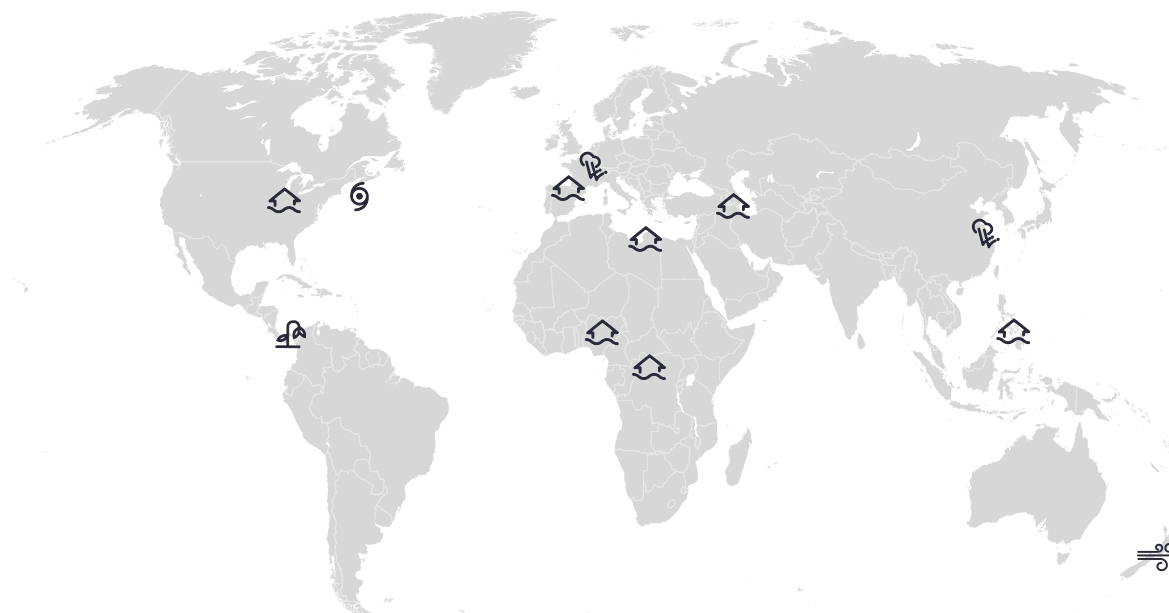


# **Weekly Cat Report**

September 22, 2023



## Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (\$)	Page
<b>Hurricane Lee</b>	U.S., Canada, Bermuda	2	10s of millions	3
<b>Flooding</b>	United States	0	10s of millions	5
<b>SCS &amp; Flooding</b>	Western Europe	0	10s of millions	7
<b>Severe Convective Storm</b>	China	10	100s of millions	9
<b>Windstorm</b>	New Zealand	0	Millions	9
<b>Drought</b>	Panama	0	Millions	9
<b>Flooding &amp; Landslide</b>	Philippines	0	Unknown	9
<b>Flooding &amp; Landslide</b>	Central Africa	17	Unknown	9
<b>Flooding</b>	Iran, Azerbaijan	0	Unknown	9
<b>Flooding (Update)</b>	Libya	3,900+	Unknown	10

Please note that any financial loss estimate is preliminary and subject to change. These estimates are provided as an initial view of the potential financial impact from a recently completed or ongoing event based on early available assessments. Significant adjustments may inevitably occur. All losses in US dollars (\$) unless noted otherwise.

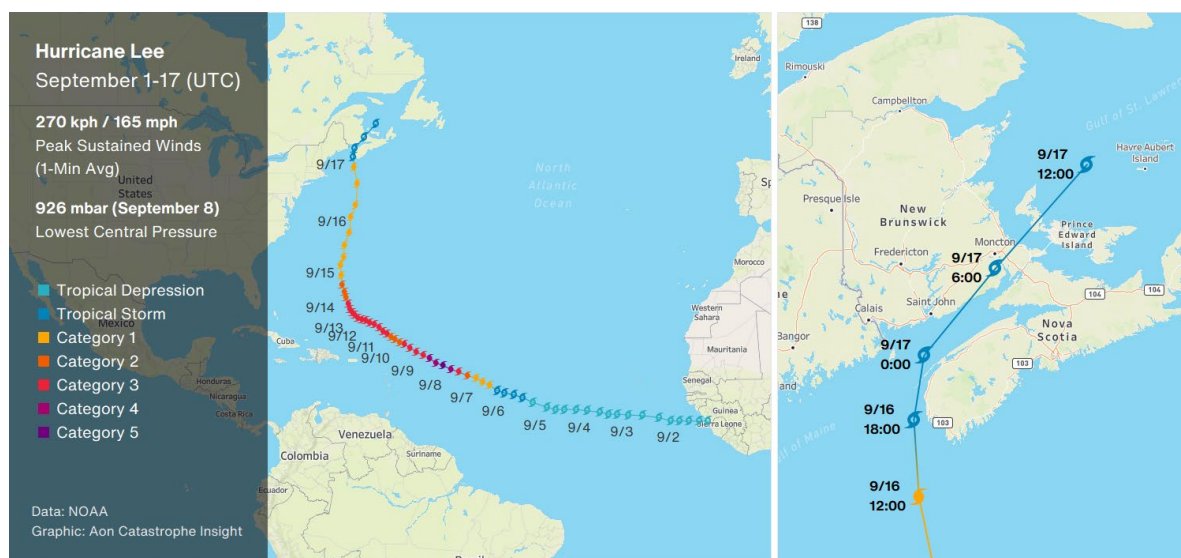
Along with this report, we continue to welcome users to access current and historical natural catastrophe data and event analysis on Impact Forecasting's Catastrophe Insight website: <http://catastropheinsight.aon.com>

## United States, Canada, Bermuda: Hurricane Lee

### Overview

*Hurricane Lee's long journey ended in the Canadian Maritimes on September 16-17. Due to its large size, Lee brought tropical storm conditions to Bermuda, New England, and Atlantic Canada during its life span. Large waves, strong winds, and moderate rainfall resulted in 2 deaths, minor coastal and inland flooding, notable tree damage, and widespread power outages. Total economic and insured losses in all the affected areas could reach into the tens of millions USD.*

