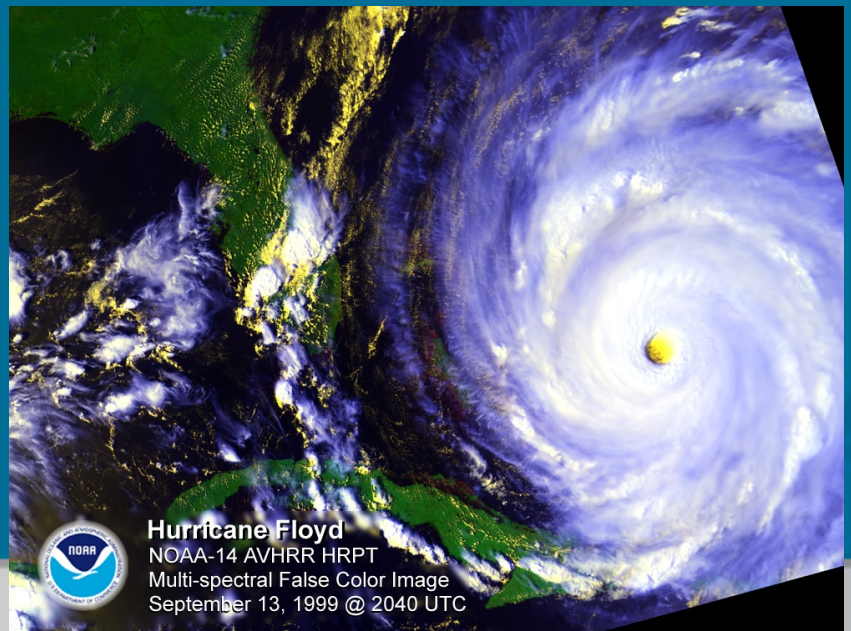
Hurricane Brief

Jeff Orrock

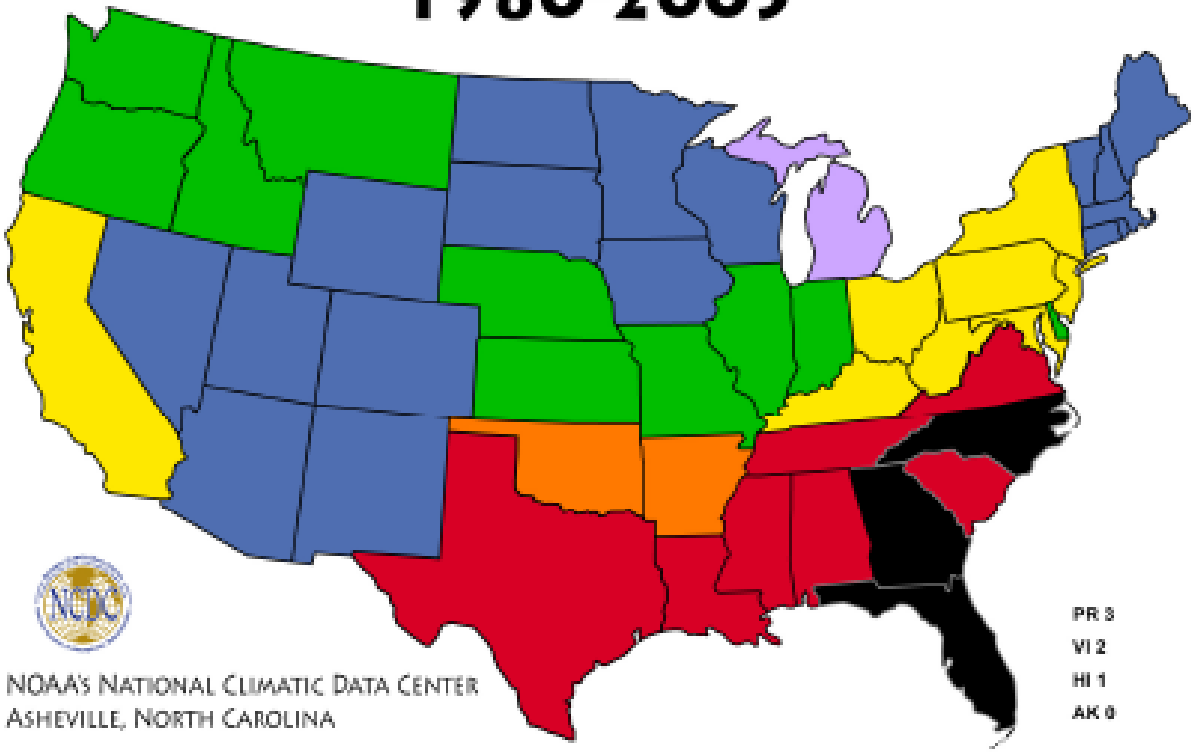
Warning Coordination Meteorologist

National Weather Service Raleigh

Jeff.orrock@noaa.gov



Billion Dollar Climate and Weather Disasters 1980-2005



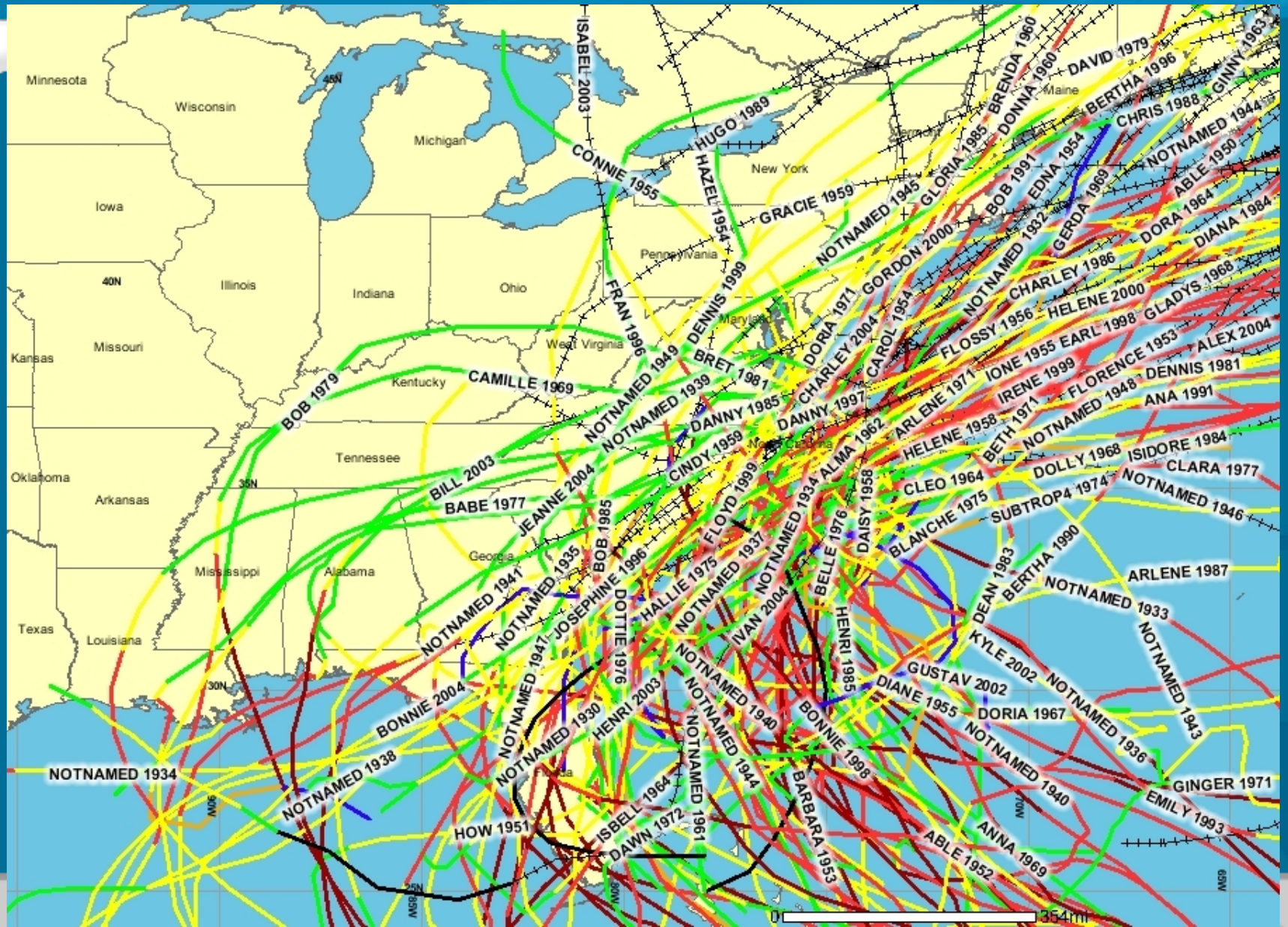
NOAA's National Climatic Data Center
Asheville, North Carolina

NUMBER OF EVENTS
21 - 25
16 - 20
13 - 15
10 - 12
7 - 9
4 - 6
