



# Building a Weather-Ready Nation

## National Weather Service



## Winter Hazards in the NRV

**Phil Hysell**  
Warning Coordination Meteorologist  
National Weather Service  
Blacksburg, VA

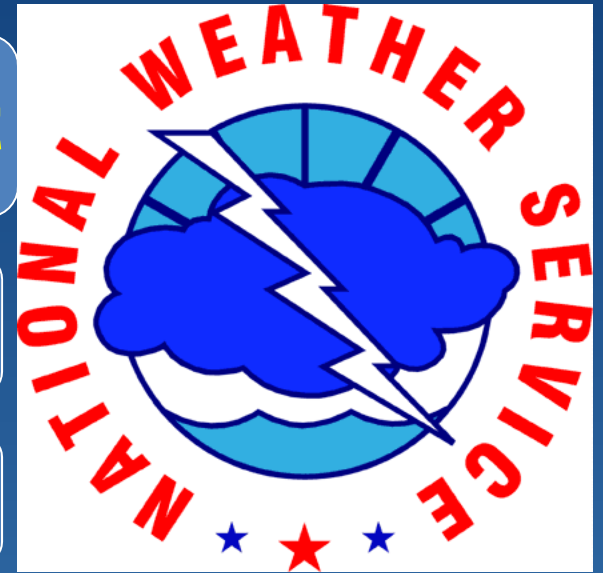
# Who Are We?



**U.S. Government**

**Dept. Of Commerce**

**NOAA**



**National Weather Service**

**NESDIS**

**NOAA  
Research**

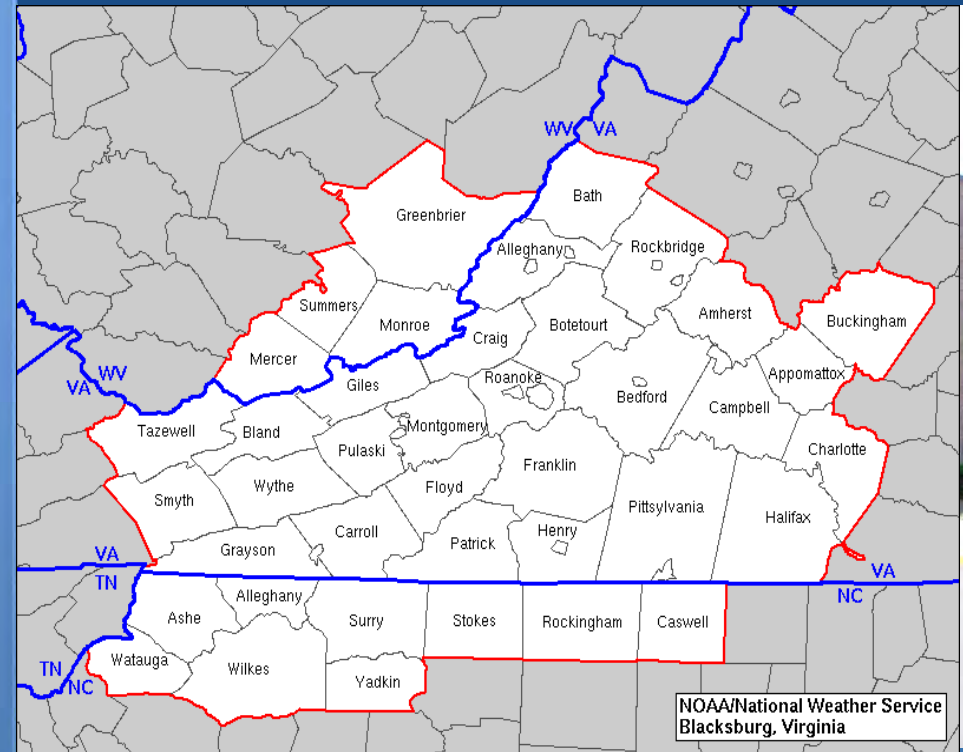
**Ocean  
Service**

**Fisheries**

**Marine and  
Aviation  
Operations**

# Who is the National Weather Service?

- ✦ Hourly Weather Forecasts through 7 days for 40 counties in 4 states.
- ✦ Open 24/7
- ✦ Warnings and Advisories
- ✦ River Forecasts and Summaries
- ✦ Climate Summaries
- ✦ Fire Weather Forecasts
- ✦ Aviation Forecasts





# Winter Weather Safety

## Winter Weather Hazards



- Snow & Ice
- Blizzards
- Freezing Rain & Sleet
- Cold Temperatures
- Wind
- Flooding
- Fog



*Building a Weather-Ready Nation*

[www.weather.gov/safety](http://www.weather.gov/safety)



# Winter Weather Safety



## What Defines a Winter Storm and a Blizzard?

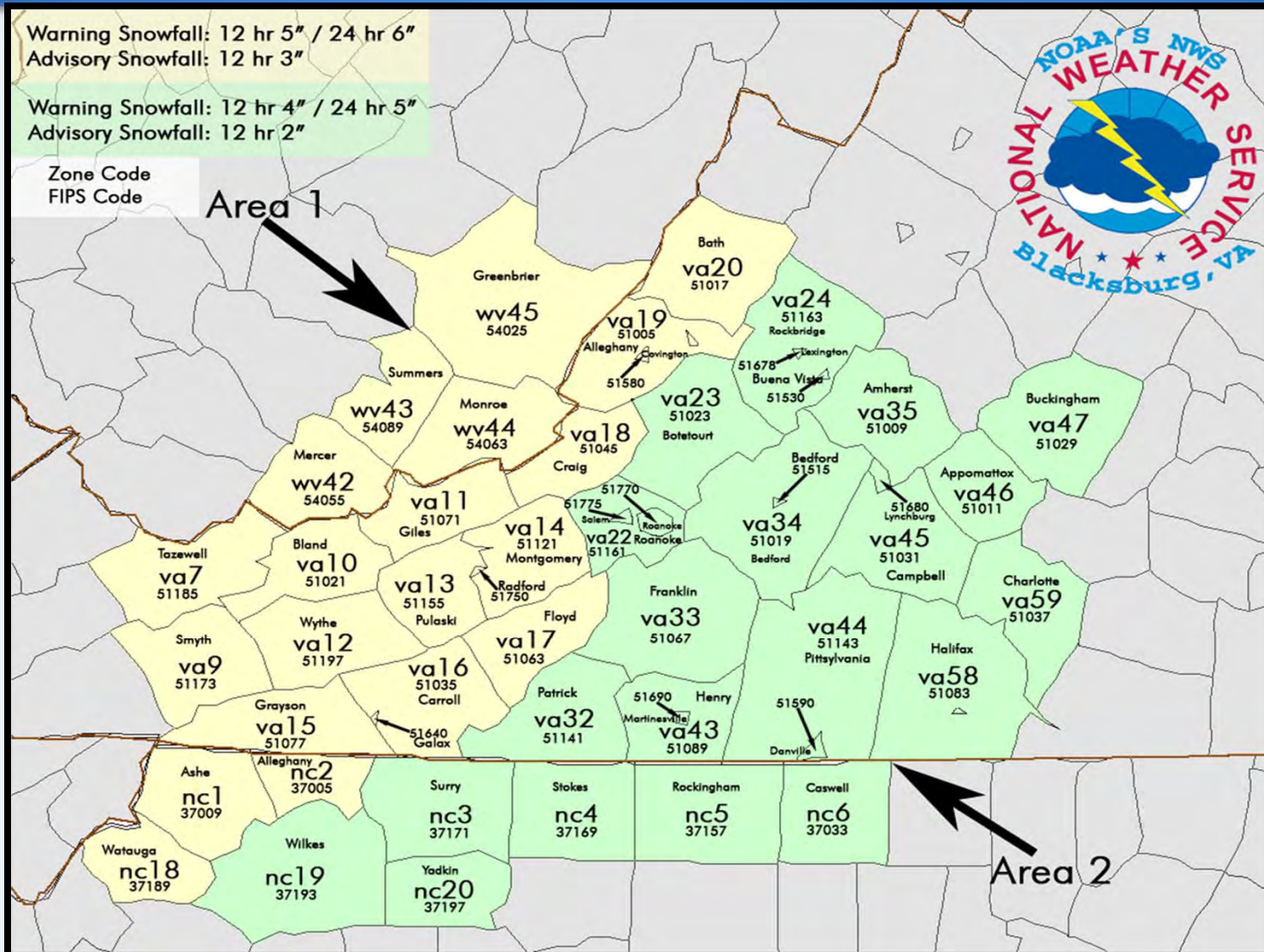
Product examples	All Snow	All Sleet	All Ice
<b>Winter Storm Watch</b> <b>Winter Storm Warning</b> <b>Ice Storm Warning</b> <i>&lt;Verified&gt;</i> <a href="#">View Regional Criteria</a>	<u>WEST</u> 5" in 12 hrs -or- 6" in 24 hrs. <u>EAST</u> 4" in 12 hrs -or- 5" in 24 hrs  <b>THESE ARE MIDPOINT VALS</b>	<u>WEST or EAST</u>  2.0"	<b><math>\geq 1/4</math> inch</b>  <u>"SPIA" Index for Ice/Wind Impacts</u>
<b>Blizzard Watch</b> <b>Blizzard Warning</b> <i>&lt;Verified&gt;</i>	Sustained or frequent gusts $\geq 35$ mph AND considerable blowing/drift of snow reducing visibilities frequently $< 1/4$ mile for three hours or more.		

- ▶ Not all impactful winter weather events are due to the NWS definition of a ‘winter storm’
- ▶ No recorded entries of “blizzards” in StormData since 1950 in the NRV.





