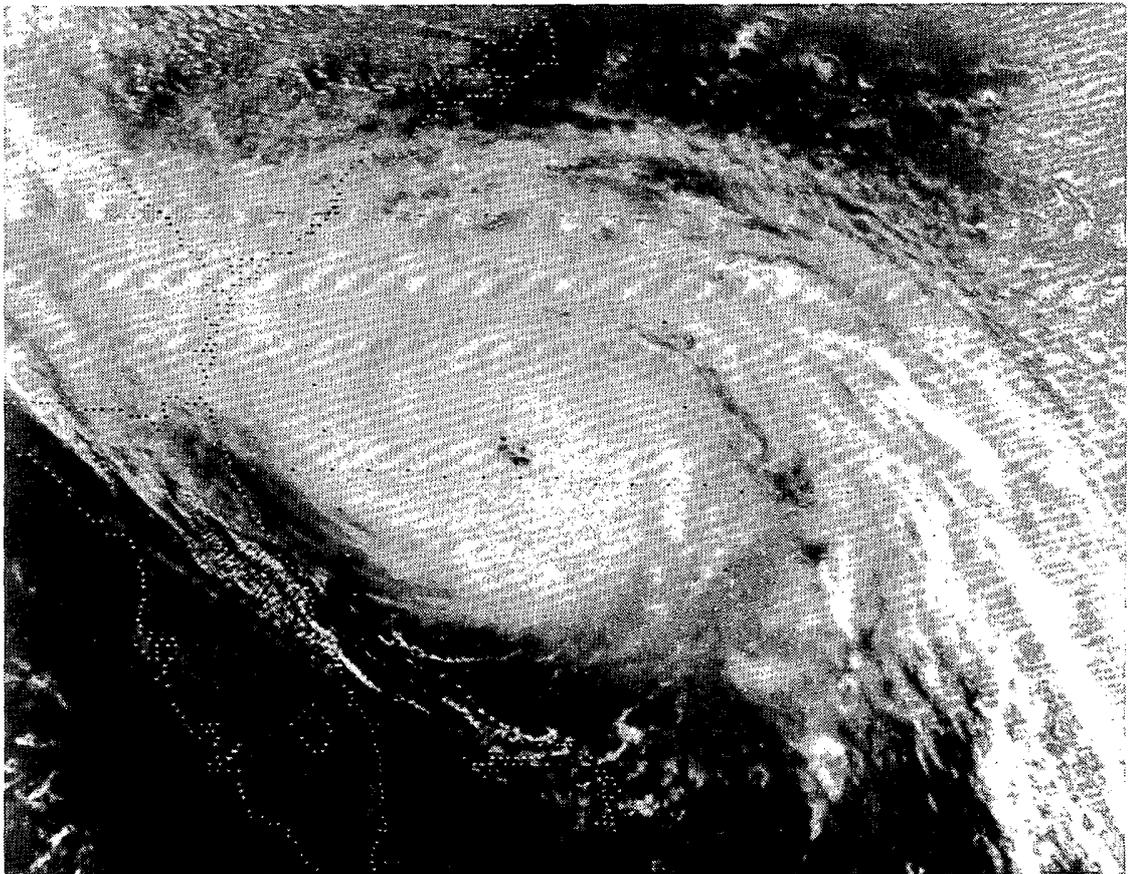


STORM DATA



"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

Kenneth D. Haden

DIRECTOR
NATIONAL CLIMATIC DATA CENTER

Support for this publication is provided in part by the Office of Naval Research, Marine Meteorology Program, Dr. Robert F. Abbey, Jr., Director. Extensive data collection efforts are provided by the National Weather Service.

C O N T E N T S

Cover: After already having exacted a heavy toll on the Virgin Islands and Puerto Rico, Hurricane HUGO is seen here in a GOES 7 satellite, visible image taken at 1800 UTC (1300 EST) on September 21st as it heads for South Carolina where it would make its final landfall near Charleston at 0400 UTC of the 22nd (2300 EST of the 21st). HUGO became the costliest hurricane in U.S. history as it did approximately ten billion dollars in total damage and caused 82 deaths (see pages 11 through 27). ---Photo from the National Hurricane Center and provided through AOML/HRD, both of Miami, Florida.

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STORM DATA (ISSN 0039-1972)

The section on Outstanding Storms of the Month is prepared by Professor T. Theodore Fujita, editor, and Duane J. Stiegler, associate editor, the University of Chicago, with funding by the U. S. Office of Naval Research. The Storm Data and Unusual Weather Phenomena narratives, and summaries of Hurricanes/Tropical Storms are prepared by the National Weather Service. The National Climatic Data Center compiles statistics on deaths, injuries, damage and prepares the annual summaries of tornadoes and lightning. This publication contains our best information on storms, but due to the difficulties inherent in collection of this type of data it is not all-inclusive. Late reports and corrections will be carried quarterly. Maps of zones used in the Storm Data and Unusual Weather Phenomena will be published in all editions.

Storm Data is published monthly by the National Climatic Data Center.

Publication Staff

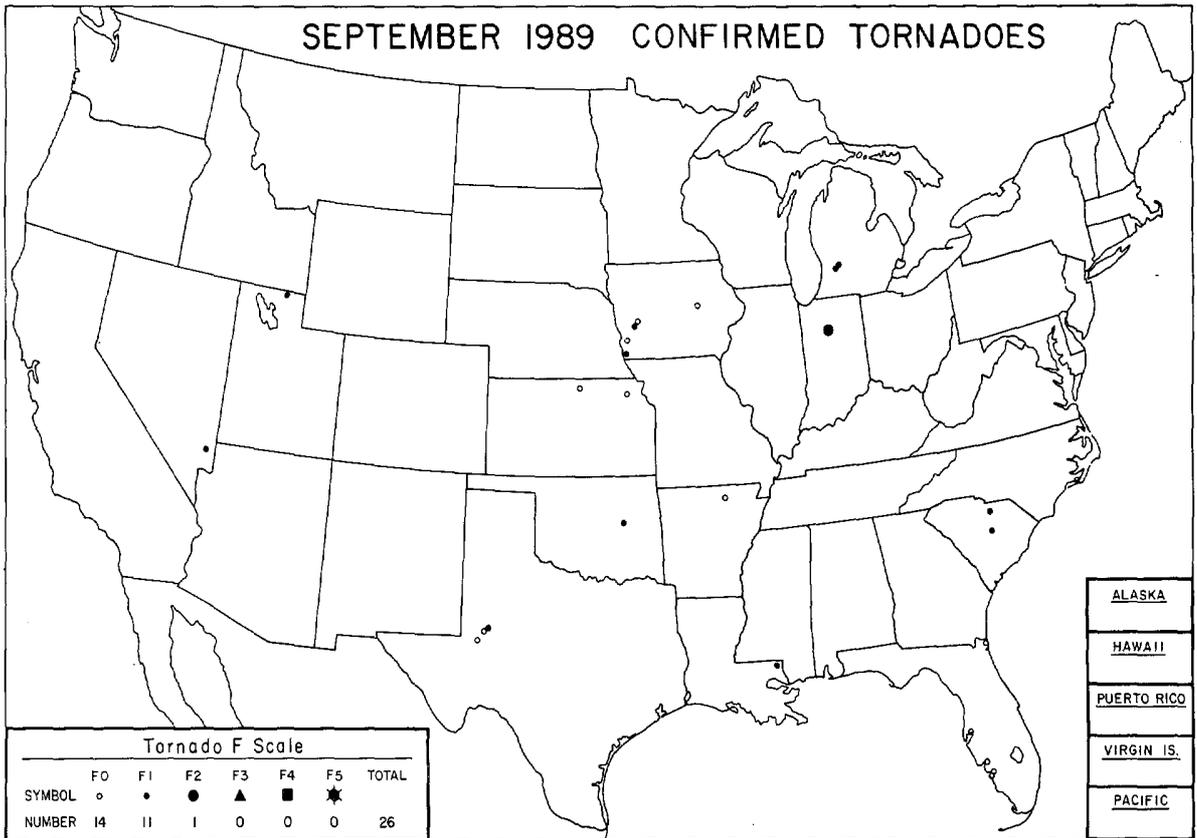
Jay Hollifield

S. C. Lackey

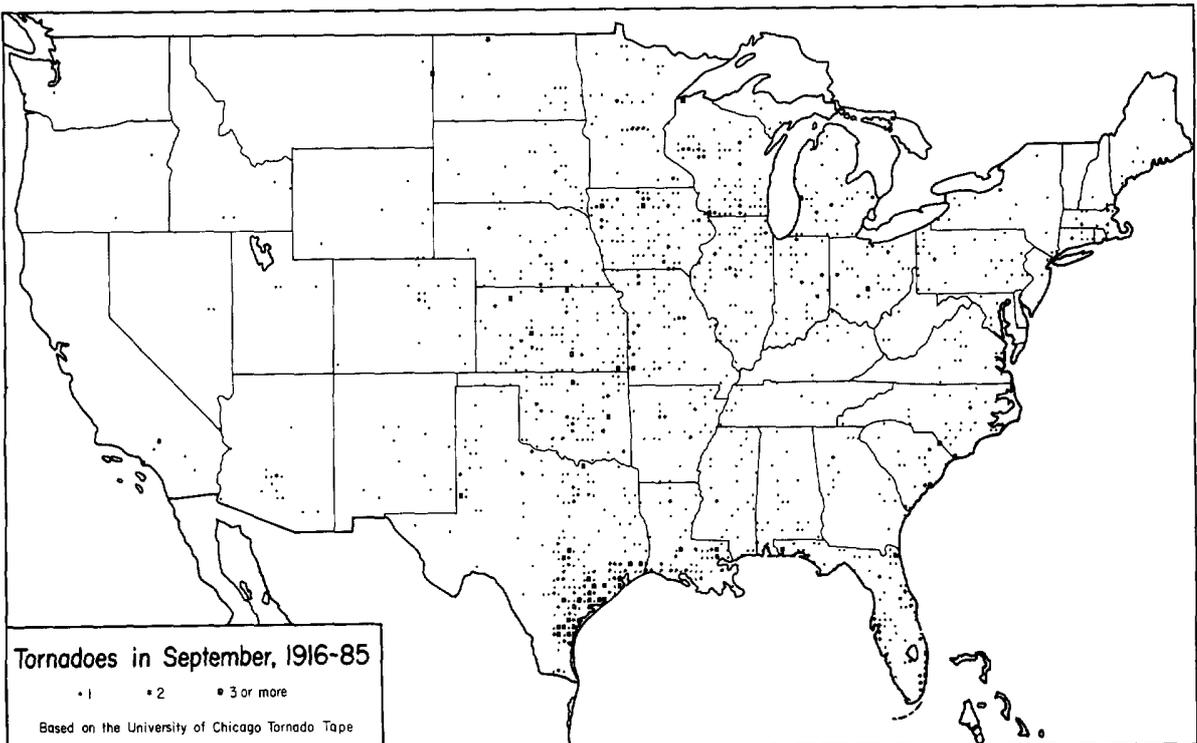
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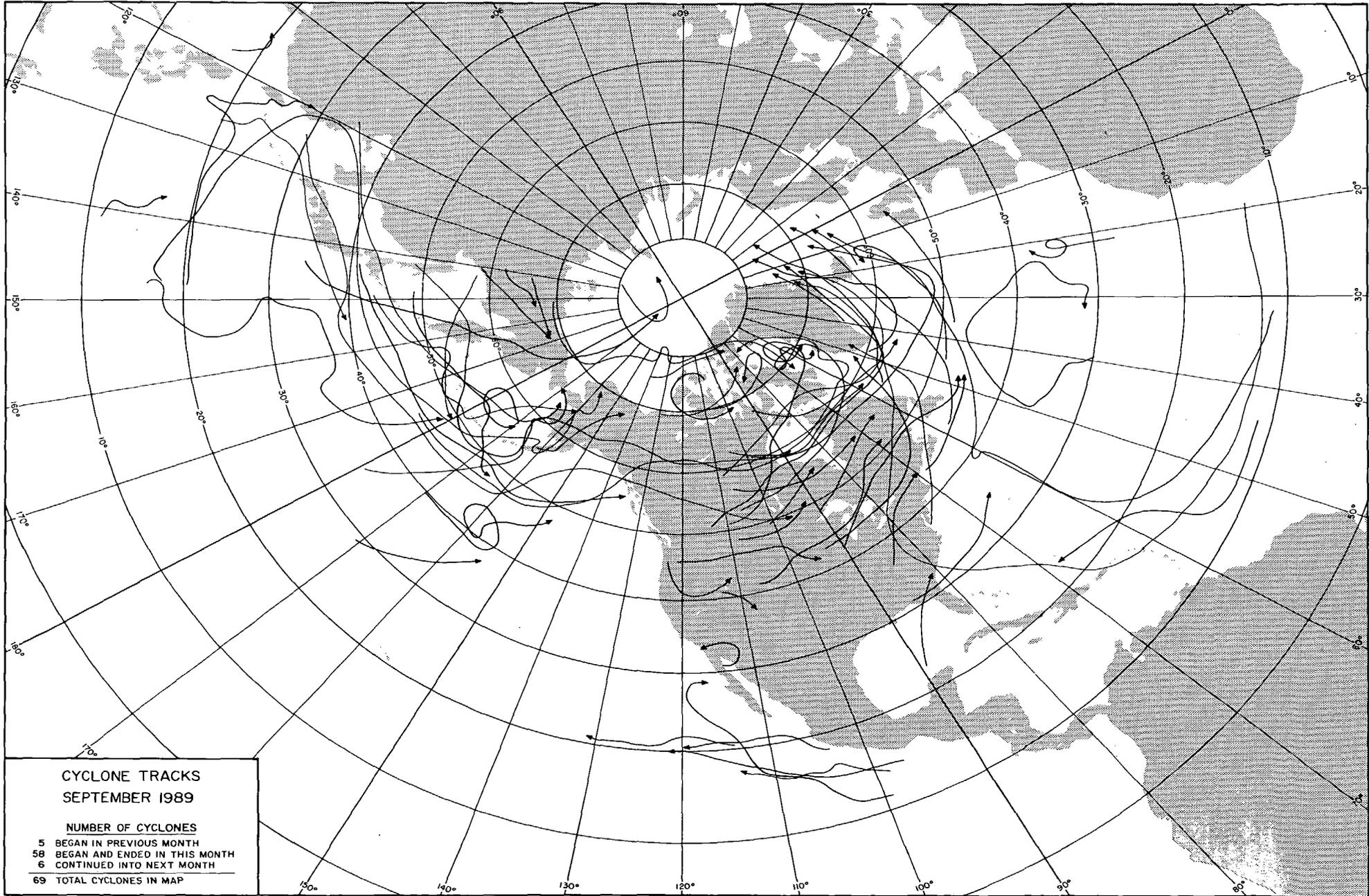
National Climatic Data Center
Federal Building
Asheville, NC 28801-2696

OUTSTANDING STORMS OF THE MONTH

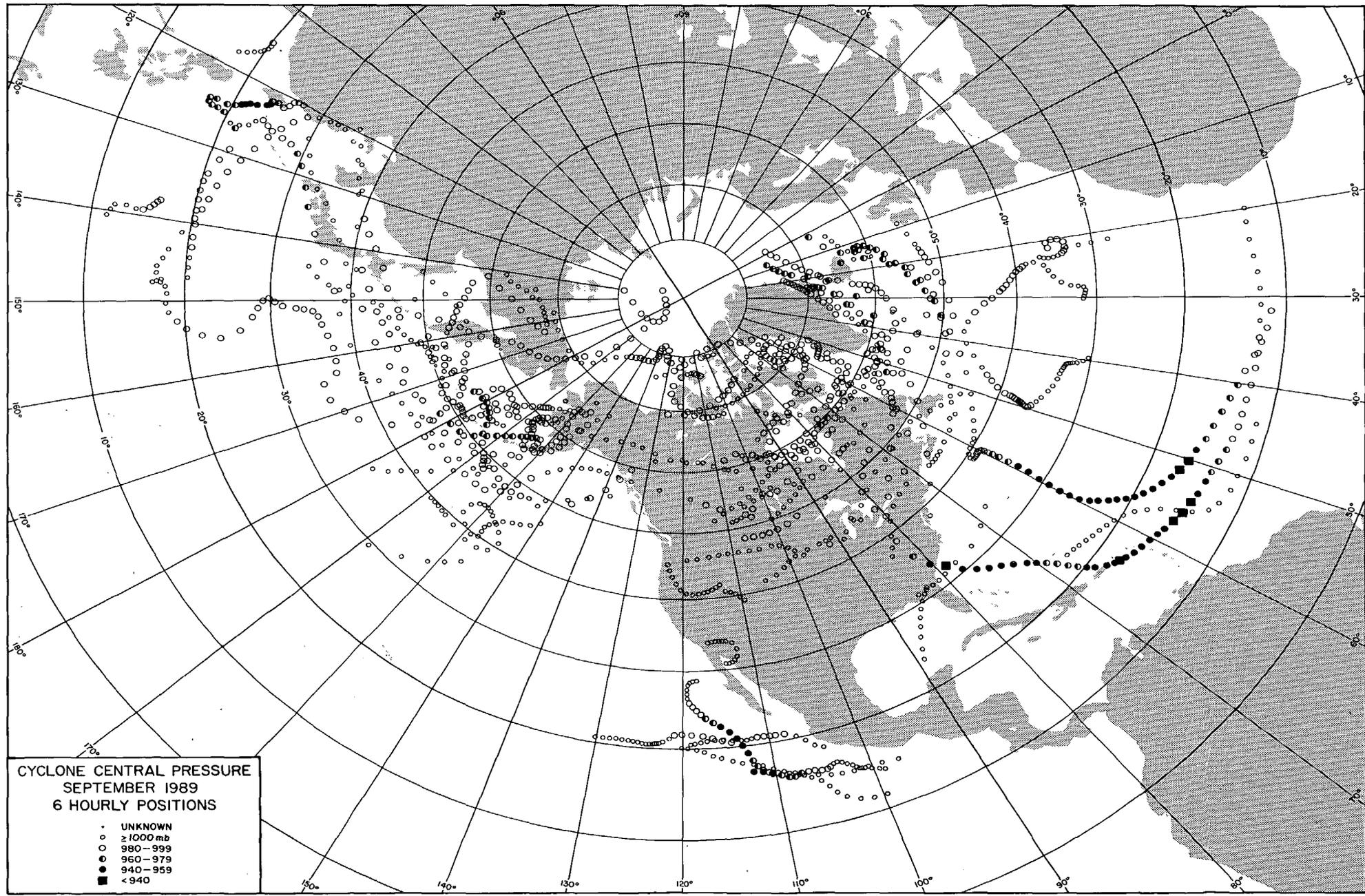


● COMPLETE REPORT RECEIVED	● 1AL	● 7DE	● 14KS	● 21MN	● 28NJ	● 33OH	● 39SD	● 44VA	● 49AK(SE)
○ PRELIMINARY REPORT RECEIVED	● 2AZ	● 8FL	● 15KY	● 22MS	● 29NH	● 34OK	● 40TN	● 45WA	● 50HI
○ REPORT NOT RECEIVED	● 3AR	● 9GA	● 16LA	● 23MO	● 30NY(O)	● 35OR	● 41TX(N)	● 46WV	● 51PR
(N) northern (W) western	● 4CA(N)	● 10ID	● 17ME	● 24MT	● 30NY(C)	● 36PA(E)	● 41TX(S)	● 47WI	● 52VI
(S) southern (C) central	● 4CA(S)	● 11IL	● 18MD	● 25NE	● 30NY(W)	● 36PA(W)	● 41TX(W)	● 48WY	● 53PC
(E) eastern (O) coastal	● 5CO	● 12IN	● 19MA	● 26NV	● 31NC	● 37RI	● 42VT	○ 49AK(N)	
(SE) southeastern	● 6CT	● 13IA	● 20MI	● 27NH	● 32ND	● 38SC	● 43VT	● 49AK(S)	





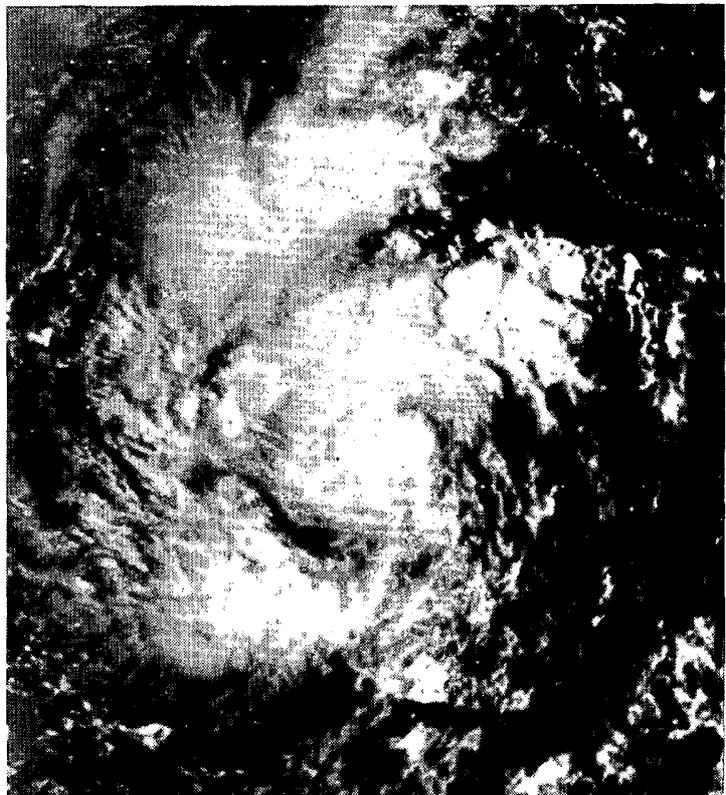
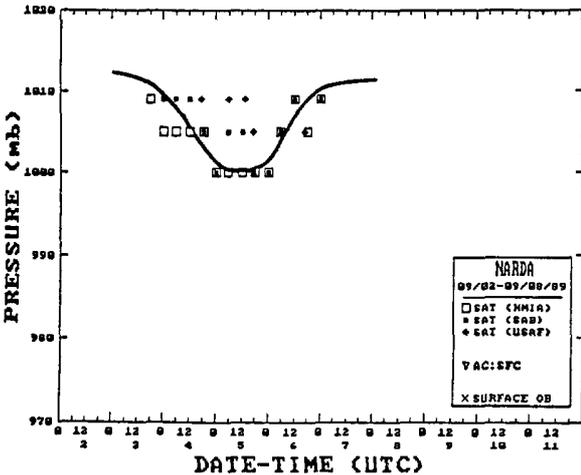
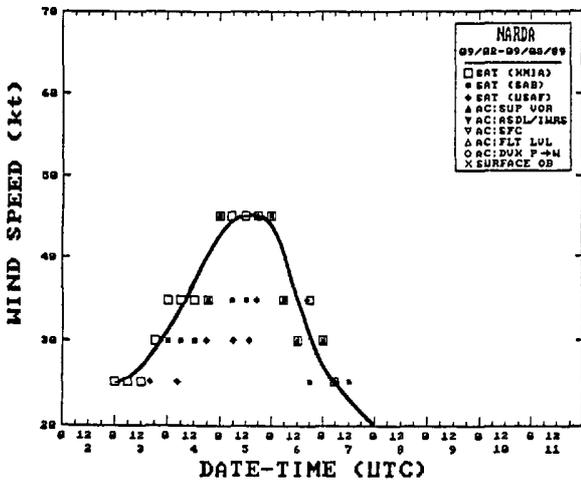
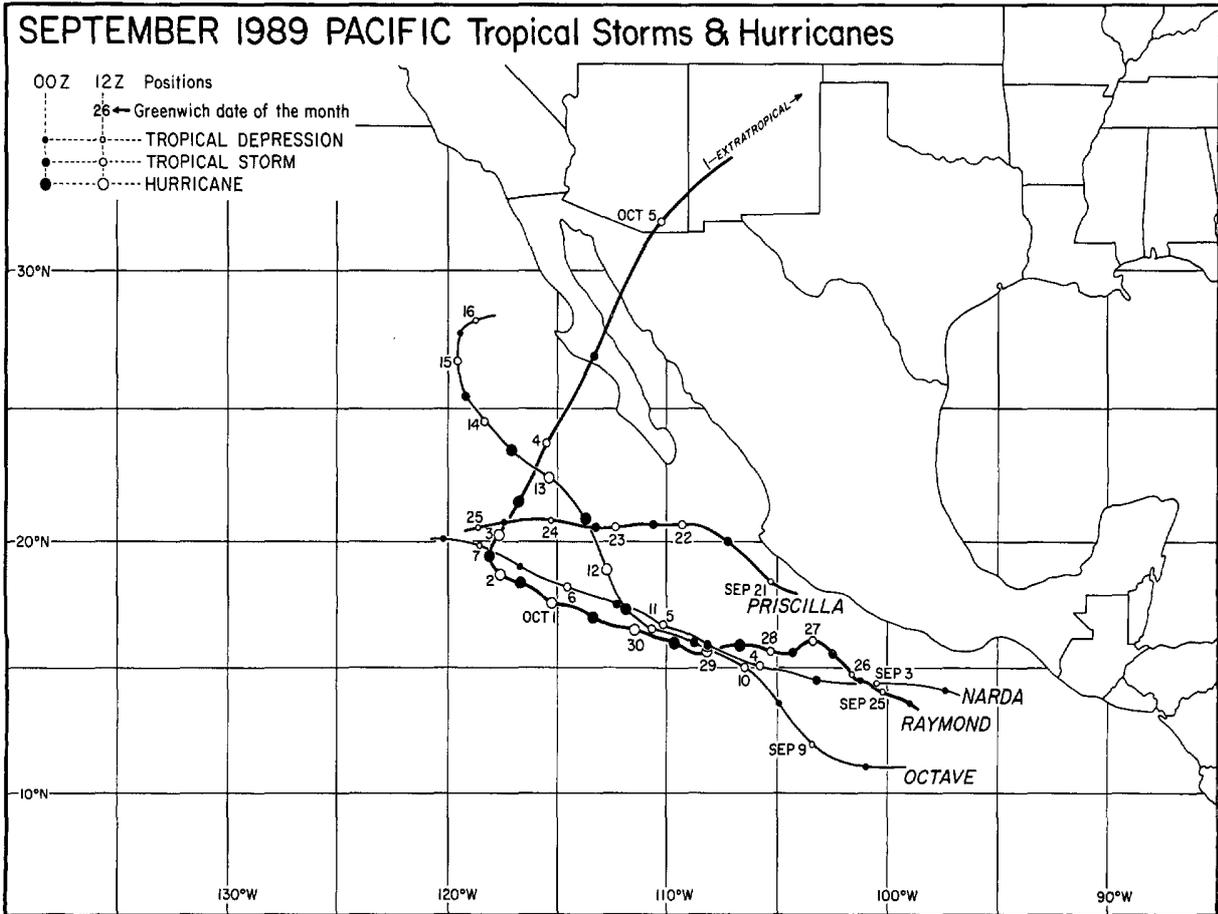
Mapped at the University of Chicago from NMC, cyclone track data



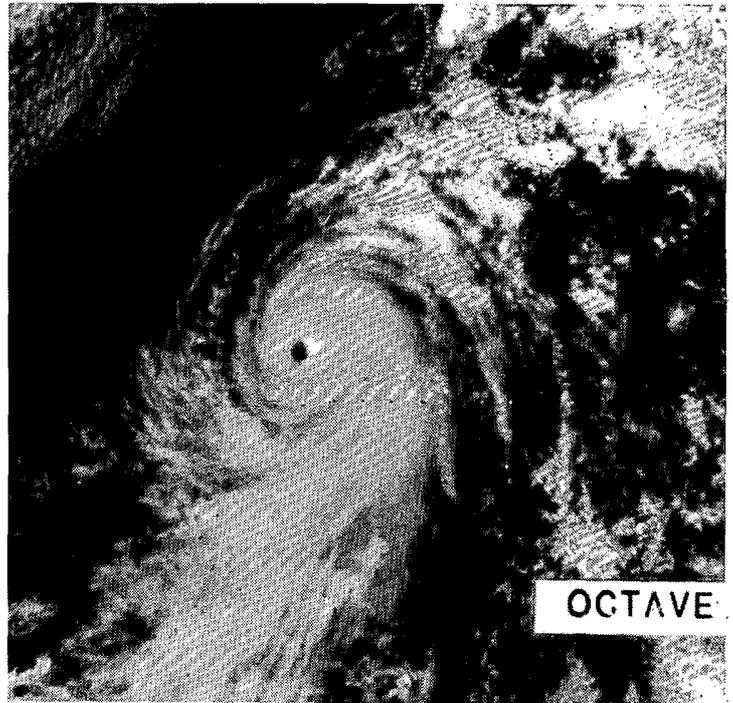
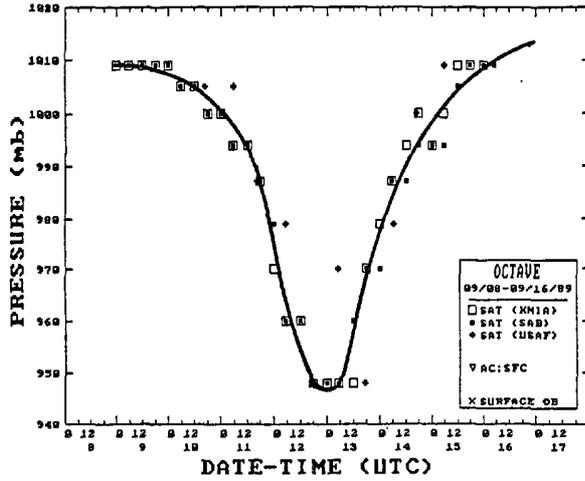
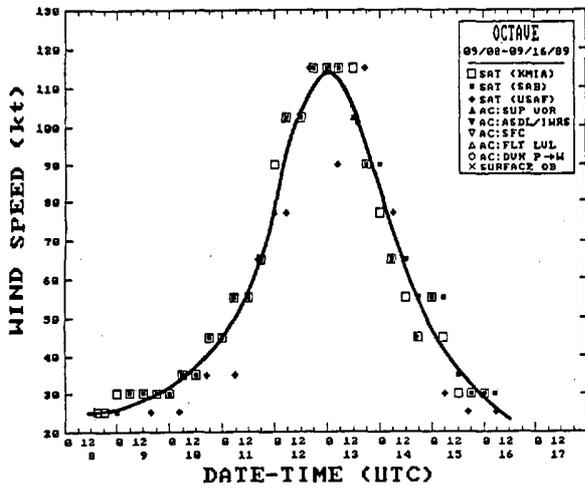
CYCLONE CENTRAL PRESSURE
SEPTEMBER 1989
6 HOURLY POSITIONS

- UNKNOWN
- ≥ 1000 mb
- ◌ 980-999
- ◌ 960-979
- ◌ 940-959
- < 940

TROPICAL STORMS and HURRICANES

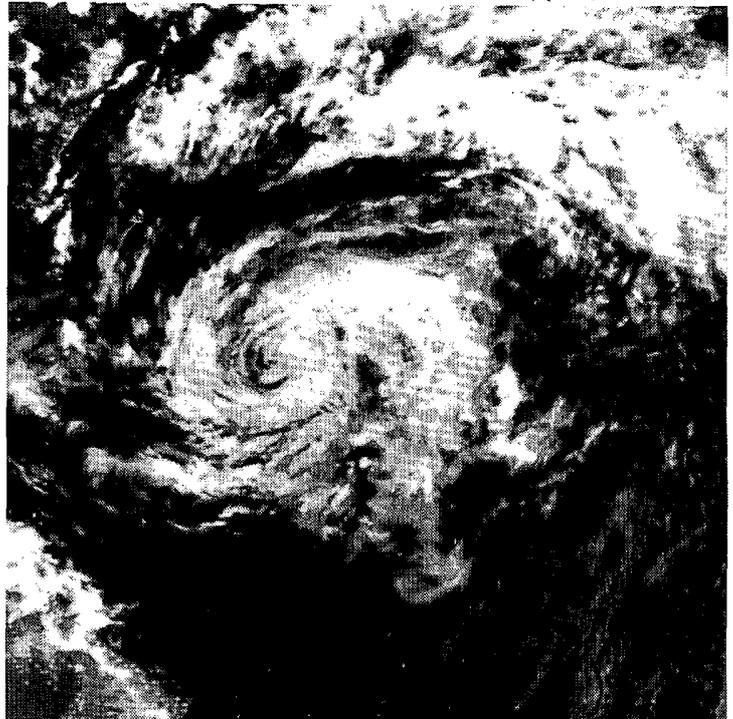
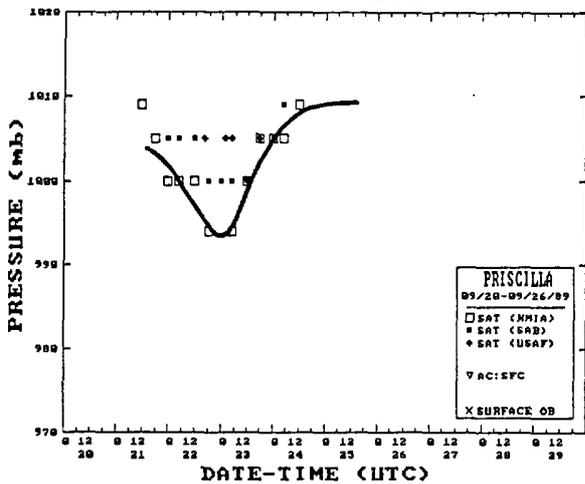
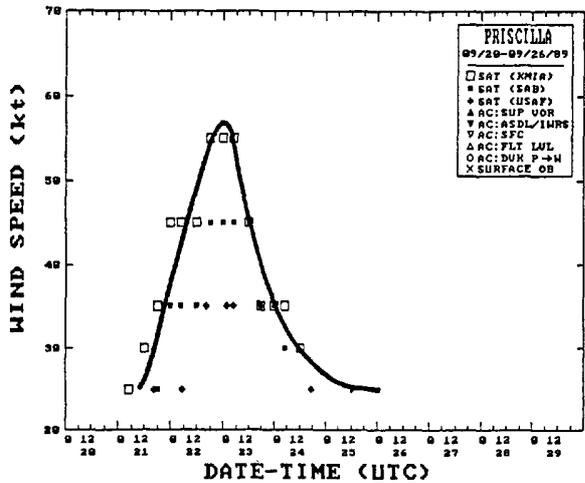


Tropical Storm NARDA centered near 15.3°N, 106.5°W in the Eastern Pacific at 1500 UTC on September 4th.
 LEFT: Plots of estimated maximum wind speed and minimum surface pressure versus time for Tropical Storm NARDA.



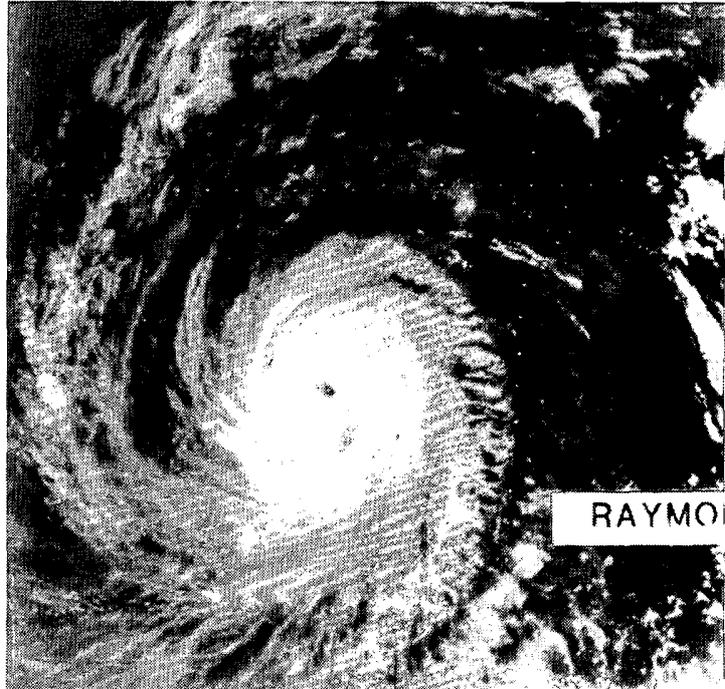
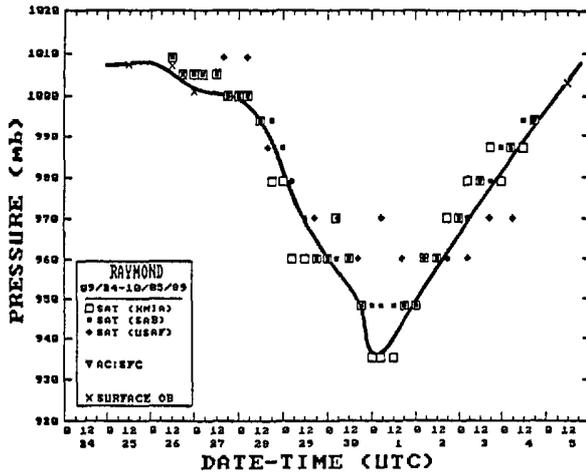
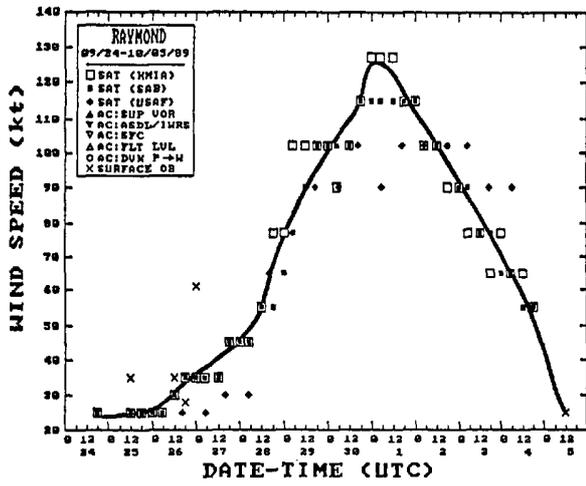
Hurricane OCTAVE exhibits a very conspicuous eye centered near 20.7°N, 113.6°W in the Eastern Pacific at 2230 UTC on September 12th.

LEFT: Plots of estimated maximum wind speed and minimum surface pressure versus time for Hurricane OCTAVE.



