington Fire Department (Hennepin County) reported responding to numerous calls, with multiple downed trees and limbs blocking roadways. Further north, earlier storms knocked over trees in Big Bog State Park, trapping campers who were rescued by the Department of Natural Resources.



August 10-11

As of this writing there were 587 instances of severe weather reported on August 10, of which 544 were for wind - with 34 reports of measured high wind gusts reaching 75 mph (120 kph) or greater.

At the peak, at least 550,000 customers across **Iowa** lost power in the wake of the historic derecho event, including 97% of customers in Linn and Marshall Counties. The governor of Iowa issued disaster proclamations for 20 counties and noted that preliminary estimates indicated 10 million crop acres (4 million hectares) impacted by the storm, which is one third of the state's total cropland. Crop damage scars were easily visible on NASA satellite images. Additionally, Iowa's Secretary of Agriculture noted that tens of millions of bushels of commercial grain storage were impacted or destroyed by the derecho, as multiple grain silos across the central portion of Iowa were damaged or torn apart by the high winds.



Crops impacts near Churdan, Iowa
Source: Iowa Department of Agriculture

With harvest season approaching this comes as a devastating blow for many farmers in central Iowa, whom were already dealing with a significant and prolonged drought. Data from the United States Drought Monitor (USDM) shows that 34.3 percent of the state was experiencing drought conditions, of which 6.2 percent were extreme as of August 13.

In Polk County, roof damage was reported at the Buccaneer Arena in Urbandale, while strong winds overturned tractor trailers along I-35 significantly impacting transportation. In Marshalltown (Marshall County) a 99 mph (160 kph) wind gust was measured. Local officials reported extensive damage to roofs, trees, and power lines, while debris blocked roadways and stranded motorists. Emergency operations received at least 50 calls concerning gas leaks. Linn County, including Cedar Rapids, were particularly hard hit and experienced some of the highest reported wind gusts. Widespread extensive damage to structures and outbuildings, vehicles, and vegetation were observed. In Green County, severe winds snapped entire fields of corn. One person was killed in Iowa from a falling tree.



Storm damage near Vinton, Iowa
Source: NWS/Darrell Werning

In **Illinois**, at least 600,000 customers were without power as the derecho passed. Pockets of prolific damage were observed throughout northern Illinois, including Chicago. State officials reported at least six injuries, five in Forreston (Ogle County), and one in Peru (LaSalle County). A disaster declaration was issued in Forreston where surveys determined straight-line wind gusts between 90 and 100 mph (145 to 160 kph) damaged or destroyed mobile homes at two mobile homes parks, along with several other residential structures, a metal building, and a large number of trees. The most severe damage forced residents to evacuate. In Chicago (Cook County), straight-line wind gusts approaching and exceeding 80 mph (130 kph) resulted in uprooted trees, downed power and utility lines, significant traffic disruptions, and impacts to numerous structures and vehicles. The Chicago Fire Department responded to multiple fires throughout the city which erupted from affected power lines and transformers.



Storm damage from Chicago, Illinois

A confirmed EF1 tornado with estimated wind speeds approaching 110 mph (177 kph) and a path length of 3.2 miles (5.1 kilometers) impacted the Rogers Park neighborhood north of downtown Chicago. The tornado toppled large trees and buckled signs, while debris and branches resulted in impassable roadways. Another EF1 tornado in the western Chicago suburb of Lombard (DuPage County) caused housing damage, including several homes with substantial roofing impacts.

At least 11 tornadoes have been confirmed in Illinois, with damage surveys verifying 8 of them reached EF1 intensity. In the wake of the derecho, the National Weather Service (NWS) warned of fluctuating water levels resulting in hazardous rip currents and flooding along the shores of Lake Michigan. All trails and lodges at Starved Rock and Matthiessen State Parks (La Salle County) were temporarily closed due to severe damage. Localities in Winnebago County measured at least 2.5 inches (64 millimeters) or precipitation from the storms.

In **Indiana**, one death was reported as severe winds impacted a mobile home. Widespread damage continued throughout northern Indiana as storms progressed through the state, producing straight-line wind gusts approaching 70 mph (112 kph). In Crown Point (Lake County) the Sparta Dome recreation facility deflated after receiving damage resulting from the high winds. A car was flipped, and notable impacts occurred to camping trailers at the Blue Lake Campground (Whitley County). Storefronts were damaged in Kendallville (Nobel County). A confirmed EF1 tornado with estimated maximum wind speeds of 110 mph (177 kph) in southeast Saint Joseph County cause significant damage to grain bins, outbuildings, and crops. A second confirmed EF1 tornado near North Webster (Kosciusko County) tore the roof from a church, while homes in its path sustained minor damage from fallen trees.

Elsewhere, a confirmed EF0 tornado caused structural damage on the east side of the Lake Geneva business district in **Wisconsin** (Walworth County). In **Missouri**, the City of St. Louis and the Forestry Department relayed multiple reports of structures damaged from fallen trees, as well as impacts to power lines and utilities.

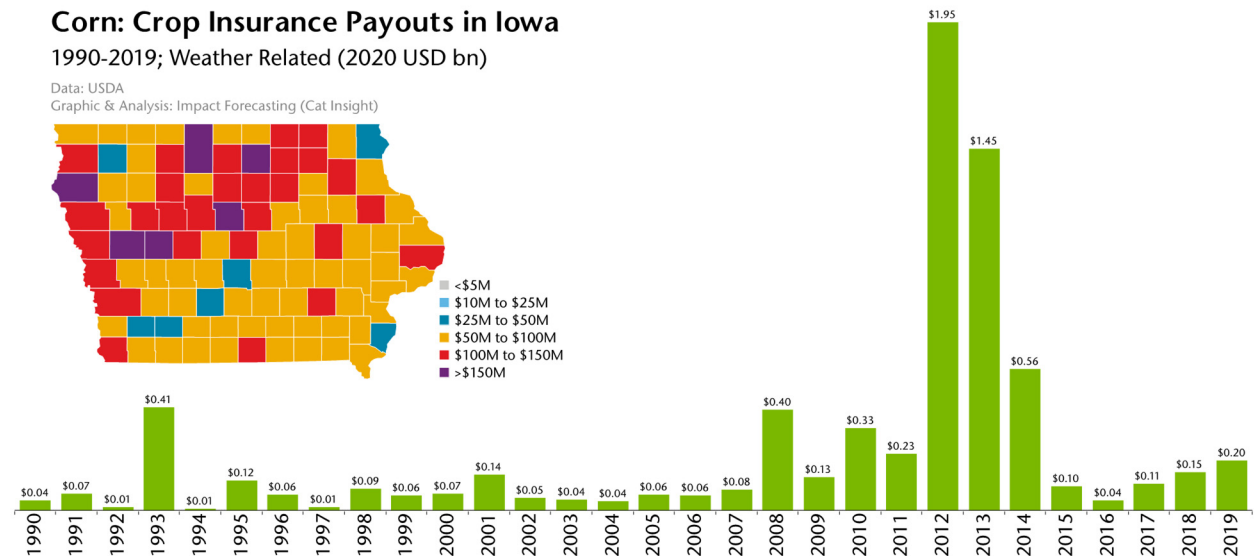
August 12

Localized flooding and flash flood warnings were prevalent across the Mid-Atlantic where slow moving storm cells produced heavy rainfall. In Maryland, Howard County officials reported flood waters which impacted trees, knocked down power lines, and closed roads. In Ellicott City, which was extensively impacted by historic flooding in 2016 and 2018, flood sirens sounded as portions of Main Street were closed to traffic due to rising water levels. Howard County Fire and EMS swift water rescue teams were deployed for a motorist who was stranded in several feet of floodwater. Flash flooding similarly impacted portions of Baltimore County, including southern regions of Baltimore City, where the East Branch of Herbert Run at Arbutus rose over 7 feet (2.1 meters) during the event, peaking at 8.35 feet (2.54 meters) - minor flood stage. Multiple water rescues were performed, including one along the Key Highway. Numerous cars were stranded or damaged by rising flood waters across southern Baltimore City. Flooding continues to be a concern in the coming days as the stalled frontal boundary lingers over the region.

Financial Loss

While it remains too preliminary to provide a specific financial loss estimate for the entire stretch from August 8-12, it is anticipated that this will be a multi-billion-dollar economic cost. This includes the August 10 derecho, large hail in the Minneapolis / St. Paul metro region on August 9, large hail in the Plains on August 8, and flooding in the Mid-Atlantic on August 12. Most of the wind and hail-driven damage to residential and commercial property, and automobiles, will be covered by insurance.

