NATIONAL WEATHER SERVICE

NWS Partners and Users Heat Webinar

April 20, 2023

NWS Public Weather Services Program

Webinar Logistics

- This webinar is being **recorded** and will be publicly posted along with the Presentation PDF after the webinar. *By attending this webinar, you consent to the recording of your likeness including voice and/or webcam images.*
  - https://www.weather.gov/wrn/calendar
- All lines will remain muted until the open discussion at the end.
- Please use the **Question Box** or the **Hand-Raise Option** to ask questions.

Opening Remarks

Mike Coyne

Acting Chief Operations Officer

NOAA National Weather Service

Today's Speakers

Greg Carbin

WPC Chief of Forecast Operations

NWS, NOAA

Evan Oswald

Research Meteorologist

ERT/CPC, NWS, NOAA

Kim McMahon

Public Weather Services Program Manager

NWS, NOAA

Stephen Baxter

Climate Services Program Manager

NWS, NOAA

National Weather Service

Impact-Based Decision Support Services and public messaging

Seasonal Outlooks

Monthly Outlooks

Weeks 3-4 Outlooks

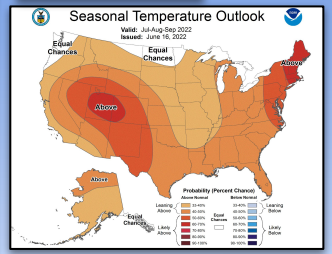
Week 2 Outlooks

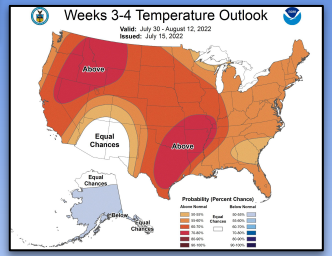
Day 1-7 Forecasts

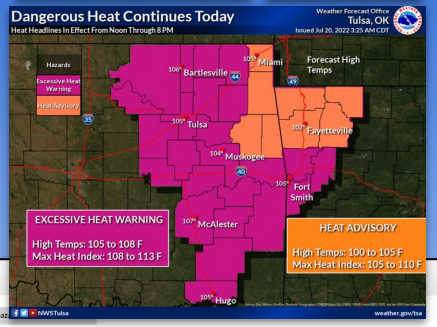
Watch, Warning, Advisory

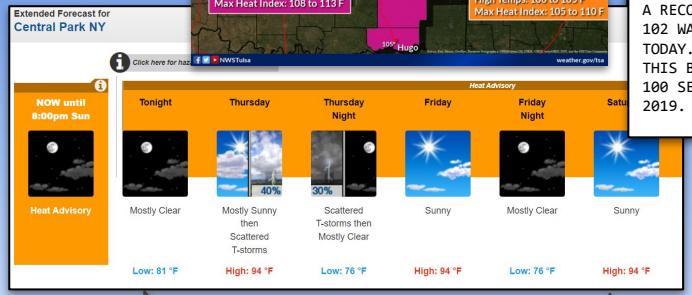
Monitor, Update, Report

Monitor, Update, Report: Validated Observations & After Action










```
...RECORD HIGH TEMPERATURE
SET AT ALBUQUERQUE NM...

A RECORD HIGH TEMPERATURE OF
102 WAS SET AT ALBUQUERQUE NM
TODAY.
THIS BREAKS THE OLD RECORD OF
100 SET IN 2009, 2010 AND
2019.
```

Planning → Preparedness → Response → Recovery

CPC = Climate Prediction Center

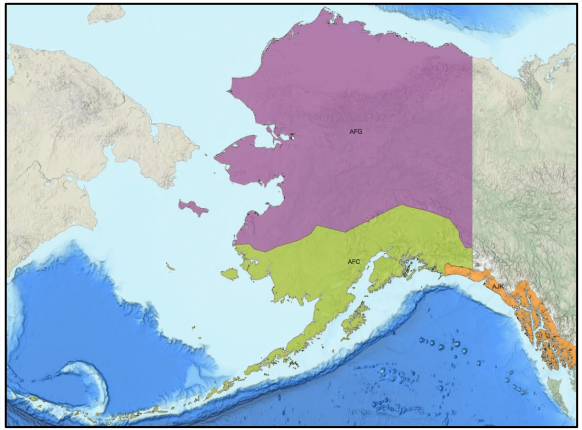
Mission: CPC delivers real-time products and information that predict and describe climate variations on timescales from weeks to years thereby promoting effective management of climate risk and a climate-resilient society.

WPC = Weather Prediction Center

Mission: To synthesize the nation's daily weather story and champion the operational prediction of rain storms, winter storms, and extreme temperature events for the protection of life and property.

WFO = local Weather Forecast Office

122 local offices across the country providing local forecasts, impact-based decision support, watch, warning, and advisories for the protection of life and property.



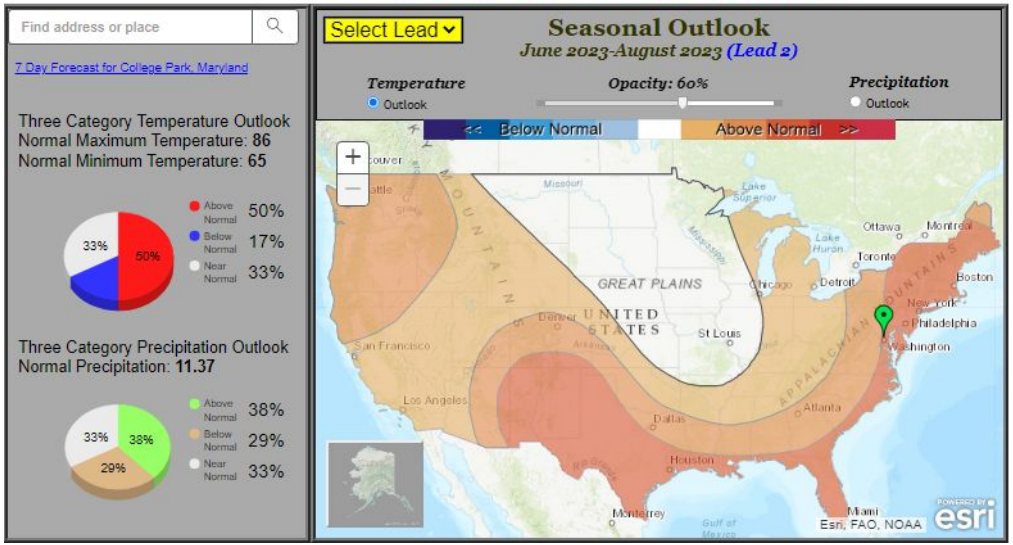
Seasonal Outlook

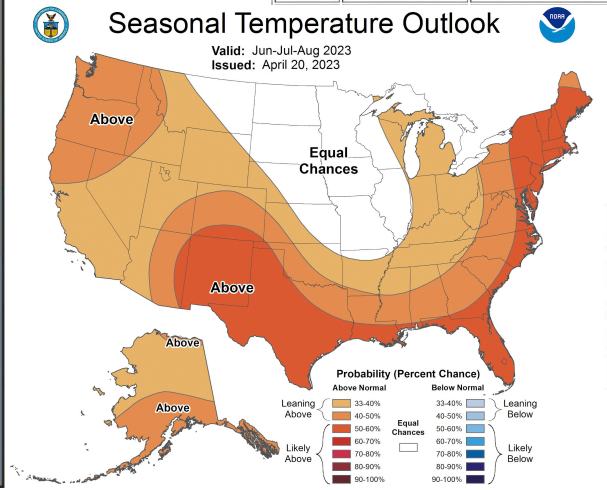
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/interactive/index.php

Long-Lead Forecast Release Schedule for 2023

Fcst #	Release Date	Inclusive Seasons	Fcst Month
1/2023	15 Dec 2022	JFM 2023 - JFM 2024	Jan 2023
2	19 Jan 2023	FMA 2023 - FMA 2024	Feb 2023
3	16 Feb 2023	MAM 2023 - MAM 2024	Mar 2023
4	16 Mar 2023	AMJ 2023 - AMJ 2024	Apr 2023
5	20 Apr 2023	MJJ 2023 - MJJ 2024	May 2023
6	18 May 2023	JJA 2023 - JJA 2024	Jun 2023
7	15 Jun 2023	JAS 2023 - JAS 2024	Jul 2023
8	20 Jul 2023	ASO 2023 - ASO 2024	Aug 2023
9	17 Aug 2023	SON 2023 - SON 2024	Sep 2023
10	21 Sep 2023	OND 2023 - OND 2024	Oct 2023
11	19 Oct 2023	NDJ 2023 - NDJ 2024	Nov 2023
			024 Dec 2023
			025 Jan 2024

INTERACTIVE DISPLAY - UPDATED: 20 APR 2023





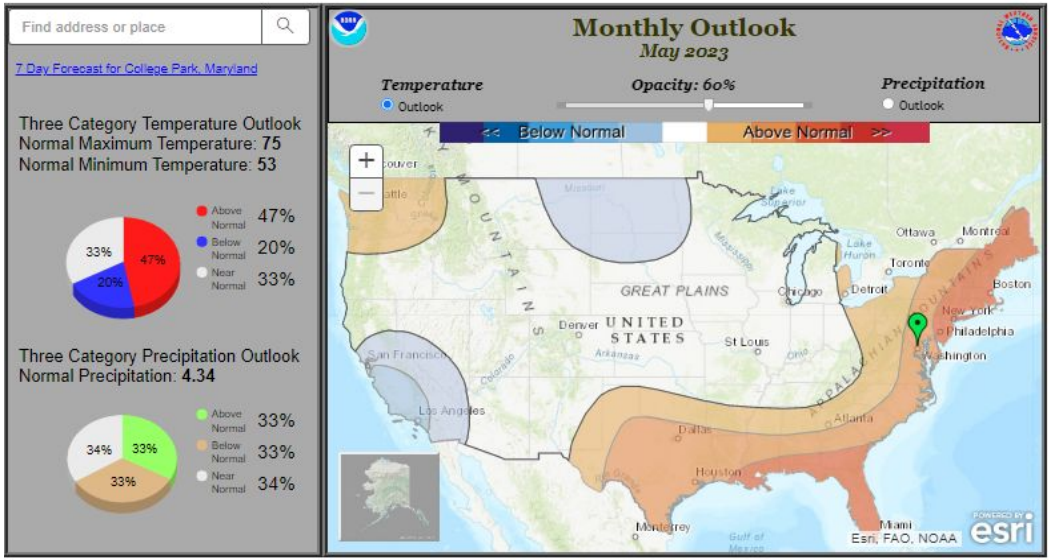
- Outlooks released every 3rd Thursday of the month (top right table) for the next 13 three-month seasons
- Forecasts available in interactive GIS tool (left figure) or static graphics (right figure)
- Forecasts can only **loosely** be interpreted as increased/decreased likelihood of hot days relative to normal

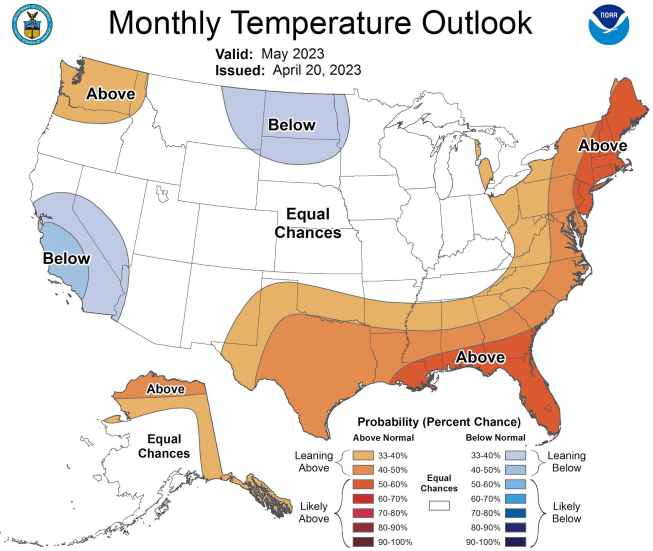
These forecasts show the probability of seasonal average temperatures being above, near, or below normal!