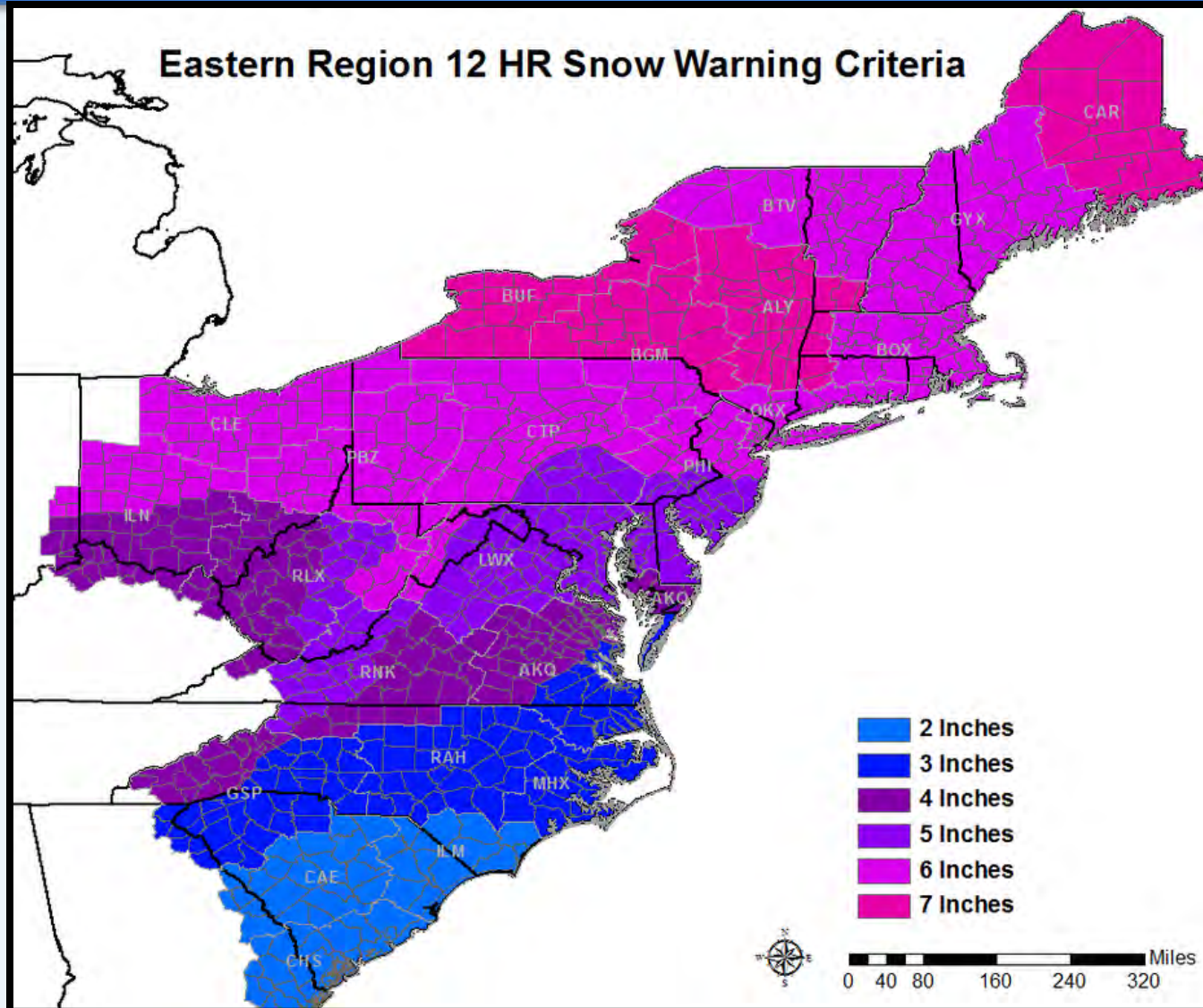
# Winter Storm Warning Criteria



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# Winter Storm Warning Criteria



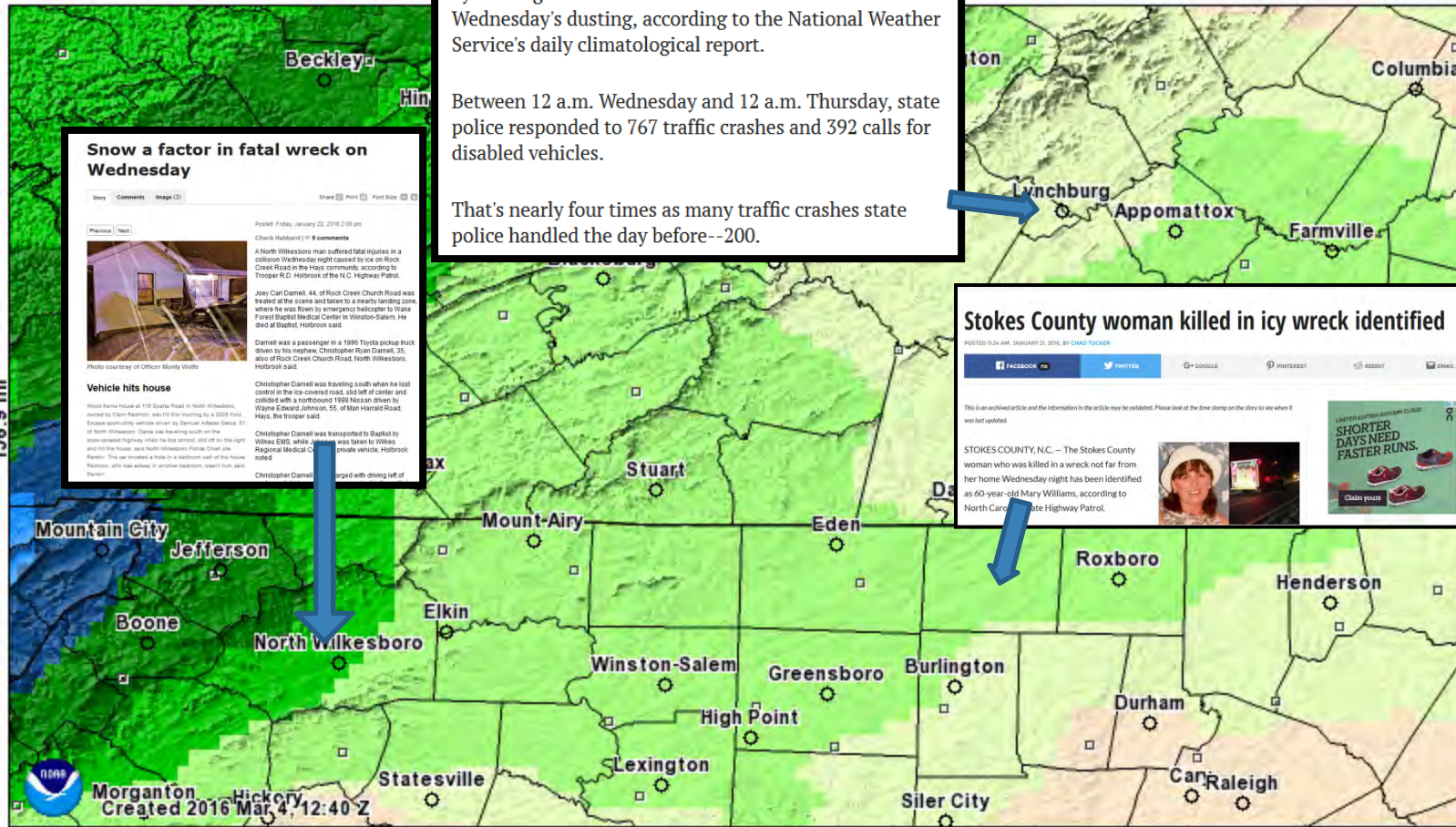


# Winter Storm?

## Wednesday January 20<sup>th</sup>, 2016



### Interpolated Observed Snowfall Analysis during 48h preceding 2016 January 21, 12:00 UTC



Lynchburg received one-tenth of an inch of snowfall in Wednesday's dusting, according to the National Weather Service's daily climatological report.

Between 12 a.m. Wednesday and 12 a.m. Thursday, state police responded to 767 traffic crashes and 392 calls for disabled vehicles.

That's nearly four times as many traffic crashes state police handled the day before--200.

**Snow a factor in fatal wreck on Wednesday**

Wood Home House at 115 Sparta Road in North Wilkesboro, owned by Glenn Robinson, was hit this morning by a 2005 Ford Escape sport utility vehicle driven by Kenneth Adams (age 51) of North Wilkesboro. Adams was traveling south on the state-maintained highway when he lost control, slid off on the right and hit the house, said North Wilkesboro Police Chief Joe Rapier. The car landed a hole in a bathroom wall of the house. Rapier, who was asked to provide a statement report from the scene, noted:

Christopher Daniels was traveling south when he lost control in the ice-covered road, slid left of center and collided with a northbound 1990 Nissan driven by Wayne Edward Johnson, 55, of Main Hartsell Road, Hays, the trooper said.

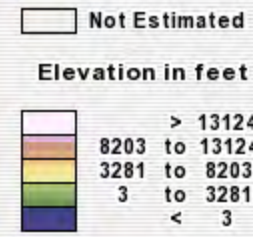
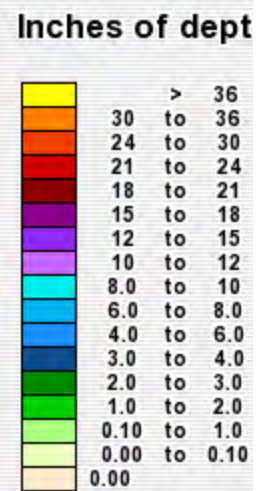
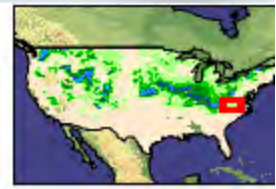
Christopher Daniels was transported to Baptist by Wilkes EMS, while Johnson was taken to Wilkes Regional Medical Center.

Christopher Daniels was charged with driving left of center.

**Stokes County woman killed in icy wreck identified**

POSTED 11:24 AM, JANUARY 21, 2016, BY CHAD TUCKER

STOKES COUNTY, N.C. — The Stokes County woman who was killed in a wreck not far from her home Wednesday night has been identified as 60-year-old Mary Williams, according to North Carolina State Highway Patrol.