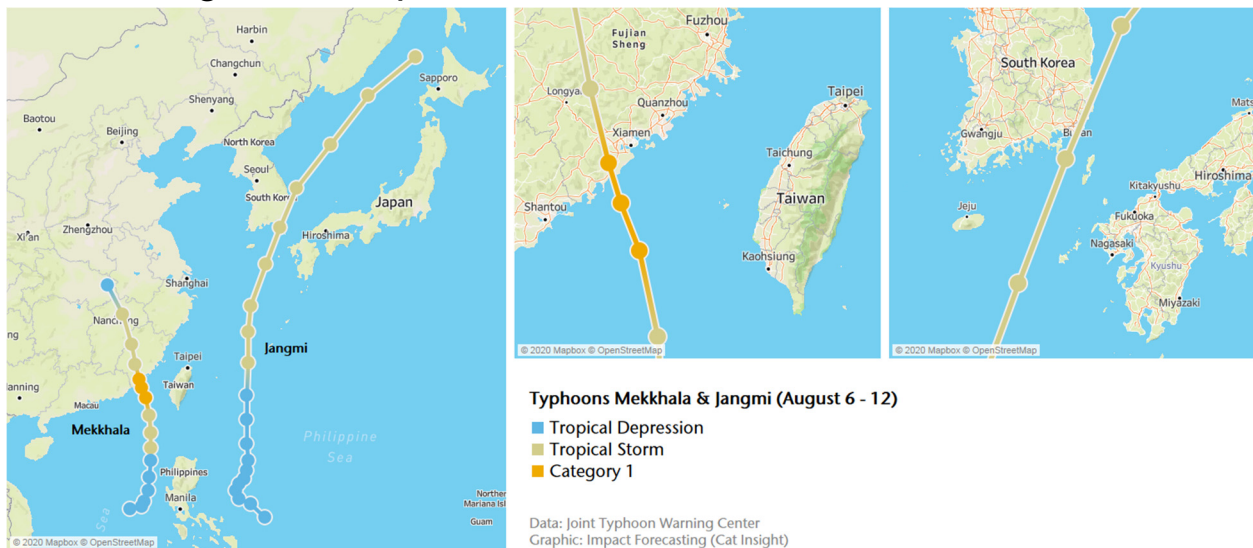
Data from the U.S. Department of Agriculture's (USDA) Risk Management Agency (RMA) highlights the volatility of weather-related crop insurance payouts in Iowa with the corn crop. Several years have seen notable spikes for various perils since 1990 – including the major 2012/13 drought and significant flood years in 1993, 2008, 2010, 2013, 2014, 2019. It remains too preliminary to know the full financial cost to the corn crop in Iowa and Illinois, as farmers will need to determine how much of the affected harvest will not be salvageable. However, it is very likely that the crop damage impact from the August 10 derecho will exceed USD1 billion. A sizeable portion of these losses will be covered via RMA crop insurance policies owned by farmers.



Cyclonic Storms enhance flooding in East Asia

Tropical Storm Jangmi became the first system of the 2020 Pacific Typhoon Season to directly strike the Korean Peninsula. The storm came ashore near the southern tip of Geoje Island in Gyeongsang Province at 05:50 UTC (14:50 KST) on August 10. Jangmi aided in enhancement of the flooding situation in Japan and South Korea, which were already facing major monsoon season flooding. Also this week, Typhoon Mekkhala made landfall as a Category 1-equivalent storm on the Saffir-Simpson Hurricane Wind Scale at 7:30 AM local time on August 11 (23:30 UTC on August 10) near Zhangpu County in Fujian Province, China. The system came ashore at peak intensity with 130 kph (80 mph) winds (1-minute sustained average). China's Ministry of Emergency Management cited that Mekkhala caused flash flood, wind, and coastal inundation damage in its wake. The combined economic losses from the storms were anticipated to reach into the millions (USD).

Meteorological Recap



Jangmi – A tropical disturbance started lurking east of Samar island in Philippines Sea on August 6 as the Joint Typhoon Warning Center (JTWC) began monitoring it. On August 7, the storm strengthened into a Tropical Depression, according to the Japan Meteorological Agency (JMA). The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) also upgraded it to a depression and gave it a local name ‘Enteng’. The JTWC issued its first tropical cyclone formation alert at 06:30 UTC on August 8. During the evening hours of August 8, the JMA also upgraded it to a tropical storm and gave it an international name ‘Jangmi’ – fifth named storm of the 2020 Northwest Pacific Typhoon season. At its peak, the JTWC highlighted that Jangmi had 1-minute sustained average winds of around 75 kph (45 mph). Jangmi continued to track generally northwards and came ashore near the southern tip of Geoje Island in Gyeongsang province at 05:50 UTC (14:50 KST) on August 10. The remnants of the storm would later track into the Sea of Japan and as it transitioned into an extratropical cyclone on August 11.

Mekkhala – A low-pressure area with organized convection formed west of Luzon island in Philippines on August 7 prompting the JTWC to begin monitoring it. Jangmi tracked northwards in the Philippines Sea on August 8, enhanced moisture advection towards this low-pressure system aided its intensification. On August 9, the JTWC upgraded it to a Tropical Depression. In tandem with JTWC, PAGASA also upgraded the storm to a tropical depression and named it as Ferdie. The system quickly organized and the JTWC upgraded it to a tropical storm on August 10 at 00:00 UTC. The JMA, which had already started following the storm on August 9, upgraded it to a tropical storm and gave it an international name ‘Mekkhala’. The system first attained hurricane-equivalent intensity on August 10 at 18:00 UTC – 120 kph (75 mph); Category 1 on the Saffir-Simpson Hurricane Wind Scale. Mekkhala came ashore near Zhangpu County in Fujian Province, China at 7:30 AM local time on August 11 (23:30 UTC on August 10) with peak winds of 130 kph (80 mph). It would later shift through Jiangxi and Anhui provinces and bring heavy rainfall.

Event Details

South Korea

Tropical Storm Jangmi ensued the flooding situation in southern provinces of South Korea, particularly in South Gyeongsang province which had been affected by prolonged flooding due to monsoon rains since mid-July. According to the Korean Meteorological Administration, several weather stations in southern parts of South Korea and Jeju island recorded 24-hour rainfall accumulations of at least 65 millimeters (2.5 inches) on August 10, causing widespread inundation damage to local infrastructure and agricultural land. Flight and ferry services between Jeju Island and mainland South Korea were stopped as preparedness measures related to the storm. As of this writing, according to the Central Disaster and Safety Countermeasure Headquarters, more than 42 people were killed in rain- and landslide-related incidents and no fewer than 12 people were missing since the beginning of the rainy season in mid-July (known locally as “Jangma”). According to local media, more than 14,100 properties sustained damage and 25,100 hectares (62,000 acres) of cropland were inundated.

Jangmi brought heavy rainfall and intense winds in the western and northwestern parts of the **Japanese archipelago** between August 7-10, particularly in the Ishikawa, Shimane, and Hokkaido prefectures. According to the latest information from Fire and Disaster Management Agency, Japan, nearly 200 buildings sustained flood-related damage during the event; however, no casualties were reported. Jangmi also aided in enhancement of flooding in several provinces of **North Korea**.

China

Typhoon Mekkhala brought damaging winds and torrential rain to China’s provincial regions of Fujian, Jiangxi, Guandong, and Hubei. Government reports cited widespread damage to the electrical grid and agriculture, primarily wind and flood-driven. Mekkhala reportedly ripped off tin roofs, swept away shades, broke down portions of temporary homes and billboards, uprooted trees, and caused damage to electrical infrastructure. Thousands of residents were evacuated from the coastal low-lying areas in Fujian province. Local rescue authorities received several emergency calls and around 4,000 people were evacuated to safety during the event.

The cyclone aided in enhancement of the ongoing flood situation throughout the Yangtze River Basin, which is currently experiencing one of its most significant seasons in recent years. Monsoon rains resulted in the swelling of rivers above the flood-stage at 635 locations. According to the Ministry of Emergency Management (MEM), China, this year’s monsoon season has left at least 219 people dead or missing, damaged or destroyed more than 500,000, and resulted in a direct economic cost of CNY179 billion (USD26 billion) since June 1.

Storms and flooding across parts of Europe

After a period of stable anticyclonic weather and heatwave conditions, several parts of Europe experienced locally strong storms with heavy rain and gusty winds from August 9-12. Among the hardest-hit areas included Evia in Greece, central Spain, and parts of Germany and Scotland. The collective economic toll from these separate events was expected to reach into the tens of million EUR.

Event Details

Severe, localized flash flooding affected parts of central Evia (Euboea) island in **Greece** on August 8-9, causing at least eight fatalities and dozens of injuries. The event was caused by an extreme thunderstorm-related precipitation event (the period of unstable weather was referred to as “Thalia” in Greece). The station of Steni recorded 300 millimeters (11.8 inches) and Psachna 226 millimeters (8.9 inches) of rainfall within just eight hours overnight from August 8 to 9. The most affected areas were Psachna, Politika, Bourtzi Vasilikou, and Lefkandi. The fire brigade received more than 650 calls for assistance, and there were nearly 100 evacuations. According to media reports, 3,000 properties were flooded; there was also a notable impact on a number of vehicles, infrastructure and beaches. Most of the damage was caused by the overflow of local streams Massapithos, Politika and Lila. Some additional flood-related damage was also reported from the northern part of Attika Peninsula north of Athens. Total economic losses were expected to reach into the millions EUR.

