

NOAA Climate Science and Services Monthly Climate Update

Sarah Kapnick

Ph.D., Chief Scientist, NOAA

Karin Gleason

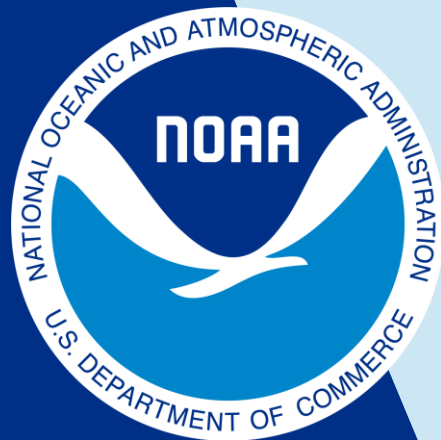
Climatologist, Monitoring Section Chief, NOAA National Centers for Environmental Information (NCEI)

Derek Manzello

Ph.D., coordinator, NOAA Coral Reef Watch Program

Dan Collins

Meteorologist, NOAA Climate Prediction Center (CPC)



National Oceanic and
Atmospheric Administration

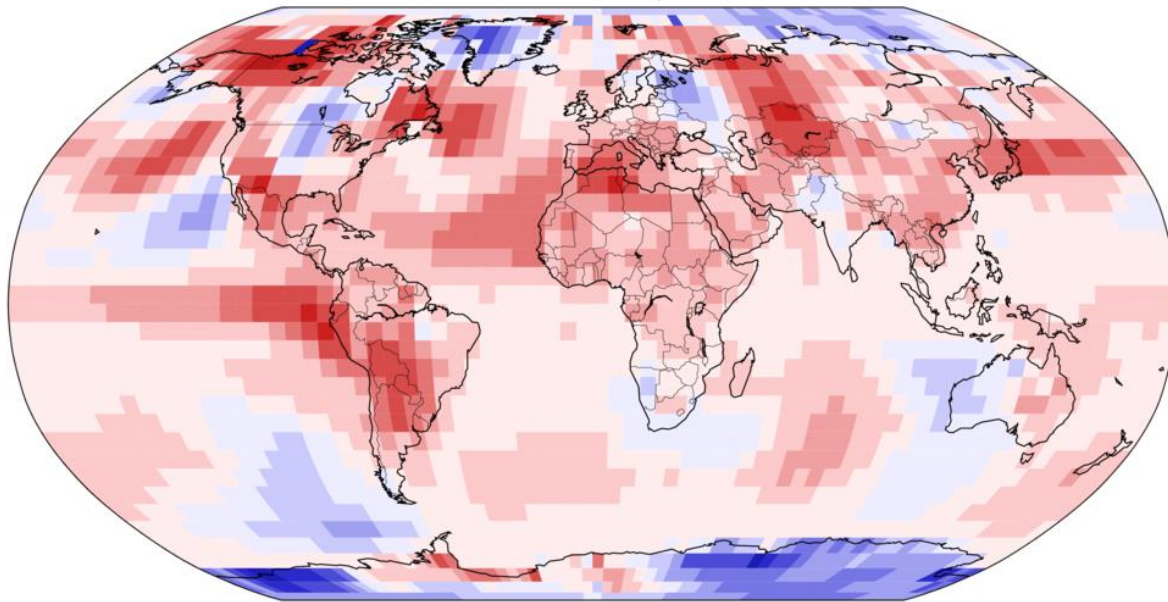
July 2023

July 2023 Global Temperature

The global temperature record dates back to 1850 (174 years)

Land & Ocean Temperature Departure from Average Jul 2023
(with respect to a 1991–2020 base period)

Data Source: NOAAGlobalTemp v5.1.0–20230807



-8.0 -6.0 -4.0 -3.0 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 3.0 4.0 6.0 8.0

Degrees C

Map Projection: Robinson

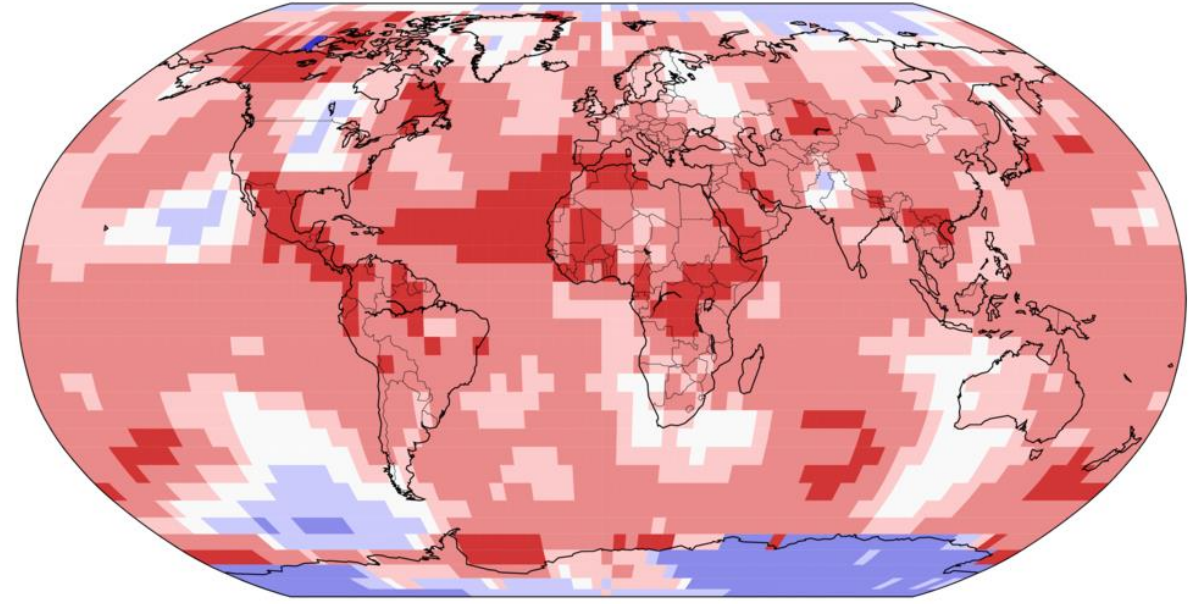


National Centers for Environmental Information

Land & Ocean Temperature Percentiles Jul 2023

NOAA's National Centers for Environmental Information

Data Source: NOAAGlobalTemp v5.1.0–20230807



Record Coldest



Much Cooler than Average



Cooler than Average



Near Average



Warmer than Average



Much Warmer than Average



Record Warmest



Global Land & Ocean: +1.12°C / +2.02°F; warmest for July on record

Global Land-only: +1.40°C / +2.52°F; warmest for July on record

Global Ocean-only: +0.99°C / +1.78°F; warmest for July on record

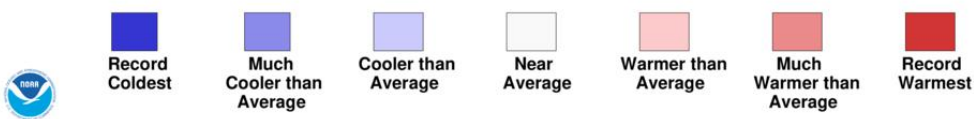
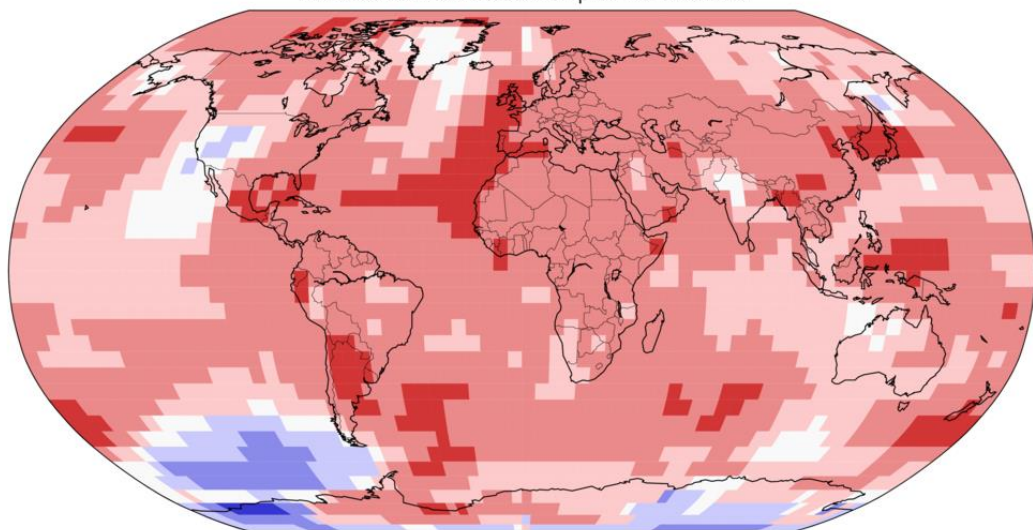
January-July Global Temperature

