CONNECTICUT WEATHER OF THE PAST AND PRESENT

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HURRICANES OF THE PAST

HYPE VS. FACT

There's been a lot of talk recently that we are experiencing so many more disasters these days. That may be true for other parts of the country, but not for New England.

We have not been struck by a major hurricane since 1954. Also, it's important to note that New England was hit by 4 major hurricanes from 1938 to 1954 (only 16 years !!!).

Sooner or later our luck is going to run out !!!

Tropical Cyclones that made landfall in New England, 1900-2009

Storm Name	Date	Intensity at Landfall	Forward Speed mi/hr	km/hr
Unnamed	July 1916	Category 1 Hurricane	18	29
Unnamed	Sept 1938	Category 3 Hurricane	51	82
Unnamed	Sept 1944	Category 3 Hurricane	29	47
Carol	Aug 1954	Category 3 Hurricane	35	56
Edna	Sept 1954	Category 3 Hurricane	46	74
Diane	Aug 1955	Tropical Storm	15	24
Donna	Sept 1960	Category 2 Hurricane	24	39
Belle	Aug 1976	Category 1 Hurricane	20	32
Gloria	Sept 1985	Category 2 Hurricane	45	72
Bob	Aug 1991	Category 2 Hurricane	32	51
Bertha	July 1996	Tropical Storm	30	48
Floyd	Sept 1999	Tropical Storm	35	56
Irene	Sept 2011	Tropical Storm	15	24

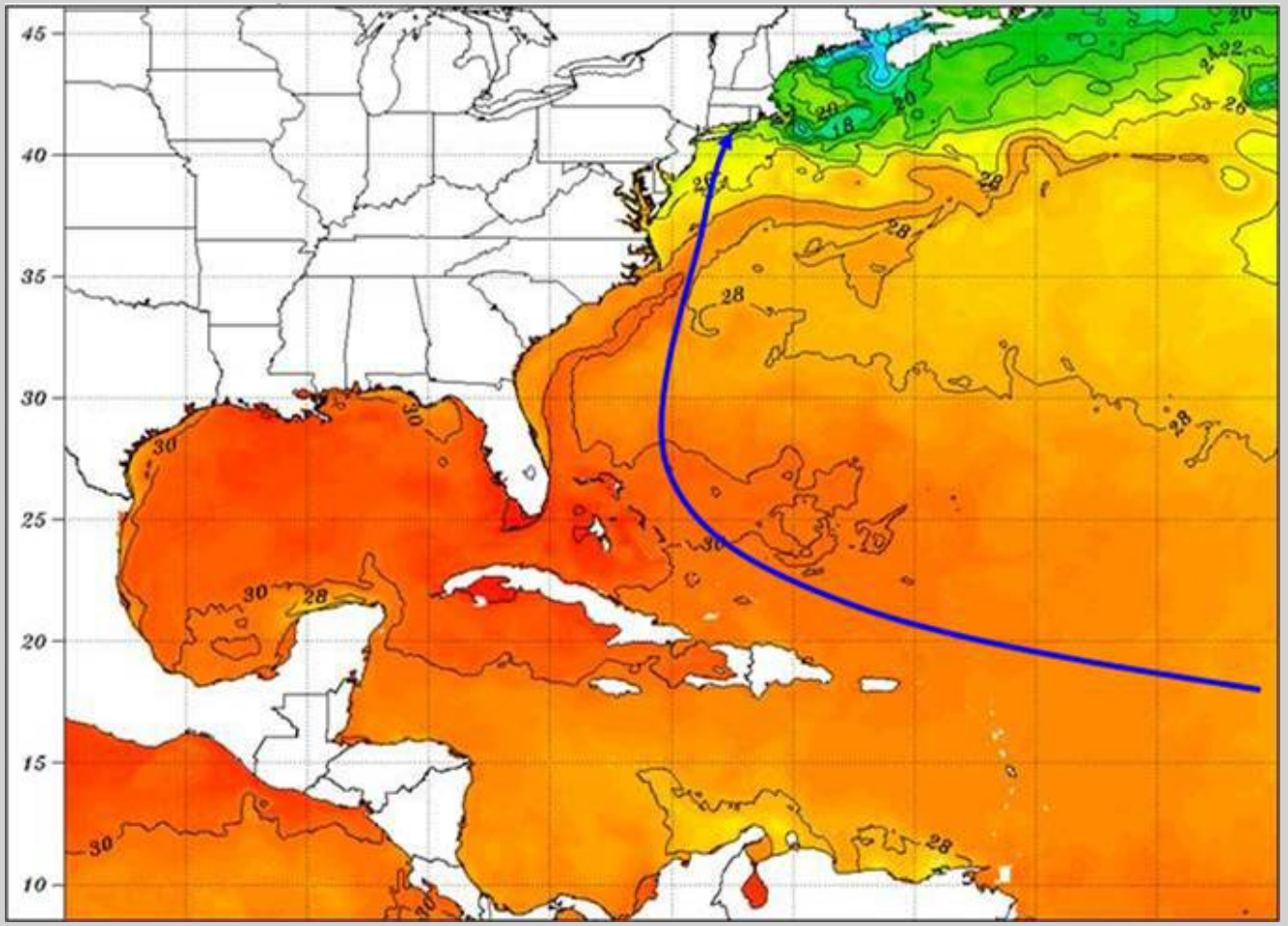
MAJOR FLOOD EVENTS 1936 - 2023

March, 1936	Heavy Rain and melting snow caused major flooding throughout the Northeast and Middle Atlantic states
Sept, 1938	Widespread 10 inch rainfall caused by a hurricane resulted in major flooding throughout the Connecticut River valley.
August, 1955	Hurricanes Connie and Diane came a week apart to batter most of New England with the most significant flooding recorded at many locations.
June, 1982	Up to 16 inches of rainfall resulted in major flooding throughout Connecticut.
Mar/April, 1987	Heavy rains combined with snowmelt resulted in major flooding throughout New England.
Sept, 1999	Hurricane Floyd brought major flooding to Western CT.
Sept, 2011	Tropical Storm Irene brought major flooding to much of New England.
Sept, 2021	The remnants of Hurricane Ida caused major flooding in southern CT and killed over 50 persons in New York City and Philadelphia.
Summer, 2023	Third wettest season since records were started in 1905.

2022 HONGA TONGA ERUPTION

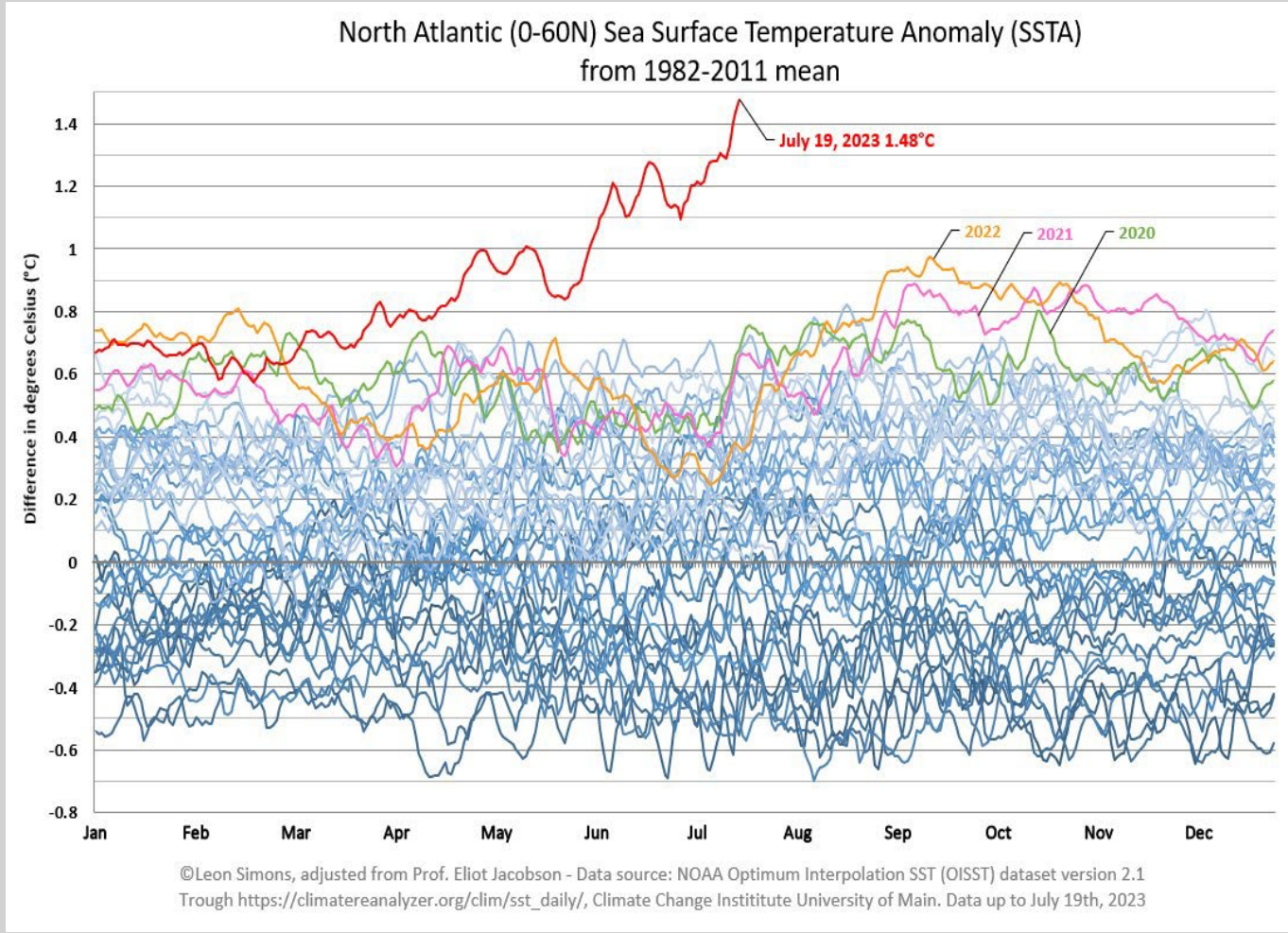
IS TONGA IMPACTING CLIMATE???