Parts of **Spain** were affected by strong thunderstorms on August 11, with notable effects in agriculture. Castilla-La Mancha and Extremadura were the most affected; Agroseguro estimated that more than 24,000 hectares (59,000 acres) of agricultural land was affected nationwide. Most of the damage was caused by either intense precipitation or large hail. In Castilla-La Mancha, impacts were concentrated near Ciudad Real and Albacete, notably on almonds, viticulture, or summer vegetables. Large hail in Extremadura particularly affected the Las Vegas Altas region. Further, mostly minor losses were reported elsewhere in the country. The agency also noted that storms on August 9 affected an additional 2,000 hectares (5,000 acres) of wine and vegetable cultures. Total economic losses were expected to reach into the millions of EUR.

Several parts of **Germany** experienced locally strong thunderstorms during the period of August 9-12. Particularly affected were the western Ruhr region (Bochum, Duisburg), Aachen, Saarland and parts of Sachsen in the east – particularly around Chemnitz. Effects were mostly attributed to strong winds and heavy rain. Strong winds also toppled multiple trees in the Frankfurt region, Hessen and prompted hundreds of fire brigade interventions. A higher concentration of damage occurred in Nürnberg and nearby towns of Erlangen and Fürth of Bayern (Bavaria), with multiple flooded basements and wind-related damage to cars and property.

Heavy rains in eastern **Scotland** resulted in regional flooding and widespread disruption in rail and road transport. A particularly difficult situation was in the Fife region ensued as dozens of vehicles were flooded in Kirkcaldy. A passenger train derailed near Stonehaven, which resulted in three fatalities and six injuries. It was reported that the event was likely caused by a rainfall-induced landslide, although the exact cause of the incident was being investigated. Scottish Fire and Rescue Service received more than 1,000 emergency calls.

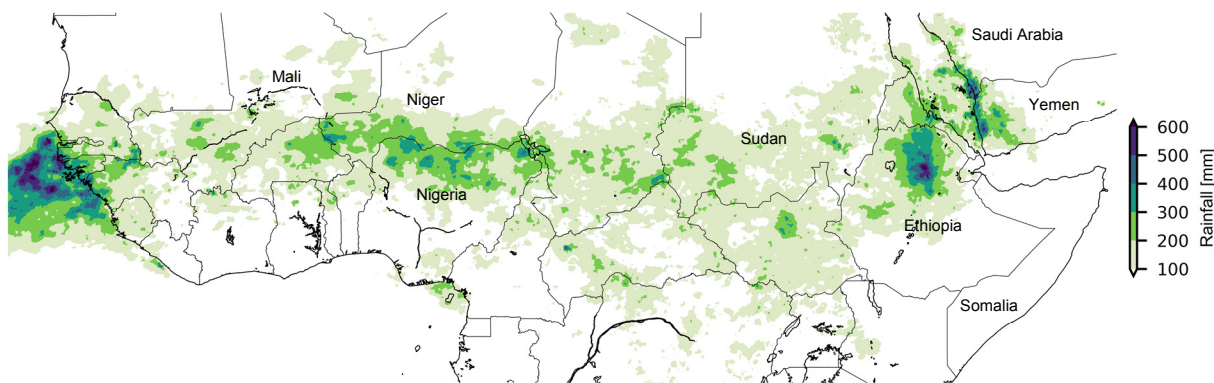
Other small-scale events occurred in parts of **Austria** (flood-related infrastructural damage in Joglland) and eastern **Poland** (impact of strong winds in Lublin city and the adjacent region).

Seasonal flooding continues in Africa & the Middle East

Flooding across several African countries continued through mid-August as seasonal rains generated further impacts across parts of western and eastern sections of the continent. Local governments reported dozens of additional deaths, and thousands of homes damaged or destroyed.

Meteorological Recap

During the first half of August, parts of northern sub-Saharan Africa received anomalous rainfall and several countries experienced notable flooding. This is in line with usual climatological patterns, with rainfall maximum typically experienced in summer months. Monsoonal circulation over Western Africa is driven by strong temperature differences between the Atlantic Ocean and the continental landmass in addition to a shift in the position of the Intertropical Convergence Zone (ITCZ). The Climate Prediction Center (CDC) noted that during early August 2020, the intertropical front underwent a notable northward progression, and was located anomalously north of its climatological position. This contributed to anomalous rainfall in parts of Mali and Niger; and Eastern Africa.



Satellite estimate of accumulated rainfall (July 20 – August 10)
Data: NASA; Graphic: Impact Forecasting

Event Details

Eastern Africa

Continuing heavy precipitation during the peak rainy season in the Ethiopian highlands resulted in renewed flooding in **Ethiopia**. Since July 20, authorities noted more than 30,000 people displaced from their homes, with Afar, Gambella, Oromia and SNPP regions among the worst affected. Due to a lack of comprehensive data from the region, it is difficult to determine the extent and severity of the current seasonal flood at this point.

Renewed episodes of flooding also affected parts of **Sudan** on August 9; according to local authorities, 20 people were killed and 13 injured, while nearly 350 homes were damaged or destroyed. Other reports suggested up to 3,300 homes were impacted. The seasonal death toll (since late July) thus rose to 35 and the number of homes affected by the disaster increased to 7,000. Widespread flooding affected at least 50,000 people in 14 of the 18 states in total.

Persistent rainfall in the Shabelle River basin caused further flooding in southern regions of **Somalia**. The latest report from UNHCR suggested that this year's flooding already displaced 650,000 people in the country, most of them prior to June. In the first week of August alone, 23,000 people were displaced, mostly in the southern states of Hirshabelle and South West.

Western Africa

Seasonal rains resulted in elevated water levels in the upper reaches of the River Niger basin from late July into early August. **Niger** experienced widespread flooding, with a total of at least 53,000 people affected in 146 settlements in 50 municipalities. According to the information from the Directorate of Emergency Preparedness and Disaster Management, 19 people were killed, 35 injured and more than 5,100 homes were damaged or destroyed. Most affected were the Maradi region with more than 2,700 homes damaged or destroyed, Tahoua (940), and Dosso (670).

Neighboring **Mali** similarly experiences material losses due to increased water levels of major rivers. According to the UN's Office of Coordination of Humanitarian Affairs, floods have affected about 7,000 people since July, including a large number of internally displaced. At least 1,100 homes were reported to be damaged or destroyed. Since early August, floods were reported from several parts of **Nigeria**, particularly Kaduna, Katsina, Zamfara and Sokot. Extent and severity of the disaster was not yet determined.

Middle East

Heavy rains that triggered notable flooding in southwestern Arabian Peninsula, notably western **Yemen** in early August, continued through August 7. Some media reports suggested that total death toll was as high as 172; others noted 130 fatalities. Notable damage occurred in western governorates; multiple UNESCO-listed buildings in Sana'a were reportedly destroyed. It is difficult to determine the exact scope of economic impact, due to a lack of reliable information from the area.

The inclement weather also affected parts of **Saudi Arabia** since late July into early August. The country's civil defense reported more than 600 evacuations and nearly 80 rescues. Among the worst affected regions were Asir, Mecca, Medina, Jazan and Al-Baha. According to media reports, there were at least five fatalities. Total economic and insured losses were not yet determined.

Natural Catastrophes: In Brief

Severe Weather (Australia)

A coastal area of low pressure, known locally as an “East Coast Low”, resulted in several days of unsettled weather in eastern Australia. From August 5-8, a low-pressure system moved through the state of New South Wales and resulted in heavy rainfall and strong winds exceeding 120 kph (75 mph). Rainfall accumulations topped 400 millimeters (16 inches) in some isolated locations, which led to hundreds of homes being inundated. The Bureau of Meteorology cited that the Shoalhaven River was anticipated to peak at 4.2 meters (13.8 feet); the highest flood crest for the river since 1991. Emergency management officials cited 1,600 emergency calls due to storm-related impacts. Damage assessments to property, infrastructure, and agriculture remained ongoing.

Flooding (Pakistan)

At least 68 people were killed, and many others remained missing after renewed flooding affected parts of Pakistan from August 6-9. According to Pakistan's National Disaster Management Authority, 19 people died in rain-related incidents in northwestern Khyber Pakhtunkhwa province, 12 in southern Sindh province, eight in Punjab province and 10 in Gilgit-Baltistan region. Initial reports from the affected regions suggested hundreds of homes were damaged or destroyed. Further losses were inflicted on local infrastructure.

Wildfire (Peru)

Eight people were killed and at least 37 were injured in a wildfire that occurred in Catca district, Quispicanchi province of Cusco region in southeastern Peru on August 7. The fire engulfed at least 100 hectares (247 acres) of natural pastures, pine plantations and other types agricultural land. Economic losses were likely to be negligible, although significant for the local community.

Earthquake (United States)

The southeastern United States was rattled by a magnitude-5.1 (M5.1) earthquake which struck 2.5 miles (4 kilometers) southeast of Sparta, North Carolina (Allegheny County) on August 9 at 8:07 AM EDT (12:07 UTC). According to the United State Geological Survey (USGS), the tremor occurred at a depth of 2.3 miles (3.7 kilometers) as the result of oblique-reverse faulting in the upper crust of the North American plate. Notable earthquakes are relatively rare in this portion of the United States, with only one other M5.0 or stronger earthquake recorded in the 20th century within 62 miles (100 kilometers) – an M5.2 quake in the Great Smoky Mountains in 1916. A State of Emergency was declared for Allegheny County as initial assessments near the epicenter indicated multiple homes with foundation and chimney damage, water main breaks, as well as cracked roads and parking lots. Several homes had to be evacuated. Total economic and insured losses were anticipated to be in the low-digit millions (USD).

