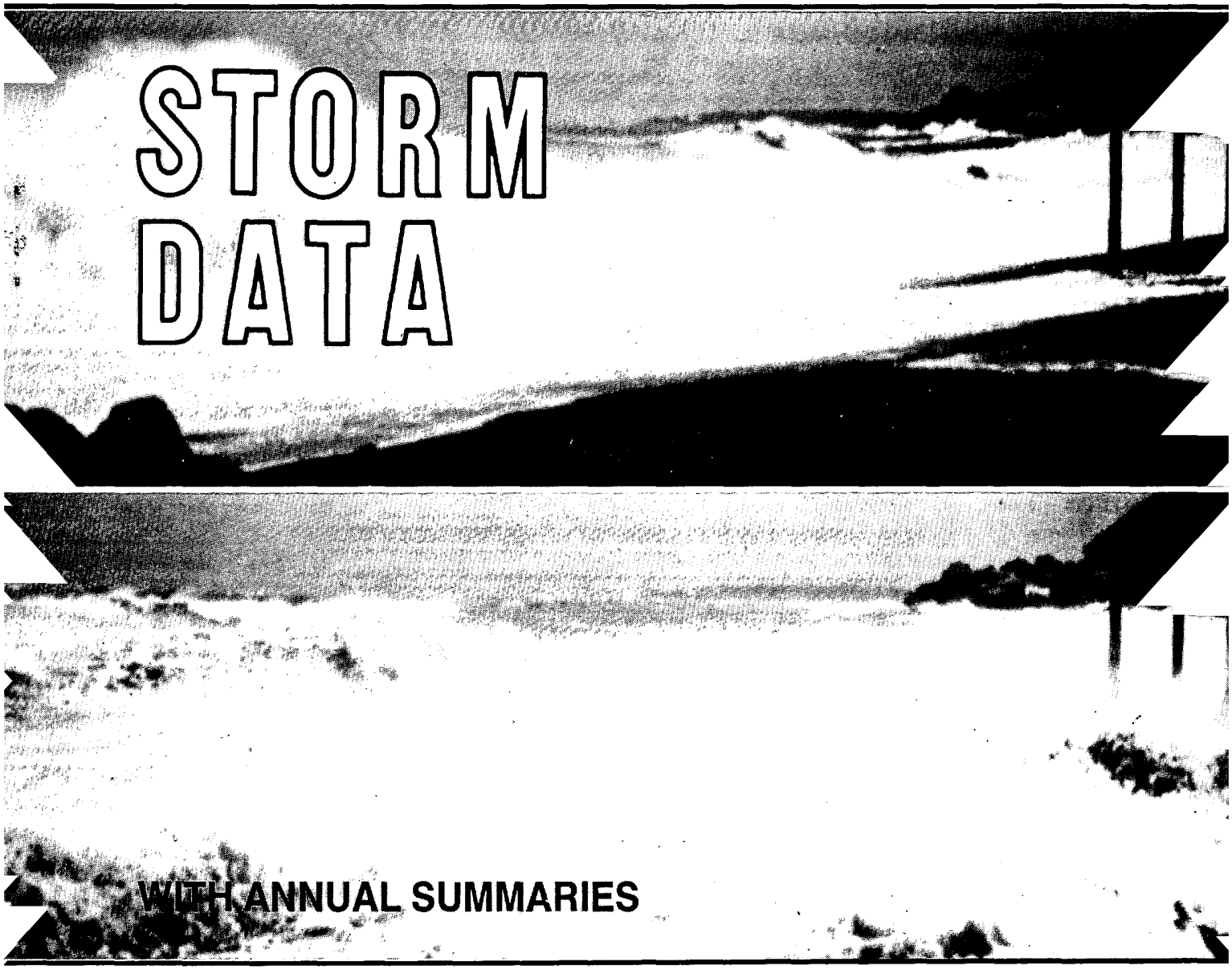
DECEMBER 1992
VOLUME 34
NUMBER 12



STORM DATA

WITH ANNUAL SUMMARIES

AND UNUSUAL WEATHER PHENOMENA WITH LATE REPORTS AND CORRECTIONS

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE / NATIONAL CLIMATIC DATA CENTER ASHEVILLE, N.C.

Cover: A powerful "Nor'easter" struck the eastern seaboard during December 11 through the 13th. Strong on-shore winds resulted in heavy surf and coastal flooding. These photographs were taken at Devereux Beach, MA ten minutes before the 11:23 a.m. high tide on December 11. (Views are to the southwest.) *(Photo courtesy: Thomas J. Adams, Marblehead, Massachusetts.)*

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STORM DATA

(ISSN 0039-1972)

National Climatic Data Center

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Publication Staff: William Angel, Greg Hammer, Jay Hollifield, and Sharon Weaver

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The Storm Data and Unusual Weather Phenomena narratives and Hurricane/Tropical Storm summaries are prepared by the National Weather Service. Monthly and annual statistics and summaries of tornado and lightning events resulting in deaths, injuries, and damage are compiled by cooperative efforts between the National Climatic Data Center and the National Severe Storms Forecast Center.

STORM DATA contains all confirmed information on storms available to our staff at the time of publication. However, due to difficulties inherent in the collection of this type of data, it is not all-inclusive. Late reports and corrections are printed in each edition.

Maps of the National Weather Service Forecast Zones which are used in the Storm Data and Unusual Weather Phenomena section will be printed in all editions.

Except for limited editing to correct grammatical errors, materials submitted are generally published as received.

Subscription, pricing, and ordering information is available from:

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(704) 271-4800 or (704) CLIMATE

The editor of STORM DATA solicits your help in acquiring photographs (prints or slides; black and white, or color), maps, clippings, etc. of significant or unusual weather events (past or present). These could be for use in the "Outstanding Storms of the Month" or "Et Cetera" sections of STORM DATA. We request our subscribers or other interested persons to mail such items to:

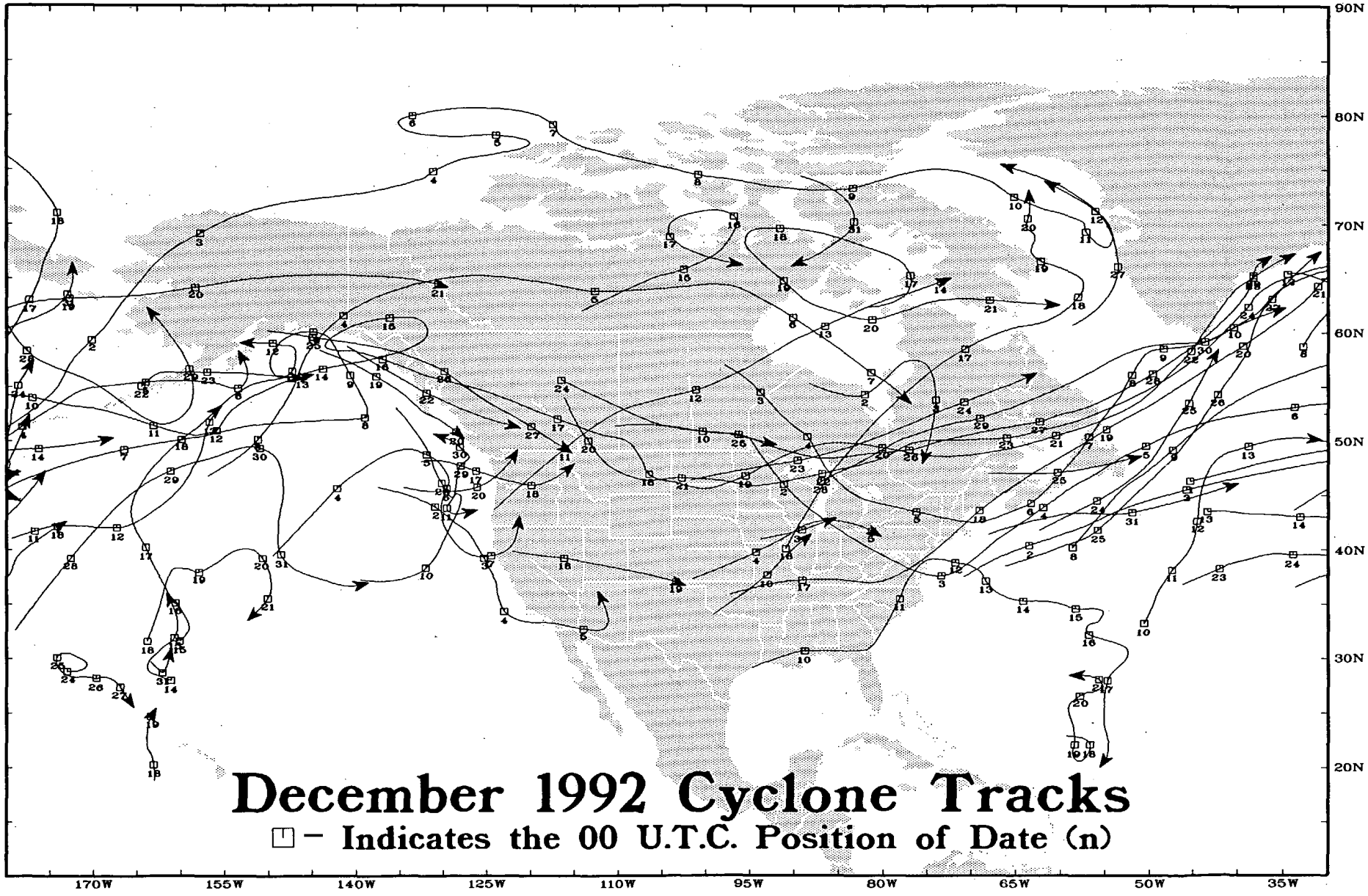
Grant W. Goodge
National Climatic Data Center
37 Battery Park Avenue
Asheville, NC 28801-2733

Any such items received by the editor will be for use in STORM DATA only. Any other use will be with the permission of the owner of said items. Materials submitted will be returned if requested in the original submission.

"I certify that this is an official publication of the National Oceanic and Atmospheric Administration and is compiled from information received at the National Climatic Data Center, Asheville, North Carolina 28801-2733."

Kenneth D Hadeen

Director,
National Climatic Data Center


90N
80N
70N
60N
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40N
30N
20N
170W
155W
140W
125W
110W
95W
80W
65W
50W
35W
December 1992 Cyclone Tracks
□ – Indicates the 00 U.T.C. Position of Date (n)

CLIMATIC DATA OF THE MONTH

PRECIPITATION AND TEMPERATURE ANOMALIES - DECEMBER 1992

Table 1 lists the 98-year temperature and precipitation rankings for the nine climatically homogeneous regions in the United States outlined below in Figure 1.

Areally averaged mean monthly temperatures across the nation ranked December 1992 as the 29th coolest December on record. During the month, a temperature dichotomy occurred across the nation. The eastern half of the country experienced average monthly temperatures that ranged from near normal to as much as five degrees above normal. Meanwhile, the western half recorded below average monthly temperatures. Departures in a few areas approached 11 degrees below normal. Temperatures across Alaska were seasonable with slightly warmer than normal conditions in the Hawaiian Islands.

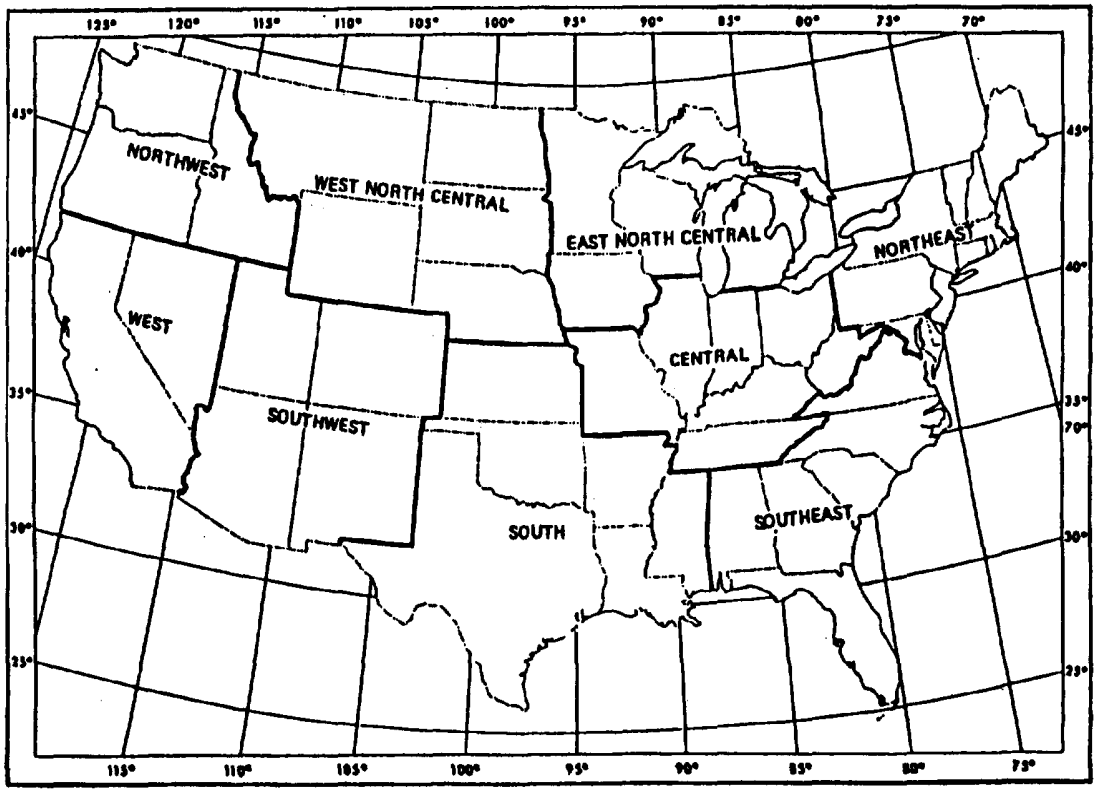
Nationally, December 1992 was the 32nd wettest December on record. The Southwest region logged its 8th wettest December since 1895. A majority of the nation experienced normal to above normal precipitation. Parts of California had over 16 inches of precipitation. The late December snowpack in the Sierra Nevadas was above normal for the first time since 1984. However, portions of northern Maine, the eastern panhandle of Florida and areas along the Rio Grande River in southern Texas recorded less than 25% of their average December precipitation. The northern two-thirds of Alaska and portions of the Hawaiian Islands received much above normal December precipitation.

TABLE 1. TEMPERATURE AND PRECIPITATION RANKINGS FOR DECEMBER 1992, BASED ON THE PERIOD 1895-1992. 1 = DRIEST, 98 = WETTEST; 1 = COLDEST, 98 = HOTTEST.

REGION	PRECIPITATION	TEMPERATURE
Northeast	58	70
East North Central	80	61
Central	49	56
Southeast	52	61
West North Central	46	16
South	68	55
Southwest	91	19
Northwest	47	15
West	84	18
National	67	29

From National Climatic Data Center

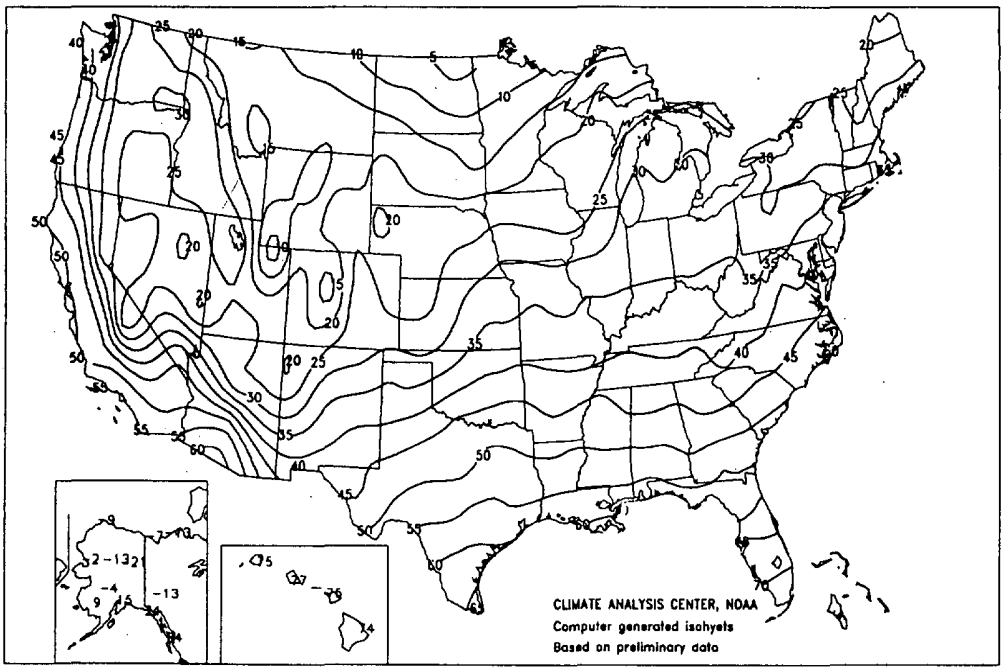
Fig. 1



From National Climatic Data Center

Average Temperature (°F) for December 1992

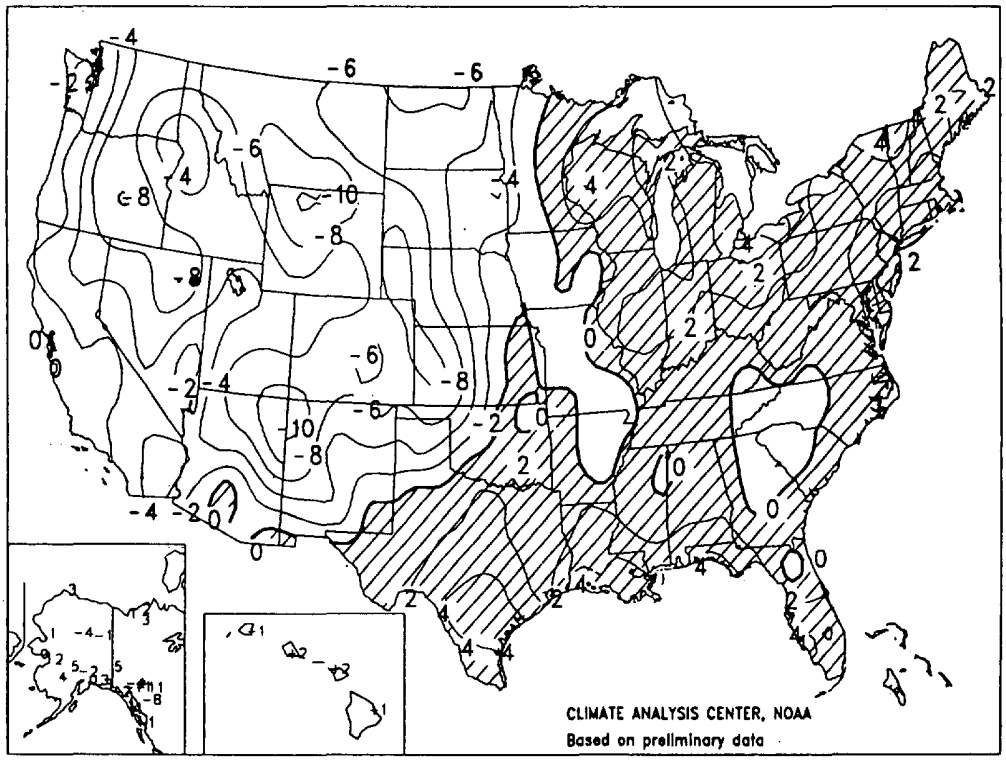
Fig. 2



Reprinted from Weekly Weather and Crop Bulletin - January 5, 1993

Departure of Average Temperature (°F) from Normal

Fig. 3



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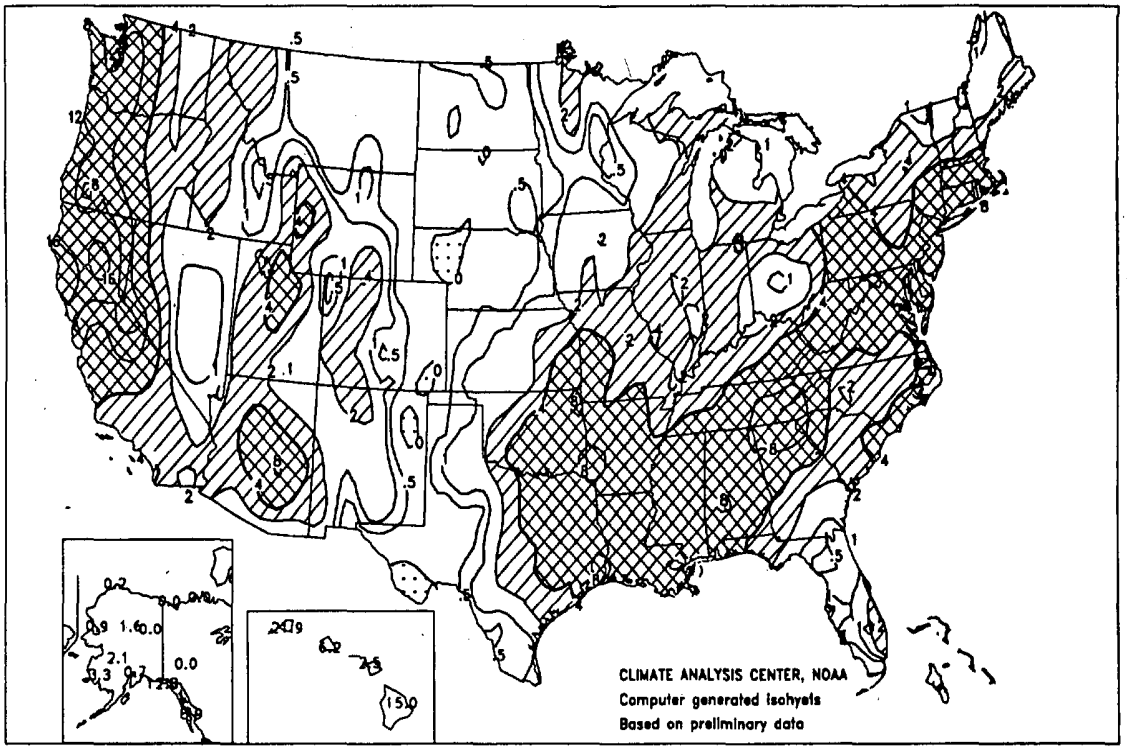
Total Precipitation (inches) for Decmber 1992

Fig. 4



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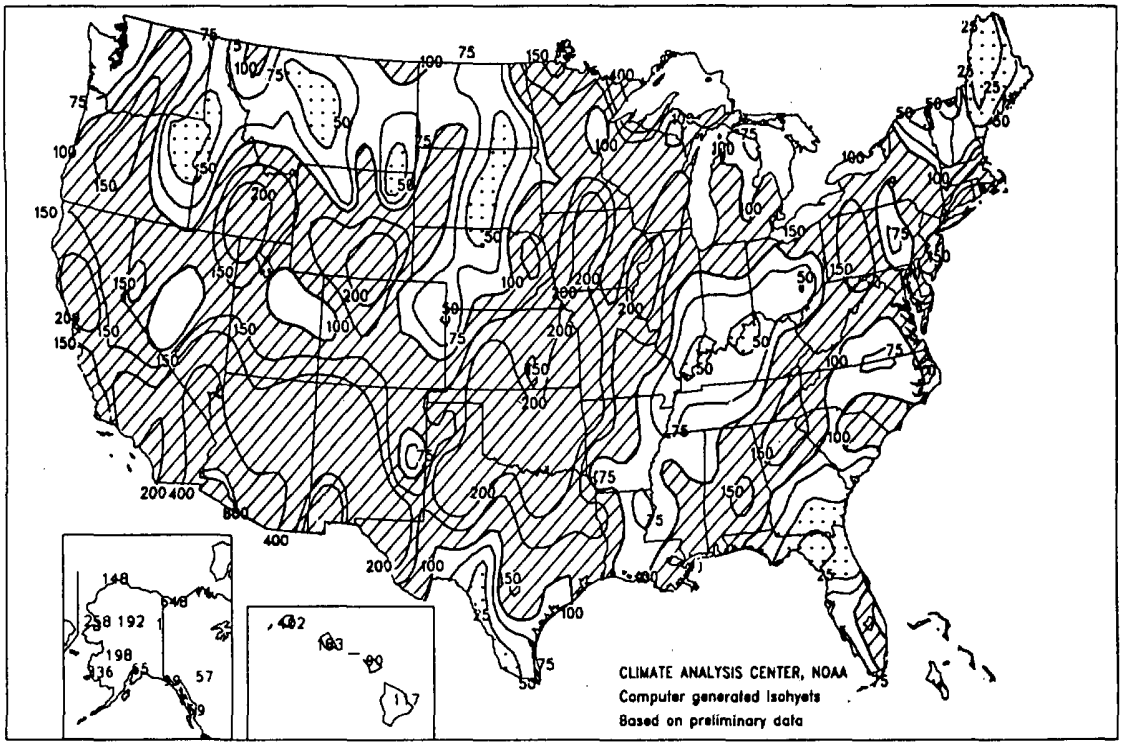
Percent of Normal Precipitation for December 1992

Fig. 5



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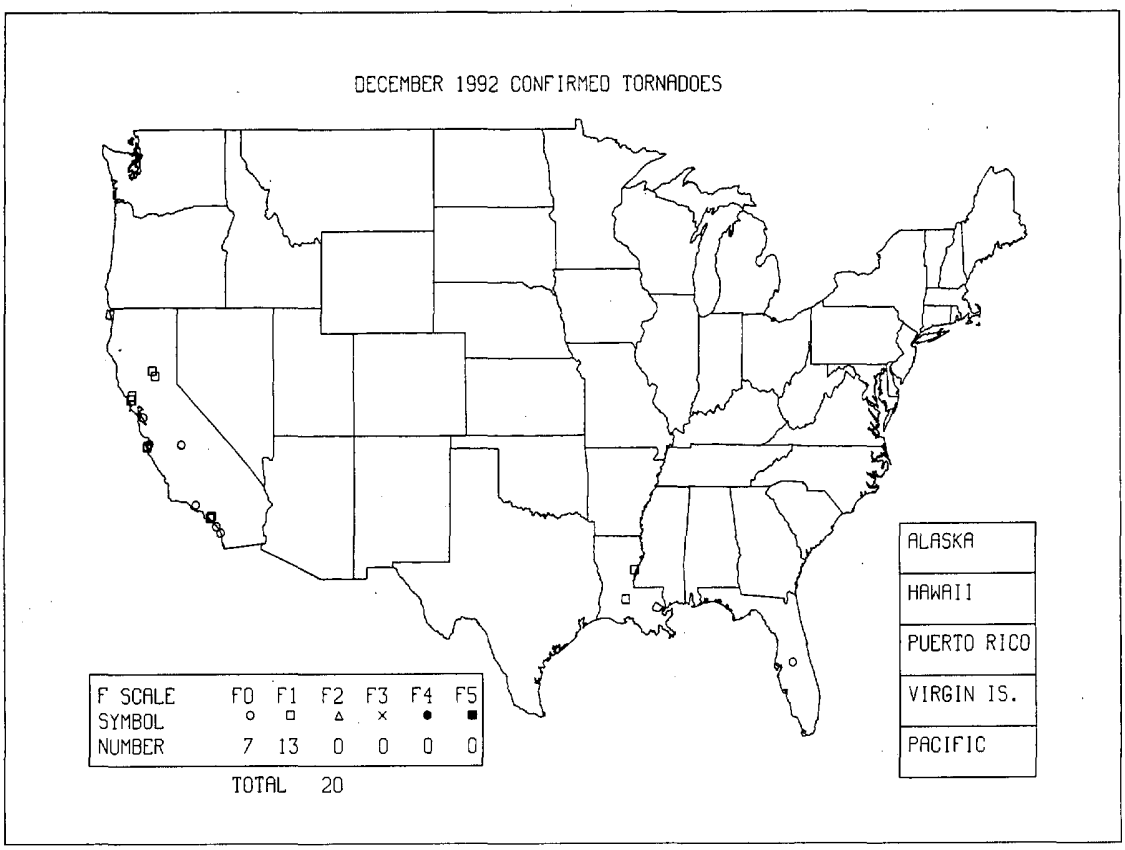
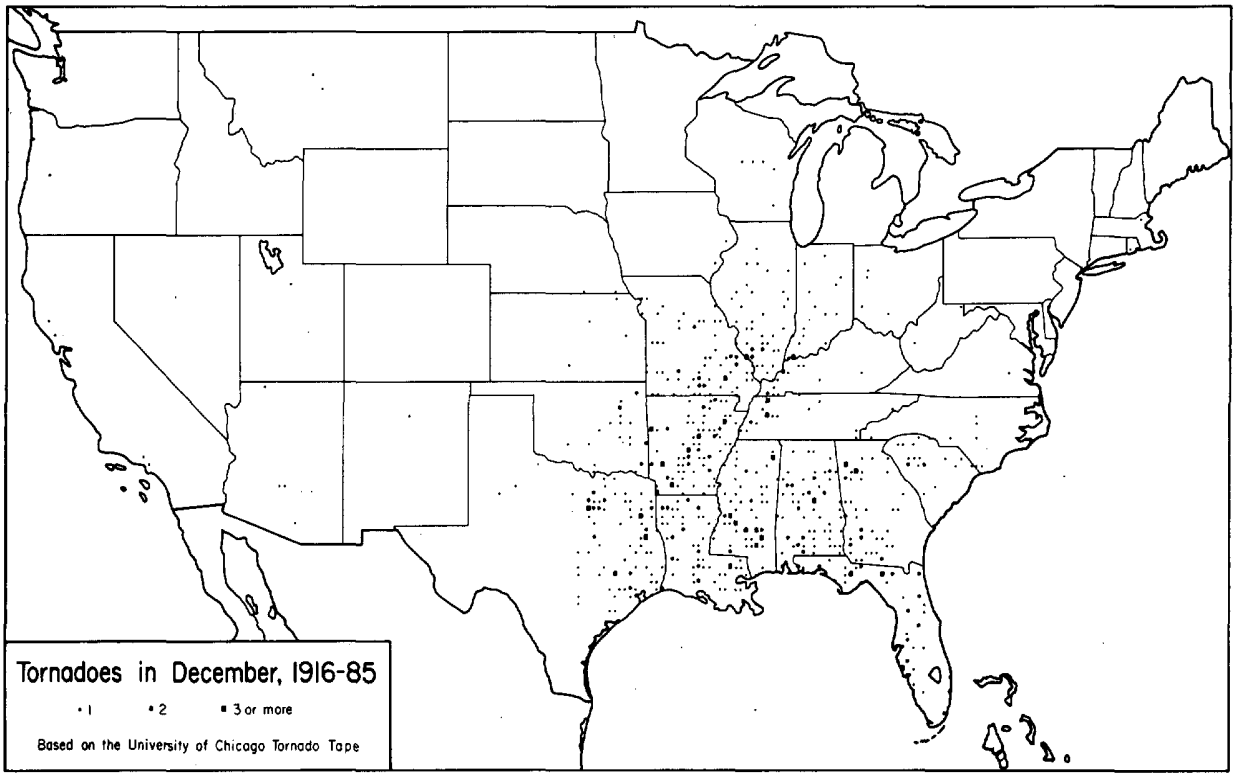

DECEMBER 1992 CONFIRMED TORNADOES
F SCALE F0 F1 F2 F3 F4 F5
SYMBOL ○ □ △ × ● ■
NUMBER 7 13 0 0 0 0
TOTAL 20
ALASKA
HAWAII
PUERTO RICO
VIRGIN IS.
PACIFIC


Tornadoes in December, 1916-85
• 1 • 2 ■ 3 or more
Based on the University of Chicago Tornado Tape

OUTSTANDING STORMS OF THE MONTH

1. POWERFUL "NOR'EASTER" STRIKES THE EAST COAST

A complex storm system moved eastward from the Gulf Coast of Texas to eastern Georgia on December 9 and 10th. In the next 24 hours, the low pressure system moved to southeastern Virginia (00 UTC December 11) and then to Chesapeake Bay (12 UTC December 11). During this time, the central pressure of the cyclone dropped 24 millibars (mb) to 985 mb. This rapid intensification classified this cyclone as a "bomb".

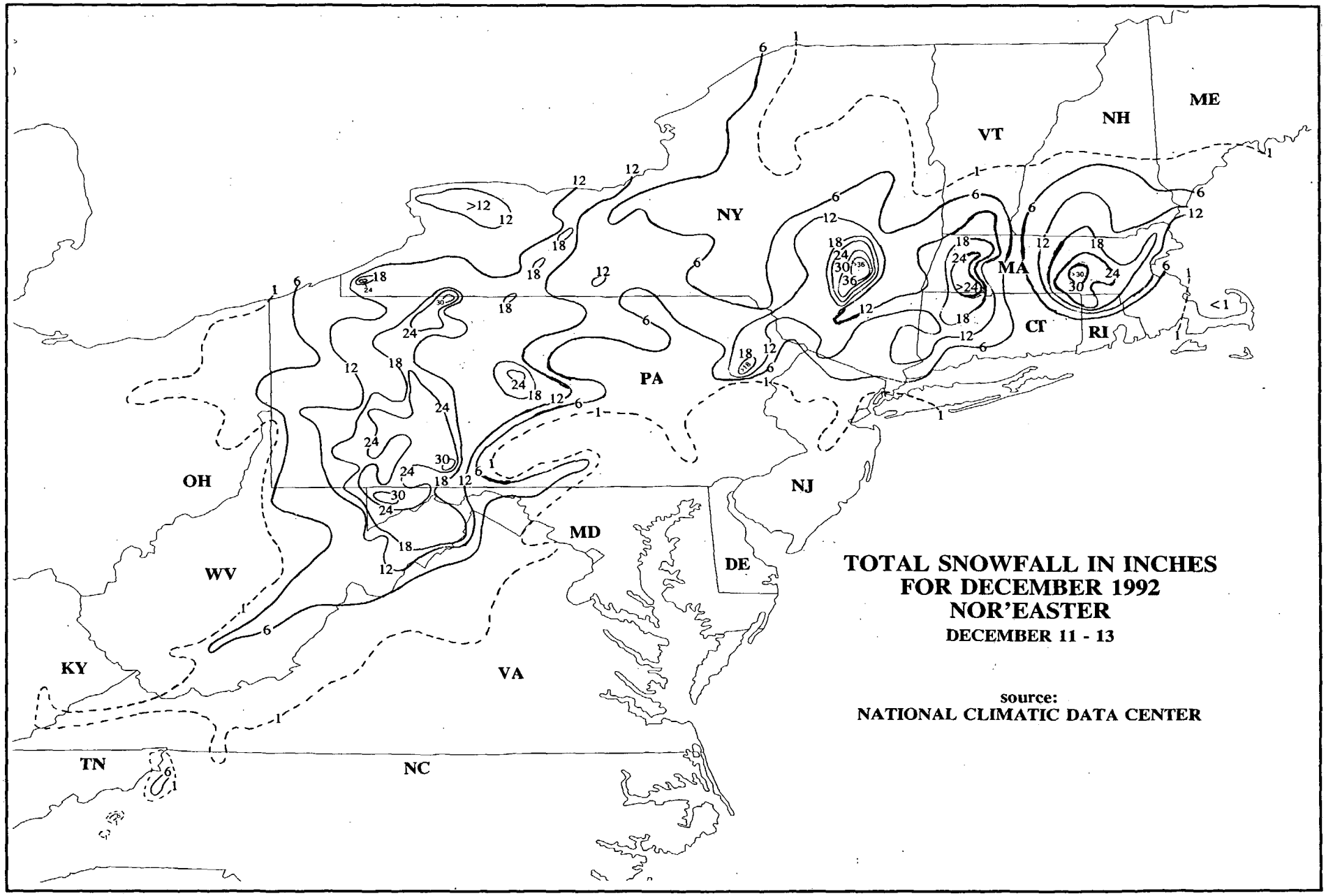
Prior to the development of the ''nor'easter'', the eastern United States was under the influence of a high pressure system. The high moved across southern Canada and remained stationary north of Maine on December 10. Moderately cold air was associated with the high pressure system. The center of the surface high moved to near Anticosti Island, off the coast of Quebec, and remained nearly stationary for the next several days. (See page 11.)

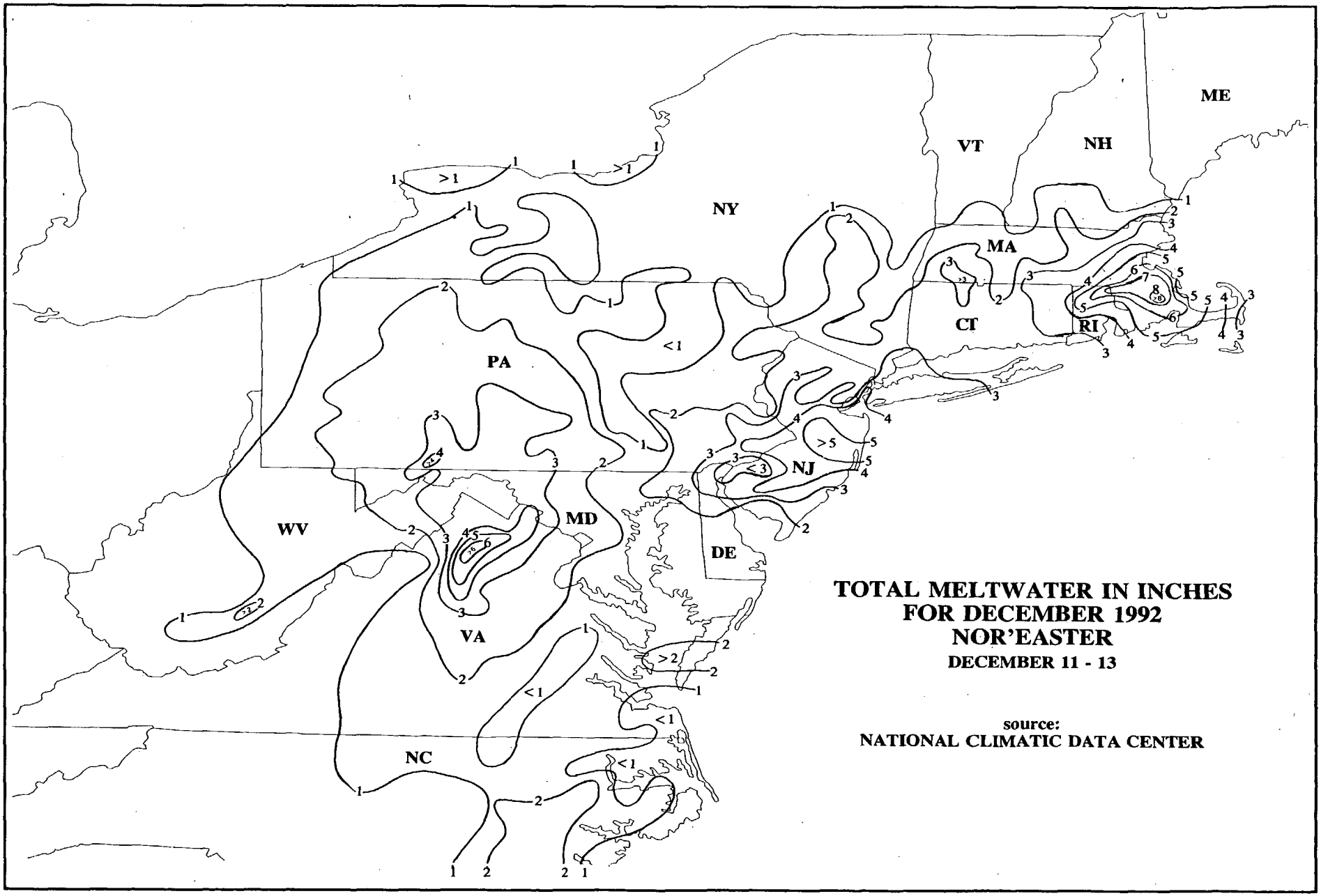
The large central pressure differences between the 1035 mb high and the 985 mb low produced a strong pressure gradient that resulted in very strong winds. Gale to storm-force winds with gusts exceeding hurricane force affected not only the Mid-Atlantic coastline, but also as far southwest as the southern Appalachians where tress were downed and roofs damaged. The strong on-shore winds also resulted in heavy surf and coastal flooding. Waves of 20 to 23 feet were reported in Massachusetts on December 12 and 13th.

Precipitation amounts with the Nor'easter, shown on the next two pages, varied greatly. Rainfall amounts of 8 inches occurred in southeast Massachusetts, while several areas in New York, Massachusetts, Pennsylvania, and Maryland recorded more than 30 inches of snow! By the evening of December 12, the storm moved slowly east over the Atlantic Ocean and brought an end to the precipitation.

Ten deaths resulted from the storm with insured losses totalling near $850 million and non-insured losses near $2 billion. The Nor'easter of December 1992 will certainly be remembered as one of the worst on record.

Additional information can be found in a Disaster Survey Report, "The Great Nor'easter of December 1992", *prepared by the National Weather Service Eastern Region Headquarters. As of this printing, the Disaster Survey Report is in draft form and not available for distribution. Inquiries: Harvey Thurm (516) 244 - 0124, NWS Eastern Region, Airport Corporate Center, 630 Johnson Avenue, Bohemia, NY 11716.*


ME
NH
VT
NY
MA
CT
RI
PA
NJ
MD
DE
OH
WV
KY
VA
TN
NC
TOTAL SNOWFALL IN INCHES
FOR DECEMBER 1992
NOR'EASTER
DECEMBER 11 - 13
source:
NATIONAL CLIMATIC DATA CENTER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WV
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>1
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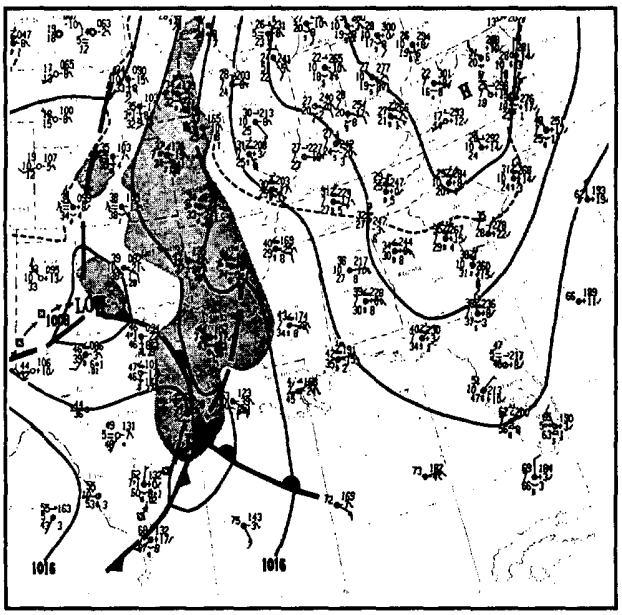
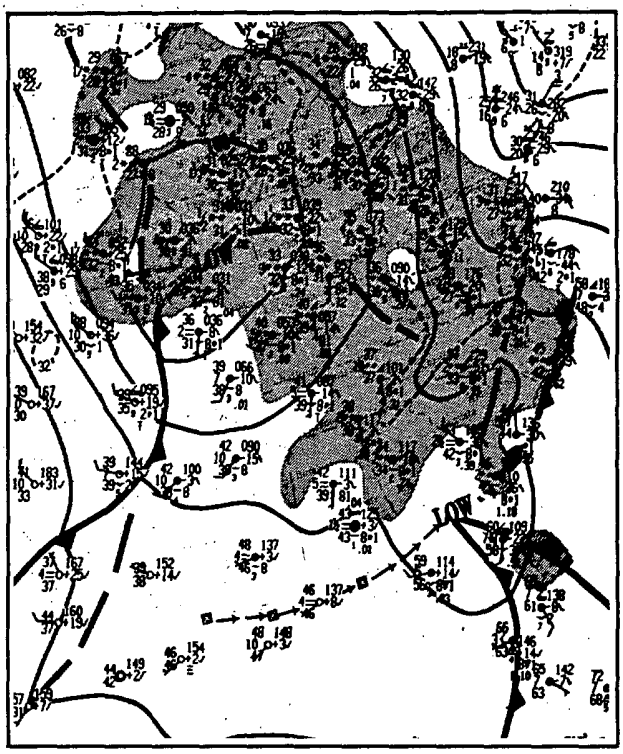
TOTAL MELTWATER IN INCHES
FOR DECEMBER 1992
NOR'EASTER
DECEMBER 11 - 13
source:
NATIONAL CLIMATIC DATA CENTER

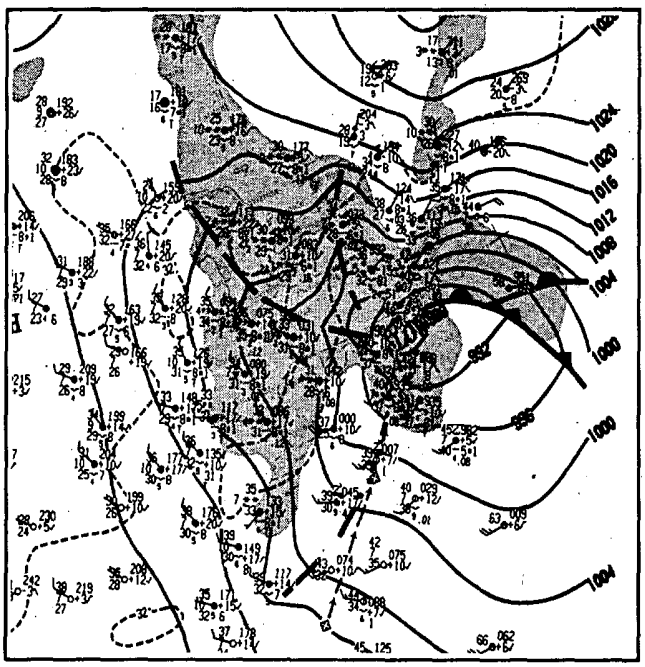
DAILY SURFACE WEATHER MAPS



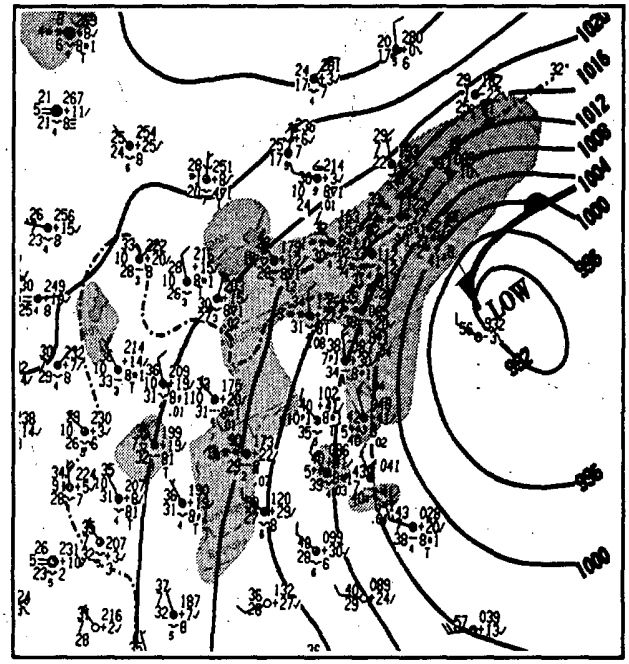
December 9, 1992



December 10, 1992



December 11, 1992



December 12, 1992

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
ALABAMA									
Baldwin County	16	2210CST			0	0	?	0	Flash Flood
	Heavy rainfall from a slow moving line of thunderstorms caused flash flooding of several roads in the county. A vehicle attemped to cross the intersection of U.S. Interstate 10 and county road 55 and was swept into deeper water.								
Mobile County	16	1841CST			0	0	?	0	Flash Flood
	Heavy rainfall from a slow moving line of thunderstorms caused flash flooding of several roads in the county. Government Street, a highly travelled road, was blocked by stalled cars.								
Clay County	16	2135CST			0	0	?	0	Flash Flood
	Heavy rains from a slow moving line to thunderstorms resulted in scattered occurrences of flash flooding at scattered locations throughout the county. Highway 148 in the Shady Grove vicinity, county road 12 in the Clairmont Springs vicinity, and highways 7 and 64 in the Hatchet Creek vicinity were flooded.								
ARIZONA									
Maricopa County North Phoenix	08	0400MST			0	0	4	0	Thunderstorm Winds
	Several homes along North 34th Street damaged by microburst winds. One wall of a garage was pushed off its foundation and a 30 foot eucalyptus tree was uprooted. Block and wooden fences were downed.								
AZZ003 Northeast Plateau	18	0646MST			0	0	0	0	High wind
	Winds were clocked at 60 mph at the Show Low airport and estimated winds of 70 mph were reported in Springerville.								
AZZ003 Northeast Plateau	27	1845MST			1	10	6	0	Ice Storm
	Widespread rain fell upon sub-freezing roads and left a coating of ice on most surfaces. At least 3 multiple-vehicle pileups occurred on U.S. Highway 40 near Winslow resulting in the closure of the freeway for some 5 hours. Icy surfaces were blamed on the death of an infant on the westbound side of the highway east of Winslow. The Flagstaff airport recorded 1.58 inches of rain on the 27th. (M01V)								
Pima County 15 E Tucson	28	1310MST			0	0	0	0	Flash flood
	Nine people stranded by runoff from melting snow and moderate rains in Sabino Canyon. All were rescued without any injuries.								
Pima County 30 NW Tucson	29	1130MST			0	0	?	0	Flood
	The Sheriff's Office reported the Santa Cruz beginning to breach it's banks near the Pinal County line. About 2.05 inches of rain fell in the foothills and over 4.00 inches fell on top of Mt Lemmon. Only .70 fell in the 24 hour period at the airport. Pima County emergency services reported that all unbridged road crossings were closed on major washes, creeks, and rivers in the Tucson area.								
Pinal County Mammoth	29	Afternoon			0	0	0	0	Flood
	A mother and her son were rescued from the rain-swollen San Pedro River near Mammoth. The water level reached up to the windshield of the pickup truck.								
ARKANSAS									
Benton County	14	0000CST-1000CST			0	0	5	0	Flash Flood
	Heavy rains resulted in flash flooding across Benton County. A number of county roads were closed because of the high waters. Several bridges in the county were also washed out.								

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
CALIFORNIA , Northern									
Sonoma County Sebastopol	02	1500PST	7.5	100	0	0	5	4	Tornado (F1)
Sonoma County Sebastopol	02	1500PST	1.0	25	0	0	4	3	Tornado (F1)
Sonoma County Windsor	02	1500PST	3.0	25	0	0	4	3	Tornado (F1)
	Three tornadoes struck communities to the west of Santa Rosa. A number of trees were blown down or damaged including those in an apple orchard. Small structures were destroyed near dwellings with minor roof damage to larger buildings. A day care center and greenhouses were also damaged.								
San Francisco County San Francisco	02	1600PST			0	2	3	0	High Winds
	A gust of wind caused a large portion of a tree to fall on a car driving through Golden Gate Park. A male driver and a female passenger were injured, and their car destroyed.								
Northern Mtns. Sierra-Nevada CA02-03-07-08-09-10 NV01-02	06 07	0800PST- 1500PST			0	4	5	0	Winter Storm
	The first in a series of major winter storms brought two to three and half feet of snow to the mountains with up to three inches of rain at lower elevations. The storm caused widespread minor damage consisting mainly of fallen trees and power lines. A number of accidents were reported in the Sierra Nevada on treacherous roads. A nine-car pileup on Highway 84 near Sunol in Alameda County injured four. Two fishing boats were beached at San Simeon Landing in San Luis Obispo County. Both were presumed a total loss, with damages set at 200 thousand dollars.								
Monterey County Carmel-Monterey-Seaside	06	1700PST	7.0	75	0	2	5	2	Tornado (F1)
Monterey County Monterey	06	1700PST	1.0	25	0	0	2	2	Tornado (F1)
	Two tornadoes moved across the Monterey peninsula. Damage consisted of a significant number of trees felled with subsequent damage to dwellings. A number of windows were blown in with many reports of lawn furniture or storage sheds destroyed. The worst damage occurred across the Old Del Monte Golf Course. Both injuries resulted from flying glass.								
Solano County 10 NE Travis Air Force Base	07	1235PST			?	?	0	0	Funnel Cloud
	A funnel cloud developed in the cold, unstable air mass behind a Pacific storm front. After a short period, the funnel went back into the base of the cloud deck.								
Sutter County 5 NW Yuba City	07	1530PST			?	?	0	0	Funnel Cloud
	The funnel cloud dissipated shortly after being observed.								
San Joaquin County Escalon	07	1553PST			?	?	0	0	Funnel Cloud
Alameda County 30 SW Stockton	07	1553PST			?	?	0	0	Funnel Cloud
Stanislaus County 8 W Patterson	07	1553PST			?	?	0	0	Funnel Cloud
	Three more funnel clouds were reported in the cold, unstable air.								

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
CALIFORNIA, Northern Cont'd									
Northern Mtns. Nrn Sierra Nev Nrn Sac Valley CA06-08-09 NV01	**08 09**	**0930PST- 1430PST**			**0**	**0**	**5**	**0**	**Winter Storm/ High Wind**
Another winter storm dumped two to four feet of new snow at higher elevations. Winds that accompanied the storm downed trees and power lines. Boats were torn from their moorings on Shasta Lake when winds gusts were up to 70 mph.									
Del Norte County Crescent City King Salmon	**10**	**0000PST**			**0**	**0**	**4**	**0**	**High Winds**
Wind gusts as high as 70 mph caused damage at both locations to trees and power lines.									
Northern Mtns. Northeast CA, Nrn Sierra Nev CA Coast CA01-02-03-05-07- 08-09 NV01-02	**10 11**	**0800PST- 1200PST**			**0**	**0**	**5**	**0**	**Winter Storm High Winds Flash Flood**
The third in a series of winter storms spread heavy precipitation and high winds over much of the state. Trees were felled in winds over 60 mph, some of them damaging houses. Snowfall at higher elevations amounted to one to two feet. At San Simeon on the San Luis Obispo County coast a fishing boat was torn from its mooring and destroyed on the beach. In Saratoga in Santa Clara County, San Tomas Creek overflowed its banks flooding a Japanese garden designated as a state and historic landmark. Damage to the garden was estimated at 100 thousand dollars. In Merced County, hail fell. Atwater experienced hail covering the ground, with LeGrand reporting up to four inches on the ground.									
Del Norte County Crescent City	**11**	**1115PST**	**0.25**	**25**	**0**	**0**	**3**	**0**	**Tornado (F1)**
Del Norte County Crescent City	**11**	**1115PST**			**?**	**?**	**0**	**0**	**Funnel Cloud**
A tornado damaged the roof of the County Sheriff's Office with additional damage to cars, fences and power lines. The funnel cloud was spotted about the same time to the west of the lighthouse.									
Fresno County 4 W Visalia Near Madera Clovis	**11**	**1600PST- 1730PST**			**?**	**?**	**0**	**0**	**Funnel Clouds**
A total of three funnel clouds were reported, including one in Clovis just 1 mile from the Fresno Air Terminal. The latter was not seen by the observer on duty.									
Monterey County Fort Ord	**11**	**1645PST**	**0.10**	**10**	**0**	**0**	**2**	**0**	**Tornado (F0)**
A tornado was reported to have briefly touched down and destroyed a fence.									
Fresno County 8 S Fresno	**11**	**1650PST**	**0.10**	**10**	**0**	**0**	**0**	**0**	**Tornado (F0)**
A tornado was spotted by an experienced observer, with a brief touchdown in a vineyard near Easton.									
Fresno County Selma	**14**	**2140PST**			**1**	**2**	**4**	**0**	**Dense Fog**
A head-on collision occurred as visibilities in dense fog were reported to be just 200 feet.(M20V)									
Northern Mtns. Sierra Nevada, NE Cane CA CA07-08-09-10 NV01-02	**17**	**0000PST- 2300PST**			**0**	**0**	**5**	**0**	**Winter Storm**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

CALIFORNIA, Northern Cont'd

The last in the series of winter storms hit the region with additional snowfall of one to two feet. At lower elevations rains continued to saturate the soil leading to incidences of urban and small stream flooding.

Alameda County									
San Leandro	**17**	**1030PST**	**0.25**	**25**	**0**	**0**	**2**	**0**	**Tornado (F0)**

A weather spotter reported that a tornado touched down briefly causing only minor damage.

Butte County									
Oroville	**17**	**1420PST**	**1.0**	**100**	**0**	**4**	**6**	**0**	**Tornado (F1)**

Fifty-three homes were damaged as well as roofs on the County Administrative offices and two apartment complexes. About 60 large trees were felled. A woman was injured by flying glass and 2 women and 1 child were hurt when a tree fell on their car.

Yuba County									
14 NE	**17**	**1530PST**	**5.0**	**25**	**0**	**0**	**4**	**2**	**Tornado (F1)**
Marysville									

A tornado struck near the settlement of Loma Rica. Damage was limited to aluminum panels torn off a barn and a number of oak trees uprooted. A witness reported that all of the water was sucked out of a cattle pond. Again, all three of these tornadoes occurred in the cold, unstable air mass behind a Pacific front.

Alameda County									
East Bay Hills	**23**	**0700PST-**							
		2000PST			**0**	**0**	**4**	**0**	**High Winds**

Diablo winds gusts were record to be greater than 70 mph in and below canyons in the East Bay hills. Electricity was cut off to 10 thousand residents of the Oakland-Berkeley hills. Two large Monterey pines caused extensive damage to two homes when they were toppled by the winds.

Alameda County									
Altamont Pass	**25**	**0700PST-**							
		0900PST			**0**	**10**	**4**	**0**	**Dense Fog**
									Ice

A combination of dense fog and ice on the highway contributed to four separate accidents involving a total of 13 vehicles on Interstate 580.