- SEA SURFACE TEMPS (SSTs) – Well above normal for most of Atlantic.
- Manatee Beach, FL +101.2F
- Cape Verde Sector +2 to +5F above normal
- Temps south of LI +8F above normal



WARM SSTs

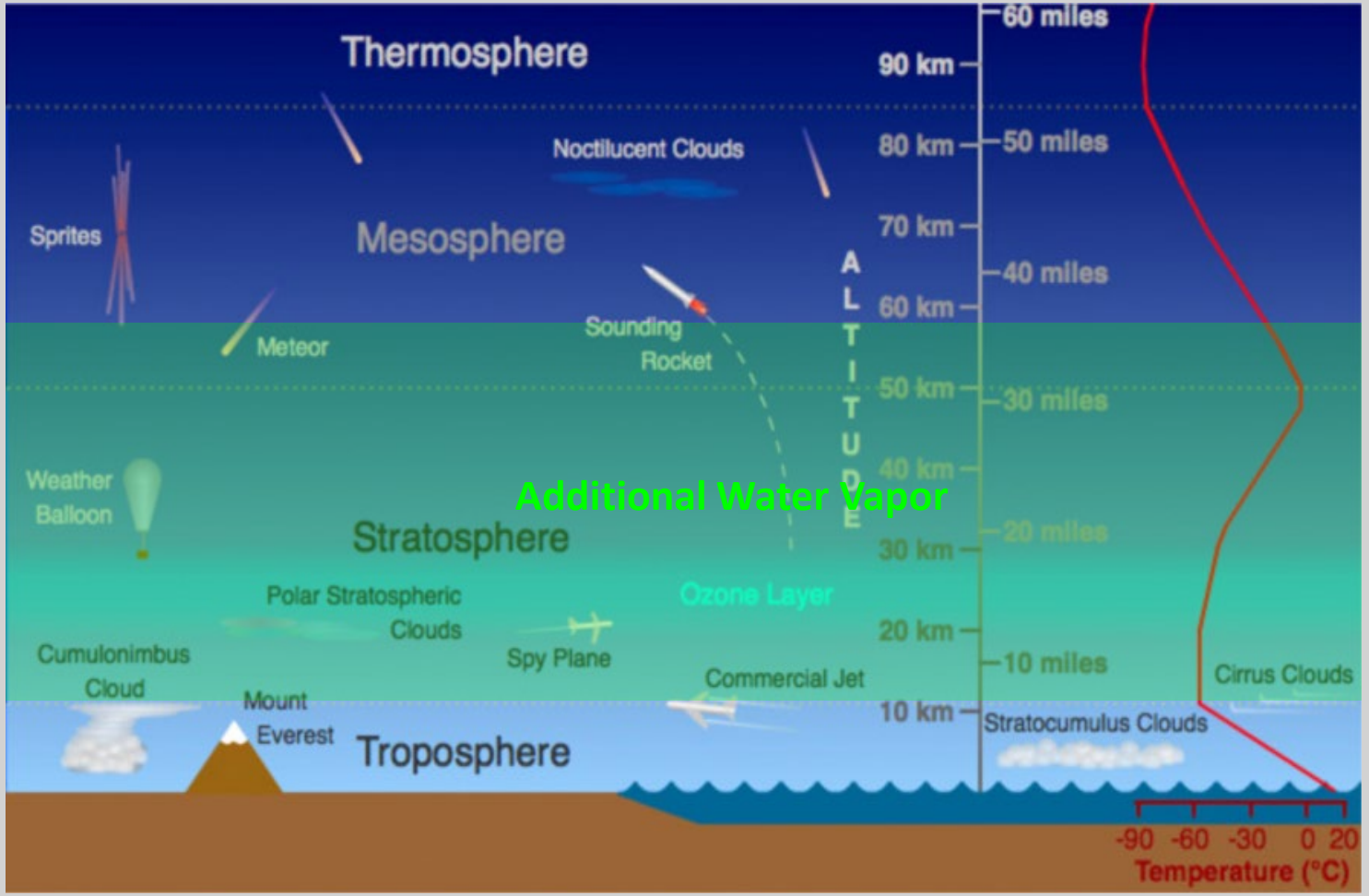
The Tonga Volcano eruption in January 2022 blasted 50 million metric tons of water vapor into the atmosphere, an estimated increase of between 5 - 13%. Water vapor is a greenhouse gas. Water vapor inhibits nighttime radiational cooling and traps heat from escaping. This effect is compounded in sea water and we are already seeing record warm water in the Atlantic. Tonga will be impacting our climate for several years and the impact on the climate could be very significant (especially in connection to heavy rainfall events) before the water vapor dissipates.



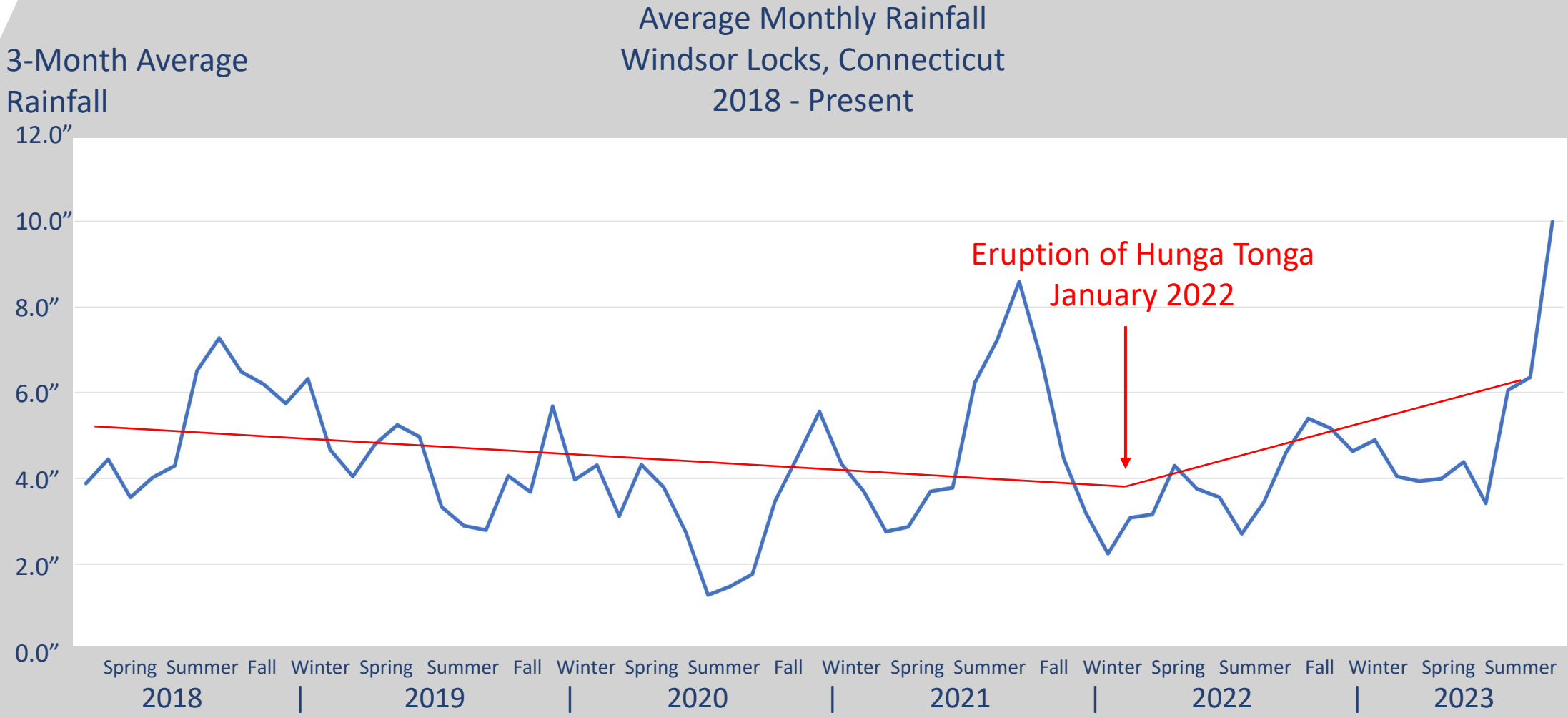
THE EFFECT OF ADDITIONAL H2O VAPOR

This additional water vapor (10% more than normal) may have un-predicable effects on weather patterns globally in the next few years. Conventional science suggests that the layer of extra water vapor high in the stratosphere and reaching the mesosphere could act like a blanket inhibiting nighttime radiational cooling. Another unknown is how long it will take the additional water vapor to evaporate. Estimates range from 2 to 10 years.

However, once the layer of moisture returns to normal, the excess energy that has been accumulating in the lower atmosphere (troposphere) will likely cause a re-bound effect with above normal severe weather and hurricanes.



IS TONGA AFFECTING LOCAL CLIMATE?