The global temperature record dates back to 1850 (174 years)

Land & Ocean Temperature Percentiles Jan–Jul 2023

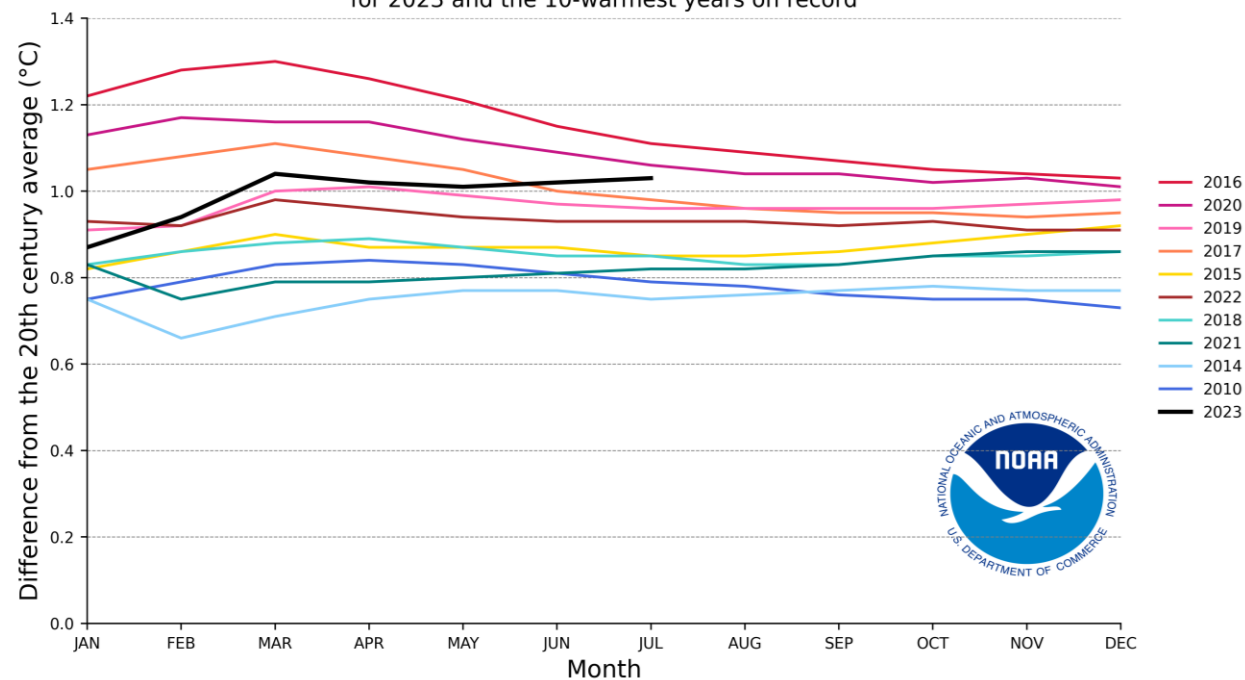
NOAA's National Centers for Environmental Information

Data Source: NOAA GlobalTemp v5.1.0–20230807

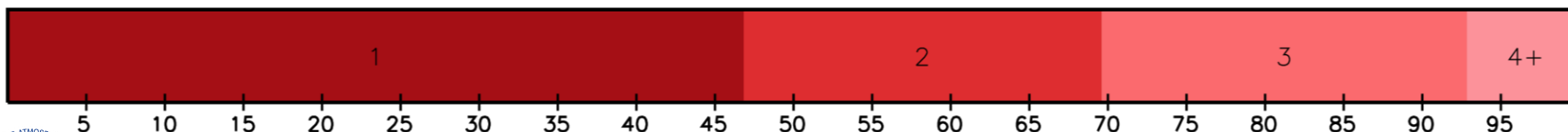


Global Year-to-Date Temperature Anomalies

for 2023 and the 10-warmest years on record



Global Land & Ocean: +1.03°C (1.85°F); the **3rd-warmest** January-July on record



~47% chance of warmest year
~70% chance 2nd warmest year

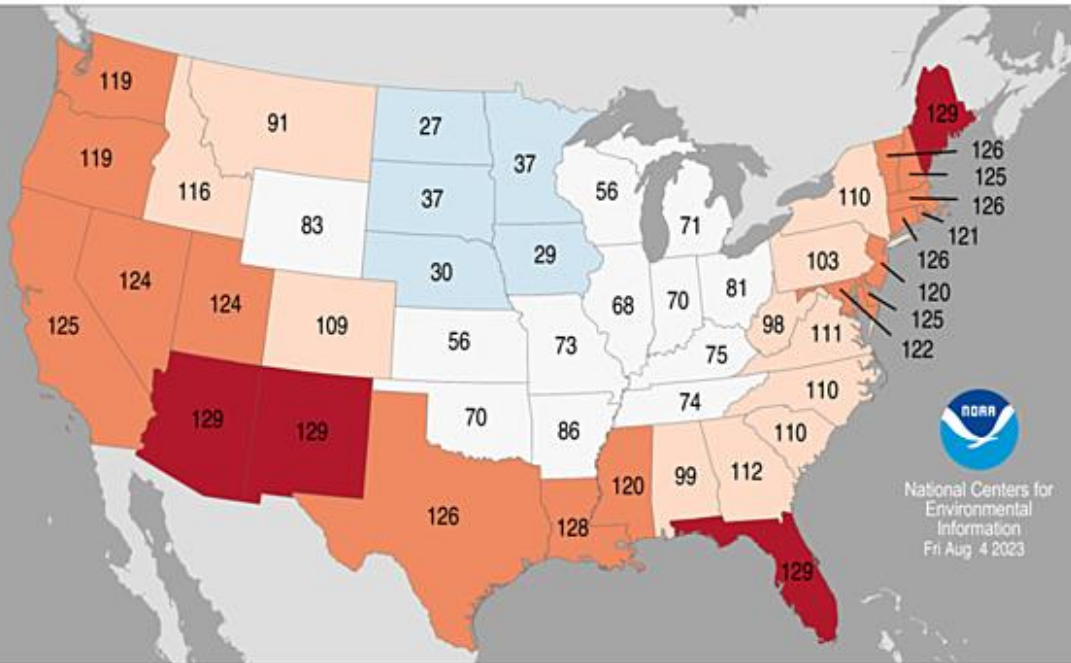


Contiguous U.S. July 2023

The U.S. temperature record dates back to 1895 (129 years)

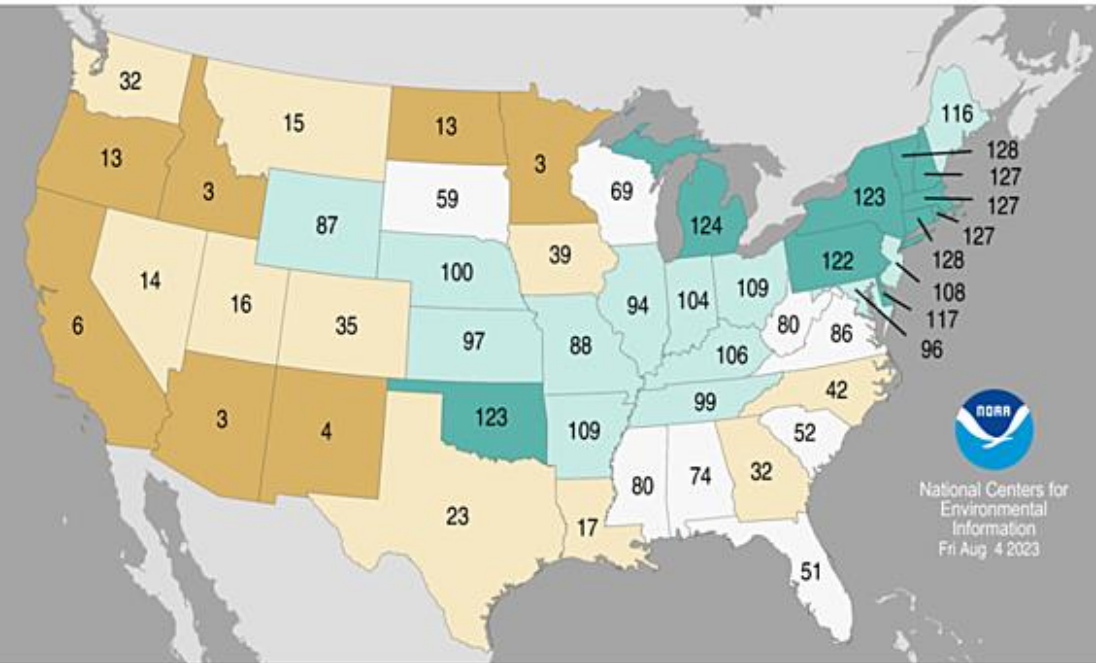
Statewide Average Temperature Ranks

July 2023
Period: 1895–2023



Statewide Precipitation Ranks

July 2023
Period: 1895–2023



Temperature: 75.7°F, +2.1°F; 11th warmest
Precipitation: 2.70 inches, -0.08 inch; near average