Northern Mtns.									
NE CA, Sierra	**28**	**0400PST-**							
Nevada	**29**	**2200PST**			**2**	**0**	**5**	**0**	**Winter Storm/**
CA01-07-08-09-10									**Mudslide**
NV01-02									

A cold, moist storm system brought another one to three feet of snow to the mountains of northern and central California. Interstate 80 and US 50, the two main routes over the Sierra Nevada, were closed for a period by the storm. In Alpine County, 60 people sought shelter at the Kirkwood ski resort after Highway 88 was closed. A supermarket in Amador County was heavily damaged when a 90 foot pine was felled by high winds. In Tuolumne County, east of Modesto, the body of a 16-year-old was found by rescue workers after his car was swept into a creek by a mudslide. A stretch of Interstate 80 in Sacramento was littered with at least 15 cars that skidded out of control when heavy rain and hail fell. High winds felled power lines in Humboldt County. A second death was reported in Quincy in Plumas County, when a falling pine tree crushed a man in his home.(M16V)(M43P)

San Joaquin County									
Stockton	**29**	**1500PST**			**?**	**?**	**0**	**0**	**Funnel Cloud**
Amador County									
Plymouth	**29**	**1610PST**			**?**	**?**	**0**	**0**	**Funnel Cloud**

Two more funnel clouds occurred in the wake of a strong Pacific front. The report from Plymouth was from a resident who said that the funnel lasted a few minutes then went back into the clouds.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

CALIFORNIA, Northern Cont'd

Del Norte County
Crescent City — 30 | 0130PST | 0.25 | 25 | 0 | 0 | 4 | 0 | Tornado (F1)

The Sheriff's Department reported the tornado near the intersection of Cooper and Butte Streets. A utility shed was completely destroyed. Other damage was reported over a two block path to roofs, cars, fences and power lines. A resident heard a noise that sounded like a low-flying jet.

Mono County
Mammoth Lakes — 30 | 1130PST | | | 1 | 1 | 0 | 0 | Avalanche

Two youths climbed a large hill near a residential area of Mammoth Lakes and snow, which had been loosely packed in 70-80 mph winds the night before, collapsed on them. One was killed and the other experienced a back injury. (M20O)

Northern Mtns.
NE CA, Sierra Nevada
CA01-07-08-09-10
NV01-02 — 31 | 0600PST- / 01 | 1800PST | | | 0 | 0 | 6 | 0 | Winter Storm

Another large winter storm struck the state with the major effects of this storm concentrated in the northern mountains and the northern Sierra Nevada. Drifts up to 12 feet in Siskiyou County closed all major roads from northern California into Oregon. About a thousand holiday travellers were stranded at the points where roads were closed. Local residents felt that the storm was the strongest to hit the area since 1952. At Mt. Shasta in Siskiyou County two roofs collapsed on two houses due to the snow load. In the Sierra Nevada, this storm brought the amount on the ground to 15 to 20 feet at higher elevations. The Eel River 35 miles southeast of Eureka overflowed its banks causing minor damage.

CALIFORNIA, Southern

CAZ019 — 04 | 0940PST | | | 0 | 0 | 0 | 0 | Winter Storm

Snow fell in the Antelope Valley of the Mojave Desert, with between two and six inches. Snow also fell on Interstate 15, between Hesperia and Cajon Pass. Many roads in the area were closed due to snow and ice.

CAZALL — 06 | 0610PST / 07 | | | 1 | 0 | 5 | 0 | Winter Storm

A major winter storm moved into southern California from the northwest, with heavy rain, snow, local flooding, gusty winds and thunderstorms. Mountain areas reported from one-half to two feet of snow. Big Bear Lake had from nine to fourteen inches of snow. Rainfall ranged from one and half to six inches along the coast and mountains. Many power outages were reported throughout the area. Roads were closed due to mud and rock slides and standing water. In Malibu one person was killed during a downpour, when the person swerved to avoid rocks that had tumbled onto Malibu Canyon road and crashed head-on into a truck. (F20V)

Ventura County
Moorpark — 07 | 0500PST | ? | ? | 0 | 0 | 3 | 0 | Tornado (F0)

Twenty trees were uprooted and some damage to outdoor patio furniture was reported.

Orange County
Westminster — 07 | 0530PST | ? | ? | 0 | 0 | 5 | 0 | Tornado (F1)

Three mobile homes were destroyed with several others damaged. Numerous power lines were blown down. Trees were uprooted.

Orange County
Anaheim — 07 | 0830PST | 0.10 | 10 | 0 | 0 | 3 | 0 | Tornado (F1)

Several moving cars were flipped over. Trees blown down, skylights torn from a roof, water sucked from street gutters for one city block.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

CALIFORNIA, Southern Cont'd

San Diego County Carlsbad	07	1500PST	?	?	0	0	3	0	Waterspout/ Tornado (F0)

A waterspout moved onshore and became a tornado. The tornado blew down three carports at a mobile home park, destroyed a plate glass window and downed a power pole.

San Bernardino County Rancho Cucamonga, Upland	07	1510PST			0	0	0	0	Funnel Cloud

Emergency Management Officials reported a possible funnel cloud.

CAZALL	12-13	0140PST			0	0	?	0	High Wind

Strong winds from 25 to 50 mph, hit many areas of southern California. A wind gust to 50 mph was reported at Sandberg, in the Tehachapi mountains.

CAZALL	17-18	0149PST			0	0	?	0	High Wind

A winter storm moving into northern California, produced winds from 25 to 40 mph, over many areas.

CAZALL	28-29	0800PST			0	0	4	0	Winter Storm

A major winter storm brought heavy rain, snow, gusty winds and local street flooding. Snowfall was from 6 to 18 inches, with rainfall from one to six inches, along the coast and in the mountains. Strong winds up to 100 mph hit Bear Mountain ski resort, with low wind chills, blowing and drifting snow.

Orange County San Clemente	29	1130PST	?	?	0	0	3	0	Tornado (F0)

A tornado moved through a neighborhood, ripping out a small grove of trees and toppling a light standard.

COLORADO

COZ002-011 Northern Mountains and Front Range	01	0000MST-0600MST							High Wind

Strong winds which developed on November 30th continued through the early morning hours on the 1st. Wind gusts of over 70 mph occurred at several National Weather Service mesonet sites in the higher elevations west of Denver. An observer near Estes Park reported a wind gust of 84 mph at midnight. At West Boulder, gusts reached 71 mph. Winds finally began weakening between 5:00 and 6:00 am. The last reported high wind gusts came from the mesonet site at Fritz Peak, which measured a gust to 77 mph at 5:15 am. The Walker Ranch, an historic site west of Boulder, burned down overnight during the high winds. Although the winds did not cause the fire, they did hamper efforts to extinguish the blaze.

COZ002-004-008-009-010-011-012-013-014-015-016-017 Mountains and East	03-05	1200MST-1800MST							Snow

A very slow moving upper low dug deep into the southwestern United States. Pacific moisture wrapping around the low as it moved into Arizona brought snow to the high country. Meanwhile, two cold fronts moved through the state, bringing an extended period of light snow to the eastern part of the state. Although it snowed almost continuously during the 2 days, accumulations were generally less than a foot and most in the lower elevations were less than 6 inches. The highest

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

COLORADO Cont'd

snow total was 19 inches at Steamboat Springs. Other amounts in the mountains included 13.5 inches at Mary Jane ski area; 11 inches at Red Mountain Pass and Coalbank; 10 inches at Irwin ski area; 9 inches at Wolf Creek ski area, Cuchara and Silverton; 8 inches at Powder Horn ski area; 7 inches at Berthoud Pass, Arapahoe Basin ski area and Vail; and 6 inches at Allens Park and Telluride. In the lower elevations, 10 inches fell at Fort Collins; 9 inches at Rye; 8 inches at South Pueblo; 6 inches at Crestone, San Luis, Castle Rock, Morrison, Merino and Wiggins; 5 inches at Walsenburg and Trinidad; and 4 inches at Longmont, Kiowa, Monument, Lamar and Springfield.

COZ002-004 — **09** — **All Day** — **Heavy Snow**

Northern and Central Mountains

A fast-moving upper level disturbance caught in very strong westerly flow over northern Colorado brought a quick shot of snow to the northern and central mountains. Snow amounts ranged from a couple of inches to just over a foot. Reports included 14 inches at Arapahoe Basin; 10 inches at Breckenridge; 9 inches at Loveland ski area; 7 inches at Gothic ski area; and 6 inches at Berthoud Pass. Strong winds caused areas of blowing and drifting snow which reduced visibilities throughout the area.

COZ002-004-011-012-013 — **09** — **0500MST-2200MST** — ? — **0** — **1** — ? — **High Wind**

Northern and Central Mountains, Front Range, Northeast Plains and Border

The same strong westerly flow which produced the heavy snow in the mountains also caused high winds in the mountains and the front range. Winds reached over 100 mph in the northern and central mountains and along the front range. Gusts began at 540 am near Boulder when a gust to 70 mph occurred at South Table Mesa. At the same time a gust of 61 mph was recorded at the Nation Weather Service mesonet station in Boulder. Gusts soon reached 95 mph at South Table Mesa. A spotter at Rustic reported wind gusts to 75 mph. Beaver Creek ski area reported a wind gust to 70 mph, forcing the closure of ski lifts. At Cone Mountain, near Berthoud Pass, a 110 mph wind gust knocked several trees on the mountains. A woman was injured at Winter Park ski area when winds blew down a tent at the ski area base. Later in the evening, a strong surface low in Kansas and Nebraska caused winds to increase in the plains and border regions of northeast Colorado. Winds at the National Weather Service mesonet station at Fort Morgan reached 58 mph. Gusts over 40 mph were also recorded at Akron. Winds gradually died down in the evening.

COZ002-004-006-007-008-009-010-011-012-013-014-015-016 — **12-14** — **1200MST-1200MST** — ? — ? — ? — **3** — **Heavy Snow**

Mountains, San Luis and Upper Arkansas Valleys, Eastern Colorado

A sharp upper trough in the western United States combined with a Pacific cold front to produce heavy snow across Colorado. Snow began in the mountains shortly after midday on the 12th with up to 16 inches falling by the next morning. In the east, upslope conditions continued through the morning of the 14th, leaving up to up to a foot of snow. Snow totals in the high country included 16 inches at Ouray; 15 inches at Cuchara; 13 inches at Conifer; 10 inches at Ironton; 9.5 inches at Snowmass ski area; 9 inches at Doubleheader; 8.5 inches at Winter Park; 8 inches at Berthoud Pass, Mary Jane, Monarch and Purgatory ski areas, Steamboat Springs and Rosita; and 7 inches at Beaver Creek, Breckenridge and Telluride ski areas. In the east, snowfall totals included 13 inches at Walsenburg; 12 inches at Castle Rock and Rye; 10 inches at Aguilar; 9 inches at Trinidad; 7 inches at Morrison; and 6 inches at Eaglecrest, Kiowa and Cañon City. Two snowmobilers were caught in an avalanche near Crested Butte in the Central Mountains on the 13th. Both walked away without injury but lost the snowmobiles ($800 total).

Statewide — **15** — **All Day** — **Snow**

A fast-moving upper level trough gave the state a one-day dusting of snow. Although snow amounts were generally three to six inches, there were a few isolated higher amounts. Snow reports included 10 inches at Rye; 9 inches at Steamboat Springs and Golden Gate Canyon; 8 inches at Doubleheader; 7 inches at Conifer; 6 inches Cameron Pass, Morrison and South Platte; 5 inches at Aguilar and Montrose; 4 inches Divide, Coaldale, Aurora, Castle Rock, Cañon City, Monument and Pueblo; and 3 inches at Aspen Springs, Rollinsville, Irwin ski area, Cedaredge, Woodland Park, Telluride ski area, Nathrop, Kiowa, and Trinidad.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

COLORADO Cont'd

COZ002-004-007 -008-010-011
Mountains, Four Corners and Front Range

18 0000MST-
19 0600MST

Heavy Snow

An intense and moisture-laden Pacific storm system rolled across the southwestern United States and brought heavy snow to the southwest and mountains of Colorado. Snowfall amounts were over two feet in several places. Most impressive was 34 inches of snow which fell in 18 hours at Wolf Creek ski area in the San Juan Mountains. The snow started shortly after midnight and by noon, 25 inches of very fine powder had fallen. The snow ended at Wolf Creek at about 2000MST. Strong southwesterly winds of 30 to 40 mph caused widespread blowing snow and reduced visibilities, often below 1/4 mile. Other snow totals included 30.5 inches at Molas; 25 inches at Coalbank; 21 inches at Steamboat Springs; 20 inches at Monarch; 17 inches at Irwin ski area; 16 inches at Gothic ski area; 12 inches at Snowmass ski area; 11 inches at Powder Horn ski area; 10 inches in the town of Aspen, Crested Butte and Mary Jane ski areas; 9 inches at Vail, Sunlight ski area and Cortez; 8 inches at Purgatory ski area; 7 inches at Winter Park, Arapahoe Basin and Beaver Creek ski areas and Cedaredge; and 6 inches at Allens Park, Summitville, Durango and St. Paul ski area. On the Front Range 5 inches fell at Boulder with other amounts generally less than 3 inches. During the storm, a ski patroller was caught in an avalanche near Monarch ski area. Also a backcountry skier was caught and buried in an avalanche near Red Mountain Pass. Both escaped without injury.

COZ002-004-011-014
Northern and Central Mountains, Front Range and Pikes Peak Area

20 1800MST-
2400MST

High Winds

Strong westerly flow aloft and trough of low pressure at the surface east of the Continental Divide produce high winds across the front range of northern Colorado. Winds exceeded 60 mph in several areas including 70 mph gusts near Livermore in northern Larimer County; 69 mph at Table Mesa near Boulder; 65 mph along the Rampart Range northwest of Colorado Springs; and 63 mph at Fort Collins.

COZ002-004-008-009-010
Mountains and San Luis Valley

28 0000MST-
30 1200MST **? ? ? 4** **Heavy Snow**

A deepening upper level trough off the West Coast brought strong southwesterly flow over Colorado, producing very heavy snow over the mountains. Snowfall amounts of over two feet were not uncommon. In addition to the heavy snow, strong winds of 40 to 60 mph reached the surface and produced blowing snow which reduced visibilities to less than 1/4 mile for extended periods. Snow totals included 28 inches at Gothic ski area; 25 inches at Coal Bank; 24 inches at Purgatory ski area; 23 inches at Molas; 19 inches at Telluride; 18 inches at Irwin and Sunlight ski areas; 17 inches at St. Paul; 16 inches at Aspen Highlands ski area; 15 inches at Mary Jane ski area; 14 inches at Aspen Mountain and Snowmass ski area; 13 inches at Bear Lake, Crested Butte and South Fork; 12 inches at Winter Park and Beaver Creek ski area; 10 inches at Creede; 9 inches at Steamboat Springs; 8 inches at Antonito; 7 inches at Silverton; 6 inches at Vail and Monte Vista; and 5 inches at Berthoud Pass and the Great Sand Dunes National Park.

The heavy snow produced a high avalanche danger. On the 28th, a mailman was caught by a snowslide on U.S. Highway 550 near Brooklyns. On the same day, near Crested Butte, a ski guide was caught in a snowslide. And on the 30th, near Irwin, another ski guide was caught in an avalanche. All three escaped without injury.

CONNECTICUT

CTZ001

02 2100EST-
03 0900EST **0 0 ? 0** **Heavy Snow**

Heavy, wet snow fell across the higher elevations of Litchfield County in northwest Connecticut. A developing storm system passing well to the southeast of Cape Cod, MA, dropped 10 inches at Bolton, 8 inches at Norfolk and 7 inches at Tolland. The snow was mixed with rain at lower elevations with only a few inches of accumulation reported. Several higher terrain locations in the northern portion of CTZ002 and CTZ003 received 6 inches with the remainder of the zone escaping significant accumulations.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
CONNECTICUT Cont'd									
CTZ001	11	0800EST-							
	12	1400EST			1	0	?	0	Heavy snow
CTZ003	11	1200EST-							
	12	2400EST			0	0	?	0	Heavy snow
CTZ005-006	11	0700EST-							
		2400EST			0	0	?	0	High wind
CTZ005-006-	11	0800EST-							
		1400EST			0	0	8	0	Coastal flood

A major winter storm struck the state with easterly gales gusts were up to 60 MPH in the coastal areas and combined with astronomically high tides to produce near record high tides along the western Connecticut coast where the morning high tide for December 11th was 5 feet above normal. The long fetch of easterly winds piled water up in western Long Island Sound to levels not seen since at least Hurricane Carol in 1954. Tide gage data for Bridgeport measured the tide height as 12.1 feet or just shy of the 12.4 feet recorded for the 1938 hurricane. Early reports indicate that 26 living units were totally destroyed, 1328 units suffered major damage and almost 1600 units experienced minor damage. Fairfield and New Haven counties were hardest hit including coastal sections of Fairfield, Stratford, Milford and East Haven. Scores of people were stranded and had to be rescued by boats, helicopters and large trucks. There were some narrow escapes and a number of those rescued were treated for hypothermia. Hundreds of people were evacuated to local shelters. In the higher elevations of northwestern and northeastern portions of the state this storm brought one to two feet of heavy, wet snow. Union reported 27 inches while Hartford got 6 inches and Milford only 3 inches. Higher elevations of CTZ002 and CTZ004 also received a foot of heavy wet snow while the remainder of these zones saw mixed precipitation turn to heavy snow for a couple hours at a time...probably during periods of heavier precipitation then turn back to mixed precipitation which minimized the impact of the less than 6 inch slushy snowfall which fell in the majority of zones 2 and 4. High winds and heavy snow brought down trees and tree limbs knocking out power to 63,000 residents statewide. In Harwinton, a man died from injuries received when his carport roof apparently collapsed on him under the weight of the heavy, wet snow. Several other people died of causes indirectly related to this storm including snow shoveling and car accidents. A preliminary figure of damage for the state for this storm was 60.17 million. (M50O)

CTZ005	28	0700EST-							
		1200EST			0	0	0	0	Glaze
CTZ001-002-004	28	0900EST-							
		1800EST			0	0	0	0	Glaze
CTZ003	28	1200EST-							
		2400EST			0	0	0	0	Glaze

A thin coating of ice brought traffic to a standstill in parts of western Connecticut and closed Bradley International Airport for a while during the mid-afternoon. The amount of glaze was only about 0.1 inch thick.

DELAWARE

DEZ001>003	10	2300EST-							
	12	1100EST			0	0	6	0	Coastal Flood/ Heavy Surf

A complex storm system moved from Georgia to southern Virginia on the 10th where it intensified. The storm produced a variety of weather across the Mid Atlantic Region as it meandered northeast. The storm dumped heavy rain across Delaware and produced winds with gusts in excess of 50 mph. This caused coastal flooding and beach erosion, especially at times of high tide. Dewey Beach was the hardest hit where approximately $3,000,000 of damage was done. A number of homes, motels, and other businesses had structural damage. Streets were broken up or littered with debris and sand, and beach erosion was widespread.

DEZ002,003	10	2300EST-							
	11	0400EST			0	0	3	0	High Winds

High winds destroyed bill board signs, knocked down trees, and power lines in numerous locations.

New Castle County	11	0450EST-							
		0800EST			0	0	3	0	Flood/Flash flood

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

DELAWARE Cont'd

Heavy rain throughout the county since Thursday evening lead to widespread flooding of low lying areas and caused the Christina river to exceed flood stage.

FLORIDA

Monroe County 6 ESE Key West	07	1518EST			0	0	0	0	Waterspout
	A waterspout was sighted south of the Boca Chica Naval Air Station.								
Gulf County 15 WNW Apalachicola	09 10	2345EST- 0020EST			0	0	4	0	Thunderstorm Winds
	Strong downburst winds hit Port St. Joe and Simmons Bayou downing trees, destroying a screen porch and damaging a barn.								
Pasco County Hudson	10	0605EST			0	0	0	0	Thunderstorm Winds
	Strong thunderstorm winds blew down trees in Hudson.								
Pinellas County	10	0711EST			0	0	0	0	Waterspout
	A waterspout was sighted over Old Tampa Bay.								
Pasco County 17 NNW Tampa	10	0730EST			0	0	0	0	Thunderstorm Winds (G50)
	A thunderstorm gust to 58 mph was reported at New Port Richey.								
Orange County	10	0735EST			0	0	0	0	Thunderstorm Winds
	Thunderstorm winds blew down signs, large tree limbs and power lines in Orlando.								
Polk County 38 E Tampa	10	0800EST			0	0	0	0	Thunderstorm Winds (G50)
	A thunderstorm gust to 58 mph was reported at Bartow.								
Polk County 36 SW Orlando	10	0855EST	short	?	0	0	0	0	Tornado (F0)
	A small tornado touched down briefly between Lake Alfred and Winter Haven with no damage reported.								
Lee County 10 E Fort Myers	10	1019EST			0	0	0	0	Thunderstorm Winds (G63)
	The Civil Air Patrol reported a thunderstorm gust to 72 mph at Alva.								
Martin County 23 N W. Palm Beach	15 16	1900EST- 0500EST			0	0	6	0	High Winds
	Persistent high winds from an offshore storm caused pounding waves and surf and beach erosion along the Florida east coast. A 50-year old beach house on Jupiter Island tumbled into the ocean after the beach was eroded beneath it.								

GEORGIA

GAZ002-003-004 NW Georgia NE Georgia Georgia Mountains	06 06 06 07	0800EST- 1110EST 0800EST- 0945EST			?	0	0	3	Ice Storm
					?	0	0	5	Ice Storm

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

GEORGIA Cont'd

Patches of light freezing rain and sleet, mixed with rain, developed over a large part of north Georgia around 0800EST. By 0845EST, bridges in the mountains of northeast Georgia were icing and accumulations were developing on exposed surfaces.

Countless power lines and tree limbs were downed during the storm, leaving thousands of customers without utility services. Lumpkin, Union, Habersham, White, Towns, Gilmer, Fannin and Hall Counties had extensive icing.

A main telephone distribution line in Hall County was burned by another ice-laden power line. About 25,000 customers were left without service in Dahlonega, Helen, Big Canoe, Cornelia, Dawsonville, Suches, Clarkesville and Batesville.

In northwest Georgia, generally around metropolitan Atlanta, ice accumulated on power lines, trees and surfaces in Clayton, Fulton, Forsyth, Henry, Carroll, Rockdale, Cherokee, Cobb and Dekalb Counties. Isolated power outages developed. Scattered limbs were downed.

GAZ002-003-004	27	0400EST-							
NW Georgia	27	0755EST		?	0	0	3		Ice Storm
Georgia Mountains	27	0400EST-							
NE Georgia	28	0500EST		?	0	0	4		Ice Storm

Sleet and freezing rain developed over a large portion of north Georgia and spread as far south as the northern suburbs of the Atlanta and around Athens. Ice accumulated over Banks, Lumpkin, Rabun, Towns, Union, Dawson, White, Habersham, Jackson, Hall Franklin, Madison, Cherokee, Hart, Elbert, Gwinnett, Oconee, Forsyth, Barrow and Walton Counties.

Numerous large limbs and trees fell during the storm over north Georgia. Tens of thousands of customers were left without utility services after lines were downed by debris and ice.

In Hall County, damage cost for utility lines were estimated at near $30,000. At Pine Log Mountain, a transmitter tower was toppled after ice accumulated over the structure. In Forsyth County, over 75 roads were blocked by fallen trees. At Elberton in Elbert County, a fallen tree limbs caused about $2,000 in damages to a trailer. A few homes sustained minor damages.

Power outages developed at many locations, including Cornelia, Clayton, Danielsville, Ila, Comer, Elberton, Lavonia, Hartwell, Alta, Lula, Homer, Jefferson, Mayesville, Canon, Royston, Bowerville, Sandy Springs, Bold Springs, Statham, Commerce, Bethlehem, Dewey Rose, Goss, Rock Branch and Elberton.

Banks County									
6 SSE Homer	28	0050EST		?	0	0	?		Hail (.75)

Hail developed at Interstate 85 in southern Banks County.

IDAHO

IDZ003	01	0000MST-							
Upper Snake River Valley	02	0000MST		0	0	0	0		Heavy Snow
IDZ006	01	0800MST-							
West Central Mountains	03	0800MST		0	0	0	0		Heavy Snow
IDZ004	01	1700MST-							
Southeast Highlands	02	1700MST		0	0	0	0		Heavy Snow
IDZ012	02	0700MST-							
Upper Snake River Highlands	03	0700MST		0	0	0	0		Heavy Snow

A major winter storm dropped six to ten inches of new snow over southeast Idaho and 12 to 14 inches over the west central mountains.

IDZ002	04	2145MST-							
South Central Idaho	05	0600MST		0	0	0	0		Wind Chill

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
IDAHO Cont'd									
		Northeast winds of 15 to 25 miles an hour and air temperatures in the single digits above zero caused wind chill readings around 30 degrees below zero Farenheit at Burley.							
IDZ012	08	0700MST-							
Upper Snake River Highlands	09	0500MST			0	0	0	0	Heavy Snow
IDZ006-007-010	08	0700MST-							
Central Mountains	09	0800MST			0	0	0	0	Heavy Snow
IDZ004	08	1200MST-							
Southeast Highlands	09	1200MST			0	0	0	0	Heavy Snow
IDZ005	08	1600MST-							
Southwest Highlands	09	1600MST			0	0	0	0	Heavy Snow
		A moist Pacific storm dumped heavy snow over southern Idaho and the central mountains. Twelve inches fell at Driggs, 50 miles east of Idaho Falls. Silver City, 50 miles southwest of Boise, also received 12 inches of snow, and reported drifts of six to eight feet high. Pomerelle ski area, 20 miles southeast of Burley, recorded 18 inches of new accumulation.							
IDZ006	11	0800MST-							
	12	1700MST			0	0	0	0	Heavy Snow
		The west central mountains of Idaho received six to fifteen inches of new snow.							
IDZ006	16	0700MST-							
West Central Mountains	17	1800MST			0	0	0	0	Heavy Snow
IDZ001-002	16	0800MST-							
Southwest and South Central Idaho	17	0800MST			0	0	0	0	Heavy Snow
IDZ009	16	1500PST-							
Northern Idaho	18	0700PST			0	0	0	0	Heavy Snow
IDZ004	16	1700MST-							
Southeast Highlands	17	1700MST			0	0	0	0	Heavy Snow
IDZ003	17	0700MST-							
Upper Snake River Valley		1500MST			0	0	0	0	Drifting Snow
IDZ011	17	0600PST-							
North Central Mountains	18	0600PST			0	0	0	0	Heavy Snow
IDZ003	17	0900MST-							
	18	0900MST			0	0	0	0	Heavy Snow
IDZ005	17	1600MST-							
Southwest Highlands	18	1600MST			0	0	0	0	Heavy Snow
		Another major Pacific storm brought widespread heavy snow amounts to Idaho between the 16th and the 18th of December. Northern Idaho received the heaviest amounts ranging from 10 to 18 inches. Elsewhere, Idaho City, 25 miles northeast of Boise, recorded 10 inches, and Anderson Ranch Dam, 20 miles northeast of Mountain Home, measured eight inches. Many other locations received snowfall in excess of six inches. In southeast Idaho, strong winds created areas of drifting snow. Interstate 86, State Highway 37, and State Highway 39 were closed in the American Falls area part of the day on the 17th. Schools in American Falls, Aberdeen, Rockland and Fort Hall were also closed on the 17th.							
IDZ006	19	0700MST-							
West Central Mountains	21	0800MST			0	0	0	0	Heavy Snow
IDZ009	19	0700PST-							
Northern Idaho	20	1800PST			0	0	0	0	Heavy Snow

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
IDAHO Cont'd									
IDZ011 North Central Mountains	19 22	0600PST- 0600PST			0	0	0	0	Heavy Snow
IDZ002>004 South Central and Southeast	20 21	1100MST- 0300MST			0	0	0	0	Blowing Snow
		More heavy snow descended on Idaho. Twenty to twenty-six inches fell on the north central mountains. The west central mountains received 12 to 20 inches and also had problems with drifting snow. Cascade, 55 miles north of Boise, had drifts eight feet high. Visibilities in McCall at times were less than one-quarter of a mile. Winds in the north were strong, where Grangeville recorded a 55 mile an hour wind gust. Blowing snow caused several road closures in southeast Idaho on the 20th. Closures included Interstate 86 from American Falls to Raft River, Interstate 84 from the I-86 junction to the Utah border, and State Highway 37 from American Falls southward.							
IDZ009 Northern Idaho	25 26	1800PST- 1800PST			0	0	0	0	Heavy Snow
IDZ006 West Central Mountains	26 30	0700MST- 1000MST			0	0	0	0	Heavy Snow
IDZ009	27 30	1600PST- 1500PST			0	0	0	0	Heavy Snow
IDZ009	28	0600PST- 1300PST			0	0	0	0	Blizzard
IDZ003 Upper Snake River Valley	28 29	1600MST- 0900MST			0	0	0	0	Heavy Snow
IDZ011 North Central Mountains	28 29	1200PST- 1200PST			0	0	0	0	Heavy Snow
IDZ004-005 Southern Idaho	28 29	1600MST- 1700MST			0	0	0	0	Heavy Snow
		A series of moist storms from the 25th to the 30th of December dropped nearly continuous snowfall over Idaho. The west central mountains received thirty to forty-five inches, along with blowing snow and low visibilities. Northern Idaho snowfall amounts ranged from twenty-five to thirty-five inches. Portions of Interstate 90 in northern Idaho were closed. Also in the north, State Highway 41 from Rathdrum south to Interstate 90 was closed. Drifting also caused the closure of most secondary roads in northern Idaho. Snow amounts in southern Idaho were much less with these storms. The upper Snake River valley recorded twelve to fifteen inches from the 28th to the 30th.							
IDZ002	28 29	2330MST- 2130MST			0	2	?	0	Blowing Snow
		Several power outages were caused by strong winds in south central Idaho. At Burley, the strongest wind gust was 46 miles an hour. Blowing snow carried by these winds played a role in over 30 automobile accidents. The only injuries reported were minor injuries sustained by 2 children involved in a head-on collision.							
IDZ003	29	0200MST- 0800MST			0	0	?	0	Wind
		Southerly winds of 30 to 35 miles an hour with gusts to near 50 miles an hour downed power lines in the north part of Pocatello. Also in Pocatello, 2 fires were reportedly started when the winds blew 2 power lines together and a shower of sparks rained down to the ground.							
IDZ012 Upper Snake River Highlands	29 30	0700MST- 1400MST			0	0	0	0	Heavy Snow
IDZ002-007 South Central Idaho	29 30	0800MST- 0800MST			0	0	0	0	Heavy Snow

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

IDAHO Cont'd

Twelve inches of new snow fell at Hansen, 20 miles southeast of Twin Falls as more moisture entered Idaho. Ketchum received eight to ten inches.

IDZ004	**29**	**Morning**			**0**	**0**	**4**	**0**	**Wind**

Near Soda Springs, 50 miles east of Pocatello, strong winds tore free a portion of a hay shed roof and sent it crashing into a grain storage bin. The roof and bin were destroyed. Debris from the roof also damaged a tractor cab and a power pole. Winds at Soda Springs were blowing at 25 miles an hour.

IDZ007	**31**	**0700MST- 2359MST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Another storm system brought more snowfall to Idaho, with the heaviest amounts restricted to the south central mountains. Over 10 inches accumulated in Ketchum.

IDZ009 Northern Idaho	**31**	**1500PST- 2200PST**			**0**	**0**	**0**	**0**	**Blowing Snow**

Near blizzard conditions caused the closure of many roads in the Rathdrum area, 10 miles north of Coeur d'Alene. Winds of 25 miles an hour occasionally gusts were 35 miles an hour, along with snow created areas of visibilities less than one-quarter of a mile in blowing snow.

ILLINOIS

ILZ01-10	**09 10**	**1200CST- 1200CST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Heavy snow of 3 to 6 inches fell over much of north and central Illinois. The heaviest snow of six to near eight inches fell from near Quincy to Rockford.

INDIANA

INZ001>003-005- 006- Far Northern IN	**09 10**	**2000EST- 1000EST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Snow of six to seven inches fell over that part of Indiana generally along, and north of a line from Valparaiso to Fort Wayne. Goshen, South Bend, Akron, Rolling Praire and Claypool reported six inches. Seven inches fell at Valparaiso. Four to five inches of snow was common over much of the remainder of northern Indiana, with 2 to 4 inches of snow falling in central sections. An inch or less of snow fell in southern Indiana.

IOWA

IAZ041-042-051> 054-063-064- 076>078-086> 089-097>099-ILZ004 Eastern Iowa	**09**	**1200CST- 2000CST**			**0**	**0**	**4**	**0**	**Snow Heavy Snow**

A low pressure system passed to the south and east of Iowa during the afternoon of the 9th. As it did a backwash, or deformation zone, snow event occurred. Snow fell heavily for a few hours over eastern Iowa. Accumulation was in the three to seven inch range, although isolated amounts around 9 inches were reported in Burlington. The snow was of the heavy wet variety which resulted in several trees being toppled. Spotty power outages were also reported. Accidents were numerous as road surfaces became slippery with compacted snow.

IAZ002>004-013> 015-020>023-031> 034-043>046-056> 058-070-071-080> 082-090>094- SDZ018-NEZ010 Western Iowa	**13 14**	**1800CST- 1500CST**			**0**	**0**	**3**	**0**	**Freezing Rain**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

IOWA Cont'd

A stationary front extended north to south across Iowa from near Estherville to just west of Lamoni. East of the front temperatures remained above freezing. To the west they fell below freezing with precipitation falling in the form of freezing rain, ice pellets, and snow. Travel was hazardous with roads described as so slippery that "police officers investigating the accidents found it hard to keep their footing". In Sioux city, a 50-car pileup occurred on U.S. Highway 20 southeast of the downtown area. Only minor injuries were reported. There were numerous other accidents across western Iowa, most were quite minor.

IAZ052>054-056>064-070>078-080>099-ILZ004	**14**	**0600CST-**							
Southern Iowa	**17**	**1200CST**			**0**	**0**	**4**	**0**	**Flooding**

Minor flooding was observed in the Nishnabotna River basin in southwest Iowa, the Grand and Chariton basins in south central Iowa, portions of the lower Des Moines basin in central and southeast portions of the state, as well as isolated portions of the Iowa/Cedar and Wapsipinicon River basins in central and east central portions of the state. Most of the precipitation events were minor during the month of December, and in the form of snow. The only significant snowfall occurred on the 9th along the Iowa/Illinois border. The first major rain event began on the 13th, with generally .50 inch amounts falling over about the southwest half, although nearly two inches fell over extreme south central Iowa. Around another .50 inch fell over much of the state on the 14th, with precipitation changing to snow during the 15th. Most of the flooding occurred during this three day precipitation event, with many other rivers rising to within 1/2 foot of flood state. The flooding that did occur was minor enough to have caused little damage in spite of it being widespread.

IAZ016>019-024>029-035>042-046>054-058>064-071>077-081>086-092>096	**29**	**2200CST-**							
Central and Eastern Iowa	**30**	**0900CST**			**0**	**0**	**3**	**0**	**Freezing Rain**

Shallow arctic air covered much of Iowa. Freezing rain broke out over central and eastern sections. Though amounts were generally a tenth inch or less, driving conditions were the worst in many years in places due to the clear ice accretion. Temperatures were in the teens and 20's allowing for firm ice adhesion to road surfaces. Travel was not recommended in many areas and several highways were closed due to accidents. Hundreds of vehicles slid off roads. Many people were hurt by falling on the ice. In Des Moines for example, 87 people were treated on the 30th for falls and broken bones.

KANSAS

Central Kansas County									
KSZ007,008,010	**05**	**1600CST-**							
		2400CST			**0**	**0**	**0**	**0**	**Heavy Snow**

Locally heavy snow ranging up to 6 inches in some isolated areas fell across north central Kansas.

Northwest Kansas County									
KSZ001>005	**14**	**0000CST-**							
		1600CST			**0**	**0**	**0**	**0**	**Heavy Snow**

Snowfall of up to 7 inches fell across much of northwest Kansas, however no major problems occurred.

Southeast Kansas County									
KSZ017	**14**	**0600CST-**							
		0600CST			**0**	**0**	**5**	**5**	**Flood**

Rainfall of around 4 inches was widespread across Southeast Kansas the 13th and 14th. Runoff sent many streams out of their banks for an extended period. Adjacent farmland and low lying areas were flooded and damaged, and some roads had water over them for a time. None of the damage was serious and the flooding did not threaten residences in any towns. The Neosho River exceeded its banks along its entire reach from John Redmond Reservoir to the Oklahoma Border. The river

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

KANSAS Cont'd

crested at levels three to five feet above flood stage at: Iola...12/14 during the night, Chanute...12/15 in the morning. East of Parsons...12/15 afternoon Oswego...12/16 early morning The Verdigris River crested between a foot and 4 feet above flood stage at Altoona, Independence and Coffeyville late the night of the 14th. The Marmaton exceeded its banks by 3 feet in Fort Scott the afternoon of the 14th. The Little Osage River flooded several roads in Northern Bourbon County on the 14th. Among those closed by the water were: Highway K-7 north of Harding, K-31 west of Fulton and K-65 east of Xenia.

Roads closed by small streams in Labette County on the 14th included: K-101 north of Edna and a County Road northwest of Chetopa. Several County Roads were also closed in Crawford and Montgomery Counties.

Labette County									
3 S Strauss	**12**	**2200CST-**							
	18	**2200CST**			**1**	**1**	**2**	**2**	**Flood and Cold**

Litup Creek in Northeast Labette County went out of its banks and flooded a remote county road. The flood water pushed a car off the road at the approach to a bridge 3 miles south of Strass. A woman and her three year old daughter, who were occupants of the car, went to high ground and avoided the flood waters. The combination of being wet from wading through the water and temperatures in the lower 30s caused both to suffer from hypothermia. The girl was dead by the time they were discovered at 0912CST 12/19. The woman recovered, but required more than a week of hospitalization.

Northwest Kansas County									
KSZ001>005	**12**	**1200CST-**							
	28	**2400CST**			**0**	**23**	**4**	**0**	**Ice Storm**

Freezing rain coated streets and highways making travel very hazardous. The worst problems were in Sherman county were 30+ accidents, mainly on Interstate 70, caused 9 people to be taken to the local hospital by ambulance with 14 other walk-ins. None were seriously injured. Similar conditions but without the injuries were common over the rest of northwest Kansas.

KENTUCKY

None reported.

LOUISIANA

Concordia Parish									
3 NE Ferriday	**15**	**1030CST**	****90**	**25**	**0**	**0**	**4**	**?**	**Tornado (F1)**
Iberia Parish	**15**	**1050CST**			**0**	**0**	**3**	**?**	**Thunderstorm Winds**
1E New Iberia									
St Landry Parish									
Opelousas	**15**	**1110CST**	****20**	**18**	**0**	**0**	**4**	**?**	**Torando (F1)**

A line of numerous thunderstorms moving east about 35 mph produced a couple of small tornadoes and a report of straight line wind damage in east central LA. The Concordia Parish Emergency Management director said a small tornado destroyed two concrete block storage buildings; and heavily damaged the roof of a nearby home about 3 miles northeast of Ferriday around 1030CST. Thunderstorm winds blew a carport about 250 yards onto a highway and blew a large pine tree on top of a home about 1 mile east of New Iberia about 1050CST according to the Iberia Parish Emergency director. Opelousas police reported a small tornado destroyed a storage shed and damaged the roof of a home about 1110CST.

MAINE

MEZ014	**11**	**0530EST-**							
Southern ME	**13**	**0300EST**			**0**	**0**	**?**	**0**	**High Winds**

A low pressure system over Georgia on the morning of the 10th intensified rapidly as it moved up the East Coast to over the Delmarva Peninsula by the morning of the 11th. High tides and winds in excess of 50 miles per hour produced 15 to 25 foot waves with surges up to two feet above

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MAINE Cont'd

normal. Those waves crashed over seawalls carrying rocks, debris and sand onto coastal routes. A 75 foot section of a wooden seawall in the Camp Ellis section of Saco was damaged by the pounding surf. High waves and winds forced rocks, debris and sand onto coastal routes.

MEZ011 Mid coast ME	**24 25**	**0800EST- 2000EST**			**0**	**0**	**?**	**0**	**High Winds**

Strong and gusty winds prevailed from the morning of the 24th to the evening of the 25th as a north to south oriented frontal system moved across New England on the 24th. A very tight pressure gradient behind this front caused strong and gusty winds over mid coast Maine. Subsequently, on the 25th another frontal system moved rapidly from the Great Lakes across New England to well offshore. Again, winds in excess of 50 miles per hour occurred across mid coast Maine. Numerous trees were downed on Pemaquid Trail in New Harbor. On School Street in Boothbay Harbor winds snapped a tall spruce tree in half. Winds gust were up to 73 miles per hour were reported in Wiscasset.

MARYLAND

Garrett and Allegany Counties	**05**	**0500EST- 1000EST**			**0**	**0**	**0**	**0**	**Winter Storm**

A strong cold front moved through the area and dumped an average of six inches of snow in Garrett County. Four to five inches average in Allegany county with some areas in both counties having up to 10 inches.

MDZ005>007	**05**	**1300EST- 1500EST**			**0**	**1**	**4**	**0**	**High Wind**

High winds following a cold front knocked down numerous trees, power lines and TV cable lines. In Frederick, a house under construction partially collapsed due to the wind, trapping and slightly injuring a man. A barn collapsed killing several head of cattle around 1:45 PM near Frederick. Wind gusts were estimated between 48 and 60 mph.

Baltimore County	**05**	**1500EST**			**0**	**0**	**2**	**0**	**High Wind**

Wind gusts to 52 mph were recorded and light damage was reported. A water parade of 50 power and sail boats was canceled due to the strong wind.

Anne Arudel County	**05**	**1600EST**			**1**	**0**	**0**	**0**	**High Wind**

A man apparently drowned in the afternoon, while attempting to cross the Chesapeake Bay from Annapolis to St. Michaels, approximately 20 miles, in a sea kayak during strong winds and choppy seas. He was only wearing jeans and a wind breaker with temperatures near 32 degrees. (M43O)

MDZALL	**10 12**	**0300EST- 0200EST**			**0**	**0**	**3**	**0**	**Winter Storm**

A complex storm system moved from Georgia to Southern Virginia on the 10th where it intensified. The storm produced a variety of weather across the Mid-Atlantic region as it meandered northeast. The storm dumped one to three inches of snow in portions of East and Central Maryland before changing to rain. North-Central Maryland received around six inches of snow before changing to rain in some places. Then the rain changed back to snow Friday before the precipitation ended. In western Maryland's Garrett and Allegany counties, snow began early in the morning on the 10th, causing numerous accidents. The snow continued through the 11th with total accumulations of around three feet.

MDZ009	**10 11**	**1600EST- 0400EST**			**0**	**0**	**0**	**0**	**Blizzard**

High winds coupled with heavy snow caused snow drifts up to six feet in some locations. The winds and weight of snow caused numerous power outages.

MDZ002,003, 005>007	**10 11**	**2245EST- 0400EST**			**0**	**0**	**4**	**0**	**High Wind**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MARYLAND Cont'd

High winds, with gusts up to and over 50 mph, knocked down power lines, trees and did minor property damage.

MDZ001	10 12	2300EST- 1000EST			0	0	4	0	Coastal Flood Heavy surf

The major winter storm produced winds with gusts in excess of 50 mph and waves of 10 to 15 ft pounded the shore. This caused coastal flooding and beach erosion during times of high tide but damage was relatively minor. A Coast Guard buoy weighing 12,000 pounds was beached at the inlet of Ocean City.

MDZ001>007	10 11	2300EST- 2100EST			0	0	0	0	Minor Flooding

Rain, which was occasionally heavy, produced widespread flooding of small creeks, streams and poor drainage areas. Washington county was the hardest hit area.

MDZ004>009	27 28	2300EST- 1200EST			0	0	?	0	Freezing Rain Freezing Drizzle

An upper air disturbance moved across the area during the early morning hours and produced light freezing rain and freezing drizzle. This caused numerous traffic accidents across the state and at least three traffic deaths. Two of them were in Prince George County and one in Baltimore county. There were scattered power outages due to ice build up breaking power lines.

DISTRICT OF COLUMBIA

DCC001	10 12	0300EST- 0200EST			0	0	3	0	Winter Storm

A complex storm system moved from Georgia to Southern Virginia on the 10th where it intensified. The storm produced a variety of weather across the Mid-Atlantic region as it meandered northeast. The storm dumped one to three inches of snow in the District before changing to rain early on the 10th.

DCC011	10 11	2245EST- 0400EST			0	0	4	0	High Wind

High winds, with gusts up to and over 50 mph, knocked down power lines and trees. The high winds did minor property damage.

DCC001	10 11	2300EST- 2100EST			0	0	0	0	Minor Flooding

Rain, which was occasionally heavy, produced widespread flooding of small creeks and poor drainage areas.

DCC001	28	0300EST- 1200EST			0	0	?	?	Freezing Rain Freezing Drizzle

An upper air disturbance caused light freezing rain and drizzle which lead to slick roads. This caused numerous traffic accidents. Ice buildup on power lines caused some to snap, leaving customers without electricity for a short period of time.

MASSACHUSETTS

MAZ006-010	02 03	2100EST- 1000EST			0	0	?	0	Heavy snow

Heavy, wet snow fell in the Berkshires as a developing storm system passed some 200 miles southeast of Cape Cod. Elevation was the most significant factor that determined snow amounts. Elevations above 2,000 feet received a foot and a half of snow including 18 inches at Peru and 17 inches at Worthington and Monterey. Great Barrington and Pittsfield reported 14 inches, with only

MASSACHUSETTS Cont'd

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
									9 inches in downtown Pittsfield. There were numerous reports of limbs down and scattered power outages. A few high terrain locations in MAZ005 received around 6 inches, but much of that zone escaped with only a little snow.
MAZ010	11-12	0700EST-1400EST			0	0	?	0	Heavy snow
MAZ006	11-12	1000EST-1400EST			0	0	?	0	Heavy snow
MAZ005	11-12	1200EST-1400EST			0	0	?	0	Heavy snow
MAZ004	11-12	1300EST-2400EST			0	0	?	0	Heavy snow
MAZ001	11-12	2100EST-2400EST			0	0	?	0	Heavy snow
MAZ008	12	0300EST-2400EST			0	0	?	0	Heavy snow
MAZ007	12	0600EST-2400EST			0	0	?	0	Heavy snow
MAZ002	12	0700EST-2400EST			0	0	?	0	Heavy snow
MAZ002-003-007-008	11-12	1000EST-0800EST			0	0	6	0	High winds
MAZ002-007-009	11-12	1300EST-0600EST			0	0	0	0	Heavy rain
MAZ002-003-007-008-009	11 11-12 12-13	1000EST-1400EST 2200EST-0200EST 1100EST-2200EST-0300EST-1100EST-1500EST			0	0	7	0	Coastal flood

A major winter storm struck the state at a time of astronomically high tides to cause major coastal tidal flooding as a result of storm force east to northeast winds gusts up to hurricane force along the coast. Record breaking snowfall occurred in the higher elevations of the central and western parts of the state. A peak wind gust to 78 mph was recorded by the National Weather Service at Boston's Logan International Airport during the early morning hours of December 12th. The Blue Hill Observatory recorded gusts to 69 mph from the east and east-northeast during the evening of December 11th and in the early morning hours of the 12th and winds averaged as high as 43 mph as early as 1000EST to 1100EST on the 11th. Waves of 15 to 18 feet were reported along the coast during the high tides on the 11th and 20 to 23 feet waves were observed during the successive high tides on the 12th and 13th. The pounding surf continued through at least five consecutive high tide cycles and caused considerable erosion and damage to beach front homes and property. Seawalls took a beating and a 350 foot section of wall was destroyed at Nantasket Beach in Hull. Protective dunes were destroyed at Duxbury. The tide at Boston reached 14.2 feet above Mean Lower Low Water on the 12th or just 0.1 foot below the high tide of the October 1991, storm and about a foot below the 15.3 feet recorded during the Blizzard of '78. Insured losses to coastal property were estimated to be about half of what they were for the October 1991, storm, or around $25 million. This was likely due to the fact that there was less property left to be damaged and also that homeowners who had their homes severely damaged one year ago were required to build above the 100-year flood levels. Coastal communities from Marblehead to Plymouth and on the east facing shores of Cape Cod suffered the most damage. On Nantucket Island six cottages were swept into the sea from the southeast corner of the Island and others damaged. The tide reached 6.9 feet above Mean Lower Low Water compared to 8.1 feet recorded for the October 1991, storm. Although the coastal flood damage was much less than that for the 1991 storm, damage from high winds and heavy snow was estimated to be around $75 million, bringing early total damage estimates between $100 and $200 million. The total damage from last year's storm was $93 million. Worcester received a storm total of 32 inches with 28 coming in 24 hours, both amounts records. Two to three feet of snow and near blizzard conditions occurred across higher elevations

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MASSACHUSETTS Cont'd

of Worcester County and in the Berkshires with several reports of over 40 inches including 48 inches at Savoy, Plainfield, and Peru; Sandisfield had 40 inches, Adams and Becket had 36 inches, Granville and Pittsfield had 30 inches. Drifts to 10 feet were reported at the highest elevations. At the same time, less than 5 inches of snow fell up and down the Connecticut River Valley in western Massachusetts and less than 1 inch of snow fell along the immediate coast south of Boston with just rain on Cape Cod and the Islands. An extreme snowfall gradient occurred along the coast from the vicinity of Boston north along the north shore with just a trace reported on Marblehead Neck to about 4 inches just a mile inland in Marblehead proper to about 16 inches in Peabody, about 5 to 6 miles inland from Marblehead, or an average increase in snow depth of 3 inches per mile. Widespread power outages were reported in Worcester County lasting up to several days where heavy snow knocked down tree limbs and power lines. Also, in the heavy snow areas, some roofs collapsed under the weight of the heavy snow and falling tree limbs damaged automobiles and roofs. Damage to public properties was estimated between $5 and $10 million in the eight counties that were declared federal disaster areas including: Essex, Suffolk, Norfolk, Plymouth, Worcester, Barnstable, Dukes, and Nantucket. Precipitation totals from this storm which included heavy rain and melted snow were phenomenal and ranged up to 8 inches in northern Bristol County of southeast Massachusetts with maximum amounts centered around Norton and Easton. At the Blue Hill Observatory in Milton, the total was 6.85 inches including 16 inches of snowfall making this the greatest storm on record in terms of both combined precipitation and snowfall. Boston set a new December record for maximum amount of precipitation in 24 hours with 5.14 inches beating the old record by 1 inch. Snow removal crews were hard pressed to move the 15 to 25 inches of heavy, wet snow in western Norfolk and most of Middlesex and Worcester Counties. Roads remained rutted and in very poor condition several days after the storm. In Worcester County, and other western Massachusetts communities, schools were closed for a week.

MAZ004-005-006	**28**	**1200EST-2400EST**			**0**	**0**	**0**	**0**	**Glaze**

A thin coating of glaze made for difficult walking and driving.

MAZ005	**31**	**0900EST-1030EST**			**0**	**20**	**0**	**0**	**Fog**

Patchy dense fog resulted in a 10-vehicle pile-up on Interstate 91 in Holyoke. More than 20 peopie were injured and taken to area hospitals.

MICHIGAN

MIZ014-047-048-050-051-052-058-059-060-064-070>073-078 Upper Michigan and Northwest Lower Michigan	**04 05**	**0000EST-1600EST**			**0**	**0**	**0**	**0**	**Heavy Lake Snow**

Heavy lake effect snow began over Upper Michigan, in the Lake Superior shore counties during the early morning hours of the 4th, and continued until the mid morning hours of the 5th. Over Lower Michigan, the lake effect snows began around 0700EST on the morning of the 4th, then continued into the mid afternoon hours of the 5th. During this event, northwest winds blew at 15 to 25 mph over Lower Michigan and 10 to 15 mph over Upper Michigan. With temperatures in the teens over the Upper Peninsula and the low to mid 20s over the Lower Peninsula, the wind chill index was mostly in the 5 to 15 below zero range. Snowfalls over Upper Michigan, in the Lake Shore Counties ranged from seven to nine inches from east of Harvey in northeast Marquette County, across northern Alger County and northern Luce county, to Whitefish Point, which is in the extreme northwest corner of Luce County. Also, western Gogebic County reported seven to nine inches. Northern Chippewa, Houghton and Ontonagon Counties reported three to seven inches. The remainder of Upper Michigan had from a trace of snow near Lake Michigan to one to three inches elsewhere over Upper Michigan. Over Lower Michigan, snowfalls of seven to fifteen inches fell in the inland counties from Emmet in the north to Newaygo county in west-central Lower Michigan. The heaviest snowfalls were in Otsego, Crawford, Kalkaska and Missaukee Counties where twelve to fifteen inches fell. Most of the remainder of southwest, west and northeast Lower Michigan had two to five inches of snow. The strong wind resulted in frequent visibilities around .50 mile and considerable blowing and drifting snow. Many traffic accidents were reported during the storm over Upper and Lower Michigan, but, most were only fender

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MICHIGAN Cont'd

benders. Two people died in weather related traffic accidents in the Lansing area. Ironically, in that area, snowfalls were generally less than one inch.

MIZ001>007-009-010-013-015-016-019-027-053-054 Southwest West and Extreme Southeast Lower Michigan

09 2200EST-
10 1700EST **0 0 0 0 Heavy Snow**

Snow began falling over southwest Lower Michigan by 1000 pm, then spread rapidly northeast. Snow was falling over all but the northeast third of Lower Michigan by midnight, then continued across all of Lower Michigan through 0800 am on Thursday, the 10th. Shortly after 0800 am, the snow changed to drizzle over southeast and south central Lower Michigan. Over west and northwest Lower Michigan the snow continued past noon. The snow diminished to occasional drizzle and flurries over southwest Lower by 0200 pm on the 10th, and over northern Lower Michigan by 500 pm that evening. The heaviest snowfalls, seven to nine inches, fell over most of the counties of southwest Lower Michigan and a narrow area of west Lower Michigan near the Lake Michigan shore. Snowfalls of three to six inches were common over southeast and central Lower Michigan. The Thumb area, north central and northeast Lower Michigan had one to three inches. This storm was the first snowstorm of the season over many parts of southeast and south central Lower Michigan. As a result, numerous, mostly minor traffic accidents occurred. One 50 year old women died when her car slid across the central line of a road and was hit broadside by a van. Other than that, the storm made for a very slow commute to work over most of south and central Lower Michigan on Thursday morning.

MIZ057>063-069-070 Northwest Lower and East Upper Michigan

23 1300EST-
24 0100EST **0 0 0 0 Heavy Lake Snow**

Heavy lake effect snow squalls developed during the early afternoon hours of the 23d and continued until the early morning hours of the 24th. Snowfalls over both northwest Lower Michigan and east Upper Michigan were in the six to ten inch range. Over the remainder of Upper Michigan along the Lake Superior shore, one to three inches of snow was common. However, parts of Ontonagon county had 4.0 inches. The heaviest snowfall over Upper Michigan was ten inches at Pine Stump Junction, which is in north central Luce County. Over northern Lower Michigan, Kalkaska, in central Kalkaska county, had 10.0 inches, this was the heaviest snowfall over Lower Michigan from this event. Snowfalls of six to eight inches were common in the rest of the heavy snow area of northwest Lower Michigan. Over the rest of west and northwest Lower Michigan, two to five inches fell. East central and southeast Lower Michigan, and most of Upper Michigan away from Lake Superior had generally an inch or less. No major problems were reported except for the typical minor traffic accidents due to slippery roads and poor visibilities.

MIZ055>060-062-063-069-070-076-077-083 Northwest and Northeast Upper Peninsula and Northwest Lower Peninsula

25 0700EST-
25 1000EST **0 0 3 0 Blizzard (G61)**

Heavy snow fell over parts of Northern Lower and Upper Michigan from about 400 pm Thursday, the 24th, through 100 pm Saturday, the 26th. The snow began falling as a result of a frontal system that moved toward the western Great Lakes during the afternoon of the 24th, and had crossed most of Upper Michigan by 700 am on the 25th, and Lower Michigan by the early afternoon hours of the 25th. From the afternoon of the 25th, Christmas day, until the snow ended as flurries by early afternoon on Saturday the 26th, lake effect snow and near gale force winds resulted in blizzard conditions over much of this area. It was during this time, that, most of the snowfall from this storm occurred. The heaviest snowfall reported was around sixteen inches in parts of central Luce County. There were three heavy snow areas, northwest Upper Michigan, from Ontonagon to the Keweenaw Peninsula, eastern Upper Michigan from Luce County to Chippewa and Mackinac Counties, and over northwest Lower Michigan, from Benzie County, west to Kalkaska County and

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MICHIGAN Cont'd

north to Cheboygan County. In northwest Upper Michigan, snowfalls were in the eight to eleven inch range, five to eight inches of which fell after 800 am on the 25th. Over eastern Upper Michigan, eight to fifteen inches fell, with an area average around 12.0 inches. Over northwest Upper Michigan, snowfalls ranged from five to fifteen inches; twelve to fifteen inches falling over parts of Grand Traverse County and central Antrim County. The remainder of the Upper Peninsula had two to four inches of snow. One to three inches fell over the rest of the northern half of Lower Michigan. Very strong winds occurred with the passage of the cold front Friday afternoon. Winds of 20 to 35 mph in most areas, with frequent gusts to 45 mph and 50 mph over both Upper and Lower Michigan. Between 100 pm on the 25th and 900 pm on the 25th, there were several wind reports of gusts over 55 mph over extreme Northern Lower Michigan and Eastern Upper Michigan. The highest wind occurred at 400 pm, when the wind gusts were up to 70 mph (61 knots) on the Mackinac Bridge. This resulted in blizzard conditions over most of northern Lower Michigan and Upper Michigan from around 700 am on the 25th, until 1000 pm on the 25th. Temperatures were in the 5 degrees Fahrenheit to 15 degrees Fahrenheit range in the Upper Peninsula during this time, and fell from the mid 20s to around 10 degrees Fahrenheit over the Lower Peninsula during this time. This resulted in wind chills frequently in the 40 to 50 below zero range over the Upper Peninsula, and 20 to 35 degrees below zero range over Northern Lower Michigan. Visibilities during this time were mostly under .25 mile and occasionally near zero, resulting in many traffic accidents. Eight people died as a result of some of those traffic accidents on Christmas day. The Mackinac Bridge was closed to all high profile vehicles during this time. Also M-28 was closed from Bergland to Wakefield and from Newberry to Munising. The Coast Guard at Saute Ste Marie closed the St Marys River from around 1100 am until just after 800 pm on Christmas day due to whiteout conditions.

MIZ028 Southeast Lower Peninsula	**30 31**	**1900EST- 1800EST**		**0**	**0**	**0**	**0**	**Flooding**

The Middle River Rouge rose above its flood stage of 7 feet during the evening of the 30th. The river crested at 7.7 feet at 600 am on the 31st, then fell below flood stage by the early evening of the 31st. Rainfalls between one and three inches fell over the southern third of Lower Michigan between 500 am on the morning of the 30th and 100 am on the 31st. The rain resulted from a storm system that moved northeast across central lower Michigan on the 30th. The heaviest rains fell over the southernmost tiers of counties. In this area, rainfalls were mostly in the 1.5 to 2.5 inch range, with a few isolated reports in the 2.5 to 3 inch range. While this event did cause some minor flooding, no significant damage was reported.