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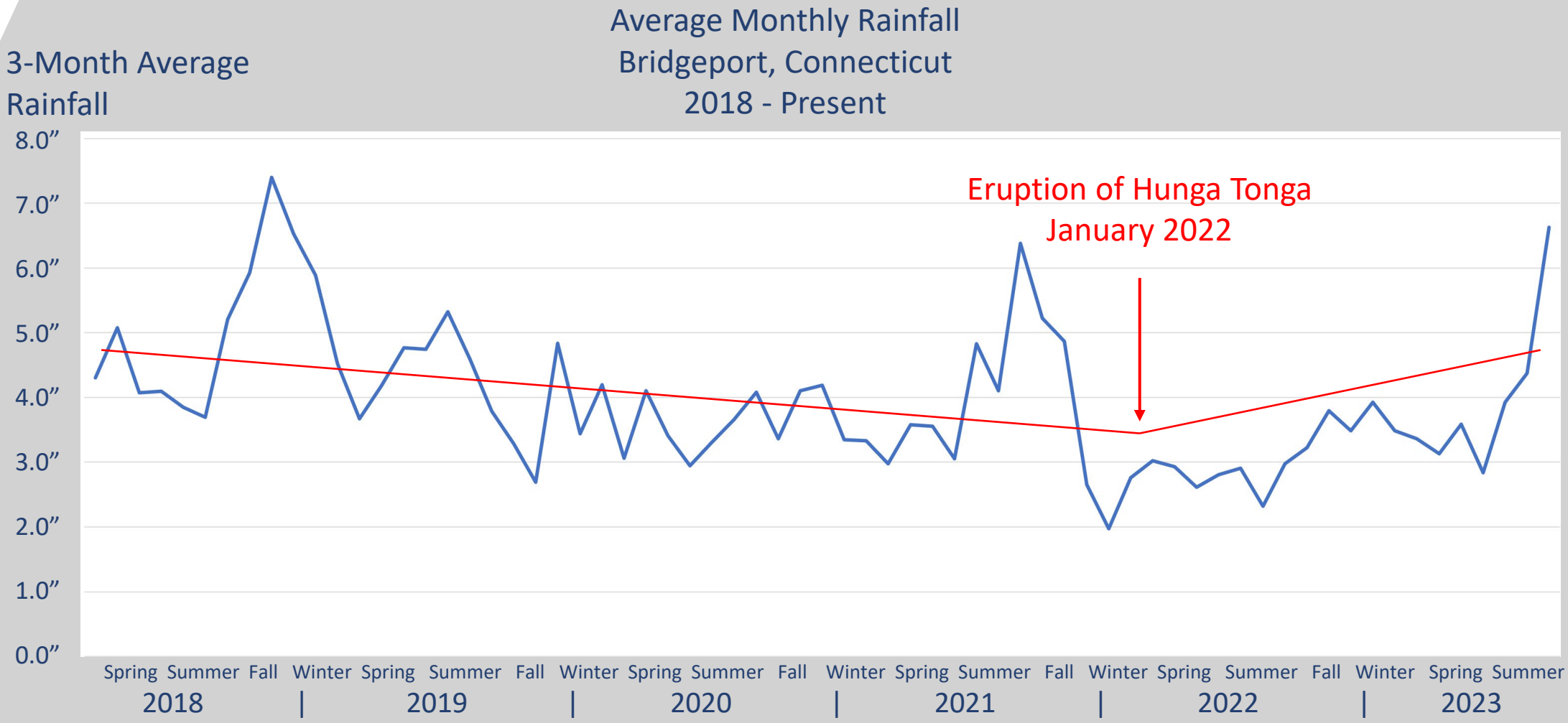


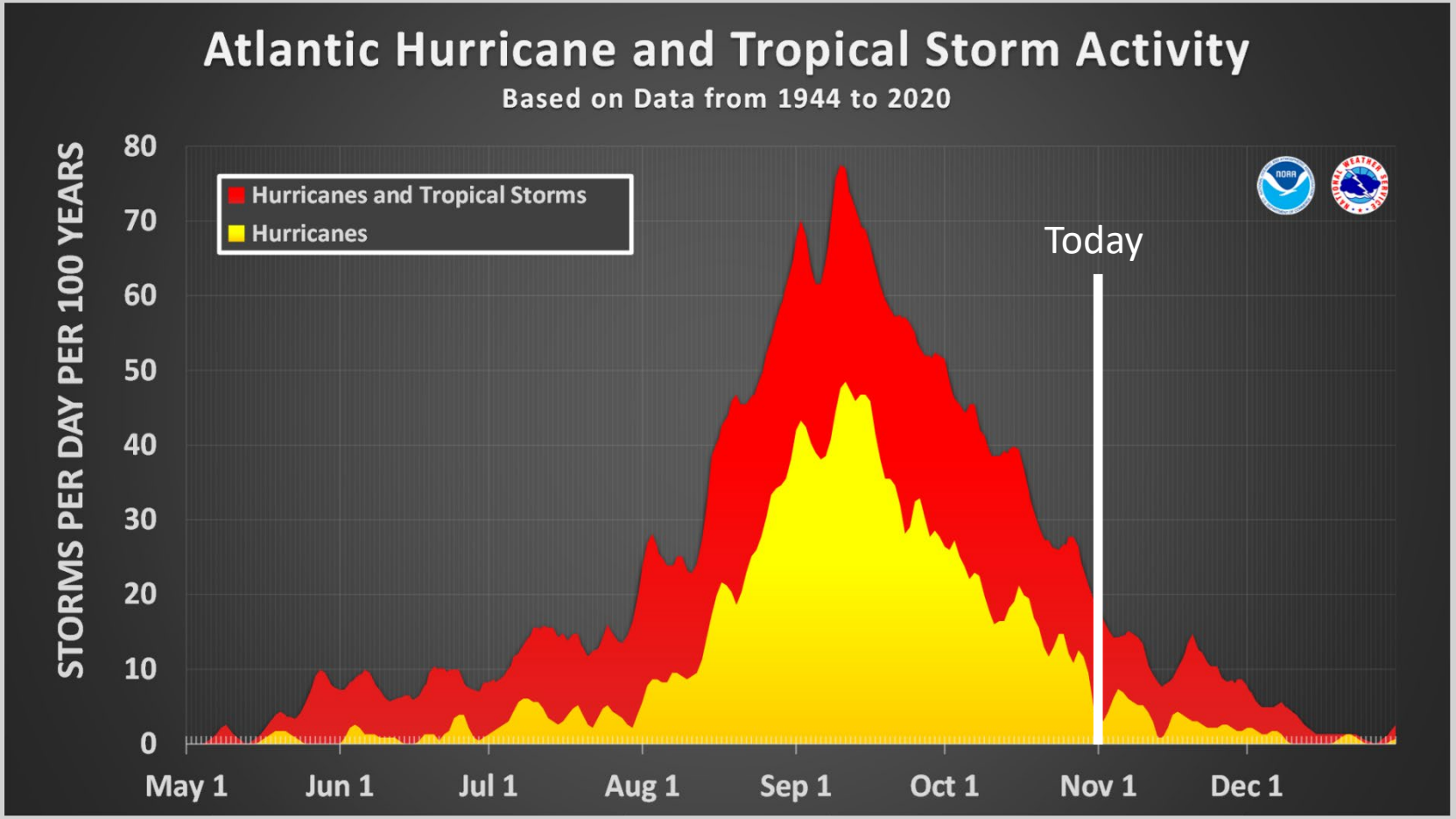
MORE STUDIES ARE NEEDED…

It’s too early to draw any conclusions about a possible increase in rainfall as a result of the Tonga Eruption. Extensive studies of thousands of rainfall records during the next several years will need to be conducted before a solid pattern can be identified.

Now lets take a look at the hurricane season which just officially ended but may not be over completely.

HURRICANE SEASON WRAP UP…

WHERE ARE WE IN THE SEASON?