Monthly Outlook

https://www.cpc.ncep.noaa.gov/products/predictions/30day/
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php

INTERACTIVE DISPLAY - UPDATED: 20 APR 2023



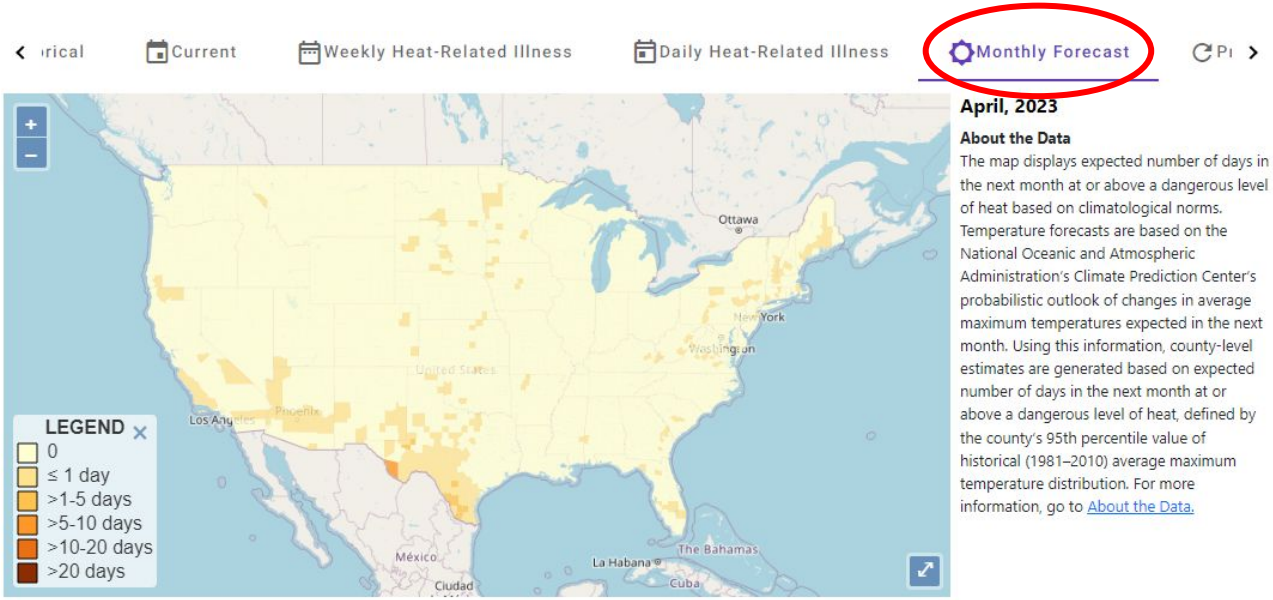


- Outlooks for next month are released **twice** a month (third Thursday and last day)
- Forecasts via interactive GIS tool (left) or static graphics (right)
- These can only **loosely** be interpreted as increased/decreased likelihood of hot days relative to normal

These forecasts show the probability of monthly average temperatures being above, near, or below normal!

CDC Heat and Health Tracker

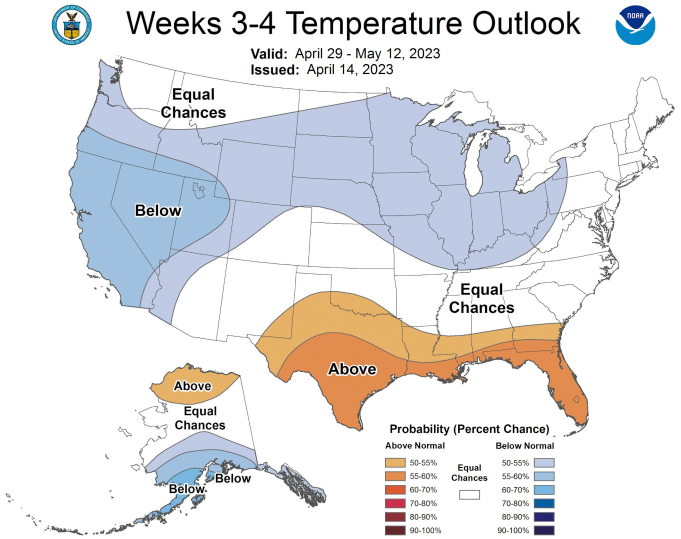
- Monthly Outlook of dangerous heat days (defined as county's 95% percentile value)
- Uses CPC Monthly Temperature Outlook

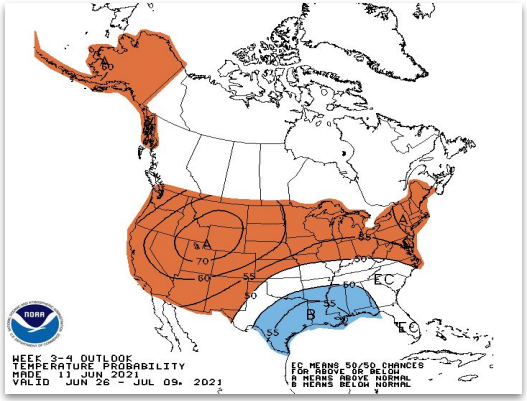


- Updates twice per month (third Thursday, and last day) with an outlook for the following month
- Available at https://ephtracking.cdc.gov/Applications/heatTracker/

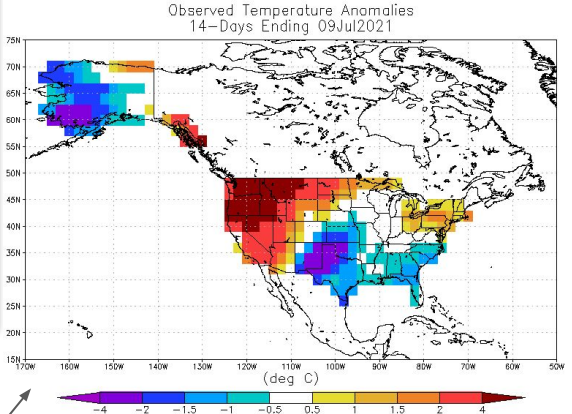
Weeks 3-4 Outlook

Front page: “Week 3-4 Outlooks”; https://www.cpc.ncep.noaa.gov/products/predictions/WK34/





Jun 11, 2021 Weeks 3-4 temperature outlook



Observed anomalies corresponding to Jun 11, 2021 outlook

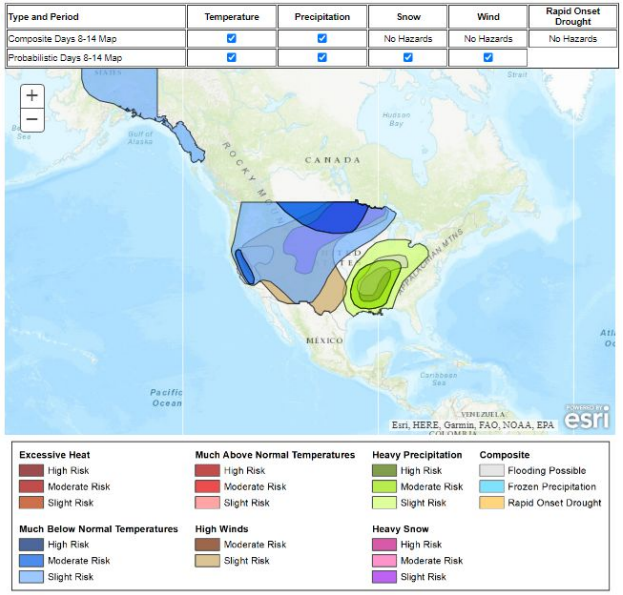
2021 Heatwave of Pacific NW

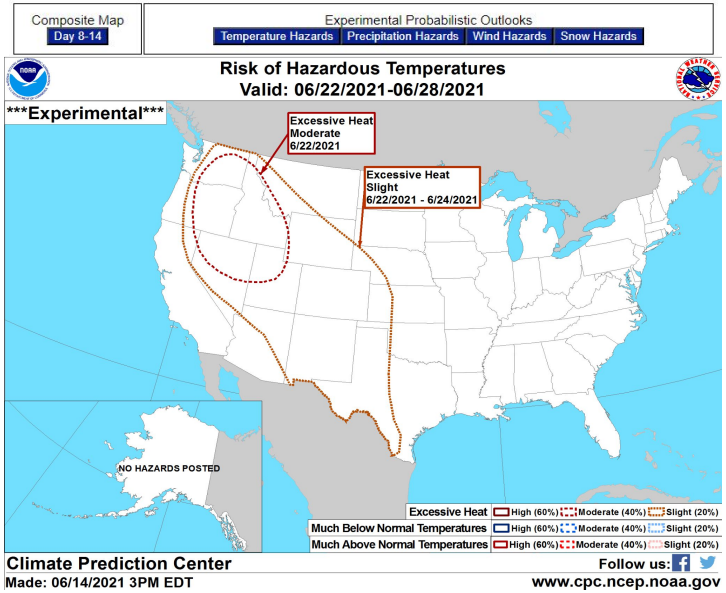
- Forecasts are issued weekly (Friday at 3PM) as static graphics
- The maps can **more confidently** be interpreted as increased/decreased likelihood of hot days relative to normal

These forecasts show the probability of Weeks 3-4 average temperatures being above or below normal!

Week 2 US Hazards outlook

Front page: “8-14 Day U.S. Hazards Outlook”; https://www.cpc.ncep.noaa.gov/products/predictions/threats/threats.php





Download Day 8-14 KML
Temperature
Precipitation
Snow
Wind
Rapid Onset Drought
Probabilistic Temperature
Probabilistic Excessive Heat
Probabilistic Precipitation
Probabilistic Snow
Probabilistic Wind

Hazards Forecast Archives

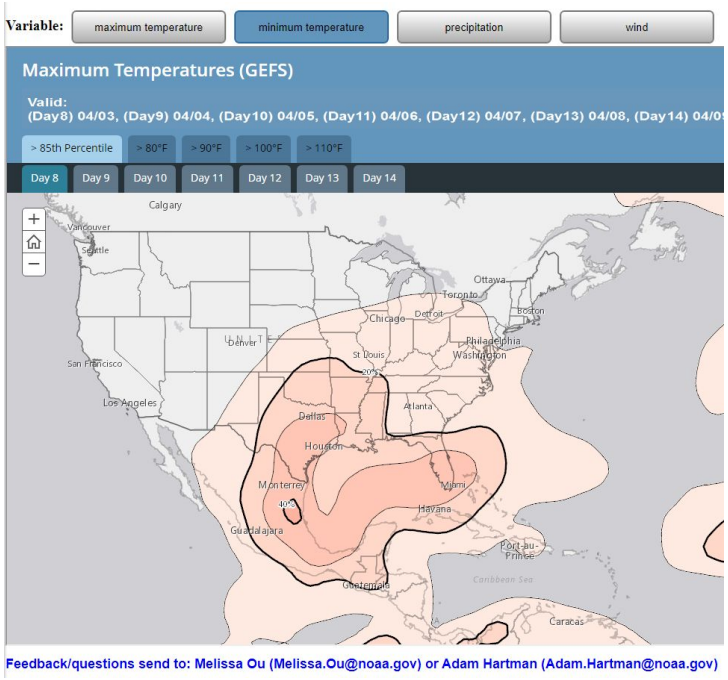
Model Guidance Tools
Probabilistic Extremes Tool

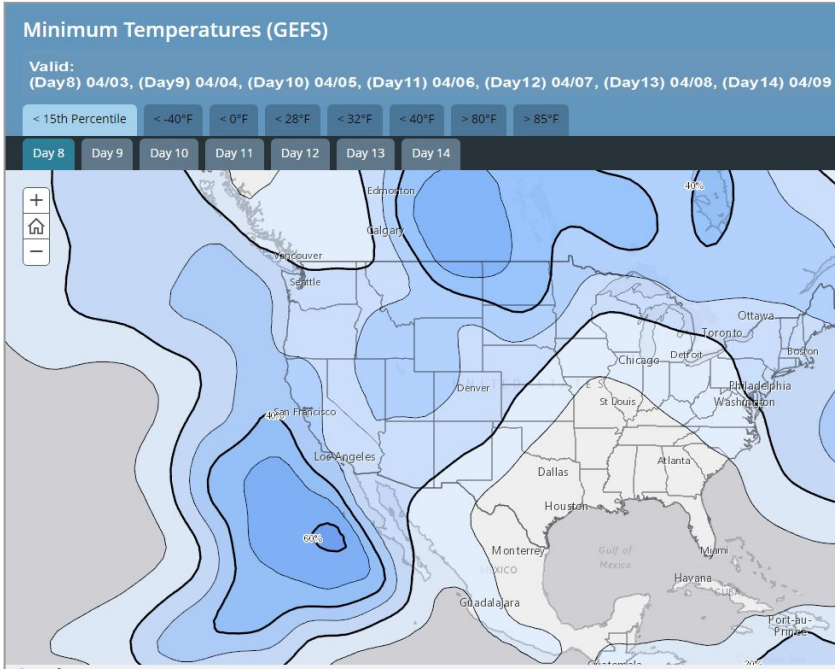
- Issued weekdays (M-F) at 3 PM in both interactive GIS interface (left) and as static graphics (middle)
- The temperature related hazards are ‘Excessive Heat’ and ‘Much Above Normal Temperatures’
- Probabilities in three levels: high, moderate, slight
- The associated forecast discussion provides additional information on context and impacts

These forecasts show the probability of extreme temperatures in Week 2!