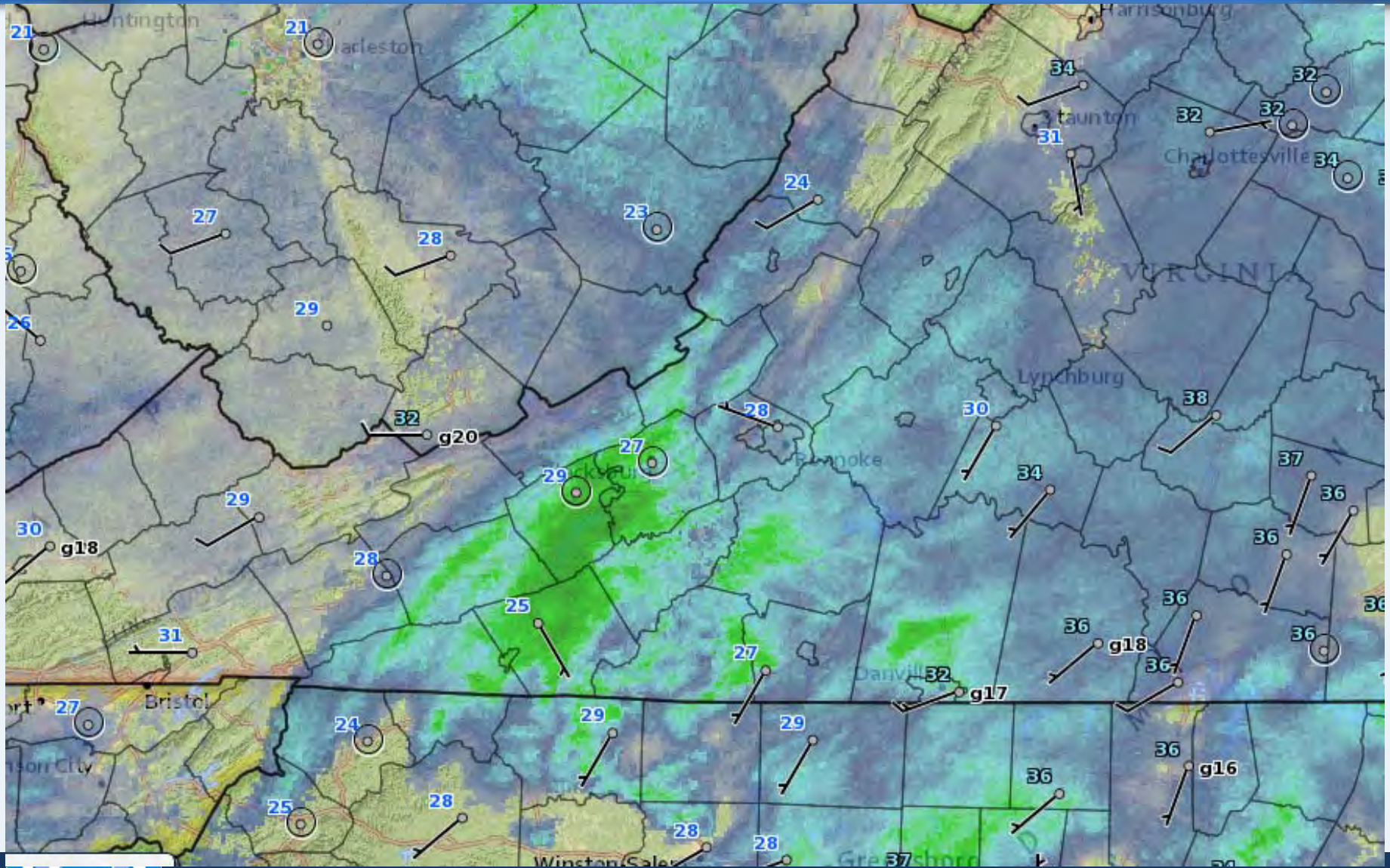






# January 20<sup>th</sup>, 2016

## Radar and Observations at 5 PM EST



*Building a Weather-Ready Nation*

[Weather.gov/safety](http://Weather.gov/safety)



# Winter Storms by County

Winter Storms (5" or more) Jan. 2005 – March 2016

County	# Events	Damage	Deaths
Giles	11	0	0
Montgomery	9	0	0
Pulaski	7	0	0
Floyd	6	0	0
City of Radford	7	0	0
Totals		0	0





# Greatest One Day Snowfall

## Blacksburg, VA



**A. 20.4"**

**Jan 28, 1998**

**B. 12.7"**

**C. 24.2"**

**D. 18.7"**

**Greatest 2 day total: 31.2" 1/8/1996**





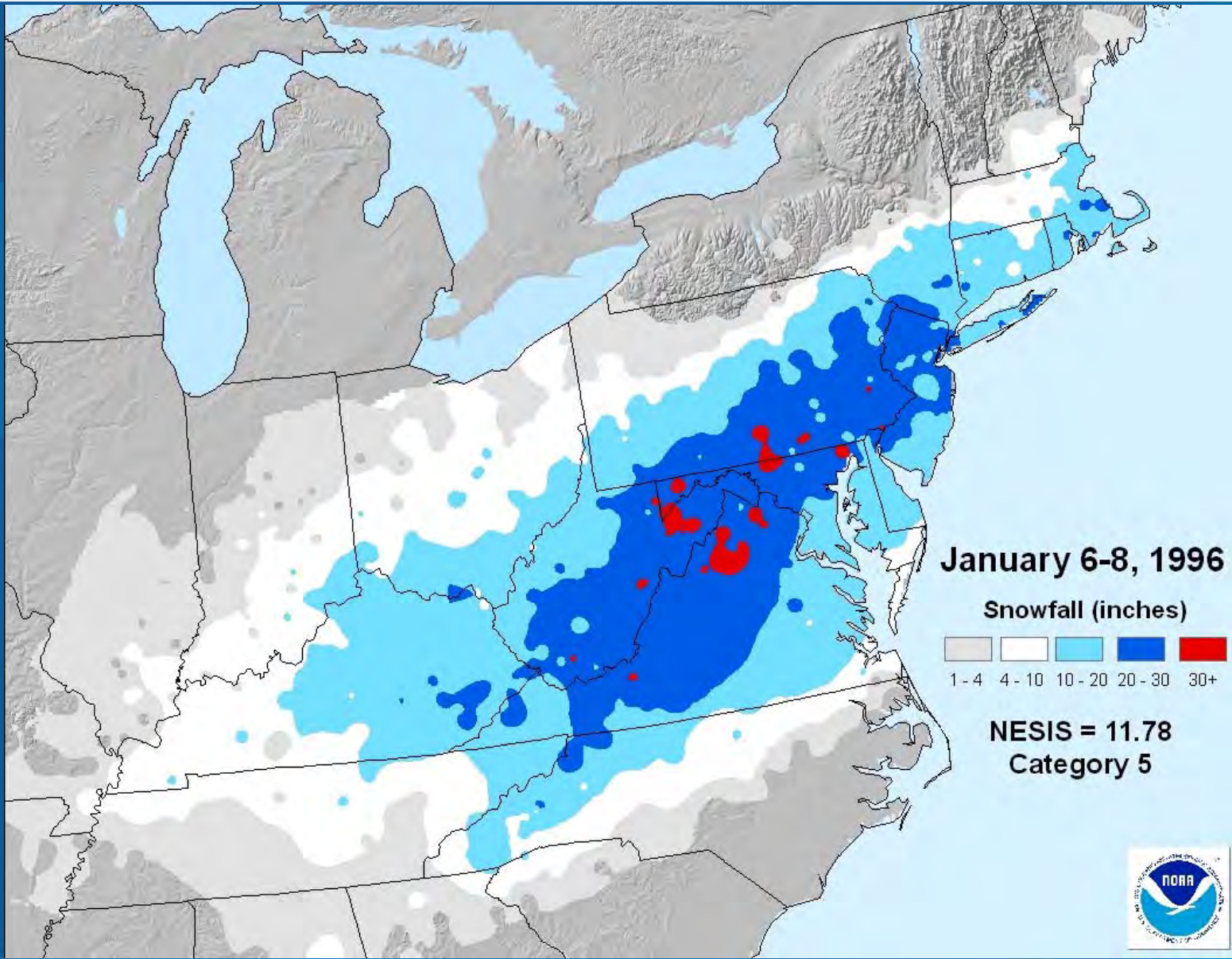
# Regional Snowfall Index (RSI)

<http://www.ncdc.noaa.gov/snow-and-ice/rsi/>

CATEGORY	RSI VALUE	DESCRIPTION
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18.0+	Extreme