Contiguous U.S. January-July 2023

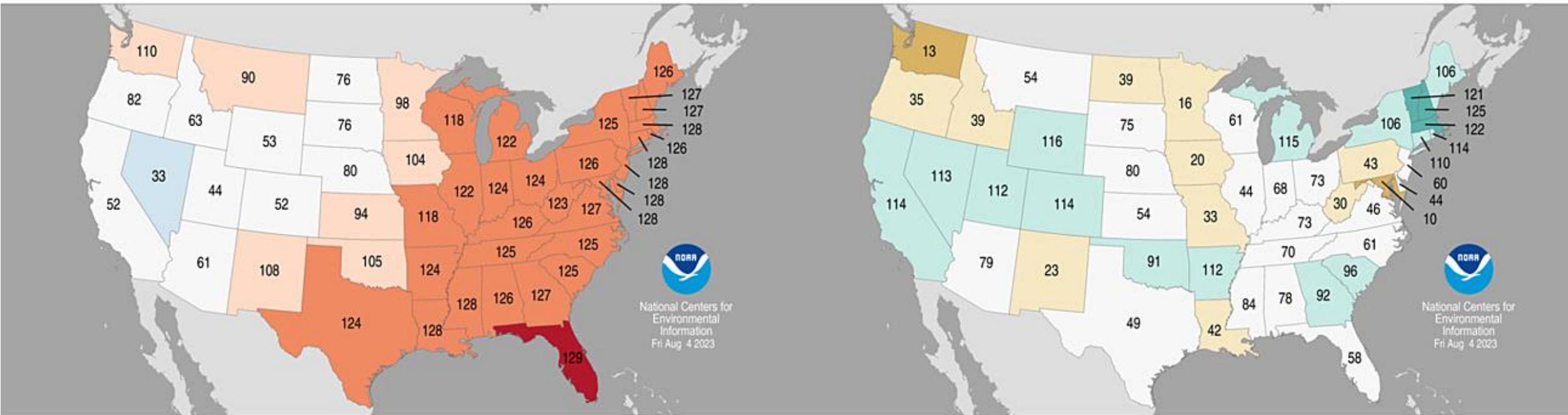
The U.S. temperature record dates back to 1895 (129 years)

Statewide Average Temperature Ranks

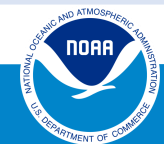
January – July 2023
Period: 1895–2023

Statewide Precipitation Ranks

January – July 2023
Period: 1895–2023



Temperature: 53.0°F, +1..°7F; 16th warmest
Precipitation: 18.41 inches, +0.32 inch; near average



Current U.S. Drought

~30.6% of the contiguous U.S. is in drought

Drought conditions lessened/diminished:

Northeast/Mid-Atlantic, Central Plains/Midwest/Great Lakes

Drought conditions expanded/intensified:

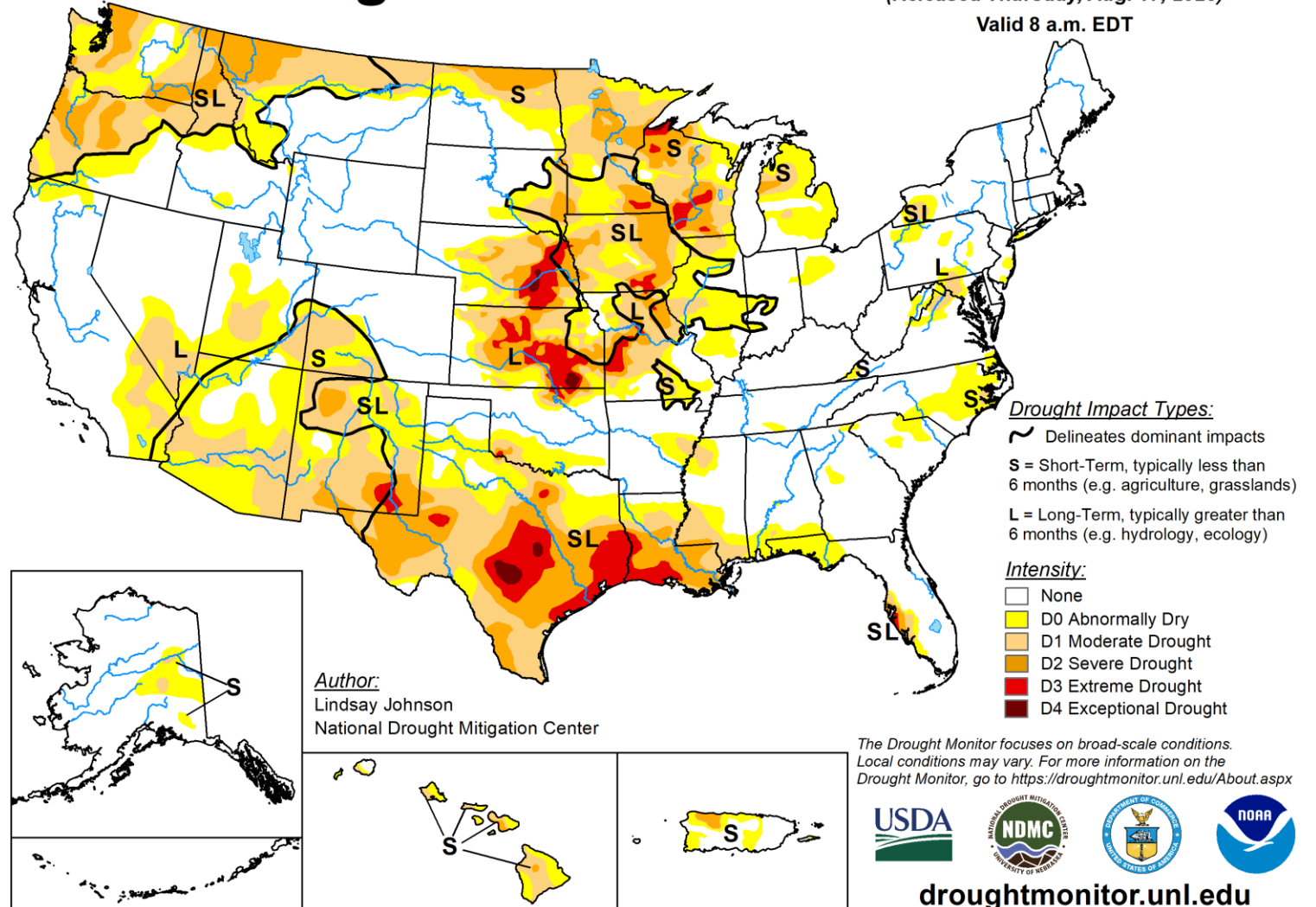
Deep South, Southwest, Northwest

Outside the contiguous U.S.:

Drought coverage expanded/intensified across Puerto Rico, Hawaii & Alaska

U.S. Drought Monitor

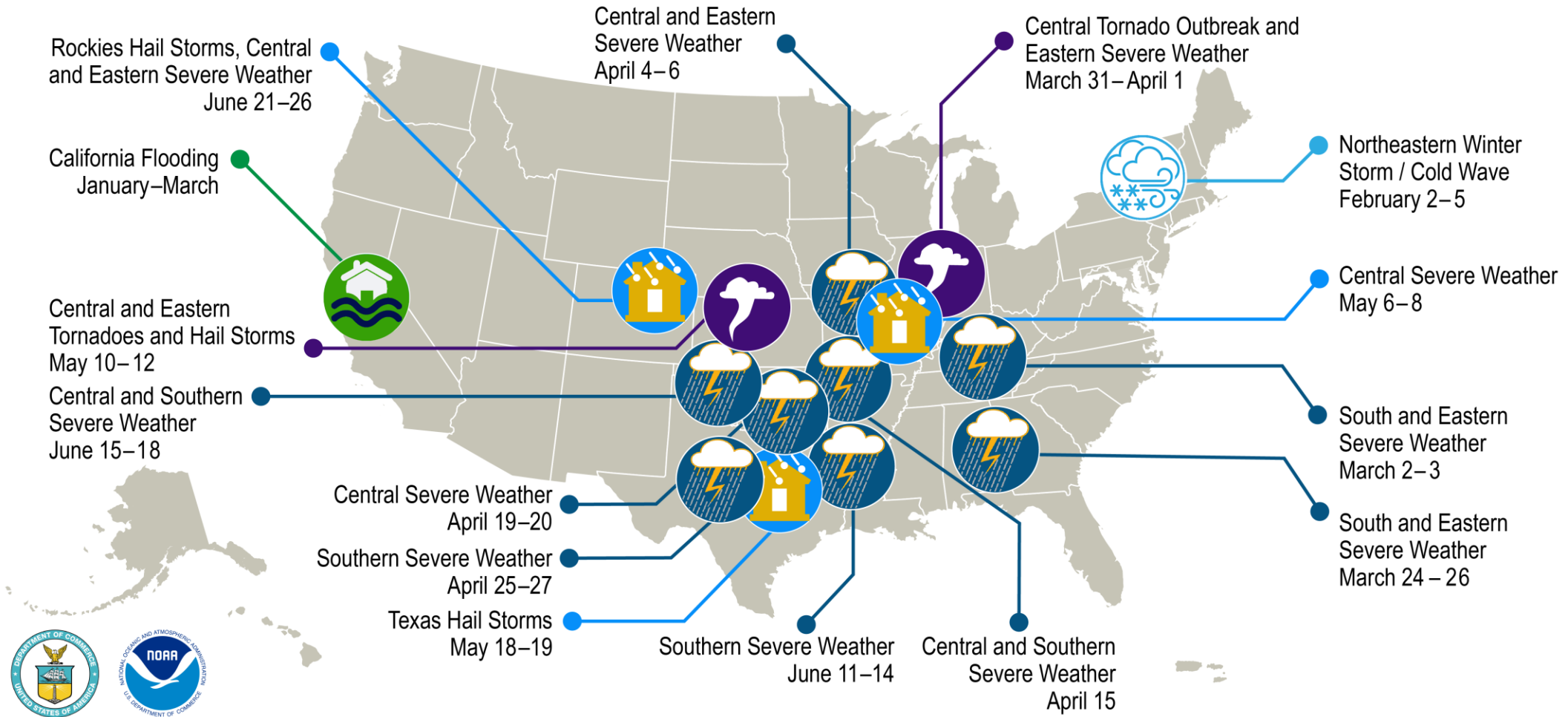
August 15, 2023
(Released Thursday, Aug. 17, 2023)
Valid 8 a.m. EDT



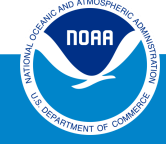
Billion Dollar Weather & Climate Disasters

U.S. 2023 Billion-Dollar Weather and Climate Disasters

- Drought/Heat Wave
- Flooding
- Hail
- Hurricane
- Severe Weather
- Tornado Outbreak
- Wildfire
- Winter Storm/Cold Wave

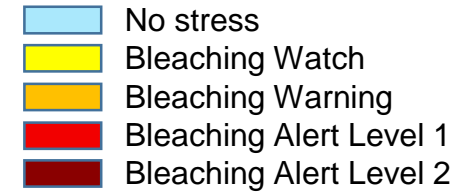
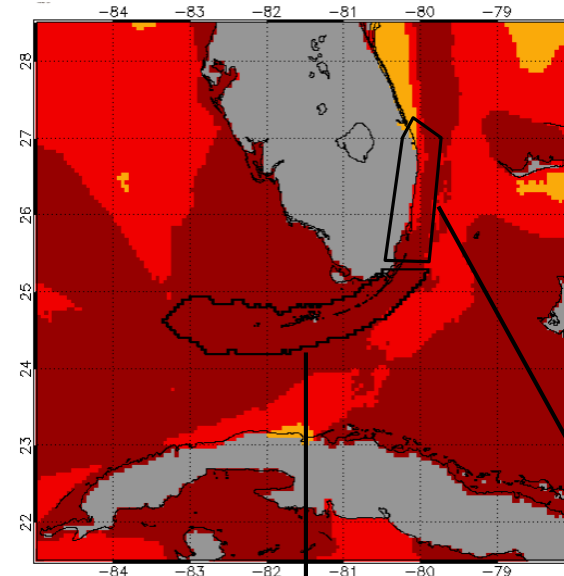


This map denotes the approximate location for each of the **15 separate billion-dollar weather and climate disasters** that impacted the United States through July 2023.



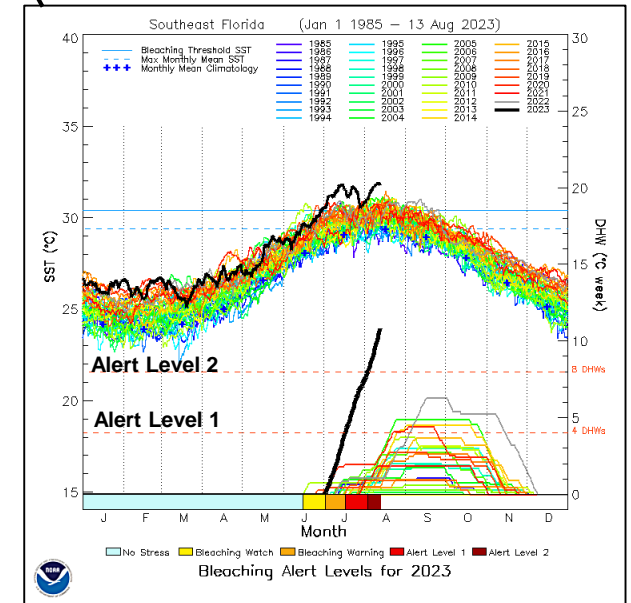
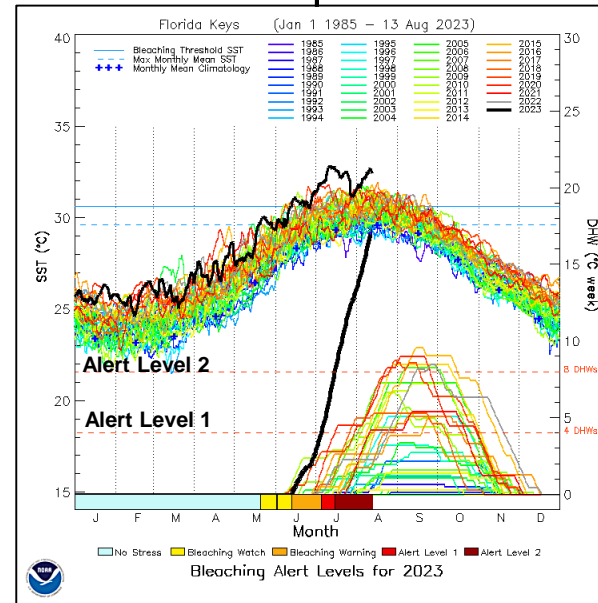
Florida Coral Bleaching-Level Heat Stress

- Unprecedented bleaching-level heat stress impacting all of Florida's Coral Reef
- Heat stress developed earlier than ever before by 5-6 weeks
- Sea Surface Temperatures for Florida Keys Virtual Station have been higher than previous record value for 27 of past 36 days
- Southeast Florida has never before reached Alert Level 2 conditions
- Most extreme heat stress in lower/middle Florida Keys