Week-2 Probabilistic Extremes tool

https://www.cpc.ncep.noaa.gov/products/predictions/threats/extremesTool.php



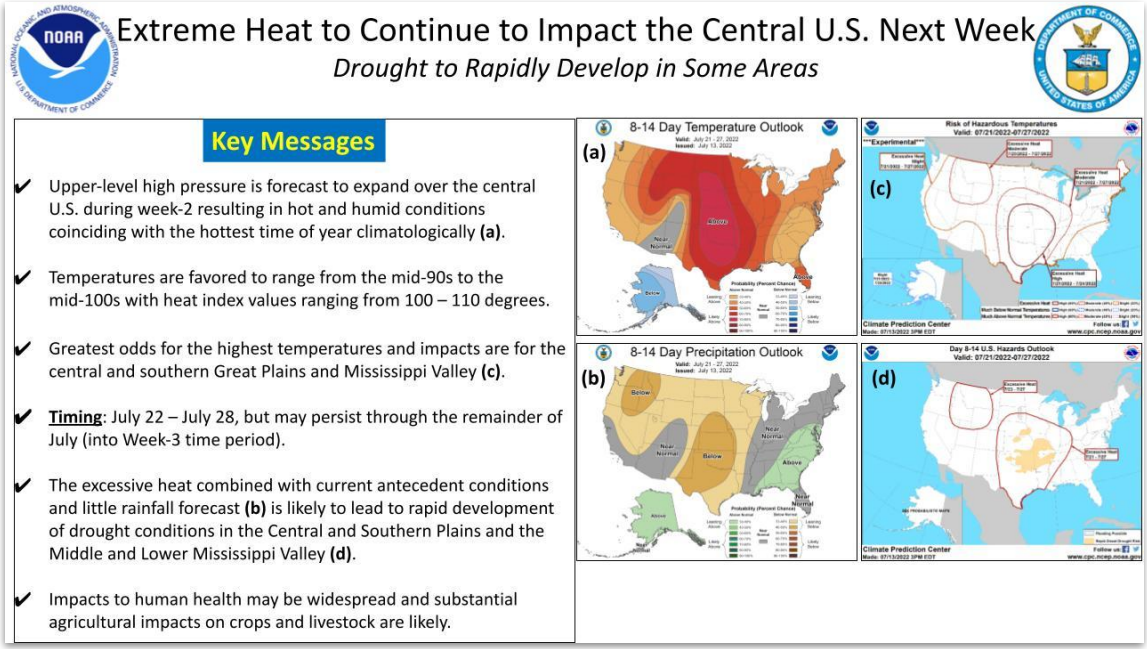


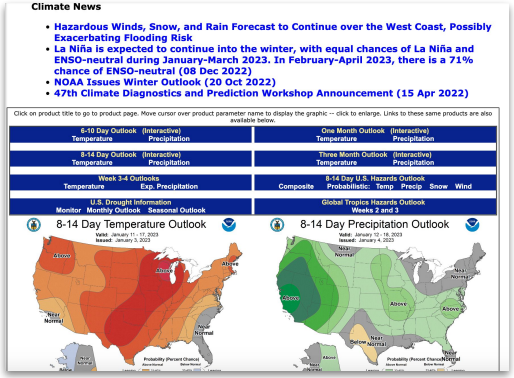
This is an interactive tool based on post-processed ensemble model output (GEFS). Probabilities are available by target date, maximum vs minimum temperatures and various thresholds. Thresholds both relative and absolute in nature.

These forecasts show the probability of individual days with extreme temperatures in Week-2!

Climate Key Messages

Key Messages are provided on the CPC Home Page under “Climate News” (when active)





- New product for **high confidence and high impact events**
- Provides shareable graphics, talking points and concise details surrounding event
- Similar to Key Messages that NHC and WPC issue for tropical storms and winter storms, respectively

Key Messages - Future Evolution

- CPC and WPC are working together to define procedures for issuing ***joint CPC/WPC key messages*** for impactful extreme heat events that span the Week-1 and Week-2 interface

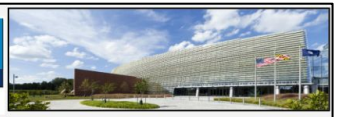
- This will ensure that our public, ***impact-based*** messaging is ***event driven***, and that the NWS is providing our users with a ***unified, actionable*** message

- We plan to seek public comment on the current iteration of our Key Messages product; ***stay tuned for this opportunity to provide your feedback!***

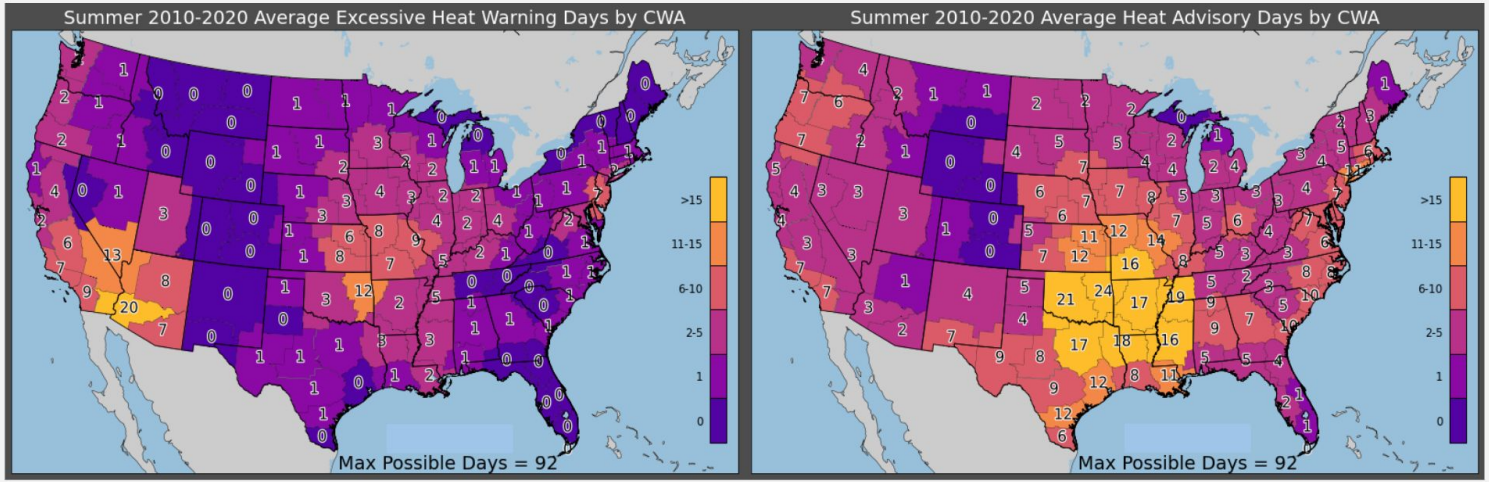
WPC Temp Forecasts & Resources

WEATHER PREDICTION CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Weather-Ready Nation



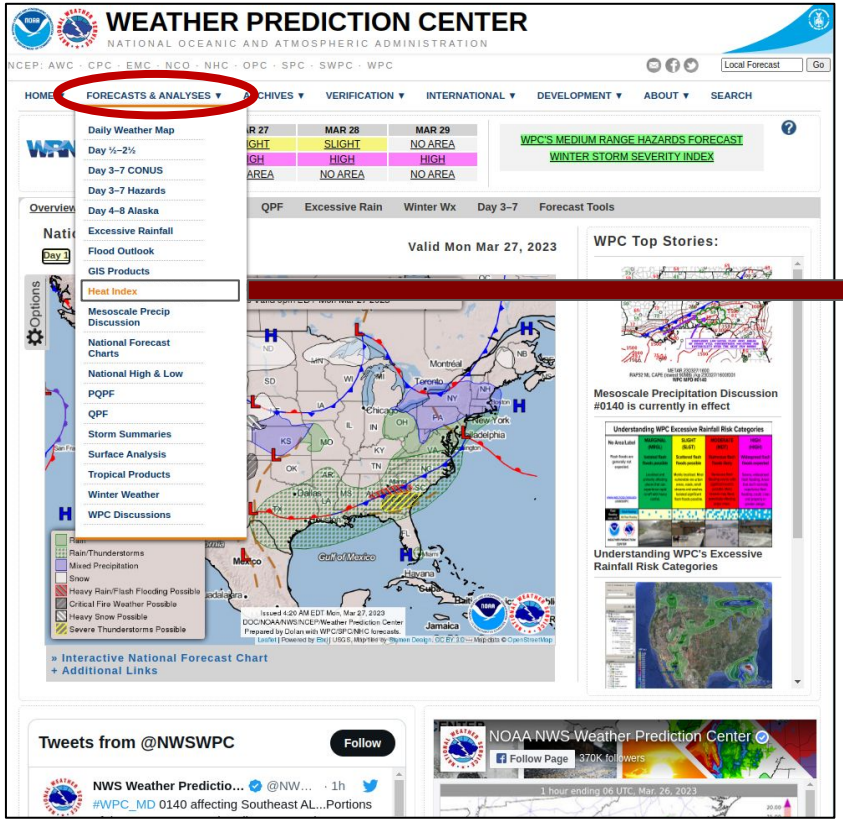
Heat is a Big Deal!
Expect Increasing Demand for NWS Forecasts and Services Related to Hot Weather

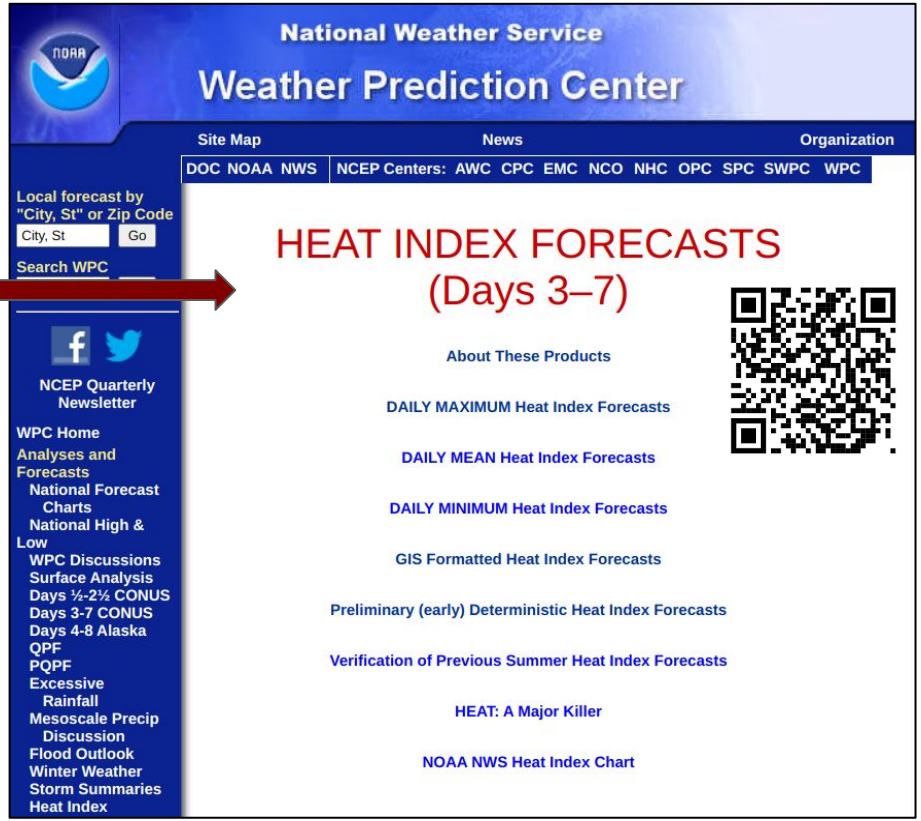


How does NWS consistently deliver expertise to inform the public about the hazards associated with heat?
What can WPC do to better position the NWS in this important endeavour?