MIZ077-078 West Upper Peninsula	**30 31**	**1900EST- 1300EST**		**0**	**0**	**0**	**0**	**Heavy Snow**

Heavy snow fell over most of Gogebic and Ontonagon Counties from the early evening hours of the 30th until the late morning hours of the 31st. Snowfalls of six to twelve inches were common over most of this area. The heaviest snowfalls were in a narrow band from Ontonagon, southward to Watersmeet. Snowfalls of twelve to fourteen inches were reported; with Watersmeet recording fourteen inches. Winds during this storm were mostly under 20 mph, as a result, no major problems were reported.

MINNESOTA

MNZ001-006-010- 013-015-017-018 Western	**13 14**	**0400CST- 0200CST**		**0**	**0**	**?**	**0**	**Heavy Snow Freezing Rain**

A wintry mix of precipitation occurred over western portions of the state causing numerous traffic accidents. A 40 mile wide band of snow in excess of 6 inches fell across north central Minnesota from International Falls to Grand Rapids. The greatest snowfall occurred at Marcell (Itasca County) with 8 inches reported.

MNZ001>019 All of Minnesota	**23 25**	**0100CST- 1000CST**		**0**	**0**	**?**	**0**	**Extreme Cold Ground Blizzard**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MINNESOTA Cont'd

A deep area of low pressure travelled across the Minnesota/Canadian border dragging a cold front southward across the state by Christmas Day. Southerly winds gust were up to 50 mph over southwest Minnesota on the 23rd in advance of the storm causing ground blizzard conditions.

As the arctic cold front swept across the state, temperatures tumbled from the 20's and 30's to well below zero by Christmas morning. Winds gusts were up to 50 mph behind the front causing ground blizzard conditions and wind chill readings from 40 below to 60 below.

A church that was under construction in Litchfield (Meeker County) was destroyed by strong winds. Many motorists were stranded on Christmas Eve and spent the night at area homes and motels. Interstate 94 from Alexandria (Douglas County) to Moorhead (Clay County) was closed for nearly 8 hours. Highway 10 from Morrhead (Clay County) to Detroit Lakes (Becker County) was closed for a time due to the treacherous driving conditions.

MNZ001>019 All of Minnesota	**30**	**0400CST**							
	31	**0200CST**			**0**	**0**	**?**	**0**	**Heavy Snow Freezing Rain**

A fast moving storm system dropped heavy snow across the northeast and an icy mix of freezing rain and snow across the south. A cold front swept through the state by New Years Eve causing temperatures to drop well below zero and promoted wind chills from 40 below to 60 below.

On the 30th, the Amtrak rail line from Minneapolis to Seattle was disrupted for a time due to the extreme cold and snow. Numerous traffic accidents occurred in southeast Minnesota due to the freezing rain and light snow. A 20 vehicle pileup on Interstate 94 east of the Twin Cities disrupted traffic and caused several injuries. A total of 4 people died from traffic accidents across the state.

Heavy snow, in excess of 6 inches, fell over extreme northeast Minnesota from east of Baudette (Lake of the Woods County) to Kelliher (Beltrami County) to Orr (St. Louis County). Another narrow band of heavy snow fell along the higher terrain near Lake Superior from Two Harbors to near Isabella (Lake County). The greatest snowfalls occurred near Isabella at 10 inches and International Falls at 9.5 inches.

MISSISSIPPI

Adams County									
3 N Sibley	**15**	**1135CST**			**0**	**0**	**5**	**0**	**Thunderstorm Winds**

The wind damaged the roofs of six houses, damaged several storage buildings and blew down several trees.

Hinds County									
Jackson	**15**	**1200CST**			**0**	**0**	**4**	**0**	**Thunderstorm Winds**

Several trees were blown down and caused roof damage to a couple of houses.

Copiah County									
Barlow	**15**	**1200CST**			**0**	**0**	**2**	**0**	**Thunderstorm Winds**

Several trees were blown down.

Jefferson County									
Lorman	**15**	**1205CST**			**0**	**0**	**4**	**0**	**Thunderstorm Winds**

Several mobile homes were damaged.

Sunflower County									
Doddsville	**15**	**1225CST**			**0**	**0**	**2**	**0**	**Thunderstorm Winds**

Several trees were blown down.

Yazoo County									
Yazoo City	**15**	**1225CST**			**0**	**0**	**2**	**0**	**Thunderstorm Winds**

Several large limbs were blown down on to power lines.

Yazoo County	**15**	**1237CST**			**0**	**0**	**2**	**0**	**Thunderstorm Winds**

Numerous large limbs were blown down on to power lines over Eastern Yazoo County.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
MISSOURI									
Jackson County	13 14	1738CST- 2132CST			0	0	5	1	Flooding
		Flooding along the Blue River in Kansas City resulted after more than 2.50 inches of rain fell on the 13th. Greater amounts were likely over parts of the Blue River watershed. Several mobile homes were evacuated.							
Platte County	13 19	2226CST- 1200CST			0	0	3	1	Flooding
		Flooding along the Platte River persisted for almost a week as rain fell over much of the northwestern-third of Missouri. Water covered parts of the roadway along Highway 92 as the water rose and fell several times.							
St. Louis County St. Louis City St. Charles County	15	1330CST- 2000CST			0	0	5	0	Flooding
		Two to three inches of rain over an 8 hour period flooded many roads, Franklin County basements and creeks across the area. At 5:15pm a roof collapsed Jefferson County at a fast-food restaurant in Winchester (St. Louis County) but no one was injured. High water covered many roads, prompting some road closures.							
Washington County 5 W Belgrade	15	1500CST			1	0	0	0	Flooding
		A four-year old boy drowned in the Cub Creek after hours of rainfall swelled the creek out of it's bank. The boy fell from his father's shoulder who lost footing while trying to cross on a fallen tree log. The body was recovered about an hour and a half later, 150 yards downstream.							
MONTANA									
MTZ007	02 03	1700MST- 0400MST			0	0	4	0	Heavy Snow
		Red Lodge received 15 inches of snow with two to ten inches elsewhere across the zone. In the city of Billings there were numerous automobile accidents.							
MTZ004	08 09	1700MST- 0500MST			0	0	0	0	Heavy Snow
		West Yellowstone received 11 inches of snow.							
MTZ001	10	1200MST- 2000MST			0	0	0	0	Heavy Snow
		Four to six inches of snow fell across the zone.							
MTZ001	20	0000MST- 1000MST			0	0	0	0	Heavy Snow
		Ten inches of snow fell at West Glacier, 5 inches at Whitefish and 3 inches at the Kalispell Airport.							
MTZ007	20	1000MST			0	0	3	0	High Winds (G82)
		Fort Smith reported winds to 95 mph. There was damage to several roofs.							
MTZ003,006,007 009	22 23	2000MST- 0800MST			0	0	4	0	Heavy Snow
		From four inches to more than a foot of snow fell across much of central and southeast Montana. The east slopes of the Rockies received the the heaviest snow.							
MTZ003,006	23 24	1145MST- 1100MST			0	0	5	0	High Winds (G102)
		Winds were very strong along the Front Range of the Rockies. Winds 11 miles west of Dupuyer hit 117 mph shortly after midnight. Browning reported 80 mph, Cut Bank 60 mph and Great Falls							

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

MONTANA Cont'd

50 mph. A train was blown off the tracks just West of Browning. A truck was blown off the road East of Stanford. In Stanford there was some wind damage to roofs.

MTZ002	**24**	**0330MST**			**0**	**0**	**3**	**0**	**High Winds**

Strong winds did damage to buildings in Hamilton.

MTZ001	**26** **27**	**2000MST-** **2000MST**			**0**	**0**	**4**	**0**	**Heavy Snow/ Blizzard**

Six to twelve inches of snow fell across much of the zone. There was an avalance on Highway 2 near Glacier National Park.

MTZ001,002,003	**28** **29**	**2200MST-** **1200MST**			**0**	**0**	**3**	**0**	**Strong Winds Heavy Snow**

Four to six inches of snow fell. Strong winds blew a tree over in Missoula.

NEBRASKA

NEZ007-013-014-016-017 Southwest and South Central Nebraska	**14**	**1200CST-** **2200CST**			**0**	**0**	**?**	**?**	**Heavy Snow**

A small band of six to nine inches of snow fell over southwest and south central Nebraska. Gibbon measured eleven inches.

NEZ004-009-010-015-019-020-094-095-096 Eastern Nebraska	**14**	**0600CST-** **2300CST**			**0**	**0**	**?**	**?**	**Ice Storm**

Freezing rain over much of eastern Nebraska iced roads and caused numerous traffic accidents.

NEZ009-013-014-018 South Central to Northeast Nebraska	**18**	**0500CST-** **1400CST**			**0**	**0**	**?**	**?**	**Ice Storm**

Freezing rain caused many traffic accidents from slippery roads.

NEZ009-010-014-015-018>020 Eastern Nebraska	**28** **29**	**0900CST-** **0800CST**			**0**	**0**	**?**	**?**	**Ice Storm**

Freezing rain coated surfaces and iced roads, which caused numerous traffic accidents and injuries when people fell on the ice.

NEVADA

NVZ003 Extreme Western Nevada	**08**	**1800PST-** **2300PST**			**0**	**0**	**0**	**0**	**High Wind**

High winds were reported in parts of Reno. There were several gusts over 60 mph in southwest Reno.

NVZ003 Extreme Western Nevada	**10**	**0930PST-** **1500PST**			**0**	**0**	**3**	**0**	**High Wind**

A strong low pressure system produced high winds across western Nevada. Sustained wind were 40 to 50 mph throughout the area. There were numerous gusts over 60 mph including 80 mph gusts in Stead and in north Reno. Some minor roof damage was reported in Stead.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
NEVADA Cont'd									
NVZ003 Extreme Western Nevada	**16 17**	**2200PST- 0300PST**			**0**	**0**	**0**	**0**	**High Wind**
		Several strong gusts occurred in the Reno area. These included gusts to 87 mph gust on Windy Hill in southwest Reno, 76 mph in the Virginia Foothills and 75 mph in northwest Reno.							
NVZ001-003 Lake Tahoe-Truckee Area/Extreme Western Nevada	**28**	**0845PST- 1100PST**			**0**	**0**	**0**	**0**	**High Wind**
		High winds developed in advance of an intense low pressure system. Sustained winds of 40 mph were common in western Nevada and along the east shore of Lake Tahoe. Wind gusts were 75 mph in southwest Reno, 65 mph in Stead and Lemmon Valley.							
NVZ001-003-004-005-006 Most of Northern Nevada	**28 30**	**1200PST- 1200PST**			**0**	**?**	**?**	**0**	**Heavy Snow**
		Snow began falling in western Nevada around noon on the 28th and spread eastward across northern Nevada during the afternoon. Although the snow continued through the 30th, the majority of the snow fell on the 28th and the 29th. Snowfall amounts in the Reno area ranged from nine inches at the Reno airport to twenty-three inches in Stead. Other storm totals included:							
		Incline Village 42"							
		Zephyr Cove 40"							
		Virginia City 36"							
		Dagget Pass 30"							
		Battle Mountain 16"							
		Gardnerville 12"							
		Jackpot 10"							
		Wildhorse 10"							
		Wells 9"							
NEW HAMPSHIRE									
NHZ005 006-007 Southern NH	**10 13**	**1030EST- 0220EST**			**0**	**0**	**?**	**0**	**Heavy Snow**
NHZ006-007 Southern NH	**11 13**	**0530EST- 0300EST**			**0**	**0**	**?**	**0**	**High Winds**
		A low pressure system over Georgia on the morning of the 10th intensified rapidly as it moved up the East Coast to over the Delmarva Peninsula by the morning of the 11th. This storm dumped up to 24 inches of snow on southern New Hampshire. Along coastal sections of New Hampshire winds in excess of 50 miles per hour were generated. High tides coupled with this storm resulted in 15 to 25 foot waves with surges up to two feet above normal. Those waves crashed over seawalls carring heavy boulders, debris and sand onto coastal routes. Seaweed was forced up into the filter of the cooling system at the Seabrook nuclear plant. Therefore, operators were forced to shut down the plant shortly before 0700EST on Sunday. Heavy snow and high winds caused many power outages and numerous automobile accidents in southern New Hampshire.							
NEW JERSEY, Northern									
NJZ0N Northern New Jersey	**11 12**	**0600EST- 0300EST**			**2**	**?**	**?**	**0**	**High Winds**
NJZ0N Coastal New Jersey	**11 14**	**0615EST- 0200EST**			**0**	**50-100**	**8**	**0**	**Coastal Flood**
NJZ01 Northwest New Jersey	**11- 13**	**1100EST- 0300EST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

NEW JERSEY, Northern

NJZ0N Northern New Jersey	**11-12**	**1200EST-1000EST**			**0**	**0**	**?**	**0**	**Flood**

THE GREAT NOR'EASTER OF '92...A savage nor'easter lashed the coastline for nearly three days and nights. It caused hundreds of millions of dollars of damage with severe coastal flooding causing the greatest monetary damage by far. The first significant coastal flooding began on friday morning the 11th at astronomical high tide. The tides already running high due to a full moon, eventually rose a full 4 to 6 feet above normal. This produced some of the worst coastal flooding this area has experienced in nearly 40 years. The problem was further compounded by extremely strong winds. The wind gusts at times friday, were to hurricane force. Sustained winds between 30 and 40 knots were common throughout the day and that night along with gusts of 60 to 80 knots. These winds were the result of a tight pressure gradient that formed between a strong high pressure system located off the new england coast and the storm drifting northward from the mid atlantic region. This pressure gradient began to relax somewhat late friday night, although gusty winds continued through the entire weekend. These strong on shore winds, not only downed hundreds of trees and power lines, but actually worsened the coastal flooding as the tides could not recede against their onslaught in a normal matter. The winds also generated a devastating surf that wiped out beaches, dunes, piers, marinas, sea walls, roads, homes and businesses. Numerous homes and businesses were completely destroyed while tens of thousands more were significantly damaged. Thousands of people had to be evacuated from their coastal communities. Hundreds had to be rescued after waiting too long to leave and many of these, along with their rescuers, were injured in some form or another. Many suffered from hypothermia due to immersion in the cold Atlantic waters. The transportation systems throughout the area were severely handicapped if not completely out of service at times. Roadways were flooded, stranding thousands of motorists. Many had to be rescued from their cars as water levels rose amazingly fast. Bridges were closed at times due to the high winds. Trains were delayed or canceled. Airports reported significant delays or cancellations. Marinas suffered a heavy toll as docking facilities were damaged or destroyed. Thousands of boats were destroyed or significantly damaged by the winds and waves. Heavy rains fell form friday morning into friday night complicated the situation even more. Rainfall of between two and three inches with some local amounts of nearly 4 inches produced widespread urban flooding as well as river and stream flooding throughout the area. Some of these waterways did not recede to their banks until saturday morning. The colder interior sections had their own problems to deal with as heavy snow blanketed these areas. The snow began to accumulate rapidly friday, with four to seven inches being quite common across interior sections friday night. The snow let up considerably thereafter, but continued to fall well into saturday night. In fact coastal sections began to experience these snows as colder air filtering in on the back side of this storm, changed the rain over to snow. When all was said and done, the snow had accumulated upwards to 2 feet across some higher elevation areas although six to twelve inches were the more common values elsewhere across the interior. Nearer the coast a couple of inches were fairly common. There were two fatalities due to this storm. A woman died in her auto when she swerved to miss a falling tree but then collided head on with a tow truck. Another woman was killed when struck by part of a roof that was blown off by the high winds. (F65V)(F38O)

NJZ0N Northern New Jersey	**28**	**0400EST-1200EST**			**0**	**0**	**?**	**0**	**Ice Storm**

A very light rain and/or drizzle began falling across the area before sunrise. With temperatures near the freezing mark, this precipitation froze upon contact with the surface. Numerous bridges and roadways had to be closed because driving conditions became impossible. Many people just gave up and abandoned their cars. Bus service was canceled in some areas and severely handicapped in others. Hundreds of accidents resulted because of this "black ice" condition. Many people were injured, some very seriously.

NEW JERSEY, Southern

NJZ00S Southern New Jersey	**10-11**	**2130EST-1310EST**			**0**	**0**	**6**	**0**	**High Wind**

An intense storm which stalled along the Maryland Coast, before moving off to the east, caused damaging winds across southern New Jersey. Many trees, limbs, and branches were down. Some

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

NEW JERSEY, Southern Cont'd

trees fell on buildings or vehicles. Wind gusts or falling trees and limbs brought down many utility lines. Some of the high wind gusts reported were: 90 mph at Wildwood Crest, Cape May County; 70 mph at Haddonfield, Camden County; 66 mph at Mt Holly, Burlington County; 61 mph at McGuire AFB, Burlington County; over 60 mph at Lawrenceville, Mercer County; 58 mph in Atlantic City and at the airport in Pomona, Atlantic County.

Cape May County									
Wildwood Crest	**10**	**2320EST**			**0**	**0**	**?**	**0**	**Thunderstorm Winds (G69)**
Wildwood Crest	**11**	**0042EST**			**0**	**0**	**?**	**0**	**Thunderstorm Winds (G78)**

Wind gusts to 80 and 90 mph were reported along with thunder and lightning.

Camden County									
Haddonfield	**11**	**0305EST**			**0**	**0**	**?**	**0**	**Thunderstorm Winds (G56)**
Haddonfield	**11**	**0650EST**			**0**	**0**	**?**	**0**	**Thunderstorm Winds (G61)**

Wind gusts of 60 to 65 mph and 70 mph were reported along with thunder and lightning.

Camden County	**11**	**0500EST-**							
	12	**0100EST**			**0**	**0**	**?**	**0**	**Flood**

Heavy rain of 3 to 4 inches caused flooding along the Cooper River. At Haddonfield the river stage reached 3.60 ft at 1300EST on the 11th where flood stage is 2.8 ft. There also was some small stream and urban flooding throughout the county.

Mercer County	**11**	**0600EST-**							
	12	**0600EST**			**0**	**0**	**?**	**0**	**Flood**

Heavy rain of 3 to 4 inches caused flooding along the Assunpink Creek. At Trenton the stage reached 9.43 ft where flood stage is 7.0 ft.

NJZ003	**11**	**0753EST-**							
	14	**1000EST**			**0**	**0**	**8**	**0**	**Coastal Flood**

An intense storm which developed along the Carolina coast in the afternoon moved north to the vicinity of Salisbury, Maryland around midnight on the 10th. The storm stalled and then drifted slowly during the day of the 11th, then finally moved out to sea on the 12th. With a large area of high pressure to the north of the storm, very high winds and an intense on shore flow developed over the southern New Jersey Coast. Very high tides and waves caused considerable beach and dune erosion and damage to property along the beach, such as seawalls, boardwalks, and buildings. At Atlantic City, the highest tide was 9.3 foot above mean low low water on the Ocean Front and 10.6 foot above mean low water on the back bays. The very high tides and waves caused considerable flooding of roadways and property along the barrier islands. The very high tides on the back bays also caused roadway and property flooding surrounding the bays. The flooding was mostly around times of high tide and continued for several days. Damage to the beaches and other property was estimated at over $100 million.

Burlington County	**13**	**0400EST-**							
	14	**1800EST**			**0**	**0**	**?**	**0**	**Flood**

Heavy rain of 3 to 4 inches on December 10 and 11 caused urban and small stream flooding. The Rancocas Creek which has a long delay time flooded on the 13th and 14th. At Pemberton the stage reached 12.96 foot where flood stage is 9.0 foot.

NJZ00S	**28**	**0300EST**			**0**	**0**	**?**	**0**	**Glaze**
Mercer, Burlington, Camden, Gloucester, Salem and Western Ocean Counties									

Mostly clear skies early at night allowed temperatures to fall below freezing. When light rain developed in the early morning hours of the 28th, roadways quickly became ice covered. The thin layer of ice was extremely slippery and caused many traffic accidents with some injuries. Many roadways became jammed with stalled vehicles either by accidents or vehicles unable to move on the ice. With highway department vehicles unable to get through traffic jams to treat roadways, a commuters nightmare developed. Although the light rain was enough to coat roadways with a thin layer of ice very little ice accumulated on trees and wires.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
NEW MEXICO									
NMZALL	**04-05**	**1400MST-0900MST**			**1**	**0**	**5**	**0**	**Winter Storm**
Bernalillo County									
7 ENE Albuquerque	**04-05**	**1900MST-0400MST**			**0**	**0**	**0**	**0**	**High Wind**
Sierra County									
3 E Truth or Consequences	**04-05**	**1900MST-0200MST**			**0**	**0**	**5**	**0**	**High Wind**

A severe winter storm (one of the worst in recent history) pounded New Mexico with freezing rain, sleet, heavy snows and high winds. As a strong storm approached New Mexico from the west, warm air moved into New Mexico from the south. A strong cold front moved into northern and eastern New Mexico. These ingredients came together over the state to produce the vicious weather. Most towns throughout the state received four to eigh inches of snow (even the southern deserts), while twenty to twenty-five inches fell at each of New Mexico's 7 major ski resorts. Some areas experienced blizzard conditions at times, with reports of four to five foot drifts near the Central Mountains. All or most parts of Interstates 10, 25 and 40 were closed from late afternoon on the 4th to midday on the 5th. Many other roads remained closed even longer. Hundreds, possibly thousands of people were stranded in motels and emergency shelters across the state. In the Albuquerque area, rain changed to sleet and freezing rain, then to snow by mid-afternoon. Roads were literally a sheet of ice and snow, with evening rush hour traffic coming to a virtual standstill. Normally 20-30 minute commutes lasted up to 3 hours. To further complicate matters, east winds broke through Tijeras Canyon, with 40 to 50 mph gusts reducing visibilities in blowing and drifting snow in the south part of Albuquerque. Winds were stronger for several hours in southeast Albuquerque near the canyon, where a co-operative observer reported 70 mph winds. These same terrain-enhanced winds also broke through the mountains east of Truth or Consequences. Sixty to 70 mph winds caused 6 foot waves on Elephant Butte Reservoir. The high winds and waves combined to destroy a marina near the dam at the south end of the reservoir and damaged or sunk a dozen boats. The marina was condemned as a total loss, with damages around 100,000 dollars to the marina and at least another 100,000 dollars to boats.

The storm contributed to dozens of accidents, some of which lead to indirect injuries and one indirect fatality. The one fatality directly caused by this storm was an elderly male who froze to death in his pickup truck, about 1 mile northwest of Hatch (Dona Ana County). The man, whose truck became stuck in a snowdrift, was wearing only lightweight clothing when found 4 days after the storm. Winds, cold air and snow lead to the exposure deaths of 400 cattle (valued at 200,000 dollars) near the Santa Teresa border crossing northwest of El Paso. (M80V)

NMZ002-008-012	**12-13**	**2000MST-0500MST**			**0**	**0**	**0**	**0**	**Heavy Snow**
Central Mountains									

An upper level storm combined with a cold front to bring snow to the mountains and northern part of New Mexico. Heavy snow was limited to the Central Mountains. In the North central Mountains, Santa Fe Ski Basin had 15 inches, Angel Fire received 6 inches with 5 inches in Santa Fe (city) and Los Alamos. In the Sandia/Manzano Mountains, Sandia Peak Ski Area had 8 inches with 6 in Estancia. Snowfalls in the south central mountains ranged from four to seven inches at Ruidoso, Carrizozo, Cloudcroft, Capitan and Mountain Park.

NMZ002-003-007	**28**	**0500MST-0800MST**			**0**	**110**	**0**	**0**	**Freezing Rain**

Freezing rain fell in parts of north central New Mexico, coating driveways, sidewalks, and some streets with a thin but slippery glaze of ice. Many vehicle accidents occurred in Santa Fe and Taos, including 17 separate accidents at just one off-ramp from Interstate 25 south of Santa Fe. Hundreds of people fell on the ice in Albuquerque, Santa Fe and Taos, with at least 110 people treated at local hospitals for injuries ranging from cuts and bruises to broken bones.

NEW YORK, Coastal

NYZ0SE	**11-12**	**0200EST-0300EST**			**0**	**?**	**?**	**0**	**High Winds**
Southeast New York									
NYZ014-023-024	**11-13**	**0315EST-0300EST**			**0**	**0**	**0**	**0**	**Heavy Snow**
Rockland, Orange, Westchester and Putnam									

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
NEW YORK, Coastal Cont'd									
NYZ0SE Coastal New York	**11-14**	**0800EST-0200EST**			**1**	**50-100**	**8**	**0**	**Coastal Flood**
NYZ0SE Southeast New York	**11-12**	**1200EST-0500EST**			**0**	**0**	**?**	**0**	**Flood**

THE GREAT NOR'EASTER OF '92...A savage nor'easter lashed the coastline for nearly three days and nights. It caused hundreds of millions of dollars of damage with severe coastal flooding causing the greatest monetary damage by far. The first significant coastal flooding began on friday morning the 11th at astronomical high tide. The tides already running high due to a full moon, eventually rose a full 4 to 6 feet above normal. This produced some of the worst coastal flooding this area has experienced in nearly 40 years. The problem was further compounded by extremely strong winds. The winds at times friday, gusted to hurricane force. Sustained winds between 30 and 40 knots were common throughout the day and that night along with gusts of 60 to 80 knots. These winds were the result of a tight pressure gradiant that formed between a strong high pressure system located off the new england coast and the storm drifting northward from the mid atlantic region. This pressure gradiant began to relax somewhat late friday night, although gusty winds continued through the entire weekend. These strong onshore winds, not only downed hundreds of trees and power lines, but actually worsened the coastal flooding as the tides could not recede against their onslaught in a normal matter. The winds also generated a devastating surf that wiped out beaches, dunes, piers, marinas, sea walls, roads, homes and businesses. Numerous homes and businesses were completely destroyed while tens of thousands more were significantly damaged. Thousands of people had to be evacuated from their coastal communities. Hundreds had to be rescued after waiting too long to leave and many of these, along with their rescuers, were injured in some form or another. Many suffered from hypothermia due to immersion in the cold Atlantic waters. The transportation systems throughout the area were severely handicapped if not completely out of service at times. Roadways were flooded, stranding thousands of motorists. Many had to be rescued from their cars as water levels rose amazingly fast. Bridges were closed at times due to the high winds. Trains were delayed or cancelled. Airports reported significant delays or cancellations. LaGuardia airport was closed for an extended period due to flooding. Marinas suffered a heavy toll as docking facilities were damaged or destroyed. Thousands of boats were destroyed or significantly damaged by the winds and waves. Heavy rains friday into friday night complicated the situation even more. Rainfall of between 2 and 3 inches with some local amounts of nearly 4 inches produced widespread urban flooding as well as river and stream flooding throughout the area. Some of these waterways did not recede to their banks until saturday morning. The colder interior sections had their own problems to deal with as heavy snow blanketed these areas. The snow began to accumulate rapidly friday, with 4 to 7 inches being quite common across interior sections friday night. The snow let up considerably thereafter, but continued to fall well into saturday night. In fact coastal sections began to experience these snows as colder air filtering in on the back side of this storm, changed the rain over to snow. When all was said and done, the snow had accumulated upwards to 2 feet across some higher elevation areas although 6 to 12 inches were the more common values elsewhere across the interior. Along the coast a couple of inches were fairly common, although some residents along the north shore of long island received 3 to 5 inches during saturday. There was one fatality due to this storm. A man attempting to reach his partially submerged car in a parking lot in Mamaroneck, was swept away in the fast moving flood waters. (M73O)

NYZ0SE Southeast New York	**28**	**0400EST-1500EST**			**0**	**0**	**?**	**0**	**Ice Storm**

A very light rain and/or drizzle began falling across the area before sunrise. With temperatures near the freezing mark, this precipitation froze upon contact with the surface. Numerous bridges and roadways had to be closed because driving conditions became impossible. Many people just gave up and abandoned their cars. Bus service was cancelled in some areas and severely handicapped in others. Hundreds of accidents resulted because of this "black ice" condition. Many people were injured, some very seriously. Indeed one person was killed when he lost control of his car and slammed into two vehicles that had stopped to help another motorist who had skidded off the roadway.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

NEW YORK, Central

NYZ013-020 Extreme Eastern Parts	03	0000EST-1200EST			0	0	5	0	Heavy Snow

A low pressure system along the New England Coast dumped copious amounts of precipitation across sections of eastern New York. Most of the precipitation fell as rain or a mixture of snow and rain in the valleys where snowfall accumulations only totaled two to four inches. However, the higher terrain of eastern Columbia and eastern Rennselaer Counties received five to twelve inches of heavy wet snow with 12 inches reported at New Lebanon and 9 inches reported at Averill Park. The heavy wet snow also brought down tree branches and power lines leaving over 3000 customers without power in the towns of Petersburg, Stephentown, Copake, West Sand Lake, Averill Park, Berlin, Hillsdale and Grafton.

Areawide	04 05	1630EST- 1800EST			0	0	5	0	Snow/ Snow Squalls

A low pressure system moving through the eastern Great Lakes region and a second low pressure system along the Long Island Coast brought generally light snow to Eastern New York on the night of the 4th and early on the 5th. Much Colder air funnelling across the warmer waters of Lake Ontario brought snow squalls to the area on the afternoon of the 5th. Snowfall amounts by the morning of the 5th ranged from one to four inches in the area with 4 inches at Newcomb. Snow squalls on the afternoon of the 5th generally dumped two to five inches across the area with 5 inches at Halcott Center and 4 inches at Queensbury and Berlin.

NYZ006	10 11	1800EST- 1600EST			0	0	5	0	Heavy Snow
NYZ010	10 12	2100EST- 2200EST			0	0	5	0	Heavy Snow
NYZ019	11 12	0200EST- 0000EST			0	0	5	0	Heavy Snow
Ulster and Greene Counties NYZ013	11 12 12 12	1330EST- 0500EST 0700EST- 2100EST			0 0	0 0	5 5	0 0	Flood Heavy Snow

One of the largest snowfalls in recent years occurred in parts of eastern New York from December 10th-12th. The snow was the result of a very powerful yet nearly stationary low pressure system which remained over the Delmarva Peninsula during the 10th and 11th before finally moving northeast on the 12th of December. Total snowfall amounts ranged from 6 inches to nearly 40 inches. Some of the larger snowfall totals included: 39 inches at East Jewett, 37 inches at Stamford, 36 inches at Gilboa, 34 inches at Berne and Windham, 32.5 inches at Slide Mountain and 23 inches at Bloomingburg. In addition winds caused considerable blowing and drifting of the snow with drifts of 10 feet reported in parts of the Catskills.

In Ulster and Greene Counties tidal flooding occurred along the Hudson River as unusually high tides and a strong easterly wind caused flooding along the west shore of the river. Minor flooding was reported along Water Streets in Athens with more substantial flooding in Kingston and Saugerties. In Kingston flooding was reported along Dock St., North St. and West Strand with flooding also reported along Light House Drive in Saugerties.

NYZ009-013	24	0400EST-1100EST			0	0	4	0	High Wind

A strong cold front swept through eastern New York early on the morning of the 24th bringing high winds to parts of the area which downed tree limbs and power lines. In Herkimer and Oneida Counties 1,500 customers were left without power, while about 3,000 customers were left without power in Dutchess and Ulster Counties.

NYZ007-009-013 -019-020	25	0900EST-2300EST			0	0	5	0	High Wind

A strong pressure gradient between high pressure along the Atlantic Coast and a low pressure system in the Great Lakes Region resulted in high winds across much of eastern New York on

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

NEW YORK, Central Cont'd

Christmas Day. In all over 5,000 customers lost power on Christmas Day. Signs were damaged in the Little Falls area of Herkimer County with several telephone poles and trees downed in the Capital District area. The peak wind gust recorded in the area was 52 kts at Massena.

Southern Adirondacks South	29 31	0000EST- 1500EST			0	0	5	0	Dense Fog

A stagnant air mass remained over much of eastern New York from the Southern Adirondacks south from December 29th-31st resulting in dense fog across the area as temperatures above freezing and snow cover combined to produce dense fog across the region.

NYZ007	29 30	1700EST- 0500EST			0	0	5	0	Ice Storm
NYZ-011	29 30	1830EST- 0500EST			0	0	5	0	Freezing Rain
NYZ007-008-011-0121	30 31	2000EST- 1200EST			0	0	5	0	Freezing Rain

A stationary front remained across the Adirondacks for two days as bands of freezing rain moved along it. A thick coating of ice developed on trees, wires and roads with many accidents reported across the region. Traveling from the Adirondacks north was extremely difficult if not impossible with many roads closed for a time. The Adirondack Northway was closed for a time early on December 30th from Exit 33 to the Canadian Border after numerous accidents stranded motorists along the stretch of highway. In addition numerous other personal injury accidents occurred across the area. In addition power outages were reported as a result of the ice in Saint Lawrence County on December 29th with a power pole downed in Franklin County.

NEW YORK, Western

NYZ022	10	2200EST			0	0	4	0	Heavy Snow
NYZ021	11	0500EST			0	0	4	0	Heavy Snow
NYZ003	11	0700EST			0	0	4	0	Heavy Snow
NYZ001	11	0900EST			0	1	4	0	Heavy Snow
NYZ002-004	11	1100EST			0	0	5	0	Heavy Snow

Low pressure moved east from the Upper Great Lakes bringing snow to the area, while another low pressure system formed off the South Carolina coast. The two systems consolidated and then moved north along the Atlantic Coast bringing additional snow across the region. General snowfalls reports of between six and sixteen inches were common. Schools were closed in parts of the Southern Tier and Finger Lakes Region. Greater Buffalo Airport was closed for about an hour and a half while crews cleared the runways. Rochester Airport was closed for nearly two hours for the same reason. A tree, felled by heavy snow, knocked out a power substation in Frewsburg, Chautauqua County, causing power outages there and in Kiantone. One man was seriously injured in Orchard Park, Erie County, when a tree branch fell onto his car pinning him in the vehicle. Snow-covered roads were blamed for numerous traffic accidents. The weight of the heavy snow caused a roof to collapse on a Pittsford, Monroe County, office building. Specific snowfall amounts included: 19 inches - South Bristol; 17 inches - Sodus and Bergen; 16 inches - Salamanca, Sinclairville, Olean, and Naples; 15 inches - Friendship and Webster; 13 inches - Whitesville; 11 inches - Portageville; 10 inches - Buffalo, Angelica, Rochester and Colden; 9 inches - Avon, New Albion, and Warsaw; and 8 inches - Lancaster.

NYZ022	25	1400EST			0	0	4	0	Heavy Snow High Winds
NYZ001	25	1645EST			0	0	4	0	Heavy Snow High Winds
NYZ004	26	1100EST			0	0	4	0	Heavy Snow

A very strong cold front crossed the area during the evening hours of the 25th. Winds gusted to 59 MPH at Buffalo and 75 MPH at Dunkirk. Behind the front, the cold northwest flow across Lakes Erie and Ontario produced lake effect snow squalls. Snowfall of 6 inches were reported across Southern Erie and portions of Chautauqua and Cattaraugus Counties. To the lee of Lake Ontario, in Lewis County, 20 inches fell at Turin and 12 inches at Copenhagen. Orwell, in Oswego County, reported 16 inches.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

NORTH CAROLINA

NCZ009-010-012 Mountains and McDowell County — 11 — 0900EST-1200EST — 1 — 0 — 5 — 0 — **High Wind**

Following a light glaze of ice and dusting of snow, high winds developed behind a mid Atlantic coastal storm with wind gusts estimated near 70 mph (60 kts) in the mountains and over portions of the foothills. One man was killed by a falling tree in Swannanoa of Buncombe County. Buncombe County also sustained over $50,000 damage including a roof blown off a high school and shattered plate glass windows in area business and a retirement home. Trees were blown down in several locations, some atop homes. In Watauga County at Blowing Rock, a roof was blown off a house. (M70O)

NCZ001 Outer Banks — 14 — 0800EST-1400EST — 0 — 0 — 4 — 0 — **Coastal Flood**

A powerful Nor'easter off the mid Atlantic coast generated high seas of fourteen to eighteen feet near shore, causing moderate to severe beach erosion and ocean over wash across NC Highway 12 on the Outer Banks. Damage occurred to two motels on Hatteras Island north of Buxton.

Cherokee County Transylvania County — 17 — 0600EST — 0 — 0 — 0 — 0 — **Flash Floods**

Heavy rain caused flash flooding on some streams and creeks, closing roads and leading to evacuations along the Hiawassee River in Cherokee County. No property damage or injuries were reported.

Cherokee County — 20 — 0800EST — 0 — 0 — 2 — 0 — **Flash Flood**

Flash flooding and high water on highways occurred during the morning. Several homes sustained minor damage from flooding of the Valley River.

Graham County — 20 — 0930EST — 0 — 0 — 0 — 0 — **Mud Slide**

Steady rains caused a massive rock and mud slide that brought down large trees and covered both lanes of U.S. Highway 129 between Topton and Robbinsville.

NCZ008 Southern Piedmont — 27-28 — 1400EST-0700EST — 0 — 0 — 3 — 0 — **Ice Storm**

A coastal storm pushed considerable moisture inland into cold air over central and western North Carolina resulting in a mixture of rain, freezing rain and sleet. The precipitation reached ice storm proportions in the Southern Piedmont. Lincoln and Cabarrus Counties had up to 3/8 inch and most other counties in the region received up to 1/4 inch of ice accumulation. Numerous trees and large tree limbs fell across homes and power lines. Interstate 85 in Gaston County had to be closed because of numerous traffic accidents and several access ramps to Interstates 85 and 77 had to be closed.

NORTH DAKOTA

NDZ010-015- Parts of North Central and Northeast North Dakota — 12-13 — 2100CST-1300CST — 0 — 0 — 0 — 0 — **Heavy Snow**

Seven inches of snow fell at Towner; while six inches of snow was reported at Pembina and Hurricane Lake.

NDZ001-002-005>018- Northern, Central and Eastern North Dakota — 24-25 — 1400CST-0300CST — 0 — 0 — 0 — 0 — **Blizzard High Winds**

A deceptively pleasant afternoon deteriorated to a blizzard within one hour, during the afternoon and evening of the 24th. A fast moving arctic cold front reached the northwest corner of North

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

NORTH DAKOTA Cont'd

Dakota at 1400CST on the 24th. The cold front then moved through the rest of the state in only six hours. Behind the front, much colder air and strong northwest winds caused ground blizzard conditions.

A deep low pressure system was associated with the cold front. The center of this system tracked eastward along the Minnesota and Canadian border and boosted the wind speeds behind the cold front. Winds gusts were over 60 mph in some places. Peak wind gusts included 69 mph at Minot, 65 mph at Jamestown and 59 mph at Bismarck, Devils Lake and Fargo, and 53 mph at Williston.

The worst blizzard conditions occurred over the northeast quarter of the state, from 1630CST on the 24th to 0100CST on the 25th. In addition to the blizzard, wind chill factors were down to 80 below zero. The storm stranded 1,000 holiday travelers and canceled Christmas church services. Many of the stranded travelers spent the night of Christmas eve in their vehicles.

The winds subsided and visibility improved early the morning of the 25th. By noon on Christmas day, all missing persons had been accounted for.

OHIO

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Killed	Injured	Property	Crops	Character of Storm
OHZ003 East Lakeshore Counties	**4-5**	**2100EST-1500EST**			**0**	**0**	**5**	**0**	**Heavy Snow**
	Snow squalls deposited as much as six to ten inches of snow.								
OHZ001-010 Northwest and West Central Counties	**10-11**	**2100EST-1200EST**			**0**	**0**	**5**	**0**	**Heavy Snow**
	Four to six inches of snow fell.								
OHZ003-004 East Lakeshore and Northeast Inland Counties	**11**	**0200EST-1430EST**			**0**	**0**	**5**	**0**	**Heavy Snow**
	As much as six to eight inches of snow fell.								
OHZ003 East Lakeshore Counties	**26**	**0100EST-1600EST**			**0**	**0**	**4**	**0**	**Heavy Snow**
	Widespread snow accumulations of four to six inches occurred. As much as a foot fell in a narrow band from Mentor to Thompson.								
Ashtabula County County Wide	**30-31**	**2135EST-1030EST**			**0**	**0**	**5**	**0**	**Flash Flood**
Cuyahoga County County Wide	**30-31**	**2135EST-1030EST**			**0**	**0**	**5**	**0**	**Flash Flood**
Erie County County Wide	**30-31**	**2135EST-1030EST**			**0**	**0**	**5**	**0**	**Flash Flood**
Geauga County County Wide	**30-31**	**2135EST-1030EST**			**0**	**0**	**5**	**0**	**Flash Flood**
Huron County County Wide	**30-31**	**2135EST-1030EST**			**0**	**0**	**5**	**0**	**Flash Flood**
Lake County County Wide	**30-31**	**2135EST-1030EST**			**0**	**0**	**5**	**0**	**Flash Flood**
	Heavy rains caused widespread flooding of basements, streets and small streams.								
Williams County Stryker	**30-12**	**2200EST-0400EST**			**0**	**0**	**4**	**0**	**Flood**
	The Tiffin River exceeded the flood stage of 11 feet at Stryker. Crest stage was 15.7 feet and occurred at 1200 EST on January 6. Flooding mainly affected farm buildings near the river.								

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
OHIO Cont'd									
Fulton County	30-	2228EST-							
County Wide	31	0615EST			0	0	5	0	Flash Flood
Lucas County	30-	2228EST-							
County Wide	31	0615EST			0	0	5	0	Flash Flood
Ottawa County	30-	2228EST-							
County Wide	31	0615EST			0	0	5	0	Flash Flood
Sandusky County	30-	2228EST-							
County Wide	31	0615EST			0	0	5	0	Flash Flood
Wood County	30-	2228EST-							
County Wide	31	0615EST			0	0	5	0	Flash Flood
Heavy rains caused significant flooding of basements, streets and small streams.									
Huron County	31	0000EST-							
Milan		1900EST			0	0	2	0	Flood
The Huron River went above the flood stage of 14 feet. Crest was 16.8 feet and occurred at 0500 EST.									
Lorain County	31	0031EST-							
County Wide		1030EST			0	0	5	0	Flash Flood
Medina County	31	0031EST-							
County Wide		1030EST			0	0	5	0	Flash Flood
Heavy rains caused considerable flooding of basements, streets and small streams.									
Cuyahoga County	31	0100EST-							
Independence		1700EST			0	0	3	0	Flood
The Cuyahoga River went above the flood stage of 16 feet. Crest was 18.6 feet and occurred at 0700 EST. Some residences near the river were affected by flooding.									
Portage County	31	0123EST-							
County Wide		1030EST			0	0	5	0	Flash Flood
Summit County	31	0123EST-							
County Wide		1030EST			0	0	5	0	Flash Flood
Hancock County	31	0228EST-							
County Wide		0615EST			0	0	5	0	Flash Flood
Henry County	31	0228EST-							
County Wide		0615EST			0	0	5	0	Flash Flood
Putnam County	31	0228EST-							
County Wide		0615EST			0	0	5	0	Flash Flood
Seneca County	31	0228EST-							
County Wide		0615EST			0	0	5	0	Flash Flood
Wyandot County	31	0228EST-							
County Wide		0615EST			0	0	5	0	Flash Flood
Heavy rains caused flooding of basements, streets and small streams.									
Lake County	31	0400EST-							
Willoughby		0600EST			0	0	0	0	Flood
The Chagrin River exceeded the flood stage of 11 feet. Crest was 11.15 feet and occurred at 0440 EST.									
Sandusky County	31-	0600EST-							
Woodville	01	1900EST			0	0	2	0	Flood
The Portage River flooded. Flood stage is 9 feet. The river crested at 10.6 feet at 0200 EST on January 1. Flooding affected mainly lowlands near the river.									
Williams County	31-	0800EST-							
Montpelier	10	1000EST			0	0	4	0	Flood
The Saint Joseph river was above the flood stage of 12 feet. The river crested at a stage of 15.7 feet at 2200 EST January 5. Some homes in the village of Pioneer were affected by flooding.									

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
OHIO Cont'd									
Trumbull County Leavittsburg	**31-01**	**1015EST-1500EST**			**0**	**0**	**3**	**0**	**Flood**
The Mahoning River was in flood. Flood stage is 10 feet and the river crested at 13.1 feet at 0000 EST on January 1. Flooding was mainly in lowlands near the river.									
Mahoning County Youngstown	**31-02**	**1030EST-0700EST**			**0**	**0**	**2**	**0**	**Flood**
The Mahoning River exceeded the flood stage of 10 feet. Crest was 10.7 feet and occurred at 0700 EST January 1. Only minor problems resulted from this flood.									
Lucas County Waterville	**31**	**1200EST-1400EST**			**0**	**0**	**0**	**0**	**Flood**
The Maumee River flooded. Flood stage is 9 feet, while the river crested at 9.2 feet at 1300 EST.									
OKLAHOMA									
Panhandle and Northern Oklahoma Zones 01>11	**04-05**	**2100CST-1800CST**			**0**	**0**	**0**	**0**	**Heavy Snow**
A winter storm dropped four to nine inches of snow across most of the Oklahoma panhandle, northwestern and north-central Oklahoma. The storm also produced one to four inches of snow and sleet in central Oklahoma. Snow, sleet and freezing rain were common in northeast Oklahoma.									
Numerous accidents were reported across the northern half of Oklahoma. A person from Shattuck suffered a heart attack and died while trying to walk home from his stalled automobile. Another person died in a multi-car accident on interstate 35 near Blackwell. An automobile accident on the Will Rogers turnpike near Vinita took the life of another person. A teenager in Oklahoma City lost his life when the sled he was being pulled on slid into an oncoming automobile.									
Oklahoma County Oklahoma City	**07**	**2200CST**			**0**	**0**	**4**	**0**	**Lightning**
Lightning struck 2 homes in Oklahoma City producing a large hole in each roof. In one home, the lightning strike started a fire that caused an estimated $10,000 damage.									
Cotton County East Cache Creek Walters	**09-11**	**1800CST-1500CST**			**?**	**0**	**0**	**?**	**Flooding**
Panhandle and Western Oklahoma Zones 1>5-8-9-12-13-	**12-13**	**2000CST-1800CST**			**0**	**0**	**0**	**0**	**Heavy Snow Ice**
SE Oklahoma Zones 17-20-21	**13-15**	**1000CST-2000CST**			**0**	**0**	**0**	**0**	**Flooding**
A strong slow moving storm brought a wide variety of weather to all of Oklahoma. In the panhandle and extreme northwest Oklahoma four to six inches of snow fell between early evening on the 12th and late morning on the 13th. In southwest and west-central Oklahoma, freezing rain fell late on the 12th and early on the 13th resulting in accumulations of ice on trees and power lines. Several areas in southwest and west-central Oklahoma reported power outages. In southeastern Oklahoma heavy rains from early in the morning on the 13th to early afternoon on the 15th resulted in some flooding of creeks and rivers. Rainfall amounts in excess of 3.0 inches were widespread across southeastern Oklahoma with some amounts in excess of 5.0 inches. Numerous roads were closed due to high water.									
Cotton County East Cache Creek Walters	**13-17**	**1500CST-1800CST**			**?**	**0**	**0**	**?**	**Flooding**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
OKLAHOMA Cont'd									
Muskogee County Countywide	13	1730CST-							
		2330CST			?	0	0	?	Flash Flood
Mayes County Countywide	13	1900CST-							
	14	1100CST			?	0	0	?	Flash Flood
Rogers County Countywide	13	1915CST-							
	14	1100CST			?	0	0	?	Flash Flood
Wagoner County Countywide	13	1915CST-							
	14	1100CST			?	0	0	?	Flash Flood
Ottawa County Countywide	13	1930CST-							
	14	0600CST			?	0	0	?	Flash Flood
Craig County Countywide	13	1930CST-							
	14	1500CST			?	0	0	?	Flash Flood
Pittsburg County Countywide	14	0700CST-							
		1200CST			?	?	0	0	Flash Flood
Tulsa County Countywide	14	0900CST-							
		1300CST			?	0	0	?	Flash Flood
Nowata County Countywide	14	0930CST-							
		1300CST			?	0	0	?	Flash Flood
Cherokee County Countywide	14	1000CST-							
		1300CST			?	0	0	?	Flash Flood
Creek County Countywide	14	1000CST-							
		1300CST			?	0	0	?	Flash Flood
Delaware County Countywide	14	1000CST-							
		1500CST			?	0	0	?	Flash Flood
Pittsburg County Countywide	14	2000CST-							
	15	0700CST			?	?	0	0	Flash Flood
Wagoner County Countywide	14	2100CST-							
	15	0100CST			?	0	0	?	Flash Flood
Latimer County Countywide	14	2200CST-							
	15	0700CST			?	0	0	?	Flash Flood
Muskogee County Countywide	14	2200CST-							
	15	1130CST			?	0	0	?	Flash Flood
Adair County Countywide	14	2300CST-							
	15	0700CST			?	0	0	?	Flash Flood
Cherokee County Countywide	14	2300CST-							
	15	0700CST			?	0	0	?	Flash Flood

Rainfall amounts of two to five inches occurred across eastern Oklahoma from December 13th through the early morning of December 15th. The rain fell on already saturated ground and resulted in widespread flash flooding. Many creeks overflowed their banks, and numerous roads were closed across eastern Oklahoma due to high water. A car was swept away near Okay in Wagoner County at 2030 CST on December 13th, and the driver of the car had to be rescued by a fire fighter who swam out to the car. Widespread mainstream river flooding also occurred throughout eastern Oklahoma during this time period. On the evening of the 14th, a woman and her

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

OKLAHOMA Cont'd

son were rescued from a raging creek in Ottawa County. On the morning of the 15th, a woman and a truck driver were pulled from flood waters near Webber Falls. In both of these incidences, an attempt was made to drive across a flooded roadway.

Kingfisher County									
Cimmaron River	**15**	**0200CST-**							
Dover	**15**	**0700CST**			**?**	**?**	**0**	**0**	***Flooding***
Atoka County									
Clear Boggy Creek	**15**				**0**	**0**	**?**	**?**	**Flooding**
Caney									
Bryan County									
Blue River	**15**	**1100CST-**							
Blue	**16**	**2200CST**			**?**	**0**	**0**	**?**	**Flooding**
Central and Eastern Oklahoma Zones 6-7-10-11-14>17-19>21-26>34-40-	**28** **29**	**0300CST-** **1000CST**			**0**	**0**	**0**	**0**	**Dense Fog**

Dense fog developed across much of Eastern and Central Oklahoma early in the morning on the 28th and continued through most of the morning on the 29th. The fog produced numerous delays at most airports. A small twin-engine plane crashed while attempting to land in the fog in Tulsa killing three people.

OREGON

ZONES 01 06-13	**01** **02**	**0900PST-** **1700PST**							**Heavy Snow**

The first of many strong Pacific storms that dropped out of the Gulf of Alaska in December left heavy snow across Oregon except for the low elevation coastal areas and the lowest elevations in the western valleys. Over a foot of snow fell in the Cascade Mountains and four to six inch accumulations were common throughout Eastern Oregon. All month long the storm track directed wet storms fuelled by Arctic air at Oregon producing a much needed above normal snowpack after 7 years of drought.

ZONE 01-03	**08**	**0000PST-** **0800PST**			**?**	**?**	**?**	**?**	**High Winds**

Another powerful Pacific storm roared on shore early in the day producing winds of 40 mph with higher gusts along the entire coast. Highest recorded gusts were 62 mph at Gold Beach along the Southern Coast and 59 mph at Sea Lion Caves and the mouth of the Columbia River.

ZONES 06-13	**08** **09**	**0000PST-** **0400PST**			**?**	**?**	**?**	**?**	**Heavy Snow**

Very cold air covered Oregon from the Cascades eastward when another strong wet Pacific storm struck the state. Snowfall amounts in Eastern Oregon were three to five inches in the lowest elevations and five to eight inches in higher locations. The Cascades received one to two feet of new snow.

ZONES 01-03 05 11	**09** **10**	**2200PST-** **1200PST**			**?**	**?**	**?**	**4**	**High Winds**

Yet another large powerful storm pounded Oregon with high winds from the South Coast, through Southwestern valleys, and into the Northeast Mountains. The highest reported wind speeds were along the South Coast where a gust of 110 mph occurred at Humbug Mountain near Port Orford. Other notable wind gusts along the coast were 96 mph at Cape Blanco, 78 mph at Sea Lion Caves and 72 mph at Gold Beach. Numerous reports of sustained winds of 40 mph or more and gusts to 60 mph occurred. As the storm moved northeastward, gusts in Southwestern Oregon knocked down trees and interrupted transmission of the Medford NOAA Weather Radio. When the storm reached Northeastern Oregon winds of 60 to 80 mph tore the roof off of a house near Joseph and threw it into a neighboring home.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

OREGON Cont'd

ZONE 01	16	1500PST-							
		1900PST			?	?	?	4	High Winds

A Pacific cold front toppled trees and knocked out power as it raced across the North Coast. Tillamook reported sustained winds of 46 mph with a gust to 80 mph while Netarts had 40 mph winds that reached up to 73 mph.

ZONE 04	16	1800PST-							
		2100PST			?	?	?	?	High Winds

The same cold front caused high winds in the northern Willamette Valley. Portland Airport reported winds of 45 mph that reached up to 60 mph.

ZONE 01	16	1600PST-							
04-13	17	2100PST			?	?	?	?	Heavy Snow

The powerful storm that caused high winds in Western Oregon dumped more heavy snow everywhere in Oregon except along the Southern and Central Coast. One to two feet of snow fell in mountainous areas with one to two inches at the lowest elevations, including the beaches- a rare occurrence in Oregon. Elsewhere snowfall was generally in the four to eight inch range. This snowstorm forced some temporary road closures, including interstate highways, as snow removal began to lag behind the nearly continuous snowstorms.

ZONE 01 02	19	2100PST-							
	20	0100PST			?	?	?	?	High Winds

High winds accompanied the next major storm across Northern Coastal Oregon. Sustained southerly winds of 51 mph with a gust to 69 mph occurred at windy Sea Lion Caves and Netarts reported 45 mph winds reaching up to 61 mph.

ZONE 06	21	2200PST-							
	22	0400PST			?	?	?	?	High Winds

Winds at Mt. Hood Meadows ski resort blew ferociously at 60 mph with numerous gusts between 75 and 80 mph. Strong winds blew in the mountains and the Columbia River Gorge all month due to the stationary strong surface high pressure east of the Cascades associated with the cold air mass there and the nearly constant low pressure storm centers offshore.

ZONE 03	30	2300PST-							
	31	0200PST			?	?	?	?	High Winds

December ended as it began- with strong Pacific storms pounding Oregon with high winds and heavy snow. Along the South Coast Cape Blanco reported a gust to 89 mph and Gold Beach had a gust of 72 mph.

ZONES 01 02 04	30	0800PST-							
06-13	31	2400PST			?	?	?	?	Heavy Snow

December wound up being the snowiest month at Klamath Falls since records began in 1949 with a total of over 39 inches for the month. Several locations in Southwestern and Eastern Oregon reported record snow depths during the month and the mountain snowpack was generally 150 percent of normal statewide by months end. December ended, appropriately, on a snowy note. Another one to two feet fell in the mountains with two to ten inch totals elsewhere. The population centers of the Willamette Valley got two to four inches of snow for the 4th time this month in stark comparison to last winter when little or no snow at all fell all season.

PENNSYLVANIA, Eastern

PAZ007-008-009-	10	1100EST-							
010-016	11	1400EST			0	0	4	0	Heavy Snow

Snow began just before 0700EST over southern portions of the Lower Susquehanna Zone and then spread North and East. The snow reached all of Eastern Pennsylvania by 1200EST but quickly mixed with and changed to rain over the Southeast Zone. The snow became heavy and three to nine inches of snow had accumulated over the Lower Susquehanna Zone by early afternoon and as much as 6 inches in portions of the Middle Susquehanna Zone. The snow continued into the 11th. By the early after it tapered off to just light snow. Six to twelve inches of snow had accumulated

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

PENNSYLVANIA, Eastern Cont'd

in the Poconos and six to seventeen inches in the Upper Susquehanna Zone. Snow accumulations were quite variable in the Northeast Metropolitan Zone with up to 12 inches in the higher elevations but only an inch or two in some built-up valley areas. Maximum snow depths in the Middle Susquehanna Zone were five to ten inches. Rain mixing with the snow limited accumulations to an inch or two over most of the East Central Zone, but four to five inches did accumulate along the northern edge of the zone.

PAZ009-010-011-012-016 — **10 2130EST- 11 1300EST** — 0 — 0 — 7 — 0 — **High Wind**

An intense coastal storm caused high winds throughout the area. Across the Lower Susquehanna and Southeast Zones winds gusts of 60 to 90 MPH occurred. Over the East Central, Northeast Metropolitan and Poconos Zones frequent gusts over 60 MPH occurred. Many trees were down throughout these zones along with many limbs and branches. There were many places where trees fell on vehicles, houses and other buildings. The wind gusts and also falling trees and limbs brought down many utility lines. Hundreds of thousands of customers had electrical power outages. There also were many houses and other buildings that had roofs or portions of roofs blown off. Some of the reported wind gusts were: 60 MPH in Abington and East Northampton Townships, Montgomery County; 70 MPH in the York area, York County; 62 MPH at Lancaster Airport and 61 MPH in Lancaster, Lancaster County; 82 MPH in New Holland, Lancaster County; 60 MPH at the Wilkes-Barre Scranton Airport, Luzerne County; 60 to 75 MPH along the Philadelphia-Bucks County border; 59 MPH at Philadelphia International Airport; 80 MPH at King of Prussia, Montgomery County.

Bucks County 1.5 W Trevose — **11 0300EST** — 0 — 0 — ? — 0 — **Thunderstorm Winds (G66)**

Wind gusts to 76 MPH were reported along with thunder and lightning.

Bucks County — **11 0800EST- 12 0600EST** — 0 — 0 — ? — 0 — **Flood**

Heavy rain of two to four inches caused flooding along the Neshaniny Creek. The creek crested at 11.3 ft at 1600EST on the 11th at Langhorne where flood stage is 9 ft. There also was some urban and small stream flooding throughout Southeastern Pennsylvania.