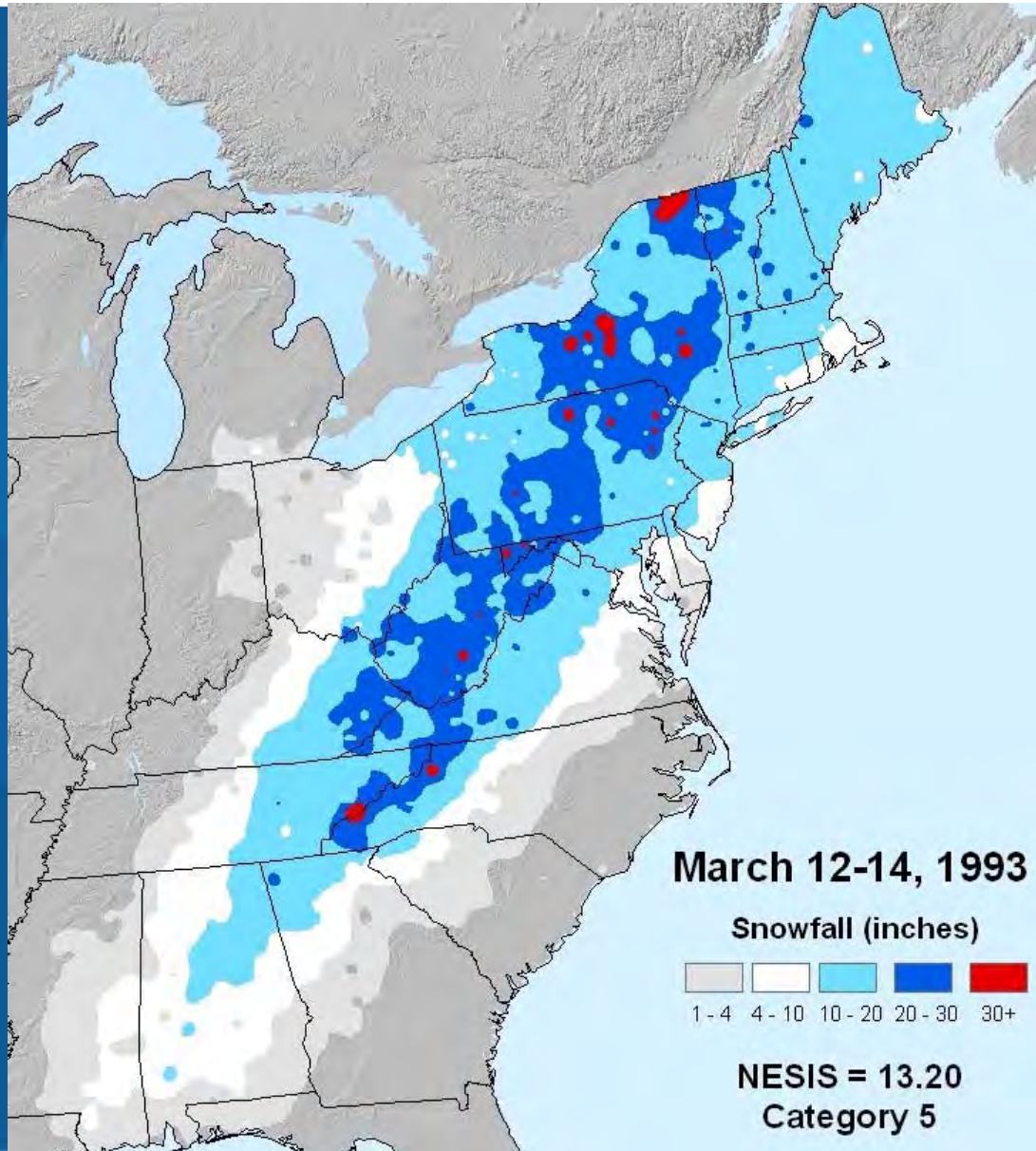


# Regional Snowfall Index (RSI)





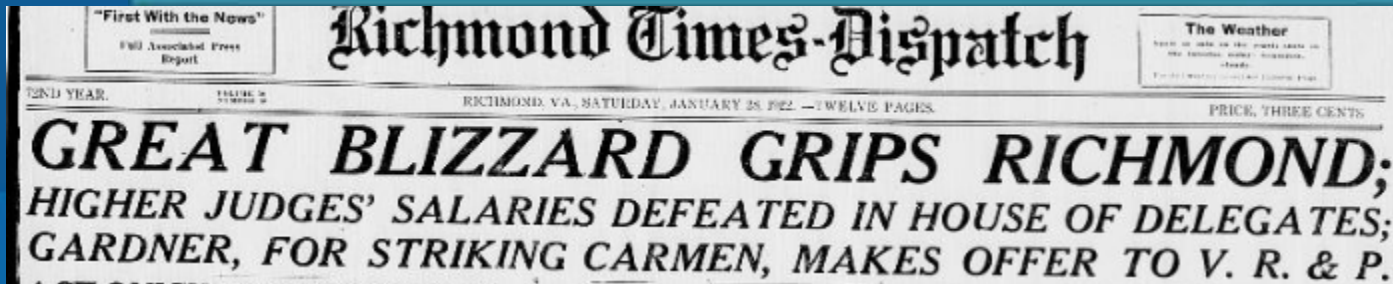
# Regional Snowfall Index (RSI)





# Regional Snowfall Index (RSI)

January 1922?



## Roanoke Daily Snowfall

1922-01-12	40	24	32.0	-4.3	33	0	0.00	0.0
1922-01-13	35	17	26.0	-10.3	39	0	T	T
1922-01-14	36	20	28.0	-8.3	37	0	T	T
1922-01-15	54	21	37.5	1.2	27	0	0.00	0.0
1922-01-16	50	32	41.0	4.6	24	0	0.09	T
1922-01-17	34	29	31.5	-4.9	33	0	0.00	0.0
1922-01-18	46	32	39.0	2.6	26	0	0.00	0.0
1922-01-19	52	36	44.0	7.6	21	0	0.10	0.0
1922-01-20	54	44	49.0	12.5	16	0	0.03	0.0
1922-01-21	60	35	47.5	11.0	17	0	0.53	0.0
1922-01-22	60	38	49.0	12.4	16	0	0.00	0.0
1922-01-23	43	33	38.0	1.4	27	0	0.00	0.0
1922-01-24	37	23	30.0	-6.7	35	0	0.00	0.0
1922-01-25	28	13	20.5	-16.2	44	0	0.00	0.0
1922-01-26	31	10	20.5	-16.3	44	0	0.00	0.0
1922-01-27	28	20	24.0	-12.9	41	0	1.10	11.0
1922-01-28	40	22	31.0	-5.9	34	0	0.20	2.0
1922-01-29	40	11	25.5	-14.5	39	0	0.00	0.0
1922-01-30	42	18	30.0	-7.1	35	0	0.00	0.0
1922-01-31	46	12	29.0	-8.2	36	0	0.00	0.0
<b>Sum</b>	1435	762	-	-	794	0	3.20	13.0



# Roanoke 24-hour Snowfall Record

## Jan 9-10<sup>th</sup>, 1921



Roanoke, VA (KROA) Extremes  
 Highest Snowfall  
 SEP 1 - MAY 30 1912 - 2016

INDIVIDUAL DAYS			272/273 DAY PERIOD	
	inches	date	inches	year
1.	20.0	1-10-1921	1.	62.7 1959
2.	15.4	2-13-1960	2.	56.0 1986
3.	14.6	12-25-1969	3.	56.0 1995
4.	14.1	3-13-1993	4.	50.3 1963
5.	14.0	1-07-1996	5.	49.9 1965
6.	14.0	12-17-1930	6.	44.5 1917
7.	13.6	1-22-1966	7.	43.1 2009
8.	12.4	3-02-1960	8.	41.8 1913
9.	12.0	12-18-2009	9.	41.7 1966
10.	12.0	1-29-1966	10.	40.8 1960

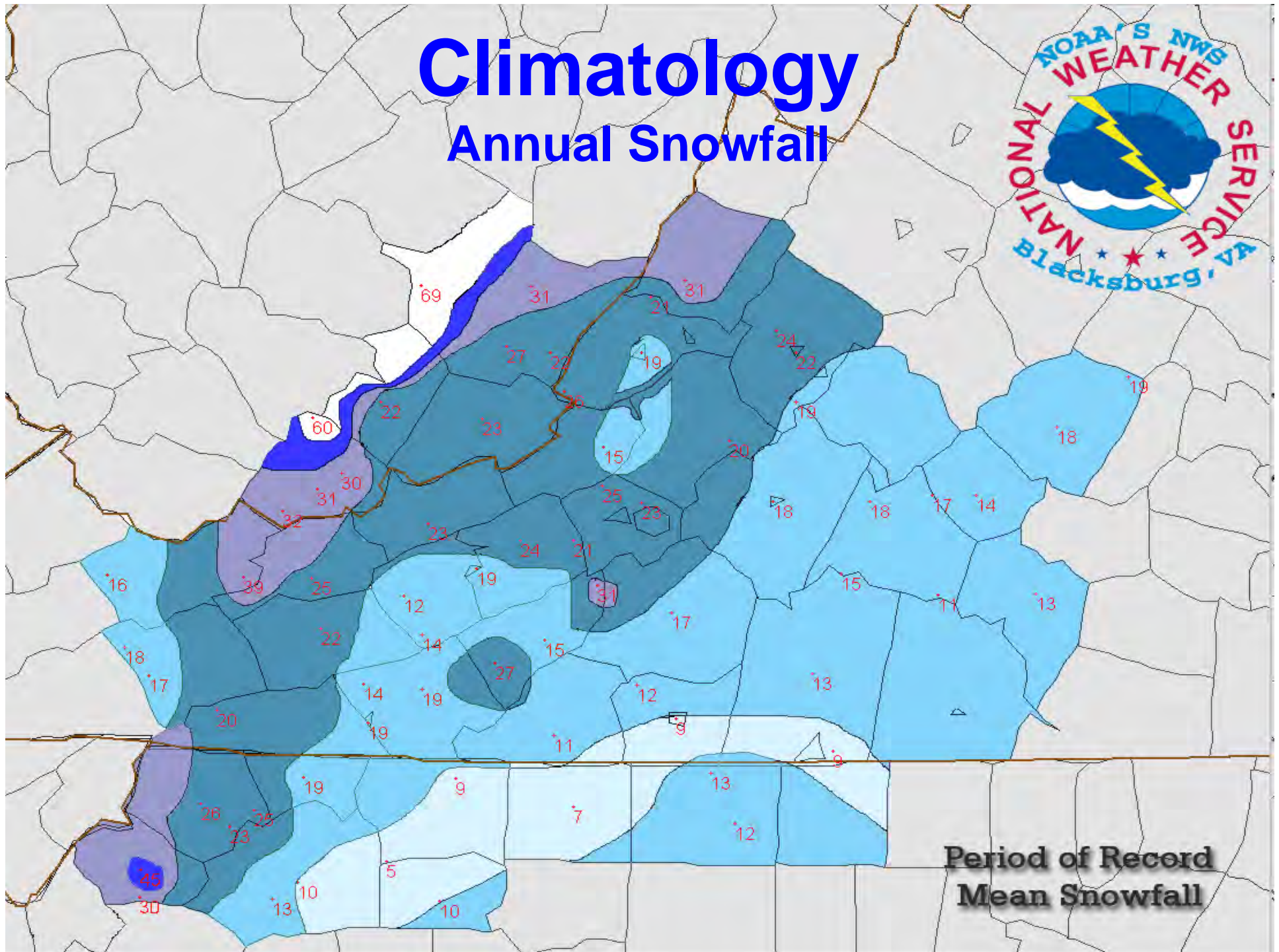
Total Years = 104  
 Missing days = 3558