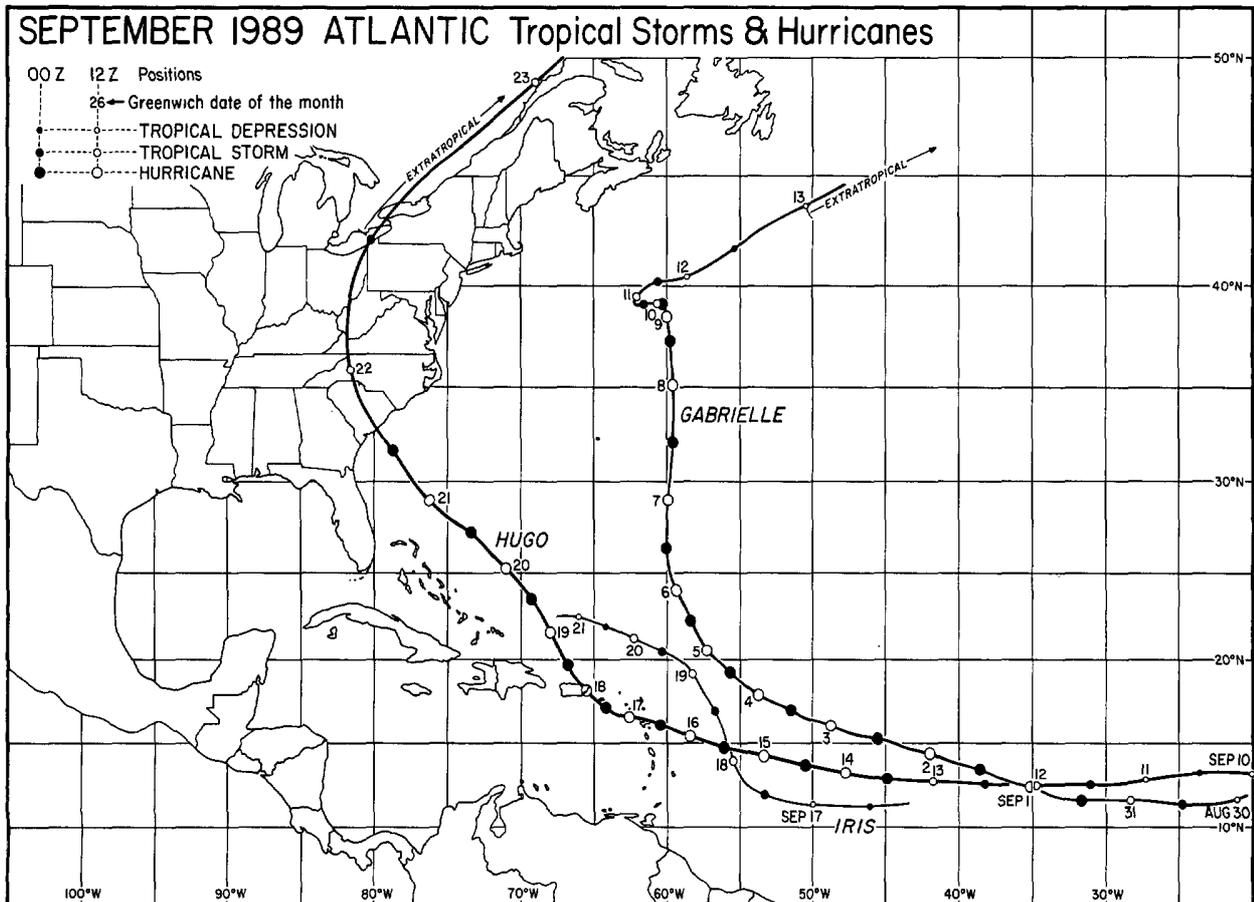
Tropical Storm PRISCILLA centered near 20.5°N, 113°W in the Eastern Pacific at 2100 UTC on September 23rd.

LEFT: Plots of estimated maximum wind speed and minimum surface pressure versus time for Tropical Storm PRISCILLA.



Hurricane RAYMOND with its small but obvious eye is centered near 17.0°N, 113.1°W in the Eastern Pacific at 2200 UTC on September 30th. RAYMOND made landfall on Baja California, Mexico on October 4th, and through the next day caused 1.5 million dollars in damage in southeast Arizona due to flooding (see October 1989 Storm Data). Information on damage in Mexico is unavailable.

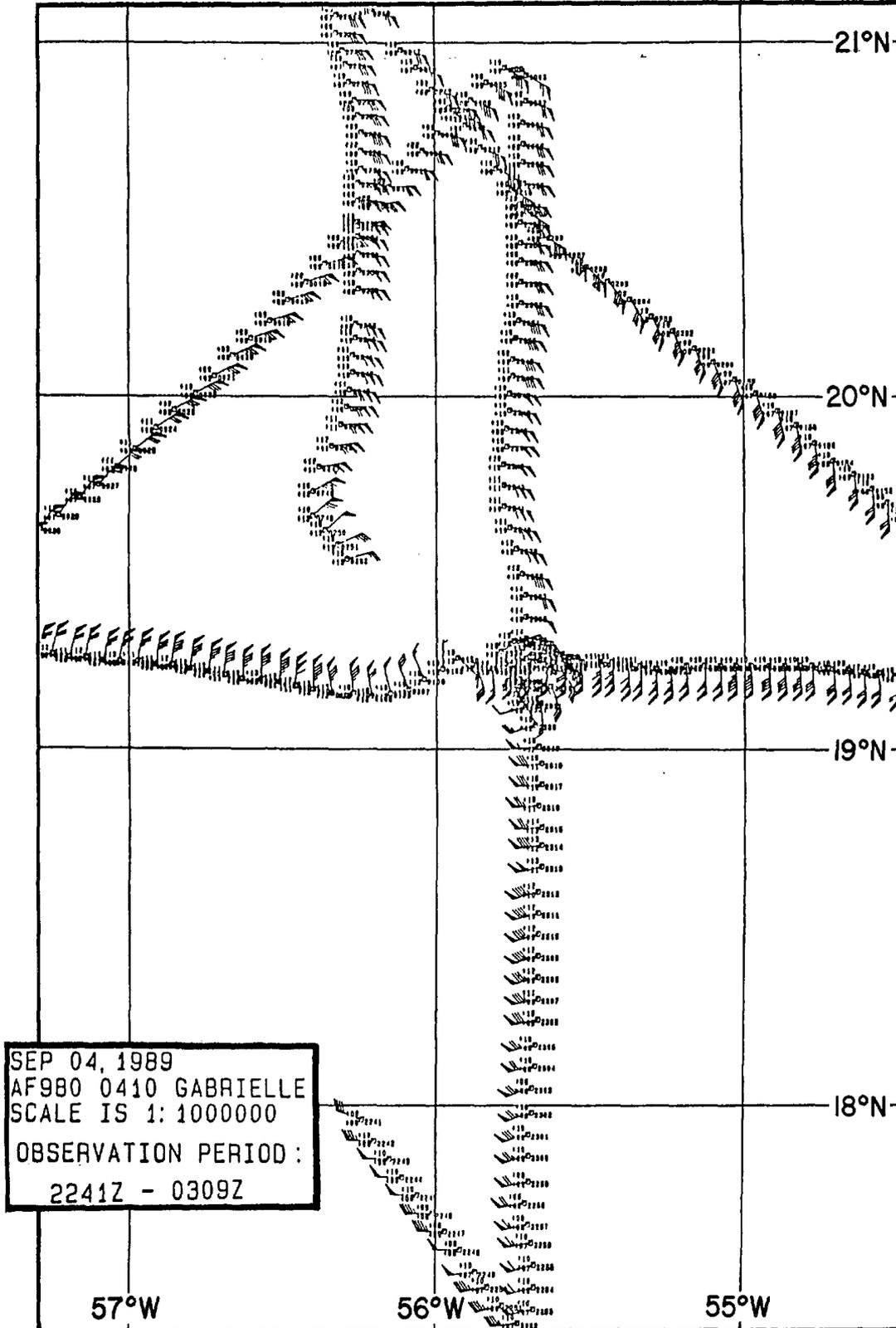
LEFT: Plots of estimated maximum wind speed and minimum surface pressure versus time for Hurricane RAYMOND.



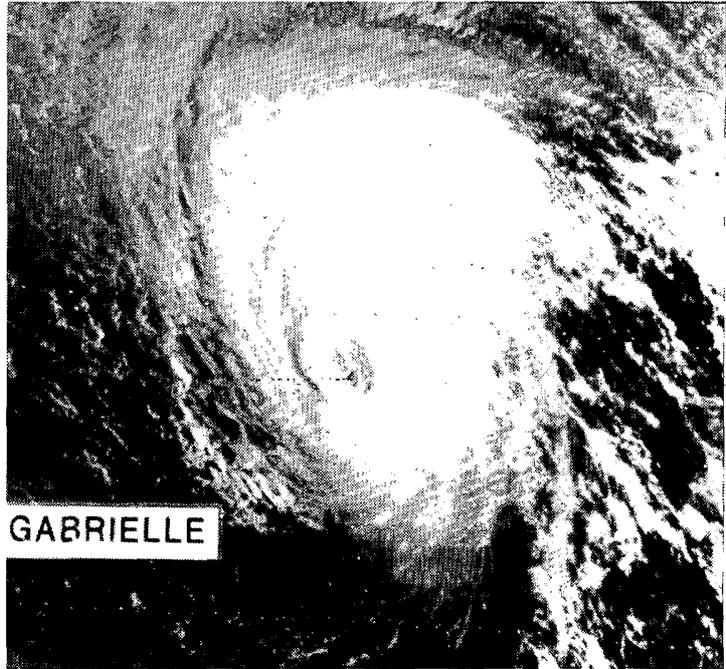
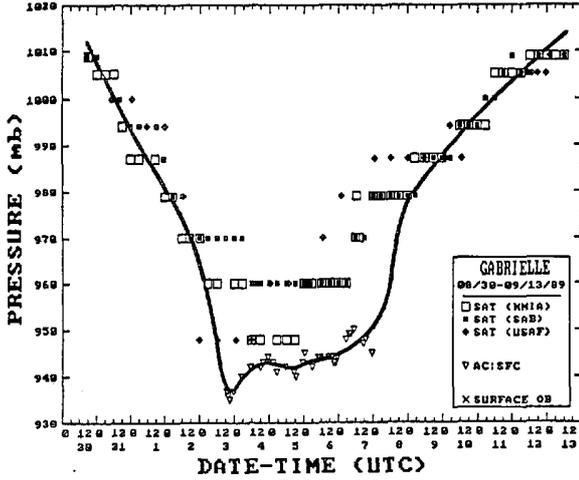
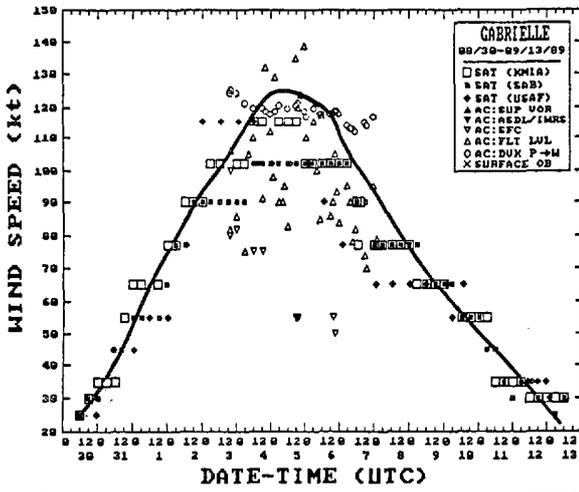
---Best track data from the National Hurricane Center, Miami, Florida.

VESSEL ID	DATE		TIME UTC	SHIP POSITION		WIND		
	MO	DAY		Lat. (N)	Lon. (W)	DIR. Deg.	SPEED (kt)	PRESSURE (mb)
EOCE	09	07	1200	30.0	57.0	160	55	997.0
UDOB	09	08	0600	34.9	56.2	160	50	993.0
2010	09	08	1200	34.7	62.3	340	55	992.1

Meteorological data from ships encountering tropical cyclone winds of 50 knots or more in Hurricane GABRIELLE.



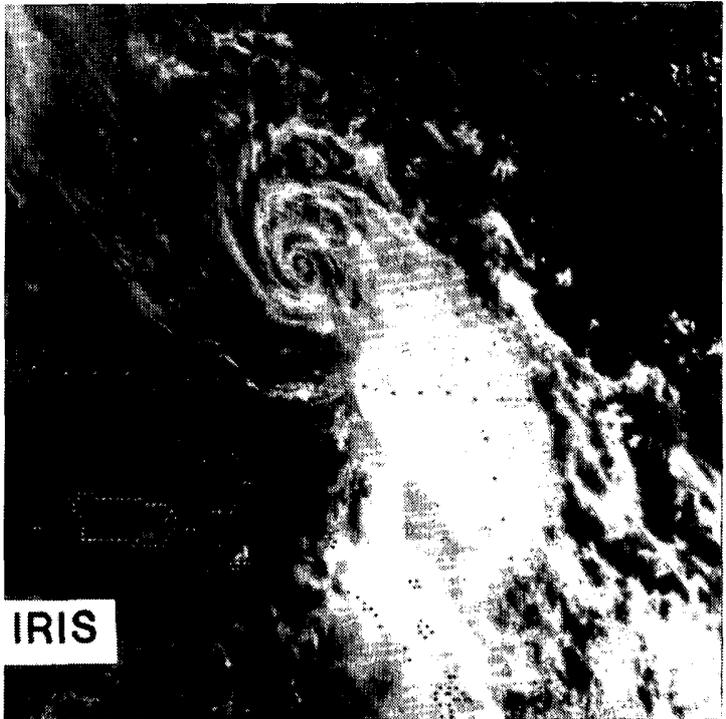
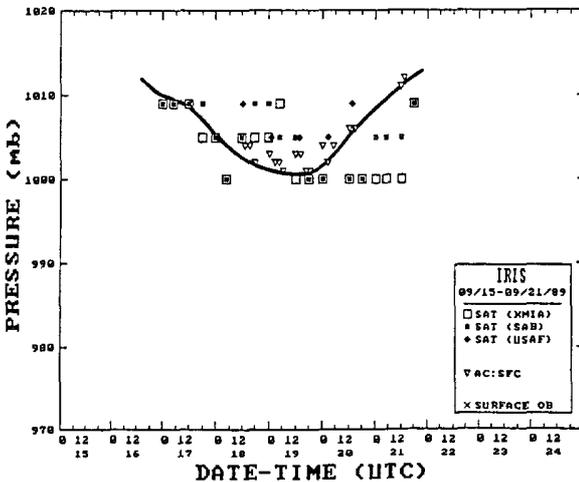
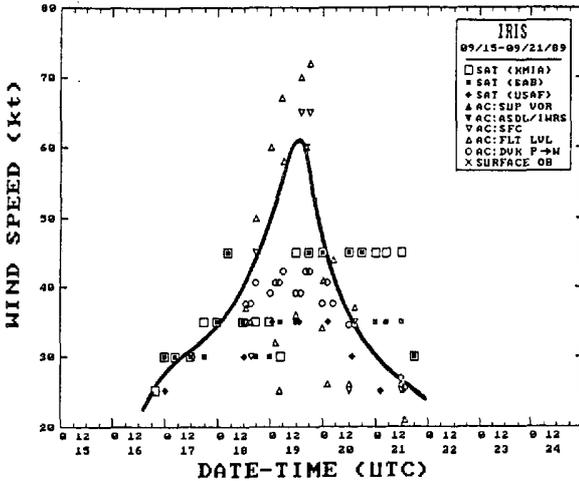
Flight-level (700 mb) winds detected from the NOAA AF980 reconnaissance aircraft in Hurricane GABRIELLE between 2241 UTC, September 4 and 0309 UTC, September 5, 1989. ---Figure from the Hurricane Research Division of the Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida.



GABRIELLE

Hurricane GABRIELLE centered near 24.1°N, 59.3°W in the Atlantic at 1230 UTC on September 6th. GABRIELLE, as long lived and nearly as strong as Hurricane HUGO, preceded HUGO by just under two weeks at their starts, followed a similar initial course as HUGO, but turned northward in the Atlantic sooner than HUGO, thus remaining oceanbound throughout its life. Information on HUGO follows on page 11.

LEFT: Plots of estimated maximum wind speed and minimum surface pressure versus time for Hurricane GABRIELLE.



IRIS

Tropical Storm IRIS, centered here near 21.5°N, 62.6°W in the Atlantic at 1430 UTC on September 20th, slips by to the northeast of Puerto Rico only two days after the island was struck by Hurricane HUGO. Following on the heels of HUGO, IRIS's path was greatly influenced by the interaction between the two tropical cyclones.

LEFT: Plots of estimated maximum wind speed and minimum surface pressure versus time for Tropical Storm IRIS.

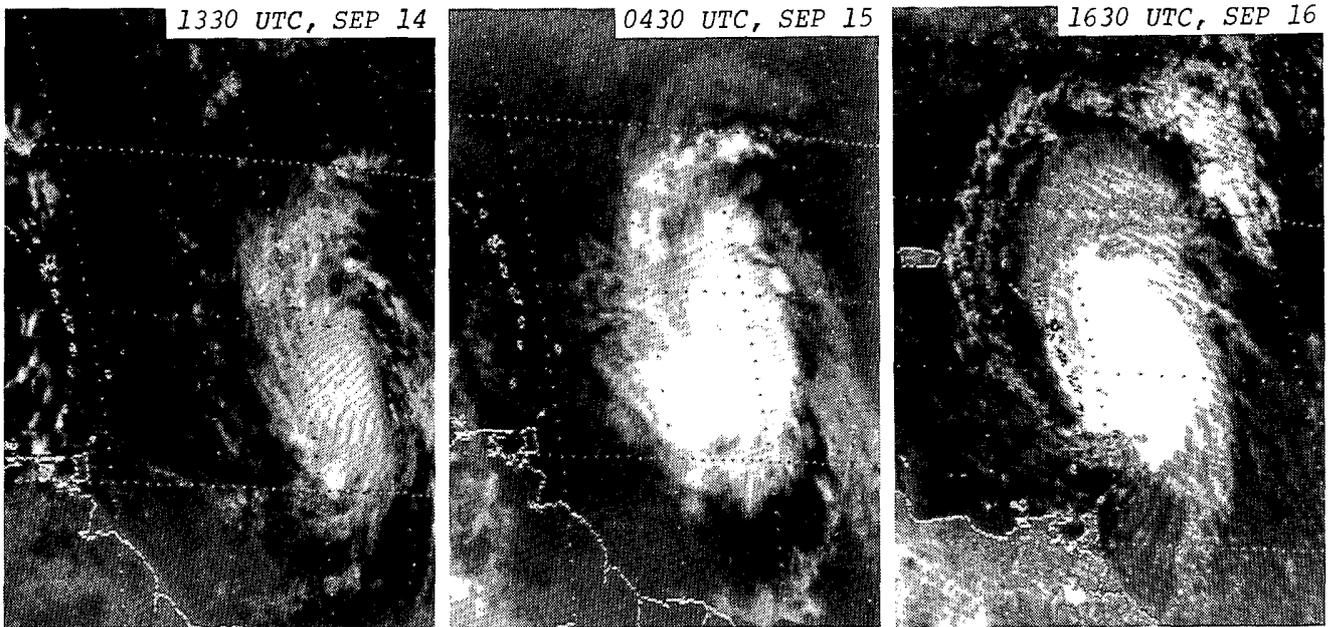
---All materials on pages 6 through 10 are from the National Hurricane Center and are provided through the Atlantic Oceanographic and Meteorological Laboratory / Hurricane Research Division; both of Miami, Florida.

1. HURRICANE HUGO, September 10-22, 1989

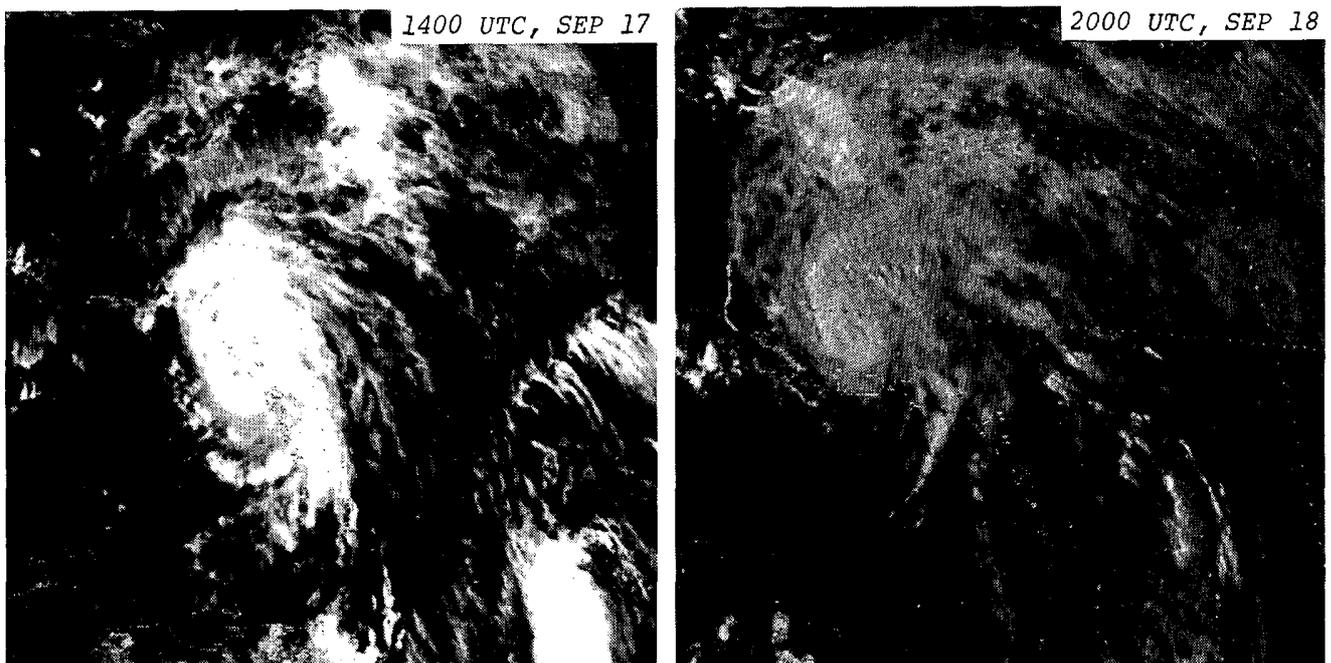
Despite excellent warning lead times and excellent government and public response to the warnings, the fury of Hurricane HUGO took many by surprise and will undoubtedly haunt the memory of many Americans for many years to come. Along with numerous deaths and injuries, HUGO brought large-scale devastation to much of the Carolinas, Puerto Rico, the Virgin Islands and other islands of the Caribbean, making it the costliest hurricane in U.S. history.

Over the course of slightly less than two weeks, HUGO followed a trajectory that was typical for an Atlantic Basin tropical system: originating near Africa in the vicinity of the Cape Verde Islands, traveling west across the tropical Atlantic to the Leeward Islands, turning northwest toward the U.S. coast until making landfall in the Carolinas, and once inland, turning northeast under the influence of the Westerlies and becoming extratropical while skirting the eastern U.S.-Canada border (see path map on page 8). The system originated from a cluster of thunderstorms that moved off the African coast on September 9th and organized into a tropical depression on the 10th just southeast of the Cape Verde Islands. The system moved west at 18 knots, attaining storm status on the 11th, and hurricane status on the 13th while located about 1100 nautical miles east of the Leeward Islands. HUGO gradually turned west-northwest and slowed in its translation as it headed for the Islands. While still several hundred miles east of the Islands on the 15th, the first reconnaissance aircraft to reach the hurricane reported HUGO as having a minimum central pressure of 918 mb and an estimated maximum surface wind of 140 knots. This turned out to be HUGO's maximum intensity.

Below and on the following page, Hurricane HUGO is depicted in GOES 7 satellite, visible images taken daily from September 14th through the 23rd shown in sequence as follows:

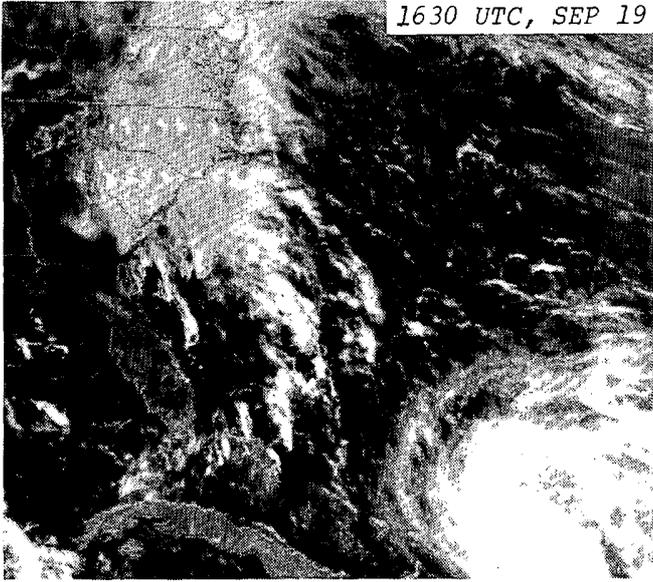


....approaching the Leeward Islands, September 14-16;....

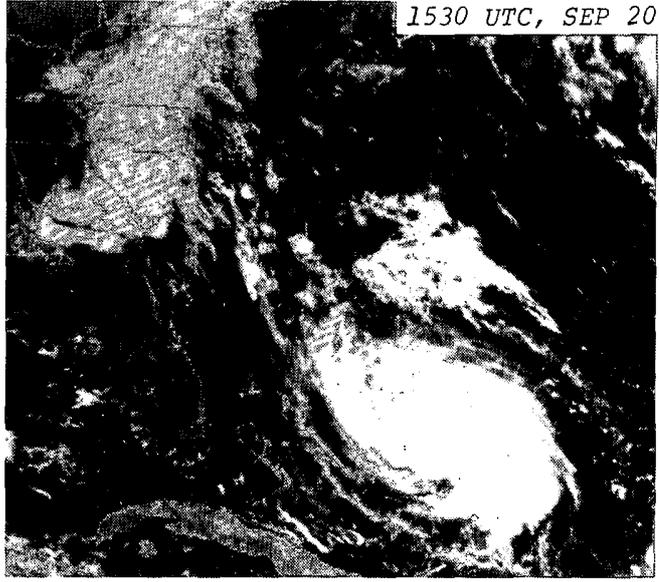


....passing through the Leeward Islands, Virgin Islands and Puerto Rico, September 17-18;....

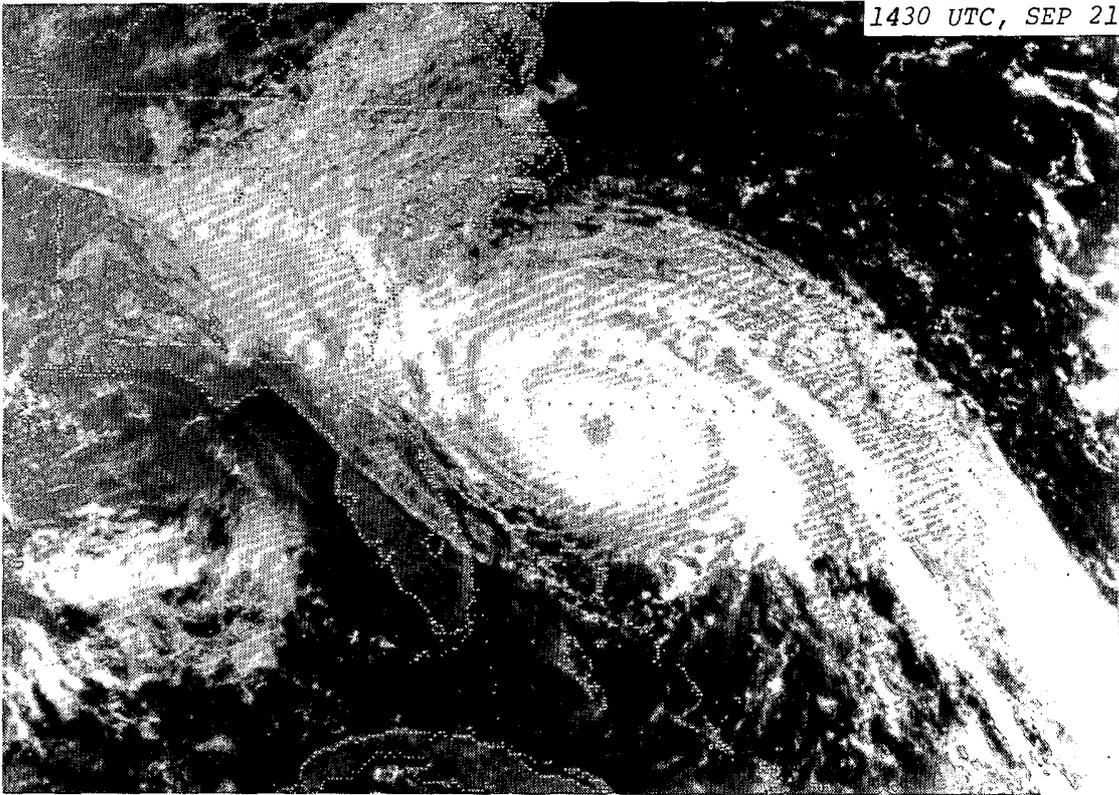
1630 UTC, SEP 19



1530 UTC, SEP 20

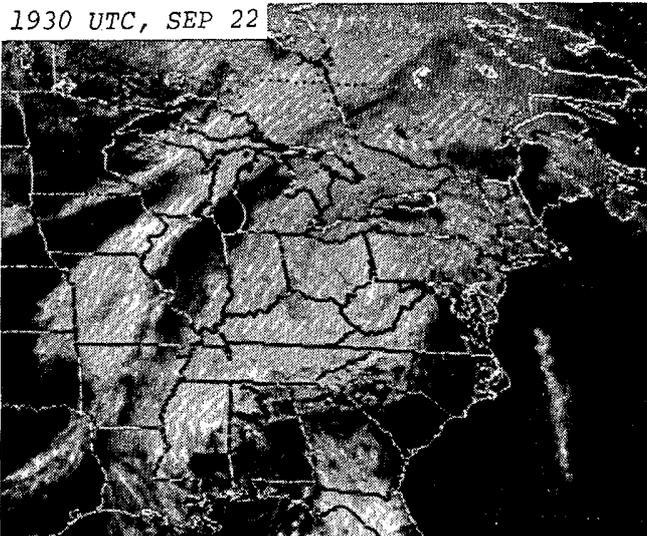


1430 UTC, SEP 21

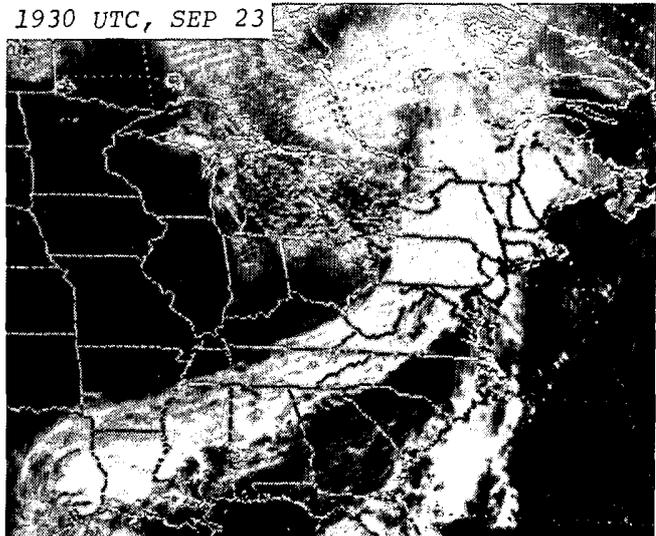


....approaching the U.S. mainland, September 19-21;....

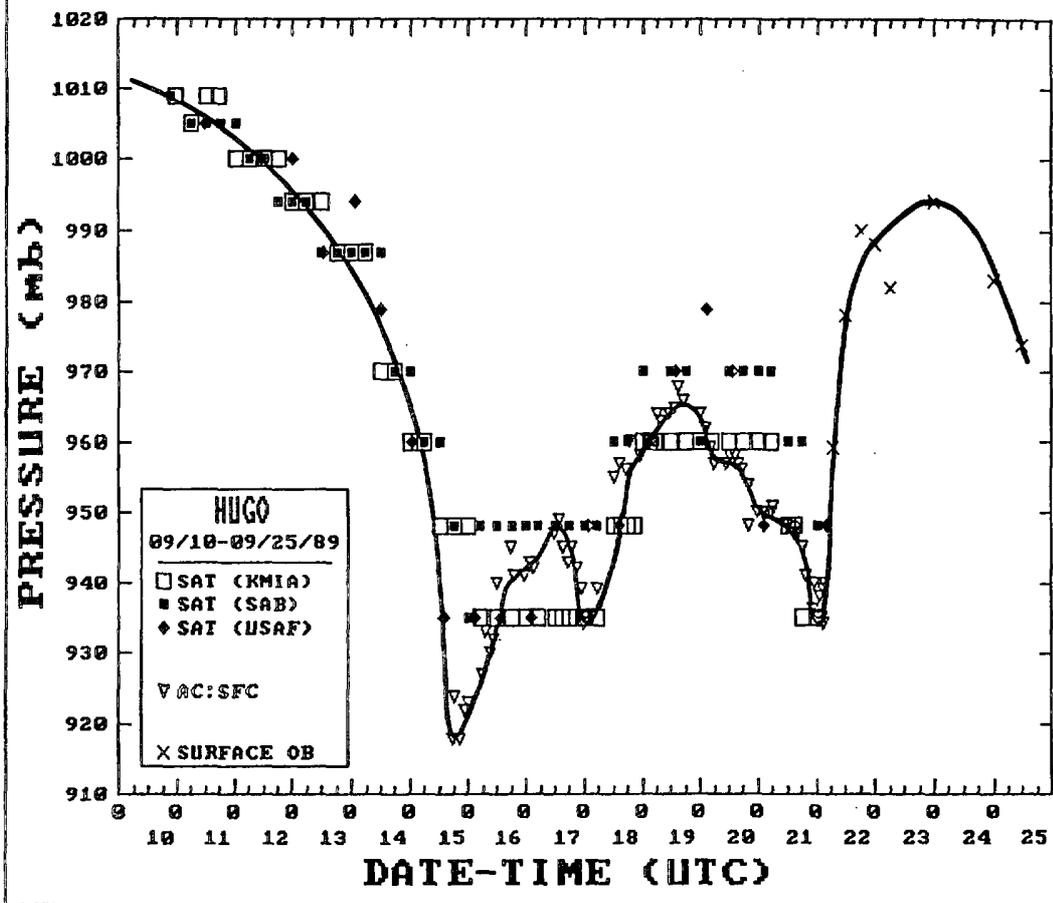
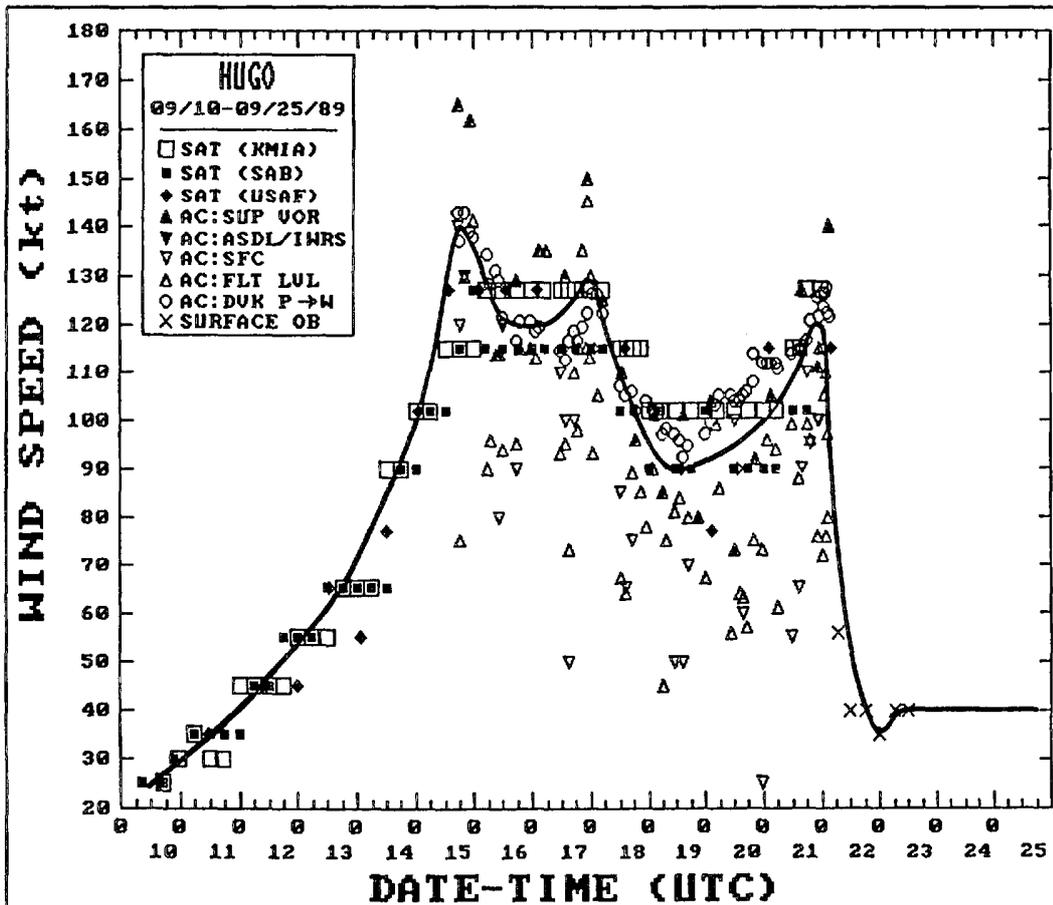
1930 UTC, SEP 22



1930 UTC, SEP 23



....and passing through the U.S. and Canada while weakening and assuming an extratropical character, September 22-23. ---All photos on pages 11 and 12 are from NESDIS, Washington, DC.



Plots of estimated maximum wind speed and minimum surface pressure versus time for Hurricane HUGO. ---Graphs from the National Hurricane Center and provided through AOML/HRD, both of Miami, Florida.