PAZ00E Eastern Pennsylvania — **28 0300EST** — 0 — 0 — ? — 0 — **Glaze**

Mostly clear skies early at night allowed temperatures to fall well below freezing. When a little light snow followed by light rain developed in the early morning hours of the 28th, roadways quickly became ice covered. The thin layer of ice was extremely slippery and caused many traffic accidents with some injuries. Many roadways became jammed with stalled vehicles, either by accidents or vehicles unable to move on the ice. With highway department vehicles unable to get through the traffic jams to treat the roadways, a commuters nightmare developed. Although the light rain was enough to coat roadways with a thin layer of ice, very little ice accumulated on trees and wires.

PENNSYLVANIA, Western

PAZ002 Northwestern — **03 0800EST** — 0 — 0 — 0 — 0 — **Heavy Snow**

Seven inches of snow at Union City and Conneautville for Lake Effect.

PAZ005 Laurel Mountains — **03 0800EST** — 0 — 0 — 0 — 0 — **Heavy Snow**

Six inches of snow at Johnstown, Seven Springs and Central City.

PAZ002 Northwestern — **05 0700EST** — 0 — 0 — 0 — 0 — **Heavy Snow**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

PENNSYLVANIA, Western Cont'd

Six to nine inches of snow fell. Six inches at Townville and Russell, seven inches at Conneautville and nine inches at Clarks Corners.

PAZ003 Western **05 0700EST 0 0 0 0 Heavy Snow**

Six inches of snow at West Hickory.

PAZ004 Northern Mountains **05 0700EST 0 0 0 0 Heavy Snow**

Six inches of snow at Kane.

PAZ002 Northwest **05 1900EST 0 0 0 0 Heavy Snow**

Six to twelve inches of snow. At Mckean Six inches, at Waterfor and Edinboro eight inches, at Franklin Center 10 inches, Union City and Linesville 12 inches.

PAZ003 Northwestern **05 1900EST 0 0 0 0 Heavy Snow**

Franklin received 8 inches of snow.

PAZ004 Northern Mountains **05 1900EST 0 0 0 0 Heavy Snow**

St. Marys and Emporium received 6 inches of snow.

PAZALL **10 1000EST-**
11 2200EST 3 0 7 0 Heavy Snow

Low pressure moving slowly along the east coast brought heavy wet snow to all areas. Total accumulation in the central mountains twenty-two to thirty-two inches. In Jefferson, Clarion, Armstrong, Indiana and Westmoreland Counties sixteen to twenty-six inches. In southwest Pennsylvania eight to eighteen inches including 10 inches around the Pittsburgh International Airport, 12 inches downtown Pittsburgh, sixteen to twenty inches in the Northern and Eastern suburbs of Pittsburgh and twelve to sixteen inches in Greene and Washington Counties. North of Allegheny County to the Erie Lakeshore fourteen to eighteen inches. The highest accumulation was in Northeast Somerset County in Ogletown with 40 inches. Drifts of five to six feet in Cambria, Blair and Somerset Counties. Roofs Collapsed from the weight of snow. One roof of a printing company collapsed in the Allentown section of Pittsburgh killing three workers. Six roof collapses in Westmoreland County. Barn roof collapsed also. Barn roof in Slickville, Indiana County collapsed. Roof of state office building in Greensburg collapsed. Apartment roof in Latrobe collapsed. Youth Center Building roof collapsed in Altoona. Many power outages throughout western Pennsylvania with 60 thousand homes without power from downed wires and trees limbs on wires. (M60O)(M36O)(M35O)

PAZ002 Northwestern **25 0900EST 0 0 0 0 Heavy Snow**

Lake effect snow dropped six to ten inches at both Union City and Edinboro respectively.

Bedford County **31 1430EST 0 0 0 0 Flood**
Flash Flood

Raystown branch of Juniata River out of banks at Camp Sunshine in Bedford Township, Reynoldsville in east Saint Clair Township. Combinined rainfall and snow melt brought rivers and streams up.

Clearfield County **31 2029EST 0 0 0 0 Flood**
Flash Flood

Moshannon Creek overflowing near Osceola Mills. Bridge washed out. Rainfall and snow melt brought rivers and streams up.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Injured	Estimated Damage Property	Crops	Character of Storm
RHODE ISLAND									
RIZ002	11	0800EST-1100EST							
	12	0900EST-1200EST			0	0	?	0	Coastal flood
RIZ002	11	0700EST-							
	12	0700EST			0	0	?	0	High winds
RIZ001	12	0000EST-2400EST			0	0	?	0	Heavy snow

A major winter storm struck the state with easterly winds gusts were up to 60 MPH in the coastal areas and combined with astronomically high tides to cause major beach erosion and coastal over wash which flooded many homes. Beaches in South Kingstown, Charlestown and Narragansett suffered the most damage when dunes built up in earlier storms were swept away by 20 foot waves. The severe erosion left many areas quite vulnerable to damage from future storms. This storm removed more material from the dunes than either Hurricane Bob or the October 1991 storm. Private property damage was mostly confined to the Green Hill Beach section of South Kingstown. Ten to 24 inches of heavy, wet snow fell in the higher elevation of northwestern Rhode Island. Jerimoth Hill had 24 inches, Woonsocket and Foster reported 20 inches, Cumberland 17 inches, while Providence had only 4 inches. Scattered power outages occurred due to the high winds. The more prolonged outages occurred where heavy, wet snow knocked down tree limbs and wires.

SOUTH CAROLINA

SCZ001-002 Mountains and Foothills	06	2200EST-							
	07	0400EST			0	0	?	0	Freezing Rain Drizzle

Light freezing rain and drizzle coated some roads, bridges and overpasses over the northern part of the Upstate. A few traffic accidents occurred late at night especially around Greenville. Before conditions became too bad, the temperature rose to above freezing and precipitation diminished.

SCZ00 Mountains	10	0220EST-0700EST			0	0	?	0	Freezing Rain
SCZ002 Foothills	10	0200EST-0700EST			0	0	5	0	Ice Storm

A winter storm left more than 7000 residences without power across upstate South Carolina. Numerous power outages from downed trees and power lines occurred in south central Greenville County around Moonville. In West Greenville, Berea, and Travelers Rest Area in northern Greenville County had numerous power outages.

Because the ground temperature was quite warm before the precipitation started, there were very few traffic problems. U.S. Highway 25 near Caesar's Head was icy for a couple of hours.

Greenville County Northern Portion	17	0900EST			0	0	?	0	Flood

Prolonged heavy rain caused lowland flooding along the Middle Saluda River. The Reedy River in Greenville reached flood stage. Damage was minor.

SCZ001-002-004 Mountains, Foothills, & Lower Piedmont	27	0500EST-							
	28	0200EST			0	0	?	0	Sleet Freezing Rain

Moist air over-running unusually cold air located over eastern U. S. caused a prolonged period of rain, freezing rain and sleet over much of northwest and northern South Carolina. Icing caused traffic problems especially on bridges and over-passes over much of the area. A number of Sunday meetings were canceled and there was some disruption to holiday travel, especially on the interstate highways. Otherwise, travel and business activities were not severely affected because the event occurred on the weekend.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

SOUTH CAROLINA Cont'd

SCZ002-003-004 -005 Foothills, East & Lower Piedmont, North Midlands

27 2100EST- 28 0400EST | 0 | 0 | 6 | 6 | **Ice Storm**

Between 2100EST to early morning of the 28th an area of enhanced precipitation and thunderstorms moved through the lower part of the Upstate while the temperatures were still below freezing. Apparently the downdrafts in the thunderstorms reinforced the cold air at the surface causing a rapid buildup of ice in some areas. Some people in Greenwood area reported that up to 1 inch of glaze accumulated during the 3 hour period, 9 p.m. to midnight. Twenty-four hour rainfall in the Greenwood area was 2.32 inches, with about one half of that amount freezing. Wind gusts from the thunderstorms were around 30 knots at times. These winds combined with the ice and soggy ground caused much damage to trees and power lines. The effect was the worst ice storm in many years along a narrow band that extended from Abbeville, southern Anderson, Greenwood, Laurens, Newberry and Union Counties hence northeast at a somewhat less intensity to York and Lancaster Counties. Some icing damage was reported as far east as Chesterfield, Kershaw and Saluda Counties. Driving was not possible over much of this area the next morning because of ice and downed trees and power lines. Approximately 100,000 power outages were reported with the power out for a couple of days in a few sections. Damage to forests totaled more than one half million dollars. There were numerous accidents and at least 3 ice-related traffic deaths. Highway I-77 in York County was closed due to ice accumulations.

SOUTH DAKOTA

SDZ001-006-008-013-014 Western SD

01 0300MST- 1800MST | 0 | 0 | 4 | 0 | **High Winds**

Strong northwest wind gusts were up to 58 mph at the Rapid City airport caused a small airplane to flip over after landing, damaging the aircraft but not injuring the pilot. Wind gusts were up to 50 mph were reported elsewhere in the Black Hills area and western South Dakota. A large grass fire was started when the wind broke a power pole causing a power line to hit the ground five miles south of Hermosa around 2 PM MST. The strong winds caused the fire to burn nearly 3000 acres of grassland before it was contained by fire fighters from a dozen area fire departments.

SDZ009 West Central SD

01 1200MST- 1500MST | 0 | 0 | 3 | 0 | **High Winds**

High winds in the Philip area blew a section of a roof from an old gas station across a highway into the side of a house causing damage to the eaves and siding.

SDZ010 Central SD

01 1100CST- 1900CST | 0 | 0 | 4 | 0 | **High Winds**

Strong northwest wind gusts were up to 67 mph caused widespread minor damage in Pierre and surrounding areas of central South Dakota. The high winds shattered windows and blew down trees and signs. The wind rolled a van into a car causing damage to both vehicles. Another car was damaged by a wind-blown dumpster. The wind also blew topers off several pickup trucks causing some damage.

SDZ003-004-005-011-012 Northeast SD

01 1200CST- 2100CST | 0 | ? | ? | 0 | **Winter Storm**

A storm system caused numerous traffic accidents and stranded several hundred travelers as Interstate 29 was closed between Watertown and Sisseton. Slush on roadways became ice as high wind gusts were up to 60 mph and snowfall of one to four inches brought blizzard conditions to some areas. Several semi-trucks jackknifed and many cars ran into ditches causing minor injuries.

SDZ007-008-013 Southwest SD

02 1200MST- 03 1200MST | 0 | 0 | 0 | 0 | **Heavy Snow**

Heavy snow fell across parts of southwest South Dakota especially the northern Black Hills and to the south of the Black Hills. In the northern Black Hills up to 14 inches was reported at Lead and

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Injured	Estimated Damage Property	Crops	Character of Storm

SOUTH DAKOTA Cont'd

to the south 6.0 inches fell near Ardmore close to the Nebraska border. One to four inches of snow fell elsewhere from southwest to west central South Dakota.

SDZ002-006-007-008-009-013 Western SD — 12 0900MST- 13 0900MST — 1 ? ? 0 — Heavy Snow Cold

A winter storm brought heavy snow and cold from the Black Hills area to west central South Dakota. Icy and snow-packed roads and blowing snow caused over 80 traffic accidents in the Black Hills area with numerous injuries reported. At least two chain-reaction pileups occurred on Interstate 90 between Rapid City and the Wyoming state line where the most treacherous driving conditions occurred. In addition an elderly Rapid City woman died of exposure in the storm. Up to a foot of snow fell in Rapid City where it took several days to dig out. Other snowfall amounts include 22 inches at Lead, 18 inches near Deerfield, 13 inches at Edgemont, 10 inches at Red Owl, and 7.0 inches at Faith. Considerable icing occurred from the storm in west central South Dakota causing very dangerous travel conditions. Temperatures dropped to 20 below zero in the Black Hills after the storm early Monday, December 14th.

SDZ012 Northeast SD — 24 2100CST- 2200CST — 0 0 4 0 — High Winds

High wind gusts were up to 55 mph in the Watertown area caused a steel frame building under construction to collapse sometime between 9 and 10 PM CST.

TENNESSEE

Montgomery County Clarksville — 06 0730CST — 0 1 0 0 — Freezing Rain

One person was injured in a car accident due to freezing rain.

Davidson County Nashville — 06 0830CST — 2 18 0 0 — Freezing Rain

Several auto accidents occurred in the Nashville area due to freezing rain.(M37V)(M70V)

McMinn County 2 E Etowah — 09 2300CST — 0 0 3 0 — High Winds

A barn was destroyed and between 15 and 20 trees were knocked down.

Monroe County Madisonville — 09 2300CST — 0 0 2 0 — High Winds

Many trees were knocked down due to high winds.

Lauderdale County Ripley — 10 1135CST — 1 0 3 0 — High Winds

A man was killed when a tree blew into his pickup truck's windshield.(M70V)

Shelby County Memphis — 10 1200CST — 0 0 2 0 — High Winds

A tree was knocked down on top of some power lines.

Sumner and N Sumner Counties — 25 1415CST — 1 0 2 0 — Snow

A man was killed when he lost control of his van on a snow-covered road.(M43V)

TEXAS, Panhandle

TXZ001>006 — 04 2200CST- 05 1500CST — 0 0 0 0 — Heavy Snow

A winter storm moved quickly through the Texas Panhandle. The storm dumped four to five inches of snowfall across the region. This snow, combined with snowfall from a previous storm,

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

TEXAS, Pandhandle Cont'd

hampered travel through the region and closed numerous schools and businesses. The greatest snowfalls of seven inches fell across the southcentral and eastcentral Texas Panhandle.

TXZ002-003,005-006	14 14	0000CST- 1400CST			0	0	0	0	Heavy Snow

A low pressure system over the southwest United States sent a series of weather disturbances across the Texas Panhandle. One of the stronger disturbances produced heavy snows which created accumulations of snow ranging from two inches in the southwest Texas Panhandle to eight inches in the northeast Texas Panhandle. The snow created hazardous driving conditions and closed numerous schools and businesses.

TEXAS, Northern

Henderson County Chandler	08	2157CST			0	0	0	0	Hail (0.75)
Cook County Gainesville	14	0245CST- 0615CST			0	0	0	0	Flash Flooding

Areas around Pecan Creek were evacuated due to high water.

Wichita County Red River Burkburnett	15 15	0400CST- 0500CST			?	0	0	?	Flooding

TEXAS, Southern

Harris County Houston	09	0450CST			0	0	4	0	Thunderstorm Winds

Roof collapsed on La Petite Academy day care center at 15202 Bellaire Blvd.

TEXAS, Western

El Paso County El Paso	04	2100CST- 2330CST			0	0	6	0	High Wind
El Paso	04- 05	2230CST- 1400CST			0	0	4	0	Ice Storm

Strong gradient winds caused considerable wind damage in western El Paso. Winds in the area were estimated as high as 80 mph. The winds damaged signs, uprooted trees and downed telephone and electric lines. The damage caused by the strong winds was compounded by freezing rain which fell across the area resulting in several traffic accidents. Total storm damage estimates were around $1 million. Some businesses and residential areas were without power for 4 days while repairs were made.

TXZ007>013 South Plains Northern Permian Basin	04 05	2200CST- 1300CST			0	0	5	0	Ice Storm

An area of freezing rain moved across much of the South Plains and the northern Permian Basin. Numerous traffic accidents were reported over the Permian Basin and South Plains, with a 15-car pileup occurring in Lubbock. However, no deaths or injuries were directly attributable to the weather.

Reeves County Pecos	08	1540CST			0	0	3	0	High Wind

Strong gradient winds behind a cold front damaged a fence and a satellite dish in Pecos.

TXZ007>016-051-052 South Plains Permian Basin, Big Bend Area	13 14	1800CST- 1200CST			0	0	4	0	Heavy Snow

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

TEXAS, Western Cont'd

A vigorous upper level storm moved over western Texas during the evening of the 13th. The storm produced heavy snow in a swath from the mountains of the Big Bend north-northeastward to the South Plains. Up to ten inches of snow fell in the mountains, with five to severn inches reported across the Permian Basin and South Plains. Several traffic accidents resulted from the hazardous driving conditions, but no casualties were directly attributable to the weather.

TXZ007>011 South Plains	31	1930CST-2359CST			0	0	4	0	Ice Storm

Another round of freezing rain moved across the South Plains during the evening of the 31st. The ice was over 1/2 inch thick on automobiles and other exposed surfaces. Several traffic accidents resulted from the hazardous conditions. The weight of the ice broke tree branches and power lines in Lubbock, Hale Center and Littlefield. Fortunately, no deaths or injuries resulted.

UTAH

UTZ001	03	0630MST-1300MST			0	0	0	0	Heavy Snow

A band of snow developed in extreme northern Utah during the early morning hours. This band brought snow to the Wasatch Front and the adjacent Wasatch Mountains as it moved southward. The Cache Valley received the heaviest amounts with six to nine inches reported.

UTZ001	04	1715MST-							
	05	0800MST			0	0	2	0	High Wind

Strong easterly canyon winds developed along the Wasatch Front in Weber, Davis and Salt Lake counties. Several gusts were reported in the 58 to 74 mph range. The winds did cause power outages in Davis county.

UTZ008-011	04	1900MST-							
	05	1900MST			0	0	0	0	Heavy Snow
UTZ009-013	04	2200MST-							
	05	0900MST			0	0	0	0	Heavy Snow
UTZ005-012	04	2330MST-							
	05	1700MST			0	0	0	0	Heavy Snow

A moist low pressure system brought snow to most of the state. The heaviest snowfall was confined to the southeast, east central, and south central portions. The high plateau region of southeast Utah along with the extreme southeast valleys received eight to twelve inches. East and south central valleys received four to ten inches. Although the low desert region of extreme southwest Utah only picked up one to two inches, it was included in this report because it rarely receives any snowfall.

UTZ008	08	0330MST-1100MST			0	0	0	0	Heavy Snow

A cold upper low moving east across Arizona spread heavy snow into the southeast portion of the state. It received five to six inches.

UTZ010	09	0200MST-1600MST			0	0	0	0	High Wind

A westerly flow aloft produced very strong and gusty winds in the northwest mountains. Wind speeds were frequently above 60 mph with a peak gust of 101 mph reported. Since the high winds were in the higher elevations of the mountains, no significant damage occurred.

UTZ010	08	2000MST-							
	09	1800MST			0	0	0	0	Heavy Snow

A moist southerly flow brought heavy snow to the northern mountains. Most amounts reported ranged from ten to twenty-eight inches with a few other areas receiving eight to nine inches.

UTZ010	10	1800MST-							
	11	0800MST			0	0	0	0	High Wind

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

UTAH Cont'd

Southwest flow ahead of an incoming storm system caused very strong and gusty winds in the northwest mountains. Several locations had sustained winds of 50 mph and above with several gusts in the 75 to 86 mph range. Since the highest winds speeds were in the higher elevations of the mountains, no significant damage occurred.

UTZ010	11	1300MST-							
	12	1900MST			0	0	0	0	Heavy Snow
UTZ011	11	1800MST-							
	13	1000MST			0	0	0	0	Heavy Snow
UTZ003	11	2300MST-							
	12	0700MST			0	0	0	0	Heavy Snow
UTZ006	12	0000MST-							
		1100MST			0	0	0	0	Heavy Snow
UTZ008	12	1300MST-							
		2200MST			0	0	0	0	Heavy Snow

A cold, moist Pacific storm system brought snow to most of the state. Amounts in the northern mountains ranged from eleven to thirty-one inches while the southwest mountains received thirty-six to forty inches. Western valleys received four to thirteen inches while the valley locations in the extreme southeast picked up around six inches. There were some accidents in the northwest urban areas because of the slick and snow packed roads. However, the accidents were minor and no significant damage or serious injuries occurred.

UTZ010	14	2300MST-							
	15	1900MST			0	0	0	0	Heavy Snow
UTZ003	14	2300MST-							
	15	1000MST			0	0	0	0	Heavy Snow
UTZ003	15	1800MST-							
	16	0600MST			0	0	0	0	Heavy Snow

A cold front brought snow to most the state with the heaviest amounts received in the northwest. The northwest mountains received sixteen to nineteen inches. The western portion of zone three had two separate rounds of heavy snow. The first period was caused by the cold front while the second was caused by lake effect from the Great Salt Lake. Each period brought four inches of new snow.

UTZ010	17	1130MST-							
	18	1100MST			0	0	0	0	Heavy Snow
UTZ001	17	1230MST-							
	18	0400MST			0	0	0	0	Heavy Snow
UTZ011	17	2000MST-							
	18	1400MST			0	0	0	0	Heavy Snow
UTZ006-007-	17	2330MST-							
013-	18	1400MST			0	0	0	0	Heavy Snow
UTZ003	18	0030MST-							
		1000MST			0	0	0	0	Heavy Snow

A cold Pacific storm brought snow to the entire state. The heaviest snowfall occurred in the mountains and western valleys. Snowfall began first in the extreme northern valleys and mountain locations that receive heavy snowfall in a southwest flow. The northern mountains received nine to thirty inches while the southern mountains picked up ten to thirteen inches. The northwest valleys had four to eight inches while the southwest and south central valleys received four to twelve inches. Numerous minor accidents occurred as a result of the slick and snow packed roadways.

UTZ013	27	1800MST-							
	28	1200MST			0	0	0	0	Heavy Snow
UTZ011	27	2230MST-							
	28	1300MST			0	0	0	0	Heavy Snow
UTZ006	28	0030MST-							
		0800MST			0	0	0	0	Heavy Snow
UTZ005-012	28	0100MST-							
		1400MST			0	0	0	0	Heavy Snow

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
UTAH Cont'd									
UTZ007	**28**	**0200MST-**							
		1200MST			**0**	**0**	**0**	**0**	**Heavy Snow**
UTZ004	**28**	**0330MST-**							
		1400MST			**0**	**0**	**0**	**0**	**Heavy Snow**
UTZ010	**28**	**0400MST-**							
		1400MST			**0**	**0**	**0**	**0**	**Heavy Snow**

A moist southwest flow produced snow over most of the state. The heaviest amounts were in the southern and eastern portions of the state. The southern mountains and high plateau region received eleven to eighteen inches. Snowfall in the northern mountains was not as heavy and widespread, but locations that receive heavy snow in a southwest flow picked up seven to eleven inches with the remaining areas getting six inches or less. The northeast and east central valleys picked up four to eight inches while the south central valleys received six to sixteen inches. Zone seven and the northern portion of zone six received four to seven inches. Localized areas of light freezing rain occurred for short periods of time on the morning of the 28th in the south central and northwest portions of the state. However, only minor accidents resulted from the icy and snow packed road conditions. No significant damage occurred as a result of the freezing rain.

UTZ003-010-	**28**	**2000MST-**							
011-	**30**	**0200MST**			**0**	**0**	**2**	**0**	**High Wind**
UTZ010-011	**29**	**2100MST-**							
	30	**1600MST**			**0**	**0**	**0**	**0**	**Heavy Snow**
UTZ001-003	**29**	**2100MST-**							
	30	**1300MST**			**0**	**0**	**0**	**0**	**Heavy Snow**
UTZ006	**29**	**2200MST-**							
	30	**0600MST**			**0**	**0**	**0**	**0**	**Heavy Snow**
Salt Lake County									
West Valley City	**30**	**1000MST**			**0**	**0**	**3**	**0**	**Lightning**

A strong southwest flow ahead of an approaching cold front caused high winds in the mountains and portions of the northwest valleys. Gusts in the mountains ranged from 63 to 113 mph. The strongest gusts were at exposed high altitude automatic stations with no people around. The most common wind speeds were 70 to 85 mph. Winds around that speed broke windows and a wind gauge in a lift operator's shed at Brian Head ski resort in southwest Utah. The wind also caused many ski-lifts at the resorts to be shut down. Wind speeds in the northwest valleys were in the 60's. There was no damage in the valley locations. Locations in western Utah that did not meet the high wind criteria had gusts from 45 to 54 mph.

The above mentioned cold front moved into northwest Utah during the evening hours of the 29th. Heavy snow followed the front into the mountains and many western valley locations. Many mountain locations had blizzard conditions which caused roadways through these areas to be closed for a period of time. Other mountain roads were also closed because of avalanches. Many mountain locations received 11 to 25 inches with a few other areas picking up eight inches. The northwest valleys received 4 to 12 inches while valley areas in the southwest had four to seven inches. During this heavy snowfall, a band of thunderstorms moved into Salt Lake City at mid-morning of the 30th. Lightning from one of these thunderstorms struck a house and a nearby tree. The bolt peeled bark off the tree and started the house's roof on fire. The bolt or electric surge entered the house, and continued down the inside wall into the basement. Pieces of sheetrock were blown out of a wall in one room, and embedded in the opposite wall. In this same room, the lightning caused a small, brief fire. Windows and a light in the basement were broken. Wires to a stereo were melted. Otherwise only minor accidents occurred as a result of the slick and snow packed roads.

VERMONT

VTZ004-005	**11**	**0000EST-**							
Windham and	**12**	**1400EST**			**0**	**0**	**4**	**0**	**Heavy Snow**
Bennington Counties									

One of the largest snowfalls in recent years occurred in extreme southern Vermont from December 11th-12th. The heavy snow was the result of a very powerful yet nearly stationary low pressure system which remained over the Delmarva Peninsula during the 11th before finally

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

VERMONT Cont'd

moving northeast on the 12th of December. Snowfall amounts ranged from four to eighteen inches. Some of the larger snowfall reports included 18 inches at Shaftsbury, 14 inches at West Dover and 11.4 inches at Sunderland.

VTZ001>004	25	1200EST- 2100EST			0	0	5	0	High Wind

A strong pressure gradient between high pressure along the Atlantic Coast and a low pressure system in the Great Lakes Region resulted in high winds across much of Vermont on Christmas Day. In all over 4,000 customers were left without power as winds gusts were reported to be over 50 kts in many areas. The highest recorded wind gust of 80 kts occurred in St. Albans during the afternoon on Christmas Day as strong southerly winds were funneled up the Champlain Valley.

Statewide	29 31	0000EST- 1500EST			0	0	4	0	Dense Fog

A stagnant air mass remained over much of Vermont from December 29th-31st resulting in dense fog across the area as temperatures above freezing in many areas and snow cover combined to produce dense fog across the region.

VTZ001>003	29 30	1830EST- 0500EST			0	0	5	0	Freezing Rain
VTZ001>003	30 31	2100EST- 1200EST			0	0	5	0	Freezing Rain

A stationary front remained across the Green Mountains for two days as bands of freezing rain moved along it. A thick coating of ice developed on trees, wires and roads with many accidents across the area. Traveling across the area was very treacherous with numerous accidents reported especially along Interstate 89 where several state highway trucks slid off the roadway.

VIRGINIA

VAZ016	02 03	0800EST- 0100EST			0	0	0	0	Snow

Snowfalls of two to four inches occurred over the higher elevations of Wise, Dickenson, Buckanon, Tazewell, Bland, and Giles Counties.

Grayson, Green, Madison, Orange Counties	05	0900EST- 1600EST			0	0	0	0	High Wind

Winds gusts were up to 50 mph knocked down trees and power lines in various parts of these counties.

Roanoke County Salem	09	1000EST			1	0	0	0	Cold

A patient walked away from the Veterans Hospital only wearing street clothes Tuesday afternoon and apparently froze to death overnight as temperatures Wednesday morning got down into the teens. (M60O)

VA005,009>011, 013>015	10 11	0300EST- 2300EST			0	0	4	0	Winter Storm

A major winter storm moved north and over Virginia producing a variety of winter weather across the state. Most of northern, western and central Virginia had snow, freezing rain and rain. Snowfall amounts ranged from two inches to three feet. Parts of the Northern Shenandoah Valley had three to six inches of snow, with a period of freezing rain. Rain in between the snow early Thursday and again Friday. In Frederick County, storm total snow accumulations of two to three feet were common with drifts of five to eight feet. Many trees and power lines throughout the area were broken due to the snow and ice. Numerous highways were closed. In Page County the roofs of a mobile home and a poultry house collapsed under the weight of the snow and ice.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

VIRGINIA Cont'd

VAZ001>002	10 12	1400EST- 1500EST			0	0	4	0	Coastal Flood Beach erosion

Gale force winds caused high waves and heavy surf along the Virginia coast Thursday afternoon through Saturday afternoon. Minor coastal flooding occurred at times of high tide and flooded several roads and caused minor beach erosion. At 4PM Thursday, winds and waves were so bad that the Scotland-Jamestown ferry suspended operations for the first time in five years.

VAZ002>007, 011,017>018	10 11	1500EST- 1200EST			0	0	4	0	Flooding

Heavy rainfall and snow melt lead to widespread minor flooding in east, central and northern parts of Virginia. Many small streams, creeks and drainage areas flooded. The excessive water also brought a number of rivers out of their banks, flooding low areas. Loudoun, Fauquier, Prince William and Stafford counties had the most significant flooding.

Loudoun County	10 11	2000EST- 0400EST			0	3	?	0	Flood Flash flood
Fauquir County	10 11	2000EST- 0400EST			0	4	?	0	Flood Flash flood

Rain throughout the day was heavy at times and produced widespread flooding. Numerous roads were closed due to high water. Three people in Loudoun County had to be rescued after the vehicle they were in was swept into Sycolin Creek. They had tried to drive through a flooded area of Route 797 near Leesburg. All three had only minor injuries. In separate incidents in Faquier County, four people had to be rescued after driving into flooded roads and their vehicles washed away. All had only minor injuries.

VAZ005,010	11	0200EST- 0400EST			0	0	3	0	High Wind

High winds did minor damage to spotty areas in northern and central Virginia. Damage was mostly trees and power lines knocked down.

Stafford County	11	0400EST			1	0	0	0	River Flood

Heavy rain in the river basin throughout the day Thursday lead to the river overflowing its banks during the early morning Friday. A man and his dog, who had been living in a tent on the bank of the Rappahannock River near Fredericksburg, drowned in the flood waters. The were found later still in the tent. (M46O)

Fluvanna County	11	0400EST- 1530EST			0	0	3	0	Flood Flash flood
Goochland County	11	0400EST- 1530EST			0	0	3	0	Flood Flash flood
Albemarle County	11	0400EST- 1530EST			0	0	3	0	Flood Flash flood
Cumberland County	11	0800EST- 2100EST			0	0	3	0	Flood Flash flood
Prince Edward County	11	0800EST- 2100EST			0	0	3	0	Flood Flash flood

Heavy rain throughout much of the day Thursday (Dec. 10) and early Friday (Dec. 11) caused widespread flooding. It caused the Appomattox and Rivanna rivers to overflow their banks as well.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
VIRGINIA Cont'd									
VAZ005,010>016, 018	27 28	1800EST- 0300EST			0	0	?	0	Ice Storm

Freezing rain and sleet fell throughout western, central and northern Virginia Sunday evening into Monday morning. This lead to ice buildup on trees and power lines that caused tree limbs to snap and power lines in many locations to break. Roads quickly became ice covered which caused hundreds of accidents. At one point Sunday night, all 67 miles of interstate 77 in Virginia were impassable and part of the Blue Ridge Parkway was closed.

WASHINGTON

King County	01	2000PDT- 2300PDT			0	0	3	0	High Wind

A weather spotter called the Seattle forecast office at 2020PDT and reported southeast winds of 70 to 80 mph. The wind eased to 50 to 60 mph by 2220PDT and continued to decrease. A total of 4,100 customers were without power for a short time. All outages were tree related.

WAZ003,009,008, 012	07	0800PDT- 1900PDT			4	2	4	0	Ice

A semi-trailer truck slid on ice on Interstate 90 near Ellensburg and struck a woman who just stepped out of her car. She slid off the road moments before. A 15 month old was killed in a 2 car collision near Battle Ground. The vehicle the toddler was in slid across the center line of an icy road and struck an oncoming car. A man was killed when two pickup trucks collided on ice covered Highway 2, 2 miles east of Leavenworth. A 4 car collision on an icy road, six miles north of Moses Lake resulted in one death. (F65V)(F01V)(M36V)(M79V)

WAZ012	08	1130PDT			4	0	4	0	Ice

A van slid into the back of a semi-trailer truck that was parked off the side of Interstate 90 near North Bend. At the time of the accident the road was covered with snow and ice with light snow falling. (M71V)(F72V)(M82V)(F76V)

WAZ004,005	09	1200PDT- 1600PDT			0	0	5	0	Coastal Flooding

The combination of extremely high tides and waves 20 feet high, broke through a jetty protecting the city of Westport. The downtown area of the city was flooded with sea water and a large amount of debris.

WAZ012	08 10	1000PDT- 2100PDT			0	0	0	0	Heavy Snow

Heavy snow fell over the Cascade mountains throughout the period. Snowfall totals for the two day period include Mt. Baker with 48 inches, 34 inches at Stevens pass and Snoqualmie Pass with 31 inches.

WAZ001-003,007, 008	10	0000PDT- 1300PDT			0	2	5	0	Heavy Snow

Heavy snow fall was reported over several areas of Washington. Snow fell over north central Washington from midnight to 0800PDT. Four to seven inches of snow accumulated in the valleys during that time. The second area of heavy snow occurred over the Puget Sound basin and southwest corner of the state. Heavy wet snow accumulated to three to seven inches in this area from 0600PDT to 1300PDT. By late morning, up to 50,000 customers were without power. Outages were caused by trees and branches falling under the weight of the snow. A couple was injured when their car slid off snow covered highway 141 near White Salmon.

WAZ003	10	0600PDT- 0900PDT			0	0	3	0	High Wind

High winds associated with the storm that produced the heavy snow, toppled trees and branches onto power lines. The outage affected up to 150 homes.

WAZ009	13	0500PDT- 1200PDT			0	0	3	0	High Wind

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

WASHINGTON Cont'd

Visibilities near zero due to blowing snow forced the closure of most of the east-west roads in the zone. The high wind also knocked out the power over a 100 square mile area involving 14 customers.

WAZ001-003,008 WAZ012	**16 17**	**1500PDT- 0600PDT**			**0**	**0**	**2**	**0**	**Heavy Snow**

A storm system moving up the west coast spread snow over western Washington, the cascade mountains and the east slopes of the cascades. Snowfall totals over the 15 hour time period were generally in the four to eight inch range. Some totals include 4 inches at Yakima, Yelm and Olympia, 5 inches at Wenatchee and 8 inches at Port Orchard. Several homes in the Port Orchard area lost power.

WAZ001	**16**	**1915PDT**			**0**	**0**	**0**	**0**	**High Wind**

A spotter in Enumclaw called the Seattle office with a report of 60 mph east winds.

WAZ006	**19 20**	**0900PDT- 1000PDT**			**0**	**0**	**0**	**0**	**Heavy Snow**

Up to 12 inches of new snow was reported to have fallen over northeast Washington over the 25 hour period.

WAZ012	**20 21**	**0100PDT- 0400PDT**			**0**	**0**	**0**	**0**	**Heavy Snow**

Another storm system dumped heavy snow over the Cascades mountains. Snoqualmie Pass was closed from 0300PDT to 1200PDT due to heavy snow and an avalanche threat. Snowfall totals range from 19 inches at Stampede Pass to 40 inches at Snoqualmie Pass.

WAZ002	**27**	**0900PDT**			**0**	**10**	**4**	**0**	**Ice**

A 32 car pileup occurred on Interstate 90, 12 miles north of Mount Vernon. The pileup occurred because of vehicles sliding on black ice. The interstate was closed for four hours. Ten people were reported to have minor injuries.

WAZ008	**27**	**1515PDT**			**1**	**0**	**3**	**0**	**Ice**

Snow and ice on Interstate 90 was blamed for a 4 car collision near Ellensburg. One young lady was killed. (F23V)

WAZ002	**28**	**0000PDT- 1000PDT**			**0**	**0**	**3**	**0**	**Heavy Snow**

Heavy snow fell over Whidbey Island and the northern Olympic Peninsula. Snow amounts include three to eight inches over north Whidbey Island, six inches at Port Townsend and ten inches at Dabob Bay. Trees in the area snapped under the snow load, interrupting power to 6,000 people.

WAZ002	**28**	**0000PDT- 1000PDT**			**0**	**0**	**3**	**0**	**High Wind**

Northeast winds gusts were 50 to 70 mph in Whatcom county. One notable gust was reported by the public to reach 90 mph. Power was knocked out to 250 customers for several hours.

WAZ006-009	**28 31**	**0400PDT- 2000PDT**			**0**	**?**	**?**	**0**	**Winter Storm**

Heavy snow, strong north winds and extreme cold gripped north central and northeast Washington. Ten to twenty inches of new snow and 20 to 30 mph winds forced the closure of most roads in these counties. Snow drifts four to ten feet high were reported throughout the area with wind chill values to 40 below zero.

WAZ009	**31**	**1100PDT**			**0**	**0**	**5**	**0**	**Heavy Snow**

Heavy snow caused a 40 foot wide section of roof over a loading dock to collapse at Columbia Cold Store. The 22 employees inside escaped without injury.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

WEST VIRGINIA

WVZ009	**02**	**1000EST-**							
Northern	**03**	**0400EST**			**0**	**0**	**0**	**0**	**Heavy Snow**
Mountains									

A strong disturbance in the winds aloft passed across the southern portion of the state late on the 2nd. In its wake, a colder upslope wind from the west and northwest was observed. These features combined to caused seven to ten inches of snow to accumulate above 2200 feet in elevation. The lowest river valleys had three to six inches of accumulation. Snowshoe, Pickens, and Canaan Valley reported 10 inches. Thomas had 9 inches on the ground, while Aurora and Cheat Bridge had 8 inches. Elkins measured 4 inches.

WVZ009-011	**05**	**0000EST-**							
High elevations		**1200EST**			**0**	**0**	**0**	**0**	**Heavy Snow**
of the Northern									
Mountains and									
Potomac Highlands									

Moisture was rung out following a cold frontal passage. Four to eight inches of snow accumulated above 2800 feet in elevation, with only one to three inches of snow along the river valleys.

WVZ005-007-008-	**10**	**0100EST-**							
009-010-0011-012	**12**	**0200EST**			**0**	**0**	**3**	**0**	**Heavy Snow**
WVZ010	**10**	**0300EST-**							
Potomac	**11**	**0900EST**			**0**	**0**	**5**	**0**	**Heavy Snow**
Highlands									
WVZ011	**10**	**0400EST-**							
Eastern		**2300EST**			**0**	**0**	**4**	**0**	**Heavy Snow**
Panhandle									
WVZ001-002	**10**	**1000EST-**							
	11	**0500EST**			**0**	**0**	**0**	**0**	**Heavy Snow**

A storm system developed over South Carolina during the morning of the 10th, then strengthened as it moved northeast to Delaware by dawn on the 11th.

The heaviest snow was over the upper Potomac River Valley, where depths around 2 feet were observed. It was the heaviest snowfall in the Potomac Highlands since February, 1983 and the heaviest to affect West Virginia since April, 1987. Four counties declared a state of emergency on the 11th. Those counties were Grant, Mineral, Hardy and Hampshire. Unofficial reports of thirty to thirty-six inches of snow were received in this region. National Guard troops were called out by the Governor to help clear roads.

Further east, the snow changed to rain across Jefferson, and Berkeley con unties as milder air came west from the Atlantic coast during the afternoon of the 10th. From the Berkeley Springs and Cacapon region of Morgan County on west, the precipitation stayed mainly snow. Poultry houses and 1 barn in eastern Hardy County had their roofs collapse due to the weight of the snow. The roof to a building supply store in Berkeley Springs was also damaged. Many evergreen trees had branches severed. The higher terrain of the northern mountains, the upper Greenbrier River Valley and the northern lowlands around Morgantown, Fairmont and Grafton had a secondary maximum in snowfall.

Snow depths across the higher terrain of the northern mountains increased from 6 inches, prior to the storm, to around 20 inches by 0700EST on the 12th. Six to ten inches of new snow fell on the lower elevations of Pocahontas County. Five to ten inches fell around Fairmont and Morgantown. Three to eight inches of snow were reported over Greenbrier, Fayette, Raleigh, Nicholas, Webster and Wetzel counties, plus the northern panhandle and river valleys around Elkins.

Electrical power was lost to about 15,000 dwellings at the height of the storm. Countywide school systems in at least 2 dozen schools stayed close until the 14th.

Some preliminary maximum snow depths include Petersburg 25 inches, Romney 23, Moorefield 20, Keyser 17, Cacapon State Park 14, Morgantown 10, Fairmnt 8 and Grafton 6.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
WEST VIRGINIA Cont'd									
WVZ0011 and Morgan County Eastern Panhandle	**16**	**0800EST-1200EST**			**0**	**0**	**0**	**0**	**Freezing Rain**
	Icy roads were widespread for several hours.								
WVZ005-007-009	**17-18**	**1900EST-0400EST**			**0**	**0**	**0**	**0**	**Minor River Flood**
	Snow melt and rain combined to cause the Tygart Valley River to crest just over the 17 foot flood stage at Philippi. Minor overflow was seen along the Meadow River, near Rupert. Banks were around three-quarter full occurred on the Cheat River.								
WV007-008 Southeastern Counties	**27-28**	**2230EST-0400EST**			**0**	**0**	**3**	**0**	**Ice Storm**
	Rainfall of .2 to .4 fell with surface temperatures in the upper 20s and lower 30s. Besides the usual travel difficulties, fallen tree branches damaged a few cars. No widespread power outages were reported.								
Jefferson County Charles Town	**01-31**								**Record Precipitation**
	The 7.6 inches of precipitation is the most measured for any December on record in this eastern panhandle community.								
WISCONSIN									
WIZ011-012-05-016-019- Southcentral and Eastcentral Wisconsin	**09-10**	**Afternoon into Morning**			**0**	**0**	**?**	**0**	**Heavy Snow**
	A snowstorm dumped between 6 and 9.5 inches of snow over portions of south central and east central Wisconsin. The snow caused numerous accidents and closed or delayed the opening of many schools. Snow amounts included 9.5 inches in Fox Lake (Dodge county), 8 inches in Horicon (Dodge county) and Berlin (Green Lake county), and 7.5 inches at Portage (Columbia county).								
WIZ001-002- Lake Superior Snow Belt	**30-31**	**Night into Morning**			**0**	**0**	**?**	**0**	**Heavy Snow**
	Heavy snow squalls deposited up to 9 inches of snow in the Lake Superior snowbelt counties of Douglas, Bayfield and Iron. Some snowfall measurements included 9 inches at Bayfield (Bayfield county), 8.5 inches at Hurley (Iron county), and 6 inches at Poplar (Douglas county).								
WYOMING									
WYZ01-02-03-08 09-23-24	**01-02**	**1400MST-1200MST**			**0**	**0**	**0**	**0**	**Heavy Snow**
	A storm out of the Pacific Northwest brought fifteen to twenty-five inches of snow to the Teton Mountains and Yellowstone Park. Six to ten inches of snow was reported from Afton and Jackson.								
WYZ50-51	**03-04**	**1800MST-0600MST**			**0**	**0**	**0**	**0**	**Heavy Snow**
	The northern Big Horn Mountains and the foothills received heavy snow during the night. Ten to twelve inches of snow was collected in the Big Horns. Story noted 9 inches while Sheridan reported 5 inches form this storm.								
WYZ12-13	**03-04**	**2300MST-0800MST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

WYOMING Cont'd

An upslope flow brought 9 inches of snow to the Lander area during the early morning hours.

WYZ22-59-60	03 04	2000MST- 0800MST			0	0	0	0	Heavy Snow

Some five to eight inches of snow was collected at Casper and Douglas with a foot of snow at Casper Mountain during the earlier morning hours.

WYZ01-02-08-09 23-24-25-26-27	08 09	1800MST- 1330MST			0	0	0	0	Heavy Snow

A large storm brought good moisture to western Wyoming. Up to nearly 3 feet of snow fell in Yellowstone Park with four to six inches in the lower valleys of western Wyoming.

WYZ63-64-65-59 67-71-72	08 09	2330MST- 2300MST			0	0	0	0	High Winds

Strong winds occurred most of the night and day from Rawlins east to Cheyenne. Wind gusts to 69 miles an hour were logged at Rawlins.

WYZ22-59-63-64- 65	10	1430MST- 2230MST			0	0	0	0	High Winds

Strong winds through the afternoon and evening hours. Wind gusts to 70 miles an hour were noted at the Rawlins airport and gusts to 55 miles an hour at the Casper airport.

WYZ22-59	11	0400MST- 1000MST			0	0	0	0	High Winds

Strong gusty winds around the Casper area during the early morning hours. Wind gusts to 60 MPH were common at the Casper airport.

WYZ01-02-03-04- 05-06-08-09-10-12 17-18	11	2000MST- 1600MST			0	0	0	0	Heavy Snow

Heavy snow was reported from northwest Wyoming during the night and during the day. Some portions of Yellowstone Park collected twelve to fourteen inches of snow with six to eight inches of snow in Cody and Worland.

WYZ52-53-54- 56-21-22-59- 60-61-62-68 69-70	12	0600MST- 2310MST			0	0	0	0	Heavy Snow

A winter storm brought six to twelve inches of snow to much of eastern Wyoming during the day. The town of Redbird in eastern Niobrara county collected one of the larger amounts with 20 inches. Douglas in Converse county measured 13 inches of new snow.

WYZ59-22	15	0300MST- 1250MST			0	0	0	0	Heavy Snow

Casper Mountain collected five to six inches of snow.

WYZ63-64-65	16	2100MST- 2330MST			0	0	0	0	High Winds

Winds near Elk Mountain were gusts up to 60 MPH.

WYZ20-22-59- 64-65	16 17	2300MST- 0900MST			0	0	?	0	High Winds

Wind gusts up to 71 MPH in the Casper area reduced visibilities and made snow drifts to 6 feet. Strong winds were common to the central and south central portion of the state with the road closed from Casper to Rawlins. Rawlins airport reported wind gusts to 63 miles an hour.

WYZ27-28-12	17	0900MST- 2130MST			0	0	0	0	Heavy Snow

A small scale storm brought six to eight inches to the southwest portion of the state. Pinedale reported six to eight inches and South Pass City collected 6 inches of new snow.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

WYOMING Cont'd

WYZ20-22-59-60-68 69-67-63-64-65	**20**	**0500MST-2000MST**			**0**	**0**	**?**	**0**	**High Winds**

Very strong winds continued in central and south central Wyoming from early morning through the evening. The east side of Casper reported wind gusts up to 75 MPH. Arlington on Interstate 80 logged wind gusts to 76 MPH.

WYZ67-68-69-70-71-72-73	**21**	**0030MST-1430MST**			**0**	**0**	**?**	**0**	**High Winds**

Winds of 30 to 40 MPH continued through the early morning and day in southeast Wyoming. A wind gust was up to 87 MPH was reported from the Wheatland area with window damage. Winds at the Cheyenne airport gust up to 71 MPH.

WYZ01-02	**21**	**0800MST-1930MST**			**0**	**0**	**0**	**0**	**Heavy Snow**

A Pacific storm brought eight to eleven inches of new snow to Yellowstone Park during the day.

WYZ01-02-03-08-09-24	**22**	**0100MST-0800MST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Up to 14 inches of additional snow was reported from the higher elevation of northwest Wyoming. Four to six inches of snow and gusty winds noted in the valleys.

WYZ63-64-65-66-67-68-69-70-71-72	**22**	**0830MST-1930MST**			**0**	**0**	**0**	**0**	**High Winds**

Strong and gusty winds were common to south central and southeast Wyoming during the day and early evening. Wind gusts to 90 miles an hour were reported by the Wyoming Highway Department south of Wheatland during the morning. Wind gusts 70 miles an hour were noted at Arlington on Interstate 80.

WYZ65	**23**	**1400MST-1800MST**			**0**	**0**	**0**	**0**	**High Winds**

Wind gusts to 65 MPH reported from Arlington on Interstate 80.

WYZ63-64-65	**26**	**0600MST-1300MST**			**0**	**0**	**0**	**0**	**High Wind**

Winds 30 to 40 miles an hour were common most of the day in south central Wyoming. Wind gusts to 64 MPH were logged at the Rawlins airport and wind gusts to 60 MPH at Arlington.

WYZ01-02-08-09	**29**	**0800MST-1945MST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Four to eight inches of new snow was noted in northwest Wyoming during the day.

WYZ01-02-03-08-09-23-24-25-29	**29 30**	**2200MST-0930MST**			**0**	**0**	**0**	**0**	**Heavy Snow**

Four to six inches of snow was reported in the western portion of the state. Afton, in the Star Valley collected 6 inches of snow as did Evanston in the southwest corner.

Sweetwater County Rock Springs Airport	**30**	**0010MST**			**0**	**0**	**?**	**0**	**Thunderstorm Winds (G78)**

A cold front with a line of thunderstorms brought a sudden gust of wind to the airport. Only minor damage was reported from the airport with no damage a few miles away in the downtown area.

ALASKA, Northern

None reported.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

ALASKA, Southern

South Central Alaska — **01** — 0 ? 7 ? — **High Winds**

A strong low developed north of Japan early November 29th and moved east-northeastward reaching western Norton Sound by 0400 AST December 2. The storm reached maximum depth of 954 mb at 0400 AST December 1 over the southern Bering Sea north of Adak. A strong front crossed over the southwest Alaska coast about 0700 AST December 1. Wind gusts to 40 mph began on the hillside of east Anchorage about this time. The wind speed increased throughout the day. Damage reports began to arrive between 1600 AST and 1900 AST December 1. Maximum wind speeds occurred between 1800 AST December 1 and 0400 AST December 2. This was a windstorm of historical proportion for Anchorage. Wind gusts were clocked at 110 mph and did an estimated $6 million of damage. This storm was unusual in that destructive winds struck all of Anchorage and were not confined to east Anchorage. Wind damage occurred all over the city. Trees down, shingles torn away, portions of roofs lost, small airplanes tossed about, widespread power outages and utility poles severed. The heaviest damage occurred in the down slope zone along Muldoon Road. This coincides well with past windstorms. The areal extent of the damage was the most unique aspect for this storm in that damaging southeast winds occurred over west Anchorage as well.

South Central Alaska — **03** — 0 ? ? ? — **Heavy Snow**

A 985 mb low moved into Prince William Sound on the morning of the December 3 dropping ten to fifteen inches of snow over the area.

Pribilofs, Alaska Peninsula, Kodiak Island — **12-13** — 0 ? ? ? — **High Wind, Snow**

A large low moved east northeast from the north Pacific to about 240 miles south southwest of Kodiak Island and deepened to 950 mb by 1500 AST on the 12th. Peak wind gusts of 81 mph were recorded at Dutch Harbor during the late afternoon and early evening of the 12th with 65 mph gusts occurring from 1200 AST to 1900 AST. gusts to 50 mph were recorded along the Alaska Peninsula. Sustained winds of 56 mph with gusts to 78 mph were recorded at Sitkinak airport on the evening of the 12th. Kodiak State Airport recorded a peak gust of 55 mph at 1918 AST. On the 12th Homer recorded 50 mph wind gusts on the evening of the 13th. This low pulled the coldest air of the season across the Bering Sea and Pribilofs. Afternoon temperatures dropped into the lower teens at St. Paul. Winds 25 to 35 mph with snow and blowing snow reduced visibilities between .25 and 1 mile for most of the late afternoon and evening. Wind chills were as low as 35 below at times. Snow fell across all of the areas mentioned above, however, amounts were not particularly heavy. The strongest winds with this low appeared to be in the south and western quadrants away from land.

Prince William Sound — **26** — 0 ? ? 0 — **High Wind**

Strong high pressure over the southeast interior of the state and lower pressure in the Gulf of Alaska resulted in northeast winds that was recorded between 70 and 80 mph across Valdez. Even higher wind gusts occurred over the Copper River Delta farther to the east.

ALASKA, Southeastern

None reported.

HAWAII

Kauai — **04** — **0300HST** — 0 0 5 0 — **Flash Flooding**

Heavy rains overnight bring streams on Kauai to bankfull or slight overflow. Also minor flash flooding mainly along windward and north shore.

PACIFIC

Johnston Atoll — **18** — **1800LST** — 0 0 5 0 — **Wind**

Heavy thunderstorm squalls cause minor damage on Johnston Atoll. Rainfall in excess of four inches causes minor flooding on island.

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm

PUERTO RICO

Loiza	**08**	**0750AST**			**0**	**0**	**2**	**0**	**Coastal Flooding**
	High swells flooded road # 187 from Pinones to Loiza making it impassable.								
Vieques	**08**	**1720AST**			**0**	**0**	**0**	**0**	**Waterspout**
	Two waterspouts were reported over the waters just north of Vieques.								
San Juan	**15**	**2115AST**			**0**	**0**	**5**	**0**	**Flash Flood**
	A heavy rain event developed across the metropolitan area of San Juan resulting in urban flooding afecting the neigborhoods of Barrio Obrero, Puerto Nuevo, cuntry Club, Florencia and San Jose. A total of 30 houses were afected. Property damages were estimated in around 90,000 dollars.								
Loiza	**16**	**0400AST**			**0**	**0**	**2**	**0**	**Coastal Flooding**
	Road #187 from Pinones to Loiza affected by high swells.								
Canovanas and Aguas Buenas	**26**	**1500AST**			**0**	**0**	**3**	**2**	**Landslides/ Minor Flooding**
	Heavy rains in Canovanas and Aguas Buenas area resulted in landslides and minor flooding. Road #985 at Km 6.7 and road #174 were affected by landslides and fallen trees.								
Rio Grande and Luquillo	**29**	**1900AST**			**1**	**0**	**4**	**0**	**Flash Floods Landslides**
	Several roads and comunities in eastern Puerto Rico affected floods. Several rivers were out their banks. At Barrio Pitahaya in Luquillo two men were overtaken by a swollen river. One man was able to save his life but the other man drowned. (M24O)								
Fajardo	**30**				**0**	**0**	**5**	**0**	**Flash Flood**
	Forty homes were affected by water in Barrio San Pedro in Fajardo as a result of heavy rains. Rio Fajardo overflowed and flooded La Alambra neigborhood. The estimated damages were around 50,000 to 60,000 dollars.								
Ponce	**31**				**0**	**0**	**4**	**0**	**Urban Flooding**
	Thunderstorms with heavy rains developed over Ponce in the south section of Puerto Rico resulting in urban flooding.								

VIRGIN ISLANDS

None reported.

STORM SUMMARY

DECEMBER 1992

TYPE	ALABAMA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	FLORIDA	GEORGIA	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND & DC	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE
TORNADOES											0	0			0												
Number				17				1								2											
Days				7				1								1											
Deaths				0				0								0											
Injuries				6				0								4											
Property Damage				5				0								?											
Crop Damage				4				0																			
HAIL																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
THUNDERSTORM WINDS																											
Deaths		0						0								0						0					
Injuries		0						0								0						0					
Property Damage		4						4								3						5					
Crop Damage		0						0								0						0					
HIGH WINDS																											
Deaths				0	0	0	0	0		0							0	1	0		0			0		0	0
Injuries				2	1	0	0	0		0							0	1	0		0			0		0	0
Property Damage				5	0	?	3	6		4							?	4	6		?			5		3	?
Crop Damage				0	0	0	0	0		0							0	0	0		0			0		0	0
LIGHTNING																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
FLASH FLOODS																											
Deaths	0		0	0																							
Injuries	0		0	0																							
Property Damage	?		5	5																							
Crop Damage	?		0	0																							
FLOODS																											
Deaths		0				0	0						0	1					0				1				
Injuries		0				0	0						0	1					0				0				
Property Damage		?				8	3						4	5					7				6				
Crop Damage		0				0	0						0	5					0				2				
HEAVY SNOWSTORMS AND BLIZZARDS @																											
Deaths				3		1							0							0	0			0	0	0	0
Injuries				5		0							0							0	0			0	0	?	0
Property Damage				6		?							4							3	?			4	?	0	?
Crop Damage				0		0							0							0	0			0	?	0	0
ICE STORMS #																											
Deaths		1							0																0		
Injuries		10							0																0		
Property Damage		6							5																?		
Crop Damage		0							0																?		
HURRICANES AND TROPICAL STORMS																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
ALL OTHERS																											
Deaths				1			0			0			0	0					0								
Injuries				13			0			2			0	23					20								
Property Damage				4			3			?			3	4					0								
Crop Damage				0			0			0			0	0					0								

SEE REFERENCE NOTES FOR STORM DAMAGE CATEGORIES

TYPE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING	ALASKA	HAWAII	PACIFIC	PUERTO RICO	VIRGIN ISLANDS	NATIONAL & DEATHS	INJURY TOTALS
TORNADOES					0																	≠				0		
Number																												
Days																												
Deaths																											0	
Injuries																											6	
Property Damage																												
Crop Damage																												
HAIL																												
Deaths																												
Injuries																												
Property Damage																												
Crop Damage																												
THUNDERSTORM WINDS																												
Deaths	0								0					0							0						0	
Injuries	0		0						0					0							0						0	
Property Damage	?		5	1					?					4							?							
Crop Damage	0		0	0					0					0							0							
HIGH WINDS																												
Deaths	2	0	0	1				0	0	0		0	1	0	0	0	0	0			0			0			5	
Injuries	?	0	0	0				0	0	0		0	0	0	2	0	1	0			0			0			5	
Property Damage	6	5	5	5				5	7	?		5	3	6	0	5	4	4			?			5				
Crop Damage	0	0	0	0				0	0	0		0	0	0	0	0	0	0			0			0				
LIGHTNING																												
Deaths							0								0												0	
Injuries							0								0												0	
Property Damage							4								5													
Crop Damage							0								0													
FLASH FLOODS																												
Deaths				0		0																	0		1		1	
Injuries				0		0																	0		0		0	
Property Damage				2		5																	5		5			
Crop Damage				0		0																	0		0			
FLOODS																												
Deaths	0		0			0			0	0	0						1	0									3	
Injuries	0		0			0			0	0	0						7	0									8	
Property Damage	?		5			4			?	?	?						5	5										
Crop Damage	0		0			0			0	0	0						0	0										
HEAVY SNOWSTORMS AND BLIZZARDS @																												
Deaths		1	0			0		0	0			1	1	0		0		0	0	0							7	
Injuries		0	1			0		?	0			?	0	0		0		2	0	?							8	
Property Damage		5	5			5		0	7			0	2	4		4		6	5	0								
Crop Damage		0	0			0		0	0			0	0	0		0		0	0	?								
ICE STORMS #																												
Deaths	0	0	0	0							0		2	0		0			0								3	
Injuries	0	110	0	0							0		19	0		0			0								139	
Property Damage	?	0	5	3							6		0	5		5			3									
Crop Damage	0		0	0							6		0	0		0			0									
HURRICANES AND TROPICAL STORMS																												
Deaths																												
Injuries																												
Property Damage																												
Crop Damage																												
ALL OTHERS																												
Deaths	0		1	0					0							0	1	9							0		12	
Injuries	75		75	0					0							0	0	12							0		220	
Property Damage	8		0	4					?							4	5	5							3			
Crop Damage	0			0					0							0	0	0							2			

SEE REFERENCE NOTES FOR STORM DAMAGE CATEGORIES

STORM DAMAGE CATAGORIES

1 Less than $50
2 $50 to $500
3 $500 to $5,000
4 $5,000 to $50,000
5 $50,000 to $500,000
6 $500,000 to $5 Million
7 $5 Million to $50 Million
8 $50 Million to $500 Million
9 $500 Million to $5 Billion

REFERENCE NOTES

0/Blank	None reported.
*	Miles instead of yards.
**	Yards instead of miles.
@	Includes heavy sleet storm.
#	Freezing drizzle and freezing rain, commonly known as glaze.
≠	Report incomplete.
##	Report not received.
o/c	Indicates Crop Damage amount is included in the value given for property damage.