WPC Temp Forecasts & Resources

https://www.wpc.ncep.noaa.gov/heat_index.shtml





WPC Temp Forecasts & Resources

National Weather Service

Weather Prediction Center

Site Map | News | Organization

DOC NOAA NWS | NCEP Centers: AWC CPC EMC NCO NHC OPC SPC SWPC WPC

Local forecast by "City, St" or Zip Code

City, St Go

Search WPC

Go

NCEP Quarterly Newsletter

WPC Home

Analyses and Forecasts

- National Forecast Charts
- National High & Low
- WPC Discussions
- Surface Analysis
- Days ½-2½ CONUS
- Days 3-7 CONUS
- Days 4-8 Alaska
- QPF
- PQPF
- Excessive Rainfall
- Mesoscale Precip Discussion
- Flood Outlook
- Winter Weather
- Storm Summaries
- Heat Index

HEAT INDEX FORECASTS (Days 3–7)

About These Products

DAILY MAXIMUM Heat Index Forecasts

DAILY MEAN Heat Index Forecasts

DAILY MINIMUM Heat Index Forecasts

GIS Formatted Heat Index Forecasts

Preliminary (early) Deterministic Heat Index Forecasts

Verification of Previous Summer Heat Index Forecasts

HEAT: A Major Killer

NOAA NWS Heat Index Chart

MAXIMUM HEAT INDEX FORECASTS

BACK TO THE MEAN, MINIMUM, MAXIMUM CHOICE PAGE

About These Products

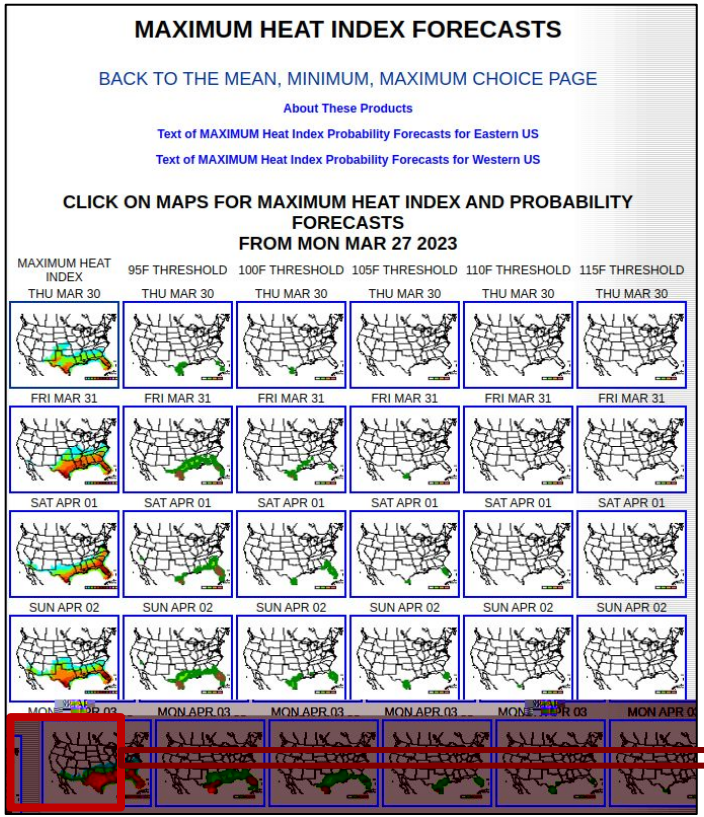
Text of MAXIMUM Heat Index Probability Forecasts for Eastern US

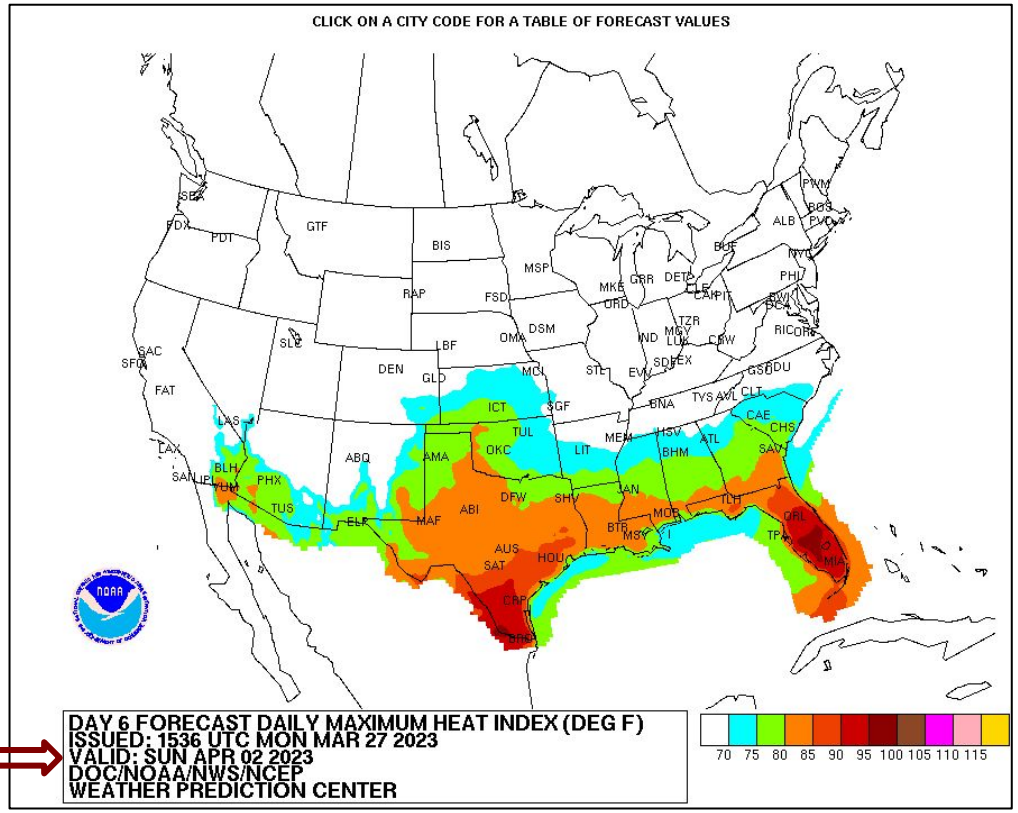
Text of MAXIMUM Heat Index Probability Forecasts for Western US

CLICK ON MAPS FOR MAXIMUM HEAT INDEX AND PROBABILITY FORECASTS FROM MON MAR 27 2023

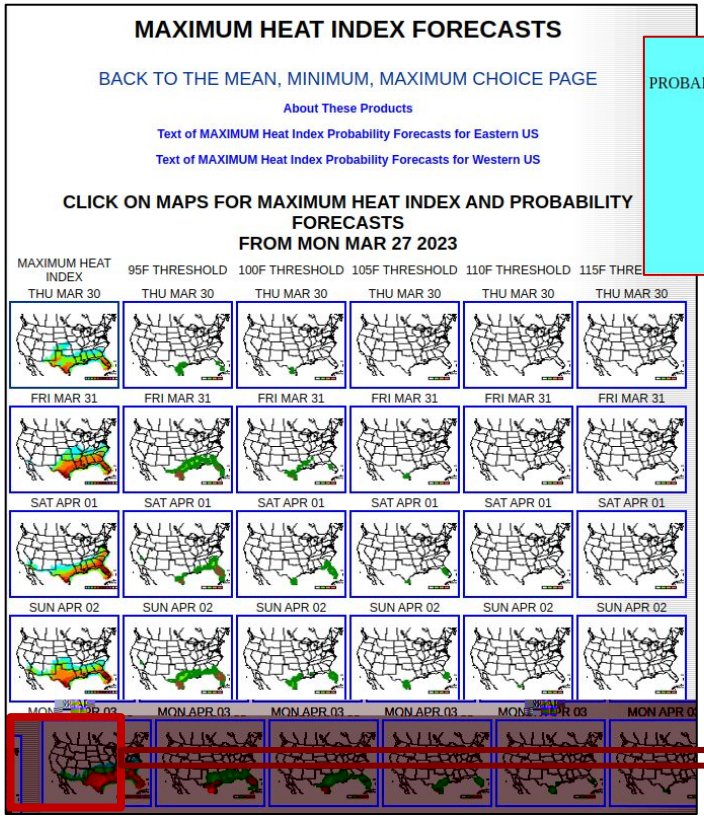
MAXIMUM HEAT INDEX	95F THRESHOLD	100F THRESHOLD	105F THRESHOLD	110F THRESHOLD	115F THRESHOLD
THU MAR 30	THU MAR 30	THU MAR 30	THU MAR 30	THU MAR 30	THU MAR 30
FRI MAR 31	FRI MAR 31	FRI MAR 31	FRI MAR 31	FRI MAR 31	FRI MAR 31
SAT APR 01	SAT APR 01	SAT APR 01	SAT APR 01	SAT APR 01	SAT APR 01
SUN APR 02	SUN APR 02	SUN APR 02	SUN APR 02	SUN APR 02	SUN APR 02
MON APR 03	MON APR 03	MON APR 03	MON APR 03	MON APR 03	MON APR 0

WPC Temp Forecasts & Resources



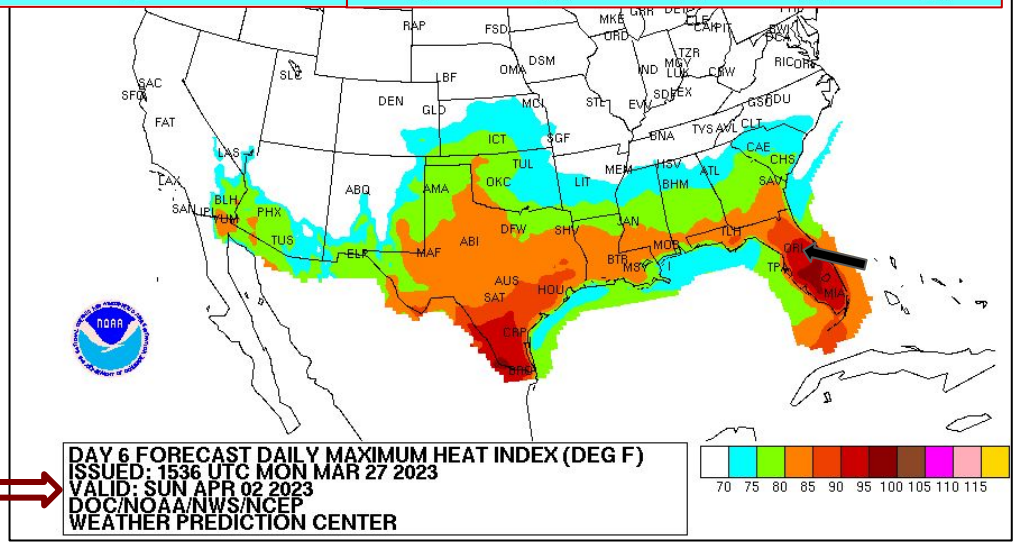


WPC Temp Forecasts & Resources



CLICK ON A CITY CODE FOR A TABLE OF FORECAST VALUES

MAXIMUM HEAT INDEX PROBABILITY OF MAXIMUM HEAT INDEX EXCEEDING:	THU MAR 30	FRI MAR 31	SAT APR 01	SUN APR 02	MON APR 03
	83 F	87 F	94 F	93 F	93 F
115 F					
110 F	0 %	0 %	0 %	1 %	1 %
105 F	0 %	0 %	1 %	3 %	3 %
100 F	0 %	0 %	6 %	8 %	10 %
95 F	0 %	1 %	20 %	20 %	22 %
90 F	0 %	5 %	44 %	39 %	41 %
85 F	1 %	26 %	71 %	61 %	62 %
80 F	24 %	63 %	90 %	80 %	80 %
	79 %	90 %	97 %	92 %	91 %