Flooding (Bangladesh)

Torrential rainfall associated with southwest monsoon led to further flooding this week in Bangladesh, causing additional fatalities and damage. Government officials noted 161 casualties in rain- and lightning-related incidents. According to the Ministry of Disaster Management and Relief and OCHA Humanitarian Response, Bangladesh, nearly 5.5 million people have thus far been directly affected and one million people displaced since the onset of the monsoon this year. More than one million houses were inundated, and hundreds of thousands of hectares (acres) of cropland were destroyed during the event.

Flooding (North Korea)

Typhoon Hagupit, which tracked in the western Yellow Sea after exiting China on August 4, aided the enhancement of monsoonal rains in North Korea between August 4-10. According to the information from North Korean State Hydro-Meteorological Administration (SHMA), rainfall accumulation of more than 200 millimeters (8 inches) in North and South Hwanghae, North Phyongan and Kangwon provinces prompted flash floods and landslides. Several rivers and lakes surpassed flood stage, causing widespread impacts. According to media reports, nearly 1,000 homes and 600 hectares (1,500 acres) cropland were inundated in North Hwanghae province alone.

Flooding (Panama)

Dozens of homes were damaged or destroyed after heavy rain triggered flash flooding and landslides in parts of Panama on August 9, according to the National Civil Protection System. In Veraguas Province, 11 people were killed (in one house). Notable damage was reported from Colón and Chiriquí provinces.

Flooding (India)

Incessant rains since August 5 prompted flash floods and landslides in the states of Kerala and Karnataka in southern India; additional damage and casualties were reported from Maharashtra, Tamil Nadu, and Gujrat. According to the India Meteorological Department, rainfall accumulations since August 1 in Kerala crossed 475 millimeters (19 inches) – well above the monthly long-term average rainfall – causing notable damage to thousands of houses and a vast area of agricultural land. More than 55 people were killed, and around 12 others were reportedly missing after a landslide event in Idukki district on August 7. Continuing monsoon rains in Karnataka and Maharashtra affected several districts across these states. No fewer than seven additional casualties were reported in rain-related incidents since August 5. According to the latest data from Disaster Management Division, Ministry of Home Affairs, India, monsoon flooding since June 1 has claimed more than 1,350 lives. Several rivers crossed flood-stage, causing damage to nearly 75,000 houses and a vast area of cropland – 470,000 hectares (1.2 million acres). Seasonal flood-related losses since June 1 were estimated at INR40 billion (USD535 million) by the government of Karnataka. Combined economic losses in India were anticipated to cross USD1.5 billion.

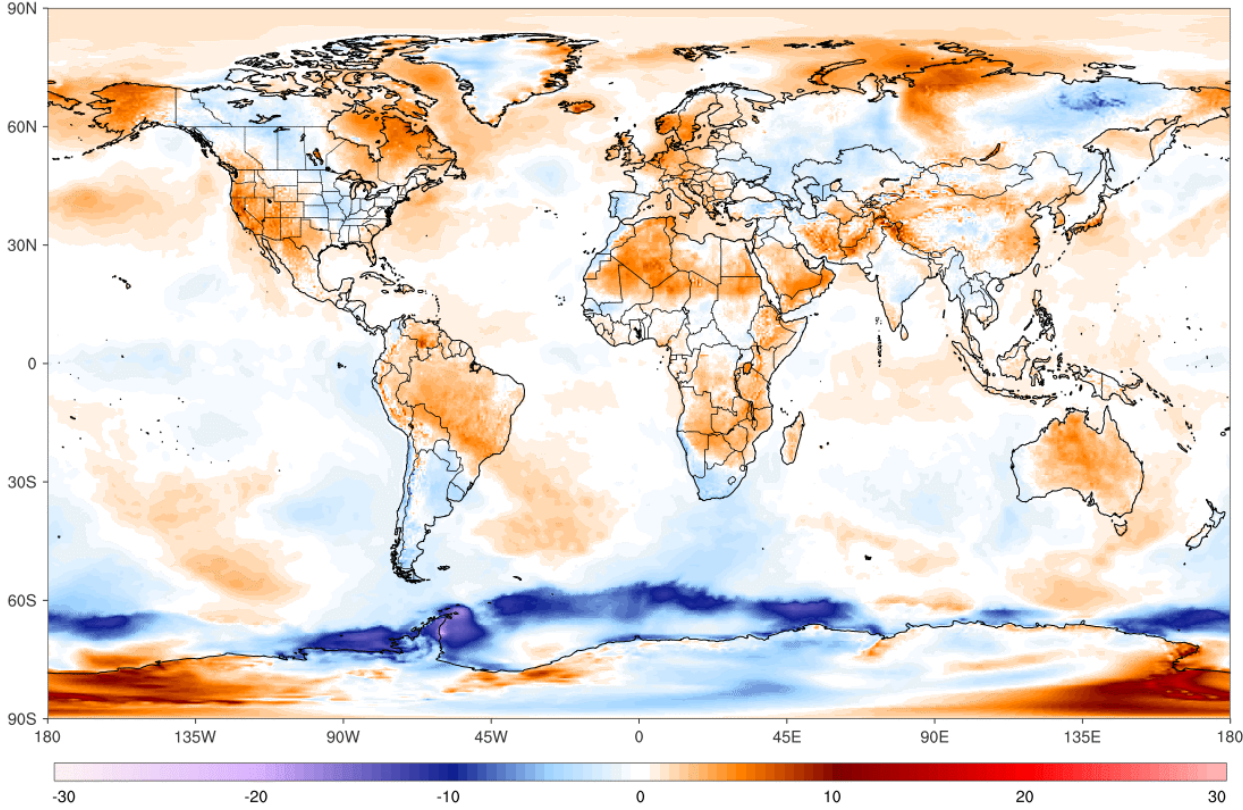
Wildfire (United States)

Dry conditions earlier this year aided in ensuring an active start to the 2020 California wildfire season. As of this writing officials reported at least 6,060 incidents in 2020 which have affected 227,349 acres (92,005 hectares). Most recently, the Lake Fire, currently ongoing in the Angeles National Forest (Los Angeles County) exhibited extreme fire behavior expanding to at least 10,500 acres in less than a day, while destroying 3 structures and threatening 5,400 additional ones. The fire is burning in regions of the forest that have been unaffected for decades, some igniting for the first time since 1968. Elsewhere, the Apple Fire (Riverside County) is 80 percent contained as of August 13 and has affected 33,424 acres, causing 3 injuries and destroying 4 structures. The Gold Fire (Lassen County) which was contained on August 12, burned 22,634 acres, and caused 4 injuries while destroying 13 structures and damaging 5 others. This situation will be closely monitored in the coming days as continued hot and dry weather is anticipated.