FORECAST & CURRENT ACTIVITY

Comparison of Colorado State University Forecast to Current Activity

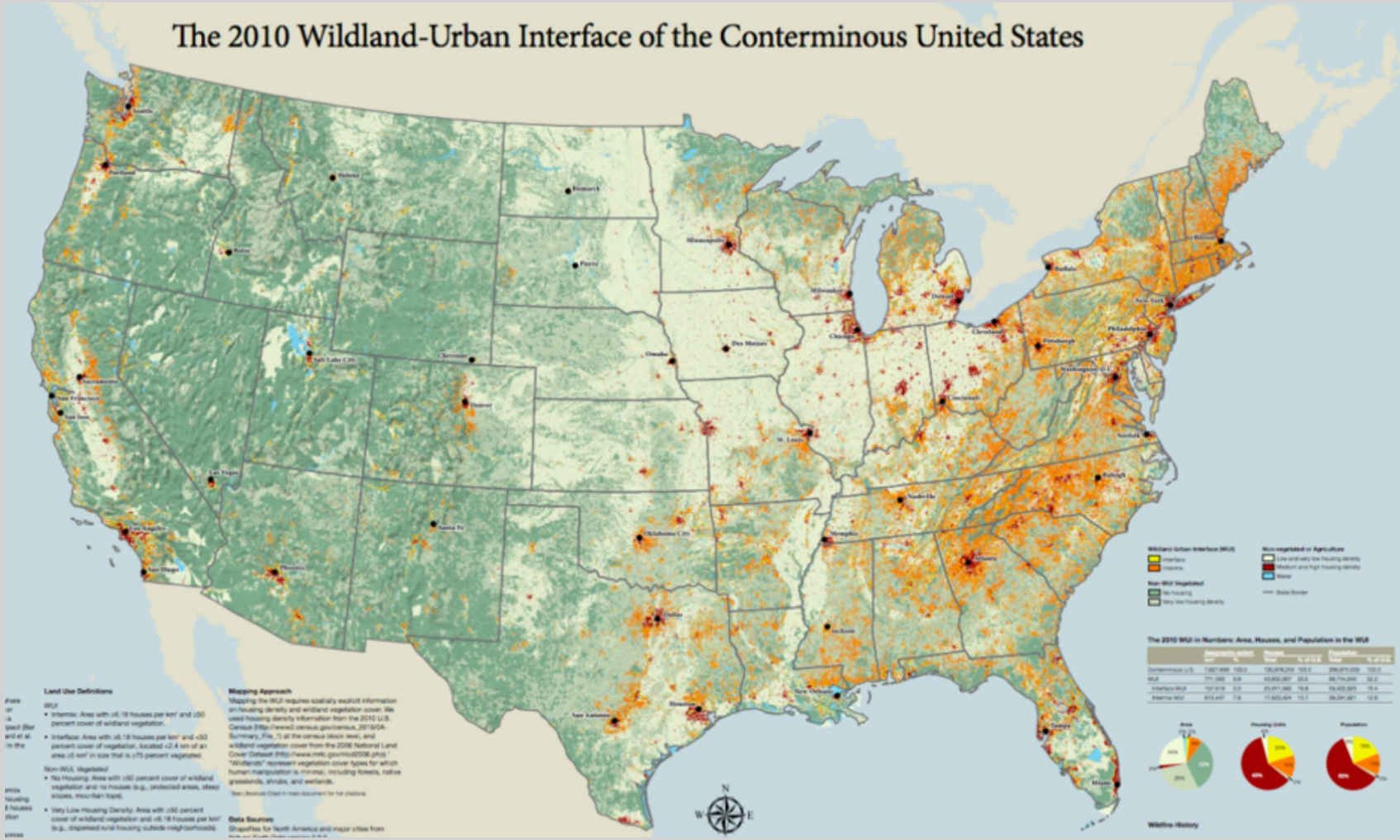
CATEGORY	# OF STORMS	NORMAL	AS OF 11/1
NAMED STORMS	18	14.4	17
HURRICANES	9	7.2	6
TROPICAL STORMS			11
INTENSE HURRICANES*	4	3.2	3

* Category III and Above

WILDLAND URBAN INTERFACE

What does a indicator of forest fire vulnerability have to do with hurricane damage?

The Wildland Urban Interface (WUI) is defined as areas where homes are built near or among lands prone to wildland fire.



WILDLAND URBAN INTERFACE

Connecticut ranks #1 in WUI in the United States. In the case of Connecticut the WUI consists of dense tree cover within suburban areas of the state. This dense tree cover is not only vulnerable to fire but also to hurricane winds.

By the way, Rhode Island and Massachusetts are #2 and #3 on the WUI ranking.

HURRICANE MULTIPLIER / CT STATS

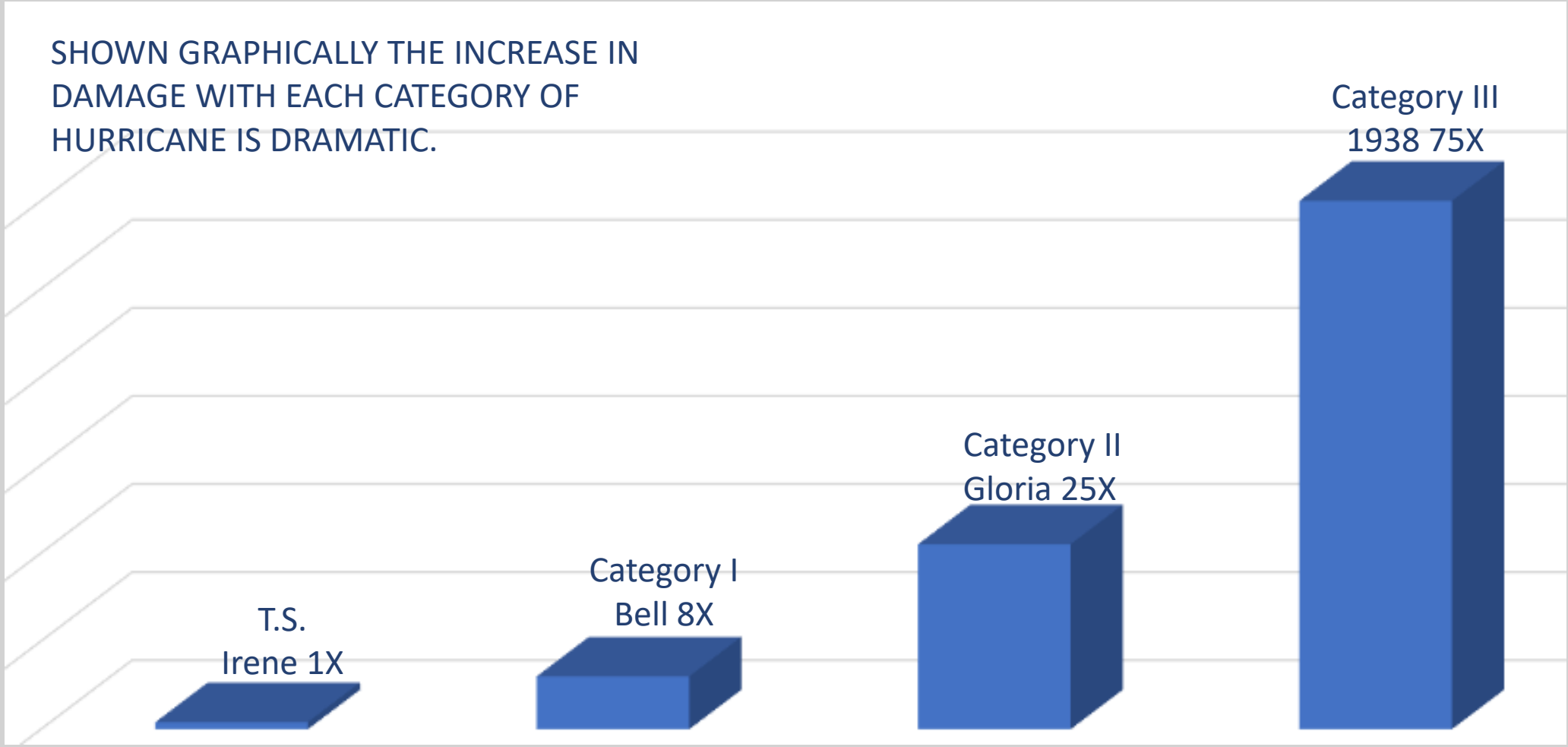
- WIND MULTIPLIER
- Damage exponentially increases as the wind increases.
- The wind damage is 10 times worse for a Category 2 hurricane compared to Category 1.

- CONNECTICUT HAS A LOT OF TREES
  - Highest urban tree cover in the nation.
  - 10 million trees within 50ft of a roadway in CT.

Category	Wind Speed			Damage Potential Multiplier
	mph	km/h	knots	
1	75	121	65	1x
	80	129	70	1.6x
	85	137	74	2.9x
	90	145	78	4.3x
	95	153	83	6.6x
2	100	161	87	10x
	105	169	91	15x
	110	177	96	21x
3	115	185	100	30x
	120	193	104	43x
	125	201	109	60x
4	130	209	113	82x
	135	217	117	110x
	140	225	122	147x
	145	233	126	195x
	150	241	130	256x
	155	249	135	333x
5	160	257	139	429x
	165	266	143	549x
	170	274	148	697x
	175	281	152	879x
	180	290	156	1101x
	185	298	161	1371x
	190	306	165	1696x

HURRICANE MULTIPLIER / CT STATS

SHOWN GRAPHICALLY THE INCREASE IN DAMAGE WITH EACH CATEGORY OF HURRICANE IS DRAMATIC.



CONNECTICUT STATS

- CATEGORY 1 HURRICANE
  - 20 PERCENT TREE LOSS
  - (Irene took out 1 to 2 percent of trees)
  - 727,000 POWER OUTAGE REPORTS
  - 101 ROADS CLOSED DUE TO FALLEN TREES AND POWER LINES.
  - RECOVERY OF 1 TO 2 WEEKS.

- CATEGORY 2 HURRICANE
  - 40 PERCENT TREE LOSS

- CATEGORY 3 HURRICANE
  - 75 PERCENT TREE LOSS
  - 30,000 MILES OF DOWNED POWER LINES
  - 175,000 BREAKS WITH RECOVERY TIME OF A MONTH OR MORE
  - The Hurricanes of 1938, 1944 and Hurricane Carol in 1954 were all Category 3 strength.

CONCLUSION

CONNECTICUT AND NEW ENGLAND ARE FAR OVERDUE FOR A MAJOR HURRICANE. IF WE ARE HIT, WE WILL BE COMPETING WITH NEW YORK, RHODE ISLAND, MASSACHUSSETS, VERMONT AND NEW HAMPSHIRE FOR RESTORATION CREWS AND FEDERAL RESOURCES.

IT ONLY TAKES ONE !!!

WINTER WEATHER FORECAST

WINTER WEATHER FORECAST

A QUICK WORD ABOUT LONG RANGE FORECASTING

Forecasts greater than 14 days in advance are often not much better than throwing darts at a dartboard. In order to have some measure of confidence and consistency, seasonal forecasts must rely on trends in climatology, analog years, and modeling.