As HUGO's eye passed over Guadeloupe at 0500 UTC on September 17th, a minimum surface pressure of 941.4 mb was recorded. Also, aircraft measurements at the time indicated HUGO as having an estimated, maximum one-minute surface wind of 120 knots. HUGO had similar 120 knot winds as its eye passed over St. Croix at 0600 UTC on the 18th. As HUGO passed over these islands its forward motion had slowed to 8 knots, but the hurricane began to accelerate as it crossed Puerto Rico.

HUGO's eye passed over the island of Vieques, Puerto Rico at 1200 UTC on the 18th and then over the eastern tip of the Puerto Rico mainland one hour later. In both instances the hurricane's estimated, maximum one-minute surface wind speed was 110 knots, a slight decrease from previous reports. Some meteorological reports on Puerto Rico include: a gust to 148 knots indicated by an anemometer aboard the ship Night Cap which was located in the harbor of the island of Culebra just north of Vieques, a highest recorded wind speed over land of 90 knots with a maximum gust to 104 knots at Roosevelt Roads, 67 knot winds with a gust to 80 knots at San Juan International Airport, a maximum rainfall amount of 9.20 inches at Gurabo in the eastern interior of Puerto Rico, and the lowest surface pressure for Puerto Rico during the passage, 946.1 mb recorded at Roosevelt Roads. In the region, water levels were estimated at three to four feet above normal tide levels during the period of onshore winds at St. Croix and along the eastern end of Puerto Rico; water levels of two to three feet above normal occurred along the north coast of Puerto Rico.

Location	Minimum sea-level pressure		Maximum surface wind speed (knots)			Storm surge (tide height above normal) (ft)	Rain (storm total) (in)
	Pressure (mb)	Date/time (UTC)	1-minute average	Peak gust	Date/time (UTC)*		
Guadeloupe	941.1						
St. Maarten Juliana Airport			40	68	18/0200		
Puerto Rico							
Gurabo							9.20
Isla de Culebra				148			
Isla Verde	970.3	18/1415					
Luquillo	956	18/1300					
Roosevelt Roads	946.1	18/1250	90	104	18/1158		
San Juan	970.3	18/1444	67	80	18/1350		3
Florida							
Jacksonville	1003.5	22/0200	18	22	21/2035		T
St. Augustine			14	26	21/1900		
Georgia							
Fort Pulaski						1.4	
St. Simons Island			20	40	22/0100		
Savannah Light Tower	989.6	22/0300	50	59	22/0400		
Savannah WSO	993.5	22/0353	30	47	22/0553		6.10
South Carolina							
Beaufort	984	22/0455	27	44	22/0700		5.94
Charleston AFB	943.2	22/0423					
Charleston city			76	94	22/0340	8.0	6.37
Charleston Pier P	942						
Charleston WSO	942.1	22/04??	68	85	22/0503		5.90
Charleston							
Savannah hwy	936.5	22/0405					
Columbia AT&T	971.7	22/0800		86	22/0654		
Columbia WSFO			46	61	22/0609		
Florence	989.1	22/0750	39	54	22/0547		
Folly Beach C-MAN	940	22/0400	74	93	22/0400		
Georgetown EOC			69		22/0300		3.74
Mt. Pleasant	933	22/0405	71	83	22/0345		8.10
Myrtle Beach AFB	993.5	22/0455	45	66	22/0555		2.30
Sampit River	984.5	22/0442	104				
Shaw AFB	959.6	22/0655	58	95	22/0655		
Summerville							5.98
North Carolina							
Asheville	989.9	22/1150	20	32	22/1050		1.93
Boone							6.91
Cape Fear River				61	22/0545		
Carolina Beach						3(est.)	
Charlotte	978.0	22/0945	60	86	22/1003		3.16
Greensboro	998.1	22/1153	37	47	22/1108		1.43
Hatteras	1013.1	22/0730	23	30	22/0050	4	0.60
Hickory	980.5		30	70	22/1046		
Holden Beach				51	22/0555	6(est.)	
Ocean Isle						7(est.)	
Raleigh	1004.6	22/0930	25	40	22/1050		0.45
Wilmington	1004.5	22/0500	26	46	22/0452		0.79
Virginia							
Norfolk	1008.8	22/1950	23	32	22/2050	0.2	0.21

*Time of 1-minute wind speed unless only gust is given.

Selected meteorological and hydrological surface observations associated with Hurricane HUGO. ---Table from the National Hurricane Center and provided through AOML/HRD, both of Miami, Florida.

Early on September 19th, HUGO was north of Puerto Rico and moving north-northwest at 12 knots while still weakening. HUGO gradually turned northwest, then, on the 21st while centered a few hundred miles east of Florida, began to accelerate toward South Carolina in response to a steering flow associated with a major extratropical low that was advancing eastward across the central U.S. Simultaneously, HUGO was reintensifying during the 30 hours prior to what would be its final landfall near Charleston. HUGO's eye passed over Sullivans Island on the South Carolina coast at 0400 UTC on September 22nd while moving northwest at 23 knots. Just prior to the landfall, measurements from reconnaissance aircraft indicated HUGO as having a minimum central pressure of 934 mb and an estimated, maximum one-minute wind speed of 120 knots. Inland wind reports included: 76 knots with a gust to 94 knots in downtown Charleston, 68 knots with a gust to 85 knots reported from the National Weather Service office at the Charleston airport, and 74 knots with a gust to 93 knots at Folly Beach. The ship Snow Goose, anchored in the Sampit River five miles west of Georgetown, measured sustained winds of 104 knots on a three-cup Tradewind anemometer located on the ship's mast at a 61 foot elevation.

By the time of HUGO's South Carolina landfall the system had become broad, and thus, effects of storm surge were experienced across a sizable portion of the coastal area, even as far north as Hatteras, North Carolina where the surge was four feet above the predicted tide. In Charleston the tide station near the Custom House recorded a storm tide of 10.4 feet above mean sea level, equating to a storm surge of 8.0 feet above the predicted normal astronomical tide. In other areas, high water marks observed by survey teams indicated that the storm tide was 10 to 12 feet above mean sea level at Folly Beach, up to near 20 feet at Bulls Bay, 13 to 16 feet at McClellanville, 13 feet at Myrtle Beach, and 8 to 10 feet at Holden Beach, North Carolina.

The rate of HUGO's forward translation at landfall on the U.S. mainland not only contributed to the substantial storm surge, but also carried the hurricane well inland before it could significantly weaken. As a result, the areal scope of damage produced by HUGO's winds was enormous. Almost the entire eastern two-thirds of South Carolina received wind damage, as did much of central North Carolina along a wide north-south band through the Charlotte area. Much of the damage was done by falling trees and limbs which were plentiful in the heavily forested states. Otherwise, roof damage was most common, and the downing of thousands of miles of power lines brought about extensive, long-term outages. In coastal areas, wind and/or storm surge caused many beachfront homes to be lifted or torn from their stilts and destroyed. An incredible number of watercraft were beached or destroyed also.

At 0800 UTC of September 22nd, four hours after landfall, HUGO was still estimated to be of hurricane strength as its center passed between Shaw Air Force Base and Columbia in the central portion of South Carolina. Winds of 58 knots with a gust to 95 knots and a pressure of 959.6 mb were reported at the Base, and winds of 46 knots with gusts to 61 knots were reported at Columbia. It was 1200 UTC of the 22nd before HUGO had weakened to a tropical storm, at which time its center was passing just west of Charlotte in North Carolina. Winds of 60 knots with gusts to 86 knots were observed at Charlotte, nearby Hickory had a gust to 70 knots. As the storm continued northward, it passed through extreme western Virginia, West Virginia, and eastern Ohio to near Erie, Pennsylvania by 0000 UTC on the 23rd, by which time the system had assumed extratropical characteristics and was coincidentally reclassified. Sustained winds of 30 to 40 knots were reported along and to the east of this portion of the storm's path. Thereafter, the storm was tracked for two more days as it passed northeastward through eastern Canada and into the far north Atlantic Ocean.

It is estimated that there was a total of 82 deaths attributable to HUGO as compiled from various sources by the National Hurricane Center, the distribution by location being as follows:

Antigua and Babuda	1	U.S. Virgin Islands	6	North Carolina	7
Guadeloupe	11	Puerto Rico	12	Virginia	6
Montserrat	10	South Carolina	27	New York	1
St. Kitts and Nevis	1				

Reliable information on the injury count is not available.

In light of HUGO's strength and the long lead times in the issuance of warnings of HUGO's landfalls, it could be said that the death count was high; but even with its staggering death count, HUGO's main impact was still in terms of damage, figures for which can only be described as astronomical. Some estimates of dollar valuation regarding the damage and costs to deal with it were as follows:

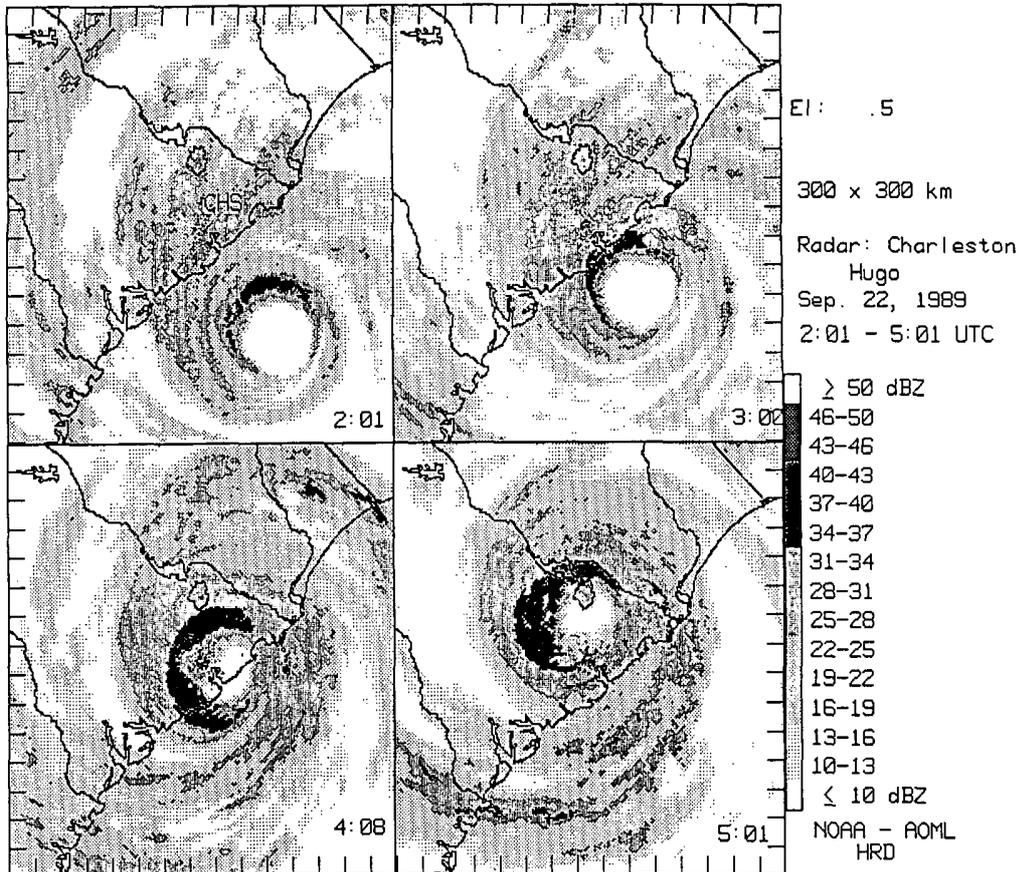
Type and Source	U.S. Mainland	Puerto Rico & Virgin Is.	other Caribbean is.
insured property damage - American Insurance Agency	3.042 billion	1.887 billion	-
money outlay - Federal Emergency Management Agency (FEMA)	.208 billion	.731 billion	-
total damage value - The State, a Columbia, S.C. newspaper	7.071 billion	1.600 billion	.450 billion

It is important to note that hurricane damage estimates for past storms have often been two to three times the valuation of insured property damage. It is therefore possible that HUGO's international damage total will exceed ten billion dollars. Also, all of the listed damage estimates are subject to upward revision. Meanwhile, the following general estimates, believed to be accurate within about plus or minus 40 percent, have been released by the National Hurricane Center: the U.S. mainland, seven billion dollars; Puerto Rico and the Virgin Islands, two billion dollars; and other Caribbean islands, one-half billion dollars.

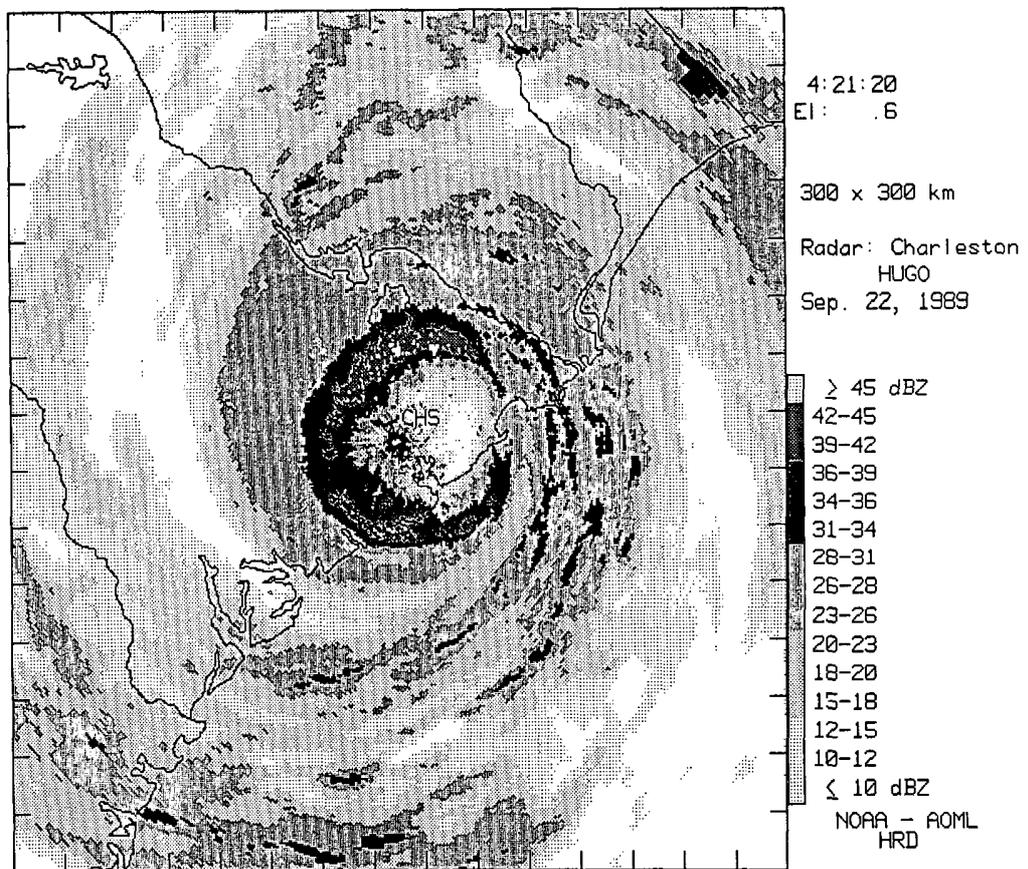
---Much of the information in the preceding narrative is derived from a National Hurricane Center report by Miles Lawrence.



The photos above are of damage sustained on the Island of St. Croix in the U.S. Virgin Islands. They show the gymnasium of Central High School near the middle of the island, which was used as a public shelter during the storm and had much of its roof torn away (top); snapped banana and coconut plants that were felled in opposing directions (compare foreground to background in middle photo) in conjunction with the wind direction reversal experienced with the passage of HUGO's eye; and a toppled 6-inch thick cinder block wall at the home of one of the photographers, John Stout, in Estate Carlton near Frederiksted on St. Croix. Mr. Stout experienced popping in the ears as his Trident barometer went through wild gyrations, jumping between 28.3 and 27.9 inches as the hurricane crossed the island during the night of the 17th-18th. A dead calm was experienced for about 45 minutes as the eye passed over taking slightly more than an hour. Clear sky could be seen overhead, surrounded by a wall of cloud that, being illuminated by the moon, gave the scene an appearance not unlike being in the center of a giant white doughnut. ---All above photos by Tammy Marcinuk, except lower right by John B. Stout, both of Frederiksted, St. Croix, U.S. Virgin Islands.

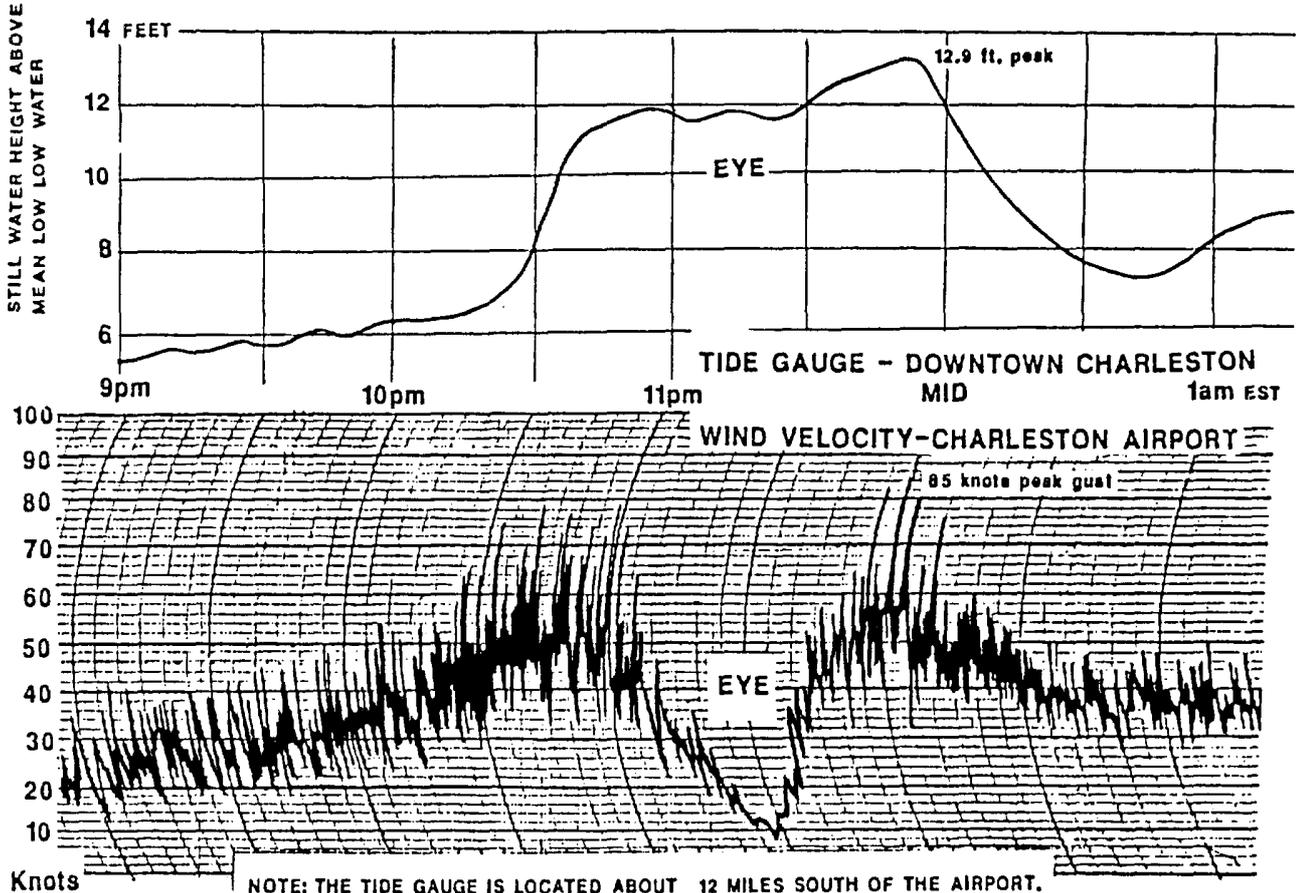


A sequence of four, hourly PPI scans from the land-based, NWS/WSR-57 radar at Charleston, South Carolina shows the echo reflectivity pattern of HUGO's near ground-level (0.5° elevation angle) precipitation as the hurricane moved ashore on the South Carolina coast between 0200 and 0500 UTC on September 22nd (2100 and 2400 EST on the 21st).



An enlarged reflectivity, PPI scan from the Charleston radar shows HUGO at 0421 UTC on September 22nd (2321 EST on the 21st), just minutes after the eye moved ashore.

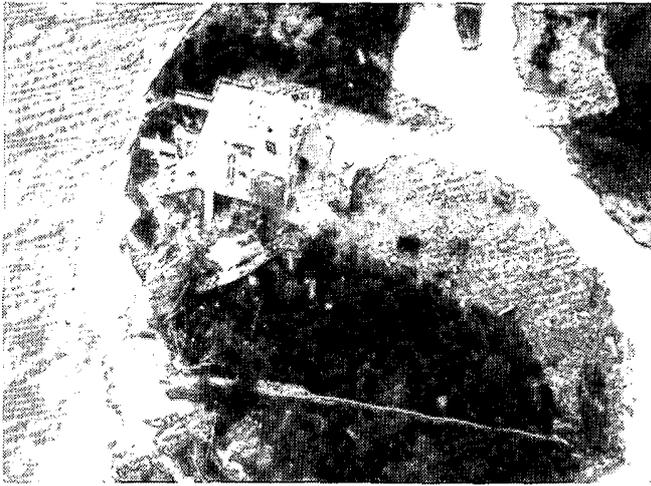
---Both above radar figures are from the Hurricane Research Division of the Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida.



Strip charts from the tide gauge near the Custom House in downtown Charleston and an anemometer at the Charleston Airport show the variations in HUGO's tide level and winds with the hurricane's passage during corresponding four-hour periods from 2100 EST on September 21st through 0100EST on the 22nd. Note that the tide and winds both peaked as the back wall of the eye passed over. ---Both charts provided by Tim Marshall of Lewisville, Texas.



Destroyed homes along the Intercoastal Waterway (upper left) at Pineland, about 25 miles northeast of Charleston, South Carolina near Bulls Bay. The homes were carried from their foundations and broken up by HUGO's storm surge and winds, the debris being scattered for several hundred yards to the west (lower right). ---(TF).



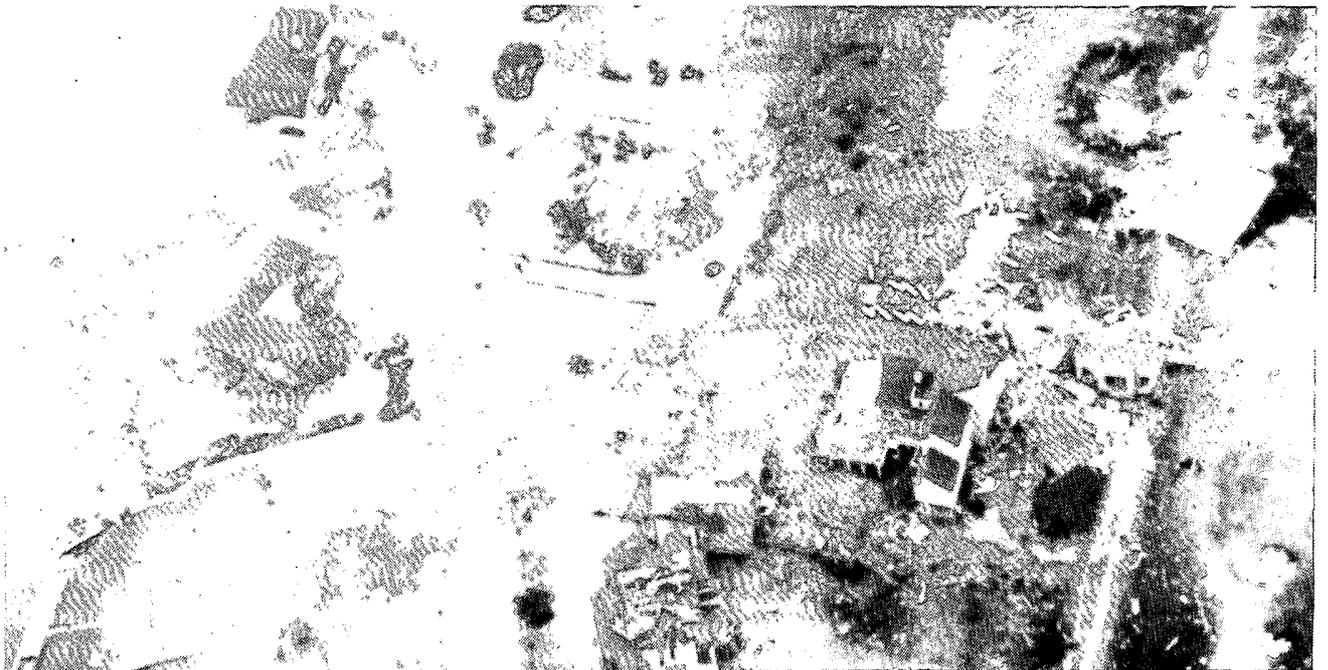
Beachfront damage at Isle of Palms about 10 miles east of Charleston. Shown is one of the numerous homes destroyed by wind and windblown water (left), and an example of the extensive beach erosion and thousands of snapped pine trees (right).

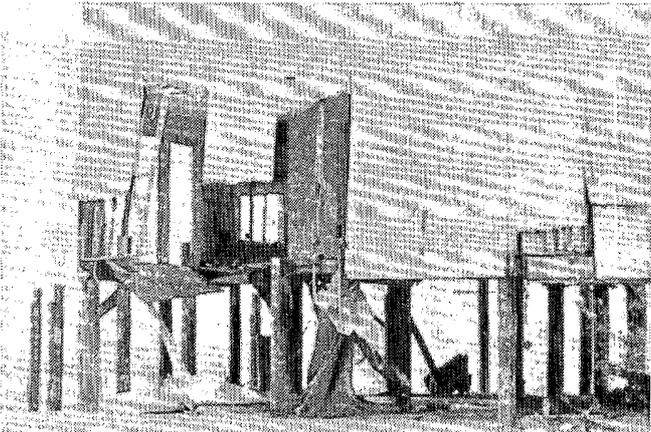
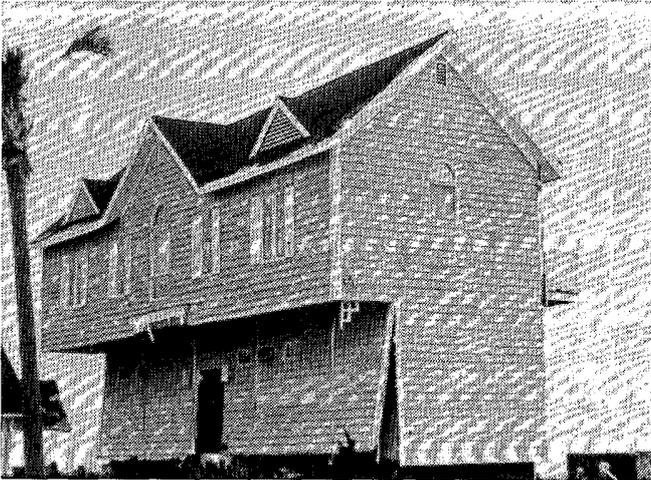
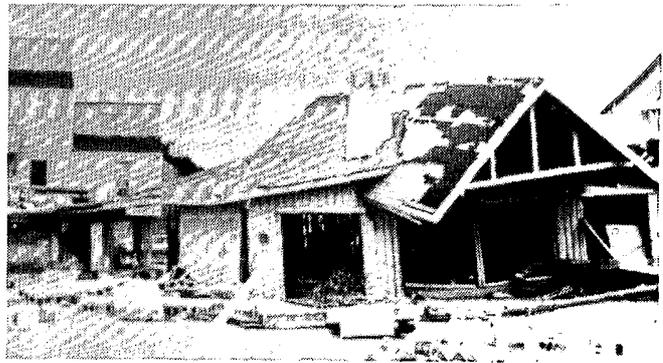


Also on Isle of Palms, these foundations are all that remain of oceanfront homes that were lifted from their stilts and carried away by the storm surge.

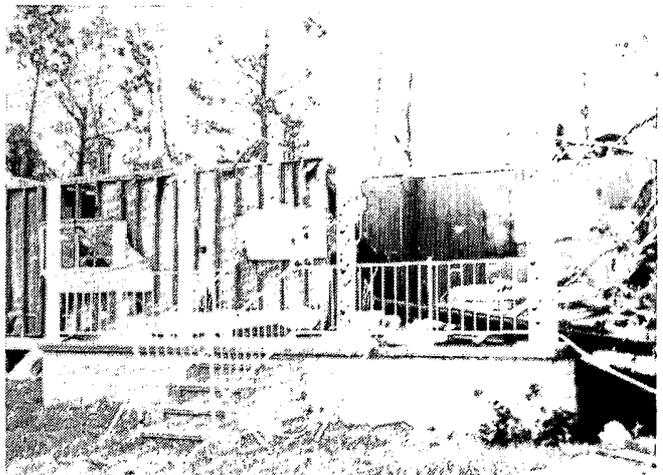
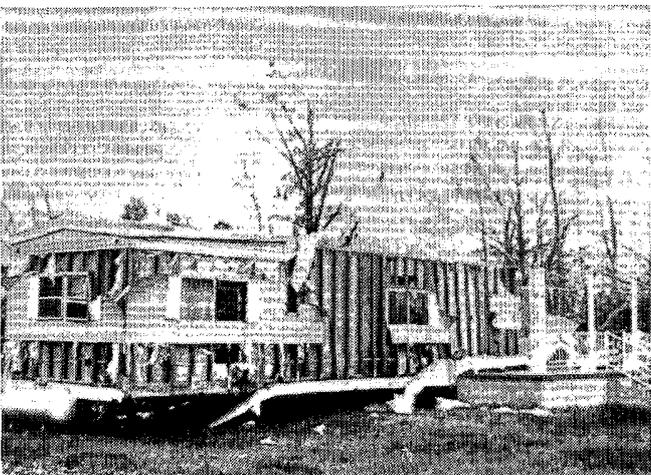


Destroyed homes on Sullivan's Island near Breach Inlet, about 6 miles east of Charleston. Shown in a larger view below, the homes, somewhat inland, actually suffered much worse than some located immediately along the shore.



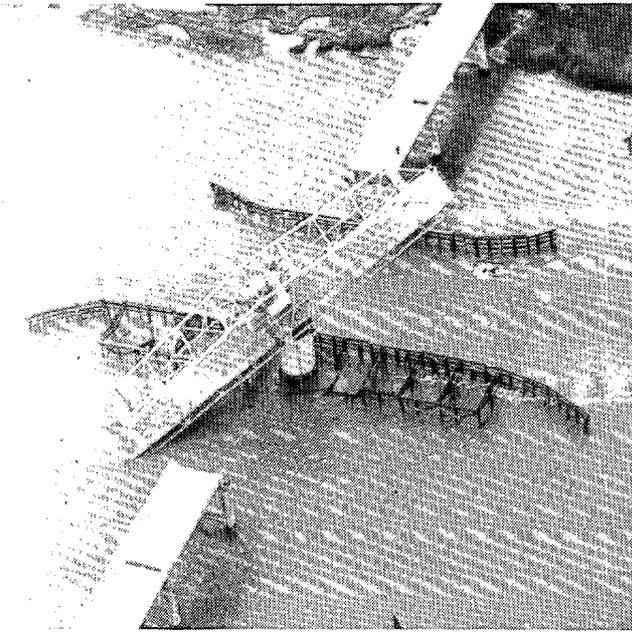


All of the above structures, located on Sullivans Island, received some combination of wind and surge damage. Again, some were washed completely off their stilts.

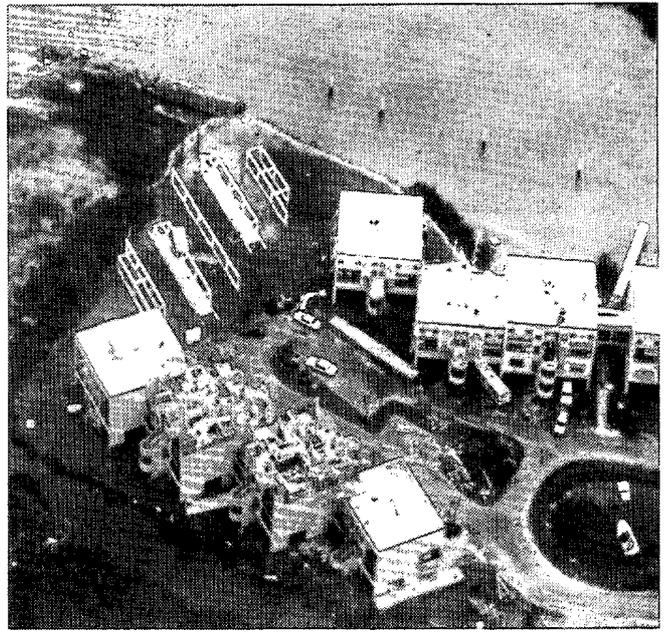


A mobile home along U.S. Highway 17 at McClellanville, 28 miles northeast of Charleston, that although still anchored, received wind damage significant enough to have rendered it totalled.

---All above photos (RB).



As a result of this swing bridge being toppled, all highway traffic between the mainland and the Sullivans Island-Isle of Palms area was halted indefinitely. The bridge carries S.C. Highway 703 over the Intra-coastal Waterway between Mt. Pleasant and Sullivans Island.



Also along the Waterway near the swing bridge shown at left, several units of this condominium complex lost their roofs to HUGO's winds.



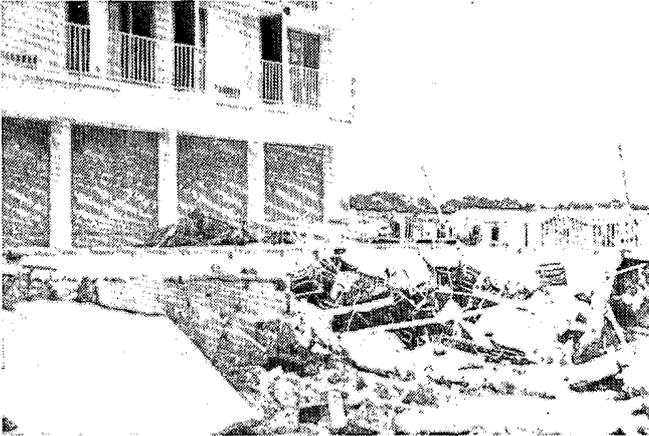
Further northeast along the coast at Surfside Beach in the Myrtle Beach area, many homes immediately along the beachfront such as these were lifted and carried inland by the storm surge. Scores of homes ended up stacked several deep against each other. Wind damage in the area was comparatively light, however.



Above, more of the surge-washed homes at Surfside Beach; right, a nearby Holiday Inn that suffered the loss of much of its concrete patio and pool to wave action. Several large chunks of the concrete, visible in both photos, were transported a considerable distance up the beach to the northeast.



---All above photos (TF).



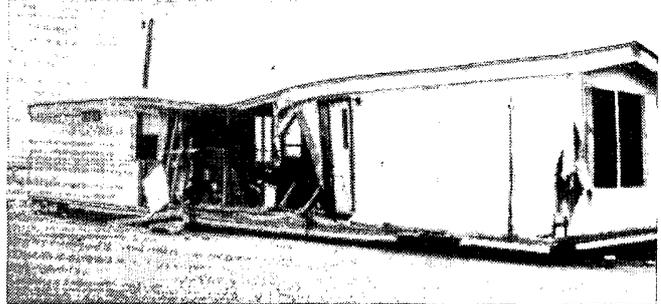
A ground-level view of the destroyed patio and pool area at the Holiday Inn at Surfside Beach. The first floor of the building received heavy water damage as well.



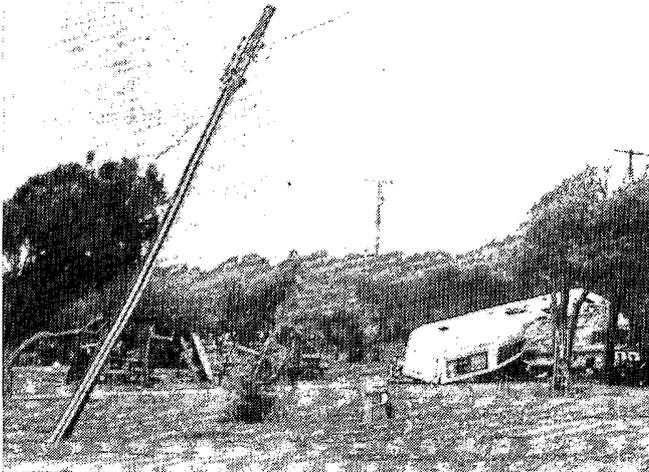
Wind and surge damage to a home just south of the Surfside Beach Holiday Inn that was typical for the area.



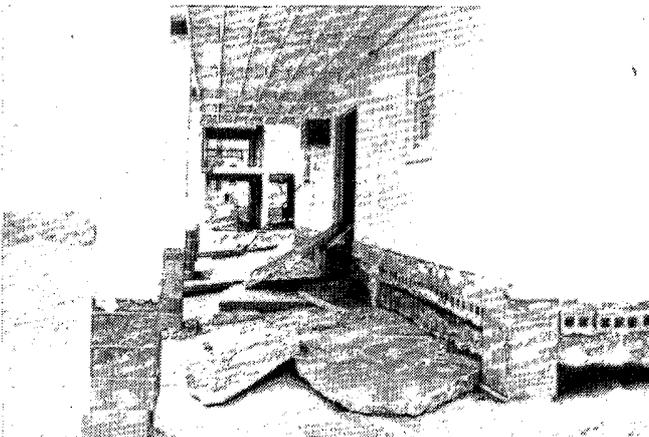
A ground-level view of some of the stacked homes just north of the Holiday Inn.



A mobile home that was moved by the storm surge at Myrtle Beach State Park.