When reports are not received or are incomplete, the Storm Summary National Death and Injury totals may also be incomplete.

Definition of Fujita Tornado Scale (F scale)

(F0) Gale tornado (40-72 mph): Light damage
Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage sign boards.

(F1) Moderate tornado (73-112 mph): Moderate damage
The lower limit (73 mph) is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads.

(F2) Significant tornado (113-157 mph): Considerable damage
Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.

(F3) Severe tornado (158-206 mph): Severe damage
Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.

(F4) Devastating tornado (207-260 mph): Devastating damage
Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.

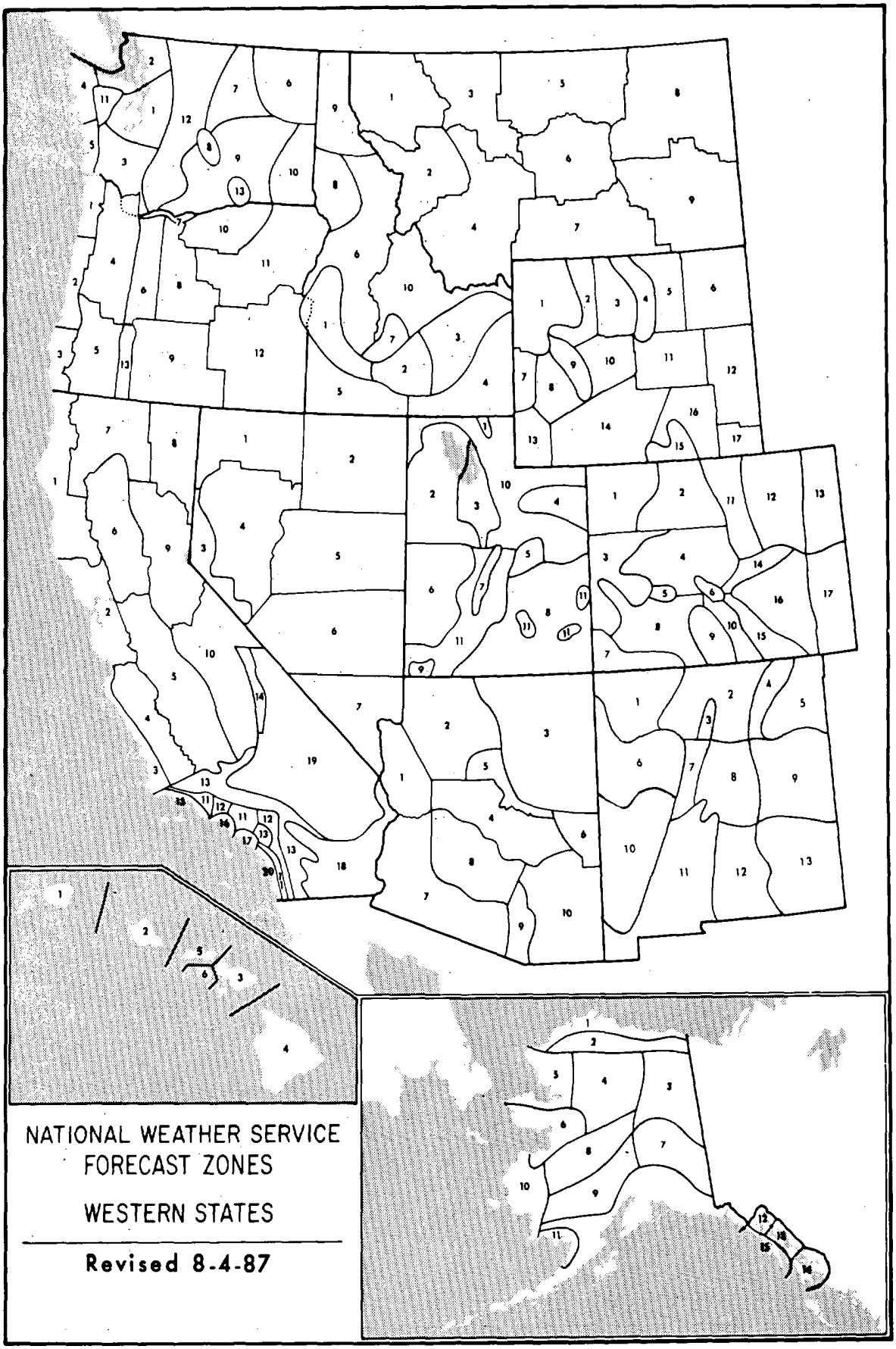
(F5) Incredible tornado (261-318 mph): Incredible damage
Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 m; trees debarked; incredible phenomena will occur.

(F6-F12) (319 mph to Mach 1, the speed of sound): The maximum wind speeds of tornadoes are not expected to reach the F6 wind speeds.

(F0+F1) Weak Tornado
(F2+F3) Strong Tornado
(F4+F5) Violent Tornado

From J. Atmos. Sci., August 1981, p. 1517-1519

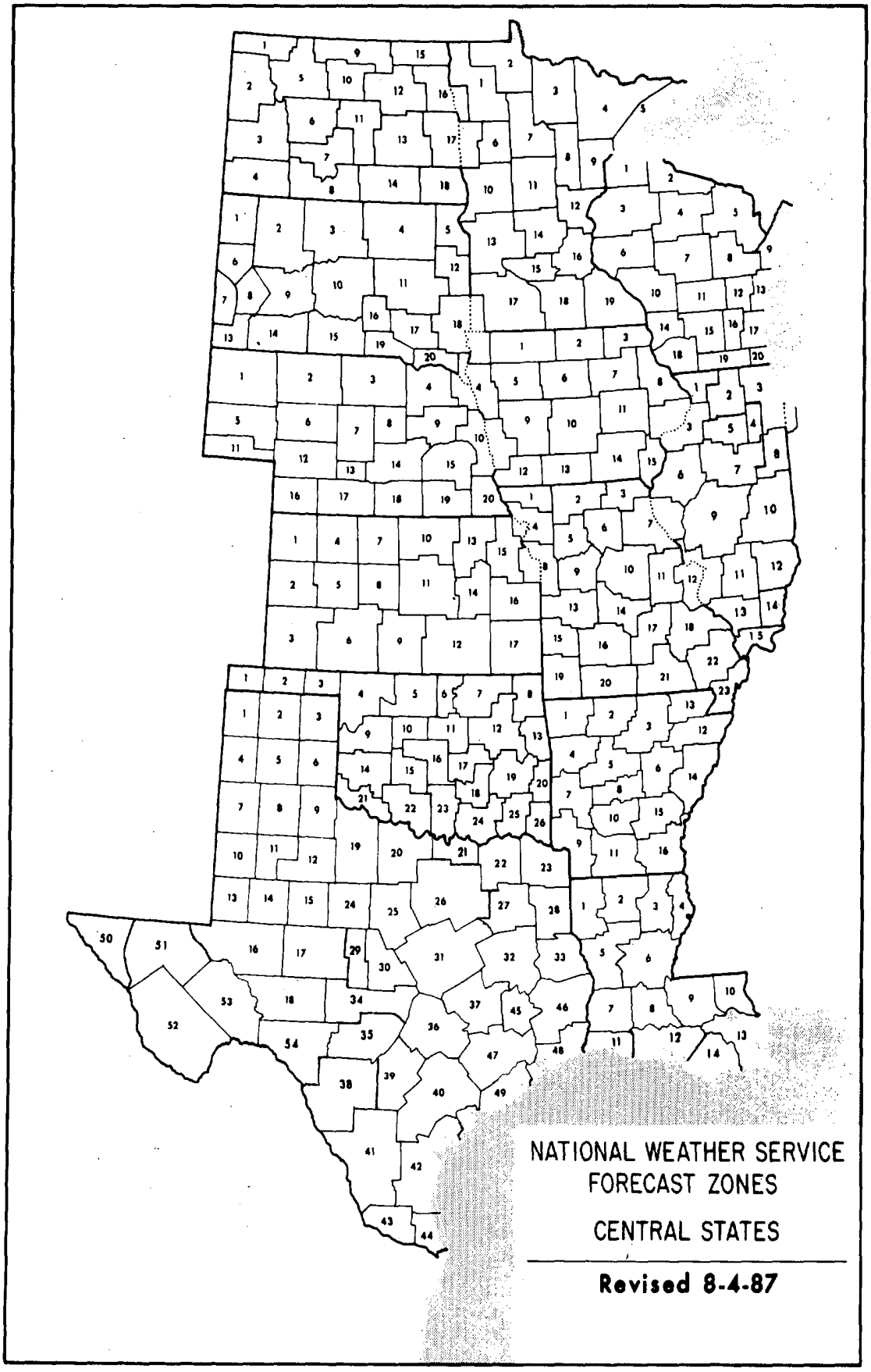
USCOMM-NOAA-ASHEVILLE, N.C. 1993-1450

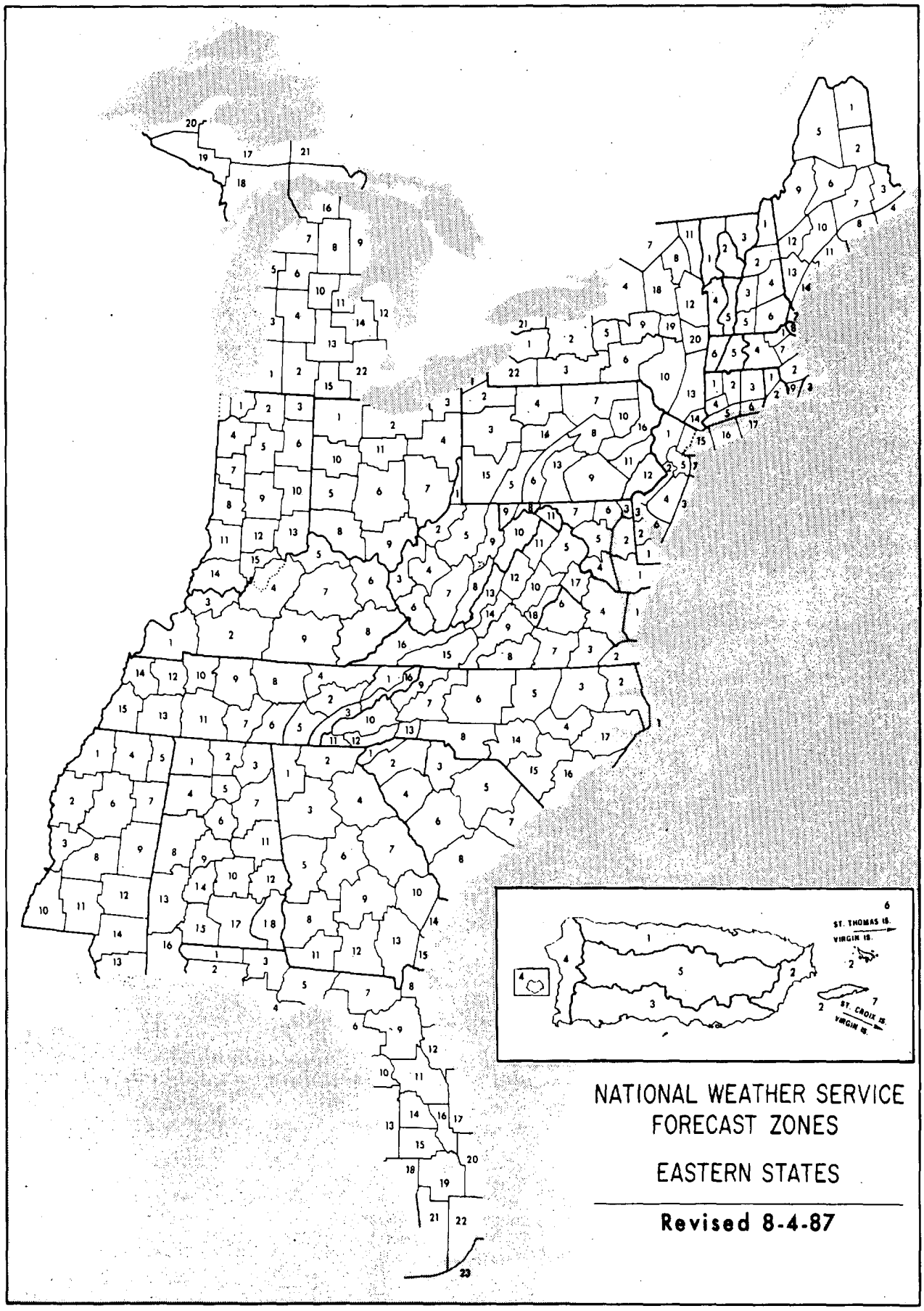


NATIONAL WEATHER SERVICE
FORECAST ZONES

WESTERN STATES

Revised 8-4-87


NATIONAL WEATHER SERVICE
FORECAST ZONES
CENTRAL STATES
Revised 8-4-87



NATIONAL WEATHER SERVICE FORECAST ZONES

EASTERN STATES

Revised 8-4-87

NATIONAL SUMMARY OF TORNADOES, 1992

WILLIAM ANGEL
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE
NATIONAL CLIMATIC DATA CENTER

The 1992 tornado season began on January 6th at 1408 MST in Phoenix, AZ. The tornado caused some roof damage. There were a total of 1303 tornadoes that occurred during the year. Thirty-nine deaths and 1300 injuries resulted from the storms. Eighteen of those deaths and 50 of the injuries occurred during the destruction or damage of 350 mobile homes. There were no tornadoes activity in Hawaii, Maine, New Hampshire, Rhode Island, or Vermont.

TABLE I. LOCATION OF KILLER TORNADOES

DATE	STATE	COUNTY	TOTAL DEATHS
March 10	Alabama	Hale	2
March 10	Mississippi	Lauderdale	3
June 16	Minnesota	Murray	1
August 25	Louisiana	St. John the Baptist	2
August 29	Wisconsin	Waushara	1
October 3	Florida	Pinellas	4
November 21	Mississippi	Rankin	10
November 22	Georgia	Lumpkin	1
November 22	Georgia	Putnam	4
November 22	Georgia	Greene	1
November 22	Kentucky	Carroll	1
November 22	Mississippi	Leake	1
November 22	Mississippi	Choctaw	1
November 22	Mississippi	Webster	2
November 22	Mississippi	Kemper	1
November 22	South Carolina	Saluda	1
November 22	Tennessee	Hardeman	1
November 23	North Carolina	Orange	2
			39

TABLE II. NEW MONTHLY RECORDS (SINCE 1953)

MONTH	STATE	RECORD # OF TORNADOES	PREVIOUS RECORD (YEAR)
February	Arizona	3	2 (1978)
March	Nevada	2	0
May	New Mexico	11	10 (1957)
June	Colorado	59	33 (1990)
June	Kansas	55	54 (1955)
June	Minnesota	29	17 (1979)
June	New Jersey	3	2 (1972)
June	Ohio	44	15 (1975)
June	Pennsylvania	20	8 (1954)
June	Texas	66	63 (1989)
July	Alaska	1	0
July	Delaware	5	1 (1991)
July	Illinois	9	7 (1972)
July	Indiana	14	9 (1961)
August	Alabama	3	1 (1976)
August	Colorado	6	5 (1974)
August	Louisiana	6	4 (1954)
August	Maryland	11	2 (1967)
August	Mississippi	27	2 (1971)
August	Tennessee	3	1 (1980)
August	Utah	2	1 (1990)
September	Minnesota	9	6 (1964)

TABLE II. NEW MONTHLY RECORDS (SINCE 1953) Cont'd

MONTH	STATE	RECORD # OF TORNADOES	PREVIOUS RECORD (YEAR)
September	New York	4	2 (1973)
September	Oklahoma	16	9 (1970)
October	Wisconsin	4	2 (1962)
November	Georgia	15	6 (1989)
November	Indiana	15	7 (1965)
November	Kentucky	4	3 (1973)
November	Louisiana	30	12 (1957)
November	Mississippi	15	13 (1973)
November	North Carolina	16	2 (1954)
November	South Carolina	4	3 (1975)
December	California	17	1 (1952)

TABLE III. NEW ANNUAL RECORDS (SINCE 1953)

STATE	RECORD # OF TORNADOES	PREVIOUS RECORD (YEAR)
California	20	16 (1991)
Colorado	81	76 (1991)
Delaware	6	5 (1975)
Louisiana	79	72 (1990)
Maryland	13	10 (1990)
Minnesota	39	34 (1968)
New York	25	16 (1990)
Ohio	61	43 (1973)

TABLE IV. STATE-TO-STATE BORDER CROSSINGS

DATE	STATE		STATE
June 18	Indiana	into	Kentucky
July 31	Pennsylvania	into	New Jersey
September 18	Indiana	into	Kentucky
November 22	Alabama	into	Georgia
November 22	Kentucky	into	Indiana
November 22	Georgia	into	South Carolina

JANUARY 1992

ARIZONA

The first tornado of 1992 occurred on January 6th at 1408 MST in Phoenix, Arizona. The tornado caused roof damage at 41st Street and Baseline. An apartment complex at 35th Street and Baseline sustained roof damage.

FEBRUARY 1992

LOUISIANA

Two tornadoes (F1, F2) struck rural areas 4 miles west of Natalbany, Louisiana, on February 15th at 0005 CST. The F2 tornado produced the most damage. It began about 4.3 miles west-northwest of Natalbany and moved east-northeast for about 0.8 mile. The tornado destroyed eight single-family homes and three mobile homes. Six single-family homes and three mobile homes were heavily damaged. Estimated property damage was between $1.5 and $2 million. The second tornado began about 3.7 miles west of Natalbany. The damage from this tornado consisted of numerous broken large pine trees.

MARCH 1992

MISSISSIPPI

An F3 tornado occurred March 10th at 0057 CST in Lauderdale County, Mississippi. The tornado touched down along Highway 11, 1 mile south of Savory and 8 miles south-southwest of Meridian. A total of 255 dwellings were damaged or destroyed, mostly in the Zero community. Twenty-three homes and forty-seven mobile homes were totally destroyed. Forty-six homes and nineteen mobile homes sustained major damage. One hundred homes and twenty mobile homes had minor damage. One school sustained major damage in Vimville. Timber damage was estimated at $1.8 million and damage to power poles and lines was estimated at $0.5 million. Three people, all in mobile homes, were killed by this tornado. These were the first fatalities of 1992.

ALABAMA

Another F3 tornado touched down on March 10th at 0205 CST in Green County, Alabama. The tornado crossed the Black Warrior River and continued across Hale County Road 35 where a woman was killed when her mobile home was destroyed. It continued northeast crossing State Road 69, then State Road 25 about 2 miles south of Greensboro. At State Road 25, one house was destroyed and a one-year-old boy was killed. Total path length was approximately 18 miles.

APRIL 1992

MICHIGAN

An F2 tornado touched down April 16th at 1503 EST in a mobile home park north of Michigan Highway 14 and west of Ridge Road near Plymouth, Michigan. Six mobile homes were demolished and fourteen heavily damaged. Four people were injured, all residents of the park. Estimated damage to the mobile homes was $1 million.

MAY 1992

OKLAHOMA

A major severe weather outbreak occurred on May 11th, with many reports of large hail and strong winds. In addition, 22 tornadoes (7 FOs, 6 F1s, 7 F2s, 1 F3, 1 F4), and isolated flash flooding occurred across large sections of central and eastern Oklahoma. Listed below are reports of selected tornadoes.

The eighth tornado developed 1 mile to the north of the seventh tornado (an F1 near Tupelo) as an F1 moving southeast. These tornadoes merged 3 miles north of Tupelo. After the merger, the tornado grew rapidly to F3 intensity and moved east-northeast for another 12 miles. Twelve homes were damaged or destroyed, numerous barns and sheds were destroyed, as well as several trucks and a recreational vehicle. The recreational vehicle was tumbled a distance of two blocks by the winds. There was only one injury.

The 11th tornado of the afternoon was a violent F4 tornado that moved along a 10-mile-long path from 3 miles northwest of Kiowa to 4 miles southeast of Savannah in Pittsburgh County. The tornado destroyed two houses and two barns. Four homes sustained major damage and several others had minor damage. Two concrete electrical transmission poles were pulled from their footings. A 500-gallon propane tank three-quarters full was thrown 0.5 mile. Three occupants of a mobile home were seriously injured by this tornado.

The 12th tornado was the most damaging of the afternoon. The F2 tornado touched down along the western edge of Kingston and moved east through the town. Along the tornadoes 2-mile path it severly damaged in 38 structures. 7 of the structures were businesses. Total damage in the town was estimated at $1 million. Fifty percent of the businesses in the town were destroyed. Thirteen people were injured in the Kingston tornado, two seriously enough to require hospitalization.

JUNE 1992

MINNESOTA

Tornadic thunderstorms developed over southwestern portions of Minnesota during the late afternoon of June 16th and moved slowly northeastward across the area. Two violent twisters roared across Murray County and caused devastating damage in the Chandler and Lake Wilson areas. Half of the town of Chandler was leveled, 35 people were injured, and an 81-year-old woman died 2 months later due to injuries caused by the tornado. Damage estimates in Chandler and Lake Wilson alone topped $27 million with an estimated $17 million damage to rural areas within Murray County. Renville and Redwood Counties were also hard hit by tornadoes and strong thunderstorm downburst winds. Total damage estimates in these counties ranged from $10 to $12 million. A tornado embedded within a line of thunderstorms tore through the town of Cokato (Wright County) injuring eight people and causing extensive damage to the downtown area. Total damage estimates in Wright County topped $15 million. Another strong tornado ripped through the town of Clarkfield (Yellow Medicine County) injuring six people and causing an estimated $7 million in damage. Another $6 million damage was estimated to have occurred in rural areas of the county. Flooding occurred in the Dawson area of Lac Qui Parle County due to a 2 day rain of 4- to 6-inches. The National Guard assisted in the cleanup after the storms moved through the communities of Chandler, Lake Wilson, Cokato, Clarkfield, and Delhi (Redwood County). Power lines across 11 counties in southwestern and central Minnesota sustained eleven million dollars damage. Over 150,000 acres of crops were affected as the storms moved across southern portions of Minnesota. (F81P)

NEBRASKA

A tornado rated at F3 occurred on June 15th in Seward County, Nebraska, at 2115 CST. It damaged or destroyed property on 22 farms and derailed a train west of Pleasant Dale. One man sustained minor injuries when his home was destroyed shortly before the tornado lifted northeast of Garland. Property damage estimates ranged from $5 to $9 million and crop damage was estimated at $1.5 to $2 million.

JULY 1992

MICHIGAN

A F2 tornado, occurred near Dowagiac, Michigan, on July 13th at 2114 EST. It touched down 4 miles northwest of Dowagiac and moved northeastward. A total of 39 buildings were damaged 14 of which were mobile homes, 22 wood frame homes, and 8 commercial buildings. One migrant worker camp housing 74 workers was destroyed. Nearly 500 acres of agriculture farmland was damaged. Twenty-five people were injured in this storm.

PENNSYLVANIA

A tornado, rated at F2 intensity, touched down at 1607 EST on July 15th in Schuylkill, Pennsylvania. It did considerable damage along a mile-and-a-half-long path which was 100 to 150 feet wide. One house and one mobile home were destroyed in Kelayres. Along the entire path, 15 homes and 5 apartments received major structural damage. Minor structural damage was done to another 23 homes, 7 apartments, and 5 commercial buildings. Sheds and garages were blown away and public buildings damaged. The roof and chimney of the township municipal building was destroyed. Many fences, awnings, and porches were blown away and numerous automobiles were damaged by flying or falling debris. Trees were uprooted or broken all along the path. Many limbs were also broken.

INDIANA

An F3 tornado occurred on July 30th at 2010 EST in Johnson County, Indiana. The path of the tornado was intermittent. West of Ninevah, where the tornado briefly attained F3 intensity, one house was destroyed and the roof was ripped off of a second home. In the house that was destroyed, a mother and her child took refuge under a bed, and escaped with minor injuries when the house collapsed around them. In and around Ninevah, the tornado also damaged several other houses, flipped over a mobile home, and threw a horse trailer and some farm equipment 50 to 100 yards. The tornado moved east across the northern part of Camp Atterbury, and ripped the roof off a gymnasium and damaged two other buildings. Twenty-two National Guard soldiers, who were on maneuvers at the camp, were injured. The tornado moved east into Edinburgh before dissipating. Numerous trees were downed in Edinburgh; the roof was blown off a house, and windows were blown out of a building. A school administration building was damaged by a fallen tree. One person was injured by flying debris in Edinburgh. The tornado damaged a total of 30 houses, with 5 houses sustaining major damage. The most significant damage was in the Ninevah area. Damage in Camp Atterbury was estimated at $250,000, with damage in the Ninevah and Edinburgh areas estimated at $1 million.

AUGUST 1992

LOUISIANA

Andrew spawned 14 tornadoes in Louisiana; the majority of them were weak and brief in duration. A strong tornado rated at F3 intensity was produced on the outer edge of Andrew during the evening of August 25, 1992. The tornado moved rapidly west on an intermittent 9-mile path through LaPlace and Reserve between 2010 CST and 2020 CST, killed two people and injured 32. Both fatalities, a 2-year-old girl and a 63-year-old man, occurred in their Belle Pointe subdivision homes in Reserve. A joint damage survey conducted by the St. John the Baptist Office of Emergency Preparedness and National Weather Service indicated that 66 homes and 33 mobile homes were destroyed; 56 homes or mobile homes sustained moderate damage; and 130 homes or mobile homes had some minor damage. Twenty-five businesses were either destroyed or sustained moderate damage. This includes the River Parishes Hospital which had roof damage and had to be evacuated. Seven public buildings including two schools were damaged. Estimated damages to homes and mobile homes were $6,726,250; businesses, $3,428,500; public buildings, $1,957,500. Agricultural losses to the sugar cane crop were $1 million, and $100,000 to the soybean crop. (M63H) (F02H)

WISCONSIN

A series of severe thunderstorms swept across west-central and central Wisconsin on August 29th. A killer tornado, rated at F3 intensity, traveled along a 28-mile path in Waushara County from north of Coloma to Wautoma to

north of Redgranite to southeast of Poy Sippi. The hardest hit area was just south of Wautoma where a woman was killed when her mobile home was hurled several hundred feet into a parking lot. In addition, 30 people were injured, several critically. The tornado caused over $10 million in damage which included $7.7 million damage to residences and businesses, $1.8 million damage to public property, $400,000 in timber losses to trees and $215,000 in agricultural losses. All together 48 homes were destroyed, 95 sustained major damage and 289 received minor damage. Also, 28 businesses were damaged, as well as a Senior Center and an industrial building which employed handicapped workers. Thousands of trees, spread over 950 acres, were toppled by the tornadic winds. (F66M)

SEPTEMBER 1992

KANSAS

On September 5th, two tornadoes (F1,F2) touched down in Wichita, Kansas. The first tornado, rated at F2 intensity, touched down at 1759 CST and lasted 16 minutes. The tornado touched down about a mile east of the intersection of Interstate 135 and U.S. Highway 54, and continued east 3 miles. The twister took a path on the eastern side of Wichita along Kellogg Street from Bluff to 0.5 mile northeast of Towne East Shopping Mall (near the intersection of Lochinvar and Heather Streets.) The tornado hit one of the most active business districts in Wichita and many businesses suffered heavy damage. The area of damage was bordered on the west by Bluff Street, on the north by Douglas Avenue, on the east by Webb Road, and on the south by Lincoln Street.

Particularly hard hit were several car dealerships, with nearly their entire stock severely damaged. A motel had its entire roof ripped off. A total of eight homes were destroyed, and 47 others heavily damaged in Wichita (by this and another tornado rated at F1 intensity). Towne East Mall took a direct hit. Many cars in the parking lot were damaged, several metal light poles bent to the ground, and roof damage occurred to the building. A woman in the mall was hit by glass when a skylight was knocked out, but she was treated for minor cuts at a hospital and released.

WISCONSIN

A strong F2 tornado, tracked over 8 miles across Green Lake County, Wisconsin, and hit the town of Berlin on September 7th. Along the path, around $1 million in damage occurred to 63 homes, 5 businesses, and 2 factories. Numerous power lines and hundreds of trees were downed. One woman sustained a minor head injury.

OCTOBER 1992

FLORIDA

An F2 tornado formed south of Florida U.S. Highway #688 west of Walingsham Reservoir in Largo (15 WSW Tampa) on October 3rd. It knocked down a few trees, then damaged fences and poles near a school sports facility. Continuing northward, it damaged roofs of several buildings in a shopping center. The storm did severe damage to many mobile homes in the Indian Rocks Mobile Home Park where an elderly woman was killed as her mobile home was demolished. It then moved over a subdivision where it damaged roofs and walls of homes. It weakened considerably while moving north, knocking down trees and ripping shingles off roofs. The tornado damaged the roofs of a fast-food restaurant and a hotel before dissipating. (F80M)

Another tornado, an F3, formed near the intersection of Florida U.S. Highway #693 and the Seaboard Coast Line Railroad (13 SW Tampa) and toppled trees south of the tracks. It moved north-northeast and did severe roof and wall damage to an apartment complex. Debris from the apartment was blown across the street into a park. Numerous trees were uprooted or broken in the park. It continued north destroying a mobile home and damaging a greenhouse. It then blew roofs off several houses and collapsed some second-story walls. The tornado then strengthened and moved across the Point Royale Village Mobile Home Park. Numerous mobile homes were blown apart. Two people were killed as their mobile homes disintegrated. The tornado then moved across the Beacon Run subdivision where it blew the roofs off numerous homes, and many homes suffered wall damage. One woman was killed by falling debris as her garage roof collapsed on her. The tornado continued north and caused considerable damage to other homes, then damaged the roof and walls of an industrial park building before dissipating. (F72M)(F63M)(F34P)

INDIANA

A tornado, rated at F2 intensity, touched down just south of the air traffic control tower at the Fort Wayne International Airport, and skipped northeast along a 2-mile path on October 8th. Nine people sustained minor injuries. The airport was closed for several hours after the

windows were blown out of the control tower. Five businesses were damaged at the airport, with the roof blown off or damaged at most. Several cars were overturned. The short-lived tornado lifted near the intersection of Airport Drive and the Baer Field Thruway, approximately 1 mile north of the airport.

PENNSYLVANIA

An F2 tornado with winds over 100 mph touched down at least six times along a 6-mile path on October 9th. The path length on the ground was approximately 2 miles and 30 to 100 yards wide in York County, Pennsylvania. Hundreds of large trees were knocked down or snapped off. The tornado went through apple orchards uprooting thousands of trees. Some trees were turned upside down. One block building was demolished and a nearby barn had most of the upper half blown away. The strong winds also tore the siding and chimney off a nearby home. Another barn had significant structural and roof damage. At least five houses had significant roof and siding damage either from the wind or from falling trees. Three farms and about 15 residences had some damage. Several vehicles were damaged by falling walls or flying debris. A truck was thrown into a nearby automobile.

MISSISSIPPI

The tornado touched down near the city limits on the northwestern side of Columbus, Mississippi, on October 10th and moved southeast through the city. Sixteen people were injured, none seriously. Two mobile homes were destroyed and five other homes received damage. Three homes were destroyed and nearly 70 others sustained damage. Thirty to forty businesses were damaged. Mississippi University for Women took a direct hit from the tornado and received major damage. Many trees were blown down or had the tops ripped off. The F2 tornado had a path length of two miles.

NOVEMBER 1992

LOUISIANA

On November 3rd, an F3 tornado stuck Bienville Parish. The tornado began at 1532 CST about 6 miles west of Bryceland. It continued northeast on an intermittent path across open country and through the town of Arcadia before ending about 1.5 miles northeast of Arcadia at 1545CST. Most of the $5,500,000 damage caused by the tornado occurred in Arcadia where 12 homes and 2 businesses were destroyed. Seventy-five homes sustained moderate to severe damage. Another 35 homes and/or businesses received light damage. Fortunately, there was no one killed or injured by the tornado.

On November 21st, three F3 tornadoes touched down in Louisiana. The first F3 tornado moved along an intermittent path that began just southwest of Iowa in Calcasieu Parish around 1930 CST. The tornado continued northeast through Iowa by 1950 CST where it destroyed 5 homes, damaged 14 homes and 4 businesses including an outlet mall. The outlet mall had part of its roof torn off and several I-beams twisted. The outlet mall sustained $100,000 in damage. The tornado crossed Interstate 10 where it caused a three-car accident. Fortunately, only two people received minor injuries in Iowa. The tornado then continued into rural Jefferson Davis Parish before ending in Woodlawn where it destroyed one home and damaged four other homes according to the Red Cross damage survey report.

The second F3 tornado injured six people, destroyed two homes and a mobile home, and blew the roof off of a barn in Monterey around 2145 CST. The Concordia Parish Emergency Management Director estimated property damage in the Monterey area at $128,000; damage to timber was about $200,000.

The third F3 tornado moved rapidly northeast on an intermittent path that began in extreme northeastern Catahoula Parish, in Foules, where it destroyed 12 mobile homes, a church, and damaged three single-family homes. The Catahoula Emergency Management Office said the tornado did an estimated $318,000 to property in the Foules area. Three people were injured in Foules around 2155 CST. The tornado moved into rural Tensas Parish and struck the town of Cooter Point where it destroyed a mobile home, partially destroyed eight homes, and injured six people about 2215 CST. The tornado continued rapidly northeast across the northern part of Tensas Parish before entering rural Madison Parish where it destroyed two mobile homes and three barns. Two homes were heavily damaged and two people injured 4 miles southeast of Tallulah about 2255 CST. The tornado had a path length of 38 miles over a life span of one hour!

SOUTH TEXAS

South Texas experienced a tornadic outbreak on November 21st. The two most powerful tornadoes were rated at F4 and F3 intensities. The F4 tornado touched down at the intersection of Interstate 10 and Beltway 8 in the Channelview area. A supercell spawned this tornado. About a mile north of

touchdown, the tornado widened to a little over 1 mile in diameter and increased to F4 intensity. After travelling about a mile, the tornado diameter decreased to about 200 yards and F2 intensity and remained the same as it would into Liberty County. While in Liberty County, the tornado tracked over mostly open land except several farms and mobile homes were damaged just west of Dayton. One person received minor injuries. In Harris County, over 200 homes were destroyed and up to 1,000 homes received damaged from this tornado. The low number of injuries (16) and no fatalities were truly amazing given the intensity and size of the tornado. The track (30 miles) and damage was surveyed extensively from the air and on the ground by NWS and Haag engineering personnel as well as emergency management officials.

The second most powerful tornado of the outbreak (F3) touched down northeast of Lake Houston and continued along a northeasterly track through northern Liberty County. Damage to residential property occurred in Tarkington, southeast of Cleveland and in the town of "Hoot and Holler," just east of Romayor, where this long track (total of 32 miles) tornado finally ended. The track was surveyed from the air by National Weather Service personnel and on the ground by Liberty County emergency management officials.

MISSISSIPPI

Mississippi experienced one F3 and two F4 tornadoes during the late evening and early morning of November 21st and 22nd. The first tornado, an F3, touched down 8 miles southwest of Carson. It moved into a northeasterly direction and exited the county at 2345 CST along Highway 84, 2 miles east-southeast of Mount Carmel. The tornado then moved to a point 4 miles southwest of Mount Olive at 2355 CST and began to turn more northeasterly. It continued through the town of Mount Olive and lifted 2 miles northeast of town at 0005CST. The path length of the tornado was 27 miles with a life span of 42 minutes!

Five people were injured in Jefferson Davis County. A total of 14 homes were destroyed in addition to numerous downed trees. As the tornado moved along Highway 35, several well-built homes were destroyed. In the Mount Olive community, 32 homes were destroyed and 55 others damaged with over 100 people injured.

The F4 tornado first touched down in northeastern Copiah County 1 mile north of Hopewell and moved northeast across extreme northwestern Simpson County. At 2337 CST, the tornado moved into Rankin County, passing 1 mile southeast of Florence. The tornado moved through the southwestern city limits of Brandon at 2353 CST and continued northeast exiting the county 7 miles east of Sandhill at 0019 CST. Then it moved into extreme northwestern Scott County and into Leake County just north of Ludlow at 0027 CST. It continued across Leake County passing 6 miles west of Carthage and exited the county 1.5 miles north of Barnes at 0056 CST. It then continued through Attala County passing 10 miles east of Kosciusko and exited the county 2 miles east of McCool at 0125 CST. The tornado continued across Choctaw County passing through the town of Weir at 0132 CST, and began to slow its forward speed before dissipating 4 miles southwest of Mathiston at 0201 CST. The path length of the tornado was 128 miles!

As the tornado moved across Copiah, Simpson, and extreme southwestern Rankin Counties, it blew down many trees. The tornado then moved through a mobile home park on the southern side of Florence. There it destroyed several mobile homes and damaged several other residences. Two people were killed in mobile homes in Florence. The tornado then moved toward Brandon. It struck another mobile home park where it destroyed 30 mobile homes and killed four people and injured many more. As the tornado moved through the southern and eastern sides of Brandon, it damaged or destroyed many more houses and mobile homes. It completely leveled a large, well built, brick home in the East Haven subdivision killing four people. In Rankin County, a total of 60 homes were destroyed, over 500 homes were damaged, 10 people were killed, and 98 injured. In Scott County, most of the damage was to trees and power lines. However, there were several houses damaged around Ludlow. In Leake County, the tornado destroyed three homes and damaged nine others. It also destroyed 26 chicken houses and several farm buildings. One death occurred in Leake County in a mobile home in the Pine Tree Community, west of Carthage. In Attala County, 36 homes were destroyed or severely damaged. Twelve people were injured. In Choctaw County 101 homes were damaged or destroyed. One person was killed in a mobile home in Weir and 12 others were injured. In all these counties, timber damage was extensive. The tornado appeared to reach its maximum strength in Brandon where it was rated F4 intensity, but it had much F3 damage all along the path. (M50M)(F04M)(F30M) (F31M)(F39M)(M07H)(M42H)(M10H)(M07H) (F68M)(M05M)(F58M)

The second F4 tornado initially touched down 2 miles southeast of Mize at 0014 CST and moved northeast through the Sylvarena community. The tornado then moved into Jasper County at 0044 CST, 2 miles north of the town of Ted. It continued across the northeast corner of Jasper County through Bienville National Forest and crossed into Smith County 4 miles northwest of Baxter at 0103 CST. The tornado lifted from the southern city limits of Newton at 0114 CST.

This intense tornado also had a large (1 mile) path width that fortunately moved through mainly uninhabited areas. In Smith County, 15 people were injured within Sylvarena. Over 90 homes were destroyed and 1 large church was demolished. Within Jasper County, 3 houses and 4 mobile homes were destroyed and 21 houses and 2 mobile homes were damaged. In Newton County, six homes were damaged, one business and one mobile home were destroyed. Timber loss was well into the millions of dollars.

INDIANA

On November 22nd, five F3 tornadoes struck Indiana. The first tornado touched down in Monroe County destroying three houses, seven mobile homes, and three barns. Two houses sustained major damage, eighteen houses sustained minor damage, and one barn was damaged. The most extensive damage occurred about 2.5 miles north of Elletsville. Three people were injured in a mobile home and a house. One hundred thirty-five acres of corn was also destroyed. Property damage was estimated at $487,700 and crop damage at $66,000.

The second tornado moved mostly through open farm country, but still hit about 50 separate farms in Putnam and Montgomery Counties. Numerous houses were damaged with a few being severely damaged or destroyed. Many barns and outbuildings were also severely damaged or destroyed. West of Fincastle, some dairy calves were killed when the barn they were in collapsed. The tornado also downed numerous trees and telephone poles, and caused extensive damage to the corn crop. About 2,000 acres of corn were destroyed. One person was injured in Putnam County. The tornado crossed into Montgomery County at 1506 EST about 0.5 miles southeast of Parkersburg. Total crop damage was estimated at $700,000. Property damage in Putnam County was estimated at $800,000, with about $500,000 property damage in Montgomery County. The tornado was on the ground for 12 miles and had a life span of 25 minutes.

The path of the third tornado was intermittent. The tornado first touched down near Hindsville. A meat market in Hindsville was damaged, and several trees were blown down in the area. The tornado apparently lifted for a short time west of Martinsville, before touching down again about 1.5 miles northwest of Martinsville. The tornado then followed a path along the White River until it passed through Centerton. Numerous homes in Centerton were damaged, and two power line towers were toppled just south of Centerton. The tornado attained its maximum strength about midway between Martinsville and Centerton, where it was mostly moving through open country. After moving through Centerton the tornado weakened considerably, with only intermittent minor tree damage occurring from north of Centerton to the Five Points area. Crop damage was estimated at $10,000. Property damage was estimated at $1 million. The path length of the tornado was 15 miles with a path width of 880 yards, and a life span of 25 minutes.

Trees were downed near 45th and Fall Creek Parkway where the fourth tornado touched down in Marion County. The tornado moved east-northeast for about 5 miles, and then turned northeast with the damage path becoming intermittent over the final 4 miles. The most extensive damage occurred over the first 4 miles of the tornado path. Some of the worst damage was to homes on Thornleigh, Winston, Staughton, and Laurel Hall Drives. Two hundred houses were damaged, with 24 to 30 sustaining major damage. A few houses were also destroyed. The tornado weakened as it crossed Interstate 465 at 56th Street. At this location there was minor damage to roofs and windows. At Fort Benjamin Harrison, large trees were downed at Boy Scout Road and 59th Street. The tornado also downed 95-foot power poles shortly before lifting 14 miles northeast of downtown Indianapolis. Eleven thousand customers lost power after the tornado. Damage was estimated at $4 million.

The last F3 tornado of the outbreak downed trees and utility poles, and caused structural damage to several outbuildings and a few houses along the first 4 miles of its path in Shelby County. The most extensive damage occurred over the final 6 miles of the tornado's path from about 4 miles southwest of Shelbyville to 2.5 miles north of Shelbyville. In this stretch, three houses, five barns, and numerous outbuildings were destroyed. Several homes and business buildings sustained damage. A semi-truck was overturned as the tornado crossed Interstate 74 on the northern side of Shelbyville. There was also extensive damage to the corn crop.

KENTUCKY

An F4 tornado touched down 1.5 miles west of Worthville on November 22nd. The tornado remained on the ground until crossing the Ohio River in northern Carroll County. For most of its life the tornado was an F1 intensity but near Easterday the tornado intensified to an F4. It was in this area that a 62-year-old woman was killed. In addition, nine people were injured as many homes and trailers were destroyed. Two 100-foot-high power transfer structures were twisted to the ground. One semi-trailer was overturned and many trees were uprooted. Pieces of insulation and miscellaneous debris were found up to 5 miles from the tornado path. The tornado had a path length of 16 miles.

NORTH CAROLINA

On November 23rd, an F3 tornado touched down in eastern Harnett County and continued for 3 hours and 15 minutes tracking 160 miles through eight other counties in northeastern North Carolina. This is the longest tornado track on record in North Carolina. The tornado appeared to reach its greatest intensity, a strong F3, near its beginning over eastern Harnett and Johnston Counties. Because the tornado moved across large open fields and in rural areas, especially further east along the path, a continuous path was difficult to conclude until signs of scouring of the ground and broken trees along the way could be viewed from the air and a close ground examination.

Harnett County had 5 homes destroyed, another 23 damaged, and 10 people injured. Property damage amounted to about $950,000. In Johnston County, the tornado moved through Wilson's Mills at 0440 EST. Twelve people were injured in the county, 22 homes and 1 business were destroyed, and another 35 homes and 1 business were damaged. Damages to property were estimated at close to $2 million. The tornado crossed into Wilson County shortly after 0500 EST, tracking mostly across farm lands and passing just south of Wilson. Damages to property were estimated at $100,000 with one house being destroyed and another damaged.

An amateur radio operator spotted the tornado as it moved into Edgecombe County at 0525 EST. There, it skirted the towns of Macclesfield and Pinetops. Two people were injured and 32 homes were damaged with estimated property damages of $150,000. In Martin County, the tornado injured 9 people, destroyed 9 homes, and damaged another 25 leading to property damages of around $190,000. The storm skirted Highway 142 near the towns of Hassell and Hamilton at around 0600 EST. In Bertie County, the tornado moved through the county seat of Windsor at around 0625 EST. Eighteen homes were damaged and property damages were estimated at $160,000.

The storm continued across rural and forested areas of Chowan and Perquimans Counties. In addition to tree damage, two houses received minor damage and four chicken houses were destroyed in Chowan County. In its final phase, the tornado hit the Elizabeth City area in Pasquotank County at around 0720 EST. A school bus carrying students was hurled 75 yards injuring 21 people. Three homes were destroyed and another 42 damaged with total damages estimated at close to $1 million. The tornado lifted and dissipated as the storm crossed the Pasquotank River on the eastern border of the county.

DECEMBER 1992

CALIFORNIA

The last tornado of the year occurred in Del Norte County, California, on December 30th at 0130 PST. It had a path length of quarter of mile, a path width of 25 yards, and rated at F1 intensity. The Del Norte County Sheriff's Department reported the tornado near the intersection of Cooper and Butte Streets. A utility shed was completely destroyed. Other damage was reported over a two-block path to roofs, cars, fences, and power lines. A resident heard a noise that sounded like a low-flying jet.

More detailed information about tornado activity can be obtained from the monthly *Storm Data* publications. The National Severe Storms Forecast Center has generated a magnetic tape that contains tornado statistics for the period 1950-1992. A copy of that tape can be obtained by contacting the National Climatic Data Center, Asheville, North Carolina 28801-2733 (telephone: (704) 271-4800).

Definition of Fujita Tornado Scale (F scale)

(F0) Gale tornado (40-72 mph): Light damage Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage sign boards.

(F1) Moderate tornado (73-112 mph): Moderate damage
The lower limit (73 mph) is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off

foundations or overturned; moving auto pushed off the roads.

(F2) Significant tornado (113-157 mph): Considerable damage
Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.

(F3) Severe tornado (158-206 mph): Severe damage
Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.

(F4) Devastating tornado (207-260 mph): Devastating damage
Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.

(F5) Incredible tornado (261-318 mph): Incredible damage
Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-size missiles fly through the air in excess of 100 mph; trees debarked; incredible phenomena will occur.

(F6-F12) (319 mph to Mach 1, the speed of sound):
The maximum wind speeds of tornadoes are not expected to reach the F6 wind speeds.

(F0+F1) Weak Tornado
(F2+F3) Strong Tornado
(F4+F5) Violent Tornado

TORNADO SUMMARY BY STATE AND NATION, 1992

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA													
NUMBER	0	0	2	1	0	0	1	3	0	0	17	0	24
DAYS	0	0	2	1	0	0	1	1	0	0	4	0	9
DEATHS	0	0	2	0	0	0	0	0	0	0	0	0	2
INJURIES	0	0	8	0	0	0	0	3	0	0	54	0	65
ARIZONA													
NUMBER	2	3	0	0	2	0	1	2	0	3	0	0	13
DAYS	1	1	0	0	1	0	1	2	0	1	0	0	7
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	1	0	0	0	0	0	1
ARKANSAS													
NUMBER	0	0	2	0	0	1	1	0	0	0	0	0	4
DAYS	0	0	2	0	0	1	1	0	0	0	0	0	4
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	1	0	0	0	0	0	0	0	0	0	1
CALIFORNIA													
NUMBER	0	1	1	0	1	0	0	0	0	0	0	17	20
DAYS	0	1	1	0	1	0	0	0	0	0	0	7	10
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	6	6
COLORADO													
NUMBER	0	0	2	0	2	59	8	6	4	0	0	0	81
DAYS	0	0	1	0	2	11	5	5	3	0	0	0	27
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	4	0	0	0	4
CONNECTICUT													
NUMBER	0	0	0	0	0	0	2	2	0	0	0	0	4
DAYS	0	0	0	0	0	0	2	1	0	0	0	0	3
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
DELAWARE													
NUMBER	0	0	0	0	0	0	5	1	0	0	0	0	6
DAYS	0	0	0	0	0	0	2	1	0	0	0	0	3
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA													
NUMBER	2	10	2	1	1	11	9	2	6	10	5	1	60
DAYS	1	3	2	1	1	9	6	2	4	1	4	1	35
DEATHS	0	0	0	0	0	0	0	0	0	4	0	0	4
INJURIES	0	15	0	0	0	1	6	0	0	77	0	0	99
GEORGIA													
NUMBER	0	0	0	1	0	0	0	2	0	1	15	0	19
DAYS	0	0	0	1	0	0	0	2	0	1	3	0	7
DEATHS	0	0	0	0	0	0	0	0	0	0	6	0	6
INJURIES	0	0	0	0	0	0	0	0	0	0	153	0	153
IDAHO													
NUMBER	0	0	0	0	1	2	1	0	0	0	0	0	4
DAYS	0	0	0	0	1	2	1	0	0	0	0	0	4
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
ILLINOIS													
NUMBER	0	0	1	2	3	6	9	1	1	0	0	0	23
DAYS	0	0	1	2	1	2	4	1	1	0	0	0	12
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	2	0	0	0	0	0	0	2
INDIANA													
NUMBER	0	1	0	0	0	7	14	3	2	4	15	0	46
DAYS	0	1	0	0	0	3	5	1	2	1	1	0	14
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	2	54	0	0	9	6	0	71
IOWA													
NUMBER	0	0	1	2	2	13	11	0	0	0	0	0	29
DAYS	0	0	1	2	1	3	6	0	0	0	0	0	13
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	3	0	0	0	0	0	0	3
KANSAS													
NUMBER	0	0	7	1	4	55	10	3	11	1	0	0	92
DAYS	0	0	3	1	2	7	6	2	3	1	0	0	25
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	12	0	0	1	0	0	0	13

TORNADO SUMMARY BY STATE AND NATION, 1992

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
KENTUCKY													
NUMBER	0	0	0	0	0	5	0	0	1	0	4	0	10
DAYS	0	0	0	0	0	2	0	0	1	0	1	0	4
DEATHS	0	0	0	0	0	0	0	0	0	0	1	0	1
INJURIES	0	0	0	0	0	0	0	0	0	0	9	0	9
LOUISIANA													
NUMBER	2	3	6	5	4	10	0	16	1	0	30	2	79
DAYS	1	2	4	3	3	7	0	4	1	0	5	1	31
DEATHS	0	0	0	0	0	0	0	2	0	0	0	0	2
INJURIES	0	10	11	1	0	0	0	39	0	0	24	0	85
MARYLAND													
NUMBER	0	0	0	0	0	0	1	11	0	0	1	0	13
DAYS	0	0	0	0	0	0	1	2	0	0	1	0	4
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	2	0	0	0	0	2
MASSACHUSETTS													
NUMBER	0	0	0	0	0	2	0	0	0	0	0	0	2
DAYS	0	0	0	0	0	2	0	0	0	0	0	0	2
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	4	0	0	0	0	0	0	4
MICHIGAN													
NUMBER	0	0	0	1	0	15	3	0	2	0	0	0	21
DAYS	0	0	0	1	0	1	2	0	2	0	0	0	6
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	4	0	0	27	0	0	0	0	0	31
MINNESOTA													
NUMBER	0	0	0	0	0	29	1	0	9	0	0	0	39
DAYS	0	0	0	0	0	3	1	0	2	0	0	0	6
DEATHS	0	0	0	0	0	1	0	0	0	0	0	0	1
INJURIES	0	0	0	0	0	52	0	0	0	0	0	0	52
MISSISSIPPI													
NUMBER	1	0	4	4	1	0	0	27	0	2	15	0	54
DAYS	1	0	3	2	1	0	0	2	0	2	2	0	13
DEATHS	0	0	3	0	0	0	0	0	0	0	15	0	18
INJURIES	2	0	58	5	0	0	0	3	0	16	269	0	353
MISSOURI													
NUMBER	0	2	2	0	0	0	11	0	8	0	0	0	23
DAYS	0	1	1	0	0	0	5	0	3	0	0	0	10
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	3	0	1	0	0	0	4
MONTANA													
NUMBER	0	0	0	0	0	3	5	1	0	0	0	0	9
DAYS	0	0	0	0	0	3	4	1	0	0	0	0	8
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA													
NUMBER	6	0	1	0	18	34	14	1	1	0	0	0	75
DAYS	1	0	1	0	2	5	8	1	1	0	0	0	19
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	5	0	0	0	0	0	0	5
NEVADA													
NUMBER	0	0	2	0	0	1	0	1	0	0	0	0	4
DAYS	0	0	1	0	0	1	0	1	0	0	0	0	3
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY													
NUMBER	0	0	0	0	0	1	3	0	0	0	0	0	4
DAYS	0	0	0	0	0	1	2	0	0	0	0	0	3
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW MEXICO													
NUMBER	0	0	0	1	11	11	0	1	0	0	0	0	24
DAYS	0	0	0	1	7	5	0	1	0	0	0	0	14
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	7	0	0	0	0	0	0	7
NEW YORK													
NUMBER	0	0	0	0	5	1	13	2	4	0	0	0	25
DAYS	0	0	0	0	1	1	5	1	1	0	0	0	9
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	6	0	0	0	6

TORNADO SUMMARY BY STATE AND NATION, 1992

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
NORTH CAROLINA													
NUMBER	0	0	6	0	0	2	3	2	0	0	16	0	29
DAYS	0	0	3	0	0	2	3	1	0	0	3	0	12
DEATHS	0	0	0	0	0	0	0	0	0	0	2	0	2
INJURIES	0	0	21	0	0	0	0	0	0	0	67	0	88
NORTH DAKOTA													
NUMBER	0	0	0	0	2	11	2	0	0	0	0	0	15
DAYS	0	0	0	0	1	4	2	0	0	0	0	0	7
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	4	0	0	0	0	0	0	4
OHIO													
NUMBER	0	3	0	0	0	7	44	3	2	0	2	0	61
DAYS	0	2	0	0	0	1	7	2	2	0	1	0	15
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	6	0	0	0	0	36	0	0	0	21	0	63
OKLAHOMA													
NUMBER	0	0	2	9	25	9	2	0	16	1	0	0	64
DAYS	0	0	1	2	2	4	2	0	4	1	0	0	16
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	26	2	1	0	1	3	0	0	33
OREGON													
NUMBER	0	0	0	0	0	0	1	0	0	0	0	0	1
DAYS	0	0	0	0	0	0	1	0	0	0	0	0	1
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA													
NUMBER	2	0	0	1	0	1	20	5	1	1	0	0	31
DAYS	1	0	0	1	0	1	8	2	1	1	0	0	15
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	6	14	0	0	0	0	20
SOUTH CAROLINA													
NUMBER	0	1	0	0	0	3	0	1	0	0	4	0	9
DAYS	0	1	0	0	0	2	0	1	0	0	1	0	5
DEATHS	0	0	0	0	0	0	0	0	0	0	1	0	1
INJURIES	0	0	0	0	0	0	0	0	0	0	9	0	9
SOUTH DAKOTA													
NUMBER	0	0	0	0	3	27	7	4	0	0	0	0	41
DAYS	0	0	0	0	1	7	4	2	0	0	0	0	14
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	9	0	0	0	0	0	0	9
TENNESSEE													
NUMBER	0	0	1	0	2	1	0	3	0	0	1	0	8
DAYS	0	0	1	0	1	1	0	1	0	0	1	0	5
DEATHS	0	0	0	0	0	0	0	0	0	0	1	0	1
INJURIES	0	0	0	0	0	0	0	4	0	0	3	0	7
TEXAS													
NUMBER	0	5	13	22	43	66	4	4	4	7	21	0	189
DAYS	0	2	8	6	14	16	4	3	3	3	6	0	65
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	1	0	0	14	0	0	3	0	35	0	53
UTAH													
NUMBER	0	0	0	0	1	0	0	2	1	0	0	0	4
DAYS	0	0	0	0	1	0	0	2	1	0	0	0	4
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA													
NUMBER	0	0	0	0	0	0	0	2	0	0	3	0	5
DAYS	0	0	0	0	0	0	0	2	0	0	1	0	3
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON													
NUMBER	0	0	0	0	0	0	1	0	0	0	0	0	1
DAYS	0	0	0	0	0	0	1	0	0	0	0	0	1
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST VIRGINIA													
NUMBER	0	0	0	0	0	0	1	0	0	0	0	0	1
DAYS	0	0	0	0	0	0	1	0	0	0	0	0	1
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0

TORNADO SUMMARY BY STATE AND NATION, 1992

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
WISCONSIN													
NUMBER	0	0	0	2	5	3	1	4	7	4	0	0	26
DAYS	0	0	0	1	1	1	1	2	4	1	0	0	11
DEATHS	0	0	0	0	0	0	0	1	0	0	0	0	1
INJURIES	0	0	0	0	0	30	0	30	1	0	0	0	61
WYOMING													
NUMBER	0	0	0	0	1	4	5	0	0	0	0	0	10
DAYS	0	0	0	0	1	1	3	0	0	0	0	0	5
DEATHS	0	0	0	0	0	0	0	0	0	0	0	0	0
INJURIES	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITED STATES													
NUMBER	15	29	55	53	137	400*	214*	115	81*	34	149*	20	1297*
DAYS &	6	9	17	11	21	29	30	22	17	10	14	9	195
DEATHS	0	0	5	0	0	1	0	3	0	4	26	0	39
INJURIES	2	31	100	10	26	147	134	95	17	105	650	6	1323

* CORRECTED FOR BOUNDARY-CROSSING TORNADOES.

& TORNADO DAYS FOR COUNTRY AS A WHOLE.