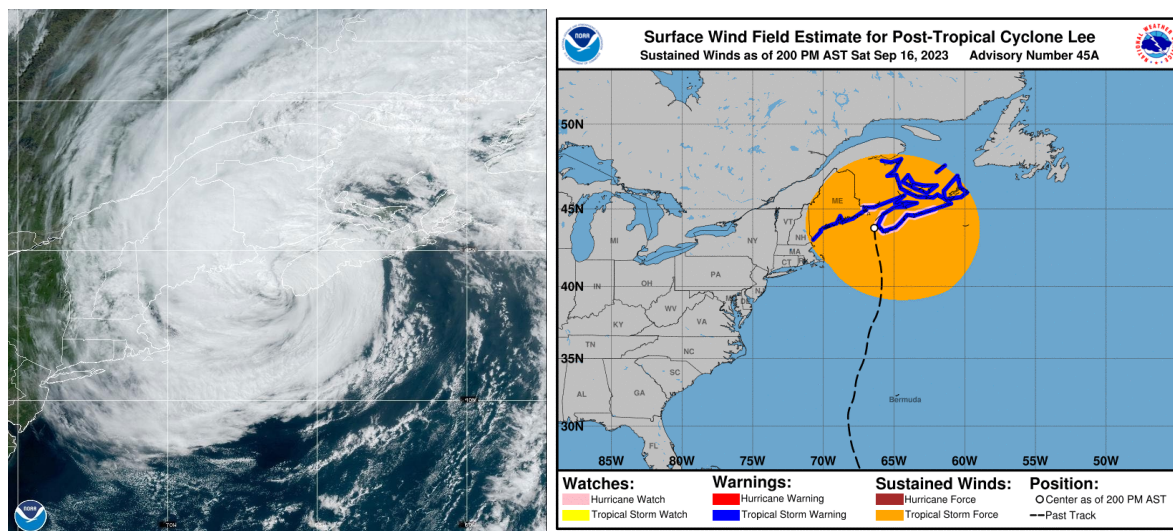
### Meteorological Recap



Lee began as a tropical wave near the western African coast on September 1, and it moved generally westward due to a mid-level ridge over the central Atlantic Ocean. The National Hurricane Center (NHC) issued its first advisory for this storm on September 5 before near record-warm water waters of 30 °C (86 °F) along its path helped fuel rapid intensification. Lee peaked in strength on September 8 as a category 5 hurricane with wind speeds around 167 mph (269 kph).

Over the next week, Lee experienced slower forward motion and fluctuations in strength before turning northward. Tropical storm conditions impacted Bermuda as the storm passed just west of the island on September 14-15. Despite weakening to a category 1 storm by September 15, the storm's wind field grew tremendously. In fact, the NHC advisories prior to landfall estimated a tropical storm-force wind radius up to 390 miles (628 km) away from the center of the storm. As a result, large waves were generated across the Caribbean, Bermuda, and the Atlantic coastlines in the United States and Canada.

Lee eventually reached the Canadian Maritimes as a post-tropical storm ahead of a mid-latitude trough on September 16-17. Tropical storm-force winds and heavy rain impacted the United States, especially the state of Maine, and Canada, mainly the provinces of Nova Scotia and New Brunswick.



## Event Details

According to BELCO, the sole electricity provider for Bermuda, Lee caused 11,750 customers to lose power, which represented one-third of the island's total customer base. Other minor impacts from the storm include damage to docks and transportation disruptions.

In the U.S., most impacts were confined to Maine, mainly in the form of tree damage. One person was killed, 3 were injured, and about 94,000 people lost power across the state. Large swells produced by Lee resulted in minor coastal flooding in places such as Maine, Massachusetts, and the North Carolina Outer Banks. These large waves were also blamed for another death in Fernandina Beach, Florida.

Lee also brought minor impacts to Nova Scotia and New Brunswick in Canada. Both provinces saw widespread tree damage, and around 277,000 people lost power in Nova Scotia alone. Localized flooding damaged multiple roads and buildings, especially in Saint John and Fredericton. Notably, Risser Beach Provincial Park in Nova Scotia suffered extensive damage due to storm surge.

## Financial Loss

Since Lee weakened considerably prior to landfall in Canada, impacts from the storm were relatively minor. Total aggregated economic and insured losses in all the affected areas could reach into the tens of millions USD.



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## United States: Flooding

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### Overview

*Multiple rounds of heavy rain across the United States on September 14-17 resulted in various localized flooding incidents. Power outages and flooding damage occurred near several populated areas such as Atlanta, Houston, Chicago, and Charleston. Aggregated economic and insured losses from these localized events could reach into the tens of millions USD.*

### Meteorological Recap

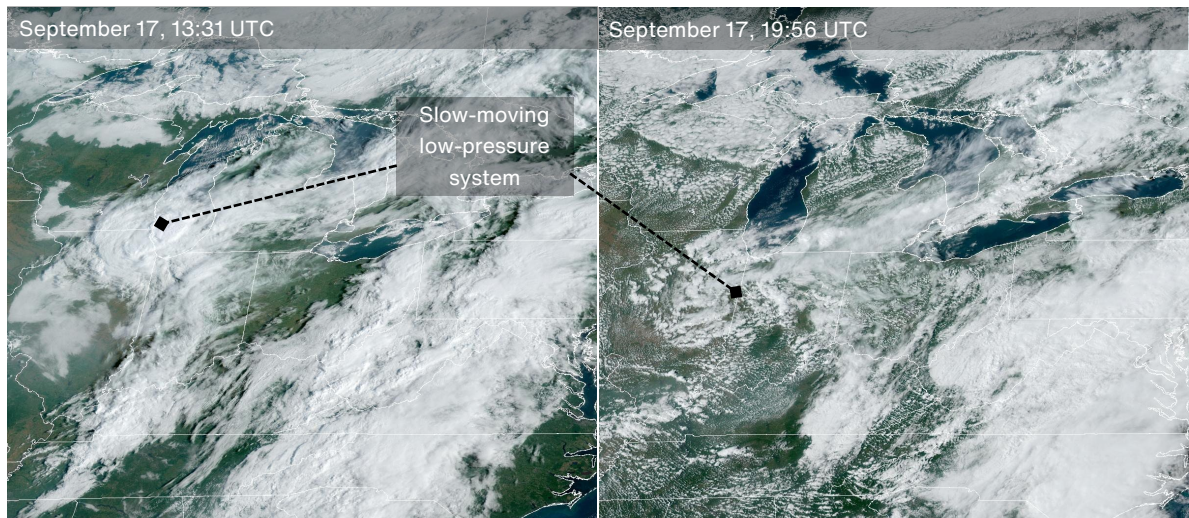
#### September 14

Daytime heating triggered afternoon thunderstorms across parts of northern Georgia on September 14. Although these storms only briefly stalled over Atlanta, heavy rain up to nearly 3.5 inches (89 mm) fell over parts of downtown, according to the NWS.

#### September 15-16

Ample atmospheric moisture combined with multiple frontal boundaries generated strong storms over much of Texas on September 15-16. Most of the heaviest rain fell on September 15, particularly over parts of southeast Texas. 24-hour rainfall measurements exceeding 4.5 inches (114.3 mm) were mainly concentrated near the Houston metro area. Additional storms packed heavy rain impacted central Texas on September 16, including towns such as San Angelo.

#### September 17



A slow-moving low-pressure system in northern Illinois brought heavy rainfall to parts of the Chicago metro area on September 17. While most of this region saw around 1 inch (25.4 mm) of rain, a highly localized area of southern Cook County saw radar-estimated rain totals of 7-9 inches (178-229 mm) in less than a day. Areas such as South Holland, Calumet City, and Dolton were among the most impacted.

Meanwhile, a separate set of afternoon thunderstorms brought heavy precipitation to parts of South Carolina on September 17. The largest rainfall totals, up to 4.5 inches (114.3 mm), were measured in downtown Charleston.