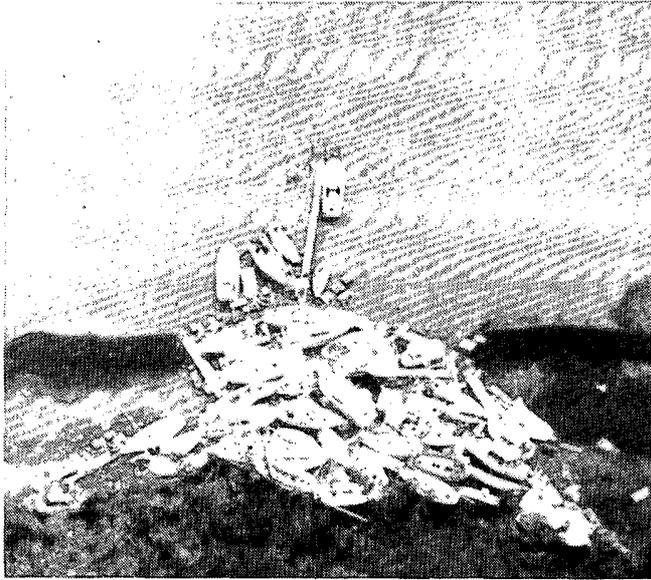
Other damage at the Myrtle Beach State Park included these travel-trailers and picnic tables, again, storm surge being the main culprit of their demise.



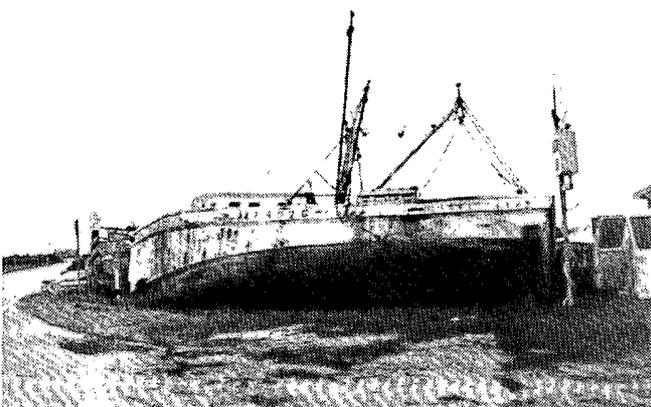
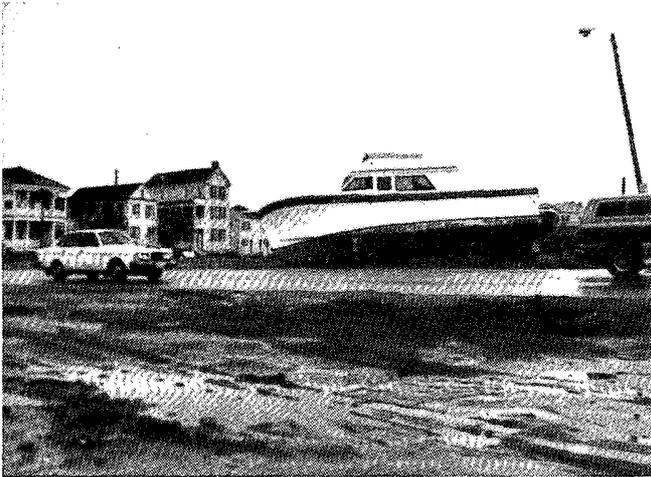
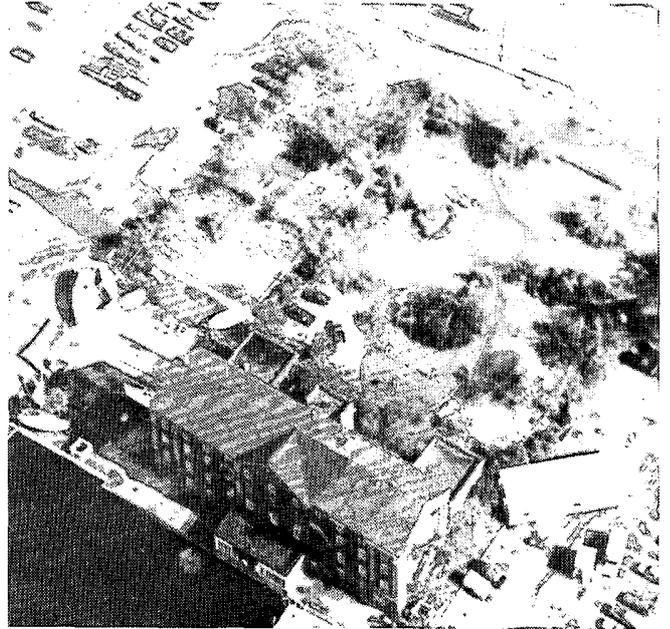
Foundation erosion at Surfside Beach (left)



and a toppled masonry wall at Murrells Inlet (right), both products of the storm surge in the Myrtle Beach area.



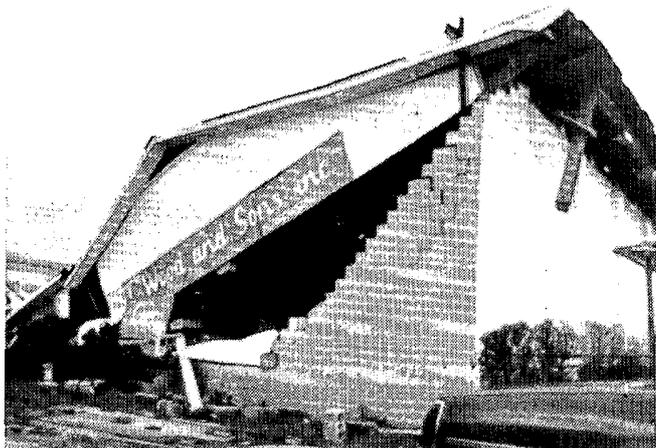
A collection of beached powerboats, small yachts and other watercraft that were torn from their moorings by HUGO's storm surge and tossed about until coming to rest along the Intracoastal Waterway at Isle of Palms. ---(TF).



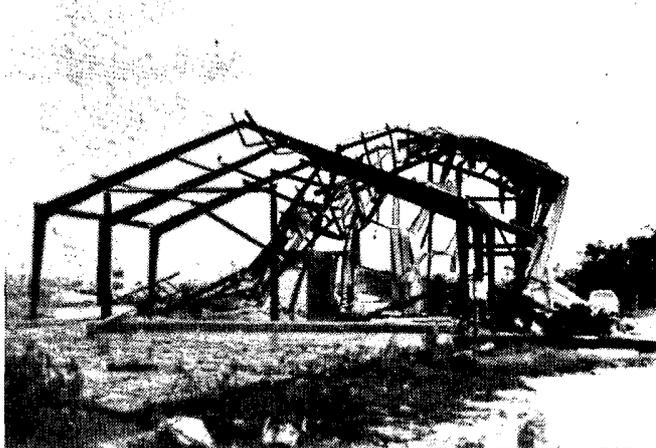
Other large watercraft that were beached by HUGO included a powerboat that ended up parked along a highway in downtown Charleston (top), and a fishing vessel earthbound along S.C. Highway 171 on Long Island, south of Charleston (bottom). ---Both photos (TF).



Aerial (top) and ground-level views of damage done at the Charleston Marina where hundreds of boats were, figuratively speaking, "sent sailing" by the storm surge. Many ended up perched atop pier posts (bottom). Trees in the parking area were felled in many directions, an indication of changing wind direction with the passage of HUGO's eye which skirted the area as its center passed by just to the north. ---Top two photos (TF), bottom photo (DS).



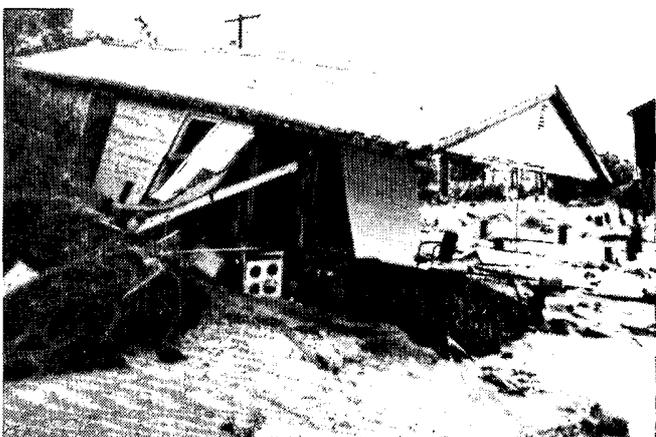
Although the roof fell in, it was the collapse of a concrete block, masonry wall that led to this building's failure under HUGO's winds in North Charleston.



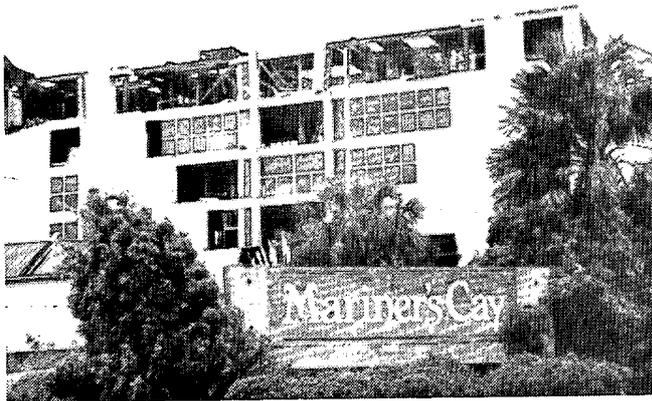
No! It's not a Calder, although the artwork HUGO's winds created of this pre-fab metal warehouse in Mt. Pleasant might well be described as resembling one of his works.



Seawall/road ablation at Mt. Pleasant (left) and dune scour at Folly Beach (right), two examples of erosional effects produced by HUGO's storm surge.



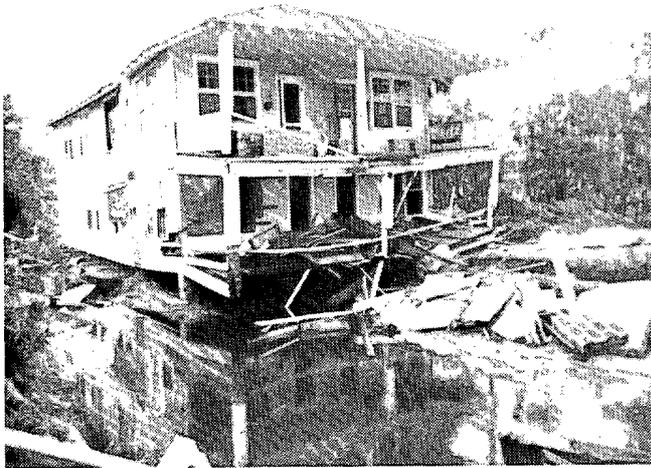
Some of the many beachfront homes that were destroyed by storm surge on Folly Island.



A recently-built, 5-story hotel along S.C. Highway 171 on Long Island that suffered severe wind damage, especially to its roof and top floor. The structure is situated just across the channel from Folly Island, about 8 miles south of Charleston.



On the oceanfront of Folly Island, many homes such as the one that once filled the scene above were completely washed away and dismantled, leaving only the broken stubs of their stilts as evidence of their former existence.



Another home in Folly Beach, this one collapsed onto its own stilts and was subsequently broken up by wind and surf.



Examples of the undermining and erosion caused by the storm surge on Folly Island. Homes and roads alike sagged or collapsed under their own, unsupported weight as the sand on which they were constructed was easily scoured and carried away by the pounding surf.



Also on Folly Beach, a home blocks the road after being deposited there almost fully intact by HUGO's storm surge.

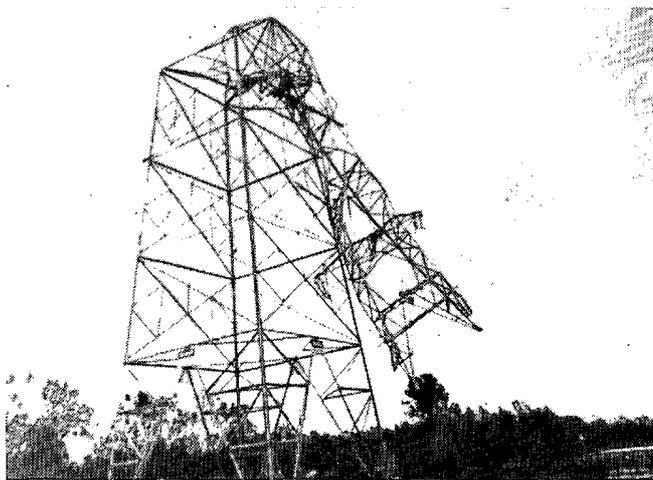
---Photo credits for pages 18 through 27 are as follows:

- (TF) by Prof. T. Theodore Fujita, Wind Research Laboratory, The University of Chicago.
- (DS) by Duane J. Stiegler, Wind Research Laboratory, The University of Chicago.
- (RB) by Roy Britt of Richmond, Virginia.
- (TM) by Tim Marshall of Lewisville, Texas; in association with HAAG Engineering.

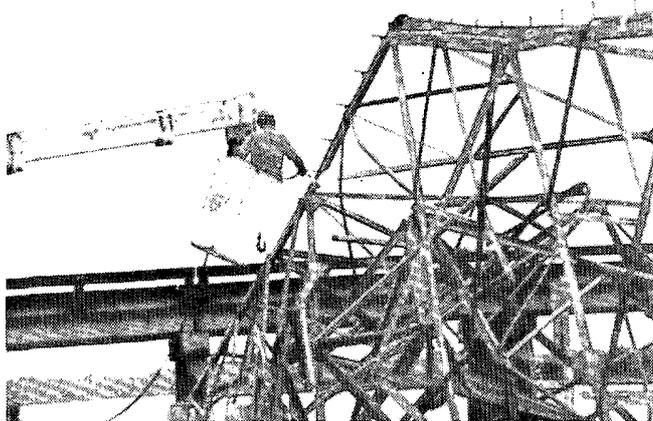
---All above photos (TF).



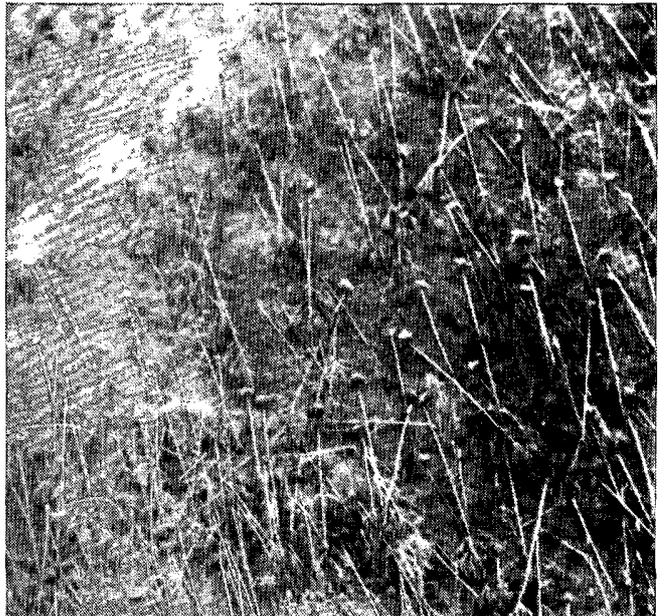
Twisted over, steel I-beam supports of a billboard sign at Fenwick Crossroads on Johns Island southwest of Charleston, give testament to the strength of HUGO's offshore wind, this being downed toward the southeast on a northwesterly wind. ---(DS).



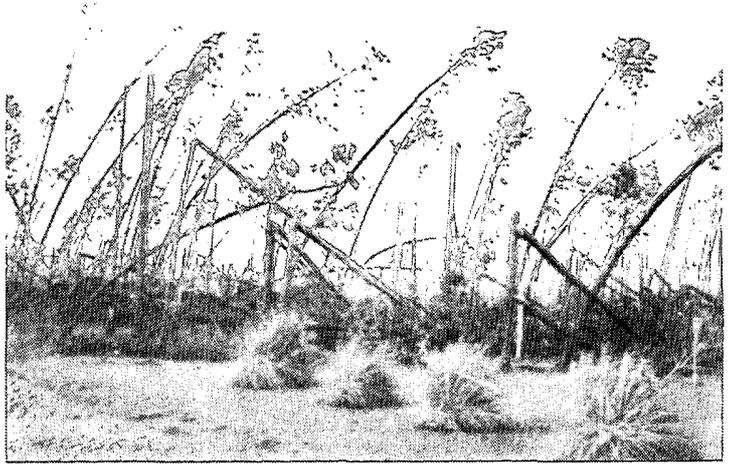
Examples of the thousands of trees that were snapped like matchsticks on Johns Island. ---Both photos (TF).



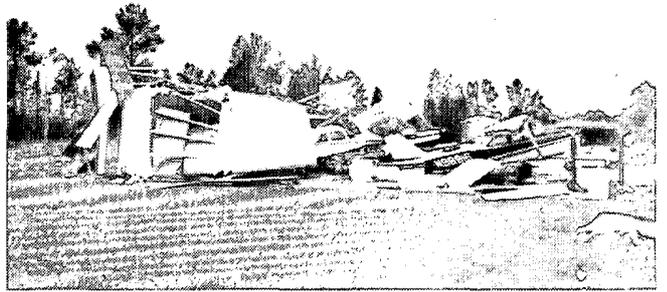
A high-tension tower (top) bows in respect to HUGO at the town of John Island, where two of these towers carried the main power feed to all of Johns Island over the Stono River. Both towers failed and had to be dismantled (bottom), resulting in a long-term outage for the entire island. ---Top photo (TF), bottom photo (DS).



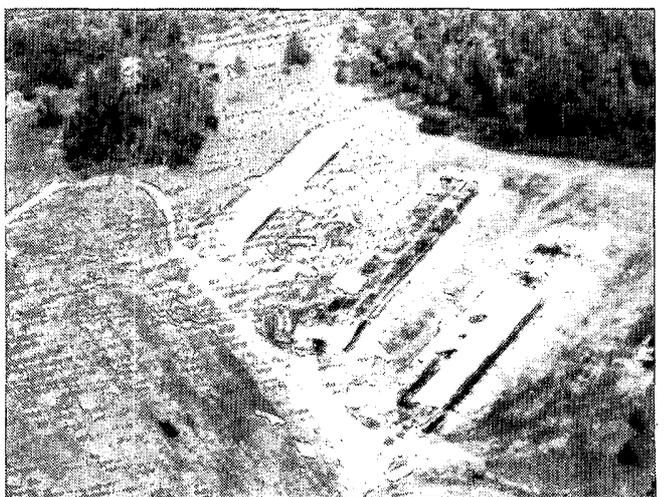
Aerial scenes such as this will be commonplace over South Carolina for years to come due to the massive number of trees that were felled across the state. At this location near Lake Moultrie, most of the trees were uprooted rather than snapped. ---(TF).



LEFT: One of the hazards of living in a forested area, when trees fall under the forces of nature such as HUGO's winds, you never know on what they are going to fall. This parking space in Charleston turned out to be a costly one. RIGHT: Some of the snapped trees in the Francis Marion National Forest northeast of Charleston, where destruction of mature trees ranged from heavy to near total. ---Both photos (TM).



Destroyed aircraft and hangars at the Moncks Corner Airport in South Carolina, about 30 miles inland from the coast near Lake Moultrie. Many owners flew their planes inland from coastal areas in anticipation of HUGO's arrival, only to have them destroyed away from home since HUGO maintained its strength for such a long distance northwestward across the state. ---All four photos (DS).

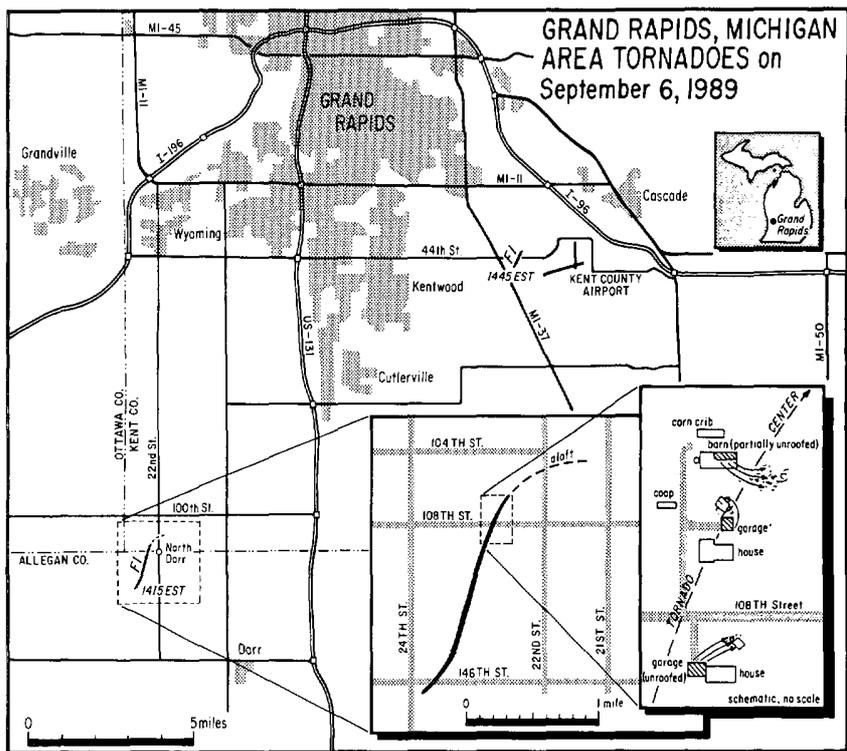


Representative of the strength of HUGO's winds once the system was well inland, this destroyed hangar is located at the Rock Hill Airport in extreme north-central South Carolina, about 15 miles southwest of Charlotte, North Carolina. RIGHT: Blown-apart chicken houses, typical of the damage sustained in the farming region of north-central South Carolina. ---Both photos (DS).

2. TORNADOES near GRAND RAPIDS, MICHIGAN on September 6, 1989

Rather benign weather conditions were in effect over southwest Michigan on September 6th, dominated primarily by a high pressure area. Some weak showers and an occasional thundershower popped up along a weak trough extending east-west through the area, but none approached the threshold of severe storm criteria. Weather radar indicated that the showers were mostly VIP 1 and VIP 2 in intensity, and only occasionally reached VIP 3. Also, most of the cells topped out at 20,000 feet, the highest being less than 23,000 feet. Yet, despite the innocuous nature of these conditions, the cells produced two tornadoes in the Grand Rapids area between 1400 and 1500 EST, each of F1 intensity.

Witnesses observed the first tornado as it touched down in a cornfield near North Dorr southwest of Grand Rapids. It unroofed a garage, destroyed another, and damaged a barn. The second tornado, just west of the Kent County Airport, peeled roof segments from two industrial buildings, causing one injury. In both cases the tornadoes were observed after the rain had stopped and the storm had passed overhead, indicating that the tornadoes had formed in the classic location in reference to the storm, under the rain-free cloud base in the southwest quadrant.



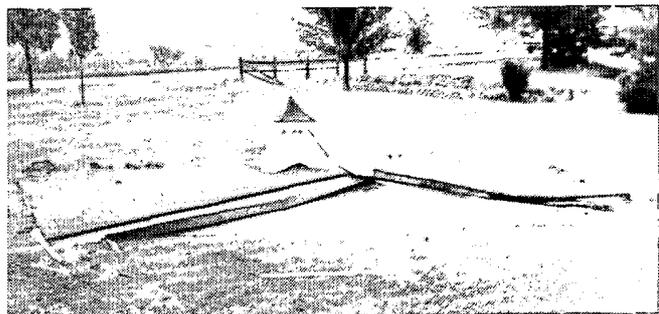
Paths of two F1 intensity tornadoes in the Grand Rapids, Michigan area on September 6, 1989. ---Graphic by the University of Chicago from mappings supplied by Jack R. Cooley, NWSO at Grand Rapids, Michigan.

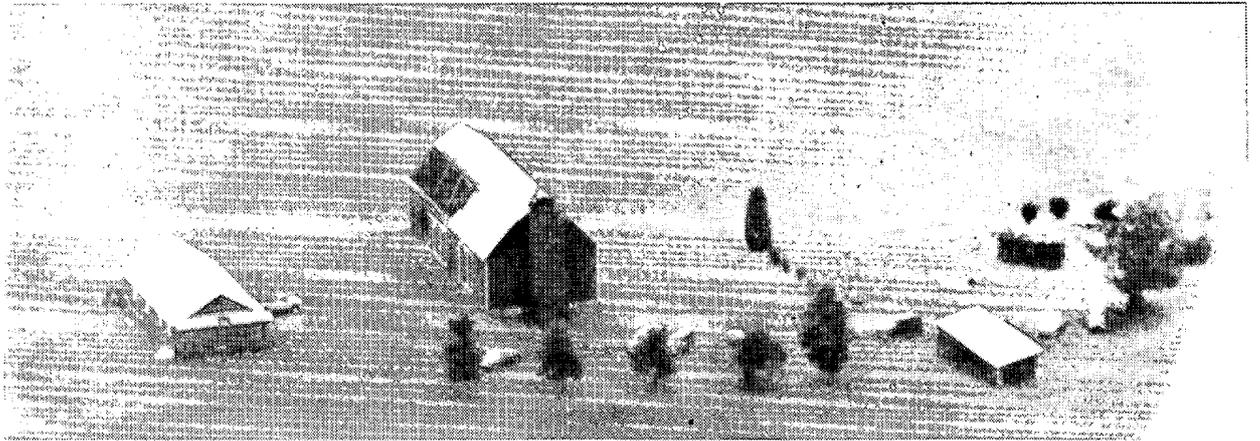


An aerial view along the path of the North Dorr tornado in the direction of the tornado's translation across 108th Street, north-northeast.



RIGHT: Aerial (top) and ground-level views of the home on the south side of 108th Street from which the roof (bottom) of an attached garage was lifted and thrown toward the northeast into the front yard. The roof was carried about 60 feet and had rotated about 45 degrees counterclockwise while airborne. The remainder of the garage and the house was essentially undamaged. Only one widow was broken in the garage, most likely by a piece of flying debris. ---All four photos by Jack R. Cooley, NWSO at Grand Rapids, Michigan.

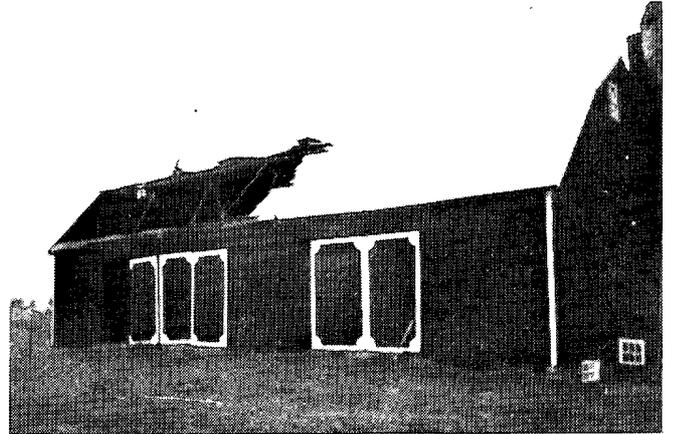




An aerial view toward the east-southeast of the farmstead on the north side of 108th Street shows a large piece of the roof from its large barn was ripped off, and the garage behind the farmhouse (far right) was completely destroyed. Although the tornado passed directly over the two-story, century old, brick farmhouse, none of its windows were broken, not a single shingle was removed, and the surrounding trees were undamaged. The only apparent damage was the buckled-out metal frame of a storm window. However, the two-stall garage behind the home was observed as it was lifted skyward by the tornado, dismantled, then dropped back to earth, its roof landing near its original site. Debris from the northeast corner of the barn roof was scattered toward the east through north. A large door also removed from the northeast corner of the barn was reduced to splinters and ended up in a neat pile at the corner of the corn crib.



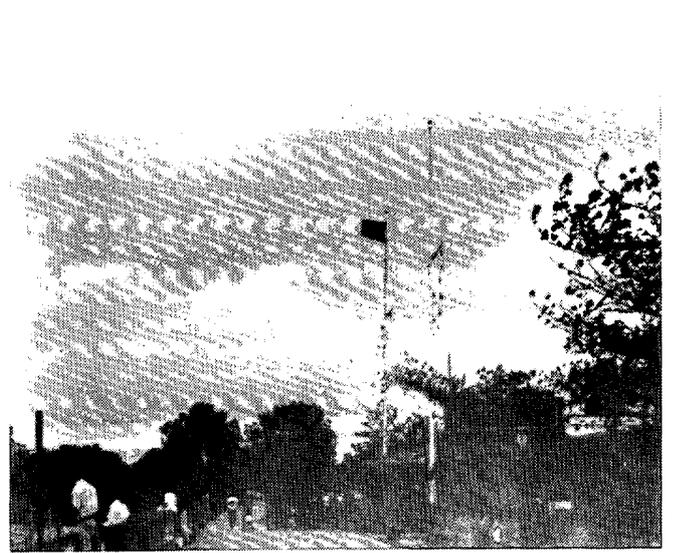
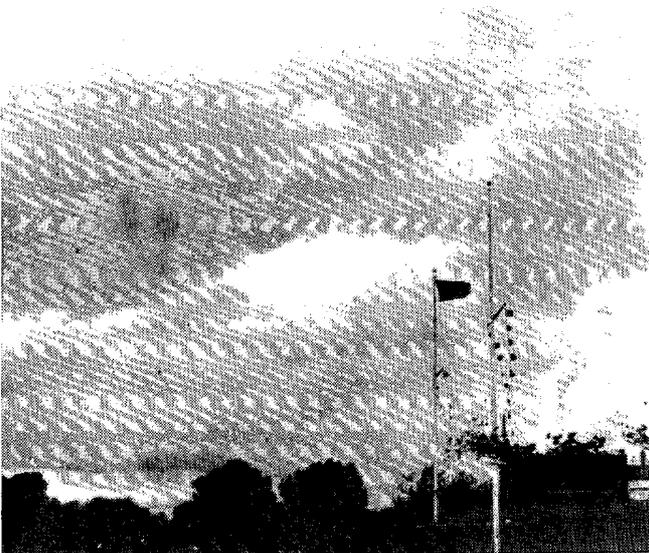
The roof and debris of the garage behind the farmhouse (background). One of the two stall doors was open when the structure was lifted by the twister.



The north face of the large barn as viewed toward the southeast.

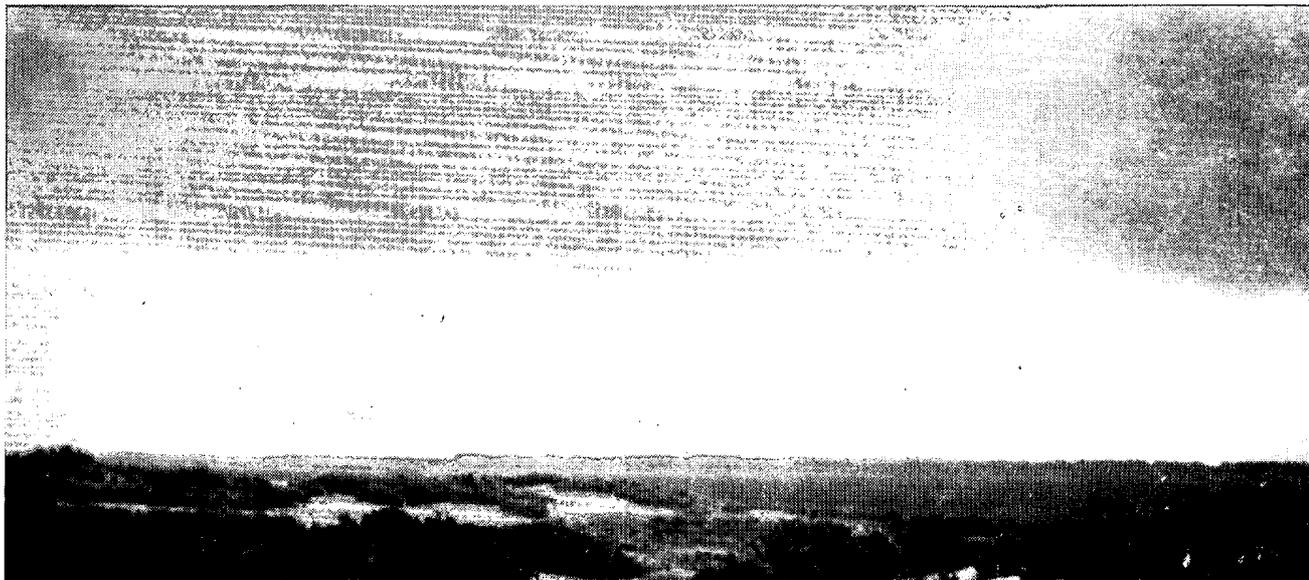
---All above photos by Jack R. Cooley, NWSO at Grand Rapids, Michigan.

STORM SHORTS . . .

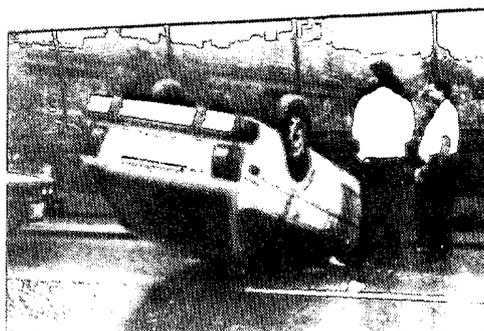


A dramatic windshift is revealed by the sudden change in direction of the above flags at Jamaica Bay, Queens as a strong cold front swept across New York City and Long Island, New York on the afternoon of September 23rd. The front was associated with the remains of Hurricane HUGO which were now part of a large extratropical system. The wind shifted from southwest (left) to northerly (right). Note that in the right photo, while the flag had

just shifted, the tree closer and at the right is still under the influence of the southwest wind, thus the exact moment of the frontal passage was captured. Below, the same front quickly developed this squall line, seen here from Oak Beach, as it moved off the south shore of Long Island and out over the adjacent warm waters of the Atlantic Ocean. ---All three photos by Jack "Thunderhead" Corso of Harrison, New York; copyright 1989.



Above, an aesthetic cloud-to-ground lightning strike discharges over Kings Point, New York on the evening of September 11, 1989. The lightning was produced by an isolated severe thunderstorm that developed over the East River in New York City and moved along the north shore of Long Island from Whitestone east, passing through Kings Point in Nassau County. The storm cell produced strong winds and heavy rain which resulted in numerous accidents and delays. One of the accidents involved a car (right) that flipped over on Union Turnpike at the Kew Gardens Interchange. ---Both photos by Jack "Thunderhead" Corso of Harrison, New York; copyright 1989.



STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
1 ALABAMA									
Lauderdale County	01	1700CST			0	0	?	?	TSTM Wind Thunderstorm winds blew down about fifteen trees in the Florence area.
Limestone County	01	1745 CST			0	0	?	?	TSTM Wind Several power poles were broken and power lines were blown down by strong thunderstorm winds in Athens.
Montgomery County	02	1255CST			0	0	?	?	TSTM Wind In Montgomery thunderstorm winds ripped the roofs off several buildings, snapped two utility poles, and moderately damaged the roofs of several homes.
Butler County	02	1500CST			0	0	?	?	TSTM Wind Thunderstorm winds damaged several roofs of homes and destroyed patio covers and awnings in Georgiana. Also, at about the same time trees were blown down in Greenville, where a tree fell through the roof of a home, causing extensive damage.
Coffee County	02	1600CST			0	0	?	?	TSTM Wind At Elba, thunderstorm winds blew down trees and power lines and moved one house off its foundation. There were no injuries.
Coffee County	03	1500CST			0	0	?	?	TSTM Wind Thunderstorm winds blew down trees and scattered debris over a 3/4 mile area of Enterprise. One home and a storage shed received extensive damage.
Jackson County	12	1550CST			0	0	?	?	TSTM Wind Strong thunderstorm winds blew down two large trees which extensively damaged the roof of a home in Scottsboro.
Lawrence County	22	1200CST			0	0	?	?	TSTM Wind Torrential rain of four to five inches fell over about a one hour period, causing widespread flash flooding in northern Lawrence County. Many streets were flooded, especially in the Courtland and Moulton areas.
2 ARIZONA									
Pima County, Green Valley	03	1600 MST			0	0	2	0	Tstm.wind(52) Thunderstorms produced winds estimated at about 60 mph along with 1/2 inch hail. A few trees were downed and some roads were temporarily flooded in this retirement community. About 2.20 inches of rain fell in just 40 minutes. The Tucson Airport recorded winds of 46 mph at 1700 MST.
Pima County, Tucson	12	1725 MST			0	0	3	0	Tstm.wind The late afternoon thunderstorms moved rapidly from the southwest to northeast over the city, resulting in strong winds and small hail. Some trees were uprooted and power lines downed. Police reported several minor collisions, but no serious injuries. The biggest problem was power outages, and city police were kept busy directing traffic where the lights were out. Visibility was reportedly as low as 20 feet near N. Kolb Road and Speedway at 1755 MST due to heavy rain.
Cochise County, Sierra Vista	12	1900 MST			0	0	0	0	Istm.wind A weather spotter reported winds estimated in excess of 60 mph along with 1/2 inch hail.
3 ARKANSAS									
Izard Co. Melbourne	01	1421CST	.25	50	0	0	4	?	Tornado (F0) A tornado touched down briefly, snapping off eight power poles.
Clay Co. Knobel	01	1500CST			0	0	4	?	Thunderstorm Wind A mobile home was destroyed and numerous large trees were downed by thunderstorm winds.
Craighead Co. Monette	01	1520CST			0	0	?	?	Thunderstorm Wind Thunderstorm winds blew over a grain truck on a road in Monette. The driver escaped injury. A falling tree also damaged a home, and falling tree limbs damaged a vehicle and downed power lines.
4 CALIFORNIA, Northern									
Alameda County Fremont	18	0830PST			0	0	0	0	Funnel Cloud
San Joaquin Co 3W Stockton	18	1125PST			0	0	0	0	Funnel Cloud
San Joaquin Co 4NW Stockton	18	1215PST			0	0	0	0	Funnel Cloud
San Joaquin Co 14N Stockton	18	1320PST			0	0	0	0	Funnel Cloud
Contra Costa Co N of Concord	18	1415PST			0	0	0	0	Funnel Cloud
Contra Costa Co E of Pittsburg	18	1625PST			0	0	0	0	Funnel Cloud
Six funnel clouds occurring in a three county area were spawned by an upper low swinging southeastward across the area. The thunderstorms also produced moderate winds, hail and heavy rainfall over a wider area of central California. Some urban and small stream flooding was reported.									
4 CALIFORNIA, Southern									
Los Angeles Co. San Bernardino Co	19	morning			0	0	0	0	Early Snow An upper-level low off the coast brought an unusual early snow to the San Gabriel and San Bernardino mountains. Four to five inches fell in the Running Springs-Lake Arrowhead area. A few minor traffic accidents occurred on Highways 330 and 18 due to the snow.