Global Temperature Anomaly Forecast

GFS/CFSR 5-day Avg 2m T Anomaly (°C) [1979-2000 base]
Thursday, Aug 13, 2020

ClimateReanalyzer.org
Climate Change Institute | University of Maine

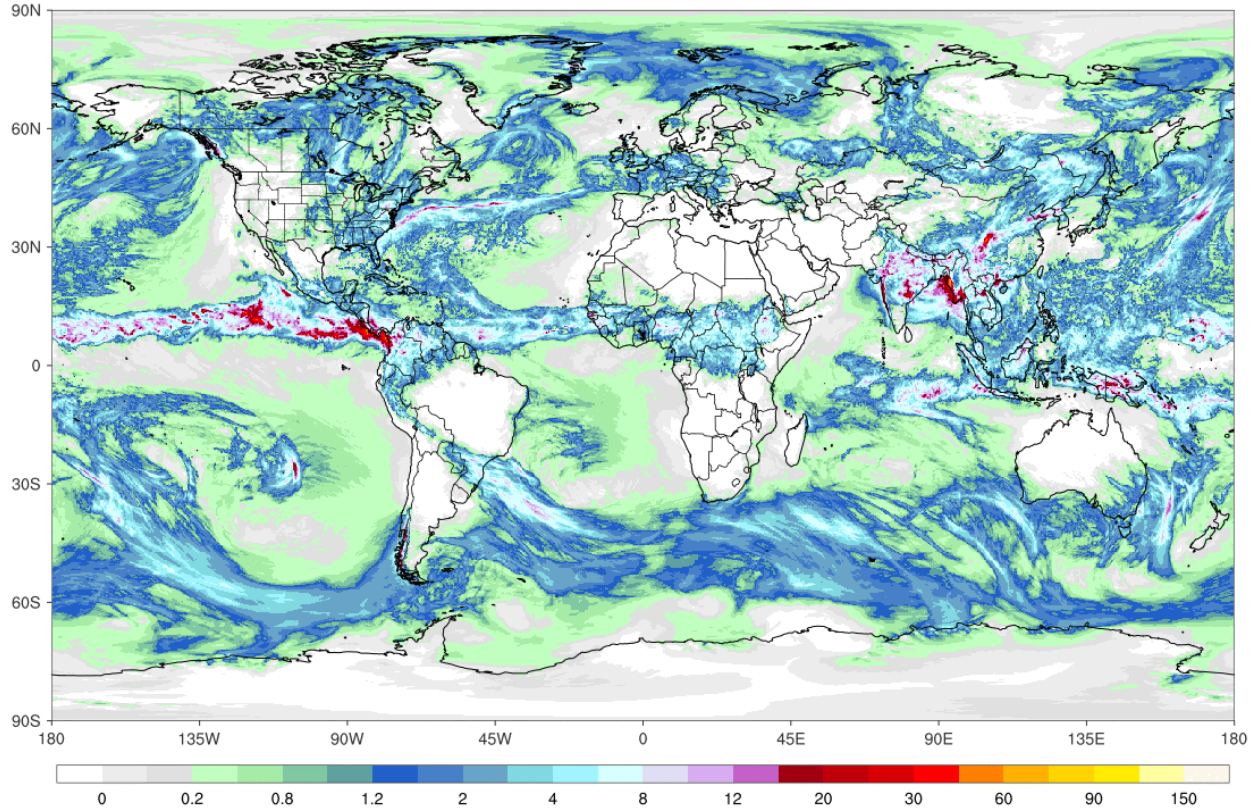


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Forecast

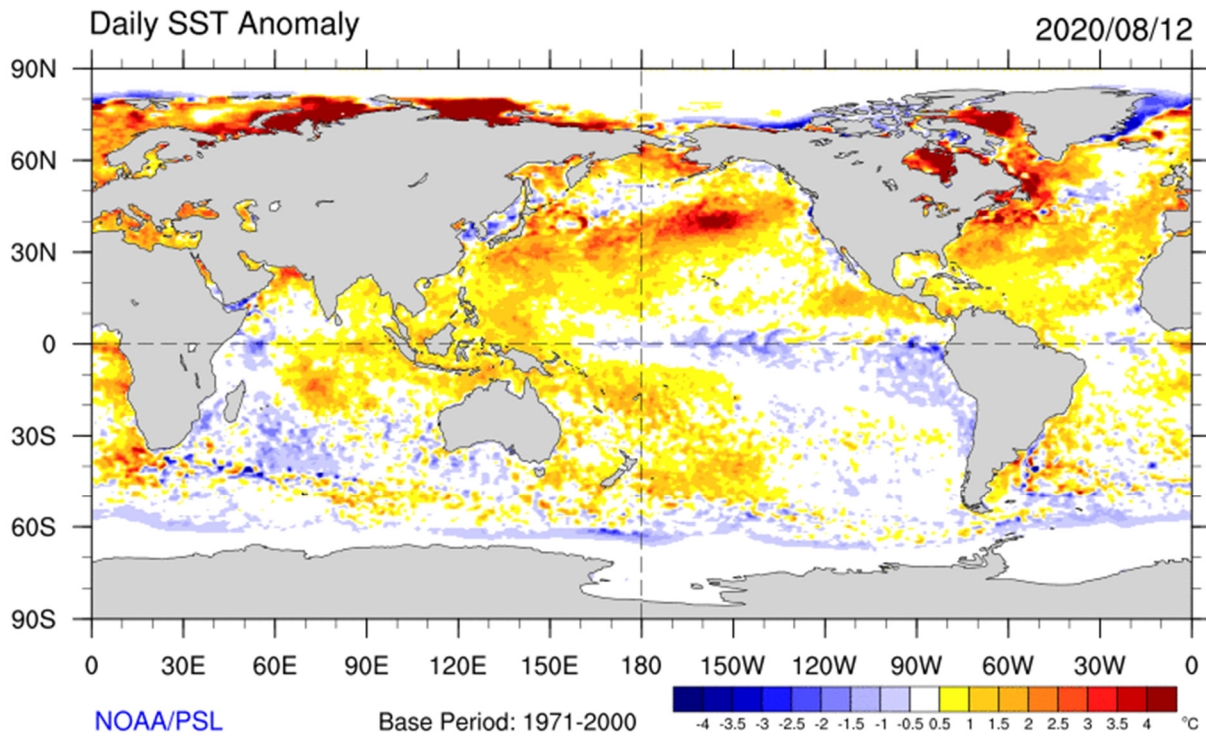
GFS 5-day Total Accumulated Precipitation (cm)
Thursday, Aug 13, 2020

ClimateReanalyzer.org
Climate Change Institute | University of Maine



Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Weekly Sea Surface Temperature (SST) Anomalies (°C)



The SST anomalies are produced by subtracting the long-term mean SST (for that location in that time of year) from the current value. This product with a spatial resolution of 0.5 degree (50 kilometers) is based on NOAA/NESDIS operational daily global 5 kilometer Geo-polar Blended Night-only SST Analysis. The analysis uses satellite data produced by AVHRR radiometer.

Select Current Global SSTs and Anomalies

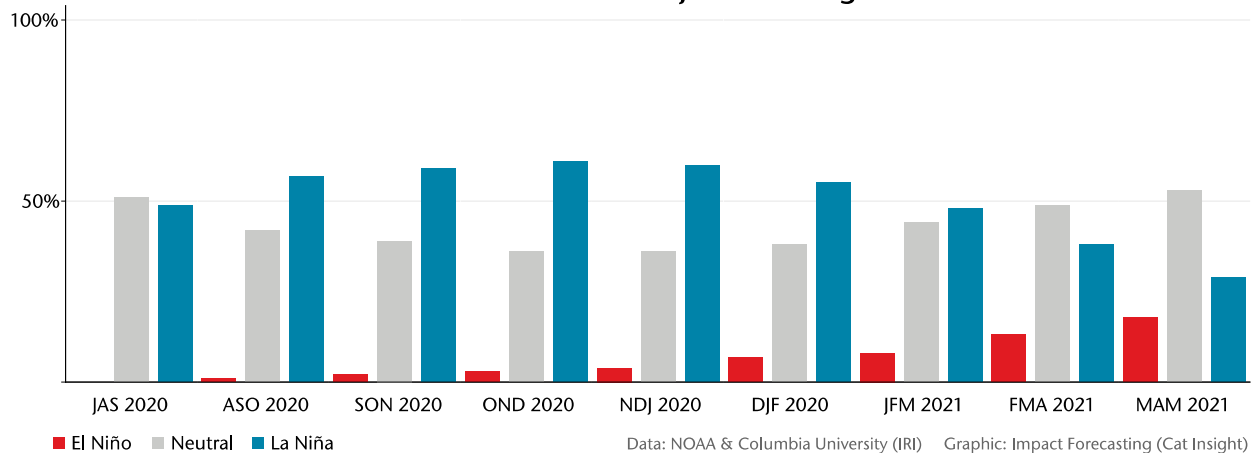
Location of Buoy	Temp (°C)	Departure from Last Year (°C)
Eastern Pacific Ocean (1,020 miles SW of San Salvador, El Salvador)	25.1	-0.2
Niño3.4 region (2°N latitude, 155°W longitude)	24.7	-1.2
Western Pacific Ocean (700 miles NNW of Honiara, Solomon Islands)	30.1	+0.6

Sources: ESRL, NOAA, NEIS, National Data Buoy Center

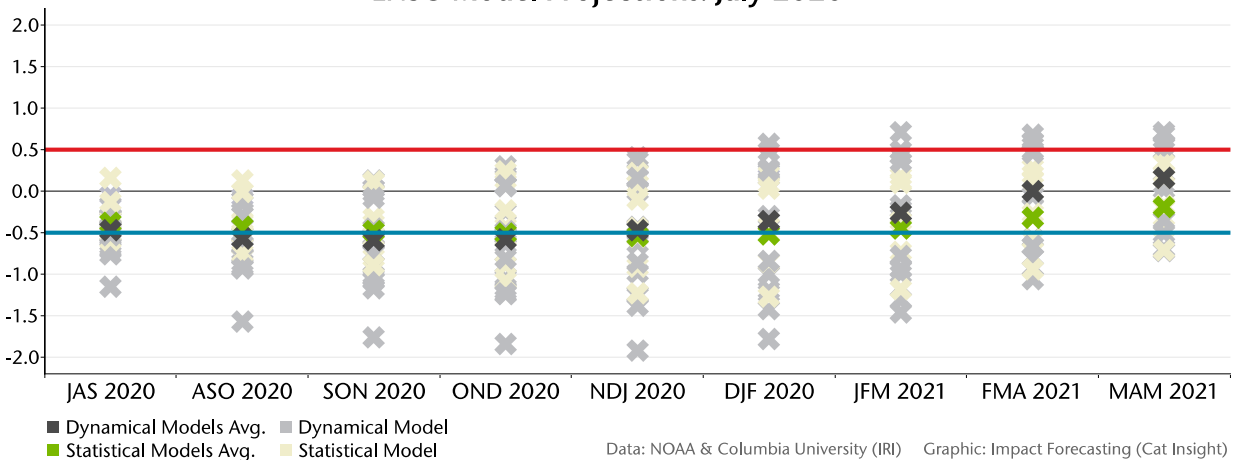
El Niño-Southern Oscillation (ENSO)

ENSO-neutral conditions are currently present. NOAA notes that these neutral conditions will likely linger through the Northern Hemisphere (boreal) summer months. The agency further states that there is a 60 percent chance that a weak La Niña will emerge in the boreal autumn and last through the winter of 2020 / 2021 (~55 percent chance).