Source: The World News, Jan. 1921



# Climatology

## Annual Snowfall



Period of Record  
Mean Snowfall



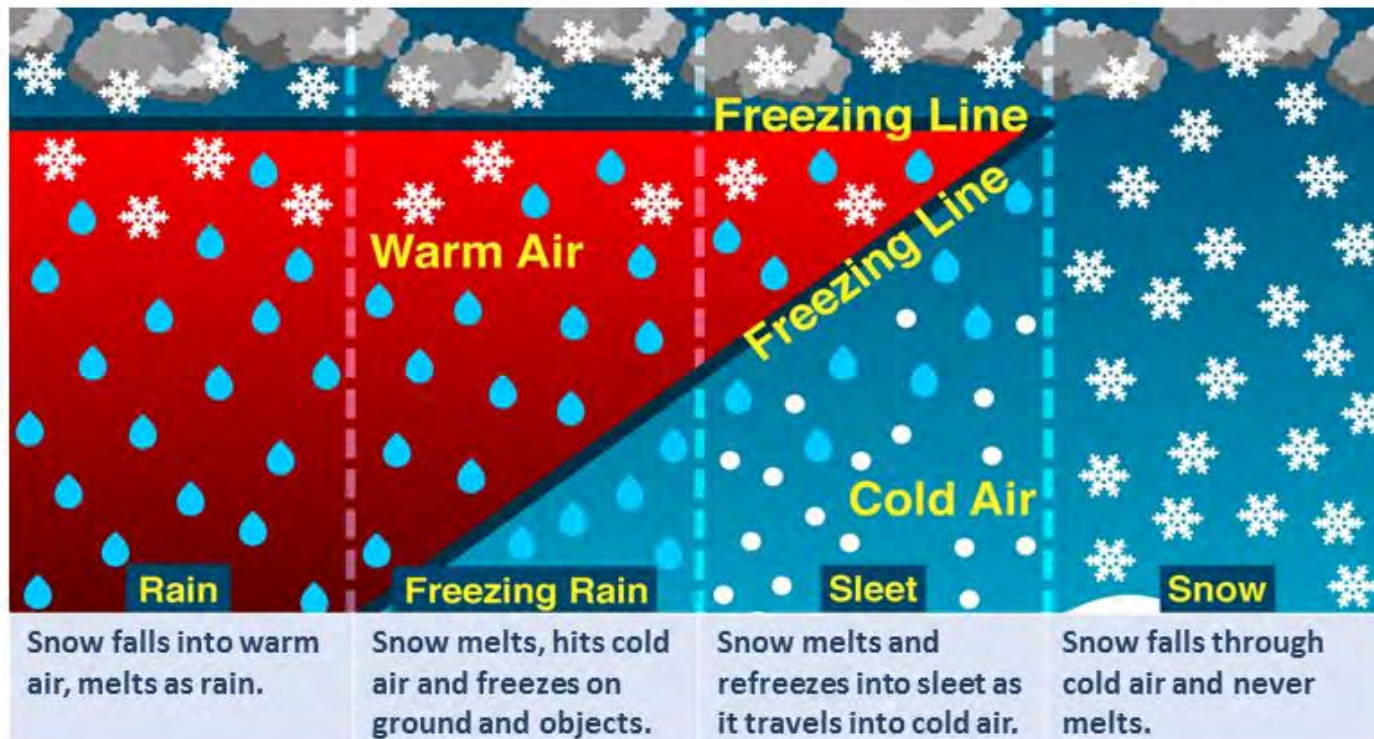
# Winter Weather Safety

## Freezing Rain

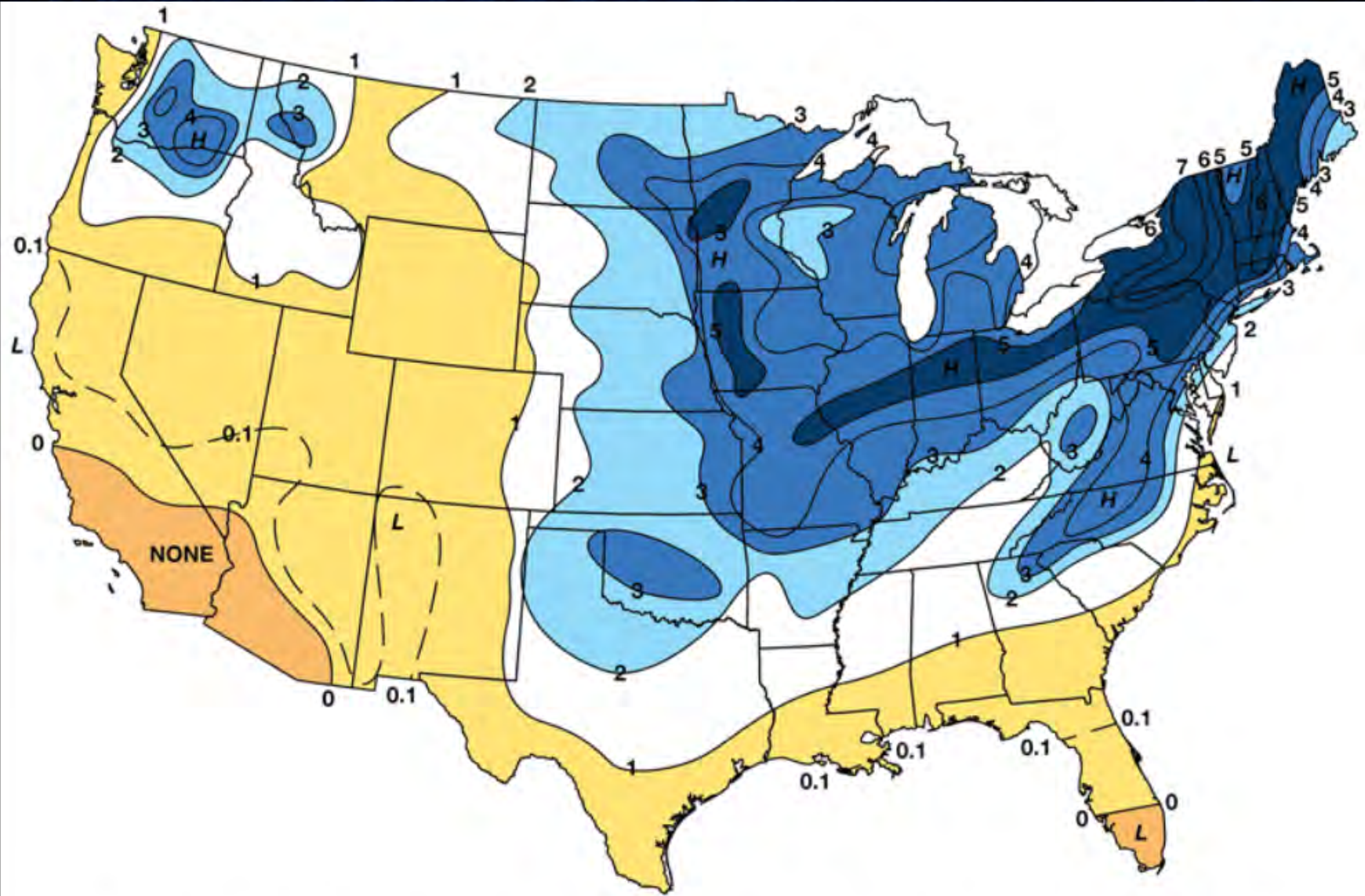


Winter can bring freezing rain, sleet, and snow.