1 - 3

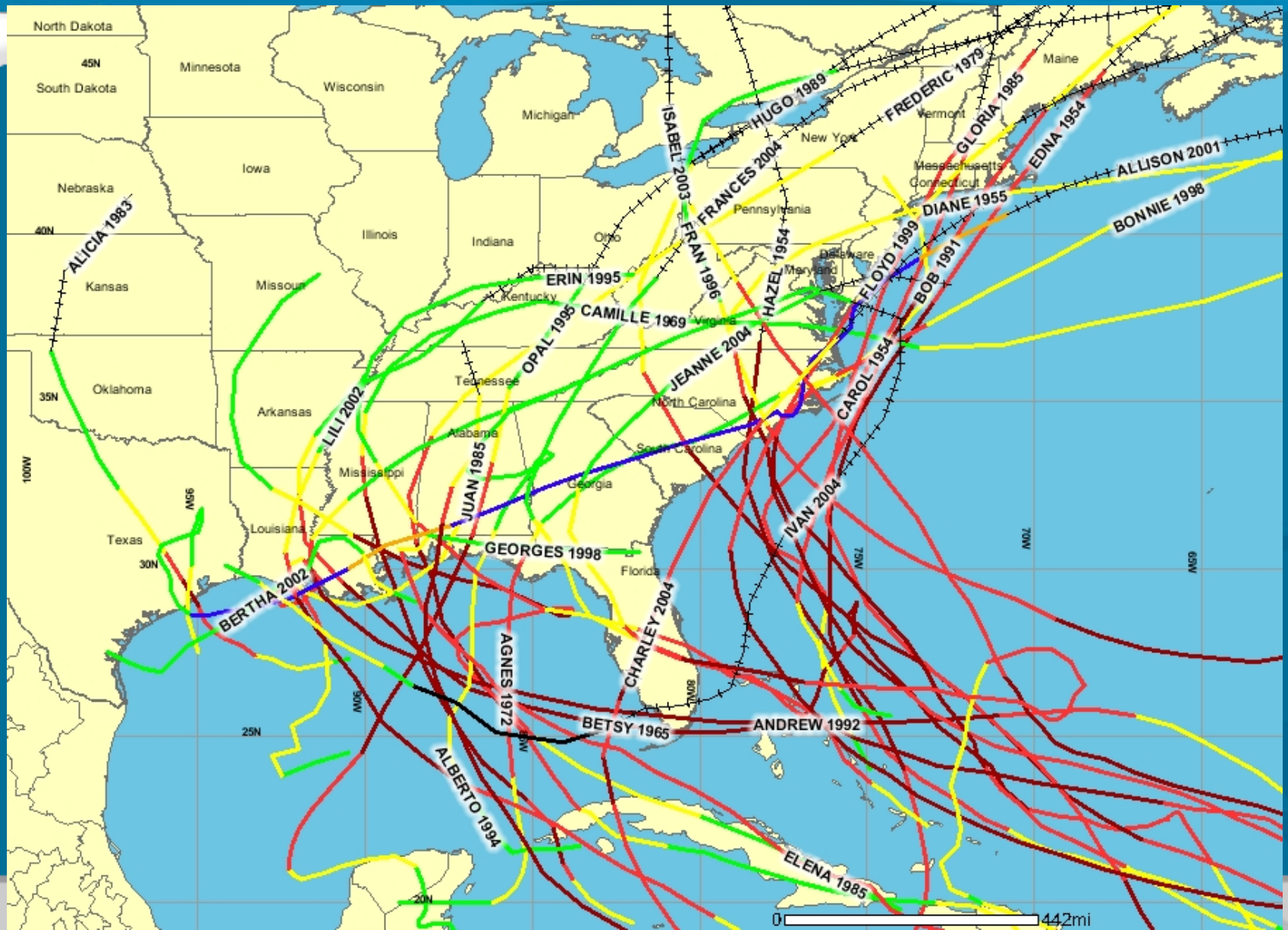
DISASTER TYPE	NUMBER OF EVENTS	PERCENT FREQUENCY	NORMALIZED DAMAGES (Billions of Dollars)	PERCENT DAMAGE
Tropical Storms/Hurricanes	24	35.8%	269	52.0%
Non-Tropical Floods	12	17.9%	55	10.6%
Heatwaves/Droughts	11	16.4%	145	28.1%
Severe Weather	7	10.4%	13	2.5%
Fires	6	9.0%	13	2.5%
Freezes	2	3.0%	6	1.2%
Blizzards	2	3.0%	9	1.7%
Ice Storms	3	3.0%	5	~1.0%
Nor'easter	1	1.5%	2	~0.3%
	67		517	