Even if all the indicators point to the same result, events such as volcanic eruptions and major storms can suddenly cool the atmosphere or change the weather pattern and render a seasonal forecast useless.

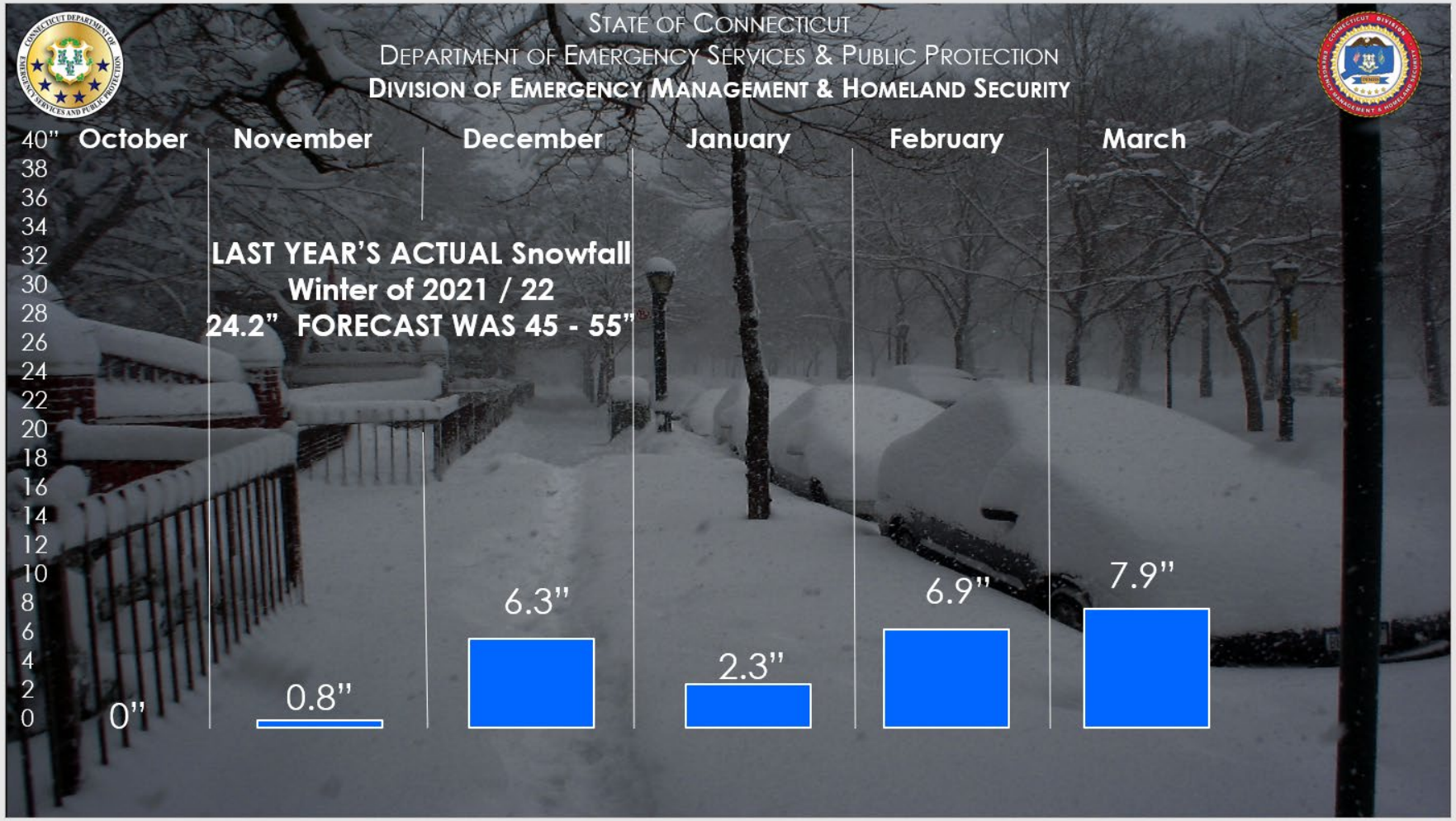
WINTER WEATHER FORECAST

A QUICK WORD ABOUT LONG RANGE FORECASTING

The following presentation uses commonly accepted indicators of long range seasonal patterns. This presentation takes a look at each indicator and what that indicator is forecasting for the upcoming winter.

However, all forecasts contain large bell curves or probabilities that cover a wide range of possibilities. Each indicator contains a wide range of possible outcomes and some indicators such as El Nino are difficult to predict which compounds the errors inherent in a seasonal forecast.

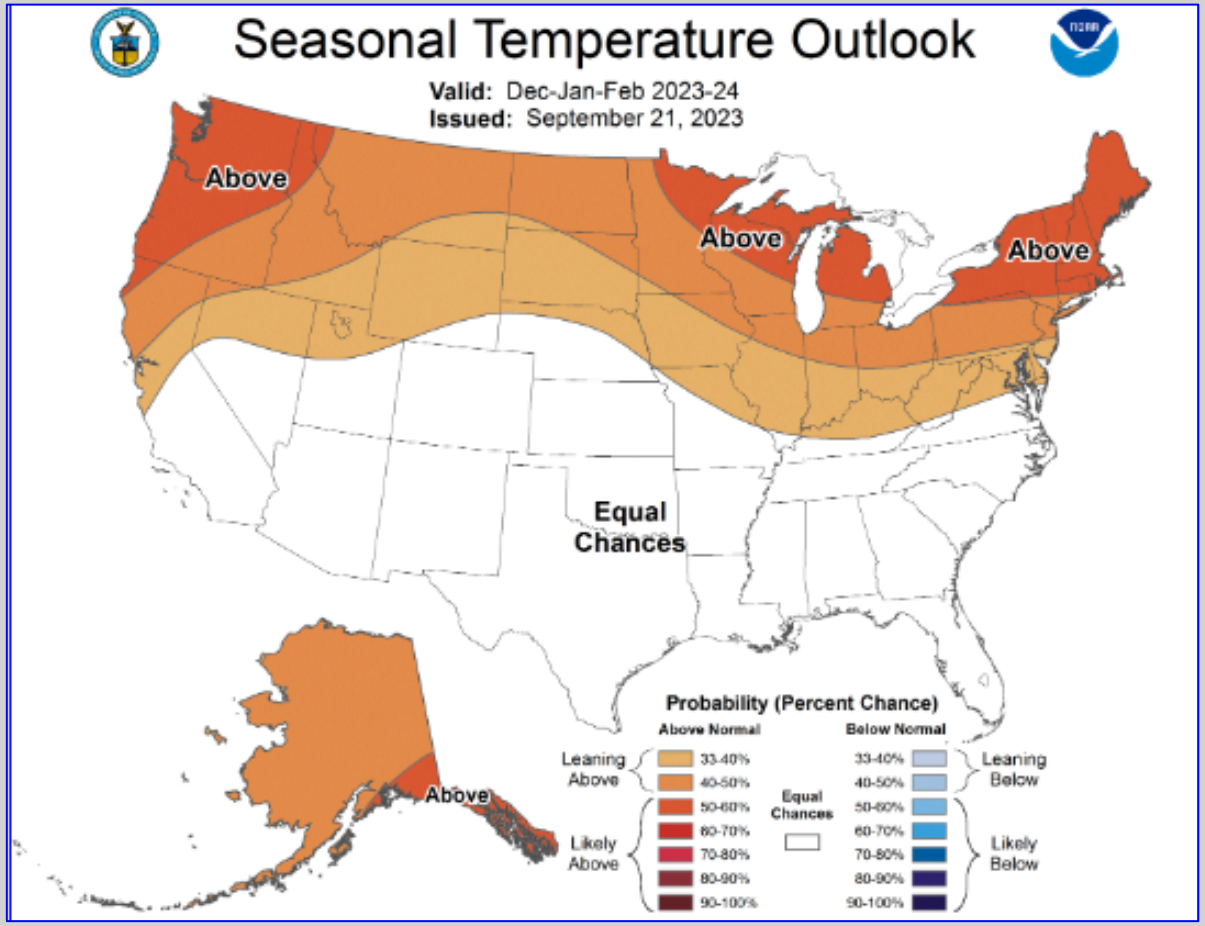
WINTER WEATHER FORECAST



MAJOR INDICATORS FOR THIS YEAR

NOAA IS FORECASTING A WARMER THAN NORMAL WINTER

The National Oceanic and Atmospheric Administration (NOAA) is forecasting that temperatures this winter will average above normal for the northern third of the country including the Northeast. NOAA is forecasting a 50% - 60% probability that this winter will be warmer than normal in the Northeast.