TORNADOES, TORNADO DAYS, AND DEATHS BY STATE AND NATION, 1953-92

STATE	TORNADOES							DAYS		DEATHS		
	TOTAL	AVERAGE	GREATEST	YEAR	LEAST	YEAR	PER # 10,000 SQ. MI.	TOTAL	AVERAGE	TOTAL	AVERAGE	PER ' 10,000 SQ. MI.
ALABAMA	841	21	45	1983+	5	1956	4.07	439	10	244	6	47
ALASKA	1	0	1	1959	0	1989+	.00	1	0	0	0	0
ARIZONA	141	3	17	1972	0	1965	.27	111	2	3	0	0
ARKANSAS	781	19	78	1982	2	1987+	3.58	361	9	165	4	31
CALIFORNIA	189	4	20	1992	0	1968+	.25	134	3	0	0	0
COLORADO	983	24	81	1992	1	1959	2.30	533	13	2	0	0
CONNECTICUT	54	1	8	1973	0	1988+	2.00	47	1	4	0	8
DELAWARE	43	1	6	1992	0	1987+	4.86	37	0	2	0	10
DISTRICT OF COLUMBIA	0	0	0	0+	0	0+	.00	0	0	0	0	0
FLORIDA	1822	45	97	1975	10	1956	7.68	1160	29	74	1	13
GEORGIA	797	19	46	1974+	2	1987	3.23	435	10	82	2	14
HAWAII	27	0	4	1971	0	1987+	.00	23	0	0	0	0
IDAHO	101	2	11	1991	0	1977+	.24	84	2	0	0	0
ILLINOIS	1065	26	107	1974	4	1953	4.61	494	12	177	4	31
INDIANA	853	21	49	1990	4	1984	5.79	391	9	215	5	59
IOWA	1258	31	71	1990	7	1956	5.51	544	13	60	1	11
KANSAS	1828	45	116	1991	14	1976	5.47	784	19	189	4	23
KENTUCKY	341	8	34	1974	0	1953	1.98	194	4	104	2	26
LOUISIANA	1028	25	79	1992	3	1955	5.15	573	14	98	2	20
MAINE	77	1	11	1971	0	1987+	.30	68	1	1	0	0
MARYLAND	113	2	13	1992	0	1988+	1.89	79	1	2	0	2
MASSACHUSETTS	130	3	12	1958	0	1988+	3.63	92	2	99	2	120
MICHIGAN	682	17	39	1974	2	1959	2.92	376	9	236	5	41
MINNESOTA	740	18	39	1992	5	1988+	2.14	398	9	79	1	9
MISSISSIPPI	959	23	62	1988	1	1979	4.82	462	11	364	9	76
MISSOURI	1067	26	79	1973	6	1987+	3.73	471	11	135	3	19
MONTANA	207	5	30	1991	0	1974+	.34	144	3	1	0	0
NEBRASKA	1524	38	88	1990	10	1966	4.92	690	17	51	1	7
NEVADA	45	1	8	1987	0	1985+	.09	40	1	0	0	0
NEW HAMPSHIRE	69	1	9	1963	0	1987+	1.07	60	1	0	0	0
NEW JERSEY	96	2	17	1989	0	1984+	2.55	68	1	0	0	0
NEW MEXICO	370	9	31	1991	0	1953	.74	267	6	3	0	0
NEW YORK	214	5	25	1992	0	1953	1.01	146	3	19	0	4
NORTH CAROLINA	534	13	38	1973	2	1970	2.47	316	7	81	2	15
NORTH DAKOTA	726	18	52	1976	2	1961	2.55	389	9	21	0	3
OHIO	607	15	61	1992	0	1988	3.64	302	7	171	4	41
OKLAHOMA	2106	52	107	1957	17	1988	7.44	843	21	203	5	29
OREGON	39	0	5	1991	0	1988+	.00	33	0	0	0	0
PENNSYLVANIA	395	9	33	1985+	0	1959	1.99	242	6	73	1	16
PUERTO RICO	9	0	2	1979	0	1989+	.00	8	0	0	0	0
RHODE ISLAND	7	0	3	1986	0	1988+	.00	6	0	0	0	0
SOUTH CAROLINA	366	9	23	1973	1	1986+	2.90	239	5	44	1	14
SOUTH DAKOTA	1011	25	64	1965	1	1958	3.24	474	11	8	0	1
TENNESSEE	437	10	44	1974	1	1987+	2.37	239	5	88	2	21
TEXAS	5138	128	232	1967	32	1953	4.79	1921	48	449	11	17
UTAH	69	1	6	1984	0	1989+	.12	59	1	0	0	0
VERMONT	31	0	5	1962	0	1985+	.00	28	0	0	0	0
VIRGINIA	235	5	22	1975	1	1982+	1.23	158	3	19	0	5
VIRGIN ISLANDS	2	0	1	1979+	0	1989+	.00	2	0	0	0	0
WASHINGTON	53	1	4	1989+	0	1988+	.15	46	1	6	0	1
WEST VIRGINIA	78	1	6	1980+	0	1988+	.41	61	1	2	0	1
WISCONSIN	759	18	43	1980	3	1953	3.26	394	9	77	1	14
WYOMING	411	10	42	1977	0	1970	1.02	266	6	2	0	0
PACIFIC ISLANDS	2	0	1	1981+	0	1989+	.00	2	0	0	0	0
TOTAL: UNITED STATES	31250*	781	1297	1992	421	1953	2.16	6814&	170	3653	91	10

\+ ALSO IN EARLIER YEAR(S).
* CORRECTED FOR BOUNDARY-CROSSING TORNADOES.
& TORNADO DAYS FOR COUNTRY AS A WHOLE.

\# MEAN ANNUAL TORNADOES PER 10,000 SQUARE MILES.
' NUMBER OF DEATHS PER 10,000 SQUARE MILES.

NATIONAL TORNADOES, TORNADO DAYS, DEATHS AND RESULTING LOSSES BY YEARS, 1916-92

YEAR	NUMBER TORNADOES	TORNADO DAYS	TOTAL DEATHS	MOST DEATHS IN SINGLE TORNADO	TOTAL PROPERTY LOSSES $	PROPERTY LOSS FREQUENCY *		
						CATEGORY 5	CATEGORY 6	CATEGORY 7 AND OVER
1916	90	36	150	30	6	7	1	0
1917	121	38	551	101	7	21	9	0
1918	81	45	136	36	7	20	5	0
1919	64	35	206	59	7	10	2	0
1920	87	50	499	87	7	14	10	0
1921	105	55	202	61	7	22	3	0
1922	108	64	135	16	7	27	5	0
1923	102	59	110	23	6	21	1	0
1924	130	57	376	85	7	26	11	1
1925	119	65	794	689	7	34	2	1
1926	111	57	144	23	6	28	0	0
1927	163	62	540	92	7	42	9	1
1928	203	79	95	14	7	40	7	0
1929	197	74	274	40	7	48	4	0
1930	192	72	179	41	7	38	6	0
1931	94	57	36	6	6	14	1	0
1932	151	67	394	37	7	23	1	1
1933	258	96	362	34	7	46	9	1
1934	147	77	47	6	6	10	3	0
1935	180	77	71	11	6	29	0	0
1936	151	71	552	216	7	17	5	1
1937	147	75	29	5	6	24	0	0
1938	213	76	183	32	7	29	6	0
1939	152	75	91	27	7	21	3	0
1940	124	62	55	18	7	13	2	0
1941	118	57	53	25	6	24	1	0
1942	167	66	384	65	7	42	10	0
1943	152	61	58	5	7	28	8	0
1944	169	68	275	100	7	50	9	0
1945	121	66	210	69	7	21	10	1
1946	106	65	78	15	7	29	7	0
1947	165	78	313	169	7	46	7	1
1948	183	68	139	33	7	62	11	2
1949	249	80	211	58	7	54	13	0
1950	200	88	70	18	7	47	9	0
1951	262	113	34	6	7	35	11	2
1952	240	98	229	57	7	53	19	0
1953	421	136	515	116	8	63	18	7
1954	550	160	36	6	7	63	8	1
1955	593	152	126	80	7	74	13	1
1956	504	155	83	25	7	83	24	1
1957	856	154	192	44	8	129	26	3
1958	564	166	66	19	7	70	8	1
1959	604	156	58	21	7	70	4	1
1960	616	172	46	16	7	65	11	1
1961	697	169	51	16	7	103	21	1
1962	657	152	28	17	7	51	10	0
1963	464	141	31	5	7	77	15	1
1964	704	156	73	22	7	113	17	5
1965	906	181	299	44	8	126	30	11
1966	585	150	98	58	8	79	13	4
1967	926	173	114	33	8	125	33	8
1968	660	171	131	34	8	82	26	6
1969	608	155	66	32	8	98	16	3
1970	653	171	72	26	8	97	24	6
1971	888	192	156	58	8	71	30	5
1972	741	194	27	6	8	100	28	1
1973	1102	206	87	7	9	219	67	9
1974	947	184	361	34	9	166	82	25
1975	920	204	60	9	9	189	31	11
1976	835	169	44	5	8	145	41	5
1977	852	189	43	22	8	173	40	6
1978	788	173	53	16	9	153	53	6
1979	852	186	84	42	9	169	62	11
1980	866	176	28	5	9	201	79	13
1981	783	175	24	5	9	144	43	12
1982	1046	182	64	10	9	254	79	13
1983	931	190	34	3	9	211	85	10
1984	907	166	122	16	9	193	90	35
1985	684	168	94	18	9	114	55	14
1986	764	168	15	3	9	157	66	9
1987	656	151	59	30	8	112	32	6
1988	702	156	32	5	9	148	48	17
1989	856	160	50	21	9	133	60	18
1990	1133	181	53	29	8	215	91	18
1991	1132	179	39	17	8	194	49	15
1992	1297	195	39	12	8	212	83	25
MEAN	781	170	91	-	-	131	40	9

NOTE: - THE ABOVE ESTIMATED LOSSES ARE BASED ON VALUES AT TIME OF OCCURRENCE.

MEAN WAS DERIVED FROM DATA FOR PERIOD 1953-1992

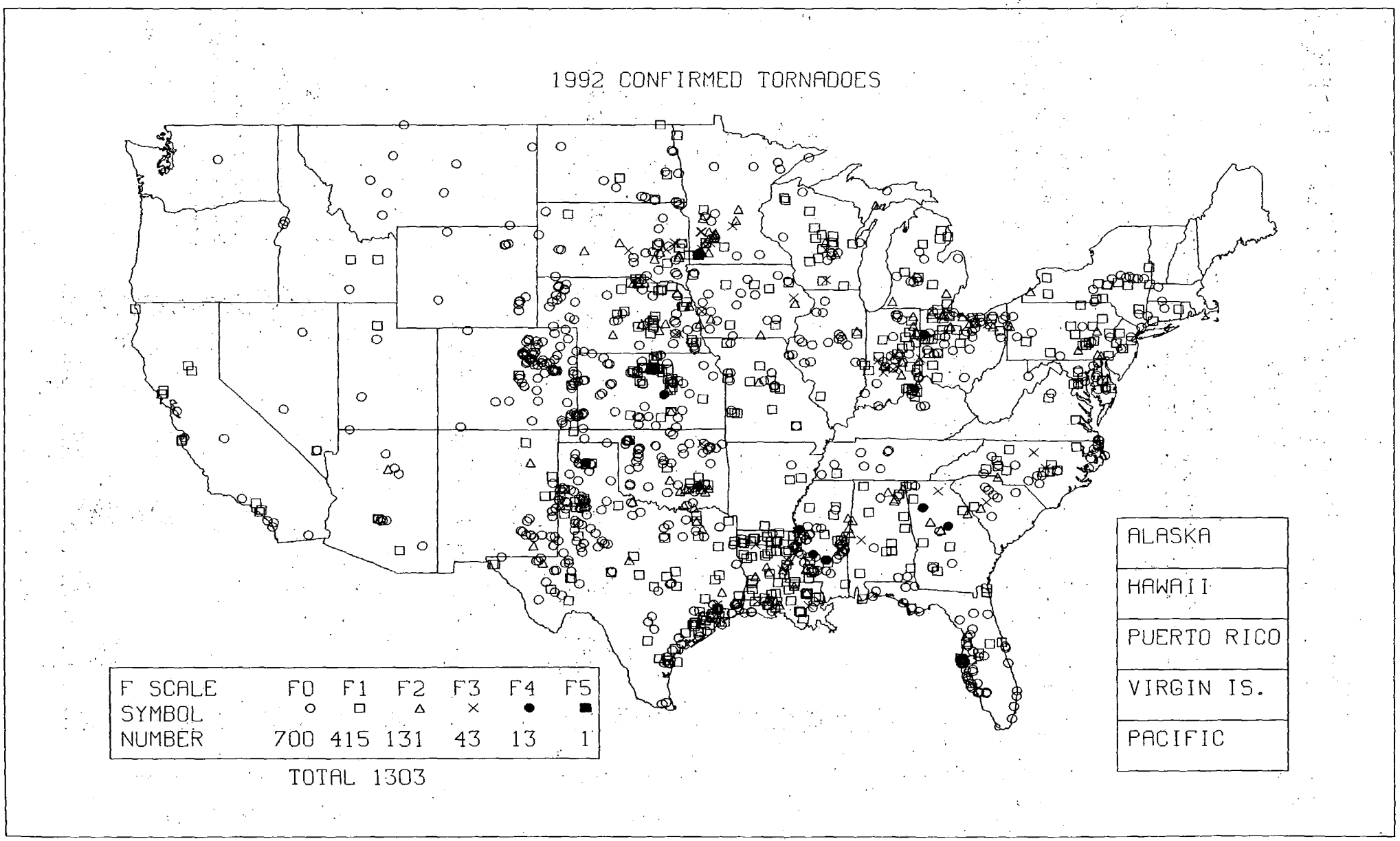
$ STORM DAMAGES IN CATEGORIES:

5. $50,000 TO $500,000
6. $500,000 TO $5 MILLION
7. $5 MILLION TO $50 MILLION
8. $50 MILLION TO $500 MILLION
9. $500 MILLION AND OVER

* NUMBER OF TIMES PROPERTY LOSSES REPORTED IN STORM DATA IN CATEGORIES 5,6,7, AND OVER.

NATION SUMMARY OF TORNADOES, TORNADO DAYS, AND DEATHS BY MONTH AND ANNUAL, 1953- 92

	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER			ANNUAL		
YEAR	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS	NUMBER	DAYS	DEATHS
1953	14	6	0	16	3	3	40	10	24	47	16	34	94	21	161	111	24	244	31	19	0	24	15	0	5	4	0	6	4	0	12	6	0	21	8	49	421	136	515
1954	2	1	0	17	9	2	63	13	10	112	22	3	101	22	9	107	26	5	45	23	0	49	21	1	21	10	3	14	8	2	2	2	0	17	3	1	550	160	36
1955	3	2	0	4	3	0	43	15	5	99	18	7	147	26	103	154	28	2	49	21	5	33	18	0	15	8	2	23	7	1	20	4	1	3	2	0	593	152	126
1956	2	2	0	47	12	8	31	7	1	85	15	67	79	24	4	65	21	0	91	26	1	43	20	2	16	10	0	29	8	0	7	6	0	9	4	0	504	155	83
1957	17	3	13	5	3	0	38	7	1	216	21	29	227	26	87	147	25	14	55	19	0	20	14	0	17	10	2	18	11	2	58	11	25	38	4	19	856	154	192
1958	12	7	0	20	5	13	15	10	0	76	19	4	68	21	0	127	27	42	121	30	1	46	20	1	24	14	1	9	6	4	45	6	0	1	1	0	564	166	66
1959	16	2	3	20	5	21	43	11	9	30	12	1	226	28	8	73	25	2	63	24	0	38	18	0	58	15	14	24	10	0	11	4	0	2	2	0	604	156	58
1960	9	4	0	28	10	0	28	10	0	70	20	7	201	26	34	124	27	3	43	22	0	47	23	1	22	13	0	18	10	1	25	6	0	1	1	0	616	172	46
1961	1	1	0	31	8	0	124	17	7	74	19	3	137	25	23	107	23	2	77	27	0	27	16	0	53	16	15	14	5	0	36	7	1	16	5	0	697	169	51
1962	12	3	1	25	7	0	37	9	17	41	8	1	200	22	3	171	29	0	78	26	0	51	21	6	24	11	0	11	10	0	5	4	0	2	2	0	657	152	28
1963	15	5	1	6	3	0	48	12	8	84	14	16	71	21	1	91	23	0	62	26	0	26	13	2	33	13	3	13	5	0	15	6	0	0	0	0	464	141	31
1964	14	3	10	2	2	0	36	11	6	157	23	15	135	20	16	136	24	0	63	23	0	79	23	2	25	10	0	22	4	22	17	8	0	18	5	2	704	156	73
1965	21	11	0	32	4	0	34	9	2	129	20	267	275	25	17	147	28	6	86	26	0	61	23	1	64	21	0	16	4	1	34	6	5	7	4	0	906	181	299
1966	1	1	0	28	5	0	12	6	58	80	20	12	98	17	0	126	28	19	100	27	3	58	21	0	22	13	0	29	6	6	20	3	0	11	3	0	585	150	98
1967	39	4	7	8	5	0	42	14	3	149	18	73	116	25	3	210	28	6	90	25	1	28	16	2	139	16	5	36	7	4	8	5	0	61	10	10	926	173	114
1968	5	3	0	7	3	0	28	8	0	102	15	40	145	26	72	136	27	11	56	22	2	66	23	2	25	14	0	14	9	0	44	12	3	32	9	1	660	171	131
1969	3	1	32	5	5	0	8	2	1	68	15	2	145	25	4	137	28	7	99	27	0	69	21	19	20	11	0	26	10	0	5	3	0	23	7	1	608	155	66
1970	9	5	0	16	3	0	25	12	2	117	16	29	88	19	26	134	24	6	81	26	3	55	21	0	54	20	0	50	13	6	10	4	0	14	8	0	653	171	72
1971	18	7	1	83	12	131	40	13	2	75	14	11	166	24	7	199	28	1	100	30	1	50	21	0	47	15	0	38	12	0	16	7	0	56	9	2	888	192	156
1972	33	10	5	7	4	0	69	17	0	96	20	16	140	27	0	114	25	2	115	29	0	59	23	2	49	19	0	34	10	0	17	4	2	8	6	0	741	194	27
1973	33	7	1	10	4	0	80	16	17	150	22	10	250	26	35	224	26	2	80	26	0	51	23	4	69	22	3	25	11	0	81	11	12	49	12	3	1102	206	87
1974	24	8	2	23	9	0	36	12	1	269	22	313	144	28	10	194	26	31	59	19	0	107	26	0	25	11	0	45	10	4	13	8	0	8	5	0	947	184	361
1975	52	7	12	45	12	7	84	16	12	108	20	13	188	30	5	196	28	6	79	26	2	60	25	2	34	17	0	12	7	0	40	8	0	22	8	1	920	204	60
1976	12	5	0	37	6	5	180	18	21	113	23	1	155	24	8	169	26	3	84	28	2	38	18	1	35	15	3	11	5	0	0	0	0	1	1	0	835	169	44
1977	5	4	0	17	3	2	64	15	0	88	15	26	228	29	4	132	27	0	99	27	1	82	26	6	65	21	1	25	5	1	24	10	0	23	7	2	852	189	43
1978	23	7	2	6	3	0	17	8	0	107	17	4	213	27	7	148	28	17	143	30	11	65	24	1	20	10	6	7	5	0	9	5	0	30	9	5	788	173	53
1979	16	9	0	4	3	0	53	13	1	120	17	58	112	23	2	150	24	8	132	30	1	127	27	5	68	19	2	47	12	7	21	8	0	2	1	0	852	186	84
1980	5	4	0	11	9	0	41	15	2	137	16	4	203	25	8	217	30	7	95	26	5	73	27	0	37	14	1	43	7	1	3	2	0	1	1	0	866	176	28
1981	3	3	0	25	5	2	33	13	1	84	18	13	187	24	0	223	29	8	98	27	0	64	22	0	26	16	0	32	12	0	7	5	0	1	1	0	783	175	24
1982	18	8	1	3	2	0	60	15	6	150	20	30	327	28	14	198	30	4	95	29	0	34	15	0	38	12	2	9	4	0	19	6	0	95	13	7	1046	182	64
1983	13	2	2	41	7	1	71	21	0	65	15	6	249	26	14	178	27	2	99	27	4	76	21	0	20	15	0	12	5	0	49	11	0	58	13	5	931	190	34
1984	1	1	0	27	4	0	73	15	64	176	22	33	169	27	6	242	25	14	72	21	0	47	20	0	17	12	0	49	12	4	30	5	1	4	2	0	907	166	122
1985	2	2	0	7	4	0	38	12	2	134	19	5	182	28	78	82	24	3	51	19	0	108	26	3	40	16	0	18	8	0	19	8	3	3	2	0	684	168	94
1986	0	0	0	30	11	2	75	9	6	84	17	2	173	25	1	134	25	0	88	24	3	67	23	1	65	17	0	26	7	0	17	8	0	5	2	0	764	168	15
1987	6	3	0	19	4	6	38	11	1	20	8	1	126	25	31	132	29	2	163	28	0	63	24	1	19	10	0	1	1	0	55	5	11	14	3	6	656	151	59
1988	17	3	5	4	3	0	28	10	1	58	16	4	132	24	3	63	21	0	103	23	0	61	13	3	76	16	1	19	8	0	121	13	14	20	6	1	702	156	32
1989	15	6	0	18	3	0	44	14	1	82	13	0	234	28	9	253	27	5	59	19	0	36	20	0	31	12	0	30	7	4	58	10	31	3	1	0	856	160	50
1990	11	7	0	57	10	1	88	8	3	108	17	0	243	27	5	335	28	11	106	26	0	60	22	29	45	15	0	35	9	2	18	5	0	35	7	2	1133	181	53
1991	29	6	1	11	5	0	159	16	13	206	20	21	335	30	0	216	30	1	65	22	1	46	17	0	26	16	0	22	9	0	20	5	2	3	3	0	1132	179	39
1992	15	6	0	29	9	0	55	17	5	53	11	0	137	21	0	400	29	1	214	30	0	115	22	3	81	17	0	34	10	4	149	14	26	20	9	0	1297	195	39
POR	546	179	99	831	227	204	2121	487	313	4219	693	1181	6846	995	818	6502	1057	497	3489	1005	47	2309	832	100	1570	566	64	946	313	76	1160	261	137	737	199	117	31250	6814	3653
MEAN	14	4	2	21	6	5	53	12	8	105	17	30	171	25	20	163	26	12	87	25	1	58	21	3	39	14	2	24	8	2	29	7	3	18	5	3	781	170	91


1992 CONFIRMED TORNADOES
F SCALE F0 F1 F2 F3 F4 F5
SYMBOL
NUMBER 700 415 131 43 13 1
TOTAL 1303
ALASKA
HAWAII
PUERTO RICO
VIRGIN IS.
PACIFIC

NATIONAL SUMMARY OF LIGHTNING, 1992

JAY HOLLIFIELD
NATIONAL OCEANIC AND ATMOSPHERIC ADMINSITRATION
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE
NATIONAL CLIMATIC DATA CENTER

Forty-one people were killed in the United States during 1992. This is 55 percent below the annual national average of 92 deaths. There were 292 injuries, 11 percent above the national average of 264. Location frequency of lightning deaths are depicted in the following two figures for 1992, and the period 1959-1992:

FIGURE 1A - LIGHTNING DEATHS

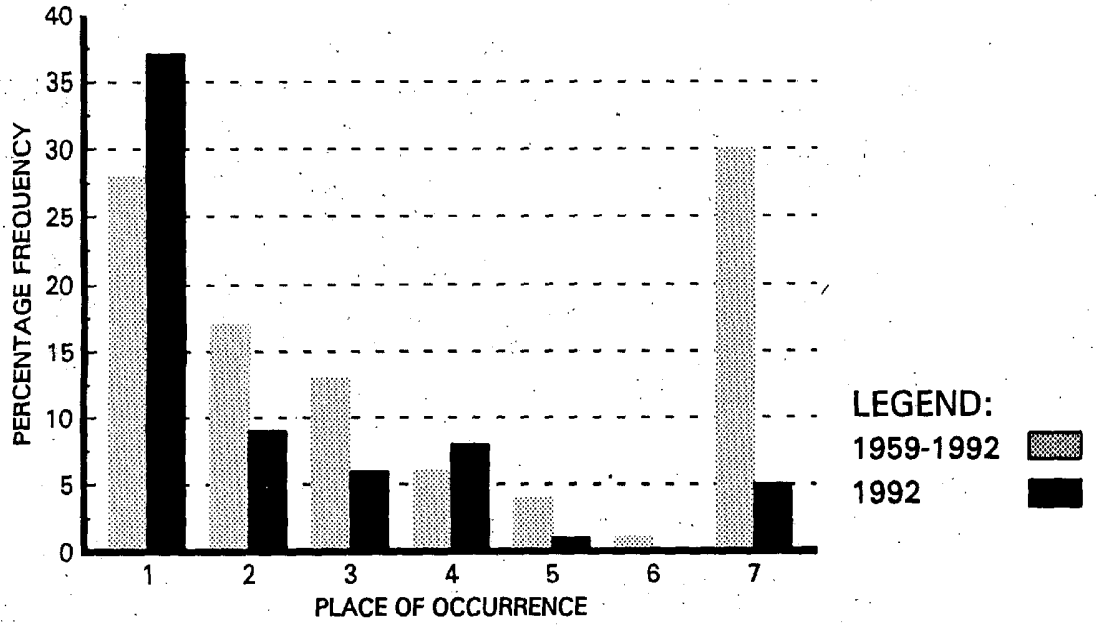
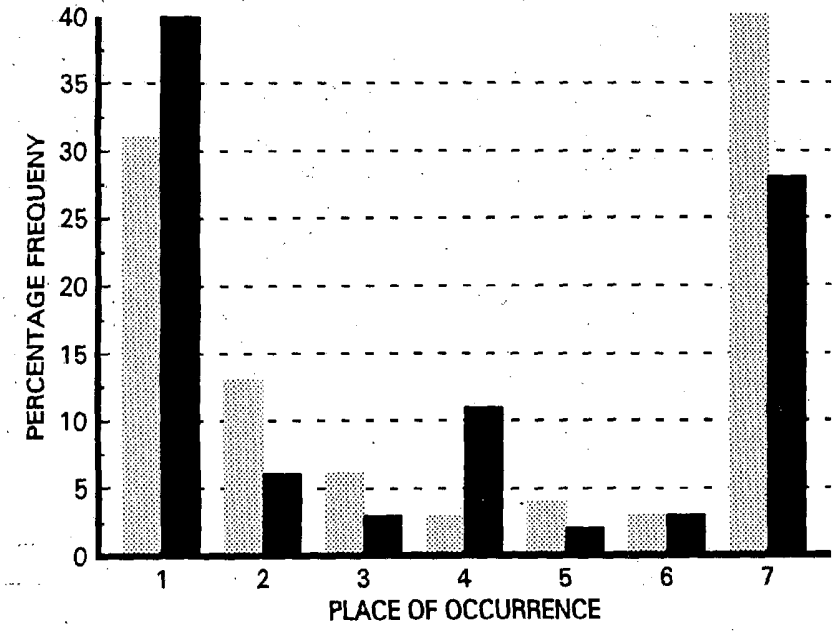


FIGURE 1B - LIGHTNING INJURIES



PLACE OF OCCURRENCE:

1. Open fields, ball fields, etc.
2. Under trees.
3. Boating, fishing, and water related.
4. Near tractors, heavy road equipment.
5. Golf courses.
6. At telephones.
7. Various other and unknown locations.

The following monthly summaries describe some lightning incidents:

JANUARY

Texas: Lightning knocked a chimney off a home on Galveston Island. Fire fighters reported a hole in the roof of the house but no injuries to anyone inside. The storm knocked out power to over 300 homes on the island.

FEBRUARY

Texas: Lightning struck a large tree on State Highway 95 south of Elgin. A large limb fell from the tree on to a pickup truck killing both occupants.

MARCH

Alabama: An 18-year-old in Geneva County was injured by lightning while working on a lawn mower. He was sitting on a cement floor under a tin roof when lightning struck a light pole and ran down the power line, bounced off a building, then struck him.

Florida: A 24-year-old man in Winter Park was injured by lightning as he was taking out the trash.

APRIL

Alabama: A 44-year-old man was struck and killed by lightning while standing under a tree during a thunderstorm in Marshall County.

Colorado: A rare, early spring lightning storm struck three skiers on Eagle's Nest Ridge in Vail. A 38-year-old man died after being in critical condition for four days. Two others were slightly injured.

Oklahoma: Lightning struck and injured three people in Eldorado who were working in the Eldorado Emergency Operations Center.

MAY

Arizona: A shepherd was struck and killed by lightning while tending his flock in the Garland Prairie area 6 miles south of Parks. The 38-year-old man's body was found beneath a tree with two dead dogs nearby that were apparently killed by lightning.

Colorado: Three boys, ages 11, 12, and 16, were seriously injured after being struck by lightning while taking cover under a large tree during a thunderstorm 7 miles northwest of Denver.

Nebraska: Lightning struck a boat in the Harlan County Reservoir in Harlan County killing one man and injuring another.

New Mexico: Lightning killed a 58-year-old man as he stood outside a house near Tularosa. A woman standing next to him was injured and hospitalized. A 52-year-old woman was killed by lightning while hiking in Chaco Culture National Park near Bloomfield. Lightning struck a tree under which two golfers had sought safety. A 24-year-old man, who was leaning against the tree, was critically injured. Fire department authorities reported the bolt exited the victim's foot and blew his shoe apart. The other golfer was slightly injured and was thrown 4 feet by the impact. The incident occurred at the University of New Mexico's North Course.

South Carolina: A 36-year-old migrant farm worker was struck and killed by lightning in Orangeburg County. The man was near an irrigation pipe when the lightning struck.

Tennessee: Twenty persons were injured when lightning struck a softball field in Sullivan.

Texas: Lightning struck a group of four trees near Lufkin. The strike killed a 17-year old girl who was removing clothes from a metal line attached to the trees.

JUNE

Colorado: Lightning struck a group of 14 horseback riders, killing 3 horses and injuring 6 riders. A 64-year-old woman was seriously injured. The incident occurred near Vail. Two climbers descending Hallet Peak in Rocky Mountain National Park were struck by lightning. A 31-year-old man was killed and a 51-year-old man was slightly injured.

Florida: A 38-year-old man was struck by lightning while checking on his livestock in Polk County. He was given CPR and transferred to the hospital, but died several days later. Lightning struck and killed a 50-year-old man who had stopped to assist two women motorists whose car had stalled along U.S. Highway 17, south of Bartow. One of the women suffered some hearing loss. This incident also occurred in Polk County.

Kansas: A bolt of lightning struck the outside radio antenna of a house in Onaga. The

lightning traveled through the ground rod, then through metal bars in the home's concrete walls before entering and exiting a man's body. The lightning blasted a 16-inch hole in the wall and knocked the man and his son 26 feet. The son was not injured. The man suffered burn marks on his neck and shoulder and was initially paralyzed on his left side. He required several weeks of hospital care and rehabilitation. Ironically, the man's brother was struck 8 years earlier in Colorado.

New Mexico: A 17-year-old woman was injured by lightning near Deming. The horse she was riding was killed. She was revived by CPR and was hospitalized with burns on her feet, legs, and chest. The worst burns were around her neck. The metal necklace she was wearing disintegrated.

JULY

Florida: Lightning struck a nursing home in Fort Myers and injured a man inside. Four people working on a car near Pensacola were injured by lightning, all four were hospitalized.

Georgia: Two brothers were struck and injured by lightning while flying kites atop Stone Mountain. A man was thrown several feet out of his chair by a lightning strike while talking on the telephone in Duluth. A woman was killed by lightning that traveled through the plumbing in her bathroom in Gainesville. Lightning destroyed a chicken house and killed 12,000 chickens in Monroe.

Indiana: A 72-year-old man in Reddington was struck and killed by lightning as he was trying to get his tractor in the barn before the storm hit. Two men working in a barn at the Elkhart County Fairgrounds were injured when lightning struck the barn. The lightning killed a horse in the barn.

Iowa: A 32-year-old construction worker was killed by lightning at a construction site in Morningside.

Kentucky: A 4-year-old girl and her 52-year-old grandmother were struck by lightning while picnicking in Lincoln County. The girl died instantly and the grandmother died two days later in the hospital.

Pennsylvania: Lightning struck at a ball field near Manayunk killing one man and injuring another.

AUGUST

Arizona: Lightning struck some trees, killing a teenager and severely injuring his 51-year-old stepfather in Coconino County.

Florida: A fireman in Sarasota County was struck by lightning and knocked unconscious for a short time as he was fighting a blaze from a previous strike. A 26-year-old German tourist was struck and killed by lightning on the Miami Beach. A 55-year-old man was killed by lightning at Homestead as he was unloading Hurricane Andrew relief supplies.

Indiana: A man near Doolittle was killed by lightning while scouting for deer. He was in a tree when the lightning struck.

Kentucky: A 14-year-old boy was struck and killed by lightning while hanging tobacco in Shelby County.

Mississippi: Four teenagers in Lucedale had been swimming and were on their way to their car when lightning struck them knocking all four to the ground. A 14-year-old was killed.

New Mexico: A 42-year-old New Mexico Tech professor was killed by lightning while walking near a dormitory on the campus in Soccoro. Ironically, the victim's wife was employed by the school's lightning research laboratory.

Ohio: A 31-year-old man in North Canton was killed by lightning while working on a roof. A 6-year-old boy suffered minor injuries when struck by lightning while climbing a fence in Painesville.

Oklahoma: Nine military personnel near Camp Gruber were injured when their tent was struck by lightning.

Pennsylvania: Lightning struck a 54-year-old man while he was boating on Presque Isle Bay near Litton Dock. He died a short time later.

SEPTEMBER

Florida: A 21-year-old man was struck and killed by lightning while fishing in the Gulf of Mexico near Pine Island.

Kentucky: A 36-year-old man and his 32-year-old fiancee were struck and killed by lightning while standing under a tree at a golf course in Florence.

North Carolina: A 5-year-old girl was struck and killed by lightning and a 7-year-old boy was injured while they were playing near a large oak tree in Old Fort.

Texas: Four construction workers were struck by lightning in Houston. One was critically injured and died later.

Utah: Two geologists conducting research in extreme western Utah (20 miles south of Callao) were struck and killed by lightning.

OCTOBER

Texas: Lightning struck the Dueitt Middle School football field in Harris County during practice. Thirty-four students and one coach were injured and taken to the hospital. They were later released.

NOVEMBER

Georgia: Lightning struck the ground in Mt. Zion, traveled to an abandoned house, and started a fire.

DECEMBER

Oklahoma: Lightning struck two homes in Oklahoma City producing a large hole in each roof.

Additional information is presented in the following tables.

More detailed information about lightning data can be obtained in the monthly *Storm Data* publication. The National Climatic Data Center has lightning data available on magnetic tape for the period 1959-1992. The tape contains the date/time (year, month, day, and hour), location (state and county), number of fatalities, number of injuries, and amount of damage. A copy of this tape can be obtained by contacting the National Climatic Data Center, Federal Building, 37 Battery Park Avenue, Asheville, North Carolina 28801-2733 (telephone: (704) 271-4800.

TOTAL DEATHS BY STATE AND NATION FOR YEAR 1992

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	0	1	0	0	0	0	0	0	0	0	1
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	1	0	0	1	0	0	0	0	2
ARKANSAS	0	0	0	0	0	0	0	0	0	0	0	0	0
CALIFORNIA	0	0	0	0	0	0	0	0	0	0	0	0	0
COLORADO	0	0	0	1	0	1	0	1	0	0	0	0	3
CONNECTICUT	0	0	0	0	0	0	0	0	0	0	0	0	0
DELAWARE	0	0	0	0	0	0	0	0	0	0	0	0	0
DISTRICT OF COLUMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	0	0	0	0	0	2	0	2	1	0	0	0	5
GEORGIA	0	0	0	0	0	0	1	0	0	0	0	0	1
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	0	0	1	0	0	0	0	0	0	1
ILLINOIS	0	0	0	0	0	0	0	0	0	0	0	0	0
INDIANA	0	0	0	0	0	0	1	1	0	0	0	0	2
IOWA	0	0	0	0	0	0	1	0	0	0	0	0	1
KANSAS	0	0	0	0	0	0	0	0	0	0	0	0	0
KENTUCKY	0	0	0	0	0	0	2	1	2	0	0	0	5
LOUISIANA	0	0	0	0	0	1	0	0	0	0	0	0	1
MAINE	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND	0	0	0	0	0	0	0	0	0	0	0	0	0
MASSACHUSETTS	0	0	0	0	0	0	0	0	0	0	0	0	0
MICHIGAN	0	0	0	0	0	0	0	0	0	0	0	0	0
MINNESOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
MISSISSIPPI	0	0	0	0	0	0	0	1	0	0	0	0	1
MISSOURI	0	0	0	0	0	0	0	0	0	0	0	0	0
MONTANA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	0	0	0	0	1	0	0	0	0	0	0	0	1
NEVADA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY	0	0	0	0	0	0	1	0	0	0	0	0	1
NEW MEXICO	0	0	0	0	2	0	0	1	0	0	0	0	3
NEW YORK	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH CAROLINA	0	0	0	0	0	0	0	0	1	0	0	0	1
NORTH DAKOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
OHIO	0	0	0	0	0	0	0	1	0	0	0	0	1
OKLAHOMA	0	0	0	0	0	0	0	0	0	0	0	0	0
OREGON	0	0	0	0	0	0	0	0	1	0	0	0	1
PENNSYLVANIA	0	0	0	0	0	0	1	1	0	0	0	0	2
PUERTO RICO	0	0	0	0	0	0	0	0	0	0	0	0	0
RHODE ISLAND	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH CAROLINA	0	0	0	0	1	1	0	0	0	0	0	0	2
SOUTH DAKOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
TENNESSEE	0	0	0	0	0	0	0	0	0	0	0	0	0
TEXAS	0	0	0	0	1	0	1	0	1	0	0	0	3
UTAH	0	0	0	0	0	0	0	0	2	0	0	0	2
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON	0	0	0	0	0	0	1	0	0	0	0	0	1
WEST VIRGINIA	0	0	0	0	0	0	0	0	0	0	0	0	0
WISCONSIN	0	0	0	0	0	0	0	0	0	0	0	0	0
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL: UNITED STATES	0	0	0	2	6	6	9	10	8	0	0	0	41

TOTAL INJURIES BY STATE AND NATION FOR YEAR 1992

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	1	0	0	0	0	0	1	0	0	0	2
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	0	2	0	2	0	0	0	0	4
ARKANSAS	0	0	0	0	1	0	0	0	0	0	0	0	1
CALIFORNIA	0	0	2	0	0	0	0	0	0	0	0	0	2
COLORADO	0	0	0	2	3	9	4	4	0	0	0	0	22
CONNECTICUT	0	0	0	0	0	0	0	1	0	0	0	0	1
DELAWARE	0	0	0	0	0	0	0	0	0	0	0	0	0
DISTRICT OF COLUMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	0	0	1	2	1	8	17	13	4	0	0	0	46
GEORGIA	0	0	0	0	0	0	10	2	0	0	0	0	12
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	0	0	2	0	0	0	0	0	0	2
ILLINOIS	0	0	0	0	1	2	3	0	4	5	0	0	15
INDIANA	0	0	0	1	0	2	5	1	0	0	0	0	9
IOWA	0	0	0	0	0	1	0	1	0	0	0	0	2
KANSAS	0	0	0	0	0	1	1	0	1	0	0	0	3
KENTUCKY	0	0	0	0	0	0	0	0	0	0	0	0	0
LOUISIANA	0	0	0	1	0	0	2	0	0	0	0	0	3
MAINE	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND	0	0	0	0	0	1	3	0	0	1	0	0	5
MASSACHUSETTS	0	0	0	0	0	0	0	0	0	0	0	0	0
MICHIGAN	0	0	0	0	0	0	1	0	4	0	0	0	5
MINNESOTA	0	0	0	0	0	0	0	0	0	0	0	0	0
MISSISSIPPI	0	0	0	0	0	0	0	0	0	0	0	0	0
MISSOURI	0	0	0	0	0	0	4	0	1	0	0	0	5
MONTANA	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	0	0	0	0	1	0	0	1	1	0	0	0	3
NEVADA	0	0	0	0	0	0	1	0	0	0	0	0	1
NEW HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY	0	0	0	0	0	0	2	0	0	0	0	0	2
NEW MEXICO	0	0	0	0	5	3	1	1	0	0	0	0	10
NEW YORK	0	0	0	0	0	3	0	3	0	0	0	0	6
NORTH CAROLINA	0	0	0	1	0	0	2	0	2	0	0	0	5
NORTH DAKOTA	0	0	0	0	0	1	2	0	0	0	0	0	3
OHIO	0	0	0	0	5	2	10	1	1	0	0	0	19
OKLAHOMA	0	0	0	3	1	0	1	9	1	0	0	0	15
OREGON	0	0	0	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA	0	0	0	0	0	1	1	3	1	0	0	0	6
PUERTO RICO	0	0	0	0	0	0	0	0	0	0	0	0	0
RHODE ISLAND	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH CAROLINA	0	0	0	0	0	0	3	0	0	0	0	0	3
SOUTH DAKOTA	0	0	0	0	1	0	0	0	0	0	0	0	1
TENNESSEE	0	0	0	0	21	0	2	0	0	0	0	0	23
TEXAS	0	0	0	0	0	0	1	1	4	35	0	0	41
UTAH	0	0	0	0	1	0	0	1	4	1	0	0	7
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	0	0	0	0	0	0	1	0	0	0	0	0	1
WASHINGTON	0	0	0	0	0	0	1	0	0	0	0	0	1
WEST VIRGINIA	0	0	0	0	0	0	1	2	0	0	0	0	3
WISCONSIN	0	0	0	0	0	0	1	0	2	0	0	0	3
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL: UNITED STATES	0	0	4	10	41	38	80	46	31	42	0	0	292

TOTAL DEATHS BY STATE AND NATION FOR PERIOD 1959-92

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	0	0	2	3	5	23	28	20	1	1	0	0	83
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	0	0	0	0	3	1	23	16	12	1	0	0	56
ARKANSAS	0	0	8	0	13	32	28	20	6	0	0	1	108
CALIFORNIA	0	0	0	0	0	2	8	5	5	0	0	0	20
COLORADO	0	0	0	3	10	21	38	17	1	1	0	0	91
CONNECTICUT	0	0	0	0	0	4	5	3	1	0	0	0	13
DELAWARE	0	0	0	0	2	2	7	3	0	0	0	0	14
DISTRICT OF COLUMBIA	0	0	0	0	1	2	1	1	0	0	0	0	5
FLORIDA	0	0	5	4	28	81	85	85	39	4	1	1	333
GEORGIA	0	0	2	5	6	18	33	12	2	1	0	0	79
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	0	0	0	1	1	7	5	5	1	0	0	0	20
ILLINOIS	0	0	0	4	10	23	13	14	11	2	0	0	77
INDIANA	0	0	1	2	8	21	18	14	5	2	0	0	71
IOWA	0	0	1	3	11	20	7	13	4	4	0	0	63
KANSAS	0	0	0	4	10	7	14	12	4	2	2	0	55
KENTUCKY	1	0	0	3	10	21	19	15	12	0	0	0	81
LOUISIANA	1	0	1	5	10	22	42	16	11	0	4	1	113
MAINE	0	0	0	0	0	3	6	9	0	3	0	0	21
MARYLAND	0	0	0	0	4	5	10	11	1	1	0	81*	113
MASSACHUSETTS	0	0	0	1	3	4	6	9	1	0	0	0	24
MICHIGAN	0	0	0	1	7	22	28	23	7	0	0	0	88
MINNESOTA	0	0	0	3	3	11	11	13	10	1	0	0	52
MISSISSIPPI	1	0	4	2	12	14	27	22	6	0	0	0	88
MISSOURI	0	0	5	4	20	19	14	8	3	1	0	0	74
MONTANA	0	0	0	0	2	8	6	2	1	0	0	0	19
NEBRASKA	0	0	0	1	4	15	8	6	4	0	0	0	38
NEVADA	0	0	0	0	0	2	0	2	1	0	0	0	5
NEW HAMPSHIRE	0	0	0	0	0	3	3	0	0	0	0	0	6
NEW JERSEY	0	0	0	1	3	8	23	14	6	0	0	0	55
NEW MEXICO	0	0	0	1	7	11	23	30	5	0	0	0	77
NEW YORK	0	0	0	0	9	20	61	26	6	2	0	0	124
NORTH CAROLINA	0	1	5	3	23	37	54	35	6	0	0	0	164
NORTH DAKOTA	0	0	0	0	0	4	4	3	0	0	0	0	11
OHIO	0	0	0	3	10	22	43	18	10	2	2	0	110
OKLAHOMA	1	1	1	10	14	13	7	20	13	3	2	0	85
OREGON	0	0	0	0	2	0	0	1	3	1	0	0	7
PENNSYLVANIA	0	1	0	1	8	26	30	26	9	1	0	0	102
PUERTO RICO	0	0	0	0	0	3	9	9	5	3	0	0	29
RHODE ISLAND	0	0	0	0	0	1	1	0	2	0	0	0	4
SOUTH CAROLINA	0	0	1	0	7	12	31	16	8	0	0	0	75
SOUTH DAKOTA	0	0	0	0	4	2	6	1	3	3	0	0	19
TENNESSEE	0	1	1	7	15	32	25	21	14	2	3	0	121
TEXAS	0	0	1	15	30	19	42	24	17	7	1	0	156
UTAH	0	0	0	3	1	5	8	9	4	1	0	0	31
VERMONT	0	0	0	0	0	4	5	4	0	0	0	0	13
VIRGINIA	0	0	0	0	10	10	11	10	3	0	0	0	44
WASHINGTON	0	0	0	0	0	1	1	0	0	0	0	0	2
WEST VIRGINIA	0	0	0	0	4	2	10	3	1	0	0	0	20
WISCONSIN	0	0	1	1	2	9	12	15	2	1	1	1	45
WYOMING	0	0	0	0	2	4	7	6	2	0	0	0	21
TOTAL: UNITED STATES	4	4	39	94	334	658	906	667	268	50	16	85	3125

* ON DECEMBER 8, 1963 THE CRASH OF A JETLINER KILLING 81 PEOPLE NEAR ELKTON, MARYLAND, WAS ATTRIBUTED TO LIGHTNING BY THE CIVIL AERONAUTICS BOARD INVESTIGATORS.

TOTAL INJURIES BY STATE AND NATION FOR PERIOD 1959-92

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
ALABAMA	6	1	11	3	11	24	76	52	3	4	0	0	191
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	2	0	0	0	6	3	30	38	18	3	0	0	100
ARKANSAS	1	2	2	27	32	41	38	61	13	1	0	2	220
CALIFORNIA	1	0	2	13	0	2	15	7	13	1	1	1	56
COLORADO	0	0	0	5	36	88	79	59	11	0	0	0	278
CONNECTICUT	0	0	2	0	7	20	17	12	6	3	0	0	67
DELAWARE	0	0	0	0	8	12	4	1	2	0	0	0	27
DISTRICT OF COLUMBIA	0	0	0	0	10	4	1	1	0	0	1	0	17
FLORIDA	0	2	18	21	46	219	259	234	153	28	0	1	981
GEORGIA	0	0	5	9	22	76	135	41	4	5	0	0	297
HAWAII	0	0	0	0	0	0	0	3	0	0	0	0	3
IDAHO	0	0	0	1	6	19	15	21	4	1	0	0	67
ILLINOIS	12	0	2	2	22	55	72	48	38	7	0	0	258
INDIANA	0	0	2	5	21	34	44	35	5	0	0	0	146
IOWA	0	0	2	9	22	46	40	20	16	3	1	0	159
KANSAS	0	0	5	11	18	27	46	31	30	5	1	0	174
KENTUCKY	0	0	0	2	22	62	61	36	10	1	0	0	194
LOUISIANA	1	0	6	4	15	18	103	42	15	2	2	1	209
MAINE	0	0	0	0	4	12	28	54	0	0	1	0	99
MARYLAND	0	0	0	0	36	21	39	21	8	3	0	0	128
MASSACHUSETTS	0	0	1	11	21	44	108	75	26	4	2	1	293
MICHIGAN	0	0	2	9	41	141	130	209	51	6	0	0	589
MINNESOTA	0	0	0	0	15	29	28	20	9	4	0	0	105
MISSISSIPPI	1	2	8	3	13	15	109	40	10	2	3	1	207
MISSOURI	0	1	3	8	20	16	8	15	10	2	4	0	87
MONTANA	0	0	0	0	5	14	10	11	2	0	0	0	42
NEBRASKA	0	0	0	4	15	8	13	17	7	0	0	0	64
NEVADA	0	0	0	0	0	2	2	4	1	0	0	0	9
NEW HAMPSHIRE	0	0	0	0	2	21	32	5	2	0	0	0	62
NEW JERSEY	0	0	0	0	5	11	56	21	16	0	0	0	109
NEW MEXICO	0	0	0	1	24	18	58	52	6	0	0	0	159
NEW YORK	0	0	0	1	18	80	147	139	25	4	1	0	415
NORTH CAROLINA	0	2	29	16	42	75	121	123	32	2	1	0	443
NORTH DAKOTA	0	0	0	0	2	4	6	6	4	0	0	0	22
OHIO	0	0	32	3	61	59	73	108	54	4	12	0	406
OKLAHOMA	1	1	3	20	33	38	34	48	24	19	5	2	228
OREGON	0	0	0	1	2	2	0	9	5	0	0	0	19
PENNSYLVANIA	0	6	0	0	22	114	124	139	48	2	0	0	455
PUERTO RICO	0	0	0	0	0	0	3	0	2	1	0	0	6
RHODE ISLAND	0	2	0	0	2	13	12	12	3	0	1	0	45
SOUTH CAROLINA	0	0	0	6	21	24	104	37	23	1	1	0	217
SOUTH DAKOTA	0	0	0	1	5	19	18	10	1	2	0	0	56
TENNESSEE	0	1	4	8	52	60	114	54	21	5	0	0	319
TEXAS	1	2	7	39	45	48	38	50	34	47	2	0	313
UTAH	0	0	0	1	6	19	17	18	8	3	0	0	72
VERMONT	0	0	0	0	0	3	11	3	0	0	0	0	17
VIRGINIA	0	0	1	4	9	21	93	33	7	0	0	0	168
WASHINGTON	0	0	0	0	5	1	8	8	0	1	0	1	24
WEST VIRGINIA	0	0	0	1	0	4	50	28	1	1	0	0	85
WISCONSIN	0	1	2	4	20	27	66	43	9	2	2	0	176
WYOMING	0	0	0	0	4	32	18	21	6	0	0	0	81
TOTAL: UNITED STATES	26	23	149	253	854	1745	2713	2175	796	179	41	10	8964

NATIONAL TOTAL DEATHS BY YEAR FOR PERIOD 1959-92

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1959	1	0	1	4	18	25	50	39	13	7	0	0	158
1960	0	0	1	5	7	33	25	17	9	0	0	0	97
1961	0	0	1	2	9	23	47	20	10	1	0	0	113
1962	0	0	3	6	27	20	26	28	9	1	0	0	120
1963	0	0	4	3	11	37	42	20	10	2	0	81*	210
1964	0	0	9	6	15	21	29	19	7	1	1	0	108
1965	0	0	2	4	12	34	39	28	4	2	0	0	125
1966	0	0	1	1	8	15	21	16	11	3	0	0	76
1967	1	0	1	2	3	26	21	14	1	2	1	1	73
1968	0	0	0	1	5	24	30	29	9	3	1	1	103
1969	0	0	1	5	13	17	27	13	14	3	0	0	93
1970	0	0	0	1	17	25	27	19	21	1	0	0	111
1971	0	0	2	1	12	27	33	19	19	0	0	0	113
1972	0	0	1	1	5	21	31	28	3	1	0	0	91
1973	0	1	2	3	10	24	31	18	13	2	1	0	105
1974	0	2	0	7	12	21	28	24	6	0	2	0	102
1975	0	1	3	3	11	19	28	18	6	2	0	0	91
1976	0	0	0	1	9	19	19	19	3	2	0	0	72
1977	0	0	0	4	9	19	16	35	14	1	0	0	98
1978	0	0	1	1	9	26	24	22	3	1	0	1	88
1979	0	0	0	3	11	4	20	16	4	3	2	0	63
1980	0	0	0	0	7	16	27	20	5	1	0	0	76
1981	0	0	0	4	5	13	19	19	5	0	2	0	67
1982	1	0	0	3	5	14	29	18	4	3	0	0	77
1983	0	0	1	2	4	8	28	23	8	1	2	0	77
1984	0	0	1	3	10	14	20	10	7	1	1	0	67
1985	0	0	0	5	12	12	26	8	8	1	1	0	73
1986	0	0	0	2	9	13	21	17	5	1	0	0	68
1987	0	0	0	2	14	18	28	15	7	2	0	0	86
1988	0	0	0	3	9	17	21	14	2	1	2	0	69
1989	0	0	1	1	9	14	19	18	4	1	0	0	67
1990	1	0	3	1	3	18	22	15	10	0	0	1	74
1991	0	0	0	2	8	15	23	19	6	0	0	0	73
1992	0	0	0	2	6	6	9	10	8	0	0	0	41
TOTAL	4	4	39	94	334	658	906	667	268	50	16	85	3125
MEAN	0	0	1	3	10	19	27	20	8	1	0	3	92

* ON DECEMBER 8, 1963 THE CRASH OF A JETLINER KILLING 81 PEOPLE NEAR ELKTON, MARYLAND, WAS ATTRIBUTED TO LIGHTNING BY THE CIVIL AERONAUTICS BOARD INVESTIGATORS.