### How The Different Types Of Winter Precipitation Form

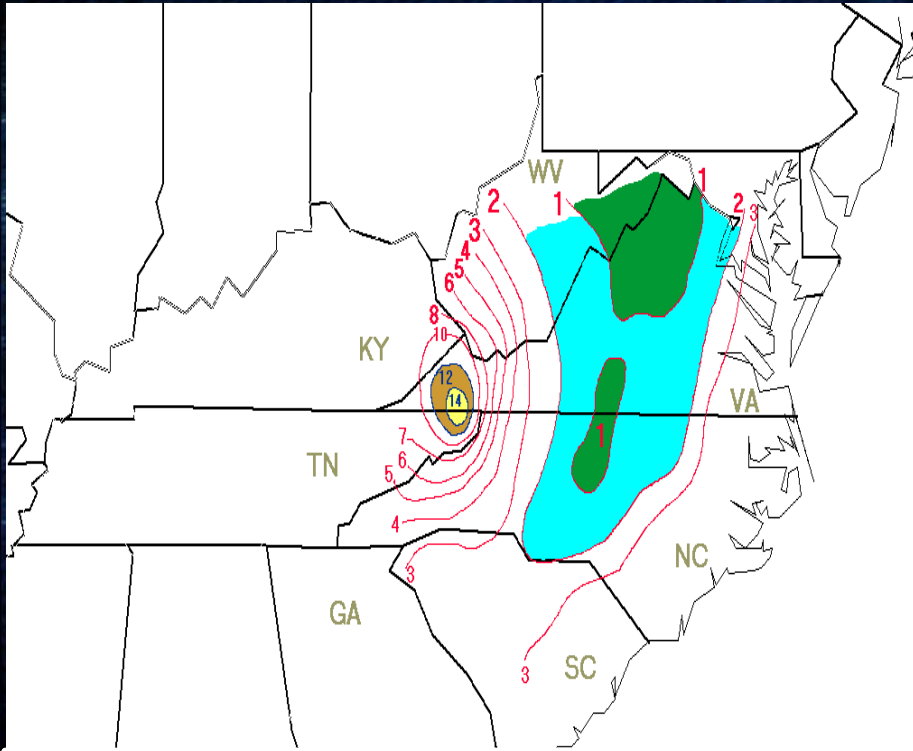


# Freezing Rain Climatology

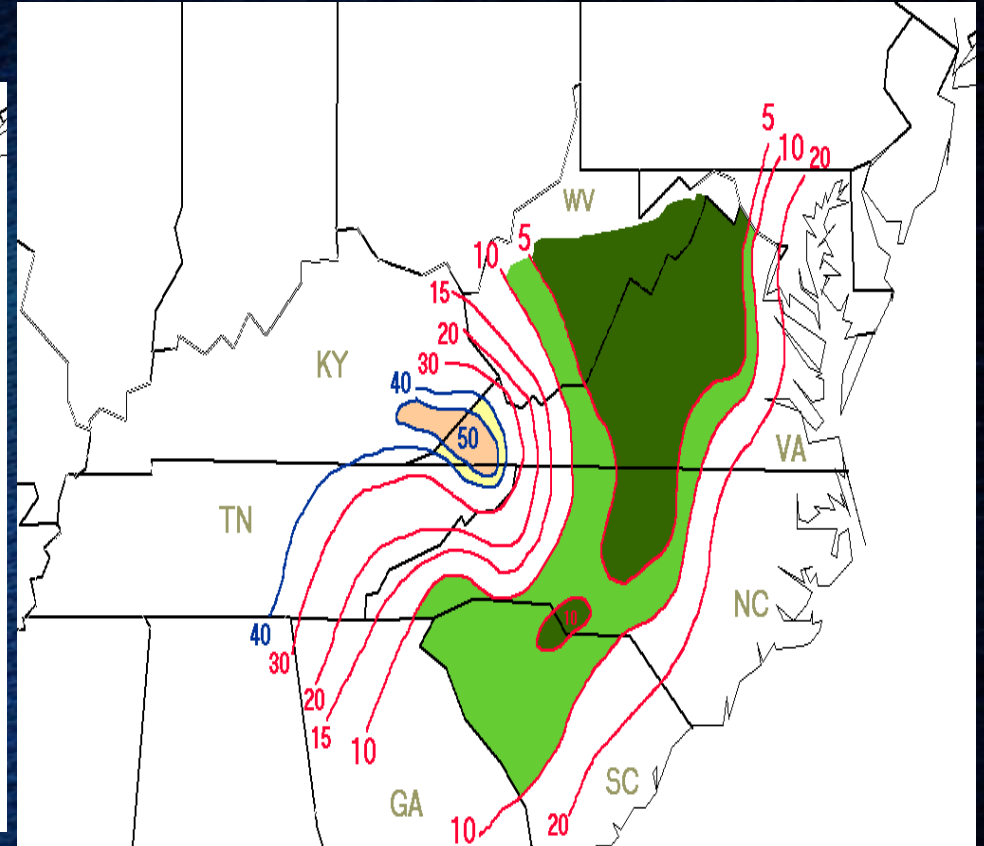


The average annual number of days with freezing rain, based on 1948-2000 data. From Changnon and Karl, 2003.

# FZRA Recurrence



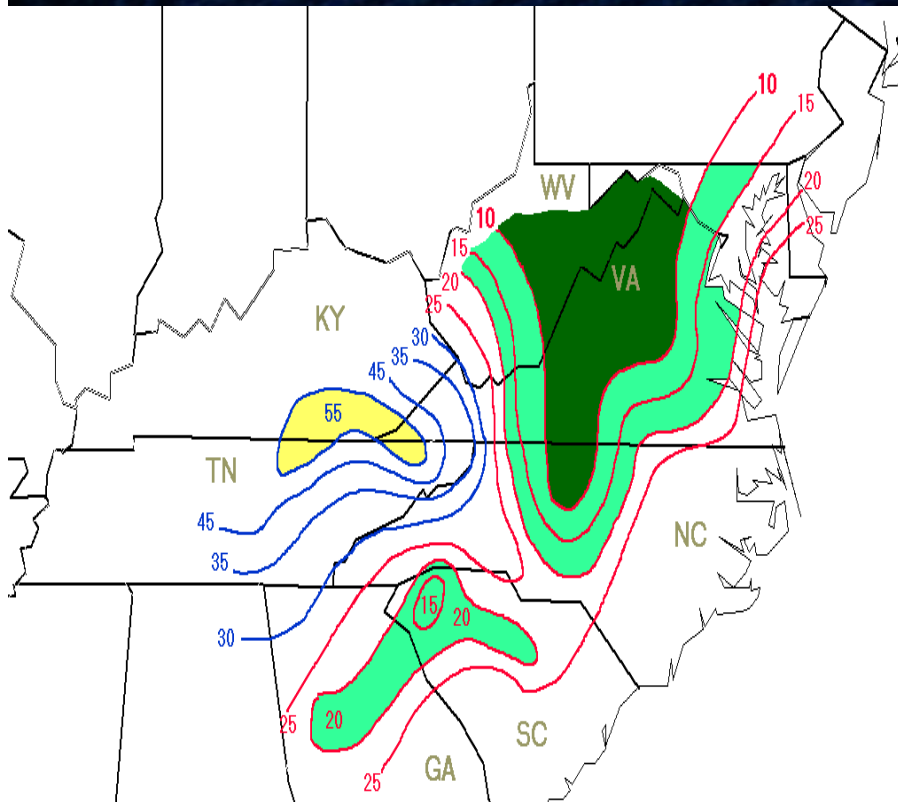
Yearly Occurrence of .25 inches FZRA.  
(1948-2003).



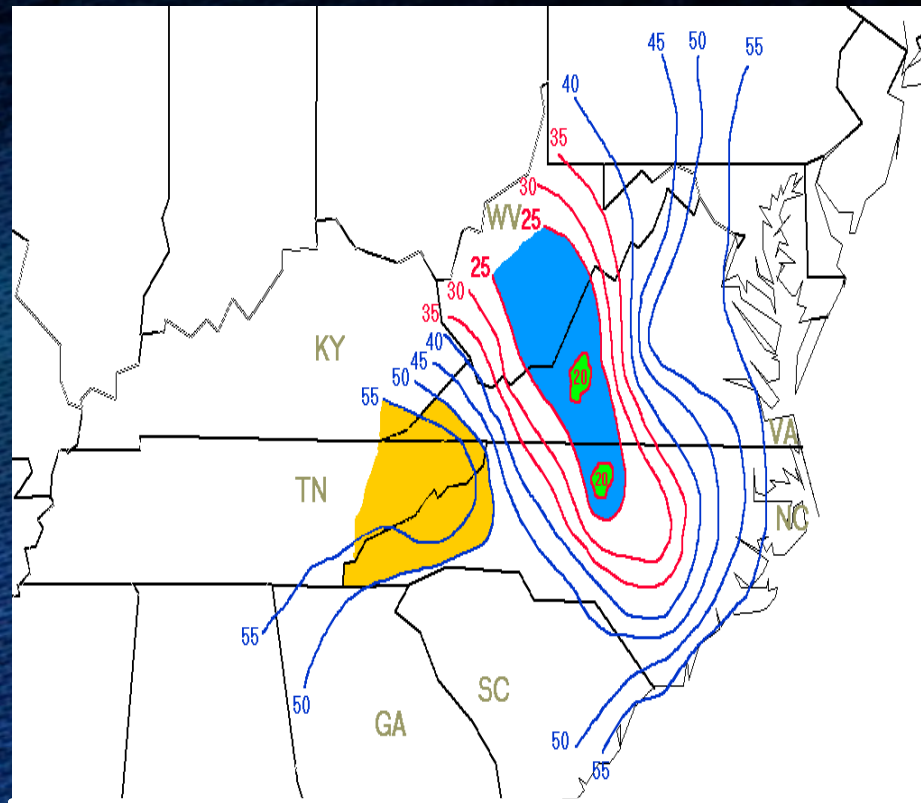
Yearly Occurrence of .50 inches FZRA.  
(1948-2003).

**Fuhrmann and Konrad (2004)**

# FZRA Recurrence--Continued

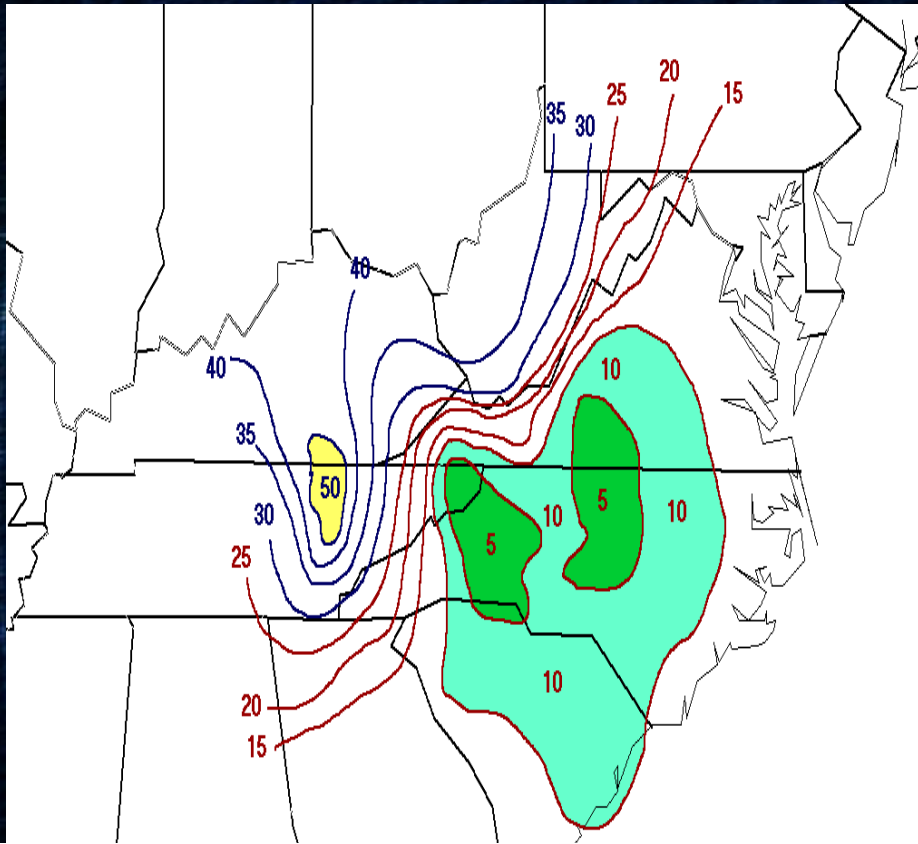


Yearly Occurrence of .75 inches FZRA.  
(1948-2003).