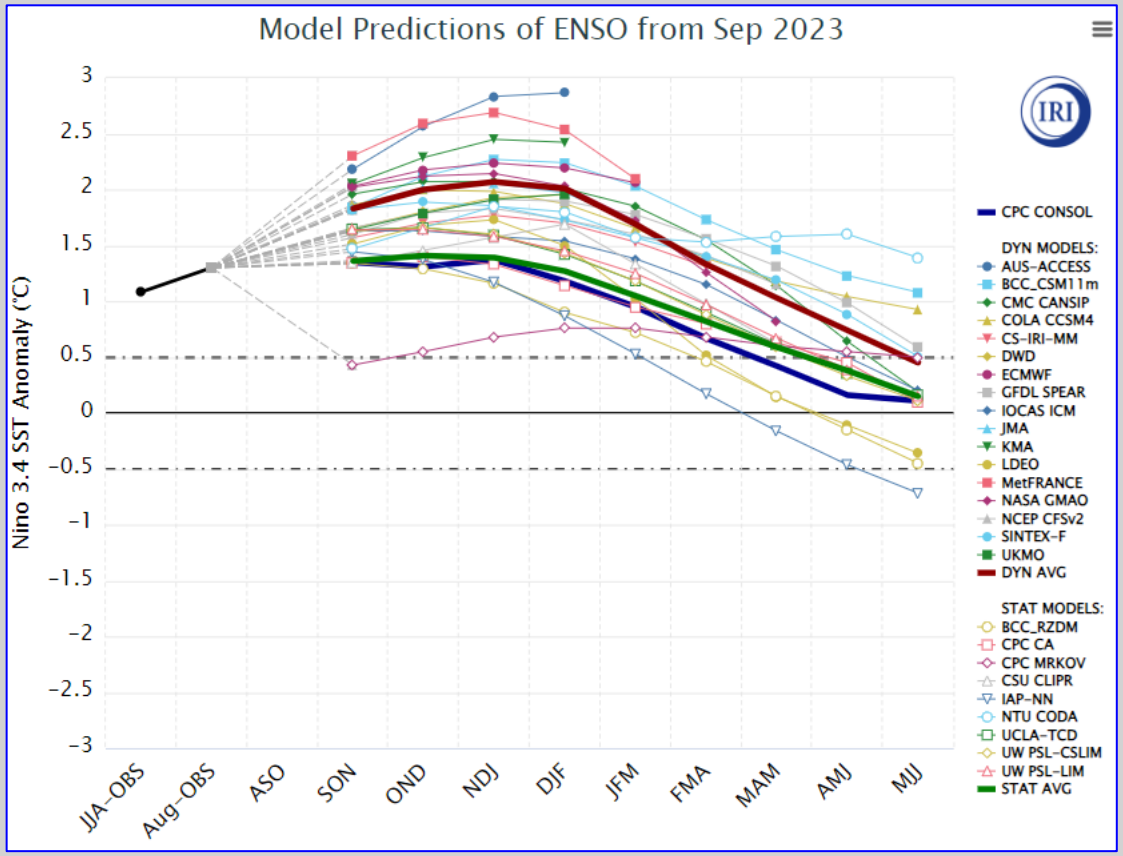


MAJOR INDICATORS FOR THIS YEAR

Let's Take a Look at the El Nino Forecast

The current monthly North American Monthly Model Ensemble (NMME) El Nino forecast from the NWS Climate Prediction Center is forecasting the likelihood of a minor to moderate La Nina (-0.7 C) for most of the upcoming winter.

Notice, however that the range of forecasts in the ensemble is spread over a wide range of possibilities.



MAJOR INDICATORS FOR THIS YEAR

Farmers Almanac
2023-24 Winter Forecast

Don’t laugh !!! The Farmers Almanac is actually correct about 80% of the time. For this winter the Farmers Almanac is predicting a near normal winter for Connecticut with snowfall perhaps a little below normal. More freezing rain and sleet is expected near the coast.

MAJOR INDICATORS FOR THIS YEAR

Private Weather Services 2024 Winter Forecasts

Some of the private weather services such as ACCU Weather are forecasting a typical La Nina pattern for this winter. The ACCU Weather snowfall predictions for the northeast are slightly below the normal range. However, other private services are going higher on the snowfall amounts.

Location	Average Snowfall	Snowfall 2022-2023	Prediction 2023-2024
Boston, MA	49.2	12.4	38-44
New York City, NY	29.8	2.3	18-26
Philadelphia, PA	23.1	0.3	16-24
Pittsburgh, PA	44.1	17.6	28-36
Buffalo, NY	95.4	133.6	70-85

MAJOR INDICATORS FOR THIS YEAR

	SNOWFALL			TEMPERATURES		
FORECAST INDICATOR	**Above Normal**	**Normal**	**Below Normal**	**Above Normal**	**Normal**	**Below Normal**
NOAA NCEP Outlook			✓	✓		
El Nino / La Nina			✓	✓		
Old Farmer's Almanac		✓			✓	
Private Weather Services			✓		✓	
Overall Outlook			✓	✓		

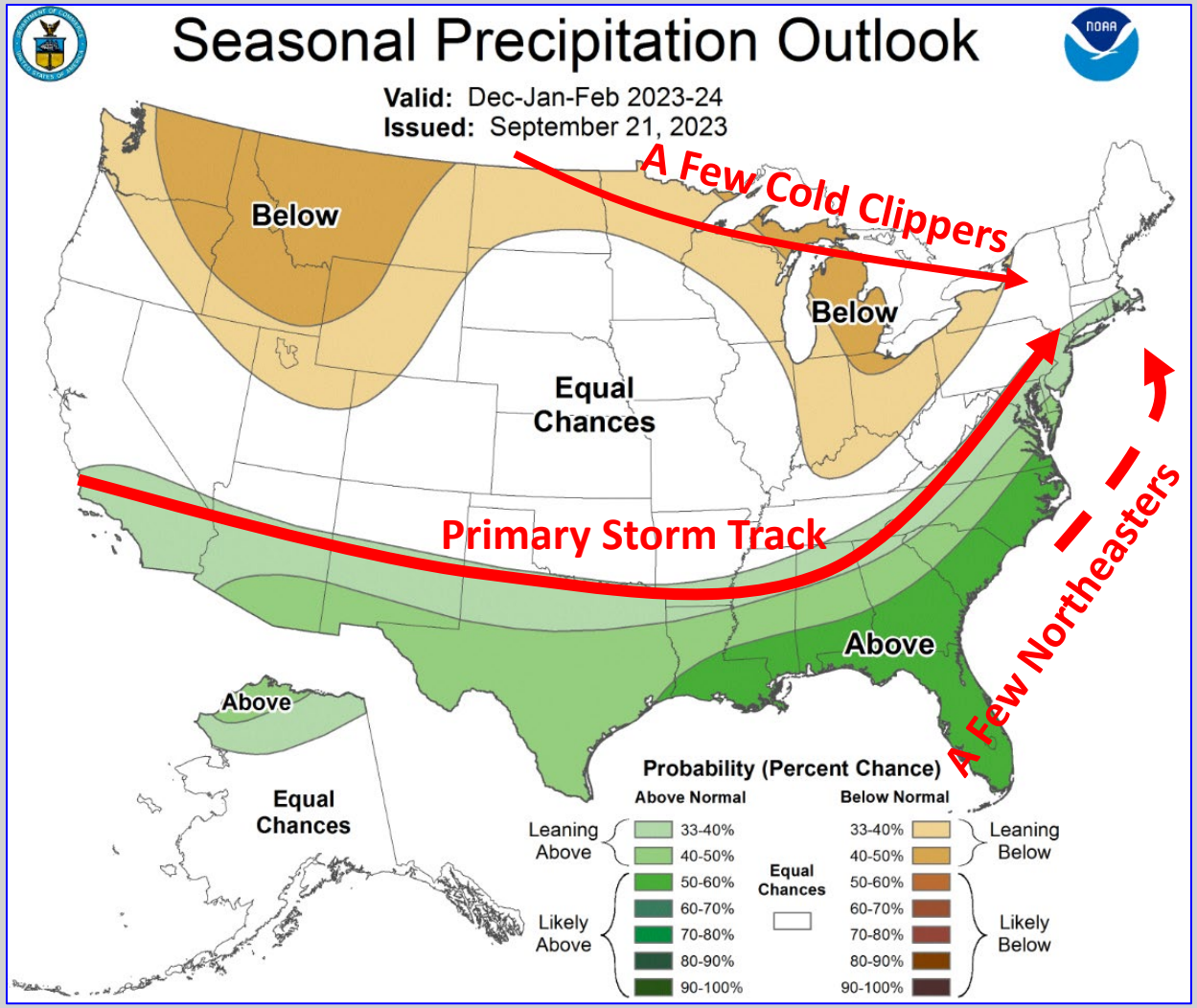
So Where are the indicators Pointing ???

Looking at the table above shows that most forecast indicators are pointing to a below normal snowfall this winter along with above normal temperatures. Given this profile, cities in southern New England may see a few big snowstorms along with several sleet and rain events also. Towns in northern New England may be in for a good ski season, especially across the higher elevations with a drier snow more likely and possibly a lot of it.