NATIONAL TOTAL INJURIES BY YEAR FOR PERIOD 1959-92

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1959	0	0	0	5	27	52	110	103	23	3	1	1	325
1960	0	0	2	11	12	70	28	50	16	9	4	0	202
1961	0	0	7	14	15	49	83	50	31	5	1	1	256
1962	0	0	3	5	39	38	90	49	12	6	0	0	242
1963	7	0	0	6	14	64	55	44	18	1	0	0	209
1964	0	0	10	15	14	38	99	53	8	1	1	0	239
1965	3	2	2	4	26	42	59	59	19	1	0	0	217
1966	0	2	1	2	37	39	42	44	15	1	0	0	183
1967	0	0	0	4	7	35	59	33	4	2	0	1	145
1968	0	0	4	2	16	52	117	155	14	9	1	0	370
1969	0	0	0	4	19	75	39	23	12	0	0	1	173
1970	0	0	1	5	40	40	82	43	43	4	1	0	259
1971	0	1	0	1	24	71	79	54	22	1	1	0	254
1972	0	0	8	6	12	24	72	54	24	2	1	0	203
1973	0	0	10	2	20	23	74	59	29	9	2	0	228
1974	1	9	1	3	12	27	56	51	12	1	0	0	173
1975	0	3	0	1	30	60	107	154	42	1	0	1	399
1976	0	1	0	7	16	39	73	68	13	1	0	1	219
1977	0	0	0	3	35	58	58	67	62	4	4	0	291
1978	0	0	5	3	19	100	73	54	42	5	0	0	301
1979	0	2	4	26	32	73	55	49	9	2	2	0	254
1980	0	1	2	11	11	49	50	134	16	1	0	0	275
1981	1	0	2	9	34	60	108	52	9	3	13	0	291
1982	1	0	2	6	38	20	54	32	11	4	4	2	174
1983	0	0	24	3	25	24	87	113	30	31	0	0	337
1984	0	0	7	5	13	43	80	53	44	7	1	0	253
1985	0	0	29	4	42	48	61	33	27	4	0	0	248
1986	0	2	4	2	15	68	112	43	22	3	0	0	271
1987	0	0	2	8	66	49	121	70	43	3	1	1	364
1988	0	0	1	14	22	53	133	63	19	5	1	0	311
1989	1	0	8	16	23	70	135	51	12	4	2	0	322
1990	12	0	4	6	10	43	88	62	25	1	0	1	252
1991	0	0	2	30	48	111	94	107	37	3	0	0	432
1992	0	0	4	10	41	38	80	46	31	42	0	0	292
TOTAL	26	23	149	253	854	1745	2713	2175	796	179	41	10	8964
MEAN	1	1	4	7	25	51	80	64	23	5	1	0	264

LIGHTNING DEATHS BY STATE, RANK, AND LOCATION OF OCCURRENCE

1959-1992 | 1992

STATE	RANK	OPEN FIELDS, BALL PARKS, AND OPEN SPACES		UNDER TREES		BOATING, FISHING AND WATER RELATED		NEAR TRACTORS HEAVY ROAD EQUIPMENT		GOLF COURSES		AT TELEPHONES		VARIOUS OTHER AND UNKNOWN LOCATIONS		OPEN FIELDS, BALL PARKS, AND OPEN SPACES		UNDER TREES		BOATING, FISHING AND WATER RELATED		NEAR TRACTORS HEAVY ROAD EQUIPMENT		GOLF COURSES		AT TELEPHONES		VARIOUS OTHER AND UNKNOWN LOCATIONS	
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
ALABAMA	15	19	23	22	27	8	10	4	5	1	1	2	2	27	33	0	0	1	100	0	0	0	0	0	0	0	0	0	0
ALASKA	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	24	25	45	8	14	5	9	0	0	4	7	3	5	11	20	0	0	2	100	0	0	0	0	0	0	0	0	0	0
ARKANSAS	9	35	32	21	19	11	10	8	7	3	3	0	0	30	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CALIFORNIA	38	5	25	3	15	2	10	3	15	0	0	0	0	7	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COLORADO	11	45	49	18	20	4	4	3	3	6	7	0	0	15	16	2	67	0	0	0	0	0	0	1	33	0	0	0	0
CONNECTICUT	42	3	23	2	15	0	0	0	0	3	23	0	0	5	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELAWARE	41	4	29	0	0	4	29	1	7	0	0	0	0	5	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DISTRICT OF COLUMBIA	48	2	40	2	40	0	0	0	0	1	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	1	91	27	44	13	84	25	21	6	10	3	0	0	83	25	4	80	0	0	1	20	0	0	0	0	0	0	0	0
GEORGIA	17	22	28	20	25	11	14	1	1	5	6	2	3	18	23	0	0	0	0	0	0	0	0	0	0	0	0	1	100
HAWAII	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	37	11	55	3	15	2	10	3	15	1	5	0	0	0	0	0	0	0	0	0	0	1	100	0	0	0	0	0	0
ILLINOIS	18	17	22	12	16	3	4	8	10	7	9	1	1	29	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INDIANA	22	11	15	21	30	6	8	7	10	1	1	2	3	23	32	0	0	1	50	0	0	1	50	0	0	0	0	0	0
IOWA	23	8	13	8	13	1	2	7	11	2	3	0	0	37	59	0	0	0	0	0	0	1	100	0	0	0	0	0	0
KANSAS	25	15	27	1	2	4	7	10	18	2	4	0	0	23	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KENTUCKY	16	23	28	12	15	4	5	4	5	2	2	1	1	35	43	2	40	2	40	0	0	1	20	0	0	0	0	0	0
LOUISIANA	7	15	13	31	27	37	33	8	7	0	0	0	0	22	19	0	0	0	0	1	100	0	0	0	0	0	0	0	0
MAINE	34	0	0	3	14	7	33	0	0	0	0	0	0	11	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND *	6	9	8	5	4	15	13	0	0	0	0	0	0	84	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MASSACHUSETTS	33	4	17	3	13	1	4	0	0	1	4	1	4	14	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MICHIGAN	12	24	27	23	26	10	11	2	2	10	11	2	2	17	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MINNESOTA	27	16	31	13	25	5	10	6	12	1	2	2	4	9	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MISSISSIPPI	13	29	33	21	24	11	13	5	6	0	0	0	0	22	25	0	0	0	0	1	100	0	0	0	0	0	0	0	0
MISSOURI	21	16	22	17	23	10	14	5	7	3	4	2	3	21	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MONTANA	39	7	37	2	11	2	11	4	21	0	0	0	0	4	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	30	16	42	2	5	4	11	10	26	0	0	0	0	6	16	0	0	0	0	1	100	0	0	0	0	0	0	0	0
NEVADA	47	0	0	0	0	1	20	0	0	0	0	0	0	4	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW HAMPSHIRE	46	2	33	0	0	1	17	0	0	1	17	0	0	2	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY	26	19	35	5	9	13	24	2	4	4	7	2	4	10	18	1	100	0	0	0	0	0	0	0	0	0	0	0	0
NEW MEXICO	19	38	49	13	17	6	8	0	0	1	1	0	0	19	25	3	100	0	0	0	0	0	0	0	0	0	0	0	0
NEW YORK	4	20	16	31	25	17	14	4	3	5	4	1	1	46	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH CAROLINA	2	34	21	25	15	22	13	6	4	7	4	1	1	69	42	0	0	1	100	0	0	0	0	0	0	0	0	0	0
NORTH DAKOTA	44	2	18	0	0	0	0	3	27	0	0	0	0	6	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OHIO	8	33	30	20	18	15	14	6	5	7	6	1	1	28	25	0	0	0	0	0	0	0	0	0	0	0	0	1	100
OKLAHOMA	14	30	35	11	13	15	18	6	7	1	1	2	2	20	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OREGON	45	3	43	1	14	0	0	0	0	0	0	0	0	3	43	0	0	1	100	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA	10	31	30	13	13	4	4	3	3	11	11	2	2	38	37	1	50	0	0	1	50	0	0	0	0	0	0	0	0
PUERTO RICO	32	11	38	8	28	1	3	0	0	0	0	0	0	9	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RHODE ISLAND	49	0	0	0	0	1	25	0	0	0	0	0	0	3	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH CAROLINA	20	16	21	15	20	8	11	9	12	1	1	3	4	23	31	0	0	0	0	1	50	0	0	0	0	0	0	0	0
SOUTH DAKOTA	40	5	26	1	5	2	11	8	42	1	5	0	0	2	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TENNESSEE	5	33	27	32	26	9	7	9	7	7	6	2	2	29	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TEXAS	3	64	41	25	16	22	14	11	7	4	3	0	0	30	19	0	0	1	33	0	0	2	67	0	0	0	0	0	0
UTAH	31	13	42	9	29	2	6	0	0	1	3	1	3	5	16	2	100	0	0	0	0	0	0	0	0	0	0	0	0
VERMONT	43	1	8	1	8	4	31	0	0	0	0	0	0	7	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	29	8	18	9	20	6	14	3	7	2	5	0	0	16	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON	50	1	50	0	0	0	0	1	50	0	0	0	0	0	0	0	0	0	0	0	0	1	100	0	0	0	0	0	0
WEST VIRGINIA	36	6	30	4	20	2	10	0	0	1	5	0	0	7	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WISCONSIN	28	8	18	3	7	9	20	4	9	6	13	0	0	15	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WYOMING	35	11	52	2	10	3	14	1	5	0	0	0	0	4	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITED STATES	0	861	28	545	17	414	13	196	6	123	4	33	1	953	30	15	37	9	22	6	15	8	20	1	2	0	0	2	5

* ON DECEMBER 8, 1963 THE CRASH OF A JETLINER KILLING 81 PEOPLE NEAR ELTON, MARYLAND, WAS ATTRIBUTED TO LIGHTNING BY THE CIVIL AERONAUTICS BOARD INVESTIGATORS.

LIGHTNING INJURIES BY STATE, RANK, AND LOCATION OF OCCURRENCE

1959-1992

STATE	RANK	OPEN FIELDS, BALL PARKS, AND OPEN SPACES		UNDER TREES		BOATING, FISHING AND WATER RELATED		NEAR TRACTORS HEAVY ROAD EQUIPMENT		GOLF COURSES		AT TELEPHONES		VARIOUS OTHER AND UNKNOWN LOCATIONS	
		NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
ALABAMA	19	58	30	42	22	3	2	1	1	1	1	11	6	75	39
ALASKA	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	29	64	64	7	7	2	2	6	6	1	1	0	0	20	20
ARKANSAS	14	49	22	28	13	12	5	7	3	4	2	11	5	109	50
CALIFORNIA	39	11	20	10	18	5	9	2	4	0	0	0	0	28	50
COLORADO	11	116	42	28	10	18	6	7	3	17	6	4	1	88	32
CONNECTICUT	36	6	9	22	33	4	6	0	0	3	4	3	4	29	43
DELAWARE	43	9	33	10	37	0	0	0	0	0	0	2	7	6	22
DISTRICT OF COLUMBIA	48	11	65	3	18	0	0	1	6	1	6	0	0	1	6
FLORIDA	1	313	32	88	9	145	15	42	4	39	4	24	2	330	34
GEORGIA	9	113	38	35	12	20	7	3	1	21	7	5	2	100	34
HAWAII	51	2	67	0	0	0	0	0	0	0	0	1	33	0	0
IDAHO	35	12	18	7	10	2	3	2	3	2	3	4	6	38	57
ILLINOIS	12	93	36	64	25	2	1	9	3	17	7	9	3	64	25
INDIANA	25	22	15	30	21	12	8	10	7	8	5	4	3	60	41
IOWA	23	28	18	20	13	1	1	1	1	2	1	2	1	105	66
KANSAS	21	26	15	14	8	2	1	7	4	10	6	7	4	108	62
KENTUCKY	18	55	28	23	12	9	5	4	2	13	7	7	4	83	43
LOUISIANA	16	97	46	33	16	19	9	4	2	0	0	2	1	54	26
MAINE	30	4	4	39	39	4	4	0	0	1	1	2	2	49	49
MARYLAND *	26	48	38	17	13	17	13	5	4	3	2	1	1	37	29
MASSACHUSETTS	10	58	20	12	4	9	3	5	2	2	1	5	2	202	69
MICHIGAN	2	224	38	103	17	26	4	15	3	31	5	17	3	173	29
MINNESOTA	28	14	13	19	18	6	6	5	5	12	11	11	10	38	36
MISSISSIPPI	17	71	34	38	18	29	14	2	1	4	2	15	7	48	23
MISSOURI	31	32	37	16	18	1	1	1	1	3	3	3	3	31	36
MONTANA	42	14	33	5	12	8	19	1	2	3	7	0	0	11	26
NEBRASKA	37	22	34	1	2	1	2	5	8	6	9	5	8	24	38
NEVADA	49	4	44	1	11	0	0	0	0	0	0	0	0	4	44
NEW HAMPSHIRE	38	11	18	1	2	0	0	1	2	4	6	1	2	44	71
NEW JERSEY	27	53	49	0	0	8	7	1	1	5	5	2	2	40	37
NEW MEXICO	24	96	60	23	14	2	1	4	3	4	3	1	1	29	18
NEW YORK	5	49	12	96	23	24	6	22	5	7	2	9	2	208	50
NORTH CAROLINA	4	138	31	35	8	28	6	9	2	22	5	8	2	203	46
NORTH DAKOTA	45	7	32	1	5	1	5	4	18	0	0	1	5	8	36
OHIO	6	94	23	80	20	12	3	4	1	32	8	11	3	173	43
OKLAHOMA	13	87	38	12	5	9	4	10	4	5	2	16	7	89	39
OREGON	46	6	32	0	0	0	0	1	5	0	0	1	5	11	58
PENNSYLVANIA	3	159	35	19	4	5	1	2	0	10	2	5	1	255	56
PUERTO RICO	50	1	17	1	17	0	0	0	0	0	0	0	0	4	67
RHODE ISLAND	41	10	22	15	33	0	0	0	0	2	4	0	0	18	40
SOUTH CAROLINA	15	56	26	13	6	11	5	7	3	2	1	5	2	123	57
SOUTH DAKOTA	40	11	20	5	9	2	4	9	16	0	0	2	4	27	48
TENNESSEE	7	111	35	80	25	4	1	7	2	8	3	14	4	95	30
TEXAS	8	146	47	37	12	32	10	9	3	4	1	6	2	79	25
UTAH	34	26	36	15	21	3	4	2	3	5	7	4	6	17	24
VERMONT	47	5	29	1	6	0	0	0	0	0	0	0	0	11	65
VIRGINIA	22	16	10	35	21	8	5	2	1	7	4	3	2	97	58
WASHINGTON	44	3	13	4	17	0	0	1	4	0	0	2	8	14	58
WEST VIRGINIA	32	16	19	11	13	3	4	1	1	2	2	1	1	51	60
WISCONSIN	20	67	38	8	5	4	2	3	2	6	3	6	3	82	47
WYOMING	33	39	48	3	4	13	16	8	10	4	5	0	0	14	17
UNITED STATES	0	2783	31	1210	13	526	6	252	3	333	4	253	3	3607	40

1992

STATE	OPEN FIELDS, BALL PARKS, AND OPEN SPACES		UNDER TREES		BOATING, FISHING AND WATER RELATED		NEAR TRACTORS HEAVY ROAD EQUIPMENT		GOLF COURSES		AT TELEPHONES		VARIOUS OTHER AND UNKNOWN LOCATIONS	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
ALABAMA	1	50	0	0	0	0	0	0	0	0	1	50	0	0
ALASKA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARIZONA	2	50	1	25	0	0	1	25	0	0	0	0	0	0
ARKANSAS	1	100	0	0	0	0	0	0	0	0	0	0	0	0
CALIFORNIA	0	0	0	0	0	0	0	0	0	0	0	0	2	100
COLORADO	13	59	3	14	1	5	0	0	1	5	1	5	3	14
CONNECTICUT	0	0	0	0	0	0	0	0	0	0	0	0	1	100
DELAWARE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DISTRICT OF COLUMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA	9	20	3	7	3	7	17	37	0	0	1	2	13	28
GEORGIA	6	50	0	0	0	0	0	0	0	0	1	8	5	42
HAWAII	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IDAHO	1	50	0	0	0	0	0	0	0	0	0	0	1	50
ILLINOIS	3	20	4	27	1	7	0	0	1	7	0	0	6	40
INDIANA	1	11	0	0	0	0	3	33	0	0	1	11	4	44
IOWA	0	0	0	0	0	0	0	0	0	0	0	0	2	100
KANSAS	0	0	0	0	0	0	0	0	0	0	0	0	3	100
KENTUCKY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LOUISIANA	2	67	1	33	0	0	0	0	0	0	0	0	0	0
MAINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MARYLAND *	0	0	1	20	1	20	1	20	0	0	0	0	2	40
MASSACHUSETTS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MICHIGAN	4	80	0	0	0	0	0	0	0	0	0	0	1	20
MINNESOTA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MISSISSIPPI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MISSOURI	5	100	0	0	0	0	0	0	0	0	0	0	0	0
MONTANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEBRASKA	1	33	0	0	1	33	0	0	1	33	0	0	0	0
NEVADA	1	100	0	0	0	0	0	0	0	0	0	0	0	0
NEW HAMPSHIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW JERSEY	2	100	0	0	0	0	0	0	0	0	0	0	0	0
NEW MEXICO	3	30	2	20	0	0	1	10	1	10	0	0	3	30
NEW YORK	5	83	0	0	0	0	0	0	1	17	0	0	0	0
NORTH CAROLINA	1	20	1	20	0	0	0	0	0	0	0	0	3	60
NORTH DAKOTA	1	33	0	0	0	0	2	67	0	0	0	0	0	0
OHIO	3	16	0	0	2	11	0	0	0	0	0	0	14	74
OKLAHOMA	9	60	0	0	0	0	0	0	0	0	0	0	6	40
OREGON	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENNSYLVANIA	3	50	0	0	0	0	0	0	1	17	0	0	2	33
PUERTO RICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RHODE ISLAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH CAROLINA	0	0	0	0	0	0	0	0	0	0	0	0	3	100
SOUTH DAKOTA	1	100	0	0	0	0	0	0	0	0	0	0	0	0
TENNESSEE	20	87	0	0	0	0	0	0	0	0	3	13	0	0
TEXAS	36	88	1	2	0	0	4	10	0	0	0	0	0	0
UTAH	0	0	1	14	0	0	1	14	1	14	1	14	3	43
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	0	0	0	0	0	0	0	0	0	0	0	0	1	100
WASHINGTON	0	0	0	0	0	0	1	100	0	0	0	0	0	0
WEST VIRGINIA	1	33	0	0	0	0	0	0	0	0	0	0	2	67
WISCONSIN	2	67	0	0	0	0	0	0	0	0	0	0	1	33
WYOMING	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITED STATES	137	47	18	6	9	3	31	11	7	2	9	3	81	28

North Atlantic Hurricanes – 1992

Max Mayfield and Lixion Avila
National Hurricane Center

Only one hurricane made landfall in the contiguous United States in 1992– Andrew. A small and ferocious Cape Verde hurricane, Andrew wrought unprecedented economic devastation along a path through the northwestern Bahamas, the southern Florida peninsula, and south-central Louisiana. Damage in the United States is estimated at $20-25 billion, making Andrew the most expensive natural disaster in U.S. history. The tropical cyclone struck southern Dade County, Florida especially hard, with violent winds and storm surges characteristic of a category 4 hurricane on the Saffir-Simpson Hurricane Scale (SSHS), and with a central pressure (922 millibars) that is the third lowest this century for a hurricane at landfall in the United States. In Dade County alone, the forces of Andrew resulted in 15 deaths, and as many as one-quarter million people were made homeless. The direct loss of life seems remarkably low considering the enormous destruction caused by this hurricane.

There were six tropical storms of which four became hurricanes during the 1992 hurricane season. In addition, one subtropical storm formed during the year. While subtropical storms are relatively rare events, on the average ten are named tropical storms and six become hurricanes. For the second year in a row, no system reached hurricane intensity south of 25°N.

Subtropical Storm One

Subtropical Storm One formed from a non-frontal low pressure system about 600 nautical miles southeast of Bermuda on April 21st. Satellite imagery showed a large comma-shaped cloud pattern associated with the Low. Ship reports indicated that the Low was also present at the surface, and the subtropical depression stage began at this time.

The decision to issue advisories on this system was based primarily on the report from the ***Chiquita Belgie*** at 0600 UTC on the 22nd. The ship (25.0°N 61.0°W) reported a wind speed of 45 knots and a pressure of 1004.1 millibars. Its pressure tendency indicated that the pressure had been even lower during the preceding 3 hours. This was the basis for estimating a maximum wind speed of 45 knots and a minimum surface pressure of 1002 millibars associated with the system. By late on the 23rd, the storm weakened back to a depression and nearly stalled as strong upper-level westerly winds began to affect the area. It soon deteriorated into a low-level cloud swirl which eventually dissipated.

Prior to 1992, April had been the only month during which no tropical or subtropical storm had formed. However, subtropical cyclones have only been tracked since 1968 (tropical cyclone records go back to 1871), and it is possible that some systems that were designated extratropical prior to 1968 could have been subtropical.

Hurricane Andrew

Hurricane Andrew formed from a tropical wave which moved off the west coast of Africa on the 14th of August. The wave passed to the south of the Cape Verde Islands the following day and reached tropical depression stage on the 16th. By the 17th, it became Andrew, the first Atlantic tropical storm of the 1992 hurricane season. The tropical cyclone continued moving rapidly in the general direction of the Lesser Antilles.

Between the 17th and 20th, the tropical storm passed south of a High over the eastern Atlantic and changing steering currents gradually forced Andrew away from the Lesser Antilles towards a strong

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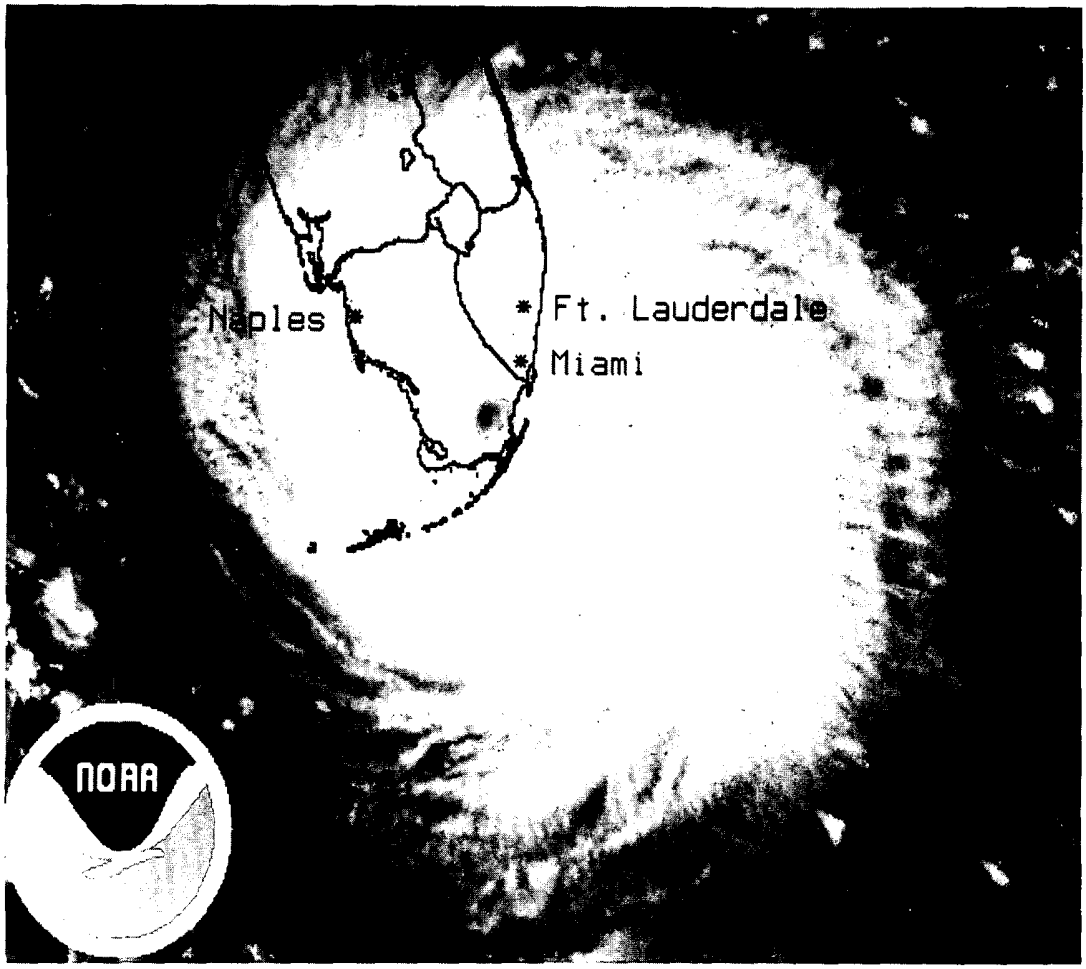


Andrew's eye is over land at 0916 UTC on the 24th of August just minutes after a central pressure of 922 mb was estimated at Homestead Air Force Base. This is the view from NOAA-11 and is infrared data. During landfall the maximum sustained wind speed was estimated at 125 knots with gusts to near 150 knots at the standard elevation of 30 feet. The sustained wind speed is based on a 1 minute average.

upper-level low pressure system centered about 500 nautical miles to the east-southeast of Bermuda. Andrew was then under the influence of strong southwesterly vertical wind shear and quite high surface pressures to its north. Air Force Reserve unit reconnaissance aircraft, on the 20th, found that the cyclone had degenerated and only a diffuse low-level circulation center remained.

Significant changes in the large-scale environment near and downstream from Andrew began by the 21st. The upper low east-southeast of Bermuda weakened and split resulting in a decrease of the vertical wind shear over Andrew while a strong, deep high pressure cell formed near the U.S. southeast coast with a ridge extending eastward just north of Andrew. The cyclone turned westward, accelerated to near 16 knots, and quickly intensified.

Andrew reached hurricane strength on the morning of the 22nd as an eye formed and the rate of strengthening increased. Just 36 hours later, Andrew reached the borderline between a category 4 and 5 hurricane and was at its peak intensity.

The High held steady and drove Andrew nearly due west for 2½ days beginning on the 22nd. Andrew was a category 4 hurricane when its eye passed through the Bahamas– over northern Eleuthera Island late on the 23rd and over the southern Berry Islands early on the 24th.

Andrew weakened when it passed over the western portion of the Great Bahama Bank and the pressure rose to 941 millibars. However, it rapidly reintensified during the last few hours preceding landfall on Florida as it moved over the Straits of Florida. It is estimated that the central pressure was 922 millibars at landfall near Homestead AFB, Florida at 0905 UTC (5:05 A.M. EDT) on the 24th of August.

The maximum sustained surface wind speed (1-minute average at 30 feet elevation) during landfall over Florida is estimated at 125 knots, with gusts at that elevation near 150 knots. The sustained wind speed corresponds to a category 4 hurricane on the Saffir-Simpson scale. Locally stronger winds occurred at heights more than 30 feet above the ground, such as on taller structures. Several unofficial reports of stronger gusts are being evaluated.

Andrew moved nearly due west and crossed the extreme southern portion of the Florida peninsula in about 4 hours. Although it weakened about one category on the Saffir-Simpson scale during this transit, and the pressure rose to about 950 millibars, Andrew was still a major hurricane when its eyewall passed over the extreme southwestern

1992 Atlantic Hurricane Season Statistics

no.	name	class[a]	dates[b]	maximum sustained wind(knots)[c]	lowest pressure (mb)	U.S. damage ($billions)	direct deaths[d]
1	One	ST	Apr. 21-24	45	1002		
2	Andrew	H	Aug. 16-28	135	922	20-25	26
3	Bonnie	H	Sep. 17-30	95	965		1
4	Charley	H	Sep. 21-27	95	965		
5	Danielle	T	Sep. 22-26	55	1001		2
6	Earl	T	Oct. 26 Sep-3	55	990		
7	Frances	H	Oct. 23-27	75	976		

a ST: subtropical storm, wind speed 34-63 kn.
T: tropical storm, wind speed 34-63 kn.
H: hurricane, wind speed 64 kn or higher.

b Dates begin at 0000 UTC and include tropical depression stage.

c Wind speed over a one-minute span.

d Includes deaths outside the United States.

Florida coast.

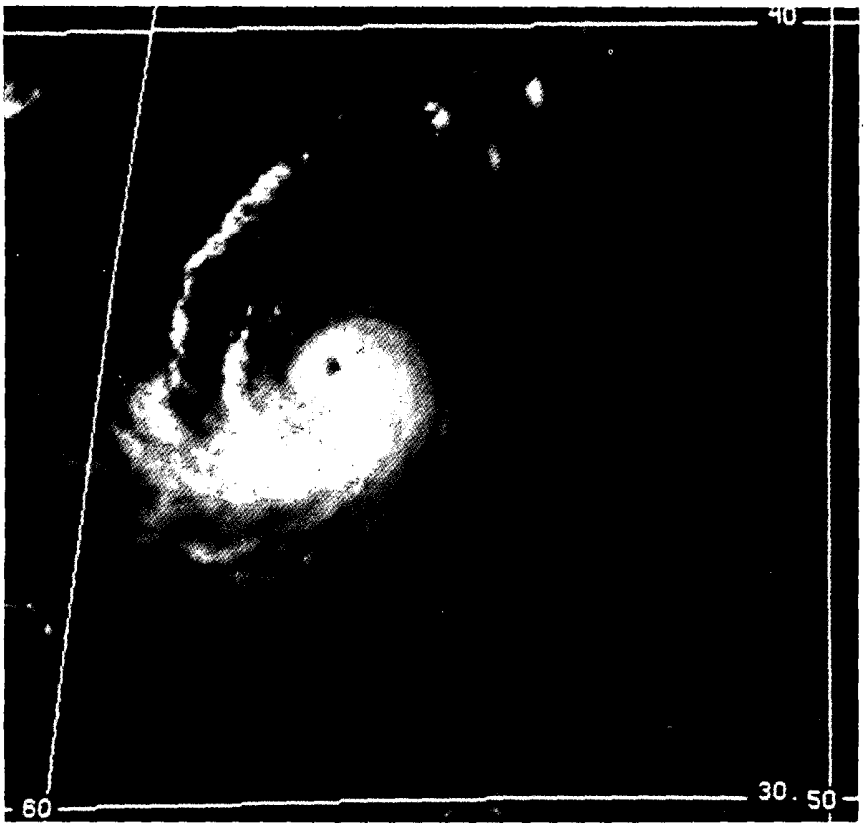
The first of two cycles of modest intensification began when the eye reached the Gulf of Mexico. Also, the hurricane continued to move at a relatively fast pace while its track gradually turned toward the west-northwest.

As Andrew reached the north-central Gulf of Mexico, the High to its northeast weakened and a strong mid-latitude trough approached from the northwest. Andrew turned toward the northwest and its forward speed decreased to about 8 knots. The hurricane struck a sparsely populated section of the south-central Louisiana coast with category 3 intensity at about 0830 UTC on the 26th. The landfall location was about 20 nautical miles west-southwest of Morgan City.

Andrew weakened rapidly after landfall, to tropical storm strength in about 10 hours and to depression status 12 hours later. Andrew and its remnants continued to produce heavy rain that locally exceeded 10 inches near its track. By midday on the 28th, Andrew had begun to merge with a frontal system over the mid-Atlantic states.

Andrew came ashore in the northwest Bahamas and southeast Florida near high tide and was accompanied by a locally huge storm surge. The surge at Current Island, near the northern end of Eleuthera Island, reached a phenomenal 23 feet. The 16.9-foot storm tide (the sum of storm surge and astronomical tide) which headed inland from Biscayne Bay is a record maximum for the southeast Florida peninsula. Storm tides in Louisiana were at least 7 feet and caused flooding from Lake Borgne westward through Vermillion Bay. The maximum storm tide on the Florida southwest coast is estimated at 5 to 7 feet.

There have been no confirmed reports of tornadoes associated with Andrew over the Bahamas or Florida. Funnel sightings, some unconfirmed, were reported in the Florida counties of Glades, Collier and Highlands, where Andrew crossed in daylight. In Louisiana, one tornado occurred in the city of Laplace several hours prior to Andrew's landfall. That tornado killed 2 people and injured 32 others. Tornadoes in the Ascension, Iberville, Baton Rouge, Pointe Coupee, and Avoyelles parishes of Louisiana reportedly did not result in casualties. Numerous reports of funnel clouds were received by officials in Mississippi, and tornadoes were suspected to have caused damage in several Mississippi counties. In Alabama, the occurrence of two damaging tornadoes has been confirmed over the mainland while



This METEOSAT visible satellite image of Hurricane Bonnie was taken at 1930 UTC on the 19th of September. At this time Bonnie had begun to move toward the east northeast and was exhibiting a fairly well-defined eye. The eye became indistinct at times on the 20th, but on the 21st, satellite images showed that it again had become sharp and it was at this time that the storm reached peak intensity.

another tornado may have hit Dauphin Island. As Andrew and its remnants moved northeastward over the eastern states, it continued to produce severe weather. For. example, several damaging tornadoes in Georgia late on the 27th of August were attributed to Andrew.

A preliminary report on Hurricane Andrew was published in the fall 1992 *Mariners Weather Log.*

Andrew and NHC

Although the National Hurricane Center (NHC) and Miami Weather Service Forecast Office (WSFO) were not in the eyewall of Andrew, they still encountered considerable effects of the hurricane. The radome was blown off the top of the 12 story building housing their offices, and the two large satellite data receiving antennas at ground level were ripped to shreds. The loss of commercial power, an inoperative water system, and the loss of air-conditioning made working conditions less than desirable. However, back-up generators provided power, and the NHC continued issuing all tropical cyclone related products even after being struck by Andrew. This was in spite of the fact that many employees suffered extensive damage to their homes. At the time of this writing, several employees remain dislocated while reconstruction of their homes continues.

Hurricane Bonnie

Bonnie formed a few hundred nautical miles east of Bermuda on the western end of a frontal trough. The tropical depression stage began on September 17th when satellite imagery showed a cloud pattern had organized into cyclonically curved bands and a small circularly-shaped overcast feature. The depression strengthened fairly rapidly, and became Tropical Storm Bonnie on the 18th. Bonnie moved slowly along a counterclockwise path before strengthening into a hurricane late on September 18th.

Bonnie reached its peak intensity with estimated maximum winds of 95 knots and minimum pressure of 965 millibars on the 21st. Bonnie was practically stationary from late on the 22nd until midday on the 23rd, when it began drifting west-southwestward. Winds decreased to tropical storm strength on the 24th. On the 26th Bonnie weakened briefly to a tropical depression, but regained tropical storm strength later in the day.

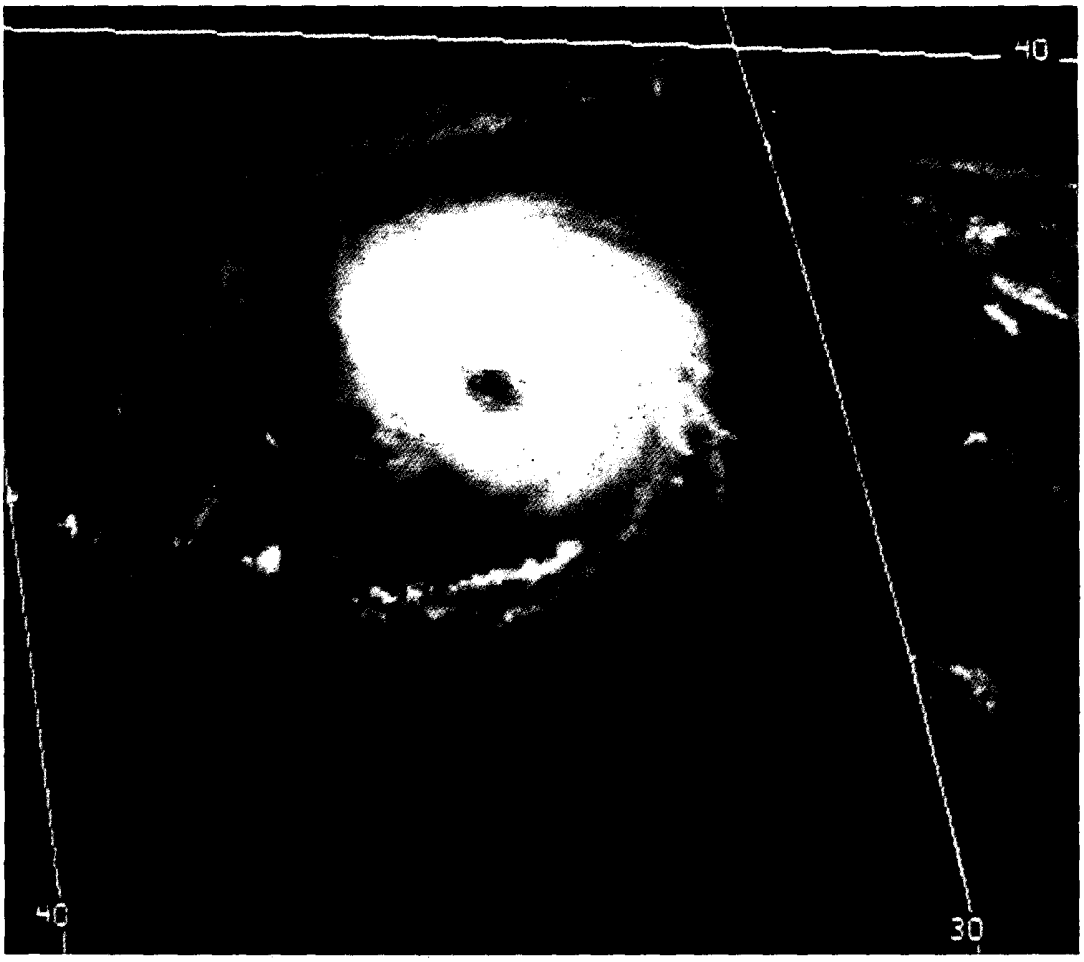
It moved through the Azores before losing tropical characteristics. Lajes Air Force Base in the Azores reported sustained winds of 35 knots with gusts to 51 knots as Bonnie passed nearby. Wind gusts to 59 knots were reported atop a 240-foot tower at Lajes.

One death attributed to Bonnie, was the result of a rockfall on the island of St. Michaels in the Azores.

A number of ships reported winds of tropical storm force associated with Bonnie. One ship, the ***Al Naseer***, reported tropical storm force winds on 4 consecutive days while paralleling the track of Bonnie.

Hurricane Charley

Satellite imagery showed that cloudiness and showers became concentrated in an area south of the Azores early on September 20th. Animation of the satellite imagery suggested that a mid- to upper-level cyclonic circulation was interacting with the northern portion of a tropical wave. The system became a tropical depression on the 21st about 550 nautical miles southwest of the Azores. The following day it headed northward as Tropical Storm Charley, influenced in part by the flow around slow-moving Hurri-



This is a METEOSAT visible satellite image of Hurricane Charley at 1430 UTC on the 24th of September, a few hours before it attained its maximum strength. Its minimum central pressure dipped to 965 millibars while maximum sustained winds were estimated at 95 knots. The following day Charley began moving toward the east and eastnortheast with increasing forward speed and over progressively cooler water.

cane Bonnie some 1000 nautical miles to the northwest. An eye formed and Charley became a hurricane on the 23rd. It reached a peak the following day with estimated maximum sustained winds of about 95 knots and minimum central pressure of 965 millibars.

By the 25th, Charley was moving over progressively cooler water. It was downgraded to a tropical storm on September 27th just southwest of the Azores. The storm center passed over the island of Terceira. Lajes AFB reported a minimum pressure of 982.4 millibars with a sustained wind of 46 knots and gusts to 71 knots. The ***Ango*** reported winds of 38 knots and a pressure of 983 millibars near the center of Charley at 1500 UTC on the 27th. The storm gradually lost tropical cyclone characteristics as it moved over cooler water and became an extratropical cyclone late on the 27th.

Tropical Storm Danielle

Danielle originated within a persistent area of low pressure near the southeast U.S. coast. A weak tropical wave moved into this area on the 18th of September. A cold front merged with the northern portion of this stationary weather system on the 20th.

By the 22nd, surface reports and satellite imagery showed that a better defined cyclonic circulation about 175 nautical miles south southeast of Cape Hatteras, North Carolina– most likely a tropical depression. An Air Force Reserve unit aircraft reported 45-knot flight-level winds, and the depression was upgraded to Tropical Storm Danielle that same day.

Danielle turned a small clockwise loop on the 23rd and 24th followed by a westward motion toward the Outer Banks of North Carolina on the 25th. However, the storm soon turned northward and some strengthening occurred as the storm paralleled the coast of North Carolina. Sustained winds increased to 55 knots and the central pressure fell to 1001 millibars.

The center of the storm moved inland over the Delmarva Peninsula late on the 25th. The weakening storm moved across Maryland and Delaware and over eastern Pennsylvania on the 26th, where it dissipated. There were several coastal reports of tropical storm force winds from North Carolina, Virginia and Delaware. The highest sustained wind speed reported from a land station was 44 knots at Cape Charles, Virginia. Several ship reported winds of 34 knots or higher. A report of 64 knots from the ***Stonewall Jackson*** is suspected of being somewhat too high although it was near the center of the storm at the time and its

pressure of 1001 millibars agrees with the reconnaissance value mentioned above. Also, offshore data buoys as far north as New York Harbor reported tropical storm force winds. The highest storm surge reported was 5.4 feet above normal astronomical tide at Cape Hatteras, North Carolina.

Two deaths resulted from a sailboat being battered and sunk by high seas to the east of New Jersey. There was minor flooding and significant beach erosion along the mid-Atlantic coast. According to press reports, only minor damage resulted from the storm.

Tropical Storm Earl

Earl formed from a tropical wave that exited the coast of Africa on September 18th. The wave developed into a tropical depression a few hundred nautical miles north of Hispaniola on the 26th and moved toward the west-northwest, steered by the flow induced by, in part, a middle to upper-level low over Cuba. However, a cold front sweeping across the eastern United States forced the depression to become nearly stationary over the warm waters of the Gulf Stream. There the depression strengthened. Data from an Air Force Reserve unit reconnaissance plane, buoys, and ships indicated that the depression became Tropical Storm Earl on the 29th. By then Earl was already moving eastward ahead of the cold front. The tropical storm was able to maintain its low-level circulation, staying detached from the surface frontal boundary for several days. It reached its peak intensity of 55 knots and 990 millibars on October 2nd.

Earl continued moving on a general east-southeast track, producing transient convection but maintaining a well-defined low-level circulation. Finally, the storm weakened to a tropical depression by midday on the 3rd and lost its tropical characteristics later on that day.

Hurricane Frances

Frances formed from a low pressure area on the trailing end of a frontal trough about 400 nautical miles south-southeast of Bermuda. The low strengthened and became a gale center of about 1004 millibars late on the 22nd of October. The deep convection then began to wrap cyclonically around the circulation center and grew in lateral extent. The system was making a transition from a gale center to Tropical Storm Frances. The transformation was completed early on the 23rd.

Several ship reports documented the storm intensification during the transition period. The ***Migaea*** observed a pressure of 1000 millibars about 150 nautical miles from the circulation center late on the 22nd. By early on October 23rd, the ***Migaea*** was closer to the center and observed 997 millibars with sustained winds of 50 knots and gusts to 74 knots. The ***Sparrow*** reported sustained winds of about 50 knots late on the 22nd. Before sunrise on the 23rd, sustained winds approached 65 knots on the ***Sparrow*** but then dropped temporarily to 34 knots while the wind direction switched from southeast to northwest. Those changes coincided with the sky partially clearing and the pressure reaching 996 millibars after falling rapidly for several hours. These observations suggest that the first stages in the formation of an eye occurred early on the 23rd. It is estimated that Frances reached hurricane strength on this date, a few hours prior to the initial aircraft reconnaissance mission in the cyclone which found a 979 millibars central pressure.

Frances initially drifted northward, in the general direction of Bermuda. By late on the 23rd, the associated steering flow began to accelerate Frances northeastward to about 20 knots. Frances reached its peak intensity, with estimated 75 knot sustained winds and 976 millibars central pressure, on the 24th.

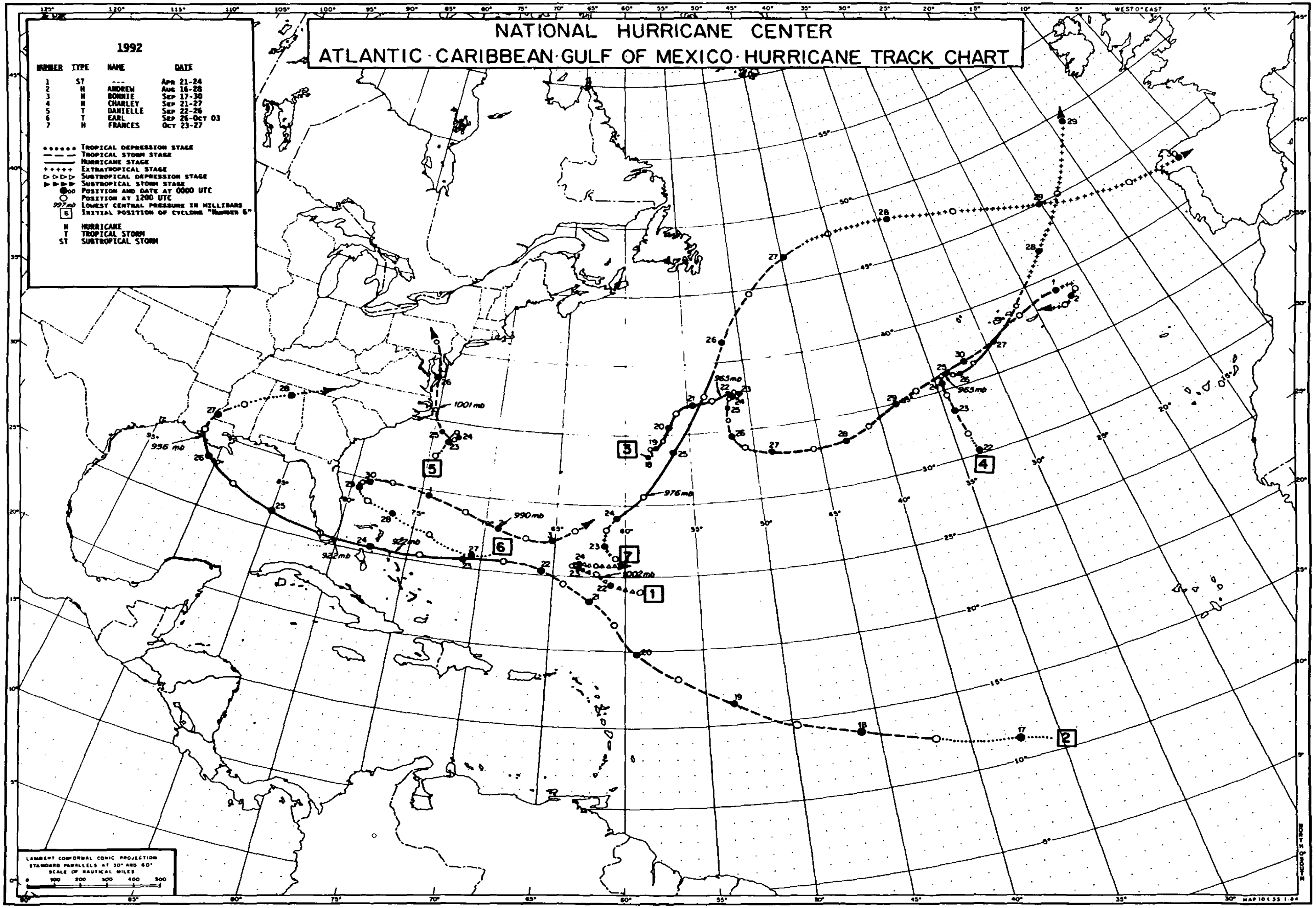
The northeastward track carried Frances over colder water. The eye became indistinct on the 25th although relatively deep convection persisted near the circulation center through early on the 27th. Analyses of surface weather maps indicate a gradual broadening of the wind field during that period, and Frances became extratropical on this day. Over the following three days, Frances moved generally to the east as a complex extratropical gale.

The only injury associated with Frances reported to the NHC occurred to Ms. Anita Page aboard the 35-foot sailboat ***Sparrow***. She suffered a broken rib, and the boat was partially disabled during her encounter with the cyclone on the 22nd and 23rd.

A post-analysis of Frances' formation using all the currently available data indicates that although satellite imagery provided qualitative clues about Frances' initial transformation, the intensity estimates using satellite data were much too low, particularly from the 22nd-24th. It is also unfortunate that the ***Migaea*** and ***Sparrow*** ship reports were not available operationally to the NHC. Such data deficiencies are not uncommon and in this case contributed to underestimates of the intensity of the cyclone in the NHC High Seas Forecasts and Tropical Cyclone Advisories during that period. The dearth of quantitative surface data will likely continue to limit the NHC's ability to assess accurately the intensity of cyclones that undergo rapid strengthening and/or structural change.

Tropical Cyclone Winds
(ship encounters of 34 knots or higher)

Tropical Cyclone	Ship Name	Date Mo/Da	Time UTC	Position LatN	Position LonW	Wind (kn) Dir/Speed	Pressure (mb)
ST One	Chiquita Belgie	4/22	0600	25.0	61.0	180/45	1004.1
Andrew	ELLE2	8/19	1500	19.4	56.6	--/35	1013.5
	TSS Carnivale	8/24	0600	28.1	79.2	--/35	1015.5
	Mercandian Continent	8/25	1200	29.5	80.6	--/60	——
Bonnie	LGG6	9/18	1200	31.0	55.3	200/35	1017.0
	Trenntsee	9/27	1200	30.7	42.1	230/42	1006.0
	Al Naseer	9/27	1500	29.6	44.0	240/36	1006.3
	Al Naseer	9/28	0600	30.2	40.6	230/35	1007.5
	Al Naseer	9/28	1200	30.9	39.5	240/38	1010.1
	Geesthaven	9/28	1200	35.8	40.9	040/45	1007.4
	Nord-Energy	9/28	1200	34.5	39.5	120/34	1003.0
	Geesthaven	9/28	1500	35.2	41.5	020/45	1007.7
	Nord-Energy	9/28	1800	34.5	41.0	020/60	1002.0
	Moraybank	9/28	2100	35.2	40.4	020/40	999.7
	Al Naseer	9/29	0300	32.7	36.6	240/37	1009.3
	Al Naseer	9/29	1200	33.9	34.8	220/40	1006.5
	Al Naseer	9/29	1500	34.1	34.2	210/48	1004.5
	Al Naseer	9/30	0600	34.9	30.5	250/44	1009.9
	Atlantis II	9/30	0600	38.8	30.1	030/58	1000.1
	Zim Korea	9/30	1200	35.8	26.9	260/47	1010.0
Charley	CGM Provence	9/23	1500	35.3	35.9	350/37	1011.5
	Chiquita Deutschland	9/23	1800	34.3	33.1	190/41	1015.1
	Trenntsee	9/25	1200	34.9	32.6	200/37	1005.0
	Trenntsee	9/25	1800	34.2	33.2	270/38	1007.4
	Ango	9/27	1500	39.7	25.7	010/38	983.0
Danielle	Unknown	9/24	0300	35.6	75.3	040/37	1009.7
	Jo Elm	9/24	0600	33.6	77.0	360/35	1016.5
	Export Patriot	9/24	2100	35.5	75.4	020/35	1015.0
	Gypsum King	9/25	0000	36.4	75.6	040/38	1019.0
	Unknown	9/25	0300	36.9	75.9	040/35	1021.9
	San Martin	9/25	1500	36.7	73.9	150/36	1017.0
	Stonewall Jackson	9/25	1500	36.6	75.3	010/64	1001.0
Earl	Unknown	9/28	1300	28.6	78.8	140/40	1004.0
	Deppe America	9/29	0900	29.0	78.6	160/54	1007.0
	DSR Europe	9/30	0300	30.5	79.9	010/38	1008.0
	Unknown	9/30	0600	30.8	79.6	020/38	1008.7
	Nuevo San Juan	9/30	1200	29.3	79.9	050/37	1011.0
	Unknown	9/30	1500	30.5	77.5	020/36	1005.5
	D5HD	10/01	0000	27.8	74.3	230/36	1007.3
	CGDJ	10/01	1200	27.5	72.7	300/34	1008.0
Frances	Horncliff	10/22	1200	27.2	63.3	060/44	1012.5
	Migaea	10/22	2230	26.3	64.3	110/25	1000.0
	Sparrow	10/22	2300	27.7	60.7	--/50	——
	Migaea	10/23	0200	27.7	61.5	225/50	997.0
	Solaris	10/23	0600	27.1	54.5	130/40	1010.8
	Sparrow	19/23	0900	27.7	60.7	--/64	996.0
	Sparrow	10/23	1500	27.7	60.7	--/45	——
	TSL Bold	10/23	1600	28.0	61.1	225/55	994.0
	Unknown	10/23	1945	27.8	62.3	290/44	1002.0
	TSL Bold	10/23	2000	28.0	60.8	225/65	994.0
	Barentzgracht	10/24	0000	31.0	63.5	010/37	1008.7
	Reed Voyageur	10/24	0300	28.5	65.3	315/35	——
	TSL Bold	10/24	0400	27.5	61.5	290/40-45	1005.0
	Westward	10/24	0800	32.1	58.9	060/35	1002.0
	Westward	10/24	1100	32.1	59.5	060/35	999.5
	Westward	10/24	1500	31.0	60.0	310/55	1002.7
	Pacific Teal	10/24	1500	27.8	56.3	220/40	1009.0
	Ultramar	10/24	1800	27.5	59.5	320/50	1010.2
	Yucatan	10/24	1800	29.7	55.5	220/42	1005.0
	Northern Enterprise	10/24	1800	33.4	56.4	130/40	997.1
	Yucatan	10/25	0000	29.3	56.3	240/40	1009.8
	Northern Enterprise	10/25	0000	32.9	57.9	330/42	998.2
	Professor Szafer	10/25	1200	31.9	54.7	250/50	1012.2
	Sheldon Lykes	10/25	1200	35.7	50.2	210/35	1008.9
	Star Florida	10/25	1200	40.4	56.3	030/38	1006.0
	Paleisgracht	10/25	1200	40.2	55.5	040/34	1003.1
	Tampa Bay	10/25	1500	39.1	56.9	020/50	1002.0
	Paleisgracht	10/25	1800	39.3	55.5	330/38	997.8
	Global Link	10/25	1800	41.3	55.6	020/40	998.0
	Baron	10/25	2100	42.0	53.8	360/45	993.0
	Star Florida	10/26	0000	39.4	54.8	280/38	1004.0
	Baron	10/26	0000	41.6	53.8	350/45	992.5
	Wilfred Templeman	10/26	0000	43.6	51.6	070/45	998.1
	Baron	10/26	0300	41.2	53.6	300/45	997.0
	Wilfred Templeman	10/26	0600	43.5	51.5	030/35	988.1
	Baron	10/26	0600	40.8	53.4	270/44	1002.0
	Baron	10/26	0900	40.6	52.5	270/38	1006.0
	Scandutch Gallia	10/26	1200	40.0	47.7	240/35	1010.0
	Ever Globe	10/26	1200	40.6	44.3	200/40	——
	Sealand Commitment	10/26	1200	43.7	44.7	200/35	1004.0
	Wilfred Templeman	10/26	1200	43.9	51.2	320/35	997.6
	Poliarnii Kroug	10/26	1200	47.8	47.5	090/37	1012.2
	Sealand Commitment	10/26	1500	43.6	45.6	210/48	——
	Sheldon Lykes	10/26	1800	35.8	58.2	260/35	1007.1


NATIONAL HURRICANE CENTER
ATLANTIC · CARIBBEAN · GULF OF MEXICO · HURRICANE TRACK CHART
1992
NUMBER TYPE NAME DATE
1 ST --- Apr 21-24
2 H ANDREW Aug 16-28
3 H BONNIE Sep 17-30
4 H CHARLEY Sep 21-27
5 T DANIELLE Sep 22-26
6 T EARL Sep 26-Oct 03
7 H FRANCES Oct 23-27
Tropical depression stage
Tropical storm stage
Hurricane stage
Extratropical stage
Subtropical depression stage
Subtropical storm stage
Position and date at 0000 UTC
Position at 1200 UTC
997mb Lowest central pressure in millibars
6 Initial position of cyclone "Number 6"
H HURRICANE
T TROPICAL STORM
ST SUBTROPICAL STORM
LAMBERT CONFORMAL CONIC PROJECTION
STANDARD PARALLELS AT 30° AND 60°
SCALE OF NAUTICAL MILES
0 100 200 300 400 500
922mb
932mb
956 mb
990mb
976mb
965mb
1001mb
1002mb

Central North Pacific Hurricanes — 1992

Andrew K. T. Chun
Central Pacific Hurricane Center

The 1992 season in the Central Pacific will be long remembered as the year of Iniki (the Hawaiian name for Enid).

Iniki was the costliest and most powerful hurricane to strike the Hawaiian Islands. The hurricane did more than $1 billon dollars worth of damage as its eye passed directly over the island of Kauai. It was the sixth costliest storm in the history of the United States.

The Central Pacific Hurricane Center had one of its most active seasons in 1992, handling a total of 11 tropical cyclones. Three of the systems became full blown hurricanes in or prior to entering the central Pacific Ocean. Three tropical cyclones formed in the central Pacific region (between 140°W and the International Dateline) and the others were escapees from eastern waters. Iniki entered the central Pacific as an unamed tropical depression.

The season started on January 28 with Tropical Depression One-C which was subsequently upgraded to a tropical storm named Ekeka and later to a hurricane. Ekeka was followed by Hali which had its beginnings as Tropical Depression Two-C on March 28. The season then remained uneventful until early

Paradise temporarily lost- Wailua Falls (left) on Kuai at a more peaceful time (B.I.) Before Iniki. This photograph was kindly loaned to us by the Hawaii Visitors Bureau and was taken by Peter French. Hurricane Iniki wrought destruction totaling $1.8 billion on this island alone. Ironically, it came during the filming of Jurrasic Park, whose plot involves the impending disaster from an approaching tropical cyclone. The prehistoric setting must have looked even more realistic when Iniki arrived although everyone on Kuai was battened down for what proved to be Hawaii's worst tropical cyclone disaster.

September when Hurricane Iniki started as Tropical Depression Thirteen-E in the eastern Pacific.

Tropical Depression Three-C capped the season off November 21-22, forming south of the Big Island of Hawaii and never intensifying past the depression stage. This summary concentrates on Iniki and the two central Pacific tropical cyclones that reached tropical storm intensity.

Hurricane Iniki
September 5–13, 1992

Hurricane Iniki formed over the warm Pacific waters near 12°N,135°W on September 5 about 1,450 nautical miles southwest of Baja, California. This is somewhat farther west and south than the initial location of most mid season storms. The system developed from an area of disturbed weather which had been tracked for several days, by the National Hurricane Center, across Central America and into the Pacific on August 28. It may have originated as a tropical wave off the coast of Africa earlier in the month. Labeled Tropical Depression Eighteen-E, it moved westward, crossing 140°W into the Central Pacific on the morning of September 6. The system was expected to dissipate, however, by 2100 UTC on the 7th, it was still a tropical depression near 11°N,143°W, and was embedded in a fairly deep easterly flow along the south edge of the subtropical ridge.

The depression began to strengthen and was upgraded to Tropical Storm Iniki at 0300 UTC on the 8th. The tropical storm continued to intensify on the and increased its westward motion to near 12 knots as the subtropical ridge shifted southward. Iniki was upgraded to a hurricane at 0900 UTC on the 9th about 470 miles south southwest of Hilo. It was moving west northwest at 12 knots.

By 0330 UTC on the 10th, Hurricane Iniki was located 385 miles south southwest of Hilo generating maximum winds estimated at 85 knots.

Iniki was approaching the western edge of the subtropical ridge to the north. A large cold low and trough aloft began to dig southward along and just east of the International Dateline at the same time, causing Iniki to take a track slightly north of west. Meanwhile, the upper level flow pattern in the western Pacific continued to change as a series of short waves dug the long wave trough southward along the dateline. The subtropical ridge appeared to be weakening west of 160°W with southwesterly flow increasing on the east side of the upper trough and it appeared that this eventually turned Iniki on a more northward track.

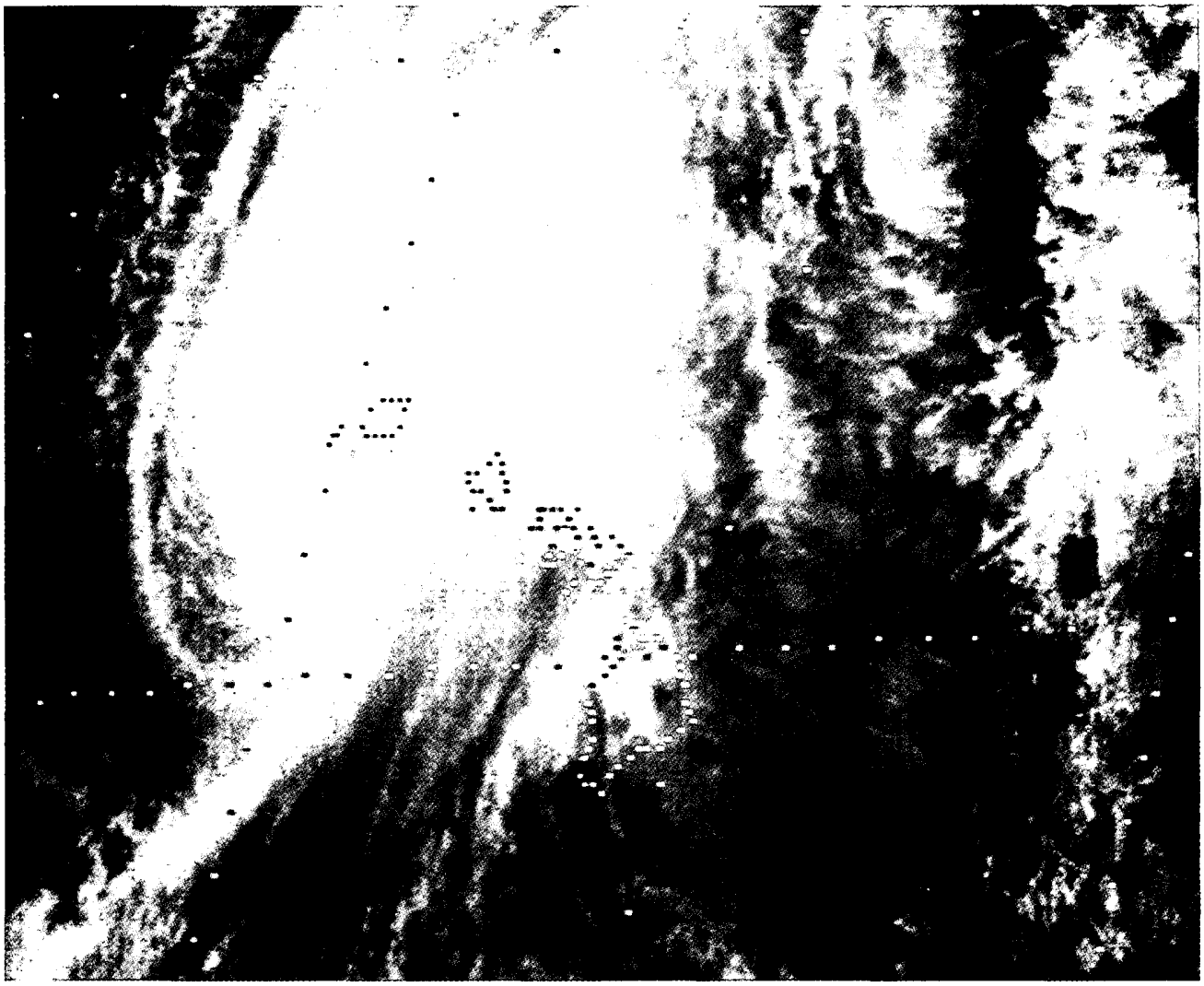
Iniki began to slow during the morning hours of the 10th by 2100 UTC was located 425 miles south of Honolulu and still moving west at 10 knots. Reconnaissance (recon) aircraft reported top winds of 100 knots and a central pressure of 951 millibars. Iniki slowed even more and started to turn northwestward. At 0300 UTC on the 11th, its center was about 400 miles south of Lihue, Kauai and maximum winds were now estimated to be 110 knots with gusts to 135 knots. A hurricane watch was issued for the western Hawaiian chain from Kauai and Niihau, westward to French Frigate shoals. An intermediate advisory at 0630 UTC issued hurricane warnings for Kauai and Niihau, and tropical storm warnings for Oahu. A tropical storm watch was issued for the islands of Maui, Lanai, and Molokai. High surf advisories were continued for all of the Hawaiian chain.