Location	Date	24-hour Rainfall (inches)	24-hour Rainfall (mm)
Atlanta, Georgia	September 14	3.43	87.1
Alvin, Texas	September 15	4.99	126.7
Houston, Texas	September 15	3.95	100.3
South Holland, Illinois	September 17	5.69	144.5
Harvey, Illinois	September 17	5.04	128.0
Charleston, South Carolina	September 17	4.50	114.3

## Event Details

In Atlanta, flooding caused minor damage to property and submerged multiple vehicles. Notably, 24 students at Clark Atlanta University had to be relocated due to flooding in their dormitory building. Heavy rainfall in Houston, Texas caused 30,000 people to lose power. Other towns in Texas, including San Angelo, saw localized flooding exacerbated by preceding drought conditions, which led to a handful of water rescues. Flooding in the Chicagoland area, especially in the south suburbs, resulted in extensive damage to many homes and vehicles. Several water rescues were carried out in towns such as Dolton and Calumet City. In Charleston, heavy rainfall primarily caused flooded roads and minor damage to buildings and vehicles.



**Flooding in Calumet City, Illinois**

Sources: NWS Chicago

## Financial Loss

After aggregating the impacts from each of these localized flooding events, the total economic and insured losses could reach into the tens of millions USD.

## Western & Northern Europe: SCS & Flooding

### Overview

Thunderstorm activity on September 15-18 in parts of Western Europe resulted in notable economic losses on property and agriculture. Notably, large hail in Valencia, Spain, caused damage in the tens of millions EUR. Additional losses were incurred due to flash flooding in Spain and France. Later on September 19-20, the low-pressure system caused additional wind-related damage in southern Sweden and central Finland.

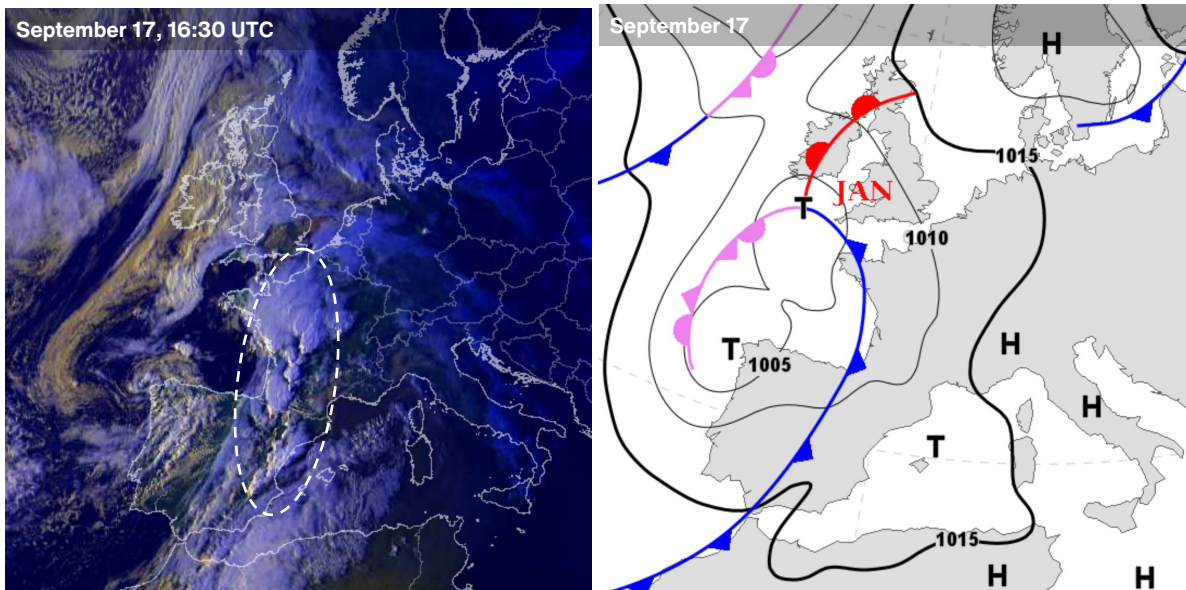
### Meteorological Recap

Isolated thunderstorm activity occurred in parts of Western Europe on September 15-18, as a deep trough presided over the Bay of Biscay. The surface low, named Jan by the FU Berlin, and its associated complex frontal boundary set the conditions for storm development. Notable effects, which included large hail and intense rainfall, were observed in parts of Spain and France.

Nearly 550 mm (21.7 inch) of rainfall fell in just a 24-hour period at Roqueredonde station in Hérault Department of southern France (to be validated), prompting localized flash flooding.

Particularly notable hail with maximum diameters of up to 8 cm occurred in the Valencian Community of Spain and in the Department of Gers in southwestern France with diameters of up to 11 cm.

On September 19-20, the low-pressure system moved further to the northeast and resulted in relatively strong gusts across parts of southern Sweden and central Finland. Impacts were particularly notable in Finland, where the storm got a local name *Varpu*.





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## Event Details

**Spain** was particularly affected by stormy weather during the past week. Already on September 15, fire brigades intervened more than 330 times in the Community of Madrid alone, mostly due to flooded buildings and vehicles after heavy rainfall.

On September 17, provinces of Valencia and Castellón were hit by severe hailstorm that affected more than 22,000 hectares (54,400 acres) of farmland, resulting in an agricultural damage of €43 million (\$46 million), according to the local agricultural unions. Additional losses of nearly €10 million (\$11 million) on 8,000 hectares (19,800 acres) of crops were caused by hailstorm and heavy rainfall on September 19.



**Crop damage in Valencia Community**

Sources: La Unió Llauradora i Ramadera

Material damage caused by heavy rainfall, flash flooding and large hail were incurred in several parts of **France**. On September 16, red warning due to extreme rainfall was issued in the department of Hérault and the intense rainfall that fell in the department resulted in isolated flash flooding. On September 17, a rare tornado occurred near the town of Ernée, department of Mayenne, and destroyed several agricultural buildings and damaged several homes.

Notable damage was also caused by a windstorm in **Sweden** and **Finland** on September 19-20, with notable impacts on forestry in central Finland. The country also suffered from power outages and disruption.

## Financial Loss

Total aggregated impacts related to the severe storms and windstorm across the affected region were initially expected to reach to at least tens of millions EUR.



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## Natural Catastrophes: In Brief

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### **Severe Convective Storm (China)**

Jiangsu, a province in eastern China, experienced a severe weather outbreak on September 19 that included multiple violent tornadoes. The city of Suqian was directly hit by an EF-2 tornado, while parts of Funing County were devastated by a separate EF-3 tornado. 10 people were killed, 8 more were injured, and over 1,600 homes were damaged or destroyed.

### **Windstorm (New Zealand)**

A strong pressure difference between two surface pressure systems generated strong winds across much of New Zealand on September 16-17. According to MetService, the highest recorded wind speed was 246 kph (153 mph) taken at Cape Turnagain, just shy of the country's all-time record of 250 kph (155 mph). As a result of the intense winds, thousands of homes lost power and 3 people were injured. The North Island also saw many reports of damaged homes, toppled vehicles, and downed trees.