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
5 COLORADO									
Adams County, E of Denver	4	afternoon			0	2	4	0	Tstm.wind
					A strong wind gust flipped a plane taxiing on a private runway in Adams County. Two unidentified people were slightly injured, and the plane was heavily damaged.				
Weld County, Milliken	7	1700MST			0	0	2	0	Lightning
					Lightning hit an oil tank near Milliken, causing a fire and blowing the lid off the tank. Damage was estimated at \$2000.				
Weld County, Greeley	7	1700MST			0	0	4	0	Lightning
					A lightning bolt knocked a radio station in Greeley off the air. The strike caused \$25,000 damage to an antenna mounted atop a 500 foot high tower.				
Boulder County	7	1700MST			0	0	5	0	Lightning
					Widespread thunderstorms produced lightning strikes that knocked out power to about 13,000 homes in Boulder County.				
Boulder County, 10W Boulder	7	1803MST			0	0	5	0	Heavy rain
					Heavy rain, falling in a rugged area stripped of vegetation by a fire in July, triggered mudslides that destroyed one home and severely damaged another in Boulder Canyon. In one home, the mud caved in an exterior wall and poured into the residence only seconds after two people had evacuated the premises. Rainfall in Boulder, Larimer, and Weld counties from the 7th through the 9th totaled 1 to 3 inches.				
Boulder County, Nederland	7	1844MST			0	0	0	0	Hail (1.75)
Clear Creek County, Idaho Springs and Golden Gate Canyon	7	1844MST			0	0	0	0	Hail (1.75)
Jefferson County, 10 N Golden	7	1925MST			0	0	0	0	Hail (1.0)
Morgan County, Wiggins	7	1939MST			0	0	0	0	Hail (1.0)
Weld County, 5W Frederick	7	2000MST			0	0	0	0	Hail (0.75)
El Paso County, Fort Carson	8	1140MST			0	0	0	0	Hail (1.75)
Arapahoe County, Littleton	10	1515MST			0	0	0	0	Hail (0.75)
Jefferson County, Lakewood	10	afternoon			0	0	4	0	Heavy Rain
					Heavy rain produced local flooding in Lakewood. This caused the collapse of a wall of a house.				
Front Range and Northeast Colorado CO2011-012-013	12				0	0	4	0	Snow
					An unseasonably early snowfall brought one to four inches of late summer slush to northeastern Colorado. 2 to 3 inches fell in the Denver area. More whitened adjacent foothills; west of Denver, Evergreen had 6 inches, and Buckhorn Mountain, west of Fort Collins, had 8 inches. The snow fell on leaf-laden trees, and branches sagging onto power lines caused numerous outages. Much of Denver's snow fell during the evening rush hour, creating traffic chaos.				
Prowers County, Lamar	12	afternoon			0	0	4	0	Lightning
					Lightning knocked a radio station in Lamar off the air and caused extensive damage to its electronic equipment.				
Bent County, 10 W Las Animas	17	evening			0	0	3	0	Hail (1.75)
					Golfball size hail damaged a car just east of Hasty. Over three inches of rain fell in the area, mostly in an hour.				
Larimer County, Loveland	19	1836MST			0	1	3	0	Lightning
					Lightning injured a man after striking his garage which suffered minor damage.				
Morgan County, Fort Morgan	20	1700MST			0	0	0	0	Tstm.wind (56)
Phillips County CO2013	20	afternoon			0	0	0	6	Heavy rain
					Downpours hit many spots in eastern Colorado, causing extensive damage to crops nearing harvest. In the Holyoke area in Phillips County, the bean crop suffered two million dollars in water damage.				
6 CONNECTICUT									
CTZALL Statewide	22-23	1900EST-0600EST			0	0	5	4	High Winds
					The remnants of Hurricane HUGO moved northward through western Pennsylvania and New York, and a period of high winds from the south affected all of Connecticut. Wind gusts of 40 to 50 mph knocked down tree limbs and a few trees, causing scattered brief power outages that affected up to 30,000 electric customers across the state. A peak gust to 49 mph was recorded at Bridgeport. Scattered, mostly minor property damage was reported state-wide.				
7 DELAWARE ————— NONE REPORTED									
8 FLORIDA									
Palm Beach Co., Delray Beach	01	1215EST			0	2	0	0	Lightning
					Two city workers were knocked to the ground by a nearby strike.				
Bay Co., Panama City	03	1500EST			0	1	0	0	Lightning
					A 19 year old man was injured when lightning struck the mast of his Hobie Cat.				
Duval Co., Jacksonville	04	0045EST			0	0	5	0	Lightning
					A lightning-initiated fire destroyed a tire company, causing \$145,000 damage.				
Sarasota Co., Sarasota	04	1445EST			0	0	4	0	Lightning
					A lightning-initiated fire caused \$10,000 damage to a house.				
Monroe Co., 5N Key West	05	1351EST							Waterspout
					Weather Service personnel observed a waterspout.				
Sarasota Co., Sarasota	05	1500EST			0	0	4	0	Lightning
	05	1530EST			0	0	0	0	Tstm.wind(50)
					Lightning initiated a house fire and a large tree was blown over.				
Palm Beach Co., Riviera Beach	05	1525EST							Waterspout
					Fire rescue reported a waterspout.				
Pinellas Co., Safety Harbor	05	1530EST			0	0	3	0	Tstm.wind(60)
					A tree was uprooted and limbs were downed. Minor damage was done to 4 mobile homes.				
Monroe Co., 2W Key West	05	1556EST							Waterspout
					Weather Service personnel observed a waterspout.				
Lee Co., Cape Coral	05	1630EST			1	0	0	0	Lightning
					Lightning struck and killed a high school football player after practice. M170				
Santa Rosa Co., Gulf Breeze and Holly Navarre	05	2030EST			0	0	2	0	Tstm. wind (60)
					Power lines, trees and limbs were downed. Slight damage was done to a mobile home. Hail of unknown size was reported.				

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					KILLED	INJURED	PROPERTY	CROPS	
FLORIDA									
Duval Co., Jacksonville Beach	06	0630EST							Waterspout
			A waterspout was reported off of Ponte Verde Beach.						
Highlands Co., Lake Placid	06	1330EST							Funnel Cloud
			A funnel cloud was sighted.						
Polk Co., Winter Haven	06	1450EST			0	0	5	0	Tstm. wind(90)
			A downburst at Winter Haven Airport caused \$275,000 damage to hangars and aircraft.						
Charlotte Co., Charlotte Harbor	06	1640EST							Funnel Clouds
			Three funnel clouds were sighted.						
Charlotte Co., Punta Gorda	06	1730EST	short	?	0	0	4	0	Tornado(F0)
			A brief tornado touchdown did \$48,000 damage to three houses, a boat and boat dock.						
Monroe Co., 5SW Key West	07	1236EST							Waterspout
			FAA personnel reported a waterspout.						
Sarasota Co., Sarasota	07	1500EST			0	0	3	0	Lightning
			A lightning-initiated fire damaged the attic of a house.						
Monroe Co., 2W Key West	07	1555EST							Waterspout
			Weather Service personnel observed a waterspout.						
Lee Co., Ft Myers to Cape Coral	09	1655EST-1705EST	5.0	50	0	0	5	0	Tornado(F0)
			Two brief tornado touchdowns did \$155,000 damage to houses. Damage at the two locations, about 5 miles apart, was produced by the same tornado, and both touchdowns were short in duration.						
Monroe Co., 5NE Key West	09	1654EST							Waterspout
			Weather Service personnel observed a waterspout.						
Collier Co., Naples and Vanderbilt Beach	09	1700EST							Funnel clouds Waterspouts
			Several large funnel clouds and waterspouts were reported.						
Nassau Co., Fernandina Beach	12	0638EST							Waterspout
			A waterspout was reported off the coast.						
Hillsborough Co., Tampa	12	1648EST	short	?	0	0	0	0	Tornado(F0)
			A tornado was observed for 3 minutes 4 miles southeast of Tampa International Airport doing no apparent damage.						
Lee Co., Ft. Myers Beach	12	1800EST	short	?	0	0	3	0	Tornado(F0)- Waterspout
			A brief tornado did slight damage to a house before moving off shore.						
Lee Co., Bonita Springs	12	1830EST							Funnel Clouds
			Several funnel clouds were reported.						
Monroe Co., 10NE Key West	13	1254EST							Waterspout
			Weather Service personnel sighted a waterspout.						
FLORIDA									
Duval Co., Jacksonville Beach	13	1324EST							Waterspout
			A waterspout 25 miles offshore of Jacksonville beach was observed and reported from a fishing boat.						
Monroe Co., 3NW Marathon	14	1233EST							Waterspout
			Civil Defense personnel reported a waterspout.						
Pinellas Co., northern part	14	1315EST							Funnel cloud
			A funnel cloud was reported.						
Monroe Co., 5S Key West	14	1454EST							Waterspout
			Weather Service personnel reported a waterspout.						
Palm Beach Co., South Bay	14	1500EST			0	0	0	0	Tstm. wind(50)
			Winds blew down a large tree.						
Pinellas Co., Largo	15	1500EST			0	0	4	0	Lightning
			Lightning initiated a fire that completely destroyed a mobile home.						
Monroe Co., 10SE Key West	16	0622EST							Waterspout
			Weather Service personnel reported a waterspout.						
Nassau Co., Amelia City	16	1400EST							Waterspout
			A waterspout was sighted off of Amelia Island.						
Alachua Co., Gainesville	16	1510EST			0	0	0	0	Hail(1.75)
			A pilot reported golfball size hail aloft.						
Palm Beach Co., 8NE Palm Beach	17	1030EST							Waterspout
			Weather Service personnel observed a waterspout.						
Pinellas Co., St. Petersburg	17	1330EST			0	0	0	0	Tstm. wind(50)
			Pea to marble size hail and a wind gust to 50 knots were observed by the FSS.						
Dade Co., 10W Miami	17	1500EST			1	0	0	0	Lightning
			A golfer was killed by lightning at the Doral Country Club. M390						
Alachua Co., Gainesville	17	1700EST			0	0	4	0	Lightning
			A lightning-initiated fire destroyed half of a house.						
Nassau Co., Fernandina Beach	18	1230EST	?	?	0	0	0	0	Waterspout- Tornado(F0)
			A waterspout moved onshore but caused no damage.						
Monroe Co., 5SW Key West	19	1140EST							Waterspout
			Coast Guard personnel reported a waterspout.						
Monroe Co., Cudjoe Key	21	1730EST							Waterspout
			Air Force personnel reported a waterspout.						

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					KILLED	INJURED	PROPERTY	CROPS		
FLORIDA										
Dade Co., Miami Beach	22	1522EST								Waterspout
										Beach Patrol personnel reported a waterspout over the Atlantic.
Marion Co., Eureka	22	1610EST			0	0	0	0		Tstm. wind (60)
Orange Springs	22	1659EST			0	0	3	0		Lightning
										Trees and power lines were blown down. A lightning-initiated fire destroyed a barn.
Putnam Co., Interlachen	22	1629EST			0	0	2	0		Tstm. wind(50)
										Trees were blown down onto a mobile home.
St. Johns Co., St. Augustine	22	1656EST			0	0	0	0		Tstm. wind(50)
										Trees were downed.
St. Johns Co., Ponte Vedra	24	1140EST								Waterspout
										The sheriff reported a waterspout.
Duval Co., Jacksonville	24	1230- 2000EST			2	?	?	0		Flash Flood
										Localized heavy rainfall (11.4") and the resultant flooding in downtown Jacksonville caused the death of two motorists whose vehicles were driven or swept into storm ditches. F73V M62V
Citrus Co., Inverness	24	1500EST			0	0	0	0		Tstm. wind(50)
										Trees were blown down.
Lee Co., St. Myrs	26	1600EST			0	1	0	0		Lightning
										A woman working on a computer was shocked by a lightning strike that discharged to the building she was in.
Hernando Co., Spring Hill	28	1800EST			0	1	0	0		Lightning
										A 54 year old man was injured by lightning while he was on a lawn mower.
9 GEORGIA										
CHATTOOGA COUNTY Summerville	01	1945EST			0	0	?	0		Lightning
										Lightning struck the main Summerville substation and damaged electrical equipment, resulting in power outages from Summerville to Menlo.
MUSCOGEE COUNTY Columbus	03	1756EST			0	0	?	0		TSTM Wind
										Strong winds blew down tree limbs which caused a power outage over one section of the city, leaving about 1,000 residents without electricity.
CLARKE COUNTY Athens	12	1700EST			0	0	?	0		Lightning
										Lightning developed in an isolated thunderstorm and struck a local residence. Damage occurred to the roof and attic portions of the home, while the remainder of the home received no damage.
GWINNETT COUNTY Norcross	15	1235EST			0	0	?	0		Lightning
										Lightning hit a house and caused substantial structural damage. Estimates were not available; there were no injuries to the occupants. Lightning also struck an electrical transmission line and left about 4,000 homes without power.
GEORGIA										
FULTON COUNTY Atlanta	15	1430EST			0	0	?	0		Flash Flood
										Flash flooding developed across Fulton County as heavy to moderate rains produced by strong thunderstorms persisted over northwest Georgia. One car was partially under water near Peachtree Creek.
DEKALB COUNTY Chamblee	15	1430EST			0	0	?	0		Flash Flood
North Atlanta	15	1430EST			0	0	?	0		Flash Flood
										Flash flooding developed in low-lying areas as persistent heavy to moderate rainfall continued over metropolitan Atlanta. With the flooding, a few commercial buildings had light water damage.
GLYNN COUNTY Brunswick	21	2000EST			0	0	?	0		Hurricane Hugo
										In Brunswick about five trees were uprooted by the winds circulating around Hurricane Hugo. One home had structural damage when a large tree fell across it. The greatest wind gust measured at Saint Simons Island was 46 miles an hour.
CHATHAM COUNTY countywide	21	2300EST			0	0	?	?		Hurricane Hugo
Hunter Army Air Field, Savannah	21	2355EST			0	0	?	0		Hurricane Hugo
Savannah Light Tower	22	0000EST			0	0	?	0		Hurricane Hugo G53
Savannah	22	0000EST			0	0	0	0		Flash Flooding
Savannah	22	0053EST			0	0	?	0		Hurricane Hugo
										Strong west to northwest winds that averaged about 40 to 55 miles an hour blew down numerous trees across Chatham County. At Savannah and at Hunter Army Air Field, the greatest wind gusts recorded were 54 and 56 miles an hour, respectively. The storm winds downed 50 to 75 trees around Savannah and severely damaged two homes when large trees fell upon them. In addition, the falling trees and limbs tore down electrical lines and caused isolated power and telephone outages across Chatham County. The wind speed value at the Savannah Light Tower represents approximately 80 percent of the original value at the surface due to the tower's height.
LIBERTY COUNTY countywide	22	0055EST			0	0	?	0		Hurricane Hugo
										Scattered tree limbs were downed by the storm's winds. At Hinesville, the greatest winds measured were 23 miles an hour. Wind damage was minimal.
BRYAN COUNTY countywide	22	0055EST			0	0	?	0		Hurricane Hugo
										Scattered trees and limbs were downed by the storm's winds. The winds caused minimal damage, although a few homes and other properties had minor damage due to the falling trees.
CLAYTON COUNTY Forrest Park	25	2040EST			0	0	0	0		Flash Flood
										Heavy rainfall caused major street flooding in north Clayton County. As much as six feet of standing water made the junction of I-285 and I-75 nearly impassable as the rainfall persisted.
DEKALB COUNTY Decatur	25	2050EST			0	0	0	0		Flash Flood
GREENE COUNTY Penfield	27	0845- 1300EST			0	0	0	?		River Flood
										The Oconee River near Penfield flooded adjacent agricultural land and pastures.
BIBB COUNTY Macon	30	1745EST			0	0	0	0		TSTM Wind
										Thunderstorm winds blew down trees and power lines.
JONES COUNTY 105 Gray	30	1810EST			0	0	0	?		TSTM Wind
										Power lines were blown down by thunderstorm winds.
CLAYTON COUNTY Riverdale countywide	30	1820EST			0	0	?	0		Flash Flood
	30	1900EST			0	0	0	0		Flash Flood
										Heavy rainfall across north Georgia pushed the Flint River out of its banks and caused streets surrounding streams to flood by 1820EST. Street flooding also developed over other portions of north Clayton County as the rainfall continued. The flooding continued into October 1 (see October Storm Data report).

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PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

GEORGIA

DEKALB COUNTY countywide	30	1905EST			0	0	?	0	Flash Flooding
DOUGLAS COUNTY countywide	30	1905EST			0	0	?	0	Flash Flooding
FAYETTE COUNTY countywide	30	1910EST			0	0	?	0	Flash Flooding
FULTON COUNTY countywide	30	1915EST			0	0	?	0	Flash Flooding

Flash flooding developed across the metropolitan Atlanta area as moderate to heavy rainfall persisted throughout the day over northwest Georgia. Rainfall amounts of two to four inches were common during the early evening. Creeks and streams were pushed to bankfull, streets flooded, and low-lying areas were inundated by the rainwater. The flooding across metropolitan and suburban Atlanta continued into October 1 (see October Storm Data report).

COBB COUNTY countywide	30	1920EST			0	0	?	0	Flash Flood
Woodstock	30	1935EST			0	0	?	0	Flash Flood

Many bridges were under water in the areas and several roads were closed. An earthen dam on an acre lake gave way and caused additional complications.

COBB COUNTY Vining and Austell	30	2355EST			0	0	?	0	River Flood
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Persistent rainfall over the metropolitan Atlanta area pushed the Chattahoochee River and area creeks, including Sweetwater Creek, beyond their banks. The floods entered many basements and yards, closed streets, and flooded parking lots and athletic fields in Vining and Austell. In addition, a large part of the Six Flags theme park was inundated at Austell. Flooding continued into October 1 (see October Storm Data report).

FULTON COUNTY Atlanta	30	2355EST			0	0	?	0	Flash Flood
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As heavy rainfall continued across the metropolitan Atlanta area, Peachtree Creek crested just a few hundredths of a foot below the second worst flood on record in north Atlanta. Water entered many basements and yards and blocked passage through several neighborhood streets. Other low-lying areas of Atlanta also flooded. A large portion of the Bobby Jones Golf Course was under water. Flooding continued into October 1 (see October Storm Data report).

IDAHO

Ada County, Boise	17	0900-1900MST			0	0	3	0	Flood
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Rainfall, totaling 0.65 of an inch at the Weather Service Office, accumulated in streets, intersections, and some yards in low-lying areas. This was due mainly to clogged or inadequate drainage systems. Some basements were flooded, resulting in property damage in some cases.

Bannock, Cassia, Minidoka, and Owyhee Counties; Oakley, Pocatello and Rupert	17	1215MST			0	4	5	2	TSTM Winds
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A dust storm cut visibilities to zero, causing a 10-vehicle pileup on Interstate 84 near the Utah border. In Oakley, a large poplar tree was blown over, fruit was blown from trees and power outages occurred. A localized wind did considerable damage to beans in a windrow ready to be threshed. Winds in Pocatello dropped a tree limb onto a bicyclist and pushed a dumpster into a parked car.

Bingham County, Blackfoot	17	1345MST			0	0	2	0	TSTM Wind
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A power outage of 1 and 1/2 hours occurred when wind blew wires together at the Blackfoot substation south of town, burning out a circuitbreaker.

Fremont County, Island Park	17	1400MST			0	0	0	0	TSTM Wind
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A peak wind gust of 60 mph was reported along with 0.75 of an inch of rain.

Caribou County, Lund	17	1500MST			0	0	3	0	TSTM Wind
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The roof of a shed measuring 40 by 45 feet was lifted off, carried 170 feet, and dropped with force enough to shatter it.

Bonneville County, Lincoln Road east of Idaho Falls	17	1500MST			0	0	2	0	TSTM Wind
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Wind lifted a camper shell from a pickup truck. The camper slid about 10 feet on its top, a window was broken, and both the sink and stove were dislodged.

IDAHO

Bingham County, Shelly-New Sweden Highway	17	1600MST			0	0	2	0	TSTM Wind
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Several spans of conductor line were blown down, leaving 30 customers without power for 4 to 5 hours.

Caribou and Franklin Counties, Bancroft, Dayton, Preston, and Soda Springs	17	1700MST			0	0	4	0	TSTM Wind
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Wind lifted parts of roofs and drove sprinklers into fences and neighbors' fields. A transmission pole was blown over, cutting power for most of Franklin County's west side for nearly 5 hours. Several trees were blown over, one crushing a pickup. In Caribou County, a few power lines and poles were blown over, and a power outage in the Bancroft area lasted about 4 hours. Roofs were torn off of two buildings.

Caribou County, Soda Springs	25	1500MST			0	0	2	0	TSTM Wind
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Winds blew a transformer pole down in a trailer court, spilling the oil from the transformer.

Ada County, Boise	25	2000MST			0	0	3	0	Lightning
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A lightning storm caused power outages for nearly two hours. A 3 to 5 acre fire was started on the Boise front.

Jerome County, Jerome	26	1740MST			0	0	2	0	TSTM Wind
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A gust of wind blew wires together, causing them to burn out. The resulting power outage affected the east and south sides of Jerome.

ILLINOIS

N Third of State	01	0000-0600CST			0	0	?	?	Heavy Rain, Flooding
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Thunderstorms produced heavy rain across about the northern third of Illinois, bounded by an area from the northeast corner of Illinois along the Wisconsin border, to just south of Rockford, then southward to just north of Peoria and to about 40 miles south of Kankakee, during the early morning hours of the 1st. Widespread rainfall amounts ranged between 2 and 4 inches, but several places received over 5 inches. One cooperative reporting station at Watseka in Iroquois County, 75 miles south of Chicago, reported the highest rain total of 7.15 inches. Gilman to the west received an even 6.00 inches. Other reports of 5 inches or more of rain:

6.00 inches... Woodland, Grundy County
5.50 inches... Danforth, Grundy County
5.04 inches... Woodhull, Henry County

Chicago's O'Hare International Airport officially recorded 2.33 inches of rain and lesser amounts under 1 inch occurred at the official reporting stations at Rockford, Moline and Peoria. Rainfall amounts over the Greater Chicago six-county metropolitan area ranged between 1.5 and 3 inches. However Joliet, 40 miles southwest of Chicago, reported 4.15 inches. In the Chicago area many viaducts, roadways and basements were flooded. The Kennedy Expressway extension to O'Hare Airport was blocked and was made impassable by 2 to 5 feet of water over the roadway between midnight and 300 a.m. CST. In Grundy County, roads were flooded and some persons were evacuated from homes in South Wilmington and East Brooklyn. At Watseka in Iroquois County, 2 feet of water covered roads and streets and caused some residential and basement flooding. Part of Route 45 was closed for a time due to flooding.

Grundy Co, South Wilmington and East Brooklyn	01	0300CST			0	0	3	0	Tstm. wind
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In addition to the heavy rain mentioned above, high winds during thunderstorms blew down some trees and did some damage to structures in the towns of South Wilmington and East Brooklyn.

Mercer, Henry, Bureau, La Salle, Putnam, Marshall, and Livingston Counties	06				0	0	?	?	Heavy rain
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Thunderstorms produced heavy 3 to 4 inch rainfall amounts over a portion of northwest Illinois, south of Rock Island in Mercer County, east to Ottawa in La Salle County, then south into Marshall and Livingston counties. The highest rainfall reported was 4.88 inches at Lacon in Marshall County.

Putnam Co, Hennepin	07	1730CST			0	0	?	0	Tstm. winds
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High winds blew down trees and some power lines.

Piatt Co, Monticello	08	1545CST			0	0	3	0	Tstm. winds
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High winds blew down a few dozen large tree limbs that blocked two streets. Power lines were knocked down in one spot.

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SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS				ESTIMATED DAMAGE	CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS		
ILLINOIS										
Cumberland, Coles, and Crawford Counties	08-09				0	0	?	6		Heavy rain, Flooding
		Millions of dollars in losses occurred to unharvested bean and corn crops when heavy rains sent the Embarras River and area creeks overflowing into crop-producing bottomland areas. In addition to crops losses, some roads were flooded and closed in the area. Unofficial rainfall totaled 9.5 inches near Oakland in Coles County late on the 8th and early on the 9th of September. Official cooperative station observers reported 4.95 inches of rain at Charleston and 4.37 inches at Diona. (Total for late on the 8th and early 9th.)								
St. Clair, Clinton, Marion, and Effingham Counties	14				0	0	?	?		Heavy rain, Flooding
		Thunderstorms produced rainfall amounts of 3 to over 6 inches. The following are cooperative observer rainfall totals: 6.28 inches New Athens, St. Clair County; 5.36 inches Albers, Clinton County; 3.39 inches Effingham, Effingham County; and 2.95 inches Centralia, Marion County. The heavy rain across the area left creeks and some roads flooded and caused some power outages.								
12 INDIANA										
Howard and Tipton Counties	01	0000-0800EST			0	0	4	4		Flash Flooding
		Five to eight inches of rain fell at Kokomo. Wildcat Creek in Kokomo was out of its banks and was flooding city streets. Just south of Kokomo, northbound U.S. Highway 31 was closed. All Howard County schools were closed. The cities of Windfall and Sharpville in Tipton County and Greentown in Howard County had serious flooding, and many roads were impassable due to high water. Most rural school openings were delayed or cancelled due to high water over county roads.								
Madison County Anderson and Elwood	01	0000-0800EST			0	0	6	?		Flash Flooding
		Many state and county roads were impassable due to flooding. Numerous basements flooded in Anderson. A construction supply business was flooded and incurred an estimated \$200,000 in damage. In Orestes, 150 migrant workers were evacuated from a company camp that was flooded and were housed in a National Guard armory activated by the governor. In Elwood, 100 homes suffered damage from flooding and many vehicles were partially under water at an auto dealership. City officials also indicated that a large portion of the northern downtown area was flooded.								
Madison County Summitville	01	0144EST			0	0	?	?		Flash Flooding
		High water closed State Road 9 and 1600N near Summitville.								
Delaware County Muncie	01	0225EST			0	0	?	?		Flash Flood
		Numerous streets were flooded in Muncie.								
Pulaski and Fulton Counties Bruce Lake	01	0335EST	1.5	500	0	3	6	?		Tornado (F2)
		A tornado reported at Bruce Lake turned over a mobile home near the lake, causing injuries to three occupants. Several mobile homes were completely destroyed and permanent homes were damaged along the southern and eastern shores of Bruce Lake.								
Pulaski and Fulton Counties	01	early morning			0	0	?	?		TSTM Wind
		Thirty to forty homes were damaged in Pulaski and Fulton counties due to strong thunderstorm winds.								
Howard County Kokomo	01	0515EST			0	0	6	?		TSTM Wind
		Numerous trees were blown down by thunderstorm winds in Kokomo. Numerous power outages occurred which forced the cancellation of work shifts at two large auto production companies. An auto dealership in Kokomo was damaged by thunderstorm winds as large display windows were blown out and dozens of cars were damaged. City officials estimated that the total storm damage could be near \$1,000,000.								
Kosciusko County Syracuse	07	2027EST			0	0	?	?		TSTM Wind
		Strong thunderstorm winds downed a large tree across State Road 13. Scattered power outages were reported across the eastern part of the county.								
Delaware County	08	0610EST			0	0	?	?		TSTM Wind
		Roofs were blown off of several houses in Albany. Numerous trees were downed in northern Delaware County.								
Wayne County Richmond	08	0800EST			0	0	?	?		Flash Flooding
		Numerous streets were flooded in Richmond by heavy rain. Seven traffic accidents due to high water on city streets were reported.								
White County Monon	08	1845EST			0	0	?	?		Flash Flooding
		Numerous streets were reported as flooded at Monon in northern White County.								
INDIANA										
Vermillion County	08	1850-2300EST			1	0	?	?		Flash Flooding
		Creeks were out of their banks in southern Vermillion County. State Roads 63 and 71 were closed due to high water. A 34 year old male working for a mining company drowned when the company vehicle that he was driving plunged into Coal Creek at 2330EST. The roadbed over Coal Creek had been washed away by high water from earlier heavy rains. M34V.								
Allen County Fort Wayne	09	1545EST			0	0	?	?		TSTM Wind
		The sheriff reported that trees were downed by thunderstorm winds in western portions of Fort Wayne.								
Marion County	09	1557-1625EST			0	0	?	?		TSTM Wind
		Winds of 60 mph were reported at the Eagle Creek Airport in northwestern Marion County. Numerous large tree limbs were downed at County Line Road and State Road 37, and in other portions of southern Marion County. A roof was blown off of a small business at Meridian and Stop 11. Downed power lines interrupted service to 20,000 customers of Indianapolis Power and Light. Trees were also reported as having been blown down at 62nd and Evanston in northern Marion County.								
Hamilton County	09	1640-1655EST			0	0	?	?		TSTM Wind
		Numerous trees were reported as having been blown down at Clarksville and Durbin.								
Hancock County	09	1640-1700EST			0	7	?	?		TSTM Wind
		Numerous trees were blown down in Greenfield. In New Palestine a tent was blown down onto 200 people at a fund raising gathering and 7 people were injured.								
Marion County	09	1640EST			0	0	?	?		TSTM Wind
		Indianapolis Power and Light recorded winds of 70 mph at 56th and Guion Road in northwest Marion County.								
Johnson County	09	1640EST			0	0	4	?		TSTM Wind
		Trees were blown down by thunderstorm winds in Greenwood in northern Johnson County. A small trailer was picked up and placed on top of a building in Franklin. A large billboard was also destroyed and blown into a truck which was also completely destroyed.								
Morgan County	09	1630-1730EST			0	0	3	?		TSTM Wind
		A roof was blown off of a house near Mooresville. Trees and power lines were blown down by thunderstorm winds near Martinsville.								
Henry County	09	1715EST			0	0	4	?		TSTM Wind
		Numerous trees were blown down by thunderstorm winds in eastern Henry County. Several buildings also sustained structural damage from thunderstorm winds at Mtville.								
Shelby County	09	1715EST			0	0	?	?		TSTM Wind
		Numerous trees and some power lines were blown down by thunderstorm winds at Norristown.								
Lawrence County Bedford	09	1718EST			0	0	?	?		TSTM Wind
		Numerous power lines were downed by thunderstorm winds.								
Randolph County Winchester	09	1745EST			0	0	?	?		TSTM Wind
		Numerous trees and power lines were downed by thunderstorm winds								
Wayne County	09	1755EST			0	0	?	?		TSTM Wind
		Numerous trees were blown down by thunderstorm winds.								
Jackson County Medora	09	1810EST			0	0	?	?		TSTM Wind
		A mobile home was overturned by thunderstorm winds at Medora. Trees were blown down by thunderstorm winds at Seymour.								
Bartholomew County Columbus	09	1820EST			0	0	?	?		Flash Flooding
		Streets were flooded by heavy rain at Columbus.								
Jennings County North Vernon	09	1825EST			0	0	3	?		TSTM Wind
		Trees were blown down by thunderstorm winds and vehicles were damaged by falling limbs and branches.								
Ripley Co.	09	1858 EST			0	0	4	0		Tstm Wind
		Trees and power lines were blown down across the county.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

INDIANA

Putnam County	14	0300-0915EST			0	0	?	?	Flash Flooding
Four and a quarter inches of rain was reported at Greencastle. Flooding occurred throughout Putnam County.									
Hendricks County	14	0500-1000EST			0	0	?	?	Flash Flooding
Heavy rains flooded county roads, and several bridges were impassable due to water topping the bridge surface.									
Vigo County	14	0813EST			0	0	?	?	Flash Flooding
Ment state and county roads west and northwest of Terre Haute were closed due to flooding from heavy rains.									
Clay County	14	0820EST			0	0	0	0	Flash Flooding
Police reported that low-lying areas were flooded, water was standing on roadways, and creeks overflowed their banks near Clay City in southern Clay County.									
Marion County	14	1145EST			0	0	?	?	Flash Flooding
Flooding of streets and basements was reported in the Mars Hill area of southwest Marion County.									

IOWA

Tama County, Dysart	01	0130 CST	0.2	20	0	0	4	0	Tornado (F0)
A small tornado touched down briefly in the town of Dysart. Damage occurred in a small area along its path. No other damage occurred in the town.									
Woodbury County, Sioux City	02	2223 CST			0	0	3	0	Lightning
As thunderstorms moved through Sioux City, lightning struck a house and damaged several appliances.									
Clay County, 5S Spencer	03	0100 CST			0	0	3	4	Hail (.88)
An isolated strong thunderstorm developed over Clay County. This cell dropped quarter size hail south of Spencer.									
Kossuth County, Algona	03	0300 CST			0	0	3	0	Lightning
Lightning struck a house in Algona. Damage was limited to several electrical appliances.									
Pottawattamie County	03	2200 to 04 0400 CST			0	0	3	5	Flash Flood
Four to five inches of rain fell across extreme northern portions of the county. This pushed Mosquito and Pigeon creeks out of their banks. Fields were flooded, and flooding also did damage to county roads and farm buildings.									
Mills County: countywide Mineola	04	afternoon			0	0	5	?	Tstm. Winds
	04	0135 CST	0.4	25	0	0	?	0	Tornado (F0)
A large area of thunderstorms developed over Eastern Nebraska. As it moved into Iowa, one of the cells produced high winds in Mills County. Strong winds ripped a portion of a roof off a business in Mineola. Windows were also blown out. Trees were blown down, some onto vehicles. As the area moved farther into Iowa, it continued to weaken. There were numerous reports of winds in the 30 to 50 MPH range. The storms produced heavy rains over the west third of the state with 1.5 to 3.5 inch amounts reported in many areas. A small tornado touched the ground twice in Mineola. Damage was relatively minor, with most of it done to trees.									
Wapello County, Ottumwa	04	0853 CST			0	0	4	3	High Winds
High winds gusting to 58 MPH were reported in the Ottumwa area. The winds were caused by the outflow jetlet from a decaying area of thunderstorms over Northern Missouri.									
Winnesho County, Lake Mills	07	0420 CST			0	0	4	3	Tstm. Winds (50+)
High winds from a line of thunderstorms caused damage near Lake Mills. On one farm, a barn was completely destroyed.									
Montgomery County, Red Oak	07	0950 CST			0	0	3	0	Lightning
Thunderstorms moved through the Red Oak area. Lightning struck a school, causing minor damage to the building.									
Keokuk County, Thornburg	07	1450 CST			0	0	4	3	Tstm. Winds (50+)
Severe thunderstorms moved through the Thornburg area. Numerous trees were downed. Flying debris broke the windows in 5 cars in the City of Thornburg.									
Crawford County, 2E Denison	07	1920 CST			0	0	0	0	Funnel Cloud
Audubon County, 4N Kimballton	07	2025 CST			0	0	4	3	Tstm. Winds (50+)
Shelby County: 4W Earling	07	2030 CST	0.2	20	0	0	5	3	Tornado (F0)
Defiance	07	2040 CST			0	0	4	2	Tstm. Winds (50+)
Panama	07	2040 CST			0	0	4	2	Tstm. Winds (50+)
35W Westphalia to 1N Harlan	07	2043 to 2055 CST	5.0	50	0	0	6	4	Tornado (F1)
Harlan	07	2210 CST			0	1	5	3	Urban Flood
Crawford County, 2S Denison	07	2226 CST			0	0	0	0	Funnel Cloud

IOWA

									A severe thunderstorm developed over West-Central Iowa. This storm produced two tornadoes in Shelby County. The first touched down briefly on a farm west of Earling. Damage was done to trees and farm buildings. The second tracked across open country for the most part, but damage was reported at two farmsteads along the way. The most extensive was on one of the farmsteads, where the house was blown from its foundation. Farther to the east, high winds caused damage north of Kimballton. Funnel clouds were sighted near Denison on two occasions. Heavy rains in the Harlan area caused considerable damage. Flood waters caused the basement walls of a few houses to cave in. One person received minor injuries as the wall of his house caved in, hitting him.
Webster County, Fort Dodge	07	2200 CST			0	0	5	2	Urban Flooding
Heavy rains fell in the Fort Dodge area, causing considerable flooding on the streets. The water broke through the wall of one house, flooding the basement and toppling a refrigerator.									
Fayette County, Oelwein	07	2230 CST			0	0	4	0	Lightning
Lightning struck the police station in Oelwein, causing damage to electrical equipment.									
Shelby County	07	2200 to 08 0415 CST			0	0	5	4	Flash Flood
Harrison County	07	2200 to 08 0300 CST			0	0	4	6	Flash Flood
Audubon County	08	0300 to 0730 CST			0	0	5	4	Flash Flood
Heavy rains of 3 to 6 1/2 inches fell across Audubon, Harrison and Shelby counties. The heavy rain caused flash flooding in the area. It was relatively minor due to the extremely dry conditions that have persisted for the past two years. The rains flooded county roads and damaged crops from northern Harrison County into a good share of Shelby County. Numerous small creeks were forced out of their banks. The Boyer River flooded around Dunlap, as did the headwaters of the Mishnabotna in Shelby County. Irwin reported 6.25 inches of rain.									
Pottawattamie County, Montgomery County, Page County and Fremont County	08	0000 CST			0	0	6	6	Flash Flood
Four to six inches of rain fell from portions of eastern Pottawattamie County south into Montgomery, Page and areas of Fremont counties. Creeks were pushed out of their banks and erosion occurred in fields. County roads and town streets were flooded, and reports of some washouts of streets, bridges, and culverts were noted. Vehicles were stranded in Avoca, Red Oak and Shenandoah. Businesses, homes and schools were flooded in Shenandoah where 5.89 inches of rain fell. Eighty to ninety percent of the homes in Shenandoah reported basement flooding.									
Page County, Shenandoah	08	0230 CST			0	0	4	2	Tstm. Winds (50+)
Thunderstorms moving through Page County resulted in high winds at Shenandoah. Trees were downed, along with numerous branches.									
IA2009-012 Southwest Iowa	08	0530 to 14 2100 CST			0	0	6	5	Flooding
Heavy rains of six to nine inches fell over parts of Southern and Western Iowa from the 7th to the 9th. Most of this fell during the night of the 7th and the morning of the 8th. Many rivers were reported to have at least minor flooding. Much of the flooding was in agricultural areas, but some flooding was also reported in towns along the rivers. The most significant flooding occurred on the Mishnabotna, Nodaway, One Hundred Two and Thompson rivers. The flooding in the Mishnabotna produced a record crest at Hamburg of 28.27 feet. The previous record was 28.14 feet, set on May 27, 1987. Even though flooding ranged from 1 to 13 feet over flood stage in Southwest Iowa, damage was relatively minor due in part to the lateness in the season, and resulted in minor agricultural losses.									
Hamilton County, Webster City	08	0553 CST			0	0	4	0	Lightning
As a thunderstorm moved through the area, lightning struck a vacant farm house southwest of Webster City. The house was set on fire.									
Fremont County: 3W Thurman to Thurman	08	1738 CST			0	0	5	4	Tstm. Winds (50+)
3SW Thurman to Randolph	08	1735 to 1805 CST	14.0	40	0	3	5	4	Tornado (F1)
Randolph	08	1809 CST			0	0	4	3	Tstm Winds (50+)
A large area of thunderstorms developed over Eastern Nebraska and Northeast Kansas. As they moved into Southwest Iowa, one storm spawned a tornado in Fremont County. The tornado touched down at intervals from west of Thurman to near Randolph. A vehicle was blown off I-29. There were three injuries as the RV was blown from the highway. Grain bins were destroyed near Thurman and a mobile home was overturned east of town. Building damage was reported between Thurman and Randolph. The tornado lifted by the time it reached Randolph, but winds downed numerous trees. High winds caused extensive damage in the area west of Thurman. Trees were toppled and several mobile homes were swept off their foundations.									
Bremer and Black Hawk Counties	08	1748 to 1758 CST			0	0	0	0	Cold Air Funnel
Cold air funnels developed over Northeast Iowa. Numerous reports were received from Bremer and Black Hawk counties.									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

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					KILLED	INJURED	PROPERTY	CROPS	

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					KILLED	INJURED	PROPERTY	CROPS	

14 KANSAS

Shawnee Co. Topeka Airport	04 0530CST				0	0	2	0	TSTM Wind (53) A thunderstorm wind gust of 61 mph was measured at the National Weather Service Office at Topeka's Phillip Billard Airport.
Sedgwick Co.	04 0600-1200CST				0	0	4	4	Flash Flood
Butler Co.	04 0600-1200CST				0	0	4	4	Flash Flood
Cowley Co.	05 0600-1200CST				0	0	4	4	Flash Flood Six to ten inches of rain fell over South-Central Kansas. Several U.S. and Kansas highways in Sedgwick, Butler and Cowley counties were closed by high water. Flooding forced the evacuation of some homes in the Hackberry Hollow Community southwest of Arkansas City, and along Four Mile Creek east of El Dorado.
Barton Co. 2NW Holington	05 0830-1145CST				0	0	5	3	Flash Flood Up to five inches of rain fell upon northwest Barton County during the early morning hours and caused some flooding along Blood Creek near Holington.
Washington Co. Clifton	06 0115-0500CST				0	0	5	3	Flash Flood Up to three inches of rain fell on saturated ground in southwest Washington County and caused some flooding in the Clifton area. Flooding closed several county roads.
Kiowa Co. Greensburg Comanche Co. 7S Coldwater Clark Co. Sitka	08 1451CST 08 1517CST 08 1722CST				0	0	3	4	Hail (.75) Hail (1.0) TSTM Wind (52) A cluster of thunderstorms moved out of the Oklahoma Panhandle and became severe as they moved toward Greensburg and Coldwater. Large hail fell at Greensburg and south of Coldwater. Wind gusts estimated at 60 miles an hour knocked down tree limbs in Sitka.
Douglas Co. Baldwin	08 1500CST				0	1	0	0	Lightning A 10 year old boy was struck by lightning while he was walking home from school. His hands were clinched and his legs shook for a few seconds after being struck. He also complained that the back of his head hurt for more than an hour, but he suffered no other injury.
Wyandotte Co. Kansas City Leavenworth Co. 4W Fairmont Lansing Leavenworth Tonganoxie	08 1505CST 08 1815CST 08 2010CST 08 2026CST 08 2208CST				0	0	1	0	Flash Flood Hail (1.5) Flash Flood Flash Flood Flash Flood Four to six inches of rain fell upon the Kansas City metropolitan area during the afternoon and evening of September 8th. It fell upon ground already saturated by earlier rains. Runoff caused widespread street flooding in Kansas City, Kansas during the afternoon. A few streets were also flooded in Lansing and Leavenworth that evening. About 50 people were evacuated from a flooded mobile home park in Tonganoxie. Large hail fell briefly 4 miles west of Fairmont.
Jewell Co. Jewell 2N Jewell	08 1525CST 08 1550CST				0	0	0	0	Funnel Tornado (F0) A tornado touched ground briefly in an open field 2 miles north of Jewell. A funnel was seen over the north side of Jewell.
Russell Co. 6S Russell	08 1600CST				0	0	3	3	TSTM Wind Straight-line thunderstorm winds blew over a granary and broke 8 telephone poles off at the ground. The wind also blew the roof off a shed.
Cloud Co. 4S Concordia	08 1614CST				0	0	3	2	Hail (1.75) A thunderstorm dropped golfball size hail south of Concordia.
Washington Co. Greenleaf 6NE Clifton	08 1800CST 08 1805CST				0	0	3	3	Hail (1.5) TSTM Wind A thunderstorm with large hail and strong winds caused damage across the south half of Washington County. Hail the size of ping pong balls fell near Greenleaf, and high winds downed power poles and damaged farm buildings northeast of Clifton.