Bleaching Alert Level 1
Significant bleaching likely

Bleaching Alert Level 2
Severe bleaching and significant mortality likely



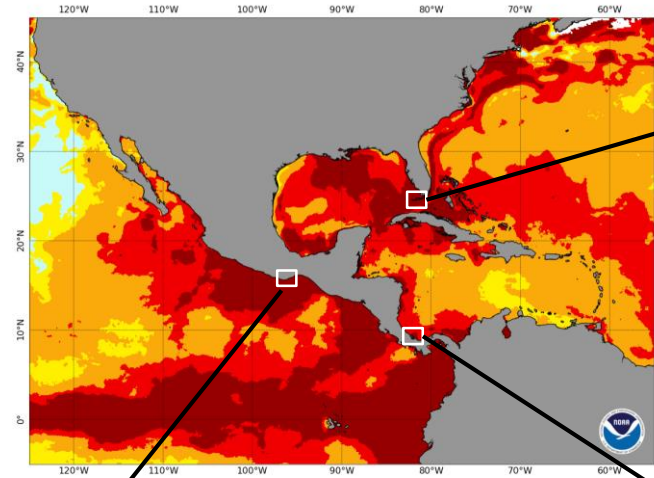
Year-to-Date Bleaching Alert Area

- No stress
- Bleaching Watch
- Bleaching Warning
- Bleaching Alert Level 1
- Bleaching Alert Level 2

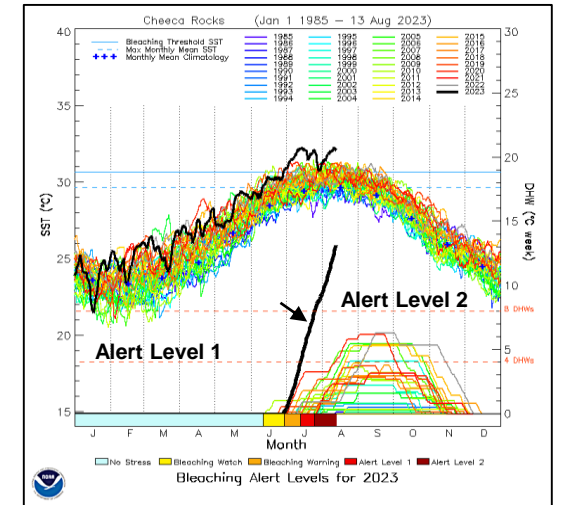
Bleaching Alert Level 1
Significant bleaching likely

Bleaching Alert Level 2
Severe bleaching and significant mortality likely

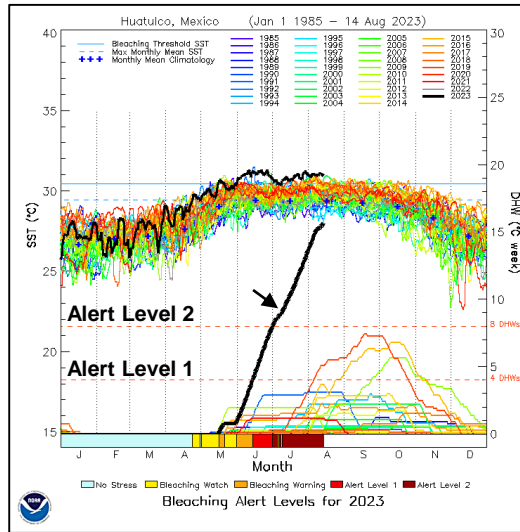
NOAA Coral Reef Watch 5km Bleaching Alert Area Year-to-date Maximum (v3.1) 14 Aug 2023



Cheeca Rocks, Florida Keys. 24 July 2023.
Image credit: G. Kolodziej/NOAA. Arrow on plot shows when photo was taken.



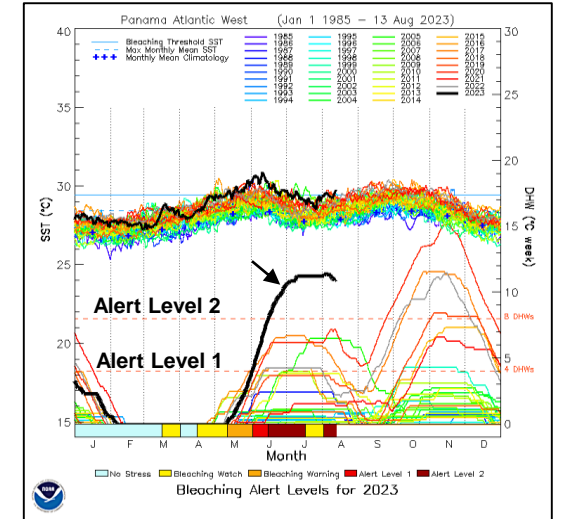
Huatulco Reef, Mexican Pacific. 13 July 2023. Mass bleaching of *Pocillopora* reef. Image credit: A. Lopez-Perez. Arrow on plot shows when photo was taken.



Bocas del Toro, Caribbean Panama. 14 July 2023.
Image credit: J. Sanchez. Arrow on plot shows when photo was taken.



All unbleached areas are recent, heat-driven mortality of *Acropora cervicornis*, which is listed as threatened under the Endangered Species Act.