### **Drought (Panama)**

During the height of Panama's traditional rainy season, an ongoing drought has reduced water levels in the Panama Canal and created a large backlog of vessels. Earlier this month, the Panama Canal Authority imposed new restrictions and transit limits aiming to reduce vessel traffic. Fears of global trade disruptions within this vital shipping route persist as the drought continues.

### **Flooding & Landslide (Philippines)**

Heavy rain on September 11-14 caused flooding and landslides primarily over Cebu City and Mandaue City. Multiple landslides and collapsing structures were reported, resulting in 140 families being evacuated. More flooding incidents occurred on September 16-17 primarily in South Cotabato, where 10 homes were damaged and nearly 8,000 people were affected.

### **Flooding & Landslide (Central Africa)**

Torrential rainfall across Nigeria and the Democratic Republic of Congo (DRC) triggered devastating floods and landslides on September 17-19. In the DRC, 17 people were killed and several homes were destroyed in Lisal along the Congo River. Eastern Nigeria saw more than 1,300 people displaced and several homes destroyed, according to NEMA.

### **Flooding (Iran, Azerbaijan)**

Significant flooding damage due to heavy rainfall affected several areas across Iran and Azerbaijan on September 17-19. Dozens of villages in the Astara District in Azerbaijan were cut off from the district center due to collapsed bridges. Hundreds of homes were flooded, multiple roads were damaged, and 20 people were injured.

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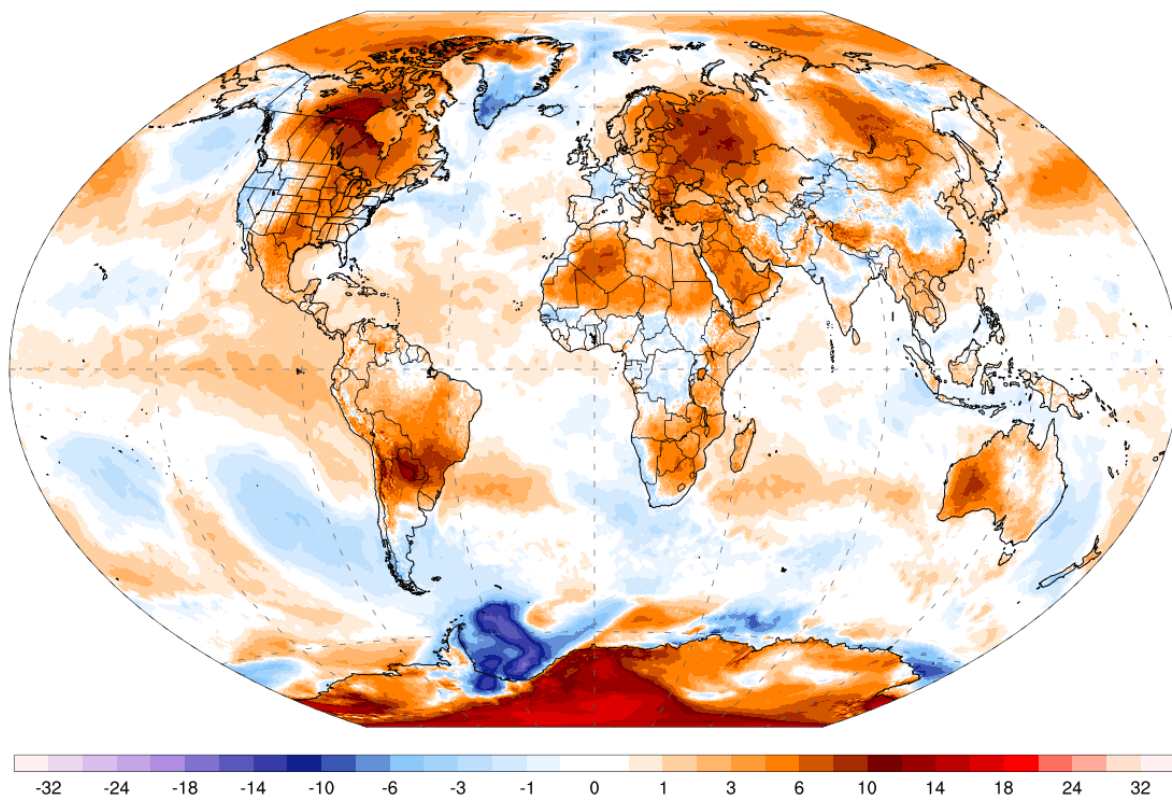
## **Flooding (Libya) – Update**

The United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) revised reports stating about number of deaths related to the recent Libyan floods. Current death toll stands at 3,958, citing the UN World Health Organization. More than 9,000 people are still missing, particularly in the Derna City.

## Global Temperature Anomaly Forecast

GFS 2m T Anomaly (°C) [CFSR 1979-2000 baseline]  
Days 1-3 Avg | Fri, Sep 22, 2023