The Future…Look to the Past

1930 - 2005

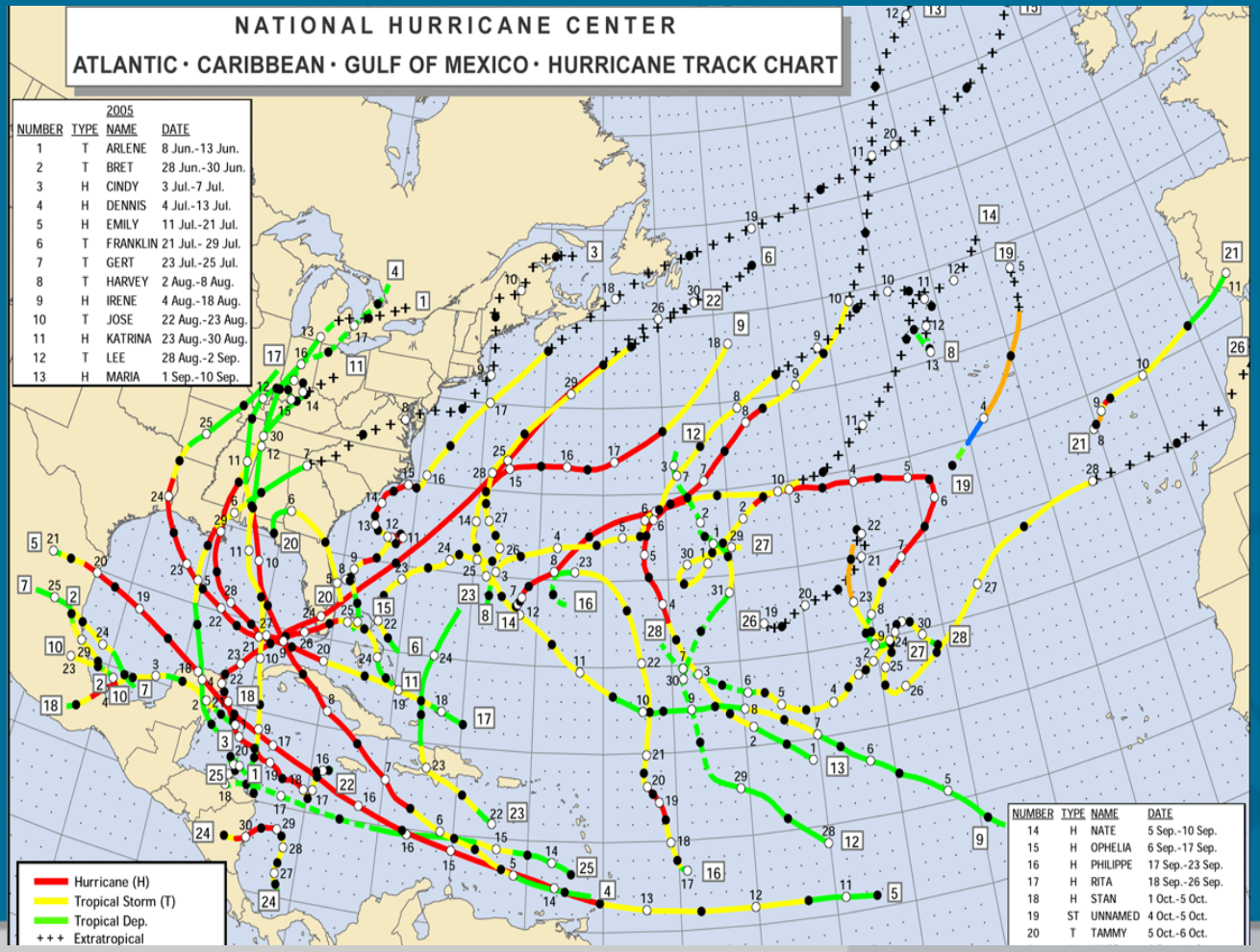

Minnesota
Wisconsin
Michigan
Iowa
Illinois
Indiana
Ohio
Missouri
Kansas
Kentucky
Tennessee
Oklahoma
Arkansas
Mississippi
Alabama
Georgia
Texas
Louisiana
Maine
New York
Pennsylvania
West Virginia
Maryland
45N
40N
35N
30N
90W
85W
70W
65W
ISABEL 2003
CONNIE 1955
HUGO 1989
HAZEL 1954
GRACIE 1959
FRAN 1996
DENNIS 1999
BOB 1979
CAMILLE 1969
NOTNAMED 1949
NOTNAMED 1939
BRET 1981
DANNY 1985
DANNY 1997
CINDY 1959
BILL 2003
JEANNE 2004
BABE 1977
BOB 1985
FLOYD 1999
ALMA 1962
CHARLEY 2004
DORIA 1971
GORDON 2000
NOTNAMED 1945
GLORIA 1985
BRENDA 1960
DONNA 1960
DAVID 1979
BERTHA 1996
CHRIS 1988
GINNY 1963
NOTNAMED 1944
BOB 1991
EDNA 1954
ABLE 1950
GERDA 1969
NOTNAMED 1932
DORA 1964
DIANA 1984
CAROL 1954
CHARLEY 1986
FLOSSY 1956
HELENE 2000
GLADYS 1968
IONE 1955
EARL 1998
ALEX 2004
IRENE 1999
FLORENCE 1953
DENNIS 1981
ARLENE 1971
HELENE 1958
BETH 1971
NOTNAMED 1948
ANA 1991
ISIDORE 1984
DOLLY 1968
CLARA 1977
CLEO 1964
SUBTROP4 1974
NOTNAMED 1946
BLANCHE 1975
DAISY 1958
BELLE 1976
NOTNAMED 1934
NOTNAMED 1937
IVAN 2004
HALLIE 1975
DOTTIE 1976
JOSEPHINE 1996
NOTNAMED 1935
NOTNAMED 1941
NOTNAMED 1941
BERTHA 1990
DEAN 1983
ARLENE 1987
NOTNAMED 1933
KYLE 2002
NOTNAMED 1943
GUSTAV 2002
DIANE 1955
DORIA 1967
NOTNAMED 1936
NOTNAMED 1940
GINGER 1971
EMILY 1993
ANNA 1969
ABLE 1952
HENRI 1985
BONNIE 1998
BARBARA 1953
NOTNAMED 1940
NOTNAMED 1944
NOTNAMED 1961
HENRI 2003
ISBELL 1964
DAWN 1972
HOW 1951
NOTNAMED 1930
NOTNAMED 1938
BONNIE 2004
NOTNAMED 1934
0
354mi

Costliest Storms in US History



1 NOAA Hurricane Outlook

9 of the last 11 Hurricane Seasons have been have been above normal



2006 NOAA Hurricane Outlook

13 - 16 Named Storms (11 is the normal average – 28 in 2005)

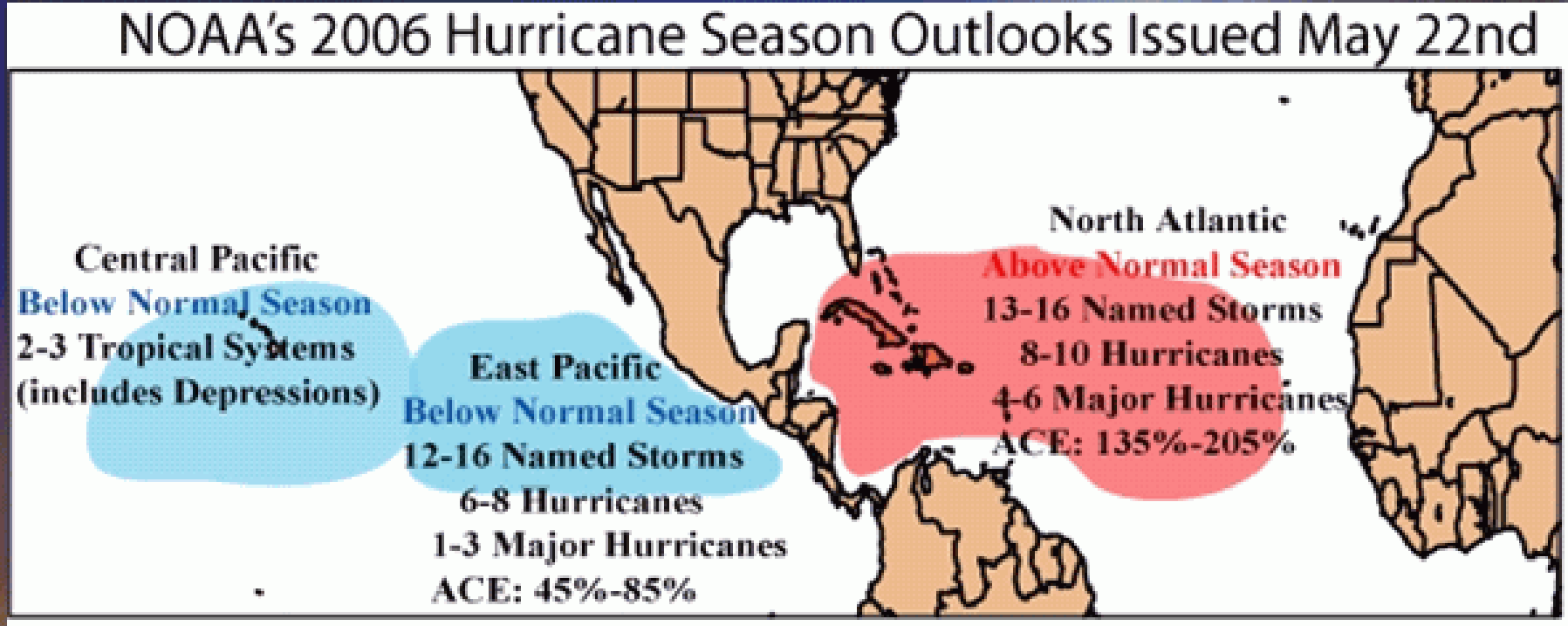
8 - 10 Hurricanes (6 is the normal average – 15 hurricanes in 2005)