KANSAS

Sumner Co. Argonia	08 1800CST				0	0	3	0	TSTM Wind
5N Wellington	08 1820CST				0	0	3	0	TSTM Wind (54)
Sedgwick Co. Wichita Airport	08 1813CST				0	0	2	0	TSTM Wind (50)
Butler Co. Douglas	08 1830CST				0	0	3	0	TSTM Wind (54) A line of severe thunderstorms produced strong wind gusts as it moved east through Wichita and Wellington. The wind blew down trees, destroyed a barn and caused a good deal of roof damage in Argonia. Wichita's Mid-Continent Airport measured a wind gust of 58 mph. Winds were estimated at 60 to 65 miles an hour north of Wellington and in Douglas.
Riley Co. Fort Riley	08 1815CST				0	0	0	0	Funnel
Manhattan	08 1830CST				0	0	3	0	TSTM Wind
Morris Co. Skiddy	08 1830CST				0	0	3	0	TSTM Wind
Pottawatomie Co. St. George	08 1845CST				0	0	2	0	TSTM Wind A severe thunderstorm produced damaging winds at times as it moved from north of Junction City southeast through Manhattan and Council Grove. A funnel was sighted over the northeast corner of Fort Riley. A tied-down airplane was tossed around and damaged at the Manhattan Airport. Several panels of sheet metal were torn from the roof of a barn near Skiddy. A few trees were knocked down at St. George.
Dickinson Co. 1S Enterprise	08 1830CST				0	0	3	3	TSTM Wind Thunderstorm winds downed a power pole south of Enterprise. A large tree was also blown down in Abilene.
Washington Co. Clifton	08 1830-2200CST				0	0	4	3	Flash Flood
Cloud Co. near Clyde	08 1830-2115CST				0	0	4	3	Flash Flood
Republic Co. near Agenda	08 1830-2115CST				0	0	4	3	Flash Flood Heavy rain fell upon saturated soil and caused some flooding across northeast Cloud, southeast Republic and southwest Washington counties. Several county roads were closed for several hours.
Jackson Co. 6WSW Holton to 1S Holton	08 1900-1930CST				0	0	4	0	TSTM Wind
1SW Holton	08 1910CST	1	50	0	1	4	0	0	Tornado (F0) A severe thunderstorm produced damaging winds as it moved from 6 miles west-southwest of Holton to a mile south of that town. An almost continuous damage path extended from 6 miles west-southwest of Holton to a point a mile south of Holton, just east of U.S. Highway 75. The width of the damage path was 2 miles wide at the start and narrowed to a mile at 3.5 miles southwest of Holton. The path was less than half a mile wide as it crossed Highway 75. A tornado touched ground briefly 1 mile southwest of Holton. It tore a shed from a barn and scattered sheet metal roofing up to half a mile away. Two by fours from the shed were driven through another barn 50 feet away, and one stud was driven about a foot into the ground. Two law enforcement officers saw a white funnel illuminated by lightning briefly over the farm. Straight winds demolished a mobile home 5 miles west-southwest of Holton. The home appeared to have flipped several times before settling into a heap of sheet metal, insulation, and wood studs about 40 feet from the foundation. The occupant of the home suffered a broken pelvis and broken leg. The mobile home was tied down, but only with 3 foot steel rods sunk in the ground.
Shawnee Co. Wakarusa	08 1900-2200CST				0	0	4	4	Flash Flood
Osage Co. 5NW Overbrook	08 1900-2200CST				0	0	4	4	Flash Flood
Douglas Co. 2S Lawrence	08 1900-2400CST				0	0	4	4	Flash Flood
Shawnee Co. Topeka	08 1945CST				0	0	3	0	Flash Flood

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

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KANSAS

Three to six inches of rain fell upon saturated ground across Shawnee, Douglas and northern Osage counties. Runoff was mainly funneled into the Kansas River, with only minor flooding resulting in most places.

Runoff sent small streams feeding into the Wakarusa River out of their banks for most of the river's reach. The town of Wakarusa had high water in some of its streets, and it came near some homes. The river itself was out of its banks for a time south of Lawrence.

A heavy downpour in Topeka left 3 feet of water in some low spots in city streets. Several cars were stalled in the high water.

Kingman Co.
BSE Kingman
Sedgwick Co.
Cheney
Wichita
Wichita

08 1920CST	0	0	0	0	Funnel
08 1935CST	0	0	3	0	TSTM Wind
08 1950CST	0	0	4	0	TSTM Wind (52)
08 1955CST	0	0	3	0	Hail (1.75)

A funnel was seen briefly southeast of Kingman. Wind gusts of more than 60 miles an hour preceded the storm across much of Sedgwick County and Wichita. Golfball size hail fell on the southwest side of Wichita near 30th Street South and St. Paul. Only minor damage resulted.

Sedgwick Co.
Wichita

08 2220CST	0	0	2	0	TSTM Wind (50)
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The third of a series of east-moving squall lines on this night produced winds measured at 59 mph near the intersection of Pawnee and Broadway in south-central Wichita.

SPECIAL HAIL SUMMARY

Kansas-Oklahoma Hail Loss Service Reports indicate hail was especially damaging to crops in the listed counties on the following dates:

10 Stanton

15 KENTUCKY

Fayette Co.

01 1330EST	0	1	5	0	Thunderstorm Wind
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Strong thunderstorm winds and heavy rain tore through Lexington, shearing off tree branches, knocking down power lines, and causing traffic jams. Winds blew down an eight foot high scaffold outside a bank, injuring one woman. She was taken to a hospital and treated for a broken arm. In addition several large trees were uprooted, damaging a car and a house.

Lee and Owsley Counties

13 2200-2300EST	0	0	3	2	Flash Flood
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Nearly two and one-half inches of rain in an hour forced creeks and streams out of their banks. Water was reported over roads in and around Beattyville and Booneville.

Jackson Co.

13 2350EST	0	0	2	1	Flash Flood
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Heavy rain in a short period of time forced the Upper Pond Creek near Anville out of its banks, flooding low-lying areas and several roads.

Pike Co.

14 2145EST	0	0	2	1	Flash Flood
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Heavy rain forced the Chloe Creek at Shelbiana out of its banks, flooding some roads and low-lying areas.

Johnson Co.

16 1320EST	0	0	2	0	Thunderstorm Wind
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State Police reported trees and power lines blown down north of Paintsville as strong thunderstorm winds moved through the area.

Lawrence Co.

16 1350EST	0	0	2	0	Thunderstorm Wind
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Strong thunderstorm winds uprooted trees in the eastern portion of the county.

16 LOUISIANA

Washington Parish
Sheridan
3 SW Sheridan

02 1600CST	0	0	?	?	TSTM Wind
02 1605CST	0.1	20	0	0	4 ? Tornado (F1)

A severe thunderstorm produced a downburst which downed a number of trees along Louisiana Highway 10 near Sheridan. A tornado touched down shortly after and lifted one mobile home completely off the ground which subsequently landed on another trailer. A third mobile home was rolled by the high wind.

St. Mary Parish,
Franklin

06 1720CST	0	0	5	0	Lightning
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A house fire, started by a lightning strike, caused \$60,000 damage.

East Baton Rouge Parish,
Baton Rouge

12 1500CST	0	0	5	0	Lightning
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A large house was heavily damaged by a fire which was caused by a lightning strike. Damage to the house totaled \$200,000.

17 MAINE

NONE REPORTED

18 MARYLAND and D.C.

MD2001
Eastern Shore

8-11	1	?	0	0	Heavy Surf
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A heavy surf caused by Tropical Storm Gabrielle pounded the mid Atlantic area for 4 days. In Ocean City, a man drowned just 15 yards from shore on Friday the 8th. On Saturday, a man was cut up on rocks after wave action knocked him down. During the period September 8-11, 225 people had to be rescued at Ocean City.
M610

Frederick Co.

23 1300EST	0	0	?	0	Thunderstorm Wind
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Montgomery Co.

23 1320EST	0	0	?	0	Thunderstorm Wind (35kt)
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Washington, DC

23 1330EST	0	0	?	0	Thunderstorm Wind (32kt)
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Baltimore Co.

23 1410EST	0	0	?	0	Thunderstorm Wind (43kt)
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Carroll Co.

23 1430EST	0	0	?	0	Thunderstorm Wind
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A cold front moved through the area, dropping temperatures 20 to 30 degrees in an hour. In Baltimore County, trees and power lines were downed; some houses were damaged when roofing and siding were ripped off, and 20,000 homes were without power. Trees were reported down in Carroll and Frederick counties.

19 MASSACHUSETTS

MAZ008
Northeast Coastal Area

10 all day	2	0	0	0	High Surf
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From hundreds of miles at sea, Hurricane GABRIELLE imparted fifteen foot waves and fierce undertow along the northeast coast area of Massachusetts. One man drowned after he was swept from the deck of a small boat near the mouth of the Ipswich River. Another man was swept out to sea by the undertow while swimming at Salisbury Beach and drowned. Many people had to be rescued while swimming at local beaches. Thirteen people were rescued after four small craft capsized.

MAZALL
Statewide

22- 2100EST-23 0900EST	0	0	5	4	High Winds
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A period of high winds gusting at 40 to 50 mph from the south occurred statewide as remnants of Hurricane HUGO moved northward through western Pennsylvania and New York. Scattered power outages affecting several thousand customers statewide were reported. In addition, the apple crop received varying amounts of damage in western Massachusetts. Some orchards reported that up to 30% of their crop was damaged, while others had less than 10% damaged. Scattered property damage was reported as trees and tree limbs fell upon autos and houses in a few locations.

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
20 MICHIGAN									
Allegan County East of South Haven	01	0410EST			0	0	3	0	Lightning
									A house sustained major damage. There were many power outages in the vicinity.
Allegan County and Kent County 4NW Dorr to 3SW Byron Center	06	1415EST	1.2	30	0	0	3	?	Tornado (F1)
									A tornado, described as a whirling cloud, was seen to touch down in a corn field. It later unroofed one garage, destroyed another, and damaged a barn. As it lifted, it removed the upper limbs from the tree.
Kent County 1W Kent County Airport	06	1445EST	0.5	25	0	1	4	?	Tornado (F1)
									A tornado peeled roof segments from two industrial buildings, causing some interior partitions to collapse. One person was slightly injured. The funnel of the tornado was later seen aloft.
Ingham County Lansing	08	1400EST			0	0	4	?	TSTM Wind
									Several branches were broken off and portions of roofs were removed by thunderstorm winds.
Oakland County Royal Oak	08	1500EST			0	0	5	0	Lightning
									A house was destroyed by a lightning-set fire.
Monroe County Frenchtown	08	1530EST			0	0	4	?	Lightning
									A barn and its contents were destroyed by fire.
Oakland County	08	1900EST			0	0	2	?	TSTM Wind
									Several trees were blown down.
MIZ001-016-022 Lower Peninsula and Straits of Mackinac Area	22	1400EST			1	0	5	?	Wind
									A car and its driver were blown off the Mackinac Bridge and into Lake Huron. Gusts were measured at up to 48 mph on the bridge, 50 mph at Manistee, and 57 mph at St. Joseph. Many trees were blown down. F31V
23 MISSOURI									
Andrew County	08	1235CST			0	0	1	0	Flash Flooding
									Schools were closed due to flooding along One Hundred Two River.
Clay County North Gladstone	08	1350CST			0	0	1	0	Flash Flooding
									Flash flooding was widespread in North Gladstone.
Platte County	08	1445CST			0	0	1	0	Flash Flooding
									Line Creek went out of its banks at 64th and N. Waukomis in the southeast part of the county.
Platte County Riverside	08	1450CST			0	0	1	0	Flash Flooding
									Line Creek went out of its banks in Riverside. A child care center was evacuated.
Clay County Liberty	08	1515CST			0	0	1	0	Flash Flooding
									Major street flooding occurred in Liberty.
Clay County	08	1542CST			0	0	1	0	Flash Flooding
									A car was stranded in high water at 7800 NE Farvin Road in the southwest part of the county.
Clay County Claycomo	08	1620CST			1	1	1	0	Flash Flooding
									Flash flooding resulted in the drowning of a 14 year old boy. A second boy, 13 years old, was seriously injured but survived. The flash flooding and incident occurred at Interstate 35 and Chouteau in Claycomo.
Clay County	08	2010CST			0	0	1	0	Flash Flooding
									Highway 210 was closed due to flooding.
Clay County	08	2010CST			0	0	1	0	Flash Flooding
									Roads were closed in Smithville.
Platte County	08	2025CST			0	0	1	0	Flash Flooding
									Highway 92 was closed due to flash flooding. Water was over the bridge at Second Creek.
Nodaway County Hopkins	08	2115CST			0	0	1	0	Flash Flooding
									Flash flooding occurred in Hopkins.
Platte County	08	2140CST			0	0	1	0	Flash Flooding
									Flooding occurred on Line Creek in the southeast part of the county. People had to be evacuated.
Nodaway County	09	0035CST			0	0	1	0	Flash Flooding
									Highway 46 was closed due to flooding on Nodaway River in the west-central part of the county.
Clay County Mosby Flats	09	0226CST			0	0	1	0	Flash Flooding
									Fishing River went out of its bank 5 feet below the bridge of U.S. Highway 69.
24 MONTANA									
Flathead County Columbia Falls	01	1930MST			0	0	3	0	TSTM Winds
Roosevelt County Culbertson. Fort Kipp	02	1800MST			0	0	3	3	Hail (1.00)
	02	1830MST			0	0	3	3	Hail (1.75)
Gallatin County West Yellowstone	17	1600MST			0	0	4	0	TSTM Winds (G57)
Yellowstone County Billings	17	1758MST			0	0	5	0	TSTM Winds (G53)
									A travel trailer was destroyed, power lines were downed and roofs were damaged by thunderstorm winds in Billings.
Big Horn County Crow Agency	17	1900MST			0	3	5	0	TSTM Winds
									A mobile home was rolled over by thunderstorm winds and three people inside received minor injuries. Trees and power lines were downed and there was widespread roof damage.
21 MINNESOTA									
Marshall County Stephen	03	0800CST			0	0	5	0	Thunderstorm Wind
									Trees were downed and minor building damage was done to some city dwellings and businesses.
Ottertail County Battle Lake	03	0942CST			0	0	0	0	Hail (1.00)
Cass County 33N Brainerd	03	est. 1200CST			0	0	0	0	Thunderstorm Wind
									Trees were downed in northern Cass County. Damage extended into southern Itasca County.
Morrison County 2N Bowls	03	1230CST			0	0	0	0	Hail (1.75)
Stearns County Avon	03	1335CST			0	0	0	0	Hail (1.75)
Stearns County St. Cloud	03	1357CST			0	0	0	0	Hail (1.75)
22 MISSISSIPPI									
Bolivar County 3SW Cleveland	07	1700CST			1	0	0	0	Lightning
									A man was struck and killed by lightning while dove hunting off of Laughlin Road southwest of Cleveland. M380

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

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					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

25 NEBRASKA

Morrill Co. Broadwater 20SW Bridgeport	02	2225CST			0	0	4	4	Hail (1.75)
	02	2226CST			0	0	3	4	Hail (1.75)
Garden Co. Levellan	03	1930CST			0	0	5	5	Hail (2.75)
	03	1930CST			0	0	3	4	Hail (1.75)
Dawson Co. 5W Lexington	03	1930CST			0	0	3	4	Hail (1.75)
	03	2020CST			0	0	3	3	Hail (1.75)
Keith Co. Keystone	03	2020CST			0	0	3	3	Hail (1.75)
	03	2030CST			0	1	6	5	Thunderstorm Wind (87)
Cherry Co. Valentine	Wind gusts estimated around 100 m.p.h. blasted the Valentine area. A man was injured when a semi-trailer was blown onto a pickup truck. Two hangers and three airplanes were damaged at the airport. Several small buildings and vehicles were damaged. The roof was blown off of a trailer and a portion of a downtown business. Windows were blown out of homes and businesses and windshields sucked out of vehicles. The barn at the fairground had its ends blown out. Trees and power lines were damaged through the area. Crops also suffered considerable damage.								
	03	2127CST			0	0	3	2	Thunderstorm Wind (62)
Madison Co. Norfolk	Wind gusted to 72 m.p.h. at the airport. Damage to tree limbs and power lines occurred.								
	03	2145CST			0	0	3	4	Hail (1.75)
Keya Paha Co. Springview	03	2145CST			0	0	3	4	Hail (1.75)
	03	2145CST			0	0	6	5	Flash Flood
Platte Co. and Colfax Co.	Four and a half to nearly seven inches of rain pushed creeks out of banks and flooded fields, county roads and city streets. Crops were damaged. A number of bridges and culverts were washed out. In Platte County, Shell, Tracy, Loseke and Elm creeks went out of banks, with Elm Creek causing flooding in Platte Center. Eight miles south of Creston a youth was stranded on top of a car for almost an hour when the vehicle was swept off a road into a creek by flood waters. A Platte County farmer lost 250 feeder pigs. The roof of a Columbus business collapsed due to heavy rains. In Colfax County, Shell Creek flooded, damaging crops northwest of Schuyler. In Schuyler streets and basements were flooded. Some rainfall amounts included 6.97 inches 6 miles southeast of Creston, 6.5 inches at Humphrey and 4.90 inches at Columbus.								
	03	2200CST			0	0	4	2	Thunderstorm Wind
Stanton Co. 9SW Stanton	Strong wind gusts destroyed farm outbuildings.								
	03	2200CST			0	0	5	5	Flash Flood
Dodge Co. and Washington Co.	Four and a half to five and a half inches of rain flooded a number of county roads and city streets. Flooding of fields damaged crops. A number of creeks were pushed out of banks, including Bell Creek in Washington County and Maple Creek in Dodge County. Water from Bell Creek surrounded a few homes in Arlington. Maple Creek reached 2.6 feet over flood stage at Nickerson. Some rainfall amounts included 5.50 inches at Arlington, 4.98 inches at Fort Calhoun, 4.82 inches at Blair, 4.62 inches at Nickerson and 4.41 inches at Kennard.								
	03	2245CST			0	0	4	3	Thunderstorm Wind
Colfax Co. Schuyler	03	2255CST			0	0	4	4	Hail (1.50)
	Strong winds blew down trees and power lines. Hail damaged crops.								
Stanton Co.	03	2300CST			0	0	2	3	Flash Flood
	Union Creek went out of banks, flooding lowland crops.								
Custer Co. 10SW Oconto	03	2305CST			0	0	3	1	Thunderstorm Wind (50)
	A spotter reported wind gusts of 55 to 60 m.p.h.								
York Co. 2N Thayer	03	2340CST			0	0	5	4	Thunderstorm Wind
	Strong gusts destroyed outbuildings and uprooted trees.								
Butler Co. 4NE David City	04	0030CST			0	0	3	2	Thunderstorm Wind
	Strong gusts blew down trees and power lines.								
Butler Co. 6NW Bellwood	04	0045CST			0	0	4	0	Lightning
	Fire started by lightning heavily damaged a home.								

NEBRASKA

Saunders Co. Mead	04	0055CST			0	0	3	2	Thunderstorm Wind
	04	0100CST			0	1	5	3	Thunderstorm Wind (65)
Leshara	04	0100CST			0	0	4	3	Thunderstorm Wind (56)
	04	0100CST			0	0	3	5	Hail (1.00)
3NE Prague countywide	04	0110CST			0	0	2	3	Flash Flood
	Gusts estimated to around 75 m.p.h. downed trees and power lines and destroyed a number of small storage sheds. At Thomas Lakes near Ashland a woman was injured when windows were blown out of a home and a mobile home was pushed off of its foundation. Two nearby cars had their windows blown out. Trees were uprooted at Mead. Hail heavily damaged crops northeast of Prague. Heavy rains of around 4 inches pushed Sand and Duck creeks out of banks for a time, flooding fields in the north area of the county and washing out a bridge. Sand Creek also caused some flooding in Wahoo later in the day.								
Sarpy Co. Gretna	04	0110CST			0	0	6	3	Thunderstorm Wind (87)
	04	0120CST			0	0	5	2	Thunderstorm Wind (69)
Papillion	04	0120CST			0	0	5	2	Thunderstorm Wind (69)
	04	0125CST			0	0	5	1	Thunderstorm Wind
Bellevue	Strong winds estimated near 100 m.p.h. blew windows out of homes and destroyed a barn and garage just east of Gretna. Tree and power line damage was widespread from 192nd Street to 168th Street along Capehart Road. At Papillion wind gusts estimated near 80 m.p.h. toppled trees and downed power lines. At the SAC museum grounds at Offutt Air Force Base, Bellevue, a 98 foot tail missile on static display was blown over.								
	04	Morning			0	0	3	2	Flood
Douglas Co.	Runoff from 4 and 1/2 to 5 and 1/2 inch rains upstream in Washington County caused minor flooding along the Big Papillion Creek in Omaha near Tranquility Park, Happy Hollow Golf Course and 84th and Frederick.								
	06	0300CST			0	0	4	1	Lightning
Cage Co. Wymore	Lightning blew the corner off of a business building.								
	07	0133CST			0	0	5	4	Hail (2.00)
Box Butte Co. 6SW Alliance	Hail upwards to 2 inches in diameter dented vehicles, damaged a roof and damaged crops.								
	07	0153CST			0	0	4	3	Hail (1.00)
Box Butte Co. Alliance	Hail dented vehicles and damaged shingles.								
	07	2215CST			0	0	3	1	Thunderstorm Wind (50)
Sarpy Co. La Vista	07	2215CST			0	0	4	1	Thunderstorm Wind (56)
	Thunderstorm gusts to 57 m.p.h. were reported at La Vista and 65 m.p.h. at Papillion. Tree limbs were broken and a few power lines damaged.								
Papillion	08	1000CST			0	0	4	4	Flash Flood
	Heavy rains of 4 to 5 inches pushed small creeks out of banks, flooded and damaged county roads, flooded fields and eroded crops. Rock Creek was pushed out of banks. Wahoo Creek moved to 1.9 feet over flood stage at Ithaca. Highway 77 flooded around Ceresco. A few of the heavier rainfall amounts included 4.90 inches at Brainard and 4.95 inches at Ceresco.								
Butler Co. and Saunders co.	08	1000CST			0	0	4	4	Flash Flood
	Heavy rains of 4 to 5 inches pushed small creeks out of banks, flooded and damaged county roads, flooded fields and eroded crops. Rock Creek was pushed out of banks. Wahoo Creek moved to 1.9 feet over flood stage at Ithaca. Highway 77 flooded around Ceresco. A few of the heavier rainfall amounts included 4.90 inches at Brainard and 4.95 inches at Ceresco.								
Lancaster Co.	08	1000CST			0	0	5	4	Flash Flood
	Around 5 to 9 inches of rain in the Lincoln area and other portions of Lancaster County caused flash flooding, with creeks out of banks and numerous county roads and city streets flooded. Some roads and culverts were washed out. Vehicles floated in the flooded roadways. Some businesses were flooded, as were home basements, especially in south and east Lincoln. An unofficial rain total of around 11 inches was reported near Holmes Lake Park in Lincoln where the lake went out of banks. Creeks reported out of banks included Salt, Deadmans, Stevens, Antelope and Beal Slough. The waste treatment plant flooded at Bennet. Crops were damaged by erosion and flooding. A few of the heavier rainfall official reports included 8.5 inches at Holmes Lake Park, 5.69 inches at Raymond, 5.00 inches at Bennet and 4.95 inches at the Lincoln airport.								
Cass Co.	08	1100CST			0	0	4	4	Flash Flood
	Four to six inches of rain pushed creeks out of banks, flooded and damaged some county roads and damaged crops. 5.67 inches of rain was reported at Union and 4.52 inches at Plattsmouth. Weeping Water Creek was pushed 2 feet over flood stage during the late evening at Union.								

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SEPTEMBER 1989

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					KILLED	INJURED	PROPERTY	CROPS	
NEBRASKA									
Lancaster Co., Cass Co. and Saunders Co.	08-09	Late Afternoon to Afternoon			0	0	5	6	Flood
									Five to nine inch rains in Lancaster County pushed Salt Creek 2.1 feet over flood stage at Lincoln 27th Street Bridge the night of the 8th, 4.6 feet over flood stage at Greenwood the early morning of the 9th and 3.3 feet over flood stage at Ashland the morning of the 9th. Considerable farmland flooding occurred. Some basements and roads flooded at Ashland but levees provided protection from serious flooding.
Cass Co. Weeping Water and Murray	08	1700CST -1720CST			0	0	4	1	Thunderstorm Wind
									Strong wind gusts knocked down utility lines and broke tree limbs. Almost a mile of power lines were reported damaged around Weeping Water.
Nemaha Co.	09	Night			0	0	3	4	Flood
									Very heavy rain pushed the Little Nemaha River 0.8 feet over flood stage at Auburn, flooding farmland.
Richardson Co.	09	Late Night			0	0	3	4	Flood
									Very heavy upstream rains pushed the Big Nemaha River 3.8 feet over flood stage at Falls City, damaging crops and some county back roads.
Nemaha Co. and Richardson Co.	09-11	Late Night to Early Morning			0	0	2	4	Flood
									Very heavy rains and strong inflow from upstream tributaries forced the Missouri River 2 feet over flood stage at Brownville and 4 feet over flood stage at Rulo. Bottomland crops were damaged.
Saline Co.	09-11	Late Afternoon to Daytime			0	0	3	4	Flood
									Heavy rain pushed Turkey Creek 3.2 feet over flood stage at Wilber on the 9th and the West Fork of the Big Blue River to a crest of 0.7 feet over flood stage at Dorchester on the 10th. Lowland cropland was damaged.
Seward Co. and Saline Co.	09-15	Late Afternoon to Late Morning			0	0	3	4	Flood
									Heavy rain pushed the Big Blue River 0.6 feet over flood stage at Seward and to a crest 6 feet over flood stage at Crete on the 12th. Croplands were damaged and some county roads flooded. The river at Crete was slow to fall and remained above flood stage into the 15th.
26 NEVADA									
Washoe County	16	1430PST 1630PST			0	0	3	0	High Winds
									Winds gusting to 60 MPH tore the top off a trailer, 20 miles southwest of Gerlach, in northern Washoe County.
Clark County	17	1130PST	.5	100	0	0	5	0	Tornado (F1)
									A tornado touched down in the small town of Moapa, in northern Clark County. Several mobile homes and buildings were damaged or destroyed. Moapa is sparsely populated with large areas of open ground between neighboring homes and businesses. This helped keep damage to a minimum. In addition to the structures at least four power poles were twisted off and several large trees were uprooted. Total damage has been estimated at nearly \$500,000. There were no injuries.
Churchill County	18	1615PST			0	0	0	0	Funnel Clouds
									Two funnel clouds were reported by the Churchill County Sheriffs Office ten to 14 miles southwest of Fallon.
27 NEW HAMPSHIRE — NONE REPORTED									
28 NEW JERSEY, Northern									
Morris, Hunterdon, Middlesex and Somerset Counties	20	afternoon			0	0	?	0	Flood
									After nearly two days of rain which was heavy at times, extensive flooding commenced across sections of Northern New Jersey. Most areas received around 3 to 5 inches of rain, with Middlesex County receiving nearly twice that amount. Hundreds of families were forced to evacuate their homes. Major roadways were closed along with several bridges as the Raritan and Millstone rivers rose to nearly five feet above flood stage.
Middlesex County Jamesburg	20	afternoon			0	0	?	0	Flash Flood
									Very heavy rains forced the operators at the Manalapan Dam to open its flood gates. Flash flooding resulted at a few points downstream. A bridge at Jamesburg just downstream of the dam received some limited damage.
28 NEW JERSEY, Southern									
Atlantic County Cape May County	19	0800EST			0	0	4	0	Flood
	19	0800EST			0	0	3	?	Flood
									Heavy rains of 2 inches or more caused considerable urban flooding mainly over eastern portions of Atlantic and Cape May counties. Many roads were flooded along with the first floors of some houses. Late morning high tides on the ocean and bays retarded the drainage of water from flooded areas. The flooding occurred from 0800 to 1200 EST.
Mercer County	19	1500EST			0	0	?	?	Flood
									Heavy rain of up to 3 inches caused flooding along the Assumpink Creek. The flooding occurred from 1500 to 1700 EST. The creek reached a stage of 7.5 feet, surpassing the flood stage of 7.0 feet.
Burlington County	20	0730EST			0	0	3	?	Flood
									Heavy rain of up to 5 inches on the 19th and 20th caused flooding along the Rancocas Creek. Quite a few roads were flooded along the creek. The creek reached a stage of 3.0 feet, surpassing the flood stage of 2.7 feet. Due to extensive marsh areas in the basin, and tidal effects from the Delaware River, the flooding which began at 0730 EST on the 20th did not completely recede until the afternoon of the 22nd.
Mercer County	20	1200EST 1630EST			0	0	?	?	Flood
									Heavy rain which totaled 4 to 6 inches in amount on the 19th and 20th caused urban and small stream flooding which left many roadways flooded. The Assumpink Creek flooded after 1630EST, reaching a stage of 8.24 feet which surpassed the flood stage of 7.0 feet. The Assumpink Creek flooded again after 2030 EST, reaching a stage of 10 feet at 0045 EST on the 21st. The flooding occurred between 1200 and 1430 EST and between 1630 EST on the 20th and 0300 EST on the 21st.
Burlington County Edgewater Park	23	1400EST			0	0	3	?	High Wind
									High wind gusts swirled through a horseshoe-shaped apartment complex, taking down trees and tree limbs and breaking windows. Some of the limbs broke windows or damaged automobiles.
29 NEW MEXICO									
Chaves County: Roswell Roswell Dexter Hagerman	12	1325-1340MST 1345-1445MST 1525MST 1545MST			0	0	?	?	Hail (1.50) Hail (3.00) Hail (1.50) Hail (2.75)
									A thunderstorm dropped three-quarter to one and one-half inch diameter hail in the City of Roswell between 1325 and 1340 MST, and hail up to three inches in diameter was reported in Roswell between 1345 and 1445 MST. A different storm broke windows in Dexter with one and one-half inch diameter hail which was reported by the Dexter Police, and later dropped baseball size hail in Hagerman that ruined cotton crops and knocked a house roof off. As a result of both storms, damage to chill and cotton crops is estimated to be high, possibly in the hundreds of thousands of dollars. A quarter of the crop was wiped out. Funnels were also sighted, but the locations and times are unknown.
Lea County	12	1542MST			0	0	?	?	Hail (0.75)
									Radio station KOBR reported dime size hail in Caprock.
San Miguel County Pecos	19	1100MST			1	0	0	0	Lightning
									A Pecos man was killed by lightning. M46?