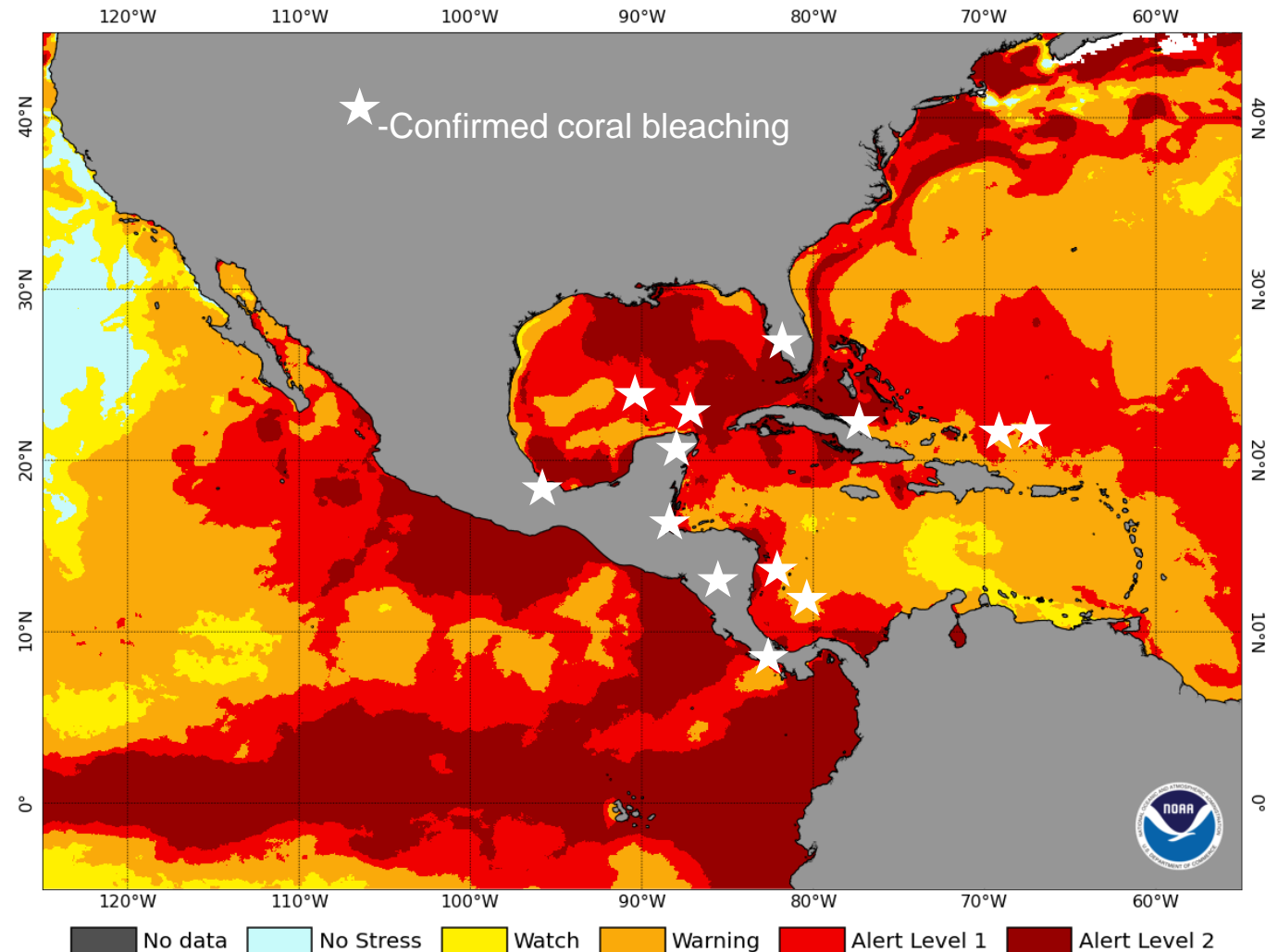


Year-to-Date Bleaching Alert Area

Confirmed coral bleaching

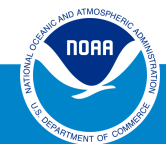
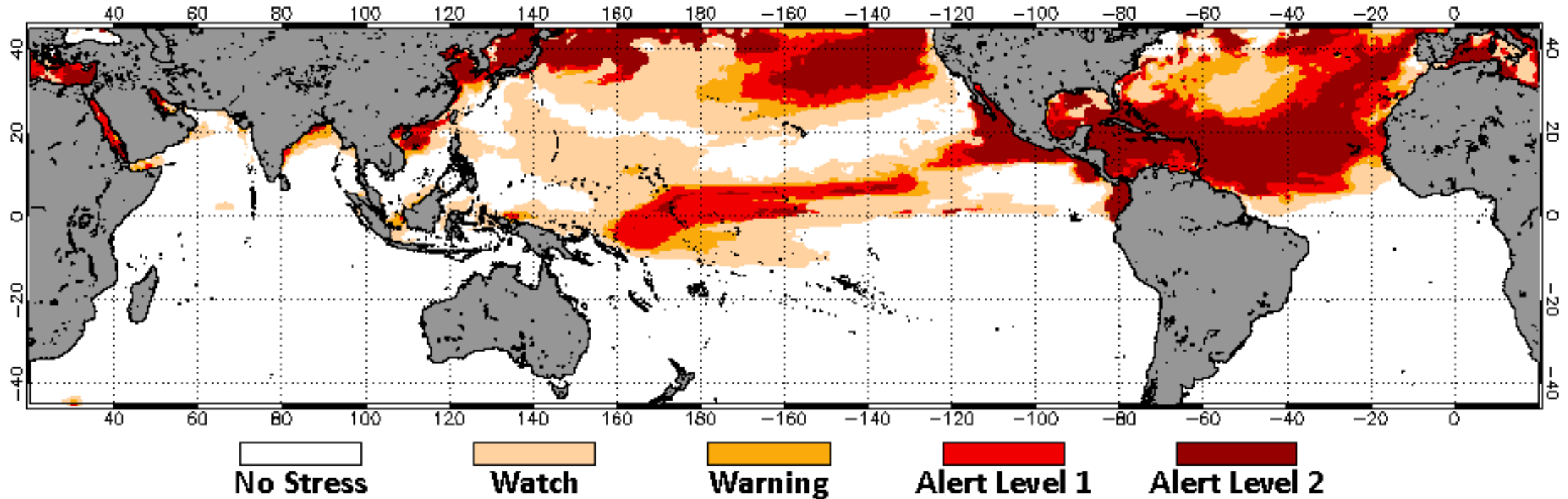
- 5 countries in Eastern Tropical Pacific
 - Mexico
 - El Salvador
 - Costa Rica
 - Panama
 - Columbia
- 7 countries/territories in Atlantic
 - Florida
 - Mexico (both sides of Yucatan)
 - Panama
 - Belize
 - Cuba
 - Puerto Rico
 - US Virgin Islands

NOAA Coral Reef Watch 5km Bleaching Alert Area Year-to-date Maximum (v3.1) 14 Aug 2023



Modeled Four-Month Coral Bleaching Outlook (Updated weekly)

2023 Aug 15 NOAA Coral Reef Watch 90% Probability Coral Bleaching Heat Stress for Aug–Nov 2023
Experimental, v5.0, CFSv2-based, 28 to 112 Ensemble Members



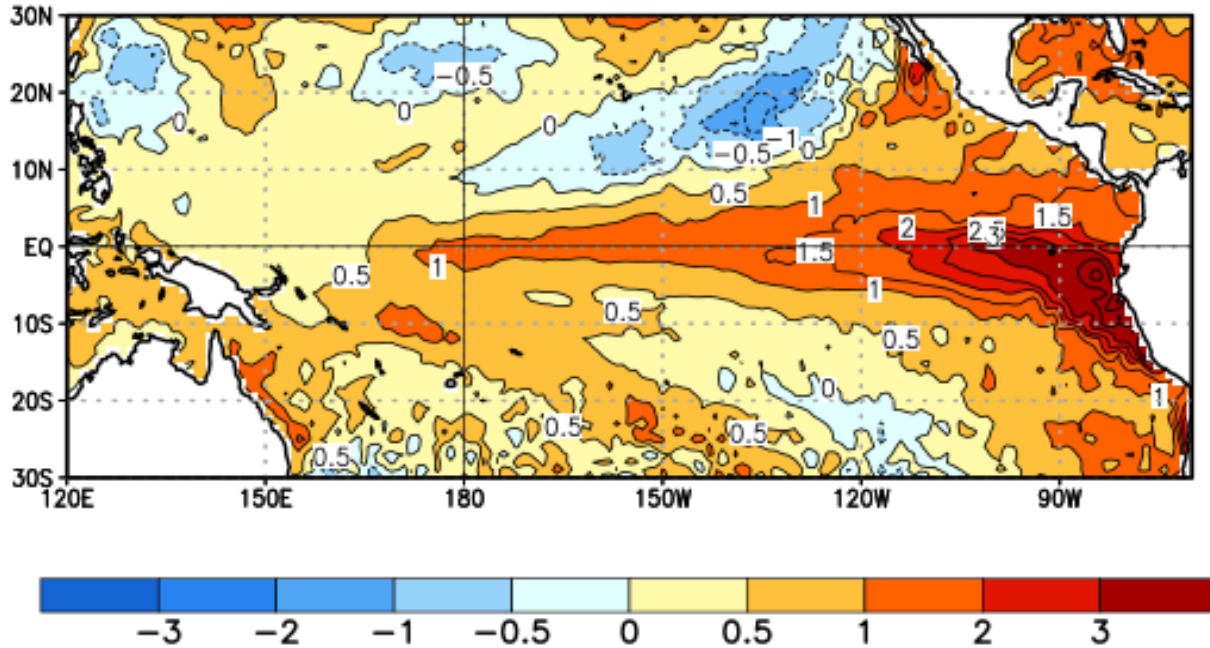
Coral Reef Watch Summary

- Large-scale heat stress and coral bleaching event underway, impacting two ocean basins and multiple countries
- All sites in Caribbean and Atlantic are experiencing:
 - *Sea Surface Temperatures as high, or higher than ever before in satellite record*
 - *Accumulation of heat stress earlier than ever before*
- Entirety of Florida Keys experiencing Alert Level 2 conditions
 - Some sites already exposed to 2 times greater amount of heat stress than when mortality is expected to begin
 - Take-home: *Corals in Florida are experiencing extreme levels of heat stress that have never been experienced before*
- Outlook product predicts intensifying heat stress across entire Caribbean
 - Caribbean-wide bleaching event may begin in a matter of days to weeks
 - Alert Level 2 conditions predicted for majority of Caribbean coral reef sites by end of September

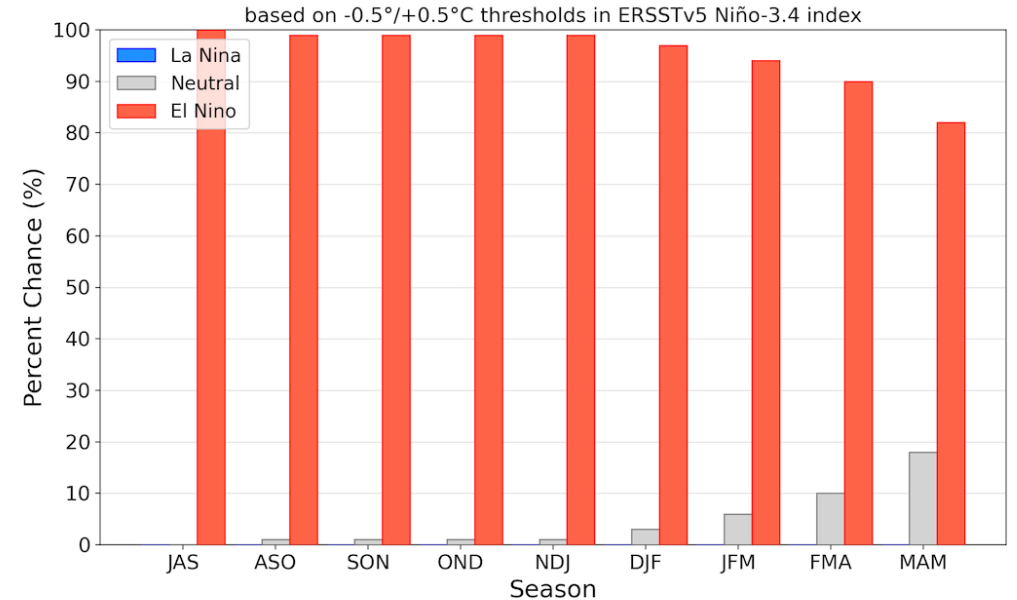


Sea Surface Temperatures and ENSO

Average SST Anomalies
16 JUL 2023 – 12 AUG 2023



Official NOAA CPC ENSO Probabilities (issued Aug. 2023)



- Sea surface temperatures are above normal across the Pacific Ocean near the equator with the greatest anomalies over the East Pacific.
- El Niño is expected to continue and strengthen with greater than a 90 percent probability through winter. A strong El Niño is likely.