4 - 6 Major Hurricanes (Cat 3 or greater with winds 111 mph or greater)

(2 is the normal average – 7 major in 2005)

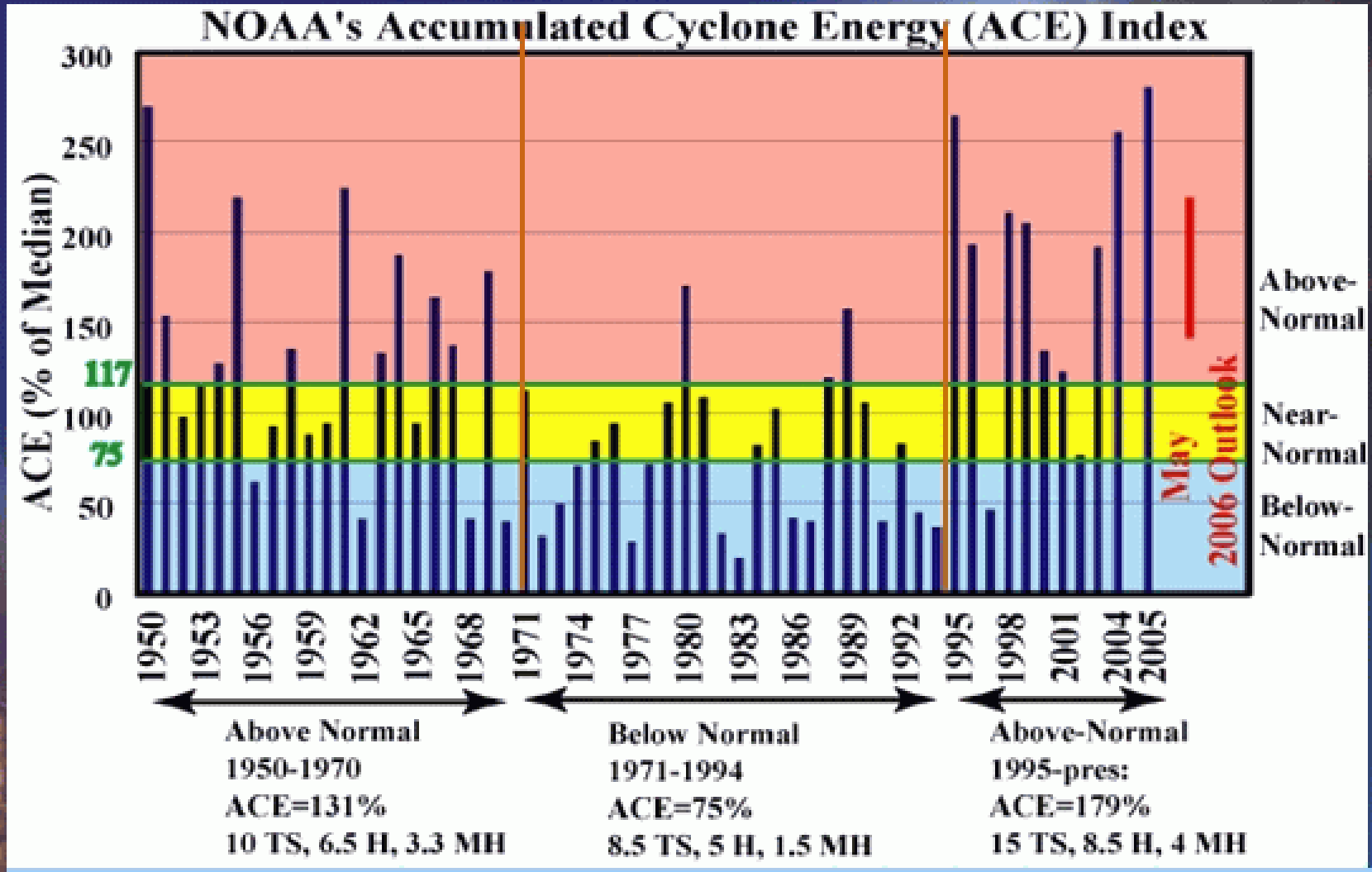
Just one of these hurricanes hitting NC will make it a bad season for someone

80% chance above normal, 15% chance near normal, 5% chance below normal



NOAA's seasonal hurricane outlooks, with the shaded areas indicating the main regions where tropical depressions, tropical storms, and hurricanes usually form. The outlooks indicate a 80% chance of an above-normal Atlantic hurricane season, and an 80% chance of a below-normal East Pacific hurricane season. Also, they indicate a below-normal hurricane season for the Central Pacific.