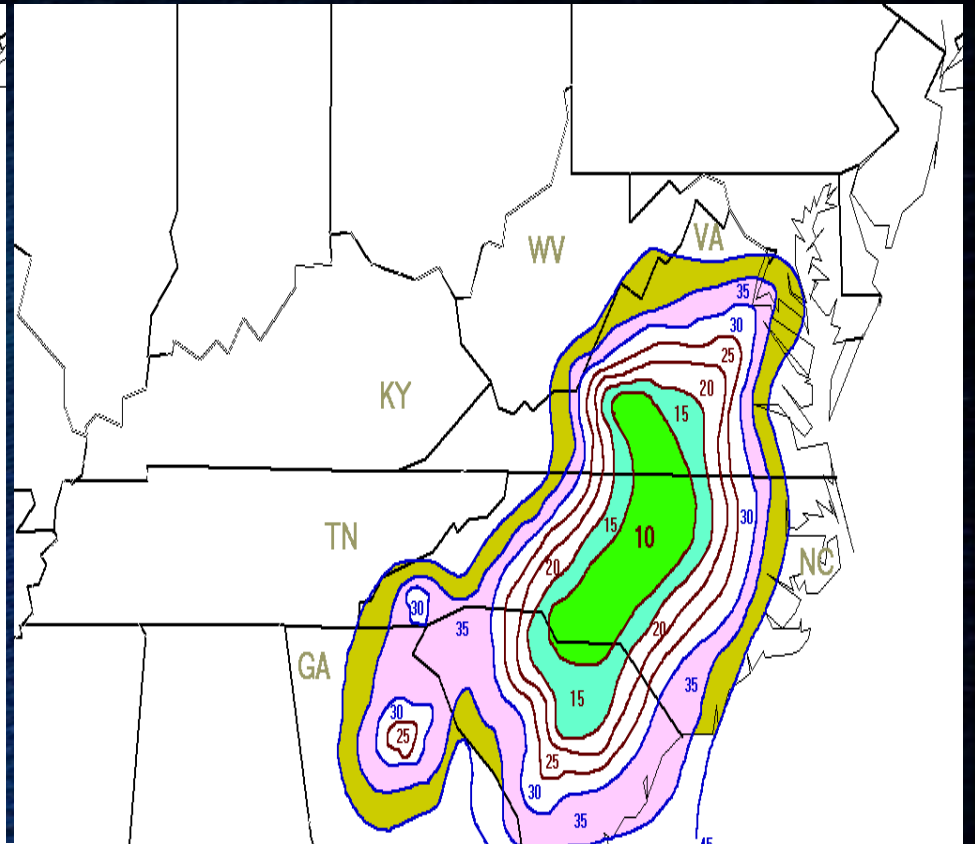


Yearly Occurrence of 1.00 inches FZRA.  
(1948-2003).

# Sleet Recurrence

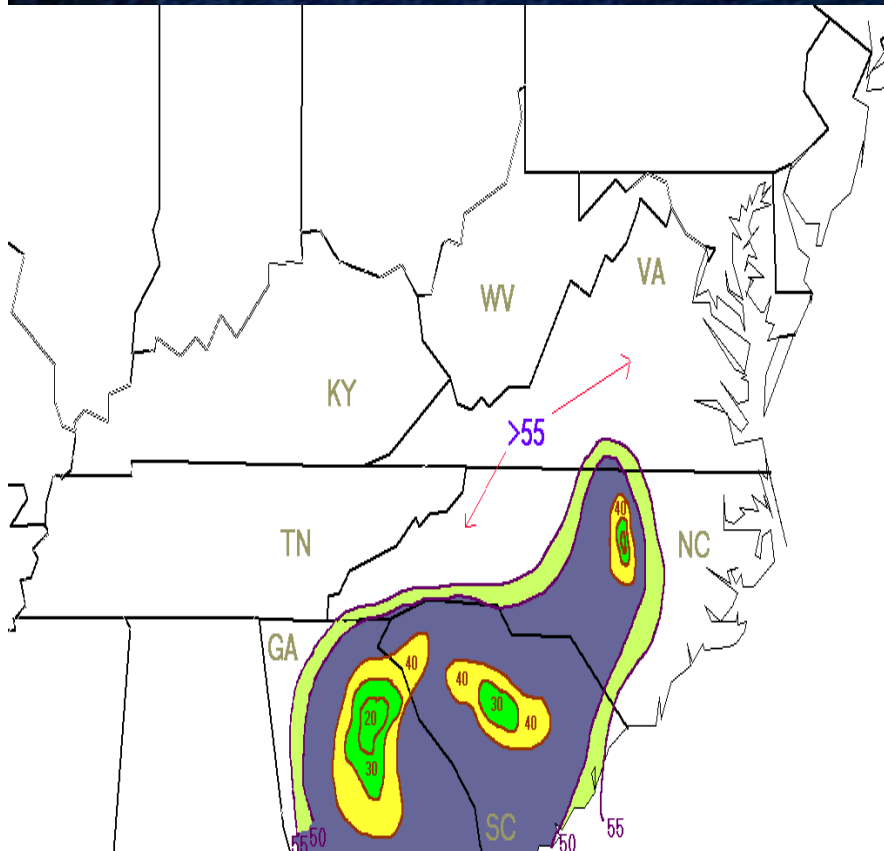


Yearly Occurrence of .12 inches of sleet.  
(1948-2003).

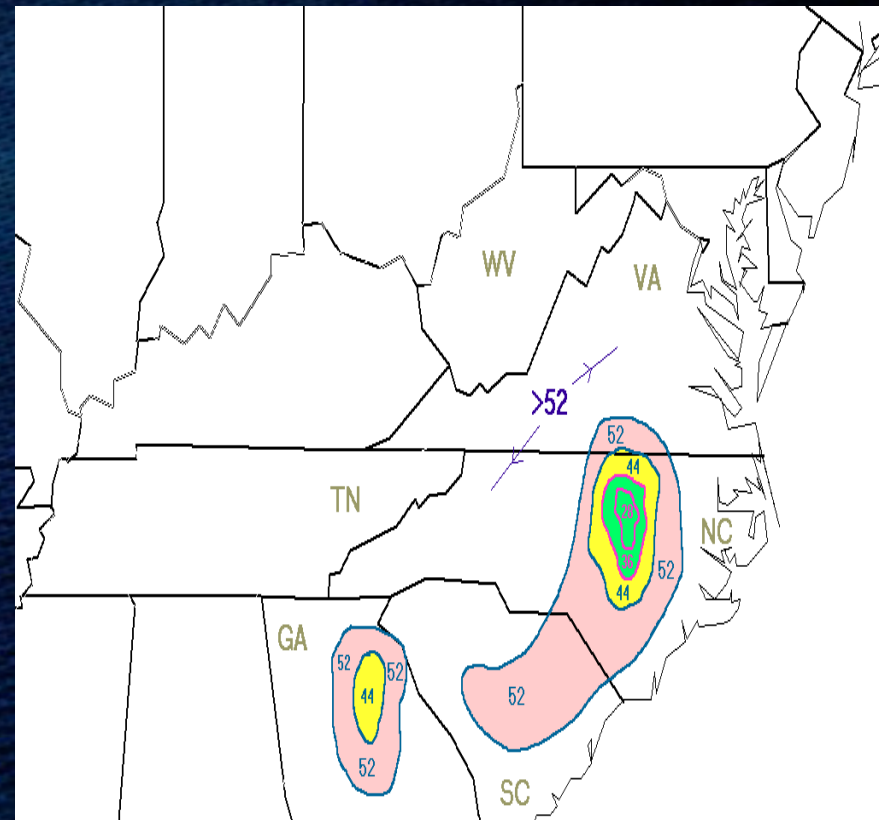


Yearly Occurrence of .25 inches of sleet.  
(1948-2003).

# Sleet Recurrence--Continued



Yearly Occurrence of .50 inches of sleet.  
(1948-2003).

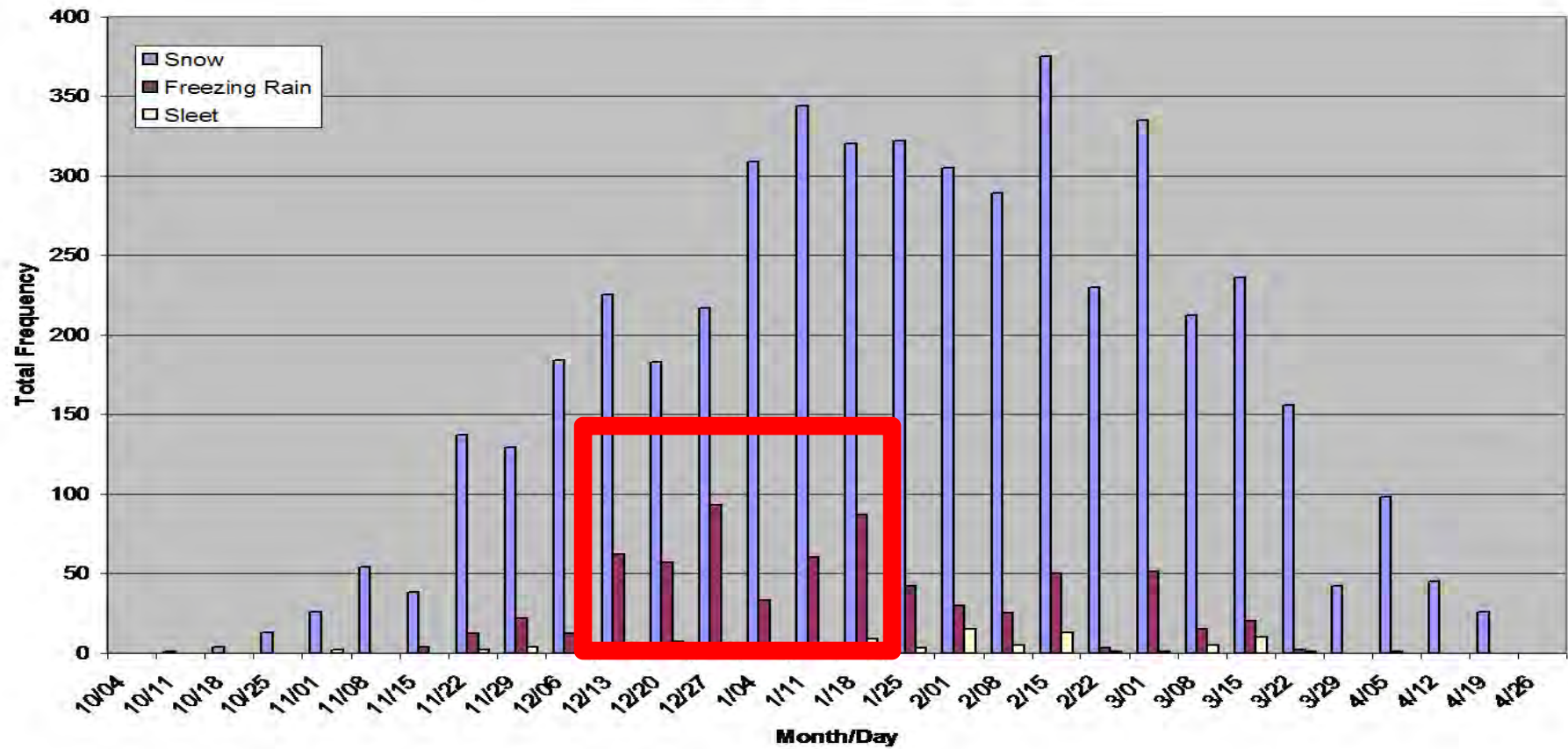


Yearly Occurrence of .75 inches of sleet.  
(1948-2003).