ClimateReanalyzer.org  
Climate Change Institute | University of Maine

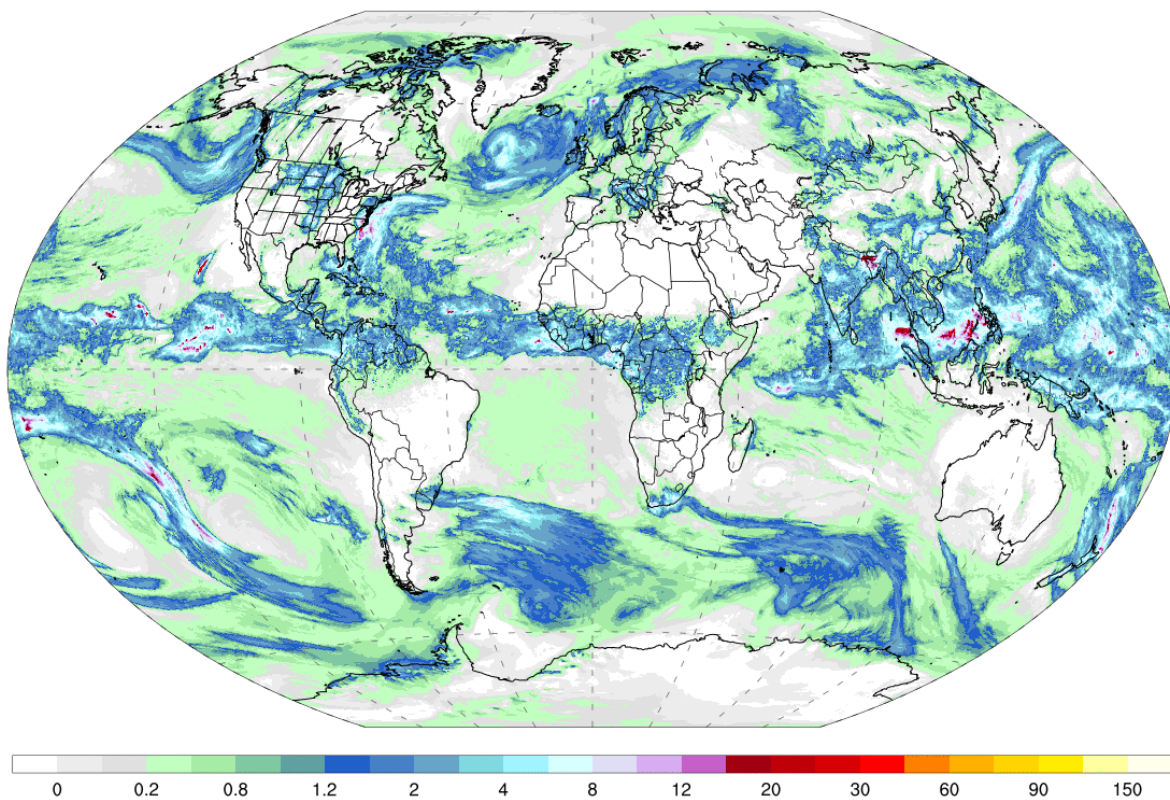


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

## Global Precipitation Forecast

**GFS Accumulated Precipitation (cm)**  
Days 1-3 Total | Fri, Sep 22, 2023

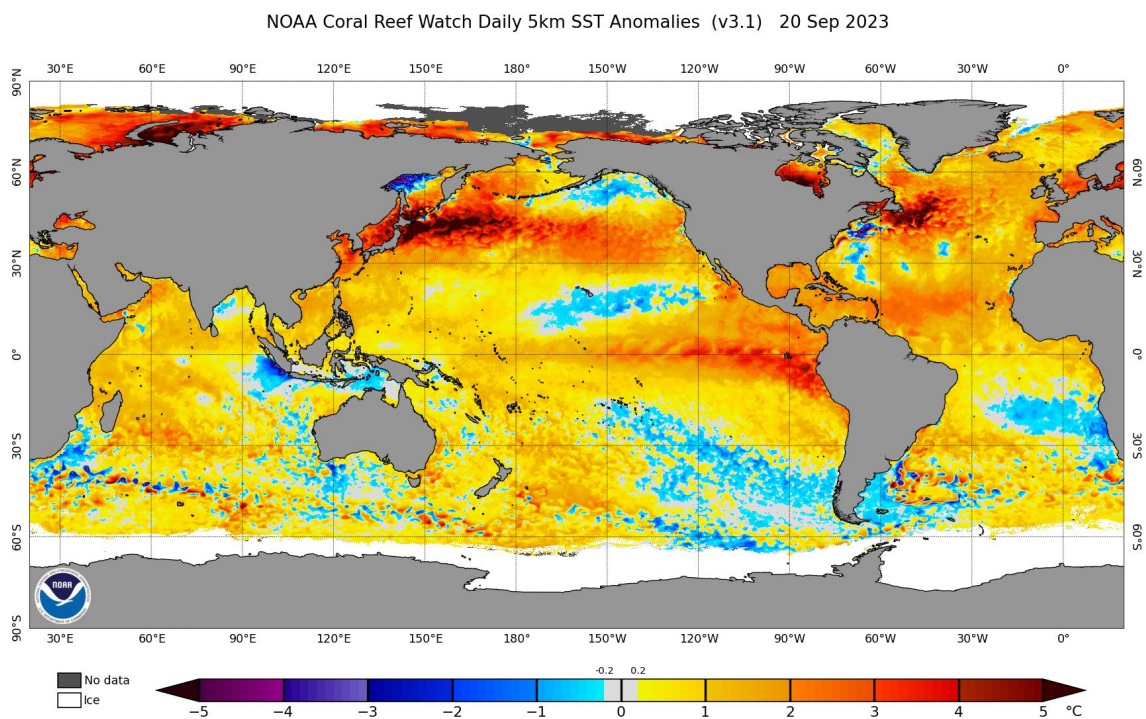
[ClimateReanalyzer.org](https://climatereanalyzer.org)  
Climate Change Institute | University of Maine



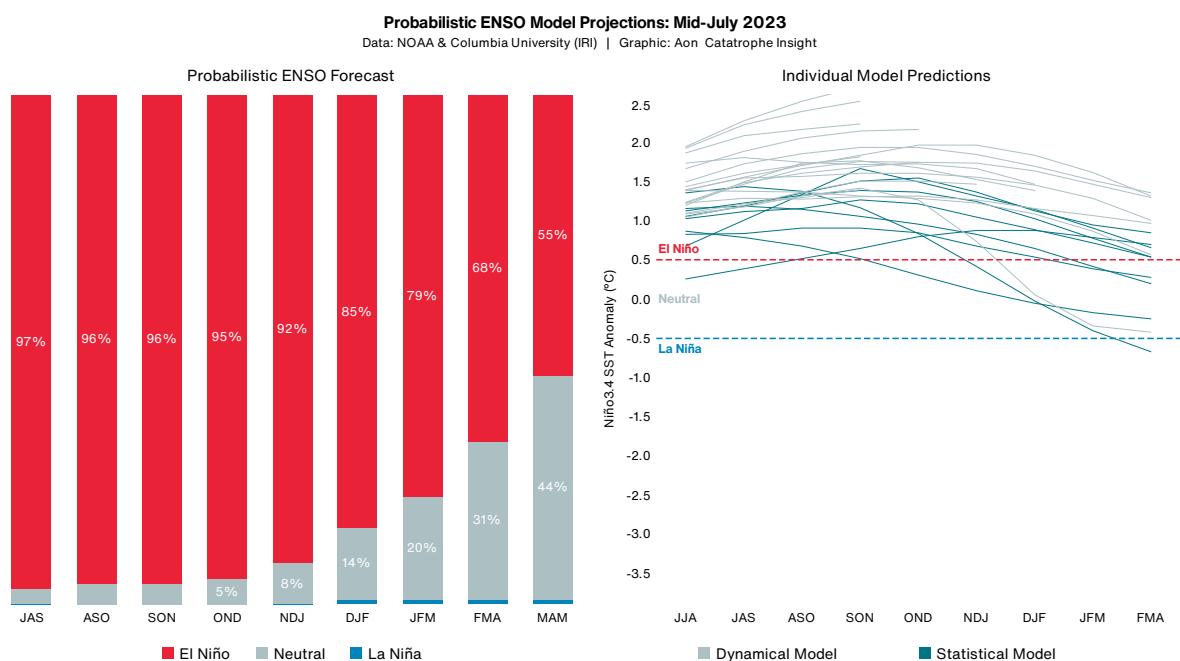
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA



## Weekly Sea Surface Temperature (SST) Maps (°C)



## El Niño-Southern Oscillation (ENSO)



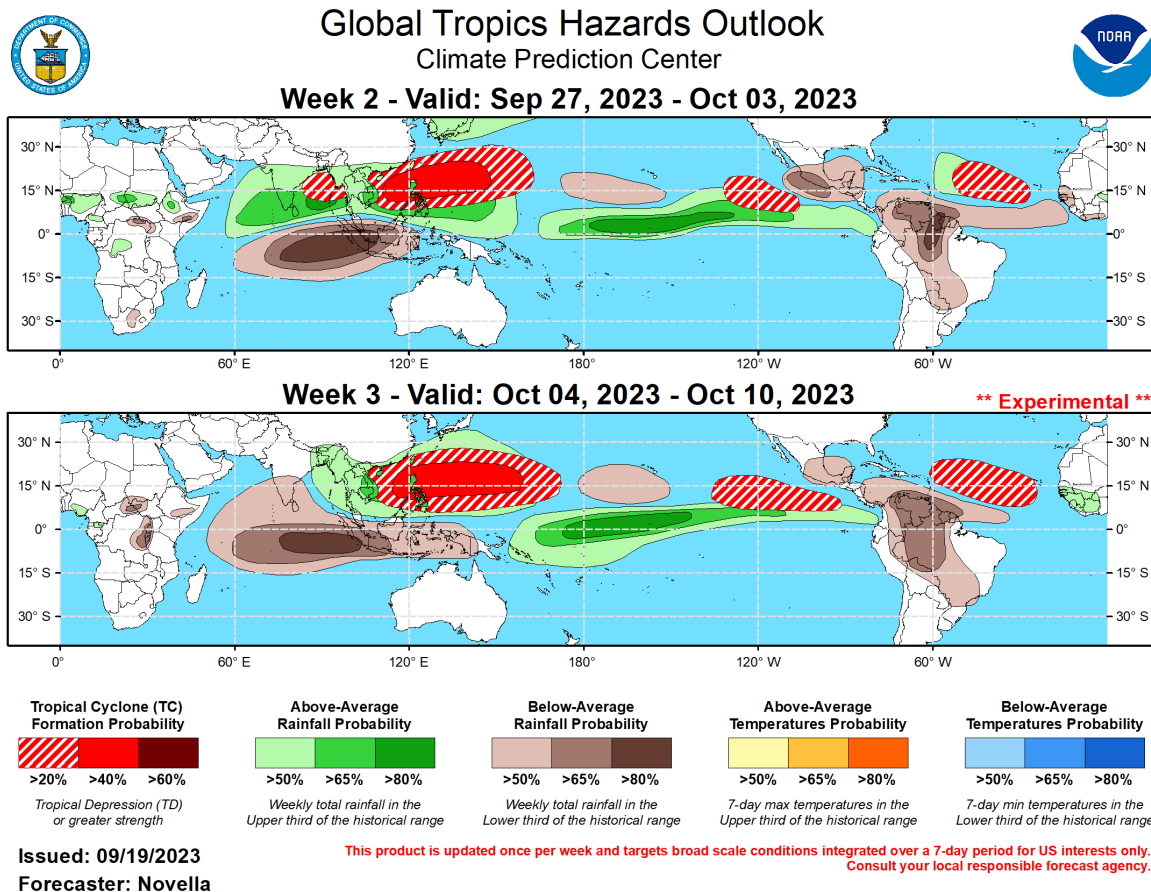
**El Niño:** Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.

**La Niña:** Cool phase of an ENSO cycle. Sea surface temperatures of -0.5°C occur across the east-central equatorial Pacific.

**Neutral:** A period when neither El Niño nor La Niña conditions are present.

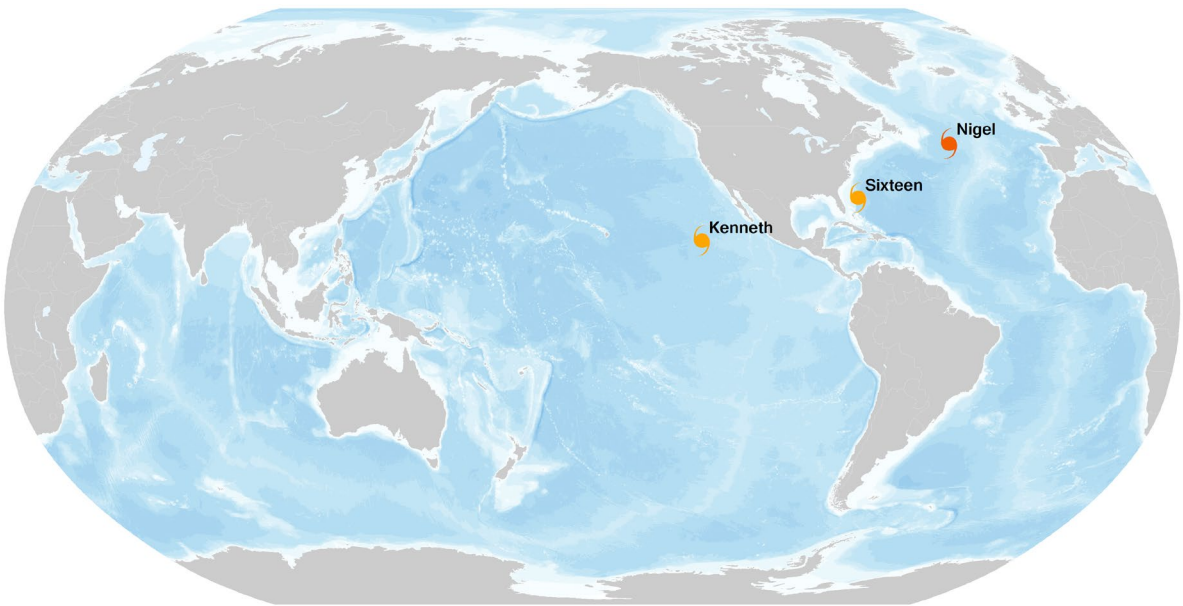
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

## Global Tropics Outlook



Source: Climate Prediction Center (NOAA)