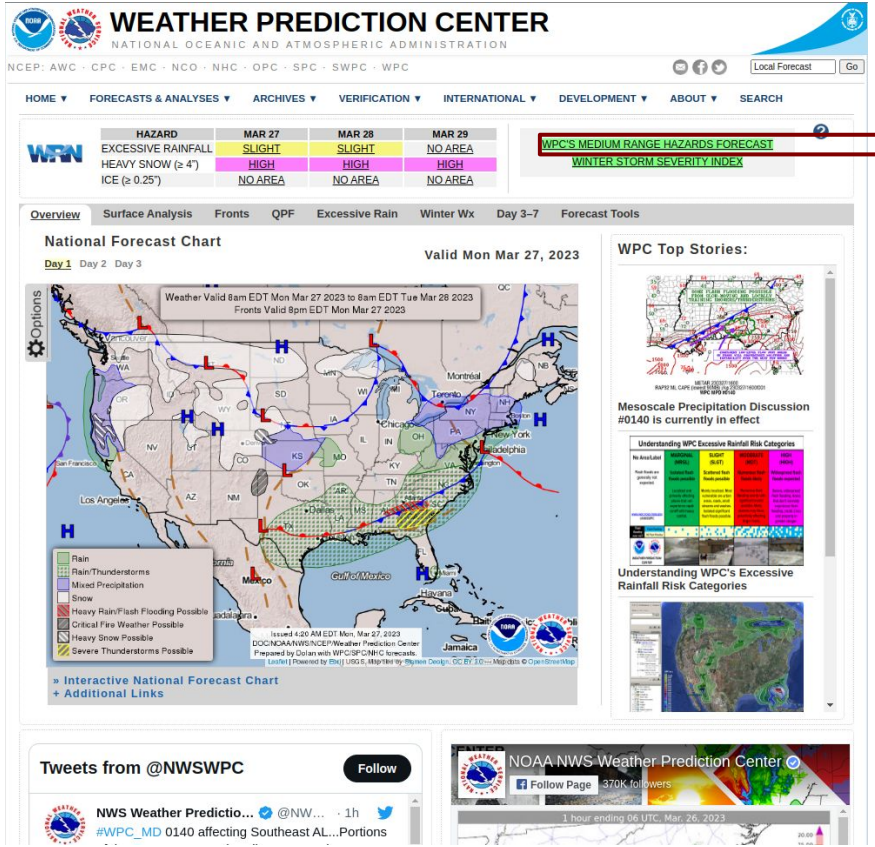
WPC Temp Forecasts & Resources

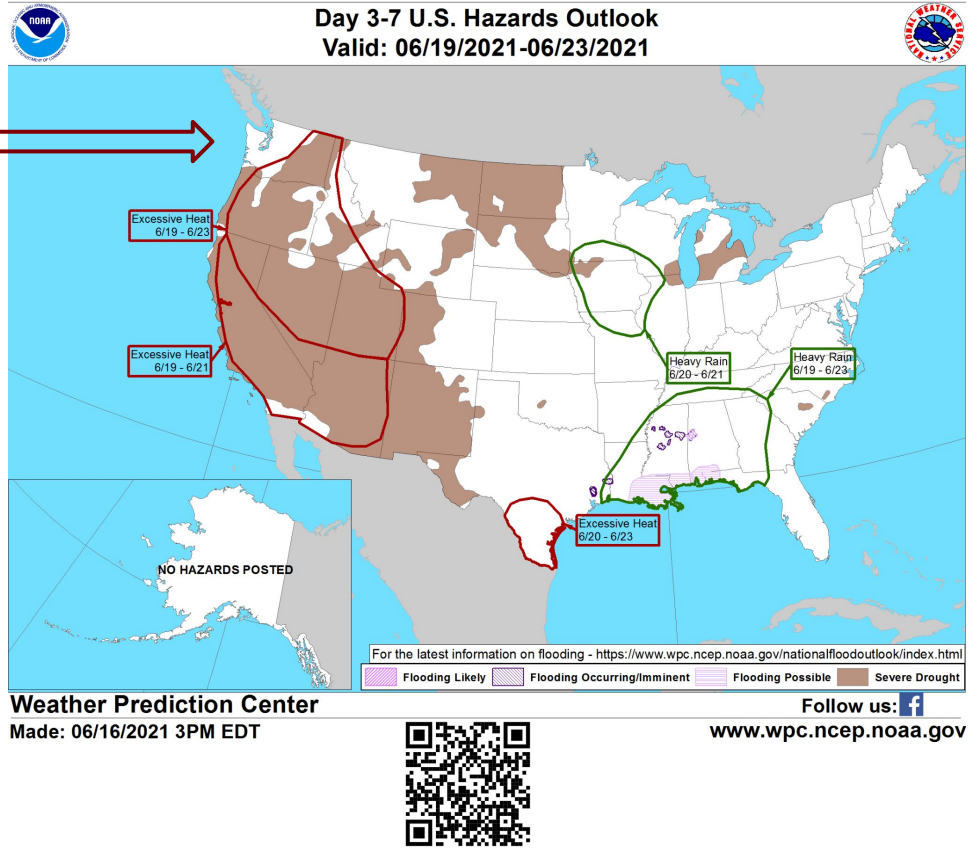
https://www.wpc.ncep.noaa.gov/medr/medr_max.shtml

Medium Range Temp Forecasts (Days 3-7)

WPC Temp Forecasts & Resources

https://www.wpc.ncep.noaa.gov/threats/threats.php

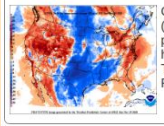




WPC Temp Forecasts & Resources

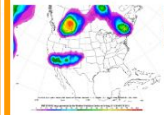
https://www.wpc.ncep.noaa.gov/#page=tls

1/3/6/24-hr Changes



Change in weather parameters (temperature, dewpoint, surface pressure, etc) over the last 1/3/6/24 hours. Data is provided from the Real-Time Mesoscale Analysis (RTMA) or the Rapid Refresh (RAP).

GEFS Probabilities



Plots of GEFS probabilistic forecast of precipitation, temperature, and sea-level pressure exceeding various thresholds.

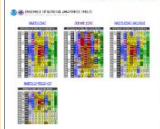
Local Storm Reports

Custom plots of Local Storm Reports across the Contiguous United States. Reports include rain, snow, ice, and severe weather, as well as other significant information from storm spotters.

Experimental Extreme Precipitation Monitor

Displays the climatological significance of precipitation forecast by WPC. The climatological significance is represented by Average Recurrence Intervals (ARIs) of precipitation estimates from NOAA Atlas-14 and Atlas2.

Ensemble Situational Awareness Table



An interactive situational awareness table that displays anomalies, percentiles, and return intervals from the GEFS, NAEFS, and ECMWF Ensembles (login required to view ECMWF data).
*Please note that there is currently an issue where only users on a NOAA network can access this page. We are actively working to resolve this problem

NDFD Forecast Temperature Records

Interactive display of where temperatures could approach or exceed records within the contiguous U.S. (based on NDFD temperature forecasts)

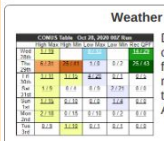
NWS NDFD Max/Min Temperatures and Departure from Normal

Displays Days 1-7 NDFD maximum and minimum temperatures, along with their respective departures from climatology.

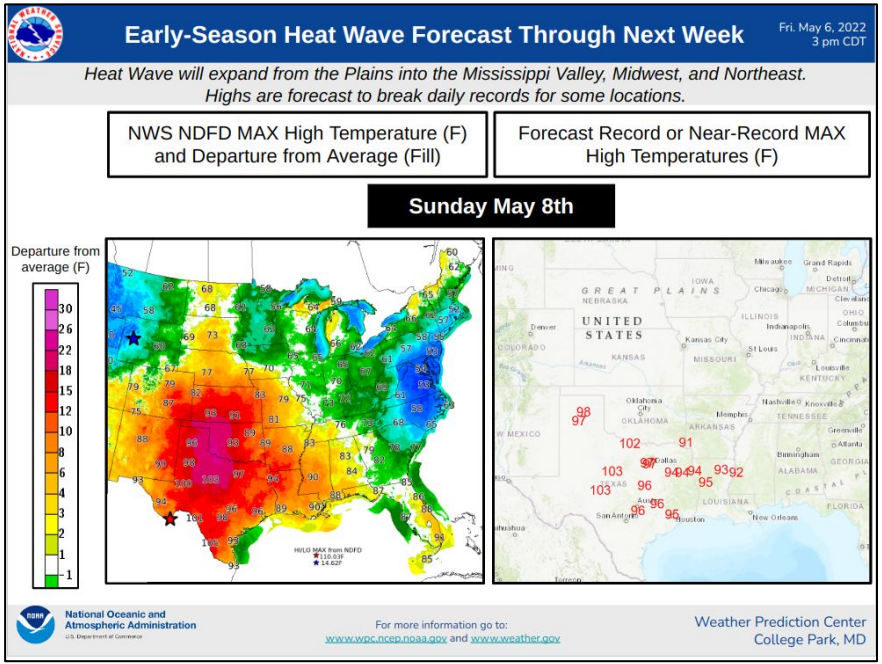
Prototype Snowband Probability Forecasts

An interactive tool that depicts areas of heavy snowfall from individual members of high-resolution short range ensemble forecasts.

Weather in Context Prototype

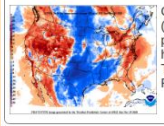


Displays forecast information and its climatological context to quickly alert a forecaster when a record or neear-record breaking event is possible. This tool is available for both CONUS and Alaska.



WPC Temp Forecasts & Resources

1/3/6/24-hr Changes



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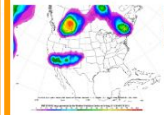


Plots of GEFS probabilistic forecast of precipitation, temperature, and sea-level pressure exceeding various thresholds.

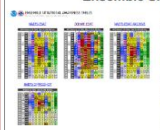
Local Storm Reports

Custom plots of Local Storm Reports across the Contiguous United States. Reports include rain, snow, ice, and severe weather, as well as other significant information from storm spotters.

Experimental Extreme Precipitation Monitor

Displays the climatological significance of precipitation forecast by WPC. The climatological significance is represented by Average Recurrence Intervals (ARIs) of precipitation estimates from NOAA Atlas-14 and Atlas2.

Ensemble Situational Awareness Table



An interactive situational awareness table that displays anomalies, percentiles, and return intervals from the GEFS, NAEFS, and ECMWF Ensembles (login required to view ECMWF data).
*Please note that there is currently an issue where only users on a NOAA network can access this page. We are actively working to resolve this problem.

NDFD Forecast Temperature Records

Interactive display of where temperatures could approach or exceed records within the contiguous U.S. (based on NDFD temperature forecasts)

NWS NDFD Max/Min Temperatures and Departure from Normal

Displays Days 1-7 NDFD maximum and minimum temperatures, along with their respective departures from climatology.

Prototype Snowband Probability Forecasts

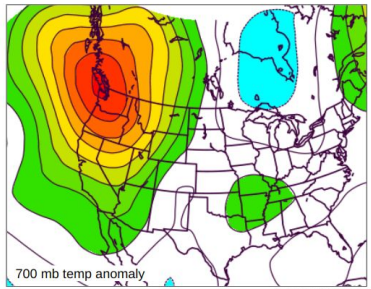
An interactive tool that depicts areas of heavy snowfall from individual members of high-resolution short range ensemble forecasts.

Weather in Context Prototype

Displays forecast information and its climatological context to quickly alert a forecaster when a record or near-record breaking event is possible. This tool is available for both CONUS and Alaska.

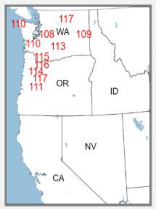
Forecast Tools →

June 2021 Pacific Northwest Heatwave



WEATHER PREDICTION CENTER

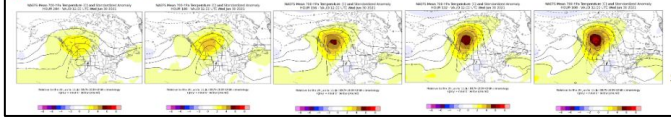
Northwestern U.S. Preliminary New All-time Maximum Temperature Records



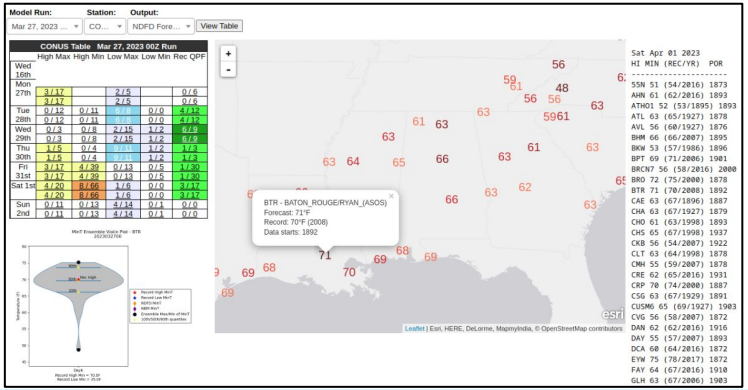
The following locations in Washington and Oregon established new preliminary all-time maximum temperature records for **any calendar day**. It is quite remarkable for these temperature records to occur in June, even more remarkable some locations obliterated their previous all-time records by more than 10 degrees, and quite incredible that, in the majority of cases, the prior all-time record maximum temperature had only been set 24 hours earlier.