# Monthly Distribution

## Roanoke

Roanoke, VA (Piedmont, north)







# Ice Storms by County

Ice Storms (1/4" or more) Jan. 2005 – March 2016

County	# Events	Damage	Deaths
Giles	4	\$7,000	0
Montgomery	6	\$12,000	0
Pulaski	2	0	0
Floyd	10	\$31,500	0
City of Radford	2	0	0
<b>Totals</b>	<b>34</b>	<b>\$60,500</b>	<b>0</b>





# Historical Ice Storms

## WYTHEVILLE IN DARK TWO NIGHTS DUE TO THE EFFECT OF ICE-STORM

Wytheville, Nov. 19.—Wytheville and vicinity experienced the first severe storm of the winter Tuesday and Wednesday, with heavy rainfall which soon turned into sleet, especially on the mountains. The sleet worked havoc with electric transmission lines and telephones lines, the towns of Wytheville and Rural Retreat being without lights Tuesday and Wednesday nights.

### At Montvale.

Montvale, Nov. 19.—Almost a blizzard struck this place on Wednesday. The trees as far as one can see around the mountains are still covered with ice. The orchards and timbers have been badly damaged.

Source: The World News, Nov. 1920

heavy, wet snowstorms that may have affected our study area during the period 1900–1998. The first growing season after the storm occurred. Sources of information are abbreviated as MWR = *The Mountain West Review*, RT = *The Roanoke Times and World News*, SD = *Storm Data and Unusual Weather Phenomena* or predecessor

VA and NC in Jan 1906, but damage may have been restricted to the Piedmont (MWR) Wytheville on Mar 7, 1911 (MWR). Heavy snow in Roanoke, but snow melted rapidly as it fell (RT) throughout VA on Jan 11–15, 1918, and Jan 27–30, 1918 (SD). RT reports most of SE suffered information specific to western VA  
s in VA in Jan 1920 (SD)  
VA on Nov 14–16, 1920 (SD, RT)  
caused heavy tree damage in central VA and power line damage over most of state (SD,

2 damaged telegraph lines, mostly north and east of Roanoke (SD, RT)  
Feb 25–26, 1934, accompanied by sleet, freezing rain, and thunderstorms, caused timber (SD, RT)  
damaged trees and power lines in parts of SW VA (SD). Not so heavy at our study sites (RT)  
n on Jan 20–21, 1969, caused considerable damage to trees and utility lines at high elevations, snow in Shenandoah Valley (SD)  
71, damaged trees and power lines in western VA (SD), but RT does not mention line damage  
damaged power lines, mostly near Rich Creek (SD, RT)  
and wind damaged trees and power lines in western VA on Dec 1–2, 1974. Most damage toward Roanoke (SD, RT)  
n VA on Mar 27, 1978. Heavy damage was restricted to elevations above 915 m (3000 ft) (SD,

- 1979 Major ice storm on Jan 20–21, 1979 (SD, RT)
- 1984 Major ice storm on Dec 21–22, 1983, in western, northern, and central VA. Much power line damage in Roanoke vicinity, less to the west (SD, RT). Wet snow on Feb. 23, 1984, damaged trees and power lines near Bluefield (SD, RT)
- 1994 Major ice storms on Feb 10–11, 1994, and Mar 1–3, 1994 (SD, RT)
- 1998 Major ice storm on Feb 4–6, 1998, caused heavy forest damage above 850 m (2800 ft) in western VA, mainly east of our study sites (SD, RT)



# Extreme Cold



## All-Time Coldest Temperatures (F)

Location	Value	Date
Blacksburg	-18	1/21/1985
Floyd 2NE (1933-2006)	-19	1/21/1985
Pulaski 2 E	-16	1/21/1985
Staffordville	-18	1/21/1985

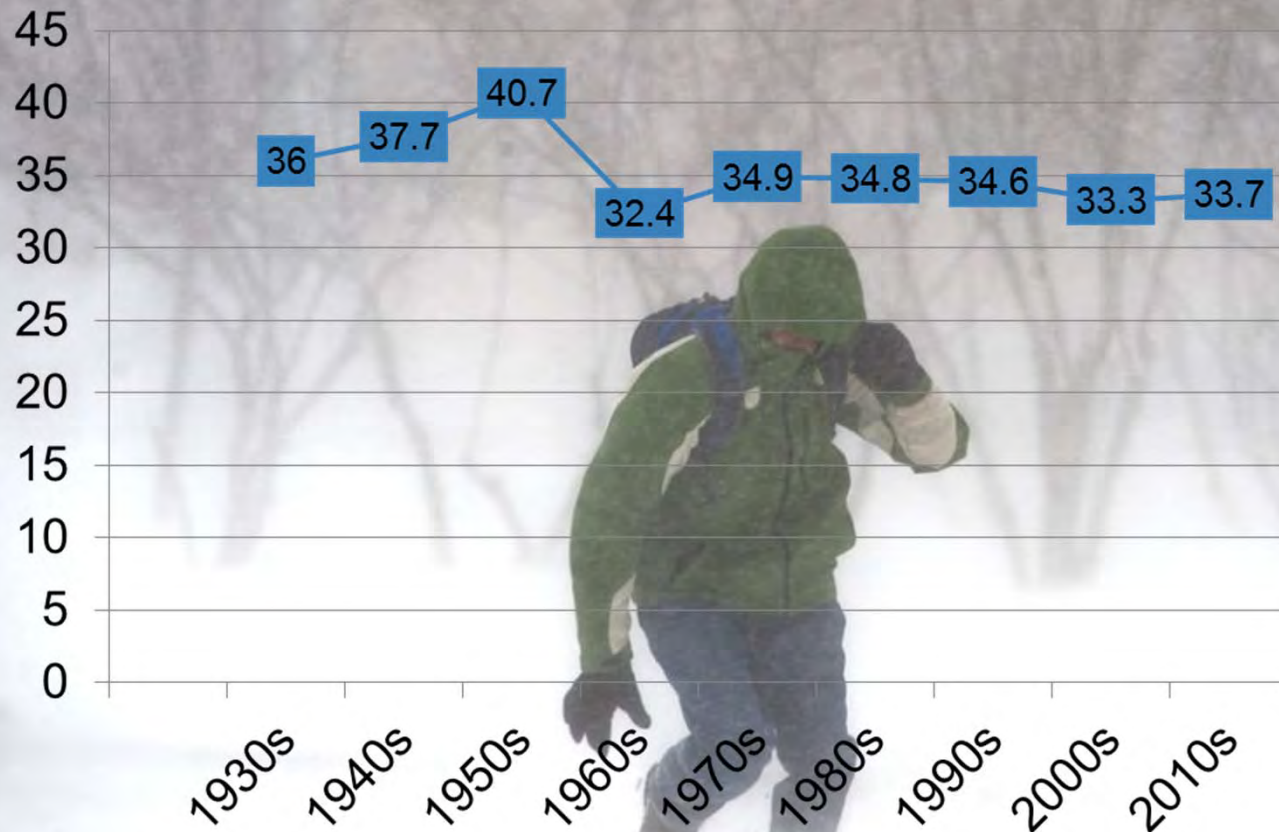




# Winter Avg. Temp



Mean Average Winter Temperature At Wytheville





# Winter Temps



Number of Days Below Zero by Decade at Wytheville



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[www.weather.gov/safety](http://www.weather.gov/safety)



# What Do Our Winter Weather Products Mean?

(Increased confidence and impact to life and property) →

## Watch

Get ready in the next 24-48 hours for some type of winter weather to impact the area. The forecast may change for better or worse depending on latest developments.



## Advisory

Expect winter weather in the next 12-24 hours that could cause minor to moderate impacts. You may want to consider leaving earlier/later if you need to travel as roadways may become slick.

## Warning

There is high confidence in winter weather occurring in the next 12-24 hours resulting in significant impacts such as closed roadways, extensive power outages, and other threats to life and property.





# Helping to Meet Your Goals

[Weather Safety](#)[Ambassadors](#)[Education](#)[News & Events](#)[About](#)

## About Weather-Ready Nation Ambassadors™

The Weather-Ready Nation Ambassador™ initiative is the National Oceanic and Atmospheric Administration's (NOAA) effort to formally recognize NOAA partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, water, and climate events. As a WRN Ambassador, partners commit to working with NOAA and other Ambassadors to strengthen national resilience against extreme weather. In effect, the WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards. [Weather-Ready Nation](#) (WRN) is a strategic outcome where society's response should be equal to the risk from all extreme weather, water, and climate hazards.



The WRN Ambassador initiative is a:

- Unifying effort;
- Action-oriented;
- Inclusive; and
- Force multiplier (i.e., new partnerships lead to even more partnership opportunities).

WRN Ambassadors serve a pivotal role in affecting societal change — helping to build a nation that is ready, responsive, and resilient to the impacts of extreme weather and water events.

To be officially recognized as a WRN Ambassador, an organization must commit to:

- Promoting Weather-Ready Nation messages and themes to their stakeholders;
- Engaging with NOAA personnel on potential collaboration opportunities;
- Sharing their success stories of preparedness and resiliency;
- Serving as an example by educating employees on workplace preparedness

As a WRN Ambassador, you will serve as a change agent and leader in your community. You will inspire others to be better informed and prepared, helping to minimize or even avoid the impacts of these natural disasters.

To support your efforts, NOAA can:

- Provide outreach content about creating a Weather-Ready Nation;
- Explore innovative approaches for collaboration with your organization;
- Assist with [StormReady](#)/[TsunamiReady](#)™ opportunities for communities;
- Recognize your organization as a WRN Ambassador; and
- Share the WRN Ambassador logo for your use.

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# Are you Ready?