Probabilistic ENSO Model Projections: August 2020



ENSO Model Projections: July 2020



El Niño refers to the above-average sea-surface temperatures (+0.5°C) that periodically develop across the east-central equatorial Pacific. It represents the warm phase of the ENSO cycle.

La Niña refers to the periodic cooling of sea-surface temperatures (-0.5°C) across the east-central equatorial Pacific. It represents the cold phase of the ENSO cycle.

El Niño and La Niña episodes typically last nine to 12 months, but some prolonged events may last for years. While their frequency can be quite irregular, El Niño and La Niña events occur on average every two to seven years. Typically, El Niño occurs more frequently than La Niña.

ENSO-neutral refers to those periods when neither El Niño nor La Niña conditions are present. These periods often coincide with the transition between El Niño and La Niña events. During ENSO-neutral periods the ocean temperatures, tropical rainfall patterns, and atmospheric winds over the equatorial Pacific Ocean are near the long-term average.

El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

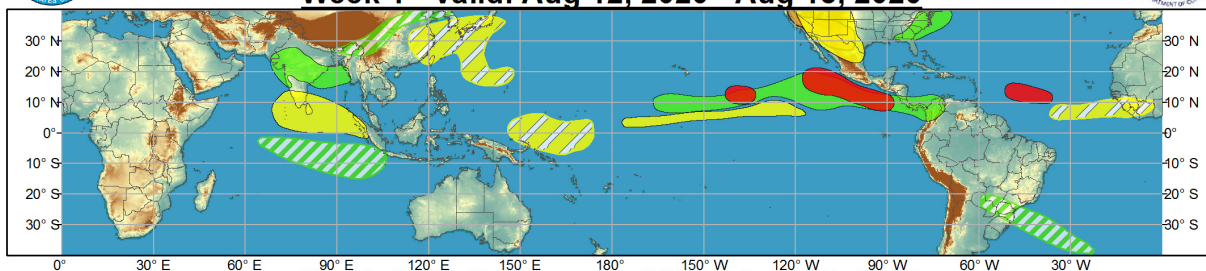
Global Tropics Outlook



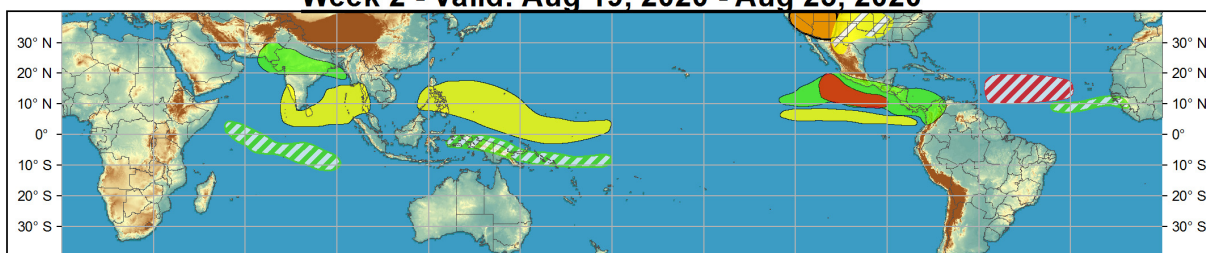
Global Tropics Hazards and Benefits Outlook - Climate Prediction Center



Week 1 - Valid: Aug 12, 2020 - Aug 18, 2020



Week 2 - Valid: Aug 19, 2020 - Aug 25, 2020



Confidence
High Moderate

- Tropical Cyclone Formation** ■ ▨ Development of a tropical cyclone (tropical depression - TD, or greater strength).
- Above-average rainfall** ■ ▨ Weekly total rainfall in the upper third of the historical range.
- Below-average rainfall** ■ ▨ Weekly total rainfall in the lower third of the historical range.
- Above-normal temperatures** ■ ▨ 7-day mean temperatures in the upper third of the historical range.
- Below-normal temperatures** ■ ▨ 7-day mean temperatures in the lower third of the historical range.

Product is updated once per week, except from 6/1 - 11/30 for the region from 120E to 0, 0 to 40N. The product targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.

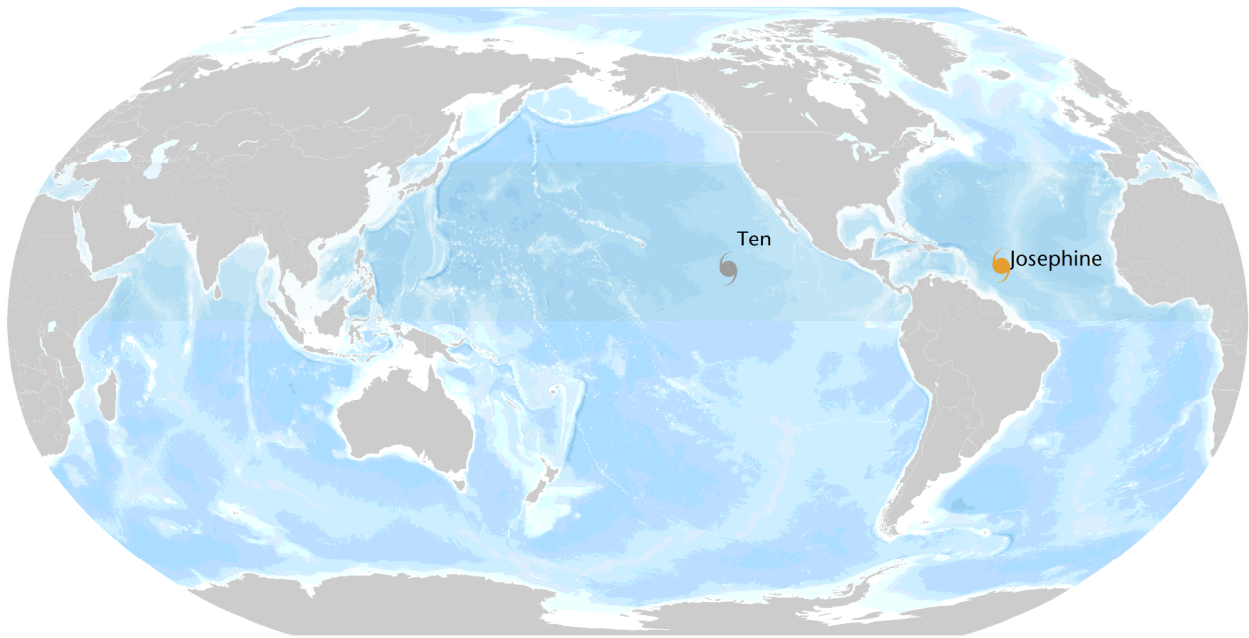
Produced: 08/11/2020

Forecaster: Harnos



Source: Climate Prediction Center

Current Tropical Systems



☪ Tropical Depression
 ☪ Tropical Storm
 ☪ Category 1
 ☪ Category 2
 ☪ Category 3
 ☪ Category 4
 ☪ Category 5

Location and Intensity Information

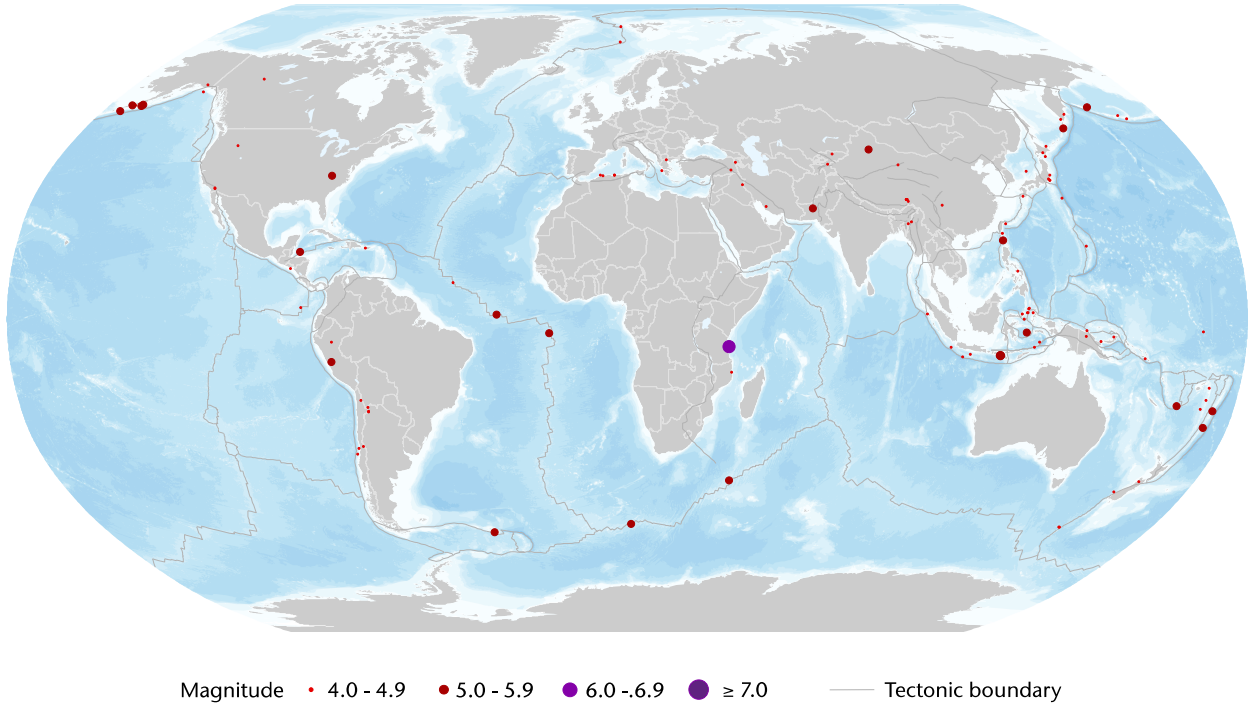
Name*	Location	Winds	Storm Reference from Land	Motion**
TS Josephine	14.5°N, 50.6°W	45 mph	865 miles (1,395 kilometers) ESE of the Leeward Islands	WNW at 16 mph
TD Ten	13.8°N, 130.6°W	35 mph	1,495 miles (2,400 kilometers) WSW from Baja California	W at 9 mph