# Current Tropical Cyclone Activity



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

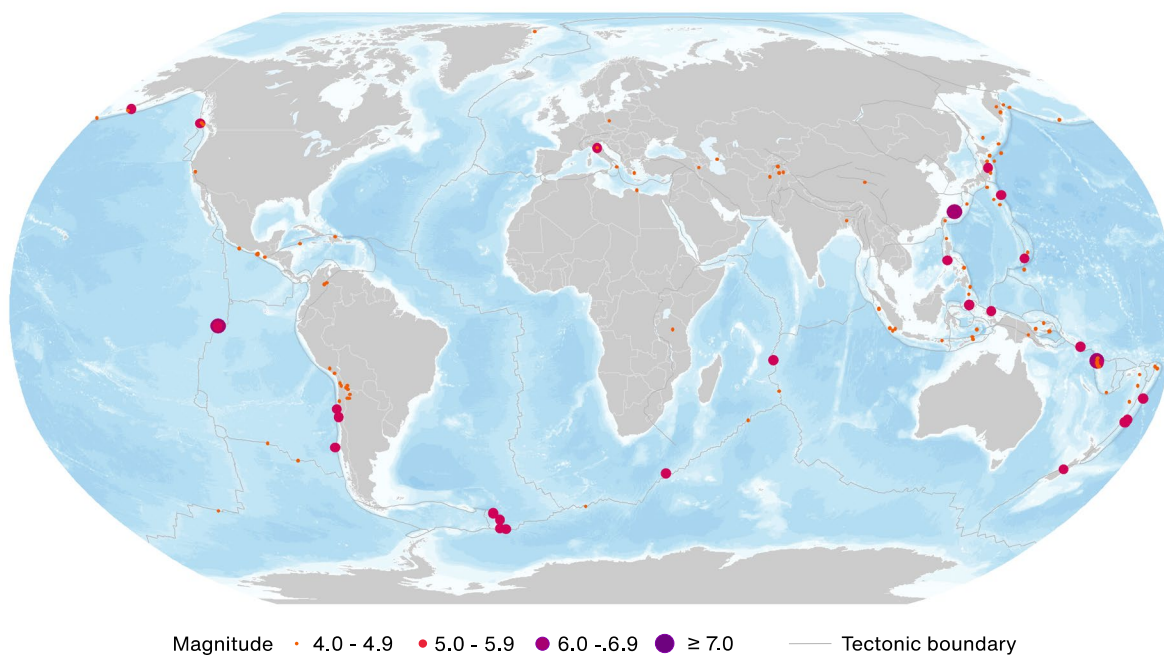
Name	Location	Winds	Center
Potential TC 16L	29.5N, 75.3W	40	330 miles (530 km) NE from Nassau, The Bahamas
HU Nigel	44.2N, 38.6W	75	715 miles (1,155 km) E from St. John's, Canada
HU Kenneth	18.0N, 125.9W	40	1,090 miles (1,755 km) W from La Paz, Mexico

\* TD: Tropical Depression, TS: Tropical Storm, HU: Hurricane, TY: Typhoon, CY: Cyclone  
\*\* N: North, S: South, E: East, W: West, NW: Northwest, NE: Northeast, SE: Southeast, SW: Southwest

Source: National Hurricane Center, Joint Typhoon Warning Center, Central Pacific Hurricane Center (NOAA)



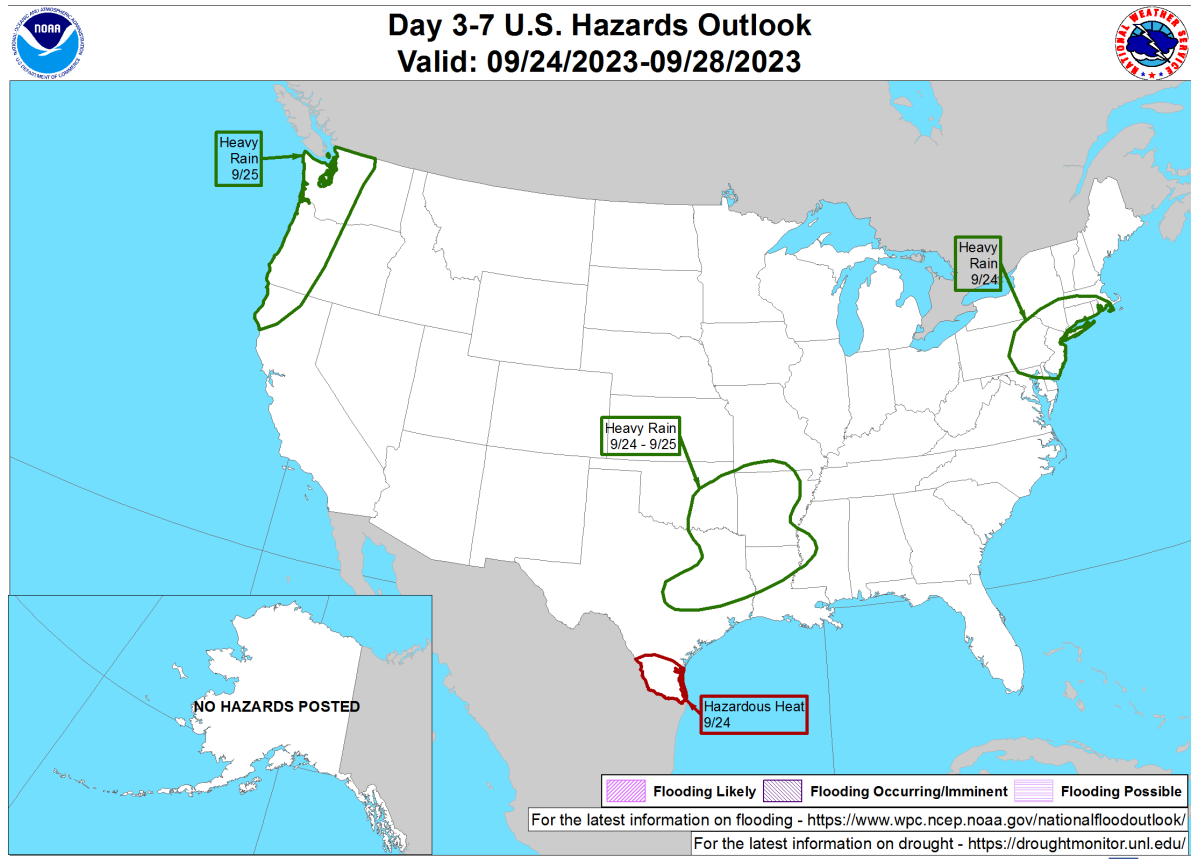
## Global Earthquake Activity ( $\geq M4.0$ ): September 15-21



Date (UTC)	Location	Mag	Epicenter
9/18/2023	26.43N, 125.30E	6.3	18 km (11 miles) N of Hirara, Japan
9/20/2023	4.58S, 105.65W	6.0	Central East Pacific Rise
9/21/2023	14.00S, 167.19E	6.1	41 km (25 miles) WSW of Sola, Vanuatu