MAJOR INDICATORS FOR THIS YEAR

Primary Storm Tracks & Warm Water

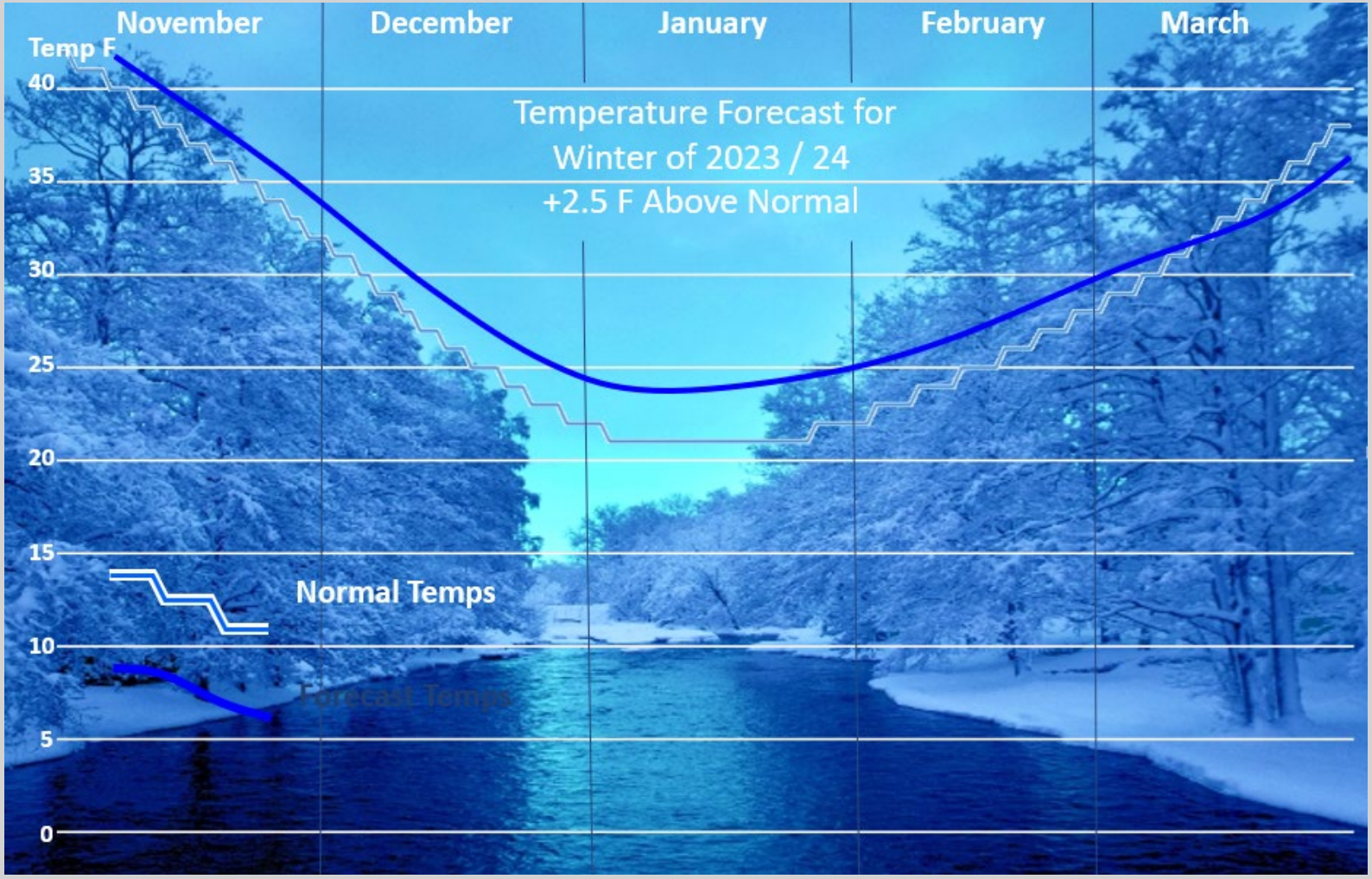
This map shows the current 1.5 month lead precipitation forecast from NOAA for December, January and February. The red lines show a primary storm track from the U.S. southwest thru the southern states and up into New England. A few clipper systems can also be expected along with a few arctic outbreaks. Finally, a few northeasters are also expected along the coast. The real wild card for this winter is some very warm water south of New England. Does this warm water provide the energy for a few big northeasters, or does it just turn our snowstorms into rain? We will find out.



TEMPERATURE FORECAST

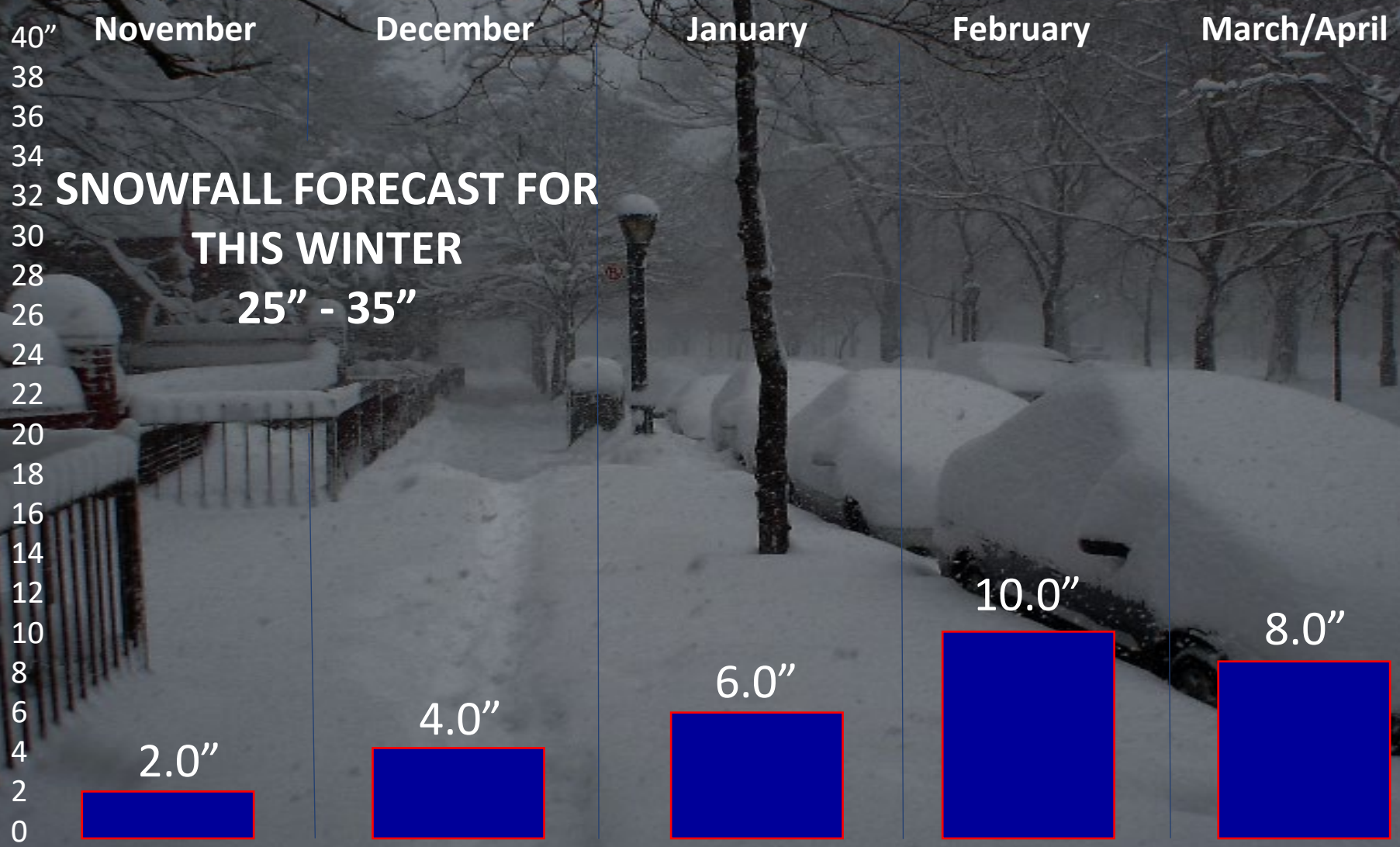
Temperatures

In general, we are expecting a warmer than normal winter. Several factors appear to be coming together (El Nino and the effects of Tonga) to keep temperatures above normal from November to February. March may see colder temperatures towards the end of the month. Of course, arctic outbreaks will still occur at times.