* TD = Tropical Depression, TS = Tropical Storm, HU = Hurricane, TY = Typhoon, STY = Super Typhoon, CY = Cyclone

** N = North, S = South, E = East, W = West, NW = Northwest, NE = Northeast, SE = Southeast, SW = Southwest

Sources: National Hurricane Center, Joint Typhoon Warning Center, Central Pacific Hurricane Center

Global Earthquake Activity ($\geq M4.0$): August 7-13

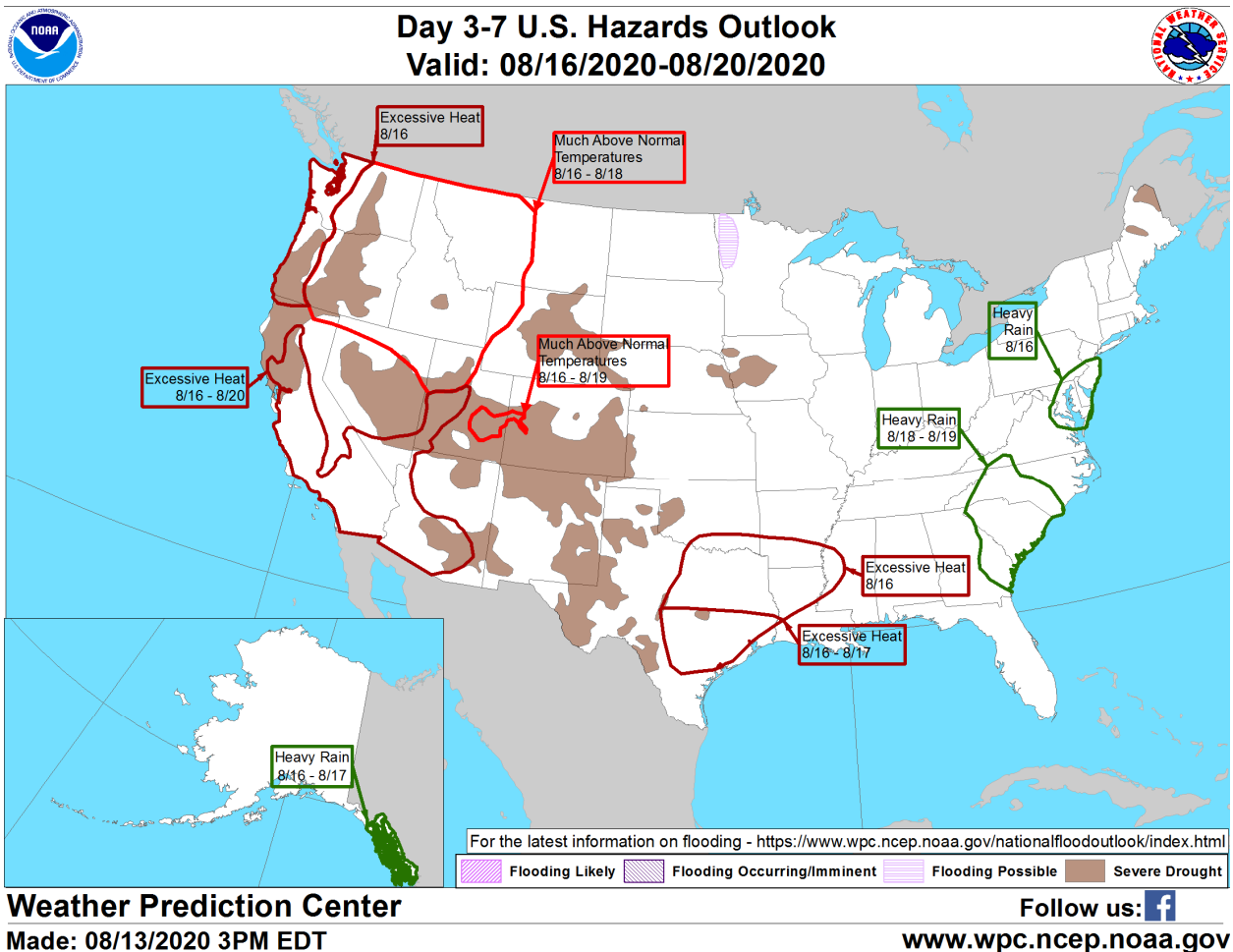


Significant EQ Location and Magnitude ($\geq M6.0$) Information

Date (UTC)	Location	Magnitude	Depth	Epicenter
8/12/2020	7.33°S, 39.81°E	6.0	15 km	66 kilometers (41 miles) ESE of Vikindu, Tanzania

Source: United States Geological Survey

U.S. Weather Threat Outlook

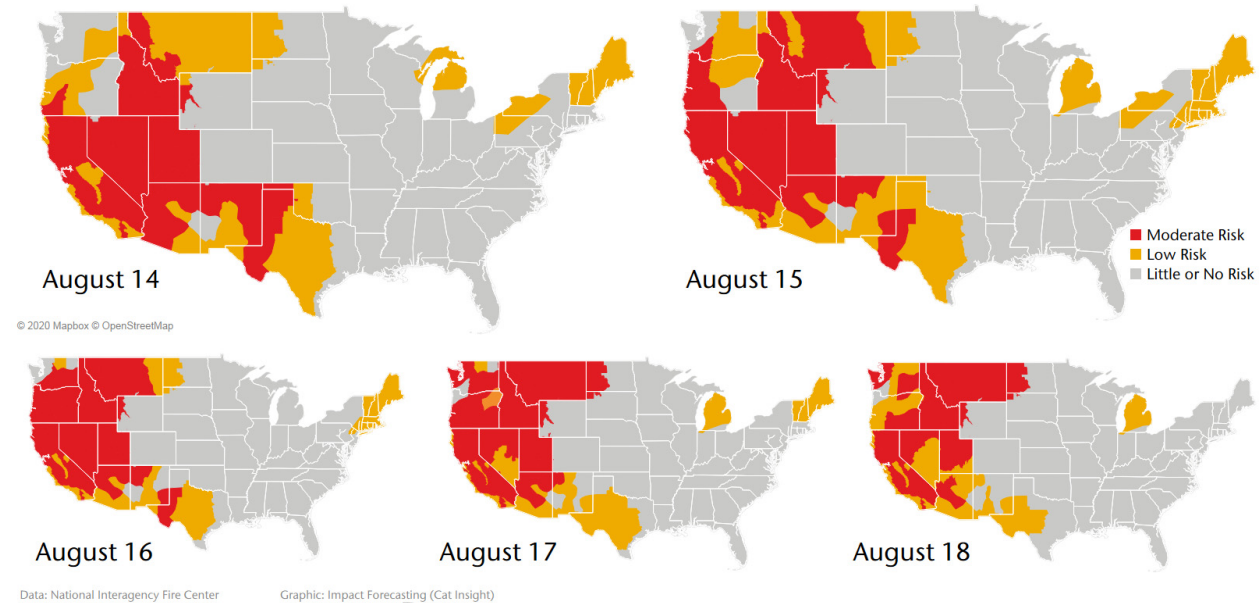


Potential Threats

- An amplified pattern featuring a robust ridge building over the Western United States will allow for much above normal temperatures and excessive heat between August 16 -20, especially for portions of California, The Great Basin, and The Pacific Northwest. The south-central United States will likewise experience excessive heat on August 16.
- A slowly departing frontal boundary will bring heavy rain to localities across the Mid-Atlantic through August 16. Later in the period, an established long wave trough and developing wave of low pressure is anticipated to bring heavy rainfall to the Southeast by August 18 and 19.
- Prolonged drought conditions, with pockets of extreme drought, persist across large portion of the western United States - extending from the southern Plains through the central Rockies and toward the Pacific Northwest.