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SEPTEMBER 1989

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					KILLED	INJURED	PROPERTY	CROPS	

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					KILLED	INJURED	PROPERTY	CROPS	

30 NEW YORK, Coastal										
Richmond County	20	afternoon								Flood
<p>After nearly two days of rain which was heavy at times, extensive flooding commenced across sections of Staten Island. Most areas received around 3 to 5 inches of rain. Most of the major highways were closed. On Amboy Road in Great Kills, an off-duty firefighter rescued a woman from her car which was stalled in several feet of water.</p>										
NYZ015-016-017 Long Island	22-	night								High Wind
<p>The pressure gradient between the remnants of Hurricane HUGO over the eastern Great Lakes and a strong high pressure system over the Atlantic coastal waters gave rise to some very strong winds. Long Island communities of Great Neck, Mineola, Locust Valley, Melville, Lattintown, Millneck, Smithtown and Huntington were hardest hit. Nearly 85,000 homes and businesses lost power as many power lines were downed by these strong winds.</p>										

— NORTH CAROLINA										
Dare Co. E of Nags Head	17	1600EST								Waterspout
<p>A large waterspout was sighted east of Nags' Head over the Atlantic.</p>										
Western North Carolina	22	0200EST								Hurricane Hugo
<p>Between 300 and 400 AM EDT tropical storm force winds ahead of Hurricane Hugo began in Union and Mecklenburg counties. The storm lost strength quickly over South Carolina but was still at tropical storm strength when the circulation center crossed into North Carolina just west of Charlotte around 7 AM EDT. The center of the storm continued north-northwest and exited the state near Ashe County about 10 AM EDT, still producing wind gusts to 60 MPH. The highest sustained wind at the National Weather Service in Charlotte was 69 MPH with peak gusts to 87 MPH. The FAA tower at Charlotte International Airport recorded a gust of 99 MPH. The FAA in Hickory recorded a gust of 81 MPH. A six month old Union County boy was killed when a large tree was blown into his mobile home. Fifteen people were injured, mostly due to falling trees. The City of Charlotte and much of Mecklenburg, Union, Anson, Cabarrus, and Stanley counties were paralyzed by the tens of thousands of trees blown down, and by widespread power outages. Catawba, Lincoln, Gaston, Iredell, Davie, Yadkin and Surry counties also received significant wind damage. Eighty percent of the power was knocked out in Charlotte and Mecklenburg County. Huge plate glass windows were blown out of tall buildings in downtown Charlotte. More than 1000 boats were severely damaged or destroyed on Lake Norman. Considerable damage was also done to marinas, boat houses, and boat slips.</p>										

30 NEW YORK, Central										
Greene Co.	22	Afternoon								High Winds
Ulster Co.	22	Afternoon								High Winds
Dutchess Co.	22	Afternoon								High Winds
Broome Co.	22	Afternoon								High Winds
Chenango Co.	22	Afternoon	1	1	5	?				High Winds
Columbia Co.	22	1630EST	0	0	5	?				High Winds
Saratoga Co.	22	Afternoon	0	0	4	?				High Winds
Warren Co.	22	Afternoon	0	0	4	?				High Wind
Washington Co.	22	Afternoon	0	0	4	?				High Winds
Fulton Co.	22	Afternoon	0	0	4	?				High Winds
Oneida Co.	22	Afternoon	0	0	5	?				High Winds
Madison Co.	22	Afternoon	0	1	4	?				High Winds
Franklin Co.	22	Afternoon	0	0	4	?				High Winds
Essex Co.	22	Afternoon	0	0	4	?				High Winds
Clinton Co.	22	Afternoon	0	0	4	?				High Winds
Sullivan Co.	22	Afternoon	0	0	5	?				High Winds
Delaware Co.	22	Afternoon	0	0	5	?				High Winds
<p>The remains of Hurricane Hugo entered New York State on the afternoon of the 22nd, bringing strong gusty winds to many areas of Eastern New York. Power lines, tree limbs and even large trees were downed or damaged. In Chenango County a 22 year old male was killed when a large tree fell on his car, killing him and injuring his fiance.</p> <p style="text-align: center;">M-22-V, Town of Norwich</p>										

30 NEW YORK, Western										
LEWIS COUNTY Lowville	20-	1100EST- 23 1100EST								FLOODS
<p>Heavy rains over the Tug Hill Plateau and the Adirondacks produced flooding in the Black River Valley. Rainfall amounts over already saturated ground averaged two and a half inches, though some areas recorded more than three inches. Hardest hit were the lowlands between Carthage and Lyons Falls. Damage to corn and hay crops was estimated between \$75,000 and \$100,000.</p>										

Carteret Co. Atlantic Beach to Morehead City	23	1030EST	1.25	70	0	0	4	0		Waterspout-Tornado (FO)
<p>A waterspout-tornado moved off the Atlantic Ocean and struck Atlantic Beach, damaging two homes. It continued north and crossed Bogue Sound where it spun a fishing trawler around. It crossed the waterfront area of Morehead City where it blew around debris and damaged a few shingles. It finally crossed into the Newport River and dissipated.</p>										

31 NORTH CAROLINA										
Cumberland Co.	18	2000EST								Flash Flood
<p>Between 800 PM and Midnight EDT, 4-5 inches of rain fell in the Fayetteville area of Cumberland County. Around 1025 PM EDT the Glenville Lake Dam failed, sending water rushing through Cross Creek in Fayetteville. At 1225 AM EDT the dam holding back Raz Evans Pond broke, sending water over Morganton Road. Shortly after, a mini-van was washed off the road, killing two young girls of ages six and four. Three other people in the van were injured. About 100 homes and apartments were flooded. Over 400 people were evacuated including 165 residents of a nursing home. Cars were flooded and overturned. Damages were estimated to be near \$10 million. Flash Flood (F6V, F4V)</p>										

32 NORTH DAKOTA										
Billings County, 5 W Belfield	02	2240CST								Hail (1.75)
Stark County, Dickinson (DIX)	02	2319CST								TSTM Wind (55)
Morton County, 12 W Mandan	03	0140CST								Hail (1.75)
Barnes County, Litchville	03	0547CST								Hail (1.75)
45 W Fargo (FAR)	03	0645CST								Hail (1.75)

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

33 OHIO

Lorain County	07 1600 EST				0	0	4	0	Thunderstorm Wind
Cuyahoga County	07 1620 EST				0	0	?	?	Hail (0.75")
<p>A thunderstorm blew down trees in the Mill Run North subdivision of North Ridgeville, in Lorain County. It then dropped dime size hail in North Olmsted, in Cuyahoga County.</p>									
Medina County	07 1915 EST				0	0	4	0	Lightning
<p>Lightning struck a house in Medina. The fire that followed did \$30,000 damage.</p>									
Lucas County	09 1725 EST				0	0	4	0	Thunderstorm Wind
<p>A thunderstorm blew down trees and power lines at many points in Lucas County.</p>									
Medina County	22 1600 EST-				0	0	5	0	Urban & Small
	1900 EST								Stream Flooding
Cuyahoga County	22 1630 EST-				0	0	5	0	Urban & Small
	1930 EST								Stream Flooding
Geauga County	22 1645 EST-				0	0	4	0	Urban & Small
	1945 EST								Stream Flooding
Lake County	22 1645 EST-				0	0	4	0	Urban & Small
	1945 EST								Stream Flooding

Two to almost four and one-half inches of rain fell on extreme northeast Ohio during the afternoon of the 22nd as the remnants of Hurricane Hugo moved through northeast Ohio. Medina received 4.3 inches of rain between 1500 and 1700 EST. In Chardon, 4.3 inches rain fell between 1530 and 1730 EST. Numerous small streams and creeks flooded, along with basements and urban areas. Cars and buses were trapped by high water in Cleveland's east suburbs. State Routes 42 and 94 in Medina County were closed due to high water and washouts. The basement wall of a house in Medina collapsed from excessive water flowing around the house.

OKLAHOMA

Pottawatomie County, Shawnee	01 1800CST				0	0	?	?	Hail (1.75)
Pottawatomie County, Shawnee	01 1800CST				0	0	?	?	TSTM Wind (61)
Grady County, Minco	01 1800CST				0	0	?	?	TSTM Wind (52)
Pittsburg County, McAlester	01 1800CST				0	0	4	?	Lightning
Seminole County, 2 NE Little	01 1810CST				0	0	?	?	Hail (0.75)
Oklahoma County, Edmond	01 1833CST				0	0	?	?	Hail (0.75)
Oklahoma County, Edmond	01 1845CST				0	0	?	?	Hail (0.75)
Muskogee County, Forum	01 1915CST				0	0	?	?	TSTM Wind (52)
Muskogee County, Forum	01 1915CST				0	0	?	?	Hail (1.00)
Pittsburg County, countywide	01- 2015CST-				0	0	5	?	Flash Flood
Caddo County, Apache	02 0015CST				0	2	?	?	Lightning
	02 0230CST								

Thunderstorms over the northern one-half of the state produced hail up to the size of golf balls, and damaging winds. In Oklahoma City debris blown by thunderstorm winds destroyed a mobile home, injuring a man inside. Thunderstorm winds also blew the roof off a feeder and carried it 300 feet. Lightning struck several power poles in McAlester, causing 25,000 dollars damage. Lightning also struck the Apache Police station early on the 2nd. A policeman and a dispatcher suffered minor injuries. Heavy rains resulted in flash flooding in Pittsburg County. Damage to county roads amounted to 50,000 dollars, and 27 homes were flooded. Several streets were closed due to high water in Ada.

34 OKLAHOMA

Roger Mills County, 10 S Angora	01 1430CST				0	0	?	?	TSTM Wind (52)
Roger Mills County, 10 S Angora	01 1430CST				0	0	?	?	Hail (1.00)
Canadian County, 5 NW Calumet	01 1430CST				0	0	?	?	Hail (0.75)
Dewey County, 10 N Leedeey	01 1445CST				0	0	?	?	Hail (0.75)
Roger Mills County, 1 SE Roll	01 1530CST				0	0	?	?	Hail (0.88)
Canadian County, Mustang	01 1545CST				0	0	?	?	TSTM Wind (52)
Custer County, 4 W Arapahoe	01 1545CST				0	0	?	?	TSTM Wind
Custer County, 4 W Arapahoe	01 1545CST				0	0	?	?	Hail (2.00)
Dewey County, Oakwood	01 1603CST				0	0	?	?	Hail (0.75)
Oklahoma County, N Oklahoma City	01 1609CST				0	0	?	?	TSTM Wind (61)
Oklahoma County, Oklahoma City	01 1617CST				0	0	?	?	Hail (0.88)
Canadian County, Piedmont	01 1620CST				0	0	?	?	Hail (0.75)
Oklahoma County, Luther	01 1623CST				0	0	?	?	TSTM Wind (61)
Kingfisher County, Cashion	01 1630CST				0	0	?	?	Hail (0.88)
Oklahoma County, NE Oklahoma City	01 1632CST				0	1	?	?	TSTM Wind
Oklahoma County, 3 S Harrah	01 1633CST				0	0	?	?	TSTM Wind (61)
Oklahoma County, Arcadia	01 1640CST				0	0	?	?	Hail (0.75)
Dewey County, Fay	01 1645CST				0	0	?	?	TSTM Wind (57)
Dewey County, Fay	01 1645CST				0	0	?	?	Hail (1.00)
Lincoln County, Hallston	01 1650CST				0	0	?	?	TSTM Wind (52)
Oklahoma County, 6 E Jones	01 1652CST				0	0	?	?	Hail (1.00)
Lincoln County, Chandler	01 1654CST				0	0	?	?	TSTM Wind (52)
Creek County, 2 SW Bristow	01 1700CST				0	0	?	?	Hail (1.00)
Oklmulgee County, Beggs	01 1715CST				0	0	?	?	Hail (0.75)
Lincoln County, 2 S Jacktown	01 1740CST				0	0	?	?	TSTM Wind (52)
Canadian County, near Cimarron Airport	01 1757CST				0	0	?	?	TSTM Wind

Ellis County, 8 S Arnett	03 1700CST				0	0	?	?	Hail (1.75)
Ellis County, 8 S Arnett	03 1705CST				0	0	?	?	Hail (1.75)
Custer County, 2 S Butler	03 2000CST				0	0	?	?	Hail (1.75)
Custer County, Butler	03 2000CST				0	0	?	?	TSTM Wind (52)
Dewey County, Oakwood	03 2045CST				0	0	?	?	Hail (0.75)
Kingfisher County, 3 NW Loyal	03 2115CST				0	0	?	?	TSTM Wind (55)
Woodward County, 2 N Mutual	03 2130CST				0	0	?	?	TSTM Wind
Woodward County, 3 E Mutual	03 2135CST				0	0	?	?	Hail (0.88)
Dewey County, Oakwood	03 2315CST				0	0	?	?	Hail (0.75)
Blaine County, 3 N Greenfield	03 2345CST				0	0	?	?	TSTM Wind (61)
Blaine County, 3 N Greenfield	03 2345CST				0	0	?	?	Hail (1.00)
Blaine County, Greenfield	04 0000CST				0	0	?	?	TSTM Wind (52)
<p>Thunderstorms in western and central Oklahoma produced hail up to the size of golf balls and winds of over 60 knots.</p>									
Washington County, Bartlesville	05 1059CST				0	0	4	?	Lightning
<p>Lightning struck a barn and a storage building. The resultant fire caused a combined 10,000 dollars in damage.</p>									
Beaver County, Slapout	08 1410CST				0	0	?	?	Hail (0.75)
Harper County, 7 NW Buffalo	08 1650CST				0	0	?	?	Hail (0.75)
Harper County, 7 NW Buffalo	08 1650CST				0	0	?	?	TSTM Wind (52)
Comanche County, Fort Sill	08 2255CST				0	0	5	?	Lightning
<p>Thunderstorms in the eastern Oklahoma Panhandle and extreme northwest Oklahoma produced dime size hail and winds of 52 knots. Lightning struck the transportation building at Fort Sill, just north of Lawton, and the resulting fire destroyed the building. Damage amounted to 450,000 dollars.</p>									
Cotton County, Temple	11 0100CST				0	0	?	?	Hail (1.25)
Jefferson County, 5 Lake Waurika	11 0110CST				0	0	?	?	Hail (0.75)
Stephens County, 2 SW Corum	11 0115CST				0	0	?	?	TSTM Wind (52)
<p>Thunderstorms in southern Oklahoma during the early morning hours produced hail up to the size of half dollars and strong winds.</p>									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

OKLAHOMA

Lincoln County, 5 N Prague	12	2000CST			0	3	4	0	TSTM Wind
Okfuskee County, 5 N Okemah	12	2040CST			0	0	4	4	TSTM Wind (61)
Okmulgee County, Henryetta	12	2055CST			0	4	5	?	TSTM Wind (81)
Okmulgee County, Henryetta	12	2055CST	0.02	25	0	0	5	?	Tornado (F1)
Oklahoma County, northern portion	12-	2200CST-			0	0	?	?	Flash Flood
Comanche County, 2 SE Lawton	13	0145CST			0	0	?	?	TSTM Wind (52)
Jefferson County, Waurika	12	2355CST			0	0	?	?	TSTM Wind (52)
Carter County, Wilson	13	0109CST			0	0	?	?	TSTM Wind
Marshall County, Madill	13	0215CST			0	0	?	?	TSTM Wind (52)
Carter County, Dickson	13	0215CST			0	0	?	?	TSTM Wind
Johnston County, Fishomingo	13	0300CST			0	0	?	?	TSTM Wind
Pittsburg County, 4 S McAlester	13	0500CST			0	0	4	0	Lightning

Thunderstorms over eastern and southern Oklahoma produced a weak tornado, substantial straight-line damaging winds, and flash flooding. A severe thunderstorm first produced straight-line wind damage 6 miles west of Okemah, where gusts over 60 knots blew down trees and power lines, damaged a barn and mobile home, and damaged a pecan grove. Property damage was estimated at 18,000 dollars while crop damage was placed at 15,000 dollars. The storm continued eastward to Henryetta, where an area 17 blocks long and 1.5 blocks wide suffered considerable damage. Straight-line winds over 85 knots produced most of the damage, but evidence of a weak tornado (FO) was also found in post-storm surveys. Twenty homes were damaged, and 5 mobile homes were destroyed. Four minor injuries occurred in the mobile homes. Total damage was estimated at 257,000 dollars. Lightning struck a home 4 miles south of McAlester, and the resulting fire destroyed the home. Damage was estimated at 45,000 dollars. Strong thunderstorm winds destroyed a mobile home north of Prague. A man and his 2 sons were inside and suffered minor injuries. Damage to the mobile home was estimated at 15,000 dollars. In northern Oklahoma County, heavy rains flooded at least 19 homes and one business. Several roads were closed due to high water, and the Edmond Fire Department reported motorists stranded in flooded intersections. Rainfall in Edmond during the evening of the 12th and early morning of the 13th totaled 6.41 inches.

Logan County, Guthrie	13	All Day			0	0	5	?	River Flooding
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The Cottonwood Creek crested 6 feet above flood stage at Guthrie. Twenty families were evacuated from their homes, and considerable damage was done as up to 3 feet of water flooded homes and businesses. Damage was estimated at between 200,000 and 300,000 dollars.

35 OREGON

CRZ005 Jackson County	29	1500 PST			0	2	0	0	Lightning
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Thunderstorms moved through southwest Oregon during this afternoon. Lightning struck 2 men while they were pouring cement in Ashland. They were both knocked to the ground with a strong shock but survived with only minor injuries.

36 PENNSYLVANIA, Eastern

Montgomery County	20	0700EST			0	0	3	?	Flood
	20	1400EST			0	0	3	?	Flood
	20	1730EST			0	0	4	?	Flood

Heavy rain on the 19th and 20th produced 4 to 6 inches in fall amounts. Widespread urban and small stream flooding resulted. Many roadways and basements were flooded, and vehicles were stranded in the water. At least one vehicle was washed off a road and into a drainage ditch. The Perkiomen Creek reached the flood stage of 11 feet at Graterford at around 1730 EST. The East Branch of the Perkiomen Creek reached a stage of 11 feet, surpassing the flood stage of 10.6 feet. The flooding occurred between 0700 and 0930 EST, between 1400 and 1630 EST and between 1730 and 2000 EST. One man drowned when he inadvertently walked into a flooded drainage ditch that was hidden under the water. This death has not been attributed to the flooding.

PENNSYLVANIA, Eastern

Bucks County	20	0715EST			0	0	6	?	Flood
	20	1400EST			0	0	3	?	Flood

Heavy rain on the 19th and 20th produced 4 to 6 inches in fall amounts. Widespread urban and small stream flooding resulted. The area suffering the worst effects of the flooding was from the Sellersville-Perkasie area northeast to the Tinicum area along the Delaware River. Nearly all of the small streams flooded. In Tinicum Township at Smithtown, water overflowed the towpath on the Delaware Canal and washed out a huge hole. The resulting outflow from the canal flooded houses and other buildings, and damaged roadways and bridges. Several dozen families had to be evacuated in the Smithtown and Perkasie areas. An 11 year old boy drowned after being swept through a large drainage pipe as he and his friends were playing in a flooded drainage basin. This death has not been attributed to the flooding. The flooding occurred between 0715 and 1015 EST and between 1400 and 2000 EST.

Chester County	20	1700EST			0	0	3	?	Flood
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Heavy rains of 3 to 5 inches on the 19th and 20th caused flooding along the Brandywine Creek. A number of roads along the creek were flooded. The flooding occurred between 1700 and 2000 EST.

Perry County, Millerstown	22	2130EST			1	0	4	?	High Wind
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High winds brought down two large trees on top of an automobile, killing the woman driver. F60V

36 PENNSYLVANIA, Western

Fayette County 10NW Uniontown	16	2214EST			0	0	0	0	Flash Flood
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Basement flooding occurred in northwest Fayette County near Republic.

Fayette County 6W Uniontown	16	2214EST			0	0	0	0	Flash Flood
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Mud slides occurred on Route 166 near Republic. Redstone Creek went out of its banks in western Fayette County.

Fayette County	22	1530EST			0	0	0	0	High Wind
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Winds associated with the remnants of Hurricane HUGO downed trees and power lines.

Westmoreland County Latrobe	22	1547EST			0	0	0	0	High Wind
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Trees were downed in Latrobe.

Somerset County 20SW Somerset	22	1645EST			0	0	0	0	High Wind
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Trees were downed in Confluence.

Butler County 15SW Butler	22	1721EST			0	0	0	0	High Wind
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Trees were downed in Cranberry and Penn townships.

Cambria County Johnstown	22	1800EST			0	0	0	0	High Wind
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The Johnstown Flight Service Station reported a wind gust to 55 mph.

Beaver County 6W Beaver	22	1828EST			0	0	0	0	High Wind
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A sustained wind of 40 mph was observed at Industry.

Indiana County 6S Indiana and 16S Indiana	22	1830EST			0	0	0	0	High Wind
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Trees were downed in Hower City and Blairville.

Fayette County 13NW Uniontown	22	1845EST			0	0	0	0	High Wind
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Winds were estimated at 60 mph by a skywarn spotter at Brownsville.

Westmoreland County 13NW Greensburg	22	1950EST			0	0	0	0	High Wind
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Trees and power lines were downed at Murraysville.

Jefferson County Brookville	22	2000EST			0	0	0	0	High Wind
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Trees were downed in Brookville.

Blair County Altoona and 15N Altoona	22	2130EST			0	0	0	0	High Wind
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Trees and power lines were downed in Altoona and Tyrone.

Indiana County 2E Indiana	23	0000EST			0	0	0	0	High Wind
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A peak wind of 73 mph was observed at Jimmy Stewart Airport.

McKean County 11SW Smethport	23	0730EST			0	0	0	0	High Wind
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Trees were downed in Mt. Jewett.

Cameron County Emporium	23	0730EST			0	0	0	0	High Wind
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Trees were downed in Emporium.

Warren County 7N Warren	23	0730EST			0	0	0	0	High Wind
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Trees were downed in Russell.

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

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					KILLED	INJURED	PROPERTY	CROPS	

37 RHODE ISLAND									
RIZALL Statewide	22-23	2100EST-0800EST			0	0	4	0	High Winds
<p>A period of strong and gusty winds occurred across the state as remnants of Hurricane HUGO moved northward across western Pennsylvania and New York. Scattered power outages and minor property damage were reported as a result of the winds which gusted at 40 to 50 mph.</p>									
Providence County Cranston	23	1530EST-1545EST			0	3	5	0	TSTM Winds (80)
<p>A thunderstorm downburst wind with very brief gusts to near 100 mph caused considerable property damage to a neighborhood in Cranston. Up to 300 trees were destroyed and a number of homes were damaged. The force of the wind was determined after National Weather Service investigation. Only three minor injuries were reported.</p>									
Kent County Coventry	23	1545EST-1600EST			0	0	0	0	TSTM Winds (70)
<p>Thunderstorm winds struck a small area in Coventry, leveling a stand of trees.</p>									
RI2002	23	1630EST			0	0	0	0	Waterspout
<p>A waterspout was sighted in Newport Harbor by the U.S. Coast Guard. The diameter was estimated to be about 15 feet and the height, 25 to 35 feet. Its movement was slow toward the south.</p>									

38 SOUTH CAROLINA									
Sumter County, Sumter	02 PM				0	0	3	0	Urban Flooding
<p>A thunderstorm knocked out power to up to 7,000 customers, and flooded streets in and around Sumter. Lightning started several house fires.</p>									
Beaufort County, Beaufort	03	0107EST			0	0	3	0	Lightning
<p>Lightning started an apartment fire.</p>									
Charleston County, North Charleston	05	1100EST			0	0	3	0	Urban Flooding
Berkeley County, Goose Creek	05	1100EST			0	0	3	0	Urban Flooding
<p>A late morning thunderstorm dumped 2.5 inches of rain at the Charleston WSO (airport) in 3 hours, causing urban flooding in North Charleston and Goose Creek.</p>									
Lancaster County, countywide	12 PM				0	0	3	0	Lightning
<p>Lightning disrupted telephone and electric service to scattered areas across the county.</p>									
Aiken County, Aiken	12	1900EST			0	0	4	0	Lightning & Urban Flooding
<p>A thunderstorm caused urban flooding of up to a foot deep, and scattered power outages.</p>									
Oconee County, Seneca	12	2100EST			0	0	?	?	Lightning
<p>Slow-moving thunderstorms caused intense lightning. There were numerous power outages around the area.</p>									
Charleston County, Johns Island	16	1300EST			0	0	3	0	Lightning
Charleston	16	1330EST			0	0	3	0	Urban Flooding
<p>At Johns Island, lightning struck a house, blowing a hole between 3 and 5 feet square through the sheetrock of one wall. Also, at Johns Island, lightning struck the antenna of the fire department radio transmitter. Some areas of the city of Charleston got flooded.</p>									
Horry County, eastern portions	16	1430EST			0	0	4	0	Lightning & Urban Flooding
<p>Thunderstorms dumping more than two inches of rain in one hour at the Myrtle Beach Air Force Base caused power outages and street flooding.</p>									

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					KILLED	INJURED	PROPERTY	CROPS	

— SOUTH CAROLINA									
Georgetown County, Sarpit	20	0350EST			0	0	4	0	Tsta. Winds
<p>Thunderstorm winds damaged the back of one house and felled several trees:</p>									
SCZ002-003-004-005-006-007-008	21-22								Hurricane Hugo
<p>Foot hills, Piedmont Midlands & Coast</p> <p>Ample warning from the National Weather Service, along with swift intergovernmental action, may have saved thousands of lives in South Carolina. After developing in the far eastern Atlantic and devastating the U.S. and British Virgin Islands, along with Puerto Rico, Hurricane Hugo (Category 4) made landfall near Sullivan's Island at 2300EST on the 21st. The hurricane caused 13 directly-related deaths, 22 indirectly-related deaths, injured 420, and caused approximately \$8 billion in total damage, including \$2 billion in crop damage.</p> <p>It was moving northwest at 25 miles per hour when it made landfall. At landfall, estimated minimum central pressure was 934 mb (27.58 inches). Minimum central pressure recorded at the Charleston Airport WSO was 943.2 mb (27.85 inches) at 2322EST on the 21st.</p> <p>The estimated maximum sustained wind at landfall was 138 mph. The highest sustained wind recorded in the storm was 85 mph at Folly Beach at 2300EST. The WSO at Charleston International Airport recorded sustained winds of 78 mph. The western portion of the eye passed directly over the Charleston WSO at 0003EST on the 22nd. Gusts reached 98 mph at Charleston WSO at 2359EST on the 21st, 109 mph at Shaw AFB in Sumter County, 70 mph at the Columbia WSO, and 79 mph at 0040EST on the 22nd at the Myrtle Beach AFB in Horry County.</p> <p>The eye of the hurricane exited South Carolina at approximately 0500 EST on the 22nd after creating havoc throughout the eastern half of the state.</p> <p>The highest storm surge occurred in the McClellanville - Bulls Bay area of Charleston County. The maximum storm surge was 20.2 MGD at Seewee Bay, south of McClellanville. Shrimp boats were found one-half mile inland at McClellanville. At Lincoln High School, in McClellanville, the storm surge flooded the building where residents had sought shelter. At the Isle of Palms (Charleston County), many structures were destroyed, and the swing bridge linking the island to the mainland was destroyed. Also at the Isle of Palms, boats that were harbored at a marina on the mainland side of the island were piled in a heap on the mainland shore. At Sullivan's Island, many beachfront homes were destroyed inland up to the second and third rows. The damage at Sullivan's Island and the Isle of Palms was estimated near \$270 million.</p> <p>Property damage was extensive in the following counties: Berkeley, Calhoun, Charleston, Clarendon, Darlington, Georgetown, Horry, Kershaw, Lancaster, Lee, Orangeburg, Richland, Sumter, Williamsburg, and York. There were areas of extensive localized damage outside of these counties. Most of the wind damage associated with the hurricane was straight-line wind damage done to pine trees. There were large groves of pine forest that were utterly devastated from the winds, especially along the path of the eye. Many structures inland were destroyed or damaged as a result of hurricane force winds. There was substantial damage to the cotton crop caused by rains and high winds. The areas in or near the path of the eye were without power or water for up to several weeks after the storm. More than one third of the timber was twisted, broken and flat on the ground. All coastal state parks except Hunting Island and Edisto were substantially damaged.</p> <p>Damage was not as severe in northwestern South Carolina as in the remainder of the state. Cherokee County was the hardest hit in that area, with property damage estimated a bit below \$100,000. There was widespread damage to timber, and some agricultural losses in northwestern South Carolina. Union, Laurens, and Spartanburg counties received scattered, but rather substantial damage, mostly in the form of fallen trees. One home in Spartanburg County lost its roof because of high winds. West of Spartanburg County, damage was scattered and light, mostly a few fallen trees. There were scattered power outages into the 23rd of the month in northwest South Carolina. There were no confirmed tornadoes in northwest South Carolina.</p> <p>The times listed in the county by county damages that follow this summary reflect the approximate times of the eye's passage over or near the county. The coast experienced tropical storm force winds beginning at approximately 2000EST on the 21st, and hurricane force winds at approximately 2200EST on the 21st. Inland areas experienced at least gale force wind gusts for as much 12 hours during the event. The wind field surrounding the hurricane caused extensive damage both ahead and behind the eye, in time as well as distance.</p>									

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PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
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Beaufort County, countywide coastal sections	21	2200EST				0	0	7	4	Hurricane
	21	2200EST				0	0	7	4	Coastal Flooding

Heavy winds from the storm caused a disalignment and a small crack in the Battery Creek bridge connecting Parris Island with the mainland. There was scattered coastal flooding, and minor beach erosion. There was also scattered minor damage to structures.

Colleton County, Northwest portion	21	2200EST				0	0	5	7	Hurricane
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Approximately 75 residences received damage with a total value of \$120,000 to \$150,000. Only two or three homes were destroyed. Crop damage was estimated at \$30,000, and timber damage around \$7 million. Much of the county's damage was in the rural northwestern tip of the county, primarily between Cottageville and SC Hwy. 61. Around 30,000 people were left without electricity because of the storm.

Charleston County, countywide - North coast up to 10 miles inland	21	2200EST				2	0	9	8	Hurricane
	21	2340EST				1	0	9	6	Storm Surge

The center of the hurricane passed directly over the Mount Pleasant - Isle of Palms - Sullivan's Island - Bulls Bay area at near 2300EST. A woman drowned at Mount Pleasant, in her mobile home in the Copahese subdivision, when the Cooper River, about 200 yards away, overflowed its banks with the storm surge. In Charleston, one man was killed when a tree fell on his house. Also in Charleston, a man was killed when his home collapsed on him. An indirect death occurred to a 57 year old man when a chainsaw cut his throat while clearing debris. The storm surge went up the Cooper, Ashley and Santee rivers, and inundated much of the low-lying areas more than 10 miles upriver. The Cathedral of St. Luke and St. Paul, built c. 1811, probably was the most heavily damaged historic building, sustaining damage to 80 percent of its roof. Many of the historic structures on the peninsula survived the storm, while newer structures were heavily damaged. Many trees on Wadmalaw and Johns islands crushed homes they fell on. The 300 year old Angel Oak tree on Johns Island sustained only slight damage to its limbs. An estimated 15,000 to 20,000 people were left homeless in the county as a result of the storm. At Mount Pleasant, there was widespread devastation associated with the winds and storm surge. On all the barrier islands, many of the newer structures were demolished completely or left unsalvageable. Many shrimp boats were brought inland as a result of the storm surge throughout the northern portions of the county. Numerous shrimp boats docked at Swan Creek in Mount Pleasant, sank. Boats at Toler's Cove, also in Mount Pleasant, sustained heavy damage; one of them was found on top of the guard house. Approximately 700 to 800 boats were left in poor to unsalvageable condition. The Francis Marion National Forest sustained damage to 70 percent of the trees more than 10 inches in diameter. Many trees were snapped like toothpicks 8 to 10 feet above the ground. The storm blew down trees valued at up to \$115 million in the forest. The salvaged timber, worth about \$12 million, was five times the normal annual harvest because of the millions of dollars of timber rotting in the forest. At least three holes twelve feet in diameter in the Patriot's Point hotel roof were caused by the hurricane. The Ben Sawyer Bridge connecting Mount Pleasant to Sullivan's Island was bent and twisted, leaving one end of the span sticking almost straight up in the air. It was temporarily replaced with a pontoon bridge. At Bulls Bay, near the maximum of the storm surge, two well-built houses were swept into the Intracoastal Waterway without a trace. Many schools and large buildings had roof damage. The Charleston harbor was closed for several days following the storm, as all aids to navigation were destroyed by the storm surge. In Harleyville, damage was estimated at \$250,000. The Cape Romain National Wildlife Refuge lost buildings and animal life. Many of the animals there were endangered species. The Charleston Naval Weapons Station sustained damages estimated from \$95 million to \$100 million. Damages to schools in the county were estimated at \$50 million. Storm Surge F60M. Hurricane M67F, M55P. Indirect M57O.

Horry County, countywide - Coast and up to 3 miles inland	22	0000EST				0	0	9	7	Hurricane
	22	0025EST				0	0	8	3	Storm Surge

There was one indirect death associated with the storm. A seven year old girl was killed when a fire that was started by a candle engulfed the mobile home she was in. Total destruction in the county amounted to about \$944 million. At Garden City in southern Horry County, the storm surge eroded a large amount of beach to the front row of houses. There were bent power poles along the front beach. The oceanfront road was traversable only with four-wheel drive vehicles as it had sand at least two feet thick in places. Landward of the causeway at Garden City, mobile homes in a trailer park had walls and roofs caved in. Also at Garden City, two cottages ended up in the creek. Damage at Garden City was estimated at nearly \$169 million. At Murrells Inlet, there were many downed trees and a number of damaged homes and businesses. A sailboat and motorboat washed up near the Murrells Inlet Boat Landing. In Conway, many trees fell on houses. The roof at Pleasant Hill High School auditorium was blown off. The control tower at the Myrtle Beach AFB was damaged by winds, causing rain to pour onto computers and other equipment. There was about \$2 million worth of damage to

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buildings and equipment at the base. The pier at Sunset Beach was heavily damaged, leaving only columns as a remainder of its existence. The pier at Surfside Beach was reduced to 100 feet long from 800 feet. The Springmaid Pier at Myrtle Beach was utterly destroyed, as was the pier at the Kingfisher Inn in Garden City. Beach erosion was severe in Myrtle Beach and North Myrtle Beach. Inland sections of Horry county lost trees and street signs, but no major damage was reported. In Cherry Grove, there was as much as 5 feet of sand on the roads. Picnic tables, cabinets, chairs, benches, roof materials and decks littered Heritage Shores, an island across from Cherry Grove at about 53rd Avenue North. Parts of the beach at Ocean Drive in North Myrtle Beach were eroded as much as 5 feet. Wooden decks at the North Myrtle Beach city park on First Avenue South were knocked loose by waves. The beach, which once met the park's concrete deck, was 5 feet below the deck. In Crescent Beach and Windy Hill, many pools and much oceanfront property were destroyed, and the beach was eroded. F07M.

Georgetown County, countywide - Coast and up to 5 miles inland	22	0000EST				0	0	9	8	Hurricane
	22	0055EST				0	0	8	4	Storm Surge

There was one indirect death. A 65 year old woman died from smoke inhalation in a house fire caused by candles. The storm surge traveled up the Waccamaw and Pee Dee rivers, inundating low-lying places beyond 5 miles inland. At Garden City, damage was estimated at \$36 million; at Pawleys Island \$17 million; and at Deboardie, \$4 million plus \$2.5 million to the water and sewer plant. The city of Georgetown had estimated losses of \$7.25 million, most of which occurred on the waterfront. The biggest loss was to agriculture, most of that in timber \$67 million. One hundred fifty houses were destroyed, 350 suffered major damage and 500 sustained minor damage, with dollar losses estimated at \$87,345,838. In addition, 10 mobile homes were destroyed, 25 had major damage, and 100 had minor damage, with losses of \$250,000. Fifty businesses received major damage and 100 minor damage, for a total of \$5 million. Also, 375 homes and 25 mobile homes on farms were damaged or destroyed, for a total of \$5 million. Other farm building losses totaled \$3 million. Seven industrial plants were damaged at a cost of \$1 million. Eighty thousand dollars damage was done to shrimp and other aquaculture operations. Pawleys Island sustained extensive storm surge damage as only a few of the beachfront houses remained intact after the hurricane. Homes were stacked up against each other, and many streets on the south end of Pawleys Island were clogged with the remains of homes. Approximately half the houses at Pawleys Island were either destroyed or left uninhabitable. The hurricane cut a new inlet at Pawleys, through a house, leaving the house under water. The roof of the Georgetown National Guard Armory was blown off. Throughout the county, hurricane force winds damaged homes and fell trees. At Murrells Inlet there were many downed trees and a number of damaged businesses and homes. F65O.

Dorchester County, countywide	22	0030EST				0	12	8	8	Hurricane
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There were five indirect deaths associated with the storm. All were in good health, and suffered heart attacks after reviewing property loss following the storm. The ages ranged from 48 years to 87 years. Preliminary estimates of storm damage are 15 permanent homes, 81 mobile homes, 5 apartment buildings destroyed; 5,066 permanent homes, four apartments, 1,070 mobile homes damaged; and 20 businesses affected. The estimated dollar value of damages is as follows: residential \$301 million, commercial \$16 million, timber \$65 million. St. Luke's Lutheran Church in Summerville had part of its roof destroyed from falling trees and limbs. The Francis Willis SPCA had standing sewage in the kennels, and the grounds were strewn with trees. A large portion of the trees in Summerville were damaged. F77O, F69O, M87O, M86O, M48O.

Berkeley County, countywide	22	0030EST				6	8	8	9	Hurricane
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Five people came up the Santee River from the coast and drowned when their boats capsized. A mobile home crushed a woman who had sought refuge outside behind a car. There were 2 indirect deaths. An eight year old boy was killed when a limb fell on him during cleanup efforts, and a 64 year old man died of a heart attack after examining property damage. Preliminary estimates of the damage in the county are \$3.4 million to residences, commercial property and mobile homes. The eye of the storm passed over the Santee-Cooper Lakes in the hour of 0015EST to 0115EST. The Francis Marion Forest destruction is described under Charleston County's narrative. Virtually all of St. Stephen's homes and business sustained damage, and about half of the residences are unsalvageable. The South Carolina Public Service Authority (Santee Cooper) had virtually all of their transmission towers bent or snapped when the eyewall went over Lake Marion. The post office in Moncks Corner had many windows blown in and part of the roof blown off. An estimated 1,500 people were left homeless in St. Stephen. Hurricane M300, M590, M580, M080, F410, F410. Indirect M080, M640.