By 2100 UTC on the 11th, Iniki was 130 miles south southwest of Lihue moving northward at 15 knots. The maximum sustained winds were estimated at 125 knots with gusts to 150 knots. The recon flight measured a central pressure of 938 millibars (lowest pressure ever recorded in a central Pacific hurricane) using a dropsonde and maximum flight level winds of 135 knots making this the most intense period of the storm's life.

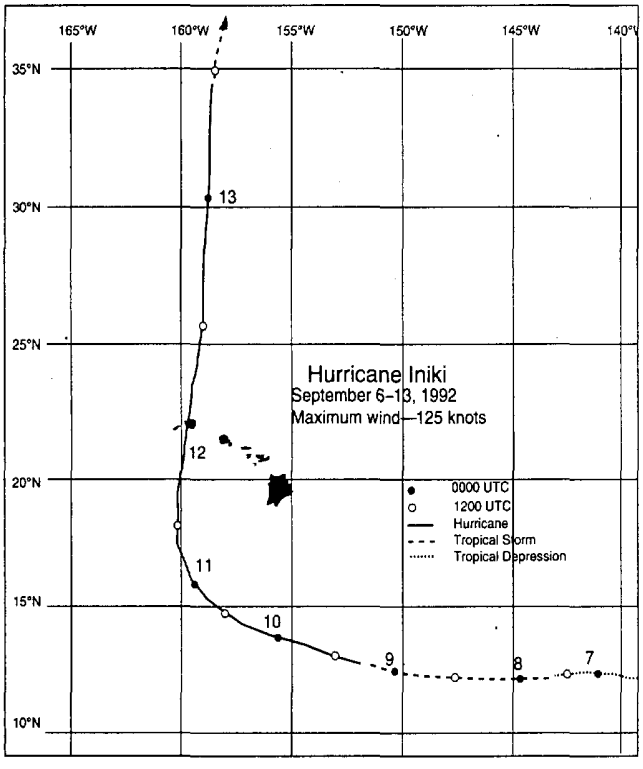
Iniki was rapidly approaching the Kauai coast and by 0100 UTC on the 12th was located near 21.6°N, 159.7°W, or 37 miles southwest of Lihue. The reconnaissance report at the time indicated a central pressure of 945 millibars and max flight level winds of 127 knots. The eye of Iniki passed over Kauai as it continued to accelerate. The center was moving northward at 25 knots and by 0300 UTC was centered about 50 miles north of Kauai.

Iniki continued to move northward and weaken. By 2100 UTC on the 12th, it was located 500 miles north of Kauai, with top winds near 80 knots and gusts to 100 knots. Iniki decreased to tropical storm strength by 1500 UTC on the 13th near 36°N, 158°W. It was becoming extra-tropical while merging with an approaching low pressure system and cold front.

Damage was extensive throughout Kauai. Ocean damage was heaviest along the south shore of Kauai and affected shoreline hotels and condominiums, especially around Poipu. Wind damage was extremely heavy throughout Kauai, as many homes or



Hurricane Iniki at about 0100 UTC on the 12th of September. Its center was located near 21.6°N, 159.7°W, or 37 miles southwest of Lihue. The reconnaissance report at the time indicated a central pressure of 945 millibars and max flight level winds of 127 knots.



buildings were flattened or lost their roofs. According to Red Cross figures, Iniki left 14,350 damaged or destroyed homes on Kauai. The number of homes that were completely destroyed was 1,421. A total of 63 homes were destroyed by waves and storm surge on the south coast of Kauai. The number suffering major damage was 5,152, and 7,178 suffered minor damage. Electric power and telephone service were lost throughout the island and only 20 percent of power had been restored 4 weeks after the storm. Crop damage was likewise extensive, as sugar cane was stripped or severely set back, while fruit trees were broken or uprooted. The monetary value of the damage caused by Iniki on the island of Kauai was estimated at $1.8 billion.

The areas most affected on Oahu were the leeward coast from Barbers Point through Makaha and Kaena Point, with lesser damage along the south shore from Ewa Beach to Hawaii Kai. Some damage also occurred on the islands of Maui County and the Big Island of Hawaii, where swell and heavy surf from a

CENTRAL NORTH PACIFIC TROPICAL CYCLONE SUMMARY, 1992*

Name	Dates	Highest Classification in Central Pacific	Max Winds (KT)	Min Observed SLP
Ekeka	28 Jan - 4 Feb	Hurricane	E100 (SFSS)	N/A
Hali	28-30 Mar	Tropical Storm	E45 (SFSS)	N/A
Frank	21-23 Jul	Tropical Storm	E45 (SFSS)	N/A
Georgette	24-28 Jul	Tropical Depression	E30 (SFSS)	N/A
Javier	7-12 Aug	Tropical Storm	E40 (SFSS)	N/A
Iniki	5-13 Sep	Hurricane	125 (RECCE)	**938 MB
Orlene	12-14 Sep	Tropical Depression	E30 (SFSS)	N/A
Roslyn	24-30 Sep	Hurricane	E65 (SFSS)	N/A
Tina	9-11 Oct	Tropical Depression	E25 (SFSS	N/A
Yolanda	22-23 Oct	Tropical Depression	E25 (SFSS)	N/A
THREE-C	21-22 Nov	Tropical Depression	E30 (SFSS)	N/A

NOTES:
* Data pertains only to period when tropical cyclone was in the Central Pacific
** SLP determined by dropsonde

southwesterly direction pounded exposed shorelines and anchorages.

There were six deaths connected to the storm. One woman on Kauai died of a heart attack when a portion of her house fell on her, a man was killed by flying debris when he was out during the storm, two Japanese nationals drowned when their boat was capsized in waters off of Kauai, one person died on Oahu when his residence was set on fire by a candle being used for light, and a National Guardsman was killed when his truck over turned while trying to avoid live wires during the post storm cleanup. More than one hundred people were injured, some after the storm when the cleanup began.

Hurricane Ekeka
January 28 – February 4, 1992

Hurricane Ekeka was a rare out-of-season tropical cyclone that formed close to the equator in the vicinity of Christmas Island. This was the first central North Pacific hurricane observed during the month of January since the advent of weather satellites in the 1960s.

Ekeka formed within a large area of deep convection close to the equator that had been observed by satellite for a number of days. Several ship reports as early as January 23 had indicated squalls and strong southwesterly winds just north of the equator to the south and southeast of the Hawaiian Islands.

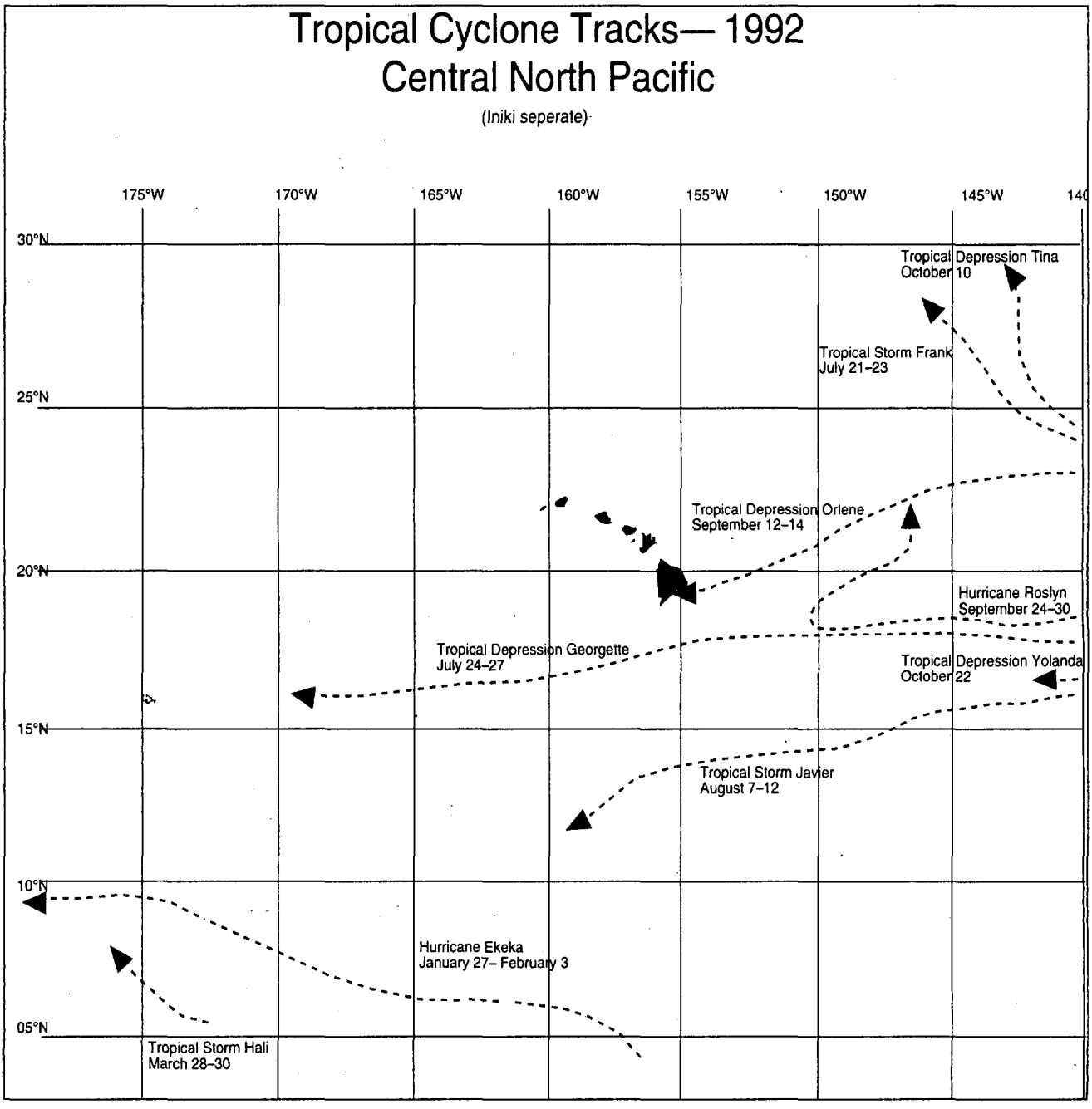
The first advisory on Tropical Depression One-C was issued by the Central Pacific Hurricane Center (CPHC) at 0900 UTC on the 28th with the center just north of Christmas Island and just east of Fanning Island. One-C intensified rapidly and became tropical storm Ekeka (Hawaiian for Edgar). Ekeka was upgraded to a hurricane at 0000 UTC on the 30th as it moved slowly west northwestward remaining well south of Johnston Island. An estimated peak intensity of 100 knots was reached on February 2 with Ekeka nearing 10°N, 175°W. A large trough in the upper level westerlies began to have detrimental effects on the hurricane as it neared the dateline on February 4. Vertical wind shear caused Ekeka to lose strength rapidly and the system was barely of tropical storm intensity when it crossed into the western Pacific near 09°N, 180° at1800 UTC on the 4th.

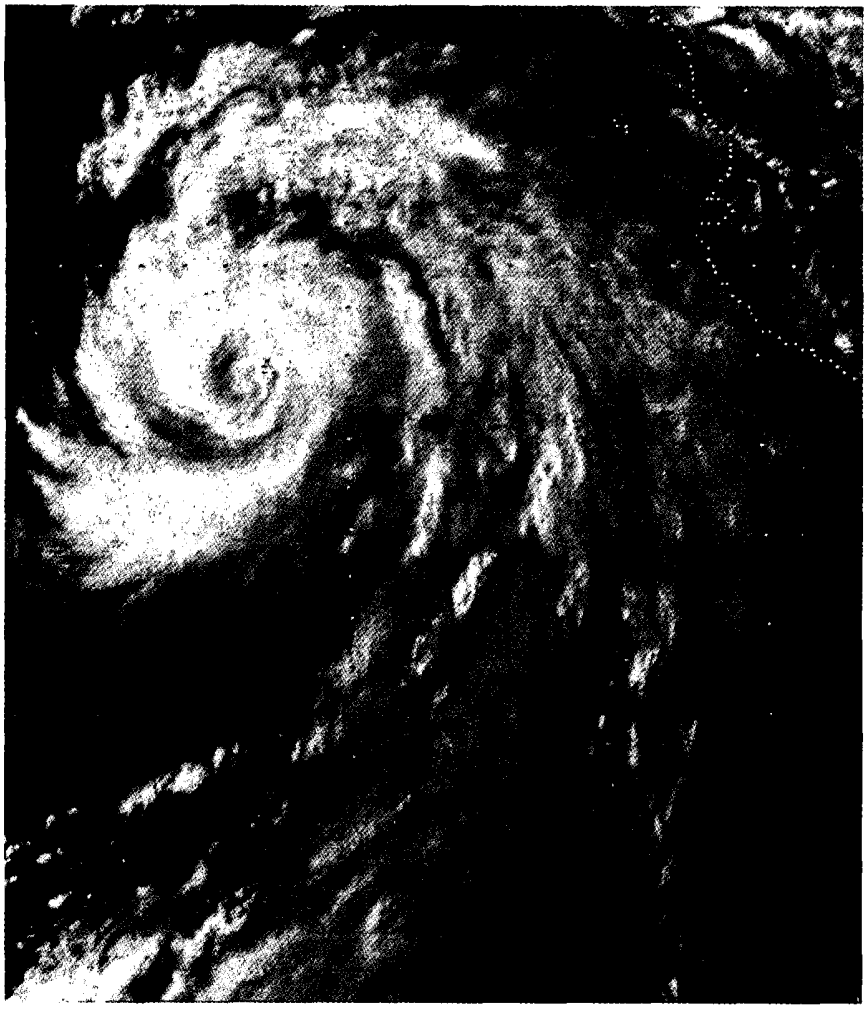
The Joint Typhoon Warning Center downgraded the weakening tropical storm to a depression at 1200 UTC on the 4th. The depression continued to move westward through the Marshall Islands and did not cause any known problems.

Tropical Storm Hali
March 28–30, 1992

Warm equatorial water south of the Hawaiian Islands early in the year had the effect of producing some very active convection and heavy rains along the equator from the dateline eastward to the coast of South America. This is typical *El Nino* weather during the Northern Hemisphere autumn and winter months when the otherwise sunny and dry Line Islands get inundated by torrential rains and the pleasant trade winds are replaced by humid westerly winds. These conditions are also conducive for the development of tropical cyclones.

Hurricane Ekeka formed within this area of heavy convection in late January near Christmas Island. This very unseasonable tropical cyclone activity repeated itself in late March as Tropical Depression 02-C developed on the 28th within a cluster of deep convection near 05°N, 170W°. The depression intensified slowly and was upgraded to Tropical Storm Hali (Hawaiian for Holly) on March 29. Hali peaked at about 45 knots in the area near 07°N, 175°W on the 29th, then weakened rapidly and dissipated on the 30th as strong upper southwesterlies sheared its top off and caused the system to break up.





This high-resolution visible satellite picture shows the northeast part of Hurricane Darby's eyewall crossing over Socorro Island at 2301 UTC on the 5th of July 1992. Observations from that island, and from the ***Oasis*** *in the vicinity of nearby San Benedicto Island, indicate that Darby had maximum sustained wind speeds near 100 knots at this time.*

Eastern North Pacific Hurricanes—1992

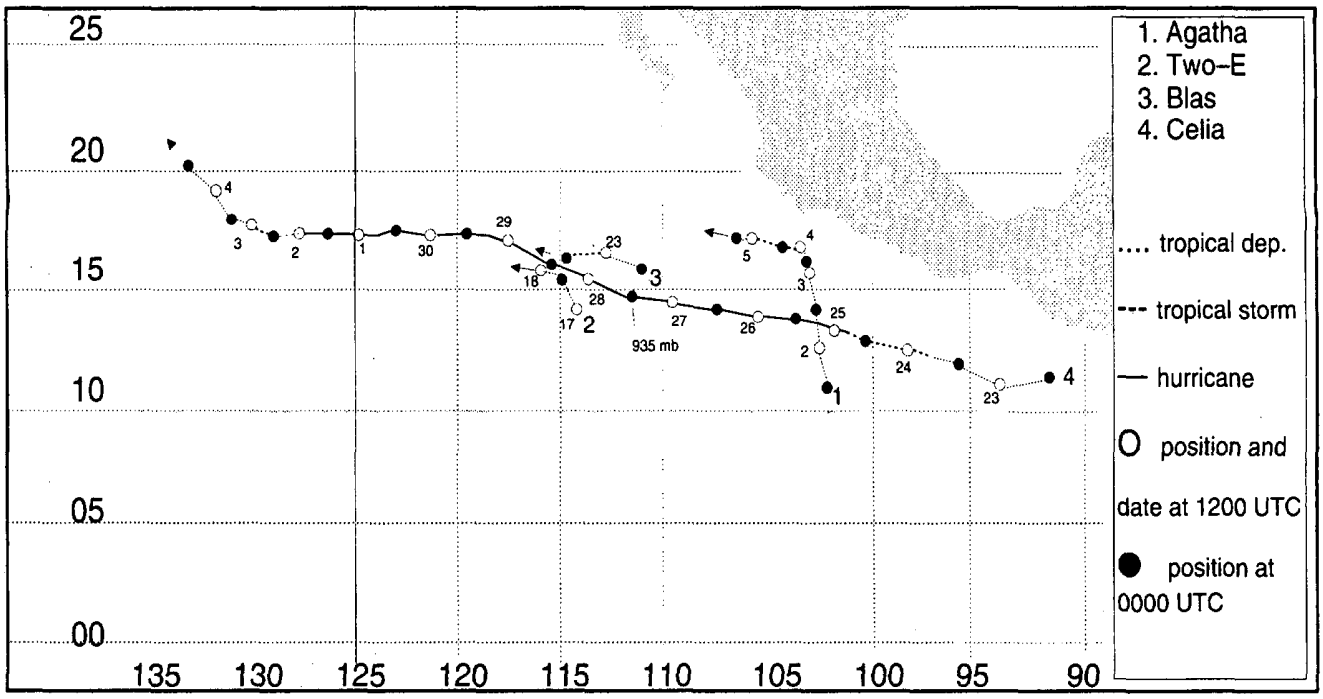
Edward N. Rappaport and Miles B. Lawrence
National Hurricane Center

Numerous challenges confronted eastern North Pacific mariners during the 1992 hurricane season. A record 27 tropical cyclones menaced the area, breaking the previous record of 26 set in 1982. Twenty-four reached tropical storm strength 14 attained hurricane status (5 more than average). Nine of these became major hurricanes (estimated 1-minute surface wind speeds exceeding 95 knots). Hurricane Tina set an endurance record for North Pacific tropical cyclones of 24 days. The previous record was 22 days, held by Typhoon Rita in 1972.

Most of the cyclones formed to the south or southwest of Mexico and many approximately followed climatology, heading toward the west northwest. There were notable exceptions, however. Tina, for example, made two sharp turns early in its life and later underwent a more gradual turn of nearly 90 degrees.

Nine tropical cyclones crossed 140°W longitude, which is the boundary separating the eastern and central North Pacific hurricane basins. One of those systems, Tropical Depression Eighteen- E, eventually became Hurricane Iniki in the central Pacific. Iniki was the first tropical cyclone on record to strike the Hawaiian Islands as a major hurricane. On the 11th of

Ed Rappaport and Miles Lawrence are Hurricane Specialists at the National Hurricane Center in Miami, FL. Also making significant contributions to this report were Lixion Avila, Hal Gerrish, Max Mayfield, and Richard Pasch from the National Hurricane Center.



September, it made landfall on the south coast of Kauai with a central pressure of 945 millibars and an estimated maximum sustained wind speed of 110 knots. Iniki killed three people in Hawaii, and with total damage estimated at $1.8 billion, is the costliest hurricane in Hawaiian history.

... NHC received 40 ship reports of tropical storm or hurricane conditions this year, all from east of 120°W longitude.

Other storms remained nearer the west coast of Mexico where Lester, Virgil, and Winifred, made landfall. In less than 1 week, both Virgil and Winifred came ashore just southeast of Manzanillo, Mexico as category 2 hurricanes on the Saffir/Simpson Hurricane Scale. In total, eastern Pacific tropical cyclones were responsible for six deaths in Mexico. Five other people were reported missing along the southwest coast of Mexico.

With such an active season in the eastern Pacific, and with several of the cyclones developing in the corridor along Mexico's west coast that is often traversed by commercial and pleasure watercraft, it is also not surprising that the NHC received 40 ship reports of tropical storm or hurricane conditions this year, all from east of 120°W longitude.

More than half of the tropical storm force wind reports this year came in association with Darby, which entered the eastern Pacific on the 29th of June. By the 2nd of July, a tropical depression formed some 200 nautical miles south of the Gulf of Tehuantepec. The ***Zim Japan*** filed the year's first report of tropical storm force winds late on the 3rd. This and satellite imagery indicate that the depression had strengthened into Tropical Storm Darby.

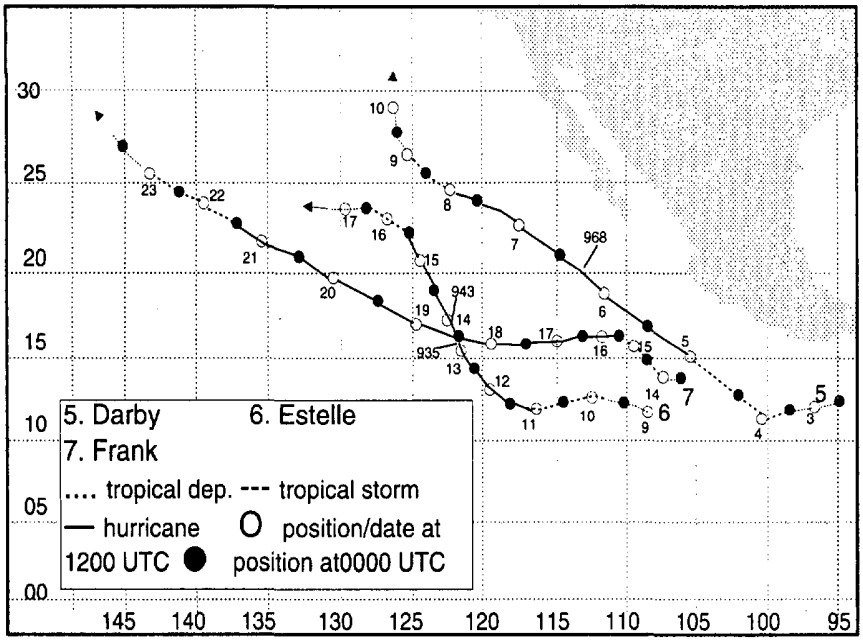
After forming, Darby began to accelerate toward the west northwest to northwest. The heading would remain nearly invariant as Darby intensified and grew. Its outer rainbands battered the southwest coast of Mexico from Acapulco to Puerto Vallarta. Some 5.75 inches of rain was dumped on Acapulco on the 3rd. According to the newspaper *Excelsior,* flooding associated with Darby killed three people and damaged about 180 small shops in Acapulco. Four fisherman were reported missing off Acapulco.

Before they abandoned, ship the crew of the **Oasis** estimated sustained winds of 95 knots in Darby.

On the night of the 4th, Darby reached hurricane strength while centered a few hundred nautical miles south of Manzanillo. The ***Silvaplana*** reported 50-knot winds on the 5th.

The hurricane passed almost directly over the island of Socorro where observations included a surface pressure of 974.5 mb and estimated sustained winds of 90-100 knots with gusts to about 110 knots.

The pleasure craft ***Oasis*** and her crew were overtaken by the hurricane in the vicinity of San Benedicto Island (just north of Socorro Island). Much of their harrowing ordeal was documented on videotape by the crew (and aired on the television show *I Witness Video).* All seven persons onboard the ***Oasis*** were rescued by the the ***Chiquita Roma.*** Before they aban-



doned ship, the crew of the ***Oasis*** estimated sustained winds of 95 knots in Darby.

Darby reached its estimated peak intensity of 105 knots shortly after passing Socorro Island. Because of its great intensity, rapid forward speed, and large size, Darby weakened slowly as it passed over the much colder waters just west of Baja California. In fact, Darby remained a hurricane to almost 25°N latitude, farther north than any previous July hurricane on record in the eastern Pacific.

Darby's remnants ultimately brought rare July showers to Southern California where 7-foot waves pounded the beaches.

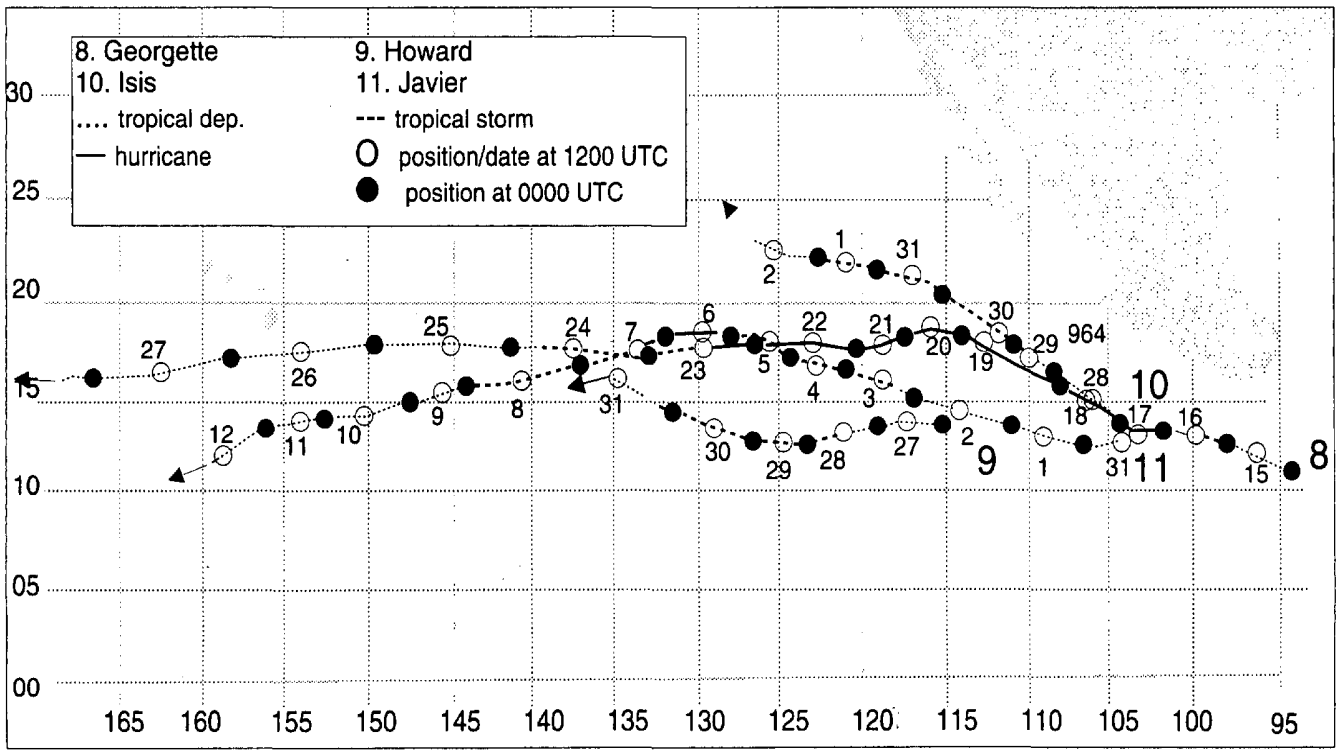
Hurricane Frank was first recognized on July 9 as an area of disturbed weather located a few hundred nautical miles south southeast of Acapulco. This area moved westward for several days and, on the 13th, became a tropical depression about 575 nautical miles south southeast of the southern tip of Baja California.

Observations from the ***Nikolai Nekrassov*** and the ***B. Prus*** helped establish that the depression had strengthened into a tropical storm on the 14th. The storm was moving northwestward then, but turned toward the west on the 15th in response to a well established deep ridge to its north. Frank became a hurricane on that date and continued to intensify, with peak winds reachingan estimated 125 knots on the 18th.

By late on the 18th, the hurricane began to turn toward the northwest and weaken over colder waters. Frank dropped to a tropical storm on the 21st and to a depression on the 23rd.

A banding-type eye formed in Lester and passed very close to the 17,000-ton, 546-foot long *Gladiator* during the evening of the 22nd.

The convection associated with a tropical wave increased upon entering the eastern Pacific on the 16th of August. By the 19th, this weather system was becoming bet-

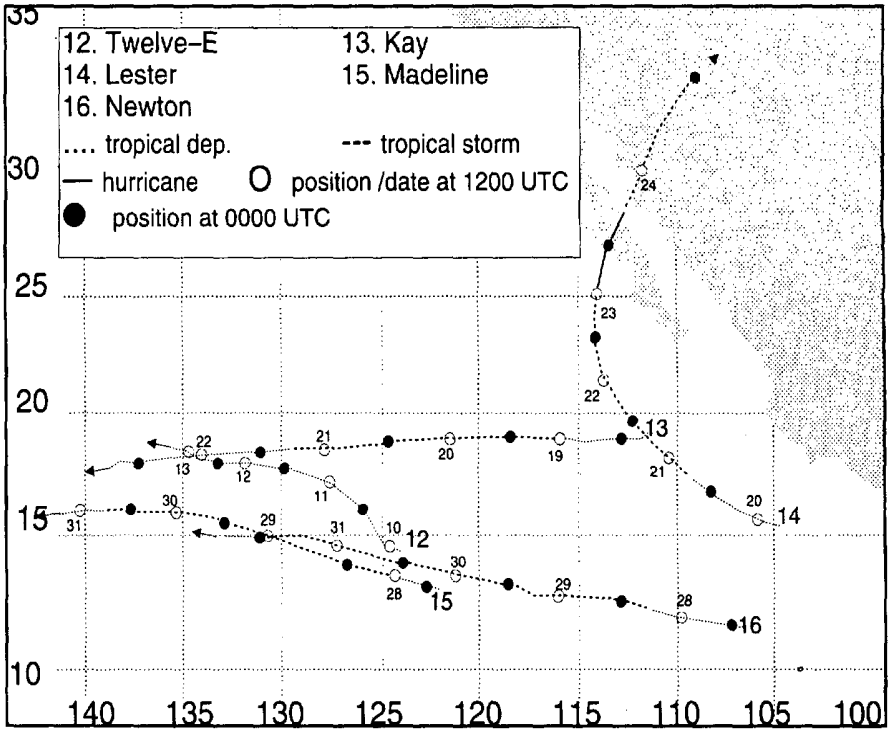


ter organized. Tropical Depression Fourteen-E centered 240 nautical miles south-southwest of Manzanillo, Mexico, developed on the night of the 19th-20th.

The depression quickly strengthened to become Tropical Storm Lester, and its center passed directly over Socorro Island near 0400 UTC on the 21st. There were no observations from the island at that time but 4 hours earlier sustained surface winds of 020° at 32 knots were reported.

Lester continued northwestward and slowly strengthened. On the 21st, the ***Century Highway No. 5*** reported 42 knot winds 150 nautical miles northeast of the center, and the ***Cape May*** reported 37-knot winds about 200 nautical miles east northeast of the center. On the basis of those ship reports, the radius of tropical storm force winds was extended in the northeast quadrant.

By early on the 22nd of August, Lester began moving toward the north and later that day reached hurricane strength, about 210 nautical miles west of La Paz, Baja California. A banding-type eye formed and passed very close to the 17,000-ton, 546-foot long ***Gladiator*** during the evening of the 22nd. That ship observed winds of



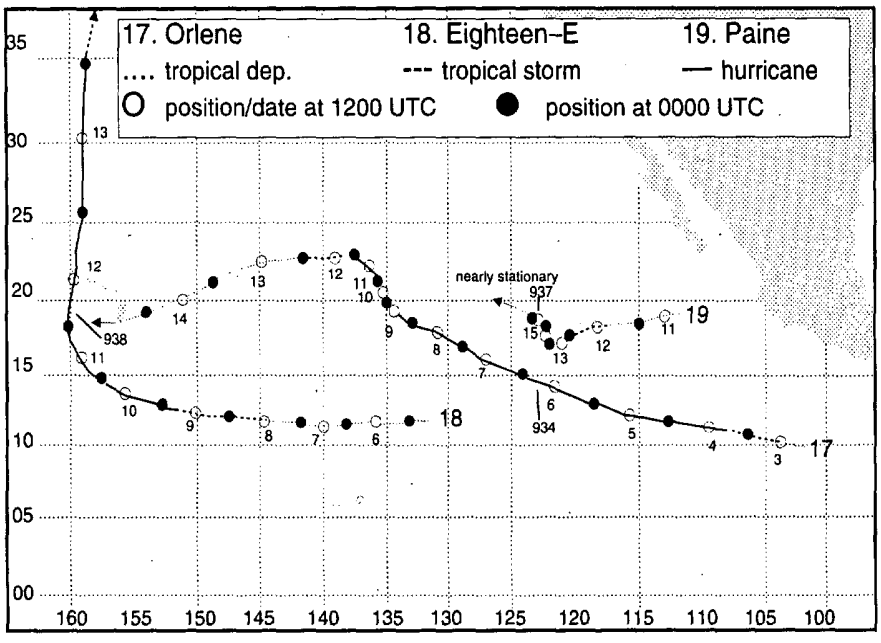
at least 34 knots for 24 consecutive hours and hurricane force winds for about half a day. Their highest winds were 75 knots and their lowest pressure was 982 millibars. Hurricane conditions caused a 33-degree roll, sending a considerable amount of cargo overboard.

A trough along the west coast of the United States became quasi-stationary and, as a result, Lester gradually turned toward the northeast making landfall first near Punta Abreojos, Baja California on the morning of the 23rd, and then near Isla Tiburon, Mexico as a tropical storm that afternoon. Lester probably was a minimal tropical storm as far inland as Tucson, Arizona but dissipated rapidly in central New Mexico.

Rainfall totals up to 8.66 inches were reported in Baja California and Sonora, Mexico. Reportedly, the associated flooding left more than 5,000 people homeless in Mexico, and several small communities were destroyed west and northwest of Hermosillo. Lester also caused minor flooding in California, Colorado, and Utah. A storm surge of uncertain dimensions reportedly occurred near the city of Empalme when Lester moved into mainland Mexico from the Gulf of California.

The convection accompanying a tropical wave became pronounced south of the Gulf of Tehuantepec on the 13th and 14th of September. It was not until the morning of the 17th, however, that the system became a tropical depression. The following night it became Tropical Storm Seymour a few hundred miles south of the southern tip of Baja California.

Seymour reached hurricane status on the 19th of September.



As the trough was replaced by the ridge, the cyclone turned westerly and regained hurricane strength.

Over the following 24 hours, five observations of tropical storm conditions were reported from vessels located just west of the Baja. All but one came from the ***London Spirit***. The other was from the ***Alligator Liberty***.

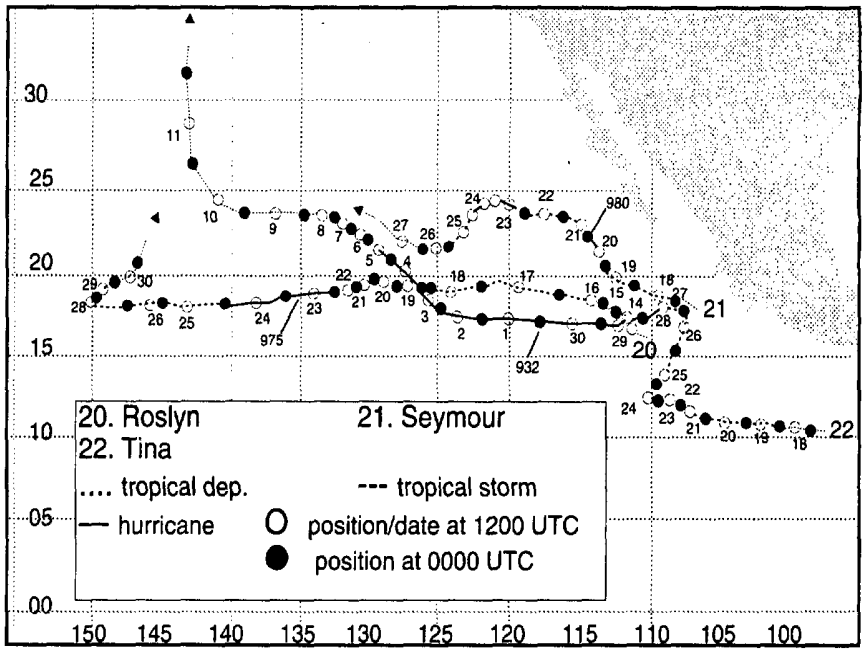
The effects of an upper-level trough, and perhaps cool ocean waters, weakened the hurricane temporarily to tropical storm strength. As the trough was replaced by a ridge, the cyclone turned westerly and regained hurricane strength.

Seymour's resurgence was short-lived, however. It soon lost all its deep convection and weakened to a tropical depression and then dissipated on the 27th of September.

Satellite images indicate that late on the 16th of September the amount of deep convection associated with a tropical wave increased and became concentrated over a small area centered about 350 nautical miles to the south of Acapulco. It is estimated that the system became a tropical depression on the morning of the 17th.

The tropical cyclone moved slowly (about 5 knots) westward through the 21st, well to the south of a deep High. Tina gradually intensified into a hurricane of 75-knot winds containing an intermittently detectable eye. The strengthening occurred despite the presence of northerly to northeasterly vertical wind shear associated with the upper-level outflow from Hurricane Seymour centered several hundred miles to the northwest.

Data from the first of several research flights by a NOAA aircraft indicate that Tina weakened back to tropical storm strength,



ending the first of its three cycles of intensification. The second cycle was underway on the 24th when Tina made a rather abrupt turn toward the west coast of Mexico. This coincided with a weakening of the ridge to the north and with a mid- to upper-level trough north of Tina.

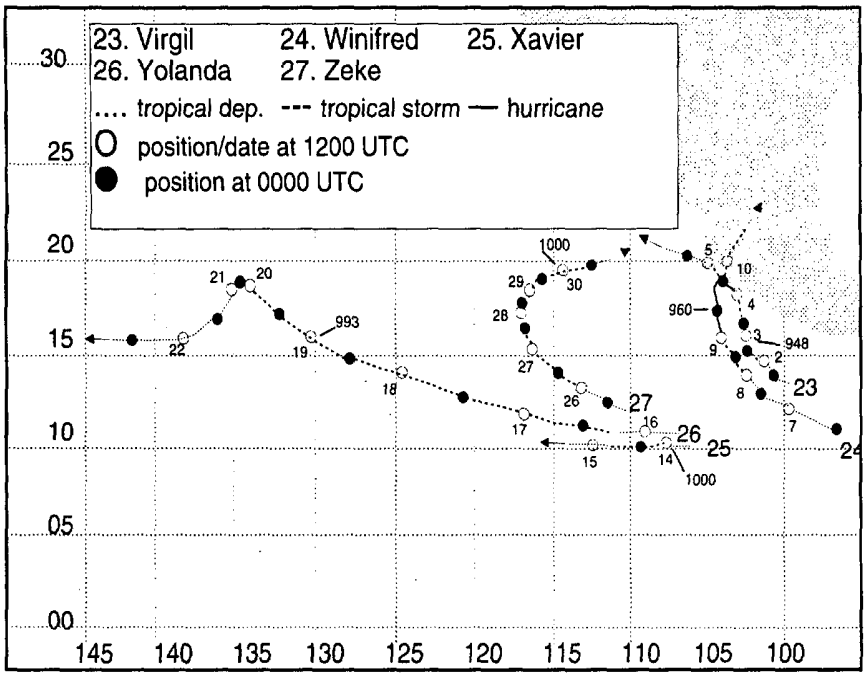
... investigations of Tina included a 944-mb central pressure and a wind speed of 125 knots at a flight level of 700 millibars ...

The trough was followed by a second and stronger High which developed west of Baja California and a ridge built southwestward. The associated steering flow turned Tina away from the coast on the 27th. Tina then strengthened for the third time and an eye of 20 nautical miles in diameter appeared. Late on the 29th, reports from a NOAA research aircraft included a 944-millibar central pressure and a wind speed of 125 knots at a flight level of 700 mb, while locating the hurricane center about 90 nautical miles to the south of Clarion Island.

Intensity estimates based on satellite data suggest that Tina was the eastern Pacific's strongest hurricane of 1992. An estimated peak of 130 knots occurred on the last day of September and early on the 1st of October.

Tina had several course adjustments during the first week of October. Eventually, it moved into an environment of progressively cooler water and moderate southwesterly wind shear. A protracted weakening trend ensued. The eye became exceptionally large, perhaps exceeding 60 nautical miles in diameter on the 4th. It became a tropical depression consisting mainly of a swirl of low clouds with a few deeper convective cells on the 7th. However, Tina then regenerated a small area of deep convection near its circulation center that persisted until the 11th of October.

Virgil formed on the 1st of October in an environment of weak vertical wind shear and warm sea surface temperatures. By mid day it became Tropical Storm Virgil centered about 400 nautical miles southeast of Manzanillo. On the 2nd and 3rd, the cyclone intensified markedly. Three ship reports of tropical storm force winds were registered during that period. One unidentified ship reported wind speeds of



58 knots and provided an estimate (presumably from radar) of Virgil's position and movement.

A distinct eye appeared on infrared satellite images at 1300 UTC on the 2nd. This observation implies that Virgil had become a hurricane while centered about 250 nautical miles to the south southeast of Manzanillo.

... Virgil had become a hurricane while centered about 250 nautical miles south southeast of Manzanillo.

The cyclone's forward motion shifted from northwest to north within a steering flow affected by a mid- to upper-tropospheric trough centered a few hundred miles to the northwest of Virgil. Virgil's center came within about 50 nautical miles of the coast, near Lazaro Cardenas, during the day on the 3rd, but then turned toward the north northwest and made landfall midway between Lazaro Cardenas and Manzanillo about 12 hours later.

Fortunately, Virgil had passed its peak intensity of 115 knots before making landfall. The eye was not generally discernable on satellite images when the hurricane came ashore and maximum sustained wind were estimated then to be near 95 knots. Rainfall totals up to 10 inches were reported in the state of Michoacan.

One person was reported missing in the state of Colima and three people were injured in the state of Guerrero. More than 1000 homes were damaged in Colima, Guerrero, and Michigan. In Guerrero, the Atoyac River overflowed, flooding 500 homes and prompting the evacuation of 2500 people.

Weakening accelerated after landfall, over nearby mountains. The cyclone center passed just north of Manzanillo on the 4th, but by that time Virgil was a tropical depression. Virgil reentered the Pacific near Cabo Corrientes. By the following day, only a small, weak low-level circulation remained. Strong upper-level westerlies over the area helped prevent Virgil from regenerating.

Hurricane Tina was near its estimated peak intensity of 130 knots at the time of this picture, 2101 UTC on the 30th of September 1992.

1992 Eastern North Pacific Tropical Cyclones

No.	Name	Class[a]	Dates[b]	Maximum Sustained wind (knots)[c]	Lowest pressure (mb)
1	Agatha	T	6/1-6/5	60	990
2	Two-E	D	6/16-6/18	30	1009
3	Blas	T	6/22-6/24	35	1004
4	Celia	H	6/22-7/4	125	935
5	Darby	H	7/2-7/10	105	968
6	Estelle	H	7/9-7/17	120	943
7	Frank	H	7/13-7/23	125	935
8	Georgette	H	7/14-7/27	95	964
9	Howard	T	7/26-7/30	55	992
10	Isis	T	7/28-8/2	55	992
11	Javier	H	7/30-8/12	70	985
12	Twelve-E	D	8/10-8/12	30	1006
13	Kay	T	8/18-8/22	45	1002
14	Lester	H	8/20-8/24	75	977
15	Madeline	T	8/27-8/31	45	999
16	Newton	T	8/28-9/1	45	999
17	Orlene	H	9/2-9/14	125	934
18	Eighteen-E	D	9/5-(became Iniki on 9/8)		
19	Paine	H	9/11-9/16	65	987
20	Roslyn	H	9/13-9/30	85	980
22	Tina	H	9/17-10/11	130	932
23	Virgil	H	10/1-10/5	115	948
24	Winifred	H	10/6-10/9	100	960
25	Xavier	T	10/13-10/15	40	1003
26	Yolanda	T	10/15-10/22	55	993
27	Zeke	T	10/24-10/30	45	1000

[a]D:tropical depression, wind speed less than 34 knots.
T:tropical storm, wind speed 34-63 knots.
H:hurricane, wind speed 64 knots or higher.

[b]Dates begin at 0000 Universal Time.

[c]Wind speed over a one-minute spa

Tropical Cyclone Winds

(ship encounters of 34 knots or higher)

Tropical Cyclone	Ship Name	Date Mo/Da	Time UTC	Position LatN	LonW	Wind(kn) Dir/Speed	Pressure (mb)
Darby	*Zim Japan*	7/03	2100	14.0	95.2	130/35	1006.0
	Silvaplana	7/04	1500	17.1	102.9	090/34	1009.0
	Lincolnshire	7/05	0000	18.0	103.4	130/40	1007.3
	Eva	7/05	0200	19.0	105.0	090/45	-
	Silvaplana	7/05	0300	18.4	105.5	120/43	1005.5
	Lincolnshire	7/05	0300	18.0	103.3	120/35	1009.6
	Silvaplana	7/05	0600	18.8	106.0	110/40	1007.0
	Silvaplana	7/05	1200	19.9	107.1	110/50	1007.0
	Century Leader No. 5	7/05	1500	19.0	105.4	130/38	1008.0
	Silvaplana	7/05	1500	20.4	107.6	110/48	1009.0
	CPC Holandia	7/05	1500	1 5.0	108.2	250/44	997.5
	Silvaplana	7/05	1800	20.9	108.1	090/34	1009.0
	Silvaplana	7/05	2100	21.4	108.7	090/34	1008.2
	Oasis	7/05		19.4	110.9	---/95	
	Pacific Sandpiper	7/06	0000	20.3	107.9	130/37	1005.5
	Silvaplana	7/06	0000	21.8	109.3	090/34	1006.0
	Silvaplana	7/06	0300	22.2	109.9	090/34	1008.0
	Oaxaca	7/06	0300	22.7	110.9	120/35	1007.0
	Oaxaca	7/06	0600	22.6	110.4	110/34	1008.5
	Silvaplana	7/06	1500	23.6	112.4	090/34	1011.0
	ELEM2	7/06	1800	24.4	112.9	130/47	1012.8
Frank	*Nikolai Nekrassov*	7/14	1800	13.4	104.3	190/35	1009.8
	Pisces Planter	7/15	1200	16.1	107.3	210/37	1008.0
	USNS Victorious	7/19	0000	13.4	119.9	190/35	1008.0
Lester	*Century Highway No. 5*	8/21	1800	21.3	109.4	100/42	1008.1
	Cape May	8/21	1800	21.9	110.8	30/37	1011.1
	Gladiator	8/22	1700 through 1600 8/23 near 25°N 113°W: wind 34 to 75 knots, pressure 982 to 1005 mb				
Paine	*Venus Diamond*	9/16	1200	15.5	119.9	210/44----------	
Seymour	*London Spirit*	9/20	1200	24.2	113.2	100/35	1002.9
	London Spirit	9/20	1500	24.2	113.9	130/35	1003.8
	London Spirit	9/20	1800	24.0	112.7	130/40	1004.4
	London Spirit	9/21	0000	23.2	112.1	150/45	1003.5
	Alligator Liberty	9/21	0000	23.6	112.4	160/35	1003.2
Tina	*South Land Star*	9/25	1200	13.7	107.5	210/40	1006.2
	World Wing II	9/27	0000	16.2	107.5	210/34	1005.5
	(unknown)	9/27	1200	15.2	106.7	180/35	1002.0
Virgil	*Huta Lenina*	10/02	2100	15.5	102.3	180/40	1000.0
	(unknown)	10/03	0000	15.3	102.2	230/58	1002.1
	(unknown)	10/03	0300	15.0	102.2	250/46	1004.8
	Sky Princess	10/03	1200	16.9	100.9	080/37	1005.1
Winifred	*B. T. Alaska*	10/09	0000	16.9	100.8	090/36	1007.0

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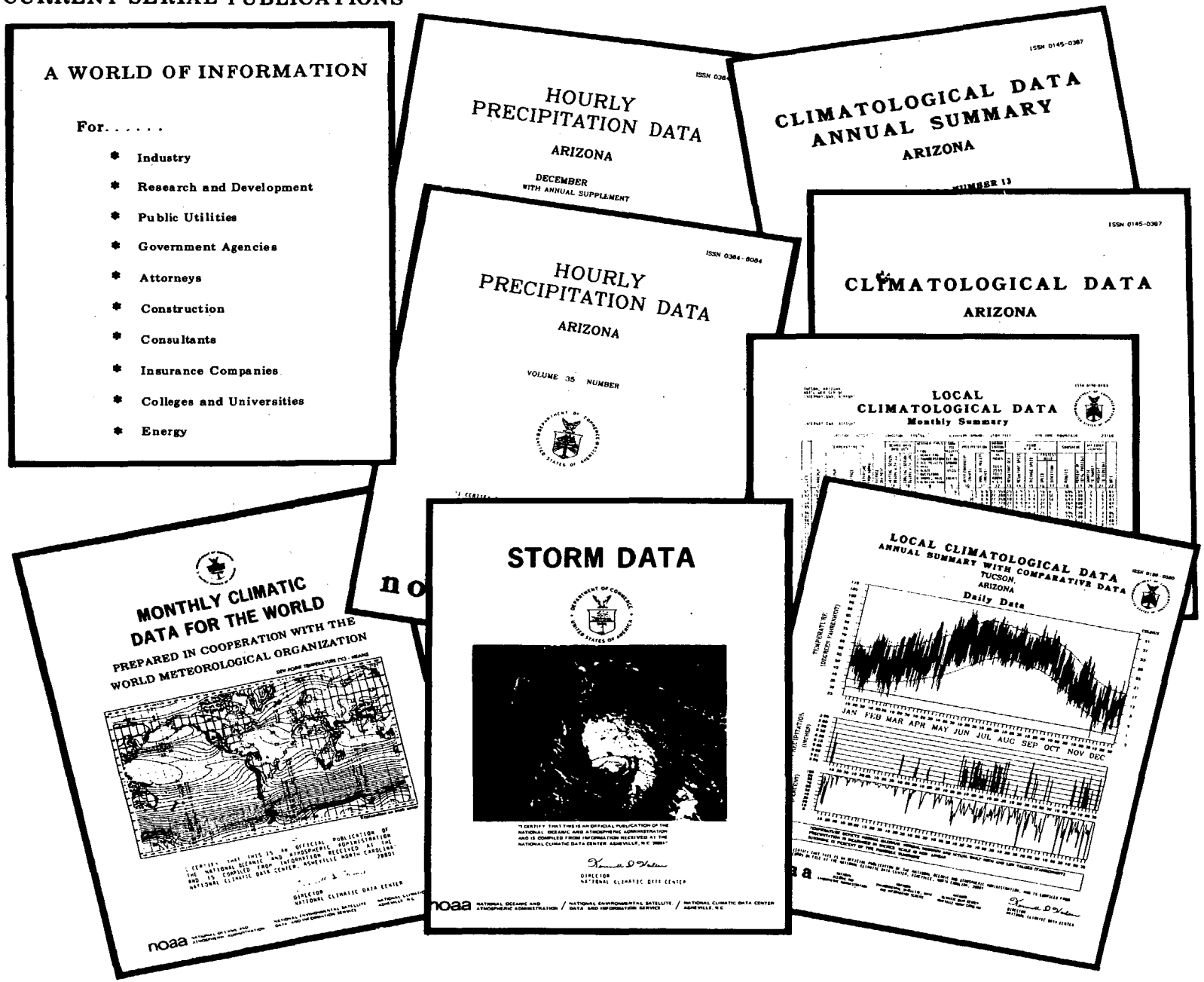

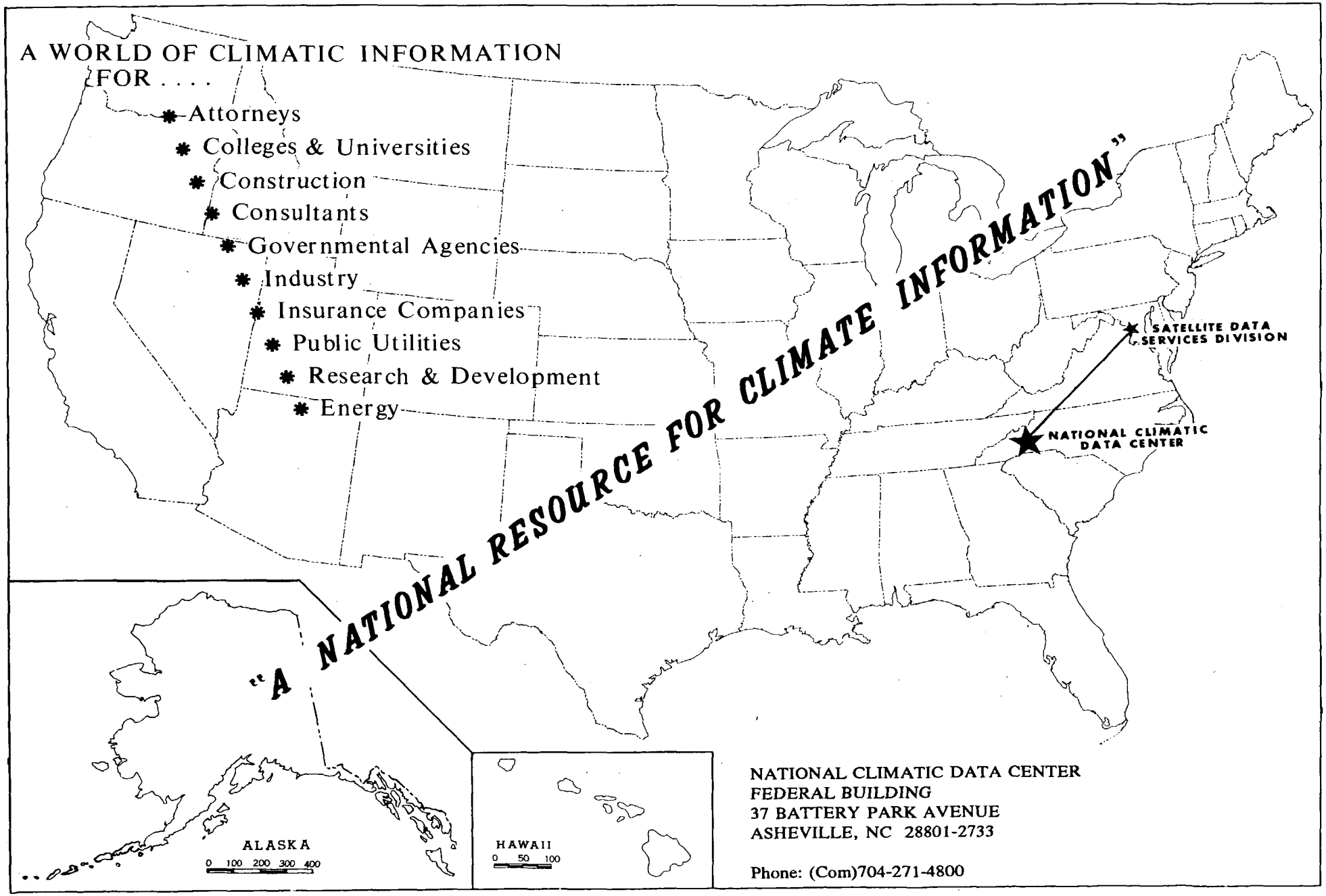
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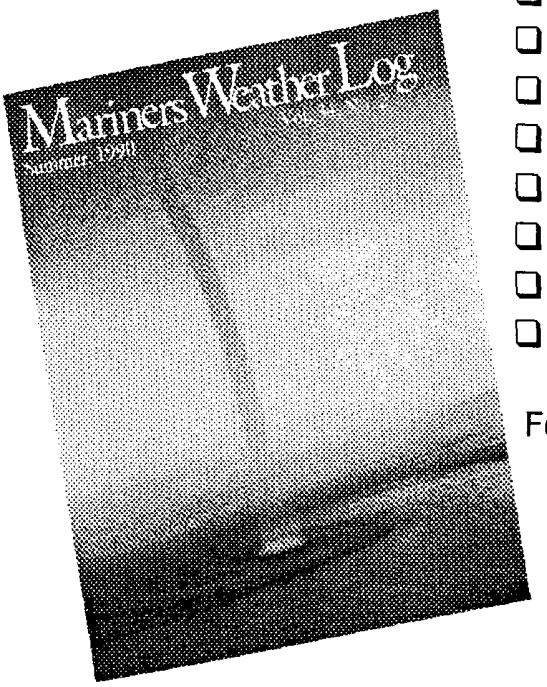

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