U.S. Wildfire: Significant Fire Risk Outlook & Activity

The National Interagency Fire Center has highlighted an extended risk of elevated wildfire conditions across parts of the West, Desert Southwest, and Southern Plains during the third week of August. Well above normal temperatures are expected to engulf much of the Western U.S. and increase the fire potential, including in California where fires continue to burn.



Annual YTD Wildfire Comparison: August 13*

Year	Number of Fires	Acres Burned	Acres Burned Per Fire
2016	37,075	3,857,015	104.03
2017	41,688	6,267,405	150.34
2018	40,392	5,623,512	139.22
2019	29,572	3,655,609	123.62
2020	35,121	2,341,183	66.66
10-Year Average (2010-2019)	38,423	4,528,603	117.86

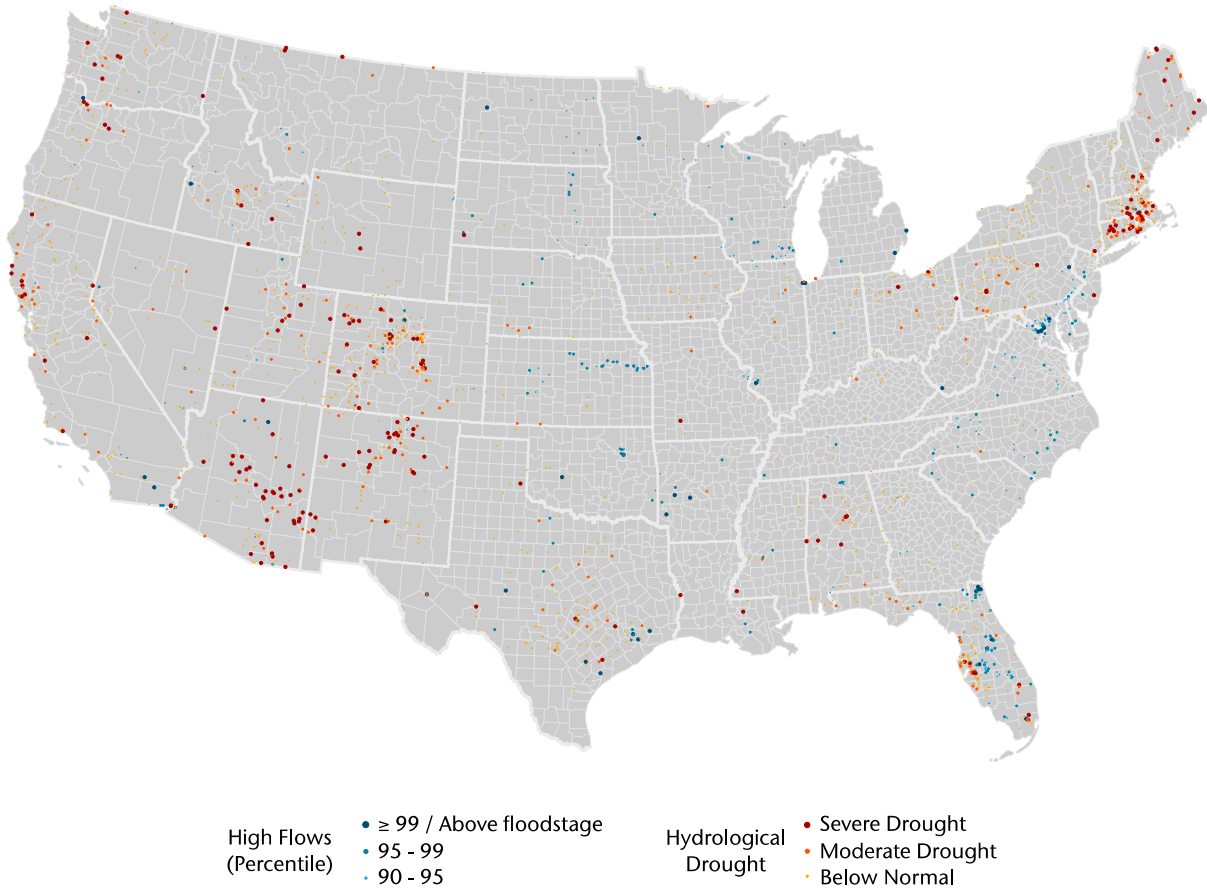
*Last available update from NIFC
Source: National Interagency Fire Center

Top 5 Most Acres Burned by State: August 13

State	Number of Fires	Acres Burned	Acres Burned Per Fire
Arizona	1,670	698,511	418.27
California	6,341	251,815	39.71
Nevada	516	198,847	385.36
Utah	1,001	192,227	192.03
Alaska	322	180,732	561.28

Source: National Interagency Fire Center

Current U.S. Streamflow Status



A $\geq 99^{\text{th}}$ percentile indicates that estimated streamflow is greater than the 99th percentile for all days of the year. This methodology also applies for the other two categories. A stream in a state of severe drought has 7-day average streamflow of less than or equal to the 5th percentile for this day of the year. Moderate drought indicates that estimated 7-day streamflow is between the 6th and 9th percentile for this day of the year and 'below normal' state is between 10th and 24th percentile.

Top 5 Rivers Currently Nearing or Exceeding Flood Stage

Location	Current Stage (ft)	Flood Percentile
Ouachita River at Camden, Arkansas	14.47	98.90
Ouachita River near Mount Ida, Arkansas	11.98	98.73
St. Mary's River at Moniac, Georgia	12.40	98.27
Thunder Bay River near Bolton, Michigan	12.61	98.18
Richland Creek near Hecker, Illinois	38.39	98.04

Source: United States Geological Survey

Source Information

Active week of U.S. storms highlighted by major derecho

U.S National Weather Service

U.S. Storm Prediction Center

Environment and Climate Change Canada (ECCC)

Marshall County Emergency Management

6 inches of rain, hail the size of baseballs in Twin Cities west metro, Star Tribune

Severe storms bring large hail, damaging winds, torrential rain to Twin Cities, MPR News

What we know about power outages, damage, Iowa government response to derecho storm, CBS2 Iowa

Storm unleashes fury on Marshalltown, Times Republican

Destructive derecho brings 100 mph winds to Iowa, blasts through Chicago along 700-mile path, The Washington Post

Widespread damage reported after evening storms, WPTA 21

ComEd power outage leaves 188K across Chicago area in dark, ABC7 Chicago

Derecho Impacts Estimated 10 Million Acres Of Iowa Agricultural Land, Iowa Public Radio

Maryland Weather: Heavy Rain Brings Flash Flooding To Parts Of State, CBS Baltimore

Cyclonic Storms enhance flooding in East Asia

China Focus: Typhoon Mekkhala makes landfall in China's Fujian, Xinhua

Typhoon Mekkhala hits Fujian with heavy wind, rains, China Daily

Typhoon Jangmi makes landfall in southern Korea, The Korean Herald

Jangmi – Northwestern Pacific Ocean, Hurricane and Typhoon Updates, NASA

Joint Typhoon Warning Center

Philippine Atmospheric, Geophysical and Astronomical Services Administration

Ministry of Emergency Management, China

Japan Meteorological Agency and Fire and Disaster Management Agency, Japan

Korean Meteorological Administration

Storms and flooding across parts of Europe

Tragedy in Evia: 7 dead, one missing from the floods - Images of destruction in the area. iEfimerida

Tragedy in Evia with 8 dead and images of destruction. The TOC

Severe weather in parts of Germany. Wetteronline

Fire brigade in constant use: Storms sweep over Hesse. Hessenschau

Storm record in Franconia: Around 430 fire service missions in the region. Nordbayern

Torrential rain and thunderstorms bring flooding and disruption. BBC

Agroseguro

Seasonal flooding continues in African countries

Sudan rains and floods claim 20 more lives. Pulse

Niger: Floods kill around 20 people and cause significant material damage. ANP

United Nations High Commissioner for Refugees

Climate Prediction Center

Natural Catastrophes: In Brief

Worst flood in decades swamps parts of the South Coast, Sunday Morning Herald

Tragedy in Cusco: forest fire in Ocongate leaves eight dead and 35 injured. Andina

Almost 50 killed in three days of monsoon rain across Pakistan, Al Jazeera

Week of heavy monsoon rains kill 68 across Pakistan, Arab News

Powerful 5.1 magnitude earthquake jolts Charlotte area, strongest in NC in 104 years, The Charlotte Observer

Tragedy in Panama: 11 members of a family die washed away by a flood, La Voz

Karnataka rains: 12 dead, loss estimated around Rs 3,500 crore, The Indian Express

Kerala: Idukki landslide death toll rises to 54, Hindustan Times

Bureau of Meteorology, Australia

National Disaster Management Authority, Pakistan

United States Geological Survey (USGS)

Alleghany County Government, North Carolina

Ministry of Disaster Management, Bangladesh

North Korean State Hydro-Meteorological Administration (SHMA)

India Meteorological Department

Disaster Management Division, Ministry of Home Affairs, India

CalFire

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