Historical Atlantic Seasonal Activity

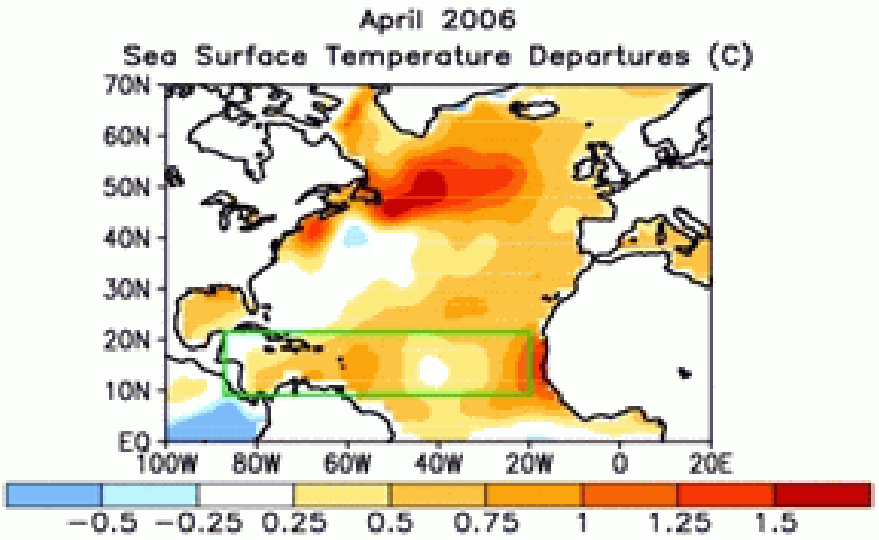


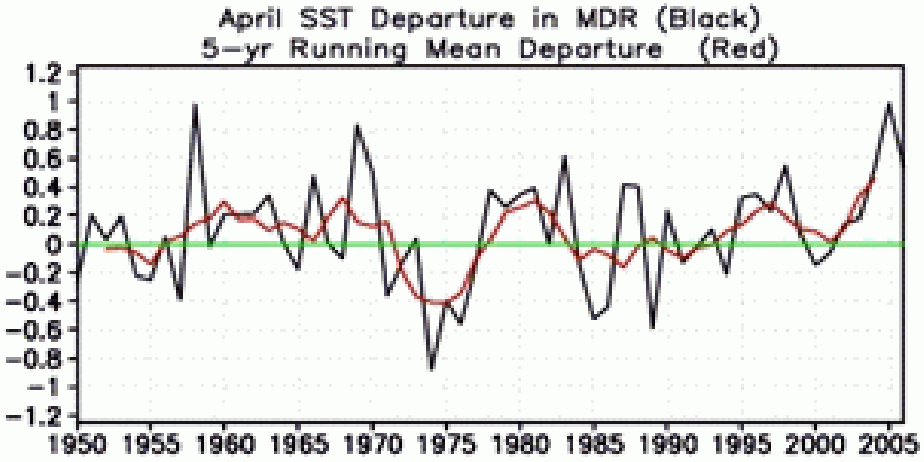
The 2006 Atlantic hurricane outlook reflects the ongoing active Atlantic hurricane era that began in 1995.

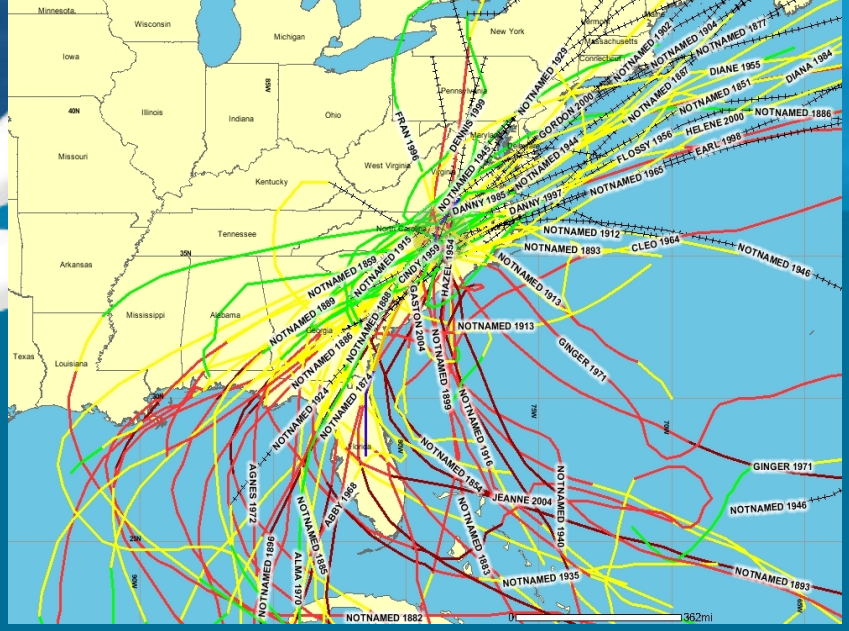
NOAA's 2006 Seasonal Hurricane Outlooks

	Atlantic Outlook	East Pacific Outlook	Central Pacific Outlook
Chance Above Normal	80%*	5%	
Chance Near Normal	15%	15%	NA
Chance Below Normal	5%	80%	
Tropical Storms	13-16	12-16	2-3 tropical systems (includes tropical depressions)
Hurricanes	8-10	6-8	
Major Hurricanes	4-6	1-3	
ACE % of Median	135%-205%	45%-85%	
Categorical Outlook	Above Normal	Below Normal	Below Normal

* 80% is highest probability ever issued in a May Outlook


April 2006
Sea Surface Temperature Departures (C)
70N
60N
50N
40N
30N
20N
10N
EQ
100W
80W
60W
40W
20W
0
20E
−0.5
−0.25
0.25
0.5
0.75
1
1.25
1.5


April SST Departure in MDR (Black)
5−yr Running Mean Departure (Red)
1.2
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
−1.2
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005



Law of Averages…
One land falling hurricane every 3-4 years

One or more hurricanes will impact the NC every one and a half years.