Washington (State all-time maximum temperature record: 118F, August 5, 1961)
6/25/2021 - 117F at Omak breaks previous all-time maximum temperature of 114F, July 28, 1928
6/28/2021 - 113F at Vancouver breaks previous all-time maximum temperature of 112, June 27, 2021
6/29/2021 - 113F at Yakima breaks previous all-time maximum temperature of 109, June 27, 2021
6/28/2021 - 110F at Quillayute breaks previous all-time maximum temperature of 99, August 9, 1981
6/29/2021 - 113F at Olympia breaks previous all-time maximum temperature of 105, June 27, 2021
6/29/2021 - 109F at Spokane breaks previous all-time maximum temperature of 108, August 4, 1961
6/29/2021 - 109F Seattle/Tacoma breaks prev. all-time maximum temperature of 104, June 27, 2021

Oregon (State all-time maximum temperature record: 119F, August 10, 1898)
6/28/2021 - 117F at Salem breaks breaks prev. all-time maximum temperature of 113, June 27, 2021
6/28/2021 - 116F at Portland breaks breaks prev. all-time maximum temp. of 112, June 27, 2021
6/28/2021 - 114F at McMinnville breaks breaks prev. all-time maximum temp. of 111, June 27, 2021
6/27/2021 - 111F at Eugene breaks breaks prev. all-time maximum temp. of 108, August 9, 1981



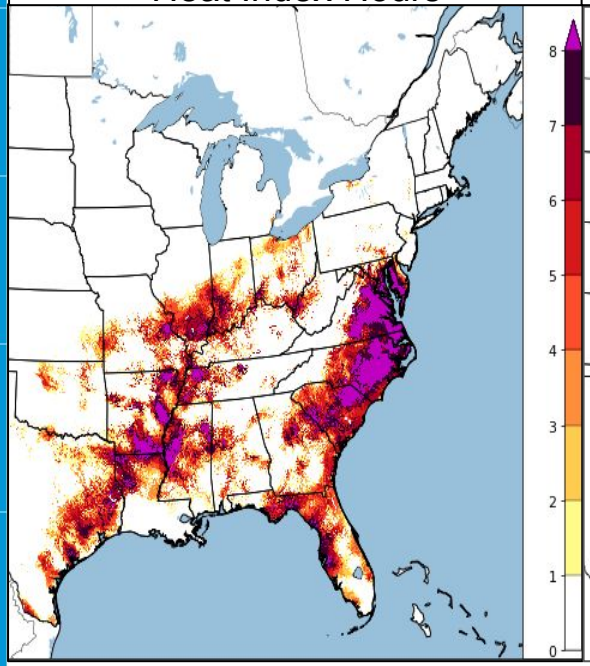
SA Tables →



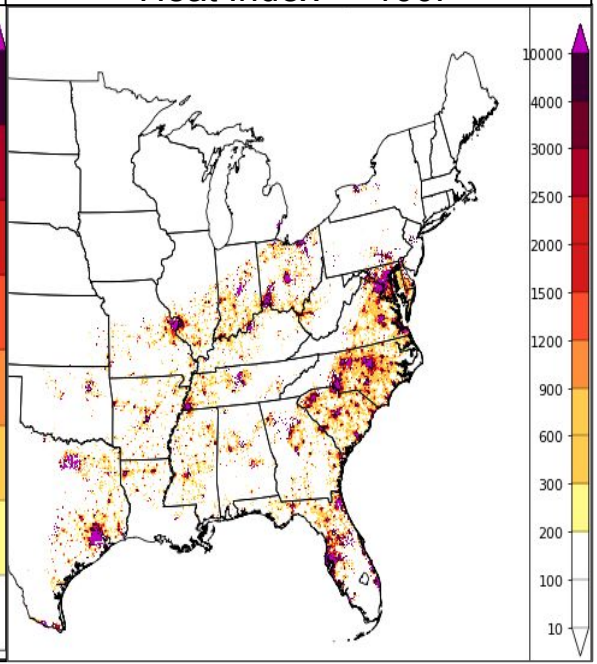
WPC Temp Forecasts & Resources

Future Heat Wave Visualization, Messaging, & Talking Points

July 20, 2020, >=100F
Heat Index Hours



Population with least 3h of
Heat Index >=100F



WPC developed **talking points** and social media **key messages** during some of the more significant heat outbreaks of 2021.

Information included:

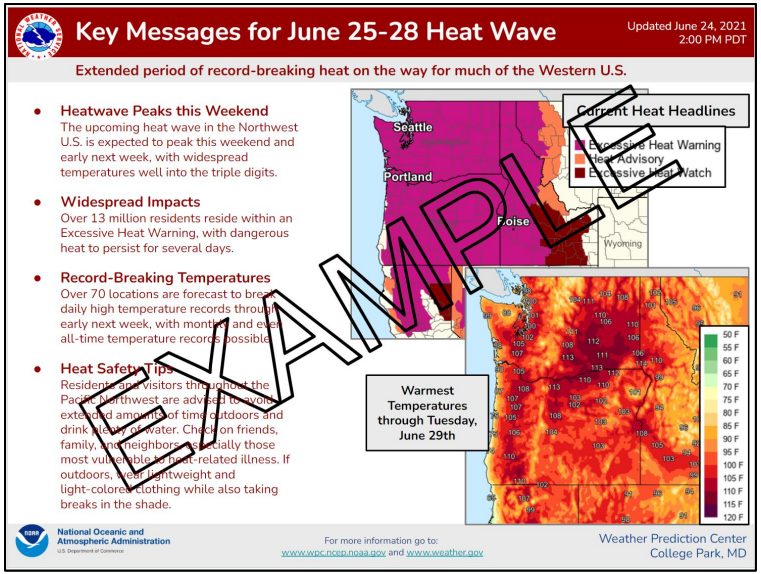
- **Pop. Statistics in WWA**
- **Temp Records and Context**
- **Heat and its Impacts FAQ**
- **NWS Safety Messaging**

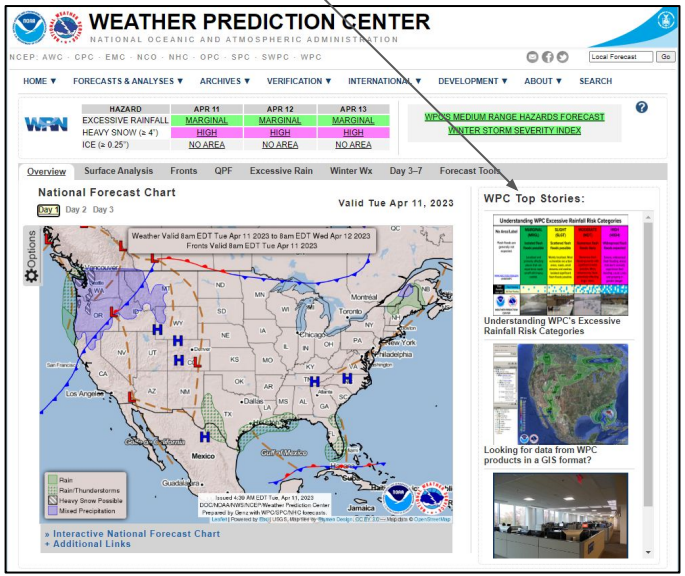
WPC resources for the field (Forecast Tools Page):

- **Situational Awareness Tables**
- **NDFD Max/Min Records Page**
- **Weather in Context Viewer**

WPC Temperature Key Messages

Key Messages are provided on the WPC Home Page under “Top Stories” (when active)



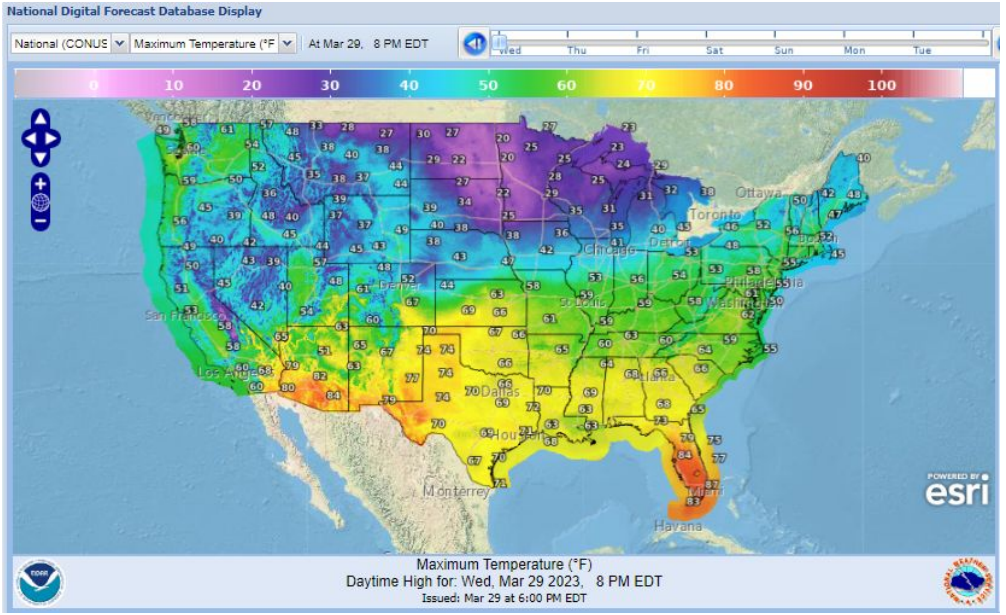


- New product for **high confidence and high impact events (roll over from CPC Key Messages for Heat)**
- Provides shareable graphics, talking points and concise details surrounding event
- Similar to Key Messages NHC and WPC issue for tropical storms and winter storms, respectively

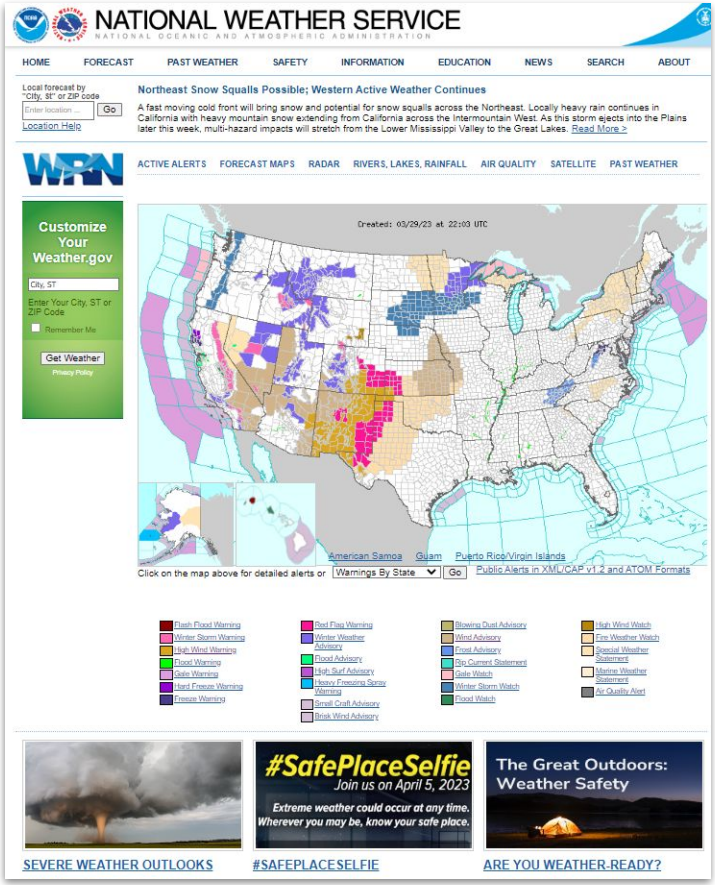
WFO Routine Forecast Products

- 122 local Weather Forecast Offices (WFO)
- Graphical forecasts of 2.5km x 2.5km resolution
- Forecast out to 7 days:
  - Max and Min Temperatures
  - Hourly Temperatures, Dewpoints, and Relative Humidity
  - Sustained Wind Speed/Direction, and Gusts
  - Sky Cover (clouds)
  - Probability of Precipitation (%)
  - Amount of Precipitation (QPF)
  - Apparent Temperature (Heat Index or Wind Chill)
  - Wet Bulb Globe Temperature (WBGT)
  - Other elements as appropriate e.g. Snowfall Amount, Wave Height, etc.