Source: United States Geological Survey

## U.S. Hazard Outlook



**Weather Prediction Center**

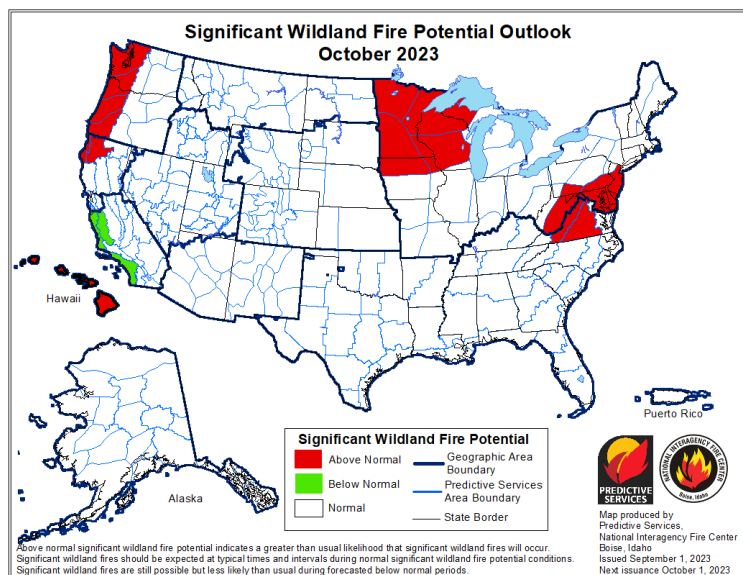
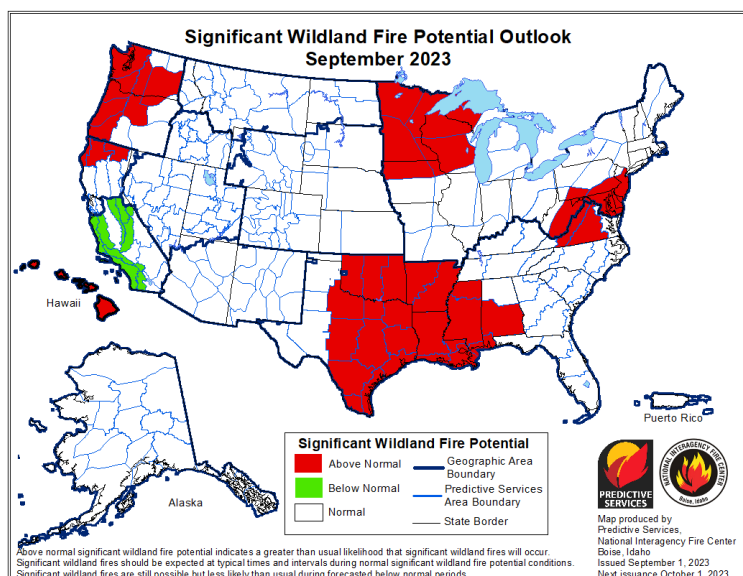
Made: 09/21/2023 04:06 PM EDT

Source: Climate Prediction Center (NOAA)

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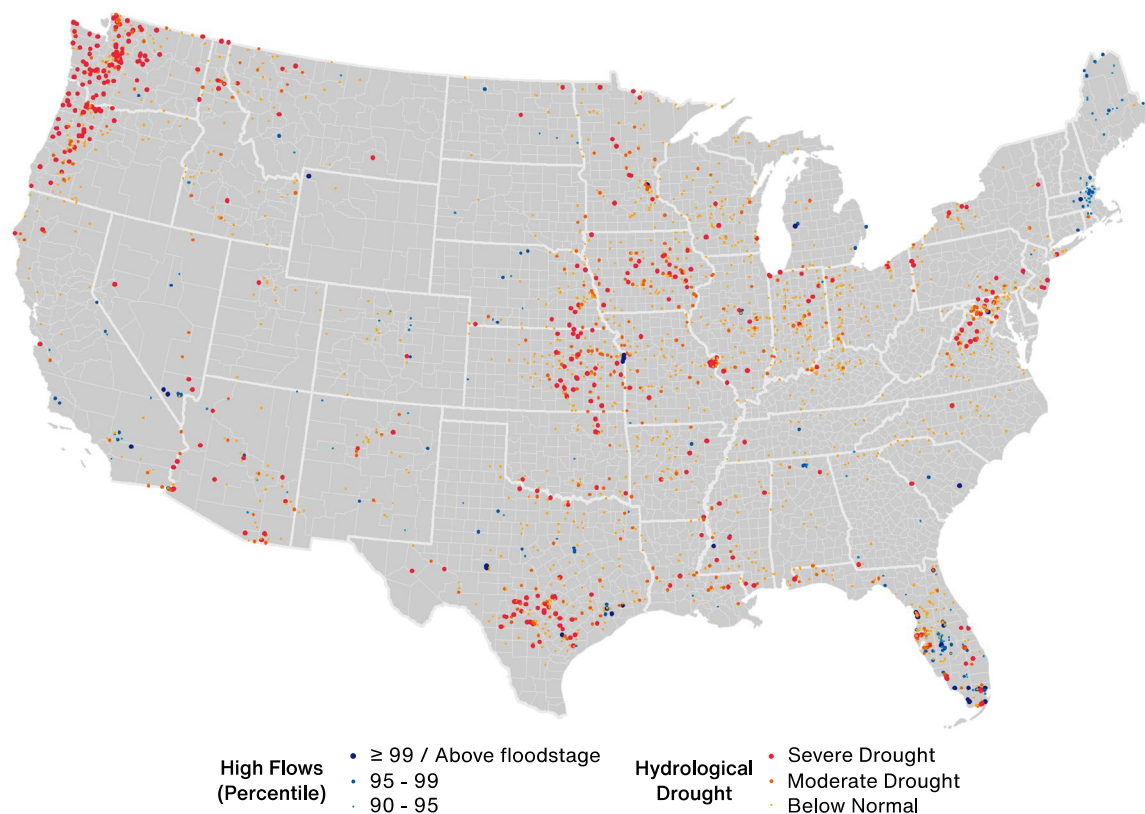
[www.wpc.ncep.noaa.gov](http://www.wpc.ncep.noaa.gov)

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



Source: NIFC

## U.S. Current Riverine Flood Risk



A  $\geq 99^{\text{th}}$  percentile indicates that estimated streamflow is greater than the 99<sup>th</sup> 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 5<sup>th</sup> percentile for this day of the year. Moderate drought indicates that estimated 7-day streamflow is between the 6<sup>th</sup> and 9<sup>th</sup> percentile for this day of the year and 'below normal' state is between 10<sup>th</sup> and 24<sup>th</sup> percentile.

Source: United States Geological Survey



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## Source Information

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### **United States, Canada: Hurricane Lee**

National Hurricane Center (NHC)

Lee makes landfall with near-hurricane strength in Canada after moving up Atlantic Ocean, *CBS News*  
Remnants of Lee move over northern Atlantic after bringing fierce winds and coastal flooding to Canada and northeast US, *CNN*

Live Updates & Videos: Hurricane Lee, *Bernews*

Cleanup from Lee continues as thousands remain without power in Nova Scotia, *CBC*

Post-tropical storm Lee hits the Maritimes with flooding, high waves and power outages, *CTV News*

### **United States: Flooding**

National Weather Service (NWS)

WATCH: Flooding in San Angelo Saturday, *San Angelo Live*

Downtown Atlanta cleans up after surprise flash flooding, *The Atlanta Journal-Constitution*

Afternoon showers cause flooding, road closures in Charleston County Sunday, *NBC Count on 2*

September 17, 2023: Significant Flash Flooding in the Near South Suburbs of Chicago, *NWS Chicago*

### **Western Europe: SCS & Flooding**

ESWD

La Unió Llauradora

### **Natural Catastrophes: In Brief**

New Zealand MetService

Weather – Thousands without power after 240 km/h winds recorded, flights delayed, roofs ripped off, trees down, *NZ Herald*

Panama Canal Authority: Vessel transits may be reduced if drought persists, *Freight Waves*

Water shortage slows ships at Panama Canal, *NHK World Japan*

4 days of rain causes widespread flooding in Cebu, *Rappler.com*

Department of Social Welfare and Development (DSWD)

National Emergency Management Agency of Nigeria (NEMA)

Destructive tornado outbreak hits Jiangsu, damaging or destroying 1600 homes and killing 10, China, *The Watchers*

UN OCHA

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