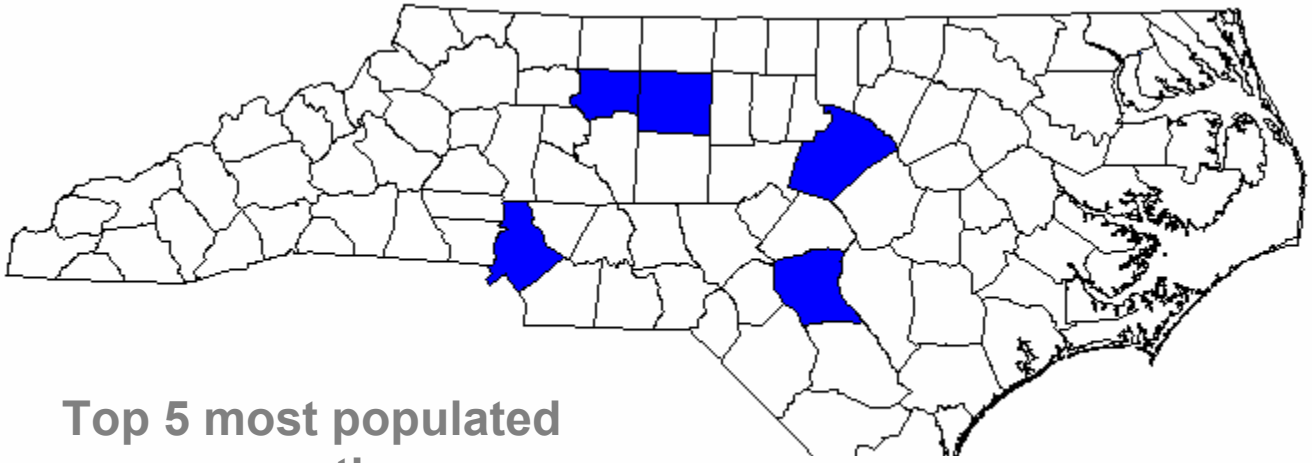
Chris Landsea NOAA Hurricane Research Division 1995 –

"Normalized data clearly indicates the US has been fortunate in recent decades with respect to storm losses. This would lead to the conclusion that it is only a matter of time before the nation experiences a $50 billion or greater storm, with multi billion dollar losses becoming increasingly frequent. Climate fluctuations in the Atlantic basin will enhance the chances that this will occur sooner rather than later."