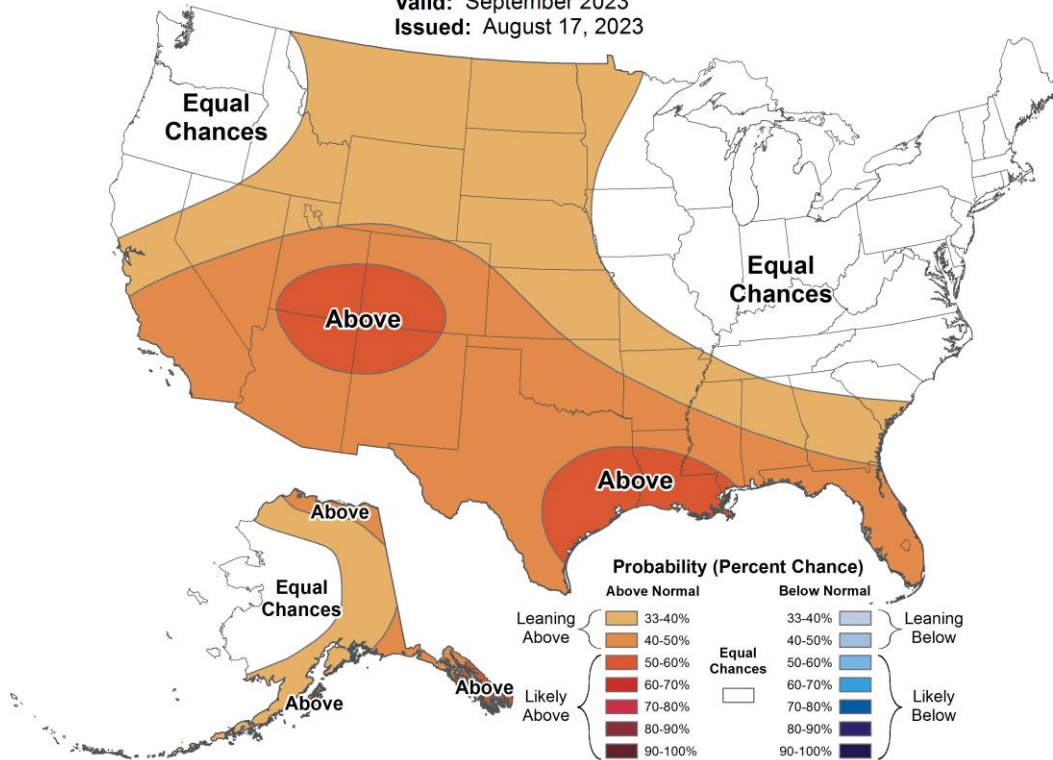
Monthly Forecast (September)



Monthly Temperature Outlook



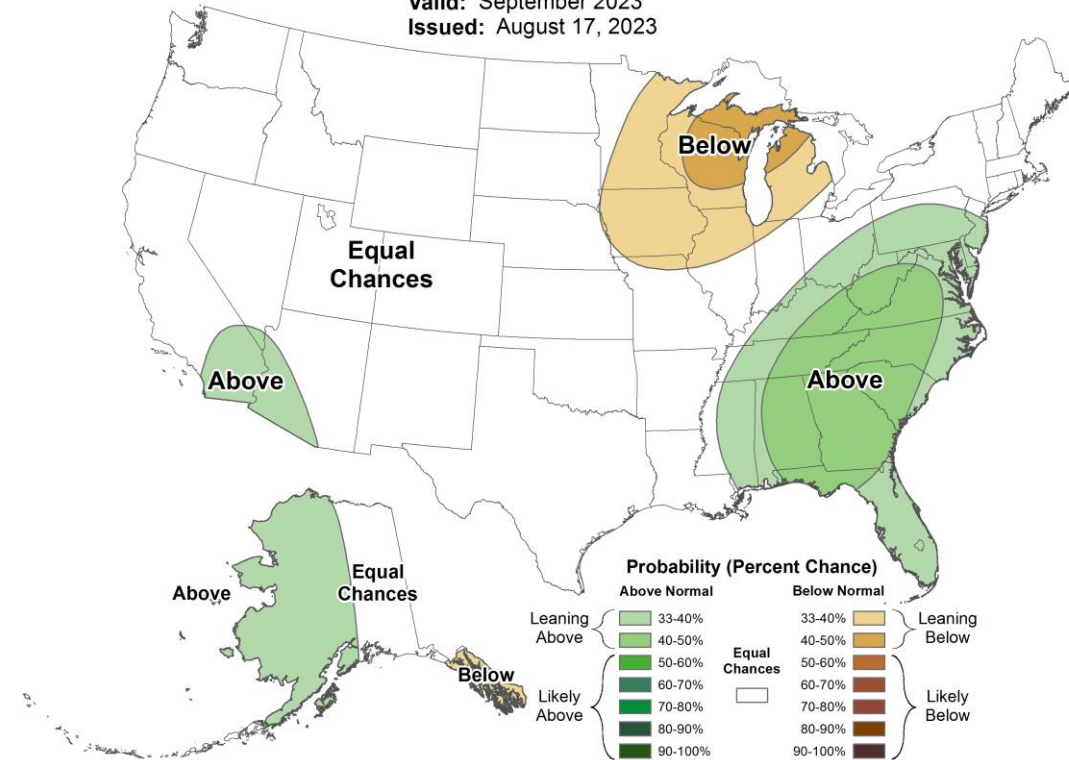
Valid: September 2023
Issued: August 17, 2023



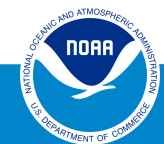
Monthly Precipitation Outlook



Valid: September 2023
Issued: August 17, 2023



- El Niño may impact the temperature and precipitation patterns during September, along with shorter timescale climate patterns.



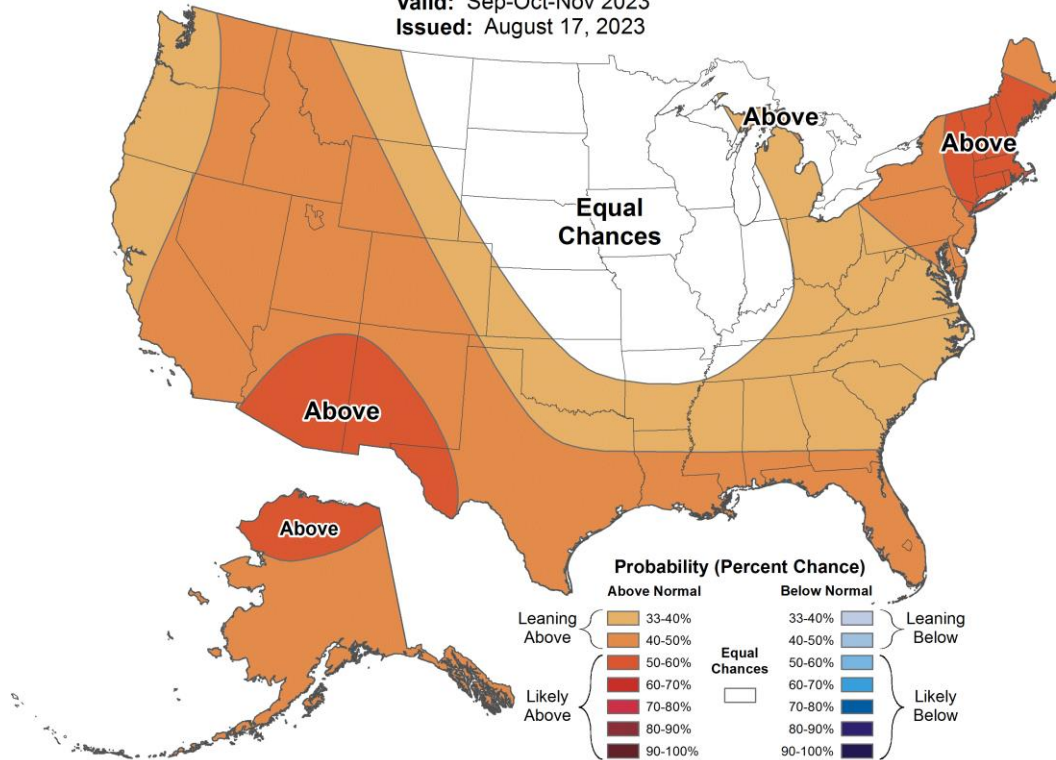
Three-Month Forecast (Sep, Oct, Nov)