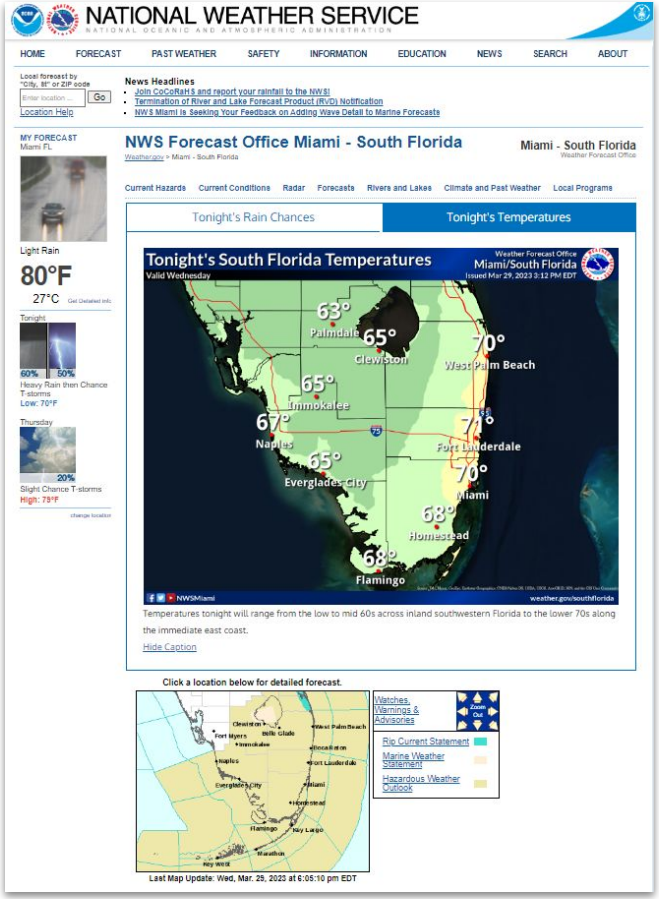
https://digital.mdl.nws.noaa.gov/



Weather.gov & WFO pages

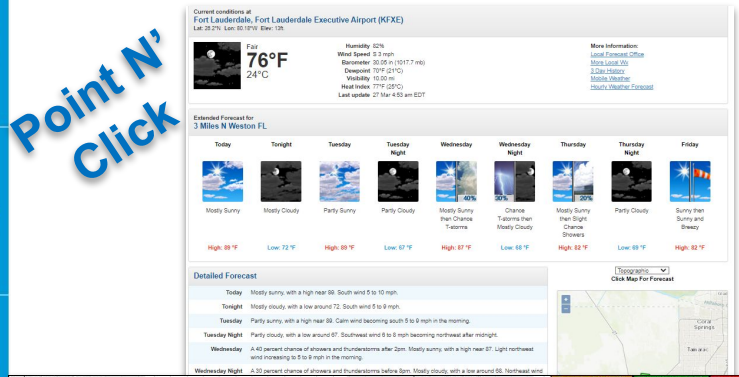


Weather.gov

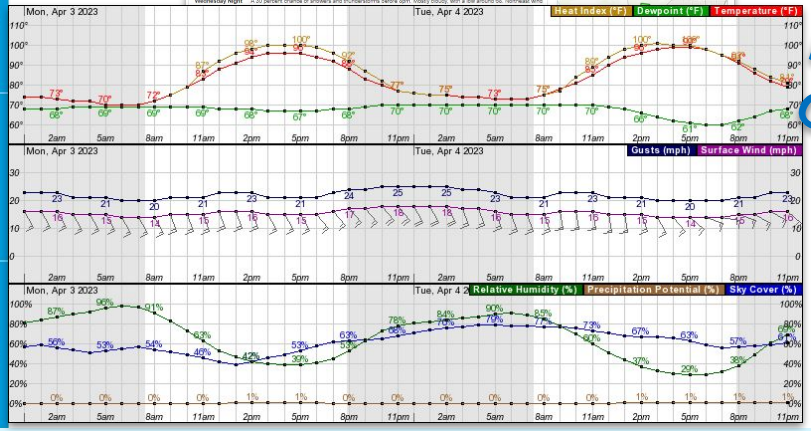


WFO Routine Forecast Products

Point N' Click



Hourly Weather Graph



Zone Forecast Product

```
Zone Forecast Product for Southern New England
National Weather Service Boston/Norton MA
700 AM EDT Mon Jul 18 2022

MAZ015-182000-
Suffolk MA-
Including the city of Boston
700 AM EDT Mon Jul 18 2022

.TODAY...Cloudy with a chance of showers with a slight chance of
thunderstorms. Highs in the lower 80s. South winds 10 to 15 mph.
Chance of rain 40 percent.
.TONIGHT...Cloudy. A chance of showers with a slight chance of
thunderstorms in the evening, then a chance of showers with
isolated thunderstorms after midnight. Some thunderstorms may
produce gusty winds and heavy rainfall in the evening. Humid with
lows in the lower 70s. South winds around 15 mph with gusts up to
30 mph. Chance of rain 40 percent.
.TUESDAY...Partly sunny in the morning, then clearing. Warmer
with highs in the lower 90s. West winds 10 to 15 mph with gusts
up to 25 mph.
.TUESDAY NIGHT...Mostly clear. Humid with lows in the lower 70s.
West winds 5 to 10 mph. Gusts up to 20 mph in the evening.
.WEDNESDAY...Sunny, hot with highs in the mid 90s. West winds
5 to 10 mph.
.WEDNESDAY NIGHT...Mostly clear. Lows in the mid 70s.
.THURSDAY...Partly sunny with a chance of showers. Hot with highs
in the lower 90s. Chance of rain 40 percent. Heat index values up
to 100.
.THURSDAY NIGHT...Mostly clear. Lows in the lower 70s.
.FRIDAY AND FRIDAY NIGHT...Clear, hot. Highs around 90. Lows in
the lower 70s.
.SATURDAY...Sunny, hot with highs in the lower 90s.
.SATURDAY NIGHT...Partly cloudy. Lows around 70.
.SUNDAY...Partly sunny with a 30 percent chance of showers. Hot
with highs around 90.
```

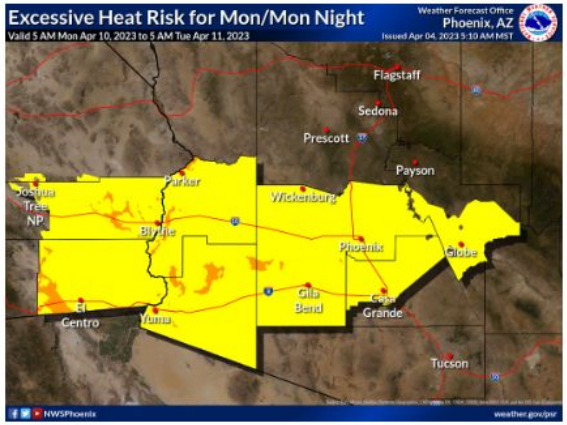
Outlooks: Days 1-7

Text based HWO

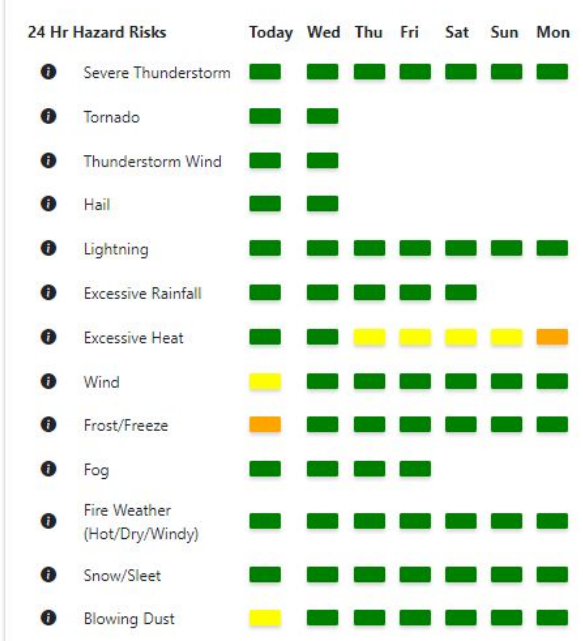
```
Hazardous Weather Outlook
National Weather Service Wilmington NC
1009 PM EDT Wed Jul 27 2022

NCZ110-290215-
Coastal Brunswick-
1009 PM EDT Wed Jul 27 2022

...MODERATE RISK OF RIP CURRENTS IN EFFECT FROM 6 AM EDT THURSDAY
THROUGH THURSDAY EVENING...
...HEAT ADVISORY IN EFFECT FROM NOON TO 7 PM EDT THURSDAY...

This Hazardous Weather Outlook is for southeast North Carolina.

.DAY ONE...Tonight.

No hazardous weather is expected at this time.

.DAYS TWO THROUGH SEVEN...Thursday through Tuesday.

Please listen to NOAA Weather Radio or go to weather.gov on the
Internet for more information about the following hazards.

   Moderate Risk of Rip Currents.
   Heat Advisory.

Heat indices of 105F to 109F are likely Thursday through Saturday.
```

Experimental Graphical Hazardous Weather Outlook (gHWO)

Example: https://www.weather.gov/erh/ghwo?wfo=psr



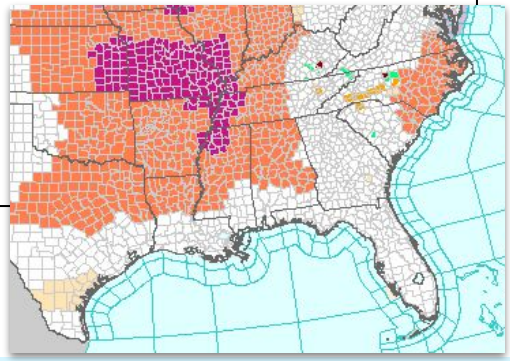
Risk Level	Category	Definition
	None	No Excessive Heat Risk.
	Limited	Heat exhaustion possible with prolonged exposure.
	Elevated	Heat exhaustion likely with prolonged exposure. Heat stroke possible.
	Significant	Heat exhaustion or heat stroke likely with prolonged exposure.
	Extreme	Dangerously hot conditions could quickly result in heat exhaustion or heat stroke.



WFO Watch, Warning, Advisory

https://www.weather.gov/safety/heat-ww

Excessive Heat **Watch**	Conditions favorable for an excessive heat event to meet/exceed local heat warning criteria in the next 24 to 72 hrs
Heat **Advisory**	Heat Index values forecast to meet/exceed local heat advisory criteria for 1 to 2 days. Generally **North**: HI>100 **South**: HI >105, and Min nighttime lows >/=75
Excessive Heat **Warning**	Heat Index values forecast to meet or exceed locally defined warning criteria for at least 2 days. Generally **North**: HI>105 **South**: HI >110 Min nighttime lows >/=75

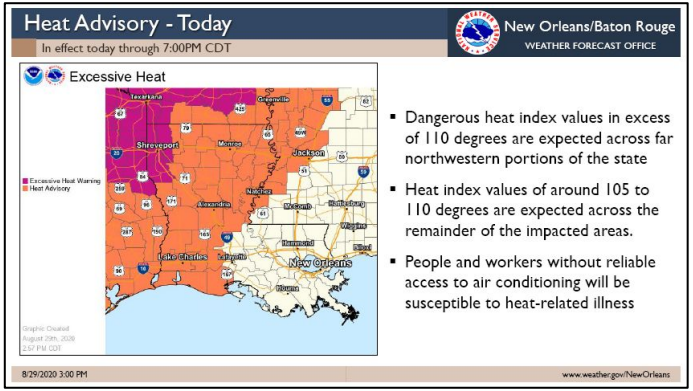


IMPORTANT NOTE:
Strongly encourage local forecast offices to work with local partners, especially public health partners, to adjust criteria to reflect local impacts

Successful Collaboration Adjusting Criteria

Post Hurricane Laura 2020

- With nearly 100% of customers without power NWS offices reached out to the Louisiana Governor's Office of Homeland Security and Emergency Preparedness to validate the need for lowered criteria



New England / Northeast 2016-2017

- Multi-year effort to set Heat Advisory criteria that better reflect health impacts

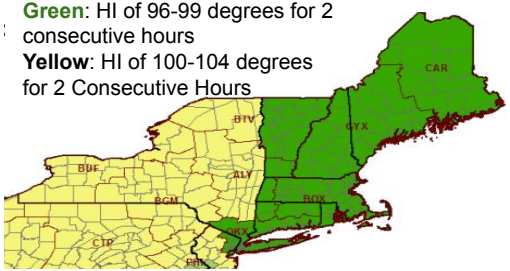
2016

Green: Heat Index of 100-104 degrees for 2 Consecutive Hours

NWS Offices serving New England worked with Northeast Health Departments and NE Heat Consortium 2016-2017

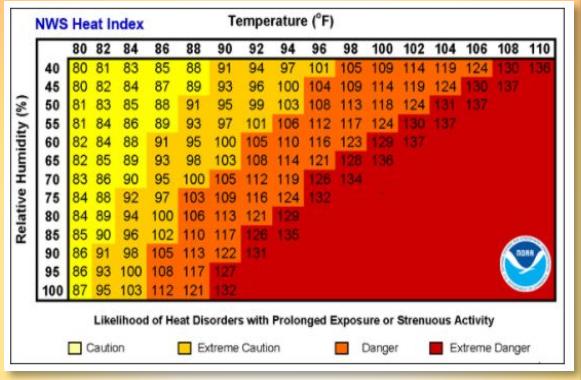
2017

Green: HI of 96-99 degrees for 2 consecutive hours
Yellow: HI of 100-104 degrees for 2 Consecutive Hours



NWS Forecast Tools used to assess Heat

Heat Index

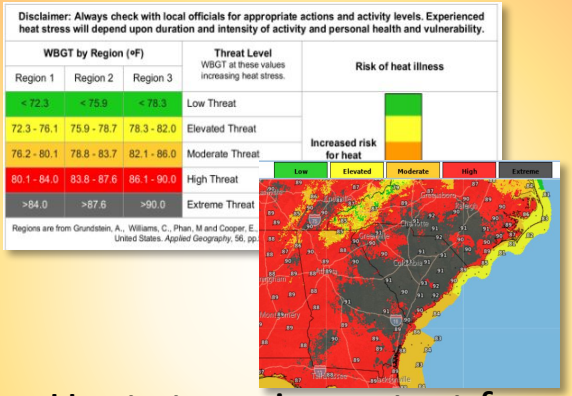


Heat stress in context for **general public.**

- Relatively simple: T + RH
- Light physical activity in shade

5'7" adult, 147.7 lbs, walking outside at 3.1 mph, wearing trousers and short sleeved shirt

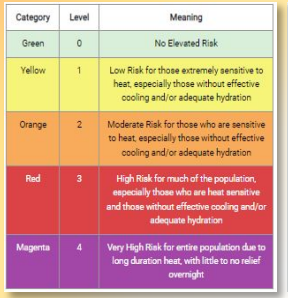
Wet Bulb Globe Temperature

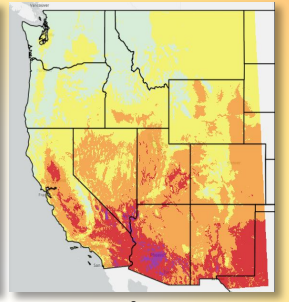


Heat stress in context for **healthy, active outdoor** communities.