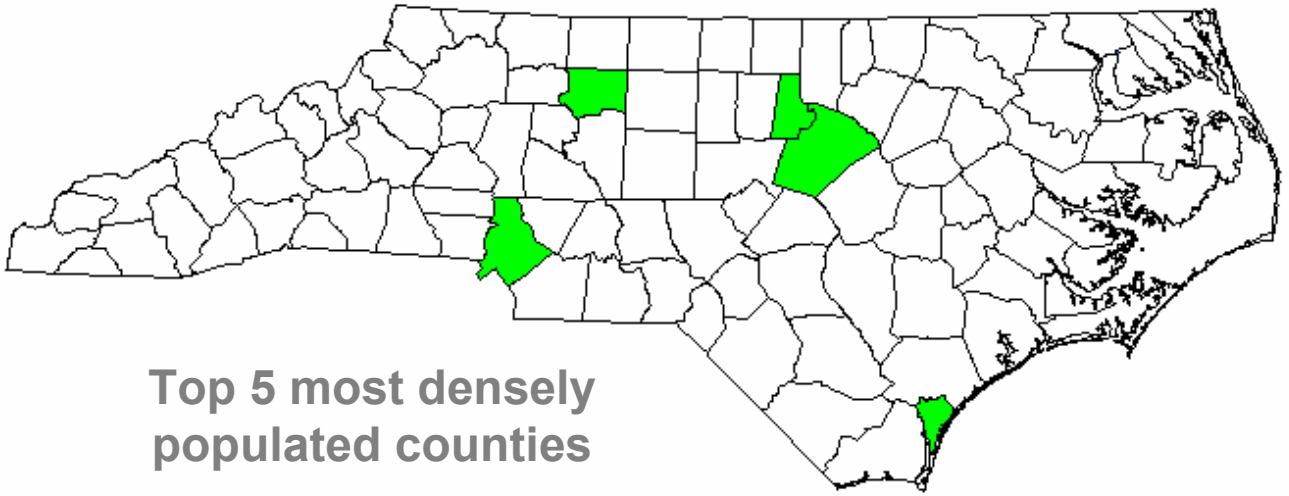
NC Population Vulnerability

NC population has increased from 4 million to over 8.4 million since 1954

Coastal populations have more than quadrupled

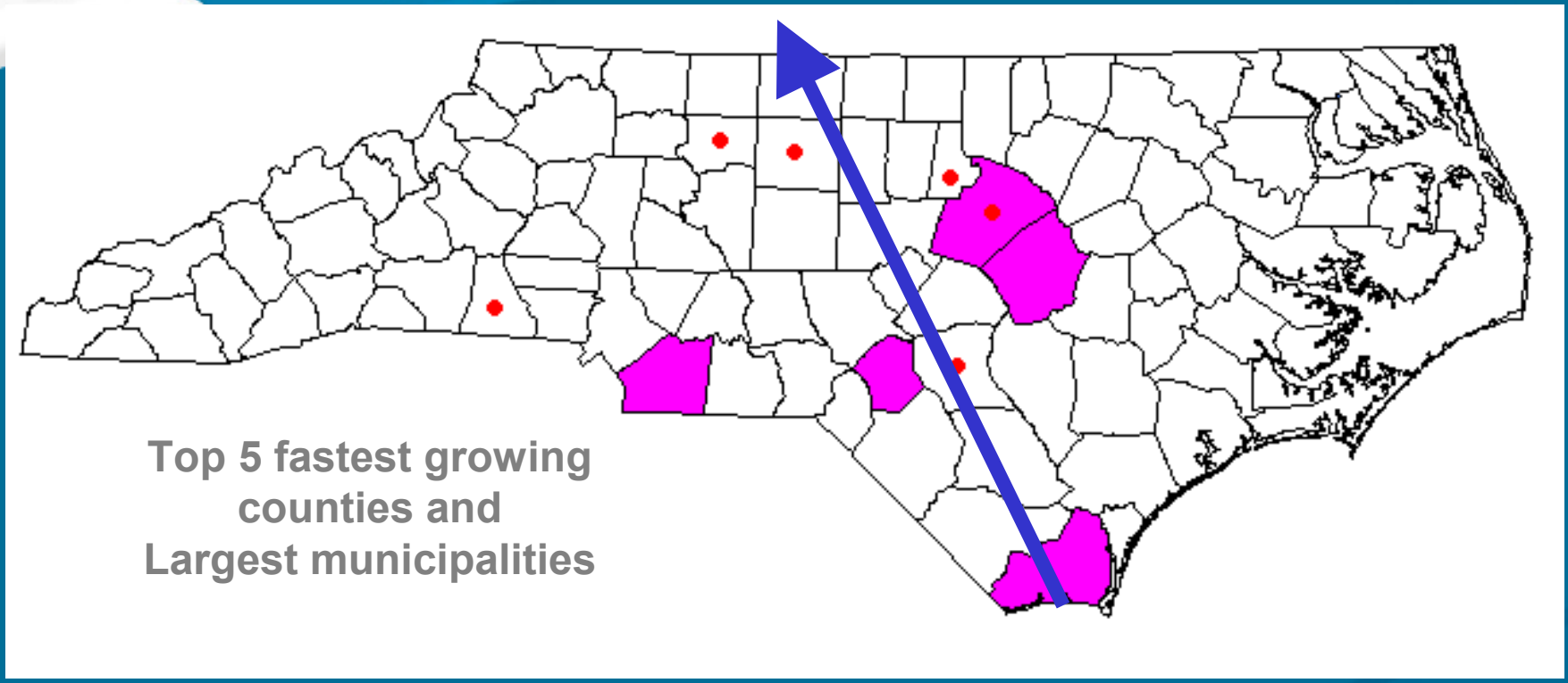


Top 5 most populated counties



Top 5 most densely populated counties

The Threat



Hazel or Hugo size storm moving from SE coast into central NC impacting some of the most densely populated areas in the state.

Winds in excess of 90 Mph along with 8-10 inches of rain. Cut all major east-west and north-south roads in the state.

Our test to come

- @ 4 million people impacted from ILM to RDU
- 391,081 buildings will be at least moderately damaged (of this 386,000 are residential)
- Estimated 90,342 buildings that will be completely destroyed (mostly residential)
- Nearly 8 times that of Hurricane Floyd
- All major N-S and E-W highways compromised


Joe Skipper / Reuters


Hilda M. Perez / Abaca

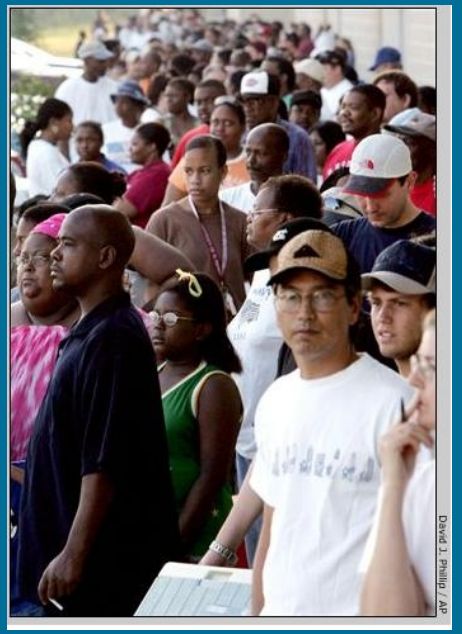
Wind damage alone is 8 times the total damage from Hurricane Floyd

County	# of Bldgs Damaged	County	# of Bldgs Damaged +
Alamance	11,000	Lee	12,000 (6,000)
Bladen	12,000 (10,000)	Moore	24,000 (12,000)