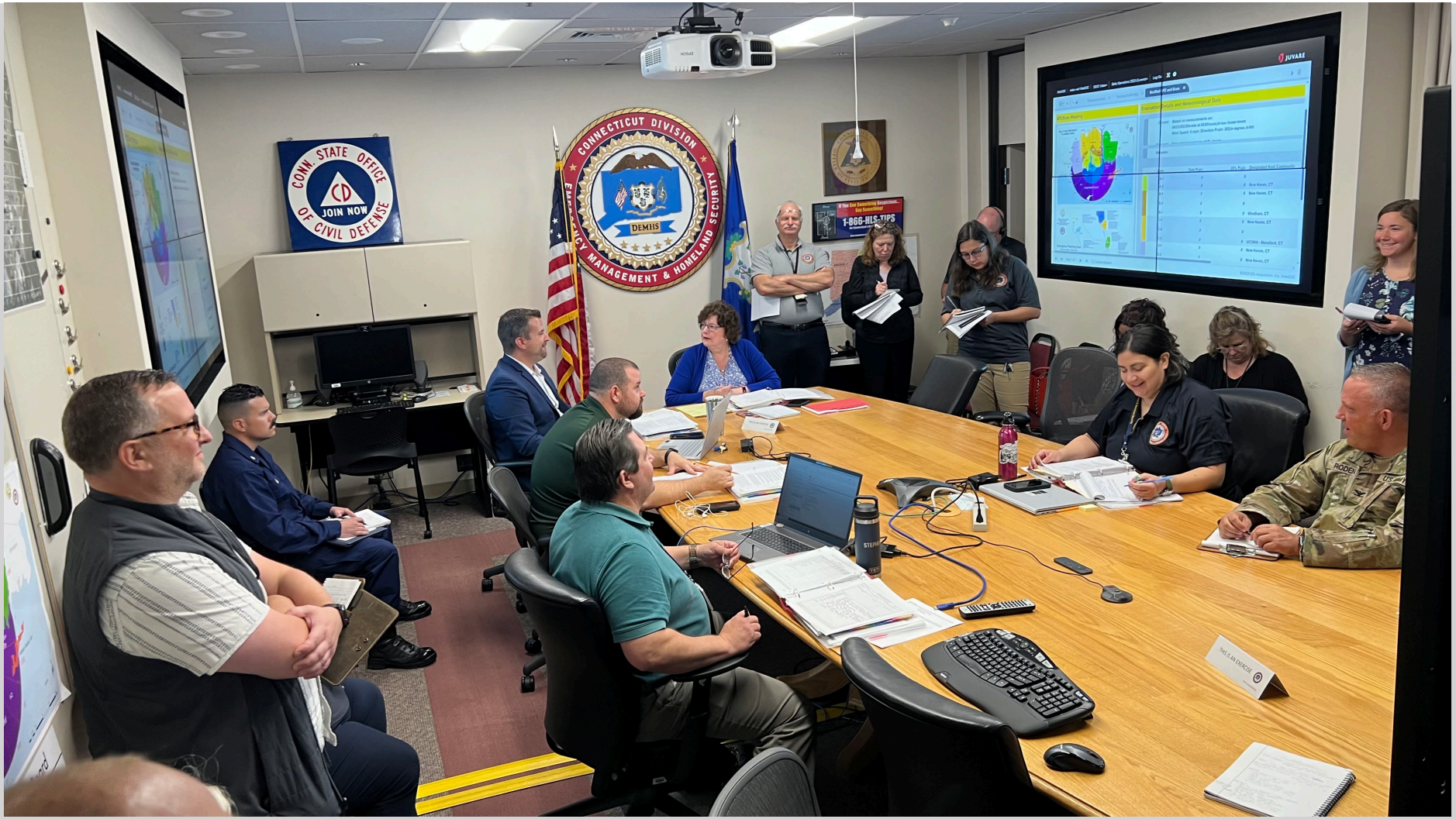


STATE OF CONNECTICUT
DEPARTMENT OF EMERGENCY SERVICES & PUBLIC PROTECTION
DIVISION OF EMERGENCY MANAGEMENT & HOMELAND SECURITY

SNOWFALL FORECAST FOR THIS WINTER
25” - 35”



EMERGENCY MANAGEMENT IN CT…



EMERGENCY MANAGEMENT IN CT…

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)

The Division of Emergency Management and Homeland Security (DEMHS) is charged with developing, administering, and coordinating a comprehensive and integrated statewide emergency management and homeland security program that encompasses all human-made and natural hazards, and includes prevention, mitigation, preparedness, response, and recovery components to ensure the safety and well-being of the citizens of Connecticut.

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)

Brenda Bergeron, Esq

Deputy Commissioner

Attorney Brenda Bergeron has served the State of Connecticut as legal advisor for the Department of Emergency Management and Homeland Security (DEMHS) since 2005. In 2011, DEMHS became a division of the Department of Emergency Services and Public Protection. Among other duties, she has advised the Governor's Unified Command on legal issues during emergencies at the State Emergency Operations Center in Hartford, CT.

William H. Turner III

State Emergency Management Director

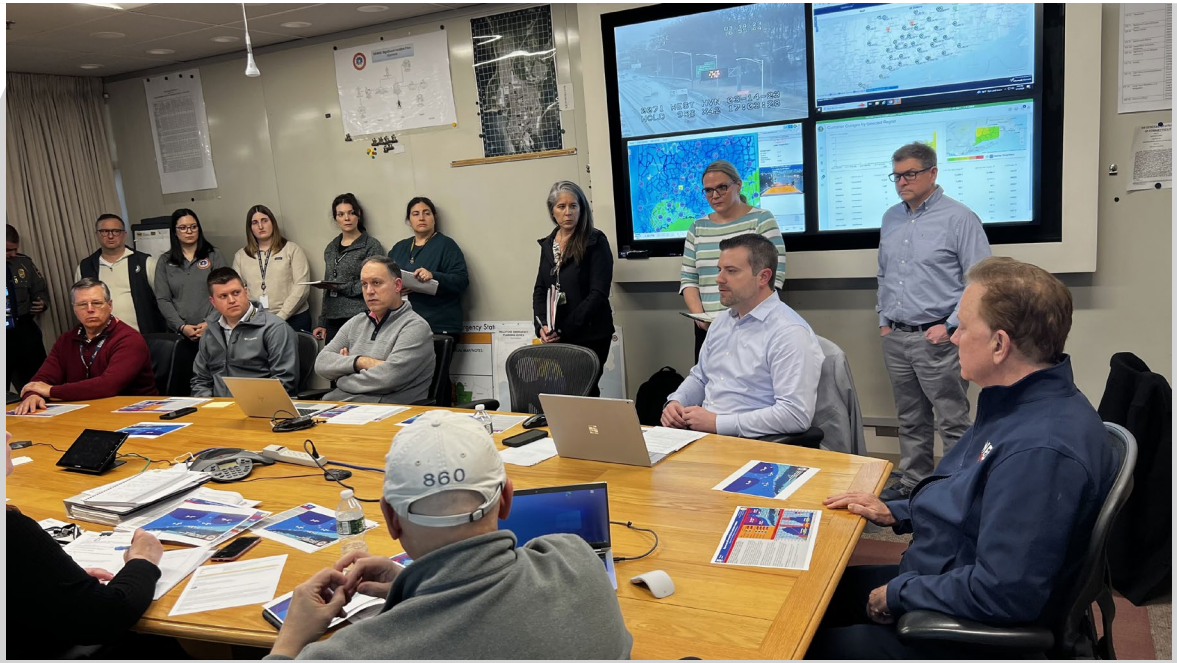
William Turner joined the Connecticut State Department of Emergency Management and Homeland Security (DEMHS) in 2022 as the Emergency Management Director. The Director is responsible for directing staff and operations of DEMHS during disaster situations and overseeing coordination, planning and management of state and federal programs involving preparedness, planning, mitigation, response and recovery from emergencies and natural disasters, and during post-disaster recovery operations and pre-disaster planning

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)

State Emergency Operations Center

- The State Emergency Operations Center (SEOC) is the State's coordination center for emergency services during any major emergency affecting the State of Connecticut.
- The SEOC is activated when ordered by the Governor or designated representative at the Department of Emergency Services and Public Protection.
- The SEOC is located on the ground floor of the State Armory, 360 Broad Street, Hartford, Connecticut.

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)



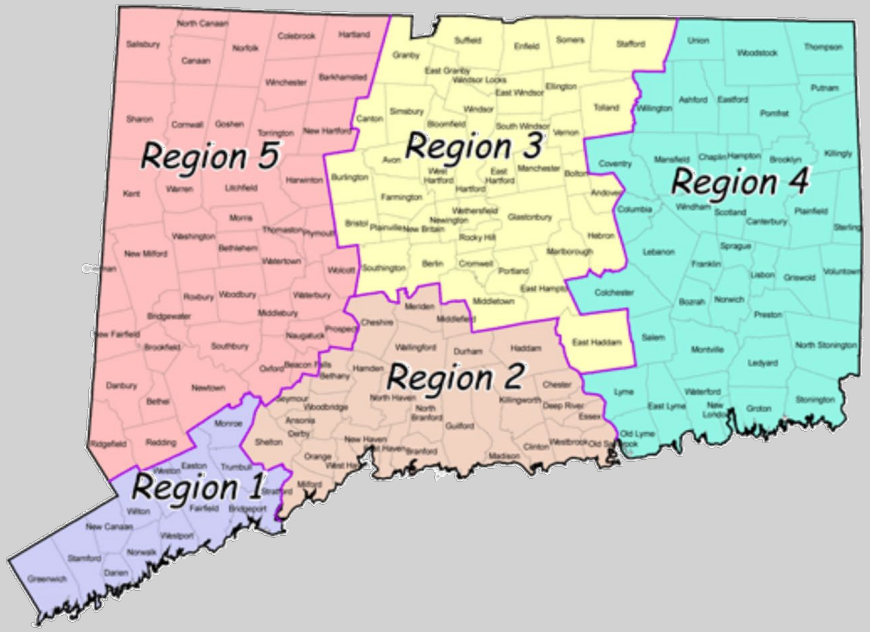
State Emergency Operations Center

- When a major emergency or disaster strikes, centralized emergency management is needed.
- The SEOC facilitates a coordinated response by the Governor, State Emergency Management officials and key disaster specific representatives.

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)

DEMHS Regional Offices

With a lack of county government structure in Connecticut, DEMHS developed with its local partners emergency preparedness regions in 2007. These regions were created to facilitate emergency management and homeland security planning and regional collaboration.



Regional Office Contact Information

REGION 1	REGION 2	REGION 3	REGION 4	REGION 5
Office: 203-696-2630 Email: demhs.region1@ct.gov	Office: 860-685-8105 Email: demhs.region2@ct.gov	Office: 860-529-6893 Email: demhs.region3@ct.gov	Office: 860-465-5460 Email: demhs.region4@ct.gov	Office: 203-591-3509 Email: demhs.region5@ct.org
Robert Kenny Regional Coordinator	Nicole Velardi Regional Coordinator	Josh Cingranelli Regional Coordinator	Mike Caplet Regional Coordinator	John Field Regional Coordinator

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)

How do we get the right info to the right people at the right time?

- When there is a statewide incident that warrants a press release from the Governor's Office, we will disseminate the release to the ESF-15 Diverse Communities Taskforce.
  - They send the important info throughout their networks and translate it into the language spoken by their community.
- Sign up for local and state alerts by going to the website of your city/town, or the state CT ALERT website.
- You can stay connected with CT DEMHS by following us on X, formerly known as Twitter.
  - **@CTDEMHS**

DIVISION OF EMERGENCY MANAGEMENT AND HOMELAND SECURITY (DEMHS)

Questions ???

Douglas Glowacki
Department of Emergency Services and Public Protection
Division of Emergency Management and Homeland Security