- More Complex: T + RH + wind + solar radiation
- High levels of physical activity

Western Region HeatRisk Prototype





Heat forecasts in **climatological context** with CDC-based health impact messaging.

- How significantly above normal the temperatures are
- Messaging can target more sensitive/vulnerable groups

Heat Index

- Derived from Steadman's work and simplified by Lans Rothfusz
- Traditional measurement of Heat stress due to high temperatures and high humidity. Includes several (21) parameters and assumptions such as:
  - body mass & height
  - clothing
  - physical activity
  - heat tolerance
  - sunlight and UV exposure
  - wind speed

5'7" adult, 147.7 lbs, walking outside at 3.1 mph, wearing trousers and short sleeved shirt

NWS Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

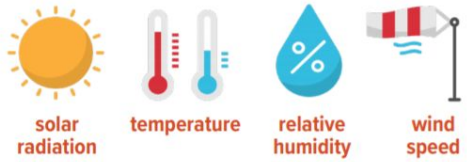
Caution | Extreme Caution | Danger | Extreme Danger

Wet Bulb Globe Temperature (WBGT)

What is it?

- Estimates the effect of temperature, humidity, wind, and solar radiation on the human body
- Effective indicator of heat stress for active populations

	WBGT	HEAT INDEX
Measured in the sun	●	●
Measured in the shade	●	●
Uses temperature	●	●
Uses relative humidity	●	●
Uses wind	●	●
Uses cloud cover	●	●
Uses sun angle	●	●



What are the benefits?

- Particularly useful for outdoor workers, athletes, people exercising or active outdoors, etc.
- Can help establish guidelines for activity modifications during exercise or outdoor work

Grundstein WBGT Regions

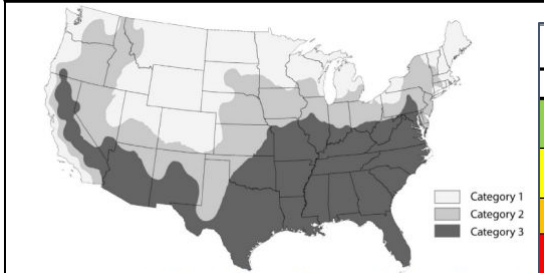
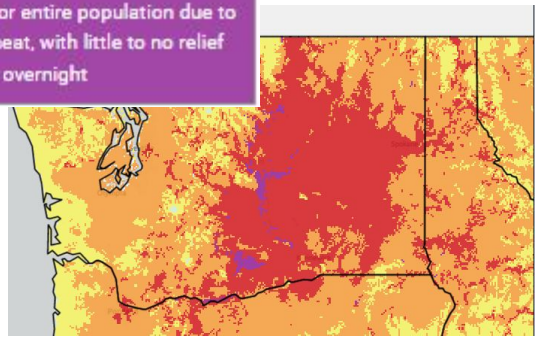


Figure: Regional Heat Category. Reprinted from "Regional heat safety thresholds for athletics in the contiguous United States", A. Grundstein, C. Williams, M. Phan, and E. Cooper, 2015, Applied Geography, Vol 56, p55-60.

WBGT by Region (F)		
Cat 1	Cat 2	Cat 3
<72.3	<75.9	<78.3
72.3-76.1	75.9-78.7	78.3-82.0
76.2-80.1	78.8-83.7	82.1-86.0
80.1-84.0	83.8-87.6	86.1-90.0
>84.0	>87.6	>90.0

Experimental Heat Tools

Category	Level	Meaning
Green	0	No Elevated Risk
Yellow	1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
Orange	2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
Red	3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
Magenta	4	Very High Risk for entire population due to long duration heat, with little to no relief overnight



NWS Western Region HeatRisk Prototype

What does it take into account?

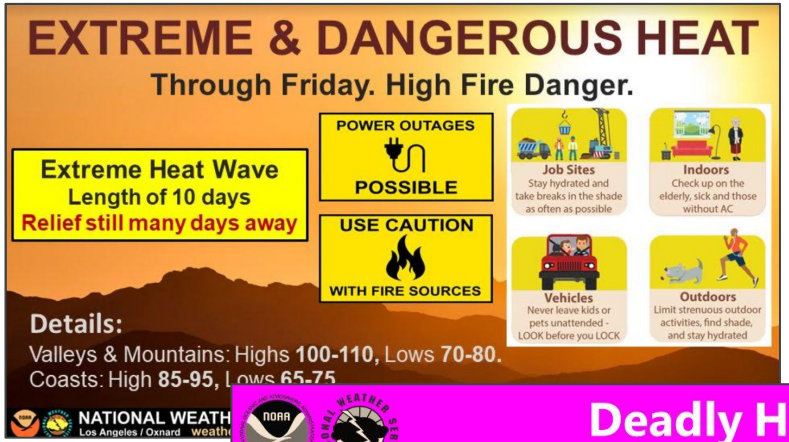
- How above normal temps are for a location
- Time of the year
- Duration of unusual heat
- Overnight temps
- Difference between lows and highs

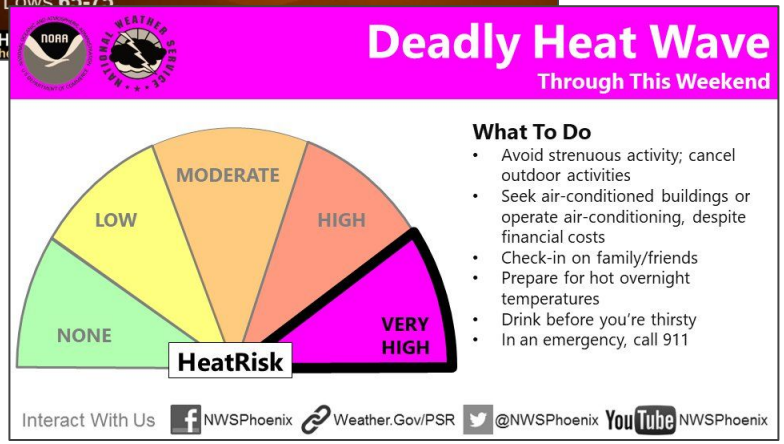
What are the benefits?

- Helps people understand what forecasted heat means to them
- Provides heat risk guidance for decision makers and heat sensitive populations who may need to take action below NWS heat product levels

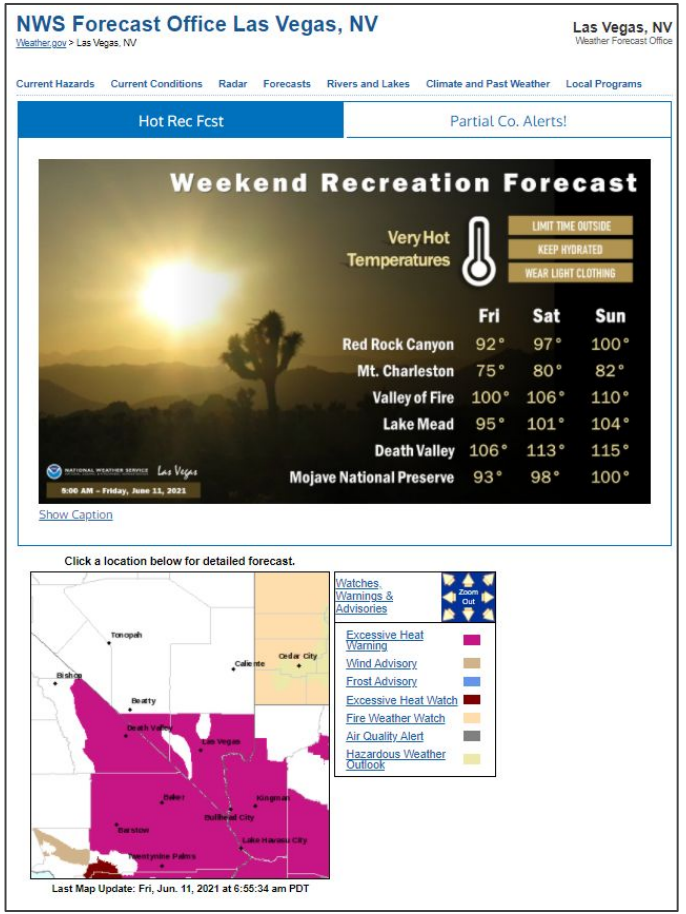
Event Messaging

Social Media





Weather Stories



Outreach & Engagement Materials

Seasonal Safety Campaigns

https://www.weather.gov/safetycampaign

Heat Safety Website

https://www.weather.gov/heat

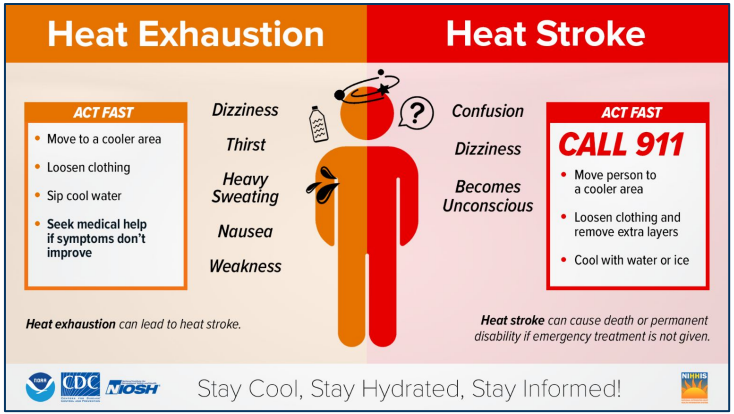
Agency collaborations: OSHA messaging in NWS heat products

```
Take extra precautions if you work or spend time outside. When
possible reschedule strenuous activities to early morning or
evening. Know the signs and symptoms of heat exhaustion and heat
stroke. Wear lightweight and loose fitting clothing when
possible. To reduce risk during outdoor work, the Occupational
Safety and Health Administration recommends scheduling frequent
rest breaks in shaded or air conditioned environments. Anyone
overcome by heat should be moved to a cool and shaded location.
Heat stroke is an emergency! Call 9 1 1.
```

Graphics

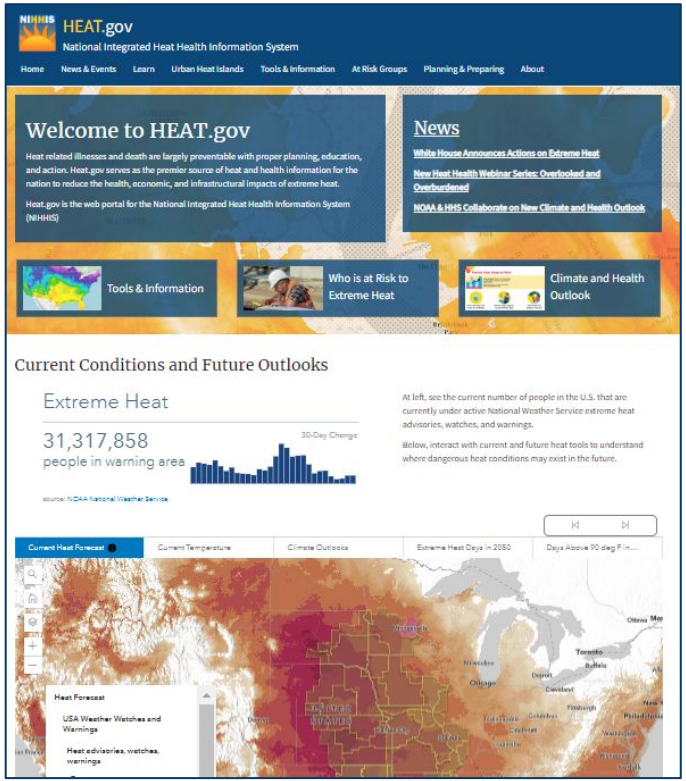
Federal Interagency Heat Health Efforts

GRAPHICS

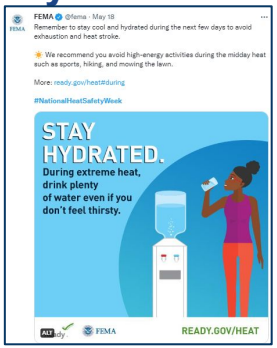


heat.gov

Federal Heat Health Information Hub



Joint Social Media Campaigns
May 15-19, 2023 #NIHHIS #HeatSafety



Questions?

Contributors:

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Presentation PDF and Recording will be available after processing at https://www.weather.gov/wrn/calendar

Links:

Climate Prediction Center Homepage
https://www.cpc.ncep.noaa.gov/

Weather Prediction Center Homepage
https://www.wpc.ncep.noaa.gov/

National Weather Service
https://www.weather.gov/

NWS Heat Safety
https://www.weather.gov/heat

Federal Heat Health Information Hub
https://www.heat.gov/

CDC Heat & Health Tracker
https://ephtracking.cdc.gov/Applications/heatTracker/