Brunswick	47,000 (42,000)	New Hanover	64,000 (56,000)
Caswell	700	Onslow	20,000
Chatham	10,300	Orange	12,000
Columbus	16,000 (10,000)	Pender	17,000 (13,000)
Cumberland	94,000 (68,000)	Person	1,700
Duplin	12,000 (6,000)	Randolph	12,000
Durham	26,000	Robeson	38,000 (29,000)
Forsyth	20,000	Rockingham	1,300
Guilford	18,000	Sampson	19,000 (14,000)
Harnett	27,000	Scotland	11,000
Hoke	9,000 (7,000)	Wake	114,000 (34,000)
Johnston	27,000 (10,000)	Wayne	22,000

Numbers represent all wind damage **( ) Moderate damage and worse**

Shelters and Evacuations

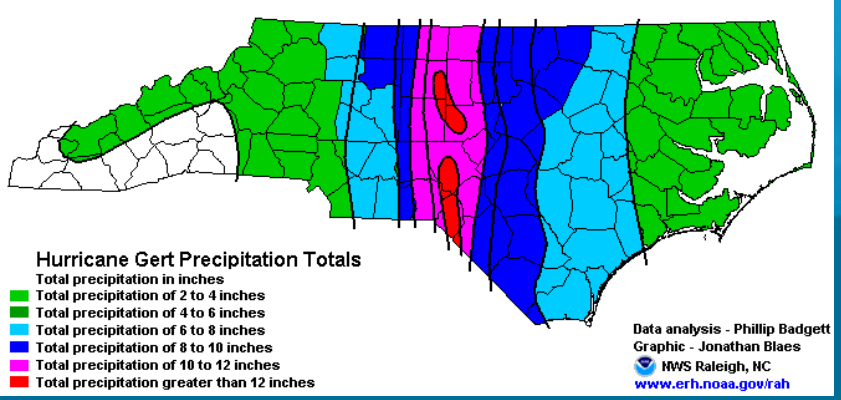
***181,880* households displaced due to the hurricane.**



The Trees and Debris

200-300 trees down for every mile of highway

In Fayetteville, Triangle and Triad 6-12 trees down per city block



The Rain
8 – 12 inches

Major to record flooding along Cape Fear, Neuse, and Haw Rivers including countless creeks.

Haw River would rise within 12 hours cresting near 35 feet flooding Interstate 40 west of Raleigh

Kerr Lake, Falls Lake and Lake Jordan could overtop flood controls. Numerous small dam failures.

Jeff Orrock

jeff.orrock@noaa.gov

http://weather.gov/raleigh

(919) 515-8209