Seasonal Temperature Outlook



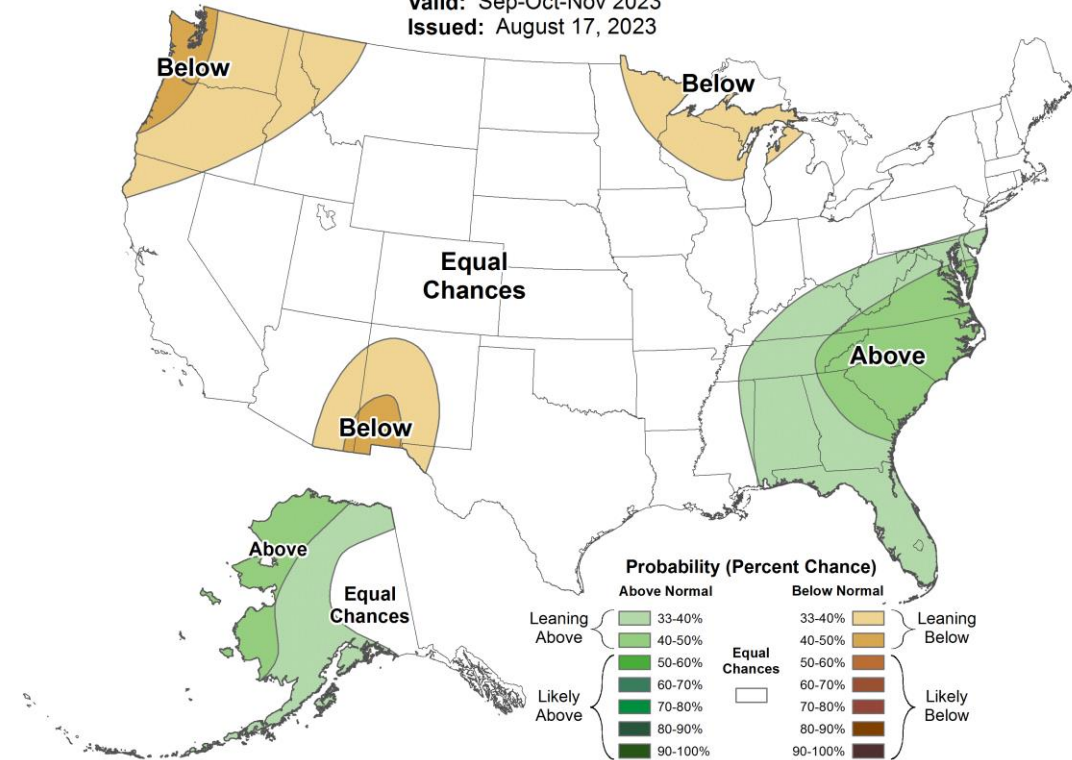
Valid: Sep-Oct-Nov 2023
Issued: August 17, 2023



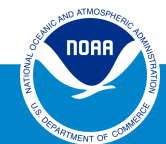
Seasonal Precipitation Outlook



Valid: Sep-Oct-Nov 2023
Issued: August 17, 2023



- El Niño impacts the temperature and precipitation patterns during the September-October-November season, as well as longer term climate trends.

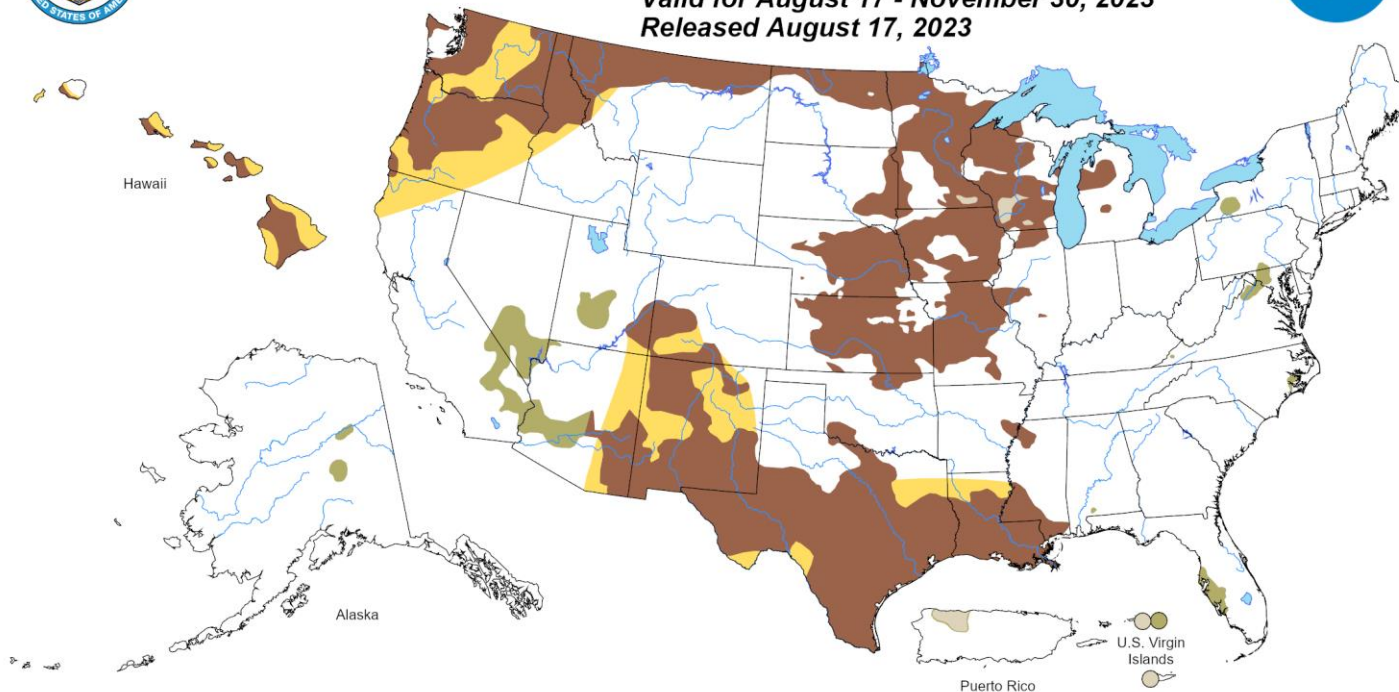


Drought Outlook



U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for August 17 - November 30, 2023
Released August 17, 2023



- Drought is expected to worsen across most of Hawaii, the Pacific Northwest, and from eastern areas of the Southwest across Texas into Louisiana.
- Drought continues along the Canadian border and for parts of the Central Plains and western Great Lakes region.
- Drought is likely to be removed in parts of California, Nevada, Arizona and Utah, with shorter term forecasts for precipitation, related to moisture from tropical storm development in the East Pacific.



Author: R Tinker, NOAA/NWS/NCEP Climate Prediction Center
https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor.

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain. The green areas imply drought removal by the end of the period (D0 or none)



For More Information



Today's presentation:

- <https://www.ncei.noaa.gov/access/monitoring/monthly-report/briefings>

NOAA's National Centers for Environmental Information: www.ncei.noaa.gov

- Monthly climate reports (U.S. & Global): <https://www.ncei.noaa.gov/access/monitoring/monthly-report/>
- Dates for upcoming reports: <https://www.ncei.noaa.gov/access/monitoring/dyk/monthly-releases>

NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov

U.S. Drought Monitor: www.drought.gov

Climate portal: www.climate.gov

NOAA media contacts: john.jones-bateman@noaa.gov, 202-424-0929 (NOAA/NESDIS PAO)