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PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	

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Ramburg County, countywide	22 0030EST								0 0 4 3	Hurricane
<p>Less than \$6,000 in damage was done in the county, including that to property and crops. Some trees were down and one mobile home was damaged. About 85 percent of the residents were without power.</p>										
Orangeburg County, eastern portions	22 0100EST								1 20 7 7	Hurricane
<p>At Birtsville, a man was killed when his mobile home rolled on top of him. There were four indirect deaths associated with the storm. Three people were killed in a mobile home fire that was started by a candle. One person was electrocuted during cleanup efforts. Preliminary damage estimates are: 74 permanent structures destroyed, 359 mobile homes destroyed; 3,640 permanent structures damaged, 177 mobile homes damaged. A total of \$31 million in damage to property was done, including \$25 million to residences alone. Agricultural losses were: 500 acres of pecans lost, 80,000 acres of soybeans lost, 500 acres of truck crops lost, 11,000 acres of cotton lost, \$19 million in timber losses. The eastern half of the county suffered the worst damage, as the eye of the storm went over Lake Marion during the hour of 0030-0130 EST. Thousands of pin oaks and pine trees were either snapped off or uprooted. The roof of the Days Inn hotel at Santee was heavily damaged. Eighty-five percent of the residents lost power during the storm. Whole peach orchards were flattened by the storm, and cotton fields were devastated as 95 percent of the crop was lost. At least 12 homes were destroyed. Hurricane M69M. Indirect F21M, F03M, M01M.</p>										
Calhoun County, countywide	22 0130EST								0 0 7 7	Hurricane
<p>There was one indirect death. A 27 year old woman was trapped under a tree and was asphyxiated. The county's crops, including cotton, corn and soybeans, sustained \$13 million in damage. An estimated \$7 million to \$8 million property damage occurred throughout the county. One third of the pecans trees were felled and pecans from other trees were strewn on the ground. The Stump Hole area with Cameron, Lone Star and St. Matthews was hit hard. Approximately 7,800 people were left without power immediately after the storm. Debris clogged roads throughout the county. Houses suffered extensive damage, including several struck by falling trees. Mobile homes sustained the most damage. A few businesses in St. Matthews had their windows broken. Fallen trees blocked many roads. Power lines were down throughout the county. F270.</p>										
Clarendon County, countywide	22 0130EST								0 2 8 8	Hurricane
<p>There were three indirect deaths that occurred when a 36 year old woman and her two children, ages 6 and 2, died from smoke inhalation as a result of a candle fire in their home. Preliminary estimated damage was set at \$367 million including at least \$78 million to timber. There was much widespread damage associated with the passage of the eyewall over the county during the hour of 0100-0200 EST. East of Turbeville, hurricane force winds flipped over a squad car, injuring a police officer. South of Turbeville, trees fell on a squad car, but did not injure the officer, although he was trapped. Eighty-five percent of the structures in the county received damage; 40 percent were destroyed. Three fire stations, the county courthouse, the county police station and a National Guard Armory received damage. Virtually every road in the county was blocked by fallen trees. It was estimated that 87 percent of the trees fell. Seventy percent of the county's residents were left without power. F36P, M02P, M06P.</p>										
Florence County, countywide	22 0130EST								0 0 8 8	Hurricane
<p>It is estimated that the total damage would exceed \$200 million from property and agriculture losses, including \$71 million in timber damage. At the intersection of I-95 and US Hwy. 52, hurricane force winds blew the roof off of a motel, sending it crashing into the parking lot, damaging many vehicles. Many parts of the roof became projectiles and damaged a hotel roof next to the property. There were many trees and power lines down as a result of the storm. There was extensive damage at Johnsville and Republic. A hangar at the Florence Regional Airport, on US Hwy. 301 South, and a terminal's roof were damaged. Also, a number of airplanes were damaged. There was also roof damage to the South Florence High School. Downtown Florence was littered with shingles, swings, aluminum siding, destroyed plastic signs and fallen trees. Many tobacco warehouses were flattened.</p>										
Sumter County, SC 441 & US 378 intersection	22 0130EST	1.25	165	0	0	6	0			Tornado (F1)
<p>A tornado, moving from northeast to southwest, flipped over several trailers, skipped one-half mile, then ripped off the roof of a day care center and proceeded into a grove of trees and dissipated. It caused an estimated \$500,000 in damage.</p>										

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Williamsburg County, countywide	22 0130EST									0 0 8 8	Hurricane
<p>An indirect death occurred when a man, aged 55 years, stepped on a live wire after the storm's passage. Preliminary estimates of storm damage are 61 permanent homes and 178 mobile homes destroyed; 1,538 permanent homes, four apartments, and 317 mobile homes damaged; and 98 businesses and 69 public buildings affected. The estimated dollar value of damages is as follows: residential \$50 million, county buildings and roads \$2.07 million, Towns of Greeleyville, Lane, Hemingway and Kingstree \$1.5 million, schools and colleges \$5.5 million, power companies \$14 million, timber \$232.5 million (on 390,000 acres), crops \$12.4 million, and farm buildings and farm equipment \$5 million, for a total of approximately \$323 million. The Carolina and Fair Deal warehouses were damaged, as was the GoldKist fertilizer plant, which had a wall blown out by the high winds at Kingstree. There was also damage to the roofs of the City Hall and Williamsburg County complexes. Most of the damage in Kingstree was downtown. M550.</p>											
Marion County, countywide	22 0145EST								0 0 5 7	Hurricane	
<p>Most of the damage (\$40 million) was confined to timber in the lower part of the county. In the city of Marion, windows on Main Street were blown out, and the courthouse, county museum and council on aging buildings were damaged. The entire county lost power as a result of the storm.</p>											
Lancaster County, Kershaw	22 0145EST	0.75	150	0	0	3	3			Tornado (F1)	
<p>A tornado, moving from northeast to southwest, caused damage to a grove of trees.</p>											
Dillon County, countywide	22 0200EST								0 0 7 7	Hurricane	
<p>One indirect death occurred when a 76 year old man was burned in a house fire started by a candle. Preliminary damage estimates are \$6 million for crops and \$3.9 million for property. There was scattered damage to structures. Many trees were uprooted and branches broken off as a result of the winds. M76P.</p>											
Marlboro County, countywide	22 0200EST								0 0 7 6	Hurricane	
Marlboro County, countywide	22 0200EST								0 0 3 8	Heavy Rain	
<p>Timber losses were estimated at \$2.2 million. Total damage throughout the county was estimated at \$9.5 million. 447 homes were damaged and two small houses were destroyed in the county. About 50 percent of the defoliated cotton and up to 30 percent of the late cotton was damaged. Other crops that were damaged included tobacco and corn still in the field and pecans. The Williams Hotel on U.S. Hwy. 15 in Bennettsville suffered substantial damage, as the roof of a large section of the motel was destroyed by the hurricane. Many trees were uprooted and/or snapped throughout the county. At the McAlpine Stadium, at Marlboro County High School in Bennettsville, winds bent the goalposts of the football field. Many signs and windows throughout the county were damaged.</p>											
Sumter County, countywide	22 0200EST								1 328 8 8	Hurricane	
<p>An infant boy suffocated as a result of damage to the mobile home he was in. There was one indirect death when a man, aged 22 years, was electrocuted while attempting to rewire his house following the storm. It has been estimated that the county sustained \$400 million in storm-related damage including substantial timber loss. Sixteen houses and 150 mobile homes were destroyed and 793 homes and 113 mobile homes suffered major damage. Forty-four businesses in the county were destroyed, 585 had minor damage and 60 had major damage. There was much widespread damage throughout the county. Many people were left without communications, power and water for up to several weeks following the storm. At the Manchester State Forest, on SC Hwy. 261 south of Wedgefield, many trees were snapped 8 to 12 feet above the ground. Witnesses in Wedgefield stated that the wind calmed down substantially around 0230EST, and picked up again at around 0300EST. The city of Sumter was devastated by the storm as the eye passed just to the west. At Shaw AFB, many trees were felled. An entire wall of the First Presbyterian Church of Sumter was ripped away during the storm. Hurricane M01M. Indirect M220.</p>											
Lee County, countywide	22 0200EST								1 20 8 8	Hurricane	
Lee County, countywide	22 0200EST								0 0 6 7	Heavy Rain	
<p>A man was killed when his mobile home was crushed by the force of the wind. The preliminary estimate of damage is \$91,713,830. Included in that is \$13 million in crops and \$40 million in timber. More than 1,100 single-family homes and mobile homes in the county were destroyed or had major damage. Approximately 1,700 homes sustained minor damage. Trees, crops and mobile homes took the brunt of the winds. Many power lines were down as a result of the winds and trees. Power poles throughout the county were snapped. The entire county was without power for several days. M32M.</p>											

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					KILLED	INURED	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INURED	PROPERTY	CROPS	

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Darlinton County, countywide	22	0200EST								Hurricane
<p>The total loss was estimated at approximately \$95 million, including at least \$20 million in timber. More than 125 homes were totally destroyed, 379 suffered major damage and 2,270 sustained minor damage as a result of the winds. Many of the trees in Hartsville were damaged, as were road signs throughout the county. Five miles north of Kellytown, two trailers were completely destroyed. In Kellytown, many trees were downed at the South Hartsville School. Crop losses of \$5.6 million were sustained, as the wind and rain destroyed much of the county's cotton crop. Many telephone/power poles were snapped off halfway up throughout the county.</p>										
Richland County, countywide	22	0215EST								Hurricane
<p>A man was killed when a tree fell on the car he was driving in during the storm. Total estimates of damage were \$50 million to \$60 million. Of that, \$23 million was crop and timber losses. The lower part of the county bore the brunt of the storm. Eastover, Hopkins and Gadsden, and the northeast area of Columbia were among the hardest hit. Numerous power lines had trees fall on them in the eastern portion. Western portions of the county sustained minor to moderate damage. More than 150,000 people were without power as a result of the storm. M307.</p>										
Lexington County, eastern portions	22	0230EST								Hurricane
<p>A minimal amount of damage occurred in the county.</p>										
Kershaw County, countywide	22	0300EST								Hurricane
<p>Preliminary estimates of damage are \$35 million in residential and commercial buildings, \$25 million for mobile homes, \$8.1 million for government buildings including schools, and \$5 million for non-profit buildings. Timber damage was estimated at \$30 million. Industrial loss was estimated at \$18 million. A gymnasium roof collapsed at Camden where 160 had sought shelter. No injuries were reported. At the DuPont plant in Lugoff, there were at least 7 wind gusts in excess of 100 mph at the top of the plant's water tower. A complete cooling tower was thrown from the roof of the plant during the storm. There were many trees down and broken around the DuPont property. There was damage to a shopping center at the intersection of US Hwy. 1 and SC Hwy. 34, where a portion of the roof was lifted off the structure. There were numerous trees downed in and around Lugoff. The eye passed over Camden, and caused widespread damage in the city of Camden. The Camden High School had damage to 2 of the football field lights which were bent over backwards and kinked. The worst damage in and around the city of Camden was located from along US Hwy. 601 to SC Hwy. 97. The Robert Mills courthouse on South Broad Street in Camden sustained heavy damage to the front portion of the roof. There was damage along the road between Hartsville and Camden, where several farm buildings had their roofs peeled off and telephone poles were snapped in half. An estimated \$1.5 million dollars worth of damage was done to city of Camden property. Seventy-five percent of the cotton was destroyed. Along Lake Wateree, there was damage to structures, boats, trees and docks.</p>										
Chesterfield County, countywide	22	0300EST								Hurricane
<p>Total damage was estimated near \$27 million, with \$18 million worth being timber damage. Many limbs fell in Cheraw, in the area in and around the intersection of Kershaw and Ruger streets. Several trailers were flipped west of Mt. Croghan. At Ruby, several trees were downed along SC Hwy. 9 near the cemetery. West of Chesterfield, several signs were blown down and the steeple of a church was bent, and a concrete block structure was destroyed. At the Lynches River bridge for Highway 601, several farm buildings had the tin peeled off their roofs. About 400 families were left homeless in the storm's wake. Twenty single-family homes and 39 mobile homes were destroyed. Another 265 homes and 74 mobile homes are uninhabitable because of major damage. A total of 2,041 homes received some damage, with repair costs estimated at \$3.5 million. The worst hit communities were Pegeland, McBee and Jefferson.</p>										
Fairfield County, eastern portions	22	0300EST								Hurricane
<p>Most of the damage occurred along Lake Wateree, to structures, boats, trees and docks. There was some loss in timber, but not as much as counties further south and east. Nearly all of the houses near the lake were damaged. Ridgeway sustained heavy damage also. At least 30 mobile homes were damaged by trees or winds.</p>										
Chester County, countywide	22	0400EST								Hurricane
<p>Most of the damage was concentrated in Great Falls and Fort Lawn. Great Falls sustained damage from falling trees. No mobile homes were blown over by the storm. Power outages affected some 20,000 residents of the county. In Richburg, the scoreboard at Lewisville High School Stadium was destroyed.</p>										

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Lancaster County, countywide	22	0400EST								Hurricane
<p>It was estimated that Duke Power lost \$50 million to \$100 million. It was also estimated that 40 percent of the forest in the county, worth \$48 million, was affected. Another \$24 million worth of property damage occurred in the storm. The hurricane knocked out power to 48,000 residents. In the town of Kershaw there was much building damage, as winds lifted the roofs off of a furniture store and auto parts store. The town fire station sustained damage to its roof, which had tin peeled back from it.</p>										
Greenville County, countywide	22	0400EST								Hurricane
<p>Winds toppled trees onto power poles, leaving 15,000 customers out of electricity for several hours.</p>										
Spartanburg County, countywide	22	0400EST								Hurricane
<p>Winds toppled trees onto power poles, leaving 5,000 customers out of electricity for several hours. A house had its roof blown off.</p>										
Laurens County, eastern portions	22	0400EST								Hurricane
<p>There were scattered areas that had fallen trees in the county.</p>										
Union County, countywide	22	0400EST								Hurricane
<p>High winds uprooted 30-40 trees throughout the county; some fell onto power lines and/or blocked streets.</p>										
York County, countywide	22	0400EST								Hurricane
<p>There was one indirect death. A 56 year old utility worker was electrocuted during cleanup efforts. Total property damage was estimated at \$11 million. There was approximately \$7 million in damage to timber. Softball complexes, high school fields and other sports facilities sustained damage during the storm. Damage to Fort Mill was estimated between \$360,000 and \$500,000. Damage to schools throughout the county was estimated at \$435,000 to \$500,000. A 200 year old oak tree measuring 6 feet in diameter at the base, fell during the storm in Fort Mill Township. In Rock Hill alone, damages were estimated at \$8 million. In Rock Hill, the winds were strong enough to bend steel beams in half. At Lake Wylie, the Tege Cay Marina broke into four parts and floated nearly two miles to Big Allison Creek, and more than 100 boats were reported damaged. The Commodore Yacht Club, near the Catawba Nuclear Station, sustained damage to 20 boats. At the River Hills subdivision, approximately six homes were destroyed and most of the roads were closed. At Lake Wylie, near Kingfisher Cove, a sailboat was blown out of the water and into some trees. In Tege Cay, it is estimated that 35,000 trees were damaged or destroyed. On the campus of Winthrop College, 30 trees were uprooted, and several buildings received structural damage. It was estimated that repairs to the campus will cost \$300,000. M560.</p>										
Cherokee County, eastern portions	22	0400EST								Hurricane
<p>Five to six thousand trees fell throughout the eastern portions of the county. There were scattered power outages.</p>										
Charleston County, Dewees Island Awendaw	25	1007EST								Tyfa Winds
	25	PM								Urban Flooding
<p>At Dewees Island, a severe thunderstorm moving about 40 mph caused additional damage to an area already devastated by the hurricane. Heavy rains caused urban flooding in parts of Awendaw.</p>										

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS				ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	PROPERTY	CROPS	

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS				ESTIMATED DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	PROPERTY	CROPS	

39 SOUTH DAKOTA											
SD2002 Northwestern South Dakota	02-03	1120 to 0300 MST			0	0	0	0	0	0	High Wind
Strong northwest winds occurred across northwest South Dakota during the late evening of the 2nd. The winds at Buffalo reached 47 mph with gusts to 62 mph at around 2300 MST and then gradually decreased through the night.											
Hamlin County, Castlewood	03	2150 CST			0	0	0	0	0	0	TSTM Wind (70)
Hamlin County, 2NE Castlewood	03	2210 CST			0	0	0	0	0	0	TSTM Wind (70)
Deuel County, SE Clear Lake	03	2305 CST			0	0	?	?	?	?	Hail (1.75)
Hail struck an area south of Clear Lake, causing considerable damage to crops, stripping leaves from trees, and damaging siding and breaking windows on houses.											
SD2001-002-006-008-009-013-014 Western One-Third of South Dakota	05-06	1915 to 0200 MST			0	0	0	0	0	0	High Wind
Strong winds associated with a cold front moved into western South Dakota at around 2200 MST. The winds gusted up to 54 mph at Buffalo, 48 mph at the Rapid City Regional Airport, and 46 mph at Ellsworth Air Force Base near Rapid City before subsiding at around 0100 MST.											
Central and Eastern Custer County	07	0145 to 0530 MST			0	0	?	?	?	?	Flash Flood
Thunderstorms developed over the southern Black Hills of southwest South Dakota at around 2300 MST of the 6th and produced very heavy rain over parts of central Custer County. By 0030 MST of the 7th, very heavy rain had spread into eastern Custer County, with the heaviest rain occurring at Custer State Park. At 0145 MST flash flooding was reported along the Grace Coolidge Creek at the Custer State Park Headquarters where floodwaters were running over the banks. The flood event continued until approximately 0300 MST before waters receded and flooding was no longer a threat. Most rainfall reports from central and eastern Custer County were between one-half and one inch in amount. However, estimated reports from Mt. Coolidge Fire Lookout, located west of the park headquarters, indicated that up to 5 inches of rain may have fallen in that area. Persons in cabins along Grace Coolidge Creek were temporarily evacuated and the road leading east of the park was closed for a period of time. There was no loss of life and no injuries, and property damage was minimal.											
Minnehaha County, Sioux Falls	07	0918 CST			0	0	?	?	?	?	Lightning
Lightning brought down power lines and damaged six transformers, leaving up to 2500 households without power for about an hour.											

40 TENNESSEE											
TIPTON COUNTY	01	1610CST			0	0	2	0	0	0	THUNDERSTORM WIND
SHELBY COUNTY	01	1630CST			0	0	4	0	0	0	THUNDERSTORM WIND
A line of thunderstorms moved across these two counties producing damaging winds. In the Mumfords and Atoka areas of Tipton County, numerous trees were blown down and several power lines were downed as well. In northern Shelby County, tree limbs and power lines were downed. A couple of storage buildings were destroyed. On McKellar Lake a barge broke loose from its moorings and was pushed about 300 yards across the channel. A tin roof was ripped off of a building at the marina, a couple of boats were damaged and another boat was sunk.											
COFFEE COUNTY	14	0015CST			0	0	4	0	0	0	LIGHTNING
COFFEE COUNTY	14	0030CST			0	0	4	0	0	0	LIGHTNING
A business office was struck by lightning at around 115pm CDT and a house was struck about 15 minutes later, both in Tullahoma. Both buildings caught on fire and received extensive damage, around \$25,000 each.											
HAWKINS COUNTY	15	1800CST			0	0	4	0	0	0	FLASH FLOOD
Heavy rain over the county caused widespread flash flooding in many areas. Some homes, apartments and offices got water in them in Rogersville when Crockett Creek and smaller drainage ditches overflowed. Roads were impassable. In Bulls Gap five cars were partially submerged in high water that filled the parking lot they were in.											

— TENNESSEE											
On September 22nd, the remnants of Hurricane Hugo, which had come inland over coastal South Carolina at Charleston then turned north, hit the eastern part of Tennessee with Tropical Storm strength. It had prompted a Flash Flood Watch and later a number of Flash Flood Warnings for parts of eastern Tennessee. The following entries for the 22nd are "HUGO" related.											
UNICOI COUNTY	22	0745CST			0	0	4	0	0	0	WIND FLASH FLOOD
GREENE COUNTY	22	0800CST			0	0	3	0	0	0	FLASH FLOOD
CARTER COUNTY	22	0800CST			0	0	4	0	0	0	FLASH FLOOD
SEVIER COUNTY	22	0830CST			0	0	4	0	0	0	FLASH FLOOD
COCKE COUNTY	22	0830CST			0	0	3	0	0	0	FLASH FLOOD
BLOUNT COUNTY	22	0830CST			0	0	2	0	0	0	FLASH FLOOD
JOHNSON COUNTY	22	1000CST			0	0	4	0	0	0	FLASH FLOOD WIND
WILSON COUNTY	22	1300CST			0	0	2	0	0	0	FLASH FLOOD
As the remnants of Hurricane Hugo moved north out of South Carolina and across North Carolina it brought strong wind and heavy rain that caused widespread flash flooding to the eastern part of Tennessee. Many people were evacuated including some campers who had gone to the Smokey Mountains from coastal South Carolina to escape the storm. In Carter County 300 people were evacuated. Mobile home and camper parks were flooded as well as homes and the downtown area of Roan Mountain. Roads were washed out and bridges covered by flood water. In Sevier County roads were washed out, and a campground along Little Pigeon River in Pigeon Forge was flooded and campers had to be evacuated. In Sevierville, school teachers carried kindergartners through rising water as Webbs Creek overflowed and flooded part of the school. Five minutes after the school was evacuated, water flowed over the bridge next to the school, isolating the school. Greene County had several bridges and roads washed out. Unicoi County had numerous trees knocked down by strong winds and they also had flash flooding, but with little damage due to the flooding. Johnson County had trees knocked down by wind and flood waters washed out several roads.											
41 TEXAS, Northern											
Fannin County: Ector	09	1620CST			0	0	?	?	?	?	Hail (1.75) and TSTM Wind (52)
2 S Bonham	09	1655CST			0	0	?	?	?	?	TSTM Wind (61)
Downburst winds estimated at 70 MPH blew over a tractor trailer and numerous large trees and damaged several television towers two miles south of Bonham.											
Stephens County Breckenridge	09	1730CST			0	0	?	?	?	?	Hail (0.75)
Taylor County Abilene	11	0930CST- 1100CST			0	0	?	?	?	?	Flash Flooding
Heavy rains ranging from two and one half inches to four inches flooded several underpasses and intersections in Abilene where high water up to windshield levels of automobiles stranded numerous motorists.											
Denton County Lake Dallas	13	0415CST			0	0	?	?	?	?	TSTM Wind
A downburst damaged three boat docks and fifteen boats, and blew down several power lines along the eastern shores of Lake Dallas.											
41 TEXAS, Southern											
Kleberg County	13	1630CST			0	0	0	0	0	0	Tstm Wind (50)
The Naval Air Station at Kingsville reported a wind gust to 57 MPH from a thunderstorm. Small hail was also reported. No damage was reported.											

STORM DATA AND UNUSUAL WEATHER PHENOMENA

SEPTEMBER 1989

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					KILLED	INJURED	PROPERTY	CROPS	

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					KILLED	INJURED	PROPERTY	CROPS	

41 TEXAS, Western									
Briscoe County 4 W of Silverton	1	1540 CST			0	0	0	0	Hail (1.00)
Hail, the size of quarters was observed by a Sheriff's Deputy 1 mile south of State Highway 86 on Farm-to-Market Road (FM) 284. This location is about 4 miles west of Silverton.									
Lubbock County Slaton	1	1925 CST			0	0	0	0	Tstm. Wind (57)
A Weather Service Cooperative Observer at Slaton reported thunderstorm winds gusting to 65 mph (57 knots).									
Donley County Howardwick	8	1440 CST			0	0	0	0	Hail (0.88)
3 S of Howardwick	8	1450 CST			0	0	0	0	Tstm. Wind (52)
The Sheriff's Office observed nickel size hail at Howardwick. Ten minutes later employees reported wind gusts to 60 mph (52 knots) at Greenbelt Lake Marina, which is 3 miles south of Howardwick.									
Collingsworth County 3 E of Lutie	8	1632 CST			0	0	0	0	Tstm. Wind (57)
The Sheriff's Office reported thunderstorm winds of 65 mph (57 knots) on FM 1439 three miles east of the Community of Lutie.									
Ector County West Odessa	8	1647 CST			0	0	0	0	Hail (0.88)
4 S of Odessa	8	1650 CST			0	0	0	0	Funnel
Odessa	8	1653 CST			0	0	2	0	Tstm. Wind (60)
Odessa	8	1655 CST	0.2	20	0	0	0	0	Tornado (F0)
The public reported nickel size hail in West Odessa. At 1650 CST the public observed a funnel cloud 4 miles south of Odessa, near Interstate 20. Thunderstorm wind gusted to 65 mph (57 knots) at Schlemeyer Field at 1653 CST, and two minutes later wind gusts to 60 knots bent a flag pole to the ground at Odessa Fire Station Number 8, located at 93rd Street and Rainbow in far north Odessa. Also at 1655 CST a very small tornado was spotted by the public at a tank company off Loop 338, 1.5 miles east of Schlemeyer Field. The tornado lifted without inflicting any damage.									
Midland County Midland Airport	8	1700 CST			0	0	0	0	Tstm. Wind (50)
NW Midland	8	1705 CST	0.3	20	0	0	0	0	Tornado (F0)
N Midland	8	1715 CST	3	50	0	0	0	0	Tornado (F1)
The same thunderstorm that affected Ector County moved across Midland County, bringing high winds and two known tornadoes. The official observer at the Midland Weather Service Office recorded a gust of 50 knots at 1700 CST. Five minutes later a small tornado was observed by a citizen at the intersection of Andrews Highway and Loop 250, in the northwest side of Midland. At 1715 CST a somewhat larger and more long-lived tornado was reported by the public. It touched down near the intersection of Loop 250 and Wadley Street, traveled in a general east-northeast direction for 3 miles, and lifted near the Loop 250 and Midland Drive intersection. Amazingly, no damage was reported as a result of either tornado.									
Dickens County 4 NW of Spur	8	1700 CST			0	0	4	0	Tstm. Wind
Thunderstorm winds of unknown speed downed several power lines 4 miles northwest of Spur, according to police in Spur.									
Carson County Panhandle	12	0933 CST			0	0	0	0	Hail (0.88)
A Department of Public Safety (DPS) trooper encountered nickel size hail in Panhandle.									
Randall County Canyon	12	1117 CST			0	0	4	0	Flash Flooding
Torrential rains totaling 2.73 inches in a 75-minute period resulted in flash flooding that inundated most streets in the City of Canyon. U. S. Highway 87 through town was also under several feet of water. Many automobiles were stalled in town.									
Lubbock County Lubbock	12	1430 CST			0	0	0	4	Lightning
Lightning struck a 30-foot ornamental tree at a residence in the 2000 block of Slide Road, on the city's west side. The tree was split to the ground and destroyed.									
Reeves County Pecos	12	Est. 1550 CST			0	0	4	0	Tstm. Wind
3 SW of Pecos	12	Est. 1600 CST			0	0	4	0	Tstm. Wind (Est. 81)
Thunderstorm winds overturned an anchored mobile home 3 miles southwest of Pecos. The unoccupied structure flipped over and crushed an automobile parked 30 feet from the original site of the home. Ten minutes earlier, several residential roofs sustained wind damage in Pecos.									

TEXAS, Western									
Hale County Plainview	12	1815 CST			0	0	4	?	Flash Flooding
Torrential rains totaling between 3 and 4 inches across northern parts of the county caused flash flooding along Running Water Draw through Plainview. Floodwaters were waist deep through the downtown section, stalling several automobiles.									
Dawson County Lamesa	12	1830 CST			0	0	0	0	Hail (0.88)
Lamesa	12	1830 CST			0	0	4	?	Flash Flooding
9 E of Lamesa	12	1850 CST			0	0	4	?	Flash Flooding
The public reported nickel size hail in Lamesa about the time that flash flooding began to be observed in town. Rains totaling up to 4 inches in the 90-minute period rapidly filled playa lakes and pushed floodwaters four feet deep through city streets, into businesses and residences. Twenty minutes later floodwaters were 5 feet deep over U. S. 180 and FM 178, in Key, which is 9 miles east of Lamesa. The intersection was to remain closed for more than a week.									
Cochran County Morton	12	1850 CST			0	0	?	?	Hail (1.75)
Hail ranging in size from marbles to golf balls was reported by the Sheriff at Morton. Damage, if any, was undetermined.									
El Paso County Tornillo	12	1900 MST			0	0	0	4	Tstm. Wind
Tornillo	12	1900 MST			0	0	0	6	Hail (0.75)
A Weather Service Cooperative Observer reported that thunderstorm winds snapped large commercial pecan tree limbs at Tornillo, in the southeast corner of the county. In addition, hail ranging in size from peas to large marbles (0.75 inch) brought significant damage to the local cotton crop.									
Howard County Big Spring	13	0214 CST			0	0	4	0	Lightning
Lightning struck an electrical regulator, causing a power outage to 2,300 customers in the southwest part of Big Spring. Service was interrupted for about 30 minutes.									
42 UTAH									
Cache County, Trenton	17	1200MST			0	0	1	0	High Wind (52)
Salt Lake County, Point of the Mountain	17	1215MST			0	0	3	0	High Wind
Cache County, Cornish	17	1530MST	?	?	0	0	4	0	Tornado (F1)
Box Elder County, Eagle Range	17	1535MST			0	0	1	0	High Wind (50)
Sevier County, Richfield	17	1549MST			0	0	1	0	High Wind (61)
Salt Lake County, West Valley City	17	1700MST			0	0	2	0	High Wind (57)
Sevier County, Richfield	17	1725MST			0	0	2	0	High Wind (70)
A cold upper trough moving through the Great Basin produced strong winds over much of western Utah. Wind reports included one by Utah Highway Patrol troopers that a camper was blown off a truck at the point of the mountain in Salt Lake County. A small tornado destroyed a barn in the northern part of Cache County in the town of Cornish at about 4:30 p.m. MDT. A gust to 60 mph was reported at Trenton, 58 mph at Eagle Range, 70 mph at Richfield at 4:59 pm MDT, then a report of 80 mph at 6:52 pm MDT.									
Tooele County, Wendover	30	1305MST			0	0	1	0	High Wind (52)
Tooele County, Bonneville Salt Flats	30	1330MST			0	0	5	0	High Wind
Salt Lake County, Draper	30	1630MST			0	0	3	0	High Wind
A strong cold front produced several high wind events over Northwest Utah. As the front moved across the Nevada border, the automatic observing station at Wendover reported a gust to 60 mph. The front then moved into the Bonneville Basin and produced a moderate amount of damage there. A wheeled trash dumpster was pushed into some cars, a large party tent was blown down, and two large balloons valued at \$15,000 each were "torn to shreds". As the front moved into the Wasatch Front area, winds blew the roof off a home near the point of the mountain at Draper, and two semis were blown over on I-15. Several reports of tree damage were also received.									

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43 VERMONT									
Statewide	22	Evening	0	0	5	?	High Winds		
Intense winds spinning off of remains of Hurricane Hugo brought down trees, power lines and tree limbs across the state of Vermont. On Lake Champlain, swells several feet high resulted in some boats being torn loose from their moorings.									
44 VIRGINIA									
VAZ001-002 Coastal Virginia	8-11		0	0	0	0	Heavy Surf		
Heavy surf churned up by offshore Hurricane Gabrielle generated waves up to 12 feet and tides of 2.5 feet above normal. No significant damage was reported.									
Lee and Wise Counties	13	1800EST	0	0	?	?	Flash Flooding		
More than 3 inches of rain in two and a half hours caused flash flooding of creeks in Lee and Wise counties. Five families were evacuated from their homes in Coeburn in Wise County. Severe flooding was also reported in Toms Creek and Maytown in Wise County. Some roads were covered by 3 to 4 feet of water, and others were blocked by debris. Rainfall was measured at 3.07 inches at Sandy Ridge in Wise County.									
Grayson Co, Galax	14	Morning	0	0	0	0	Flash Flooding		
Rainfall measured at 2.5 inches caused Chestnut Creek to overflow its banks near Galax. Several motorists had to be rescued from their cars.									
VAZ009-014-015-016 Southwestern Virginia	15-16	Overnight-Midday	1	0	?	?	Heavy Rain, Flooding		
Widespread heavy rain which exceeded 4 inches in many areas caused numerous creeks to overflow their banks, flooded basements and roads, and caused mudslides. A 44 year old man drowned at 0530 EST of the 16th in the Snowville section of Clayton Lake in Pulaski County after the boat he was in capsized from filling up with water. Two other men in the boat, ages 19 and 49, were rescued. Heavier rainfall reports included 5 inches in southern Amherst County where several roads were washed out, more than 5 inches in Grayson County and the City of Galax, and 4 to 6.5 inches in the Lynchburg area. M440									
Bedford Co, Bedford	15-16	Overnight	0	0	?	0	Thunderstorm Winds		
Thunderstorm winds destroyed a house.									
Norfolk	16	1500EST	0	1	0	0	Lightning		
A 30 year old man was jolted at the Norfolk International Airport when the airplane on which he was working was struck by lightning.									
Powhatan Co, Clayville	16	1510EST	0	0	0	?	Hail (1.75)		
Prince George Co.	16	1535EST	0	0	?	0	Thunderstorm Winds		
Several trees and power lines were downed along Arwood Road. Winds were estimated at 60 mph.									
Dinwiddie Co.	16	1549EST	0	0	?	0	Thunderstorm Winds		
Several trees were downed along Horseshoe Road. Winds were estimated at 60 mph.									
Prince George Co.	16	1615EST	0	0	?	0	Thunderstorm Winds		
Several trees were downed along Morninghead Road. Winds were estimated at 60 mph.									
Powhatan Co, Plainville	16	1633EST	0	0	0	0	Funnel Cloud		
Police reported a funnel cloud along U.S. Route 60 near Plainville. There was no touchdown.									
Fairfax Co, Arlington Co, Alexandria	16	1732EST	0	0	?	0	Thunderstorm Winds, Hail		
Thunderstorm winds downed approximately 100 trees and damaged about 100 others at the Belle Haven Country Club, and downed approximately 30 trees along the George Washington Memorial Parkway. A shed was also knocked down at the country club. Eyewitnesses reported seeing									

— VIRGINIA									
VAZ002 Greater Hampton Roads	19	All Day	0	0	3	0	Heavy Rain, Coastal Flooding		
Periods of heavy rain and gusty winds buffeted the Greater Hampton Roads area. Rainfall was measured at 1.37 inches at the Norfolk International Airport. Some streets at Ocean View became flooded at high tide. Winds downed one tree in Norfolk.									
VAZ009-013-014-015-016 Southwestern Virginia	22	Morning	0	3	7	7	Tropical Storm Hugo		
The center of Tropical Storm Hugo moved northward across Washington, Smyth, and Tazewell counties of the panhandle of western Virginia during the late morning. Major wind damage occurred along and up to 50 miles east of the center's track, and significant damage occurred as far north and east as Highland and Rockbridge counties. During the passage of the storm, winds were sustained at near 40 mph with gusts to near 70 mph. The highest wind gust measured was 81 mph at Hot Springs in Bath County and also at an unknown location in Bland County. Most counties in southwestern Virginia reported many downed trees and some structural damage. Many trees fell onto buildings, motor vehicles, and power lines, which resulted in widespread power outages. Also, hundreds of roads were blocked by fallen trees and limbs. Swaths of downed trees in a remote forested area in western Carroll County suggested possible tornadic activity, but no tornadoes have been confirmed. In the hardest hit agricultural areas, thousands of acres of crops, mostly corn, were bent flat against the ground. Rainfall was less than what can be expected from a tropical storm; nevertheless, the storm did produce enough rain to cause flooding of some creeks, rivers, low-lying areas, and basements. The greatest rainfall reported was 6.5 inches at Hillville in Carroll County. Rainfall amounts of 1 to 4 inches were common throughout southwestern Virginia. Total damage in Virginia was estimated at nearly 60 million dollars, with more than 40 million of that occurring in Carroll and Grayson counties. Also, there were reports of isolated damage at several locations in central Virginia almost as far east as Interstate Highway 95.									
Giles, Pulaski and Montgomery Counties	23	Morning	0	0	?	?	River Flooding		
The New River at Radford in Pulaski County swelled by Tropical Storm Hugo rainfall crested at 21.65 feet at 0300 EST. Flood stage was 14 feet. The New River at Glen Lyn in Giles County crested 11 feet above flood stage at 0630 EST.									
Roanoke Co.	23	Morning	0	0	?	?	River Flooding		
The Roanoke River which was swelled by up to 6 inches of Tropical Storm Hugo induced rainfall over its head waters, crested 1.5 feet above flood stage at Roanoke. Approximately 60 people were evacuated from along the South Fork of the Roanoke River.									
Statewide	23	Afternoon	0	0	0	0	Cold Front		
A strong cold front swept across the state from west to east and was accompanied by gusty winds, briefly heavy rain showers or thunderstorms, and a sharp drop in temperature. Temperatures dropped from the low 80's to the 50's or upper 40's in one to two hours. A few isolated incidents of damaging winds were reported and are detailed below.									
Henrico Co, Richmond	23	1530EST	0	14	?	0	Thunderstorm Winds		
Thunderstorm winds struck the State Fair which was in progress. A large balloon was blown into a crowd, and a tent was collapsed. At least 14 fair goers were injured as a result of these incidents or by flying debris.									
Middlesex Co, Rappahannock River	23	1547EST	0	?	?	0	Thunderstorm Winds (65kt)		
High winds sunk or capsized eight sailboats on the Rappahannock River one mile south of Carters Creek. At least 18 boaters had to be rescued. Also, a catamaran was capsized near Norris Bridge, and some trees were downed along the shore. Waves were reported at 4 to 6 feet.									
Virginia Beach	23	1840EST	0	0	3	0	Thunderstorm Winds (52kt)		
Strong winds capsized numerous boats on the coastal waters of Virginia Beach. All boaters were rescued without injury. Also, some trees were downed on land, including a few onto power lines.									

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45 WASHINGTON									
Spokane County	30	1730PST	0	0	0	0	0	0	Funnel Cloud
		Intense thunderstorm activity developed around the northern sections of Spokane during the early evening. A pilot reported a funnel cloud 9 miles north of Fairchild Air Force Base, but no reports of damage were received.							
46 WEST VIRGINIA									
Lincoln County	16	0030EST	0	0	?	0	0	0	Flash Flood
		Two private bridges were washed out. Flooding occurred along Ely Fork near McCorkle Avenue. Some damage was done to homes. Part of a state road was washed out.							
Putnam County	16	0030EST	0	0	?	0	0	0	Flash Flood
		Heizer and Bills creeks had flooding. Some minor damage was done to homes.							
Kanawha County	16	0200EST	2	0	?	0	0	0	Flash Flood
		Two feet of water pooled on roads near Alum Creek. A man drowned when he slipped and fell into high water. A woman drowned when she tried to drive her vehicle through high water on Wolf Pen Road. Her car was washed into a creek. A mobile home was destroyed by a mud slide. Several homes received minor damage on Eden Forks. M??, F??V							
Wayne County	16	1400EST	0	0	0	0	0	0	Hail (0.75)
		Dime size hail was reported by a Cabwaylingo State Forest ranger.							
Mercer County	22	0900EST	0	0	?	0	0	0	High Wind
		High winds from the remnant system of Hurricane HUGO caused numerous trees and power lines to go down over much of the county.							
Pocahontas County	22	?	0	0	?	0	0	0	High Wind
		Winds of 60 mph were clocked at Snowshoe in Pocahontas County as the spiral bands of Hurricane HUGO, in tropical storm stage, passed through the region, causing trees to be downed and scattered power outages that affected several customers.							
47 WISCONSIN ————— NONE REPORTED									
48 WYOMING									
WYZ005 NORTHERN FRONT RANGE	05	1830MST	0	0	0	0	0	0	WIND
WYZ006 NORTHEASTERN PLAINS	05	2100MST	0	0	0	0	0	0	WIND
		A COLD FRONT MOVING THROUGH THE NORTHERN ROCKIES PRODUCED BRIEF STRONG WIND GUSTS ACROSS NORTHEASTERN WYOMING ON THE EVENING OF THE 5TH. AT 1830MST, SHERIDAN EXPERIENCED A 63 MPH WIND GUST IMMEDIATELY AFTER FRONTAL PASSAGE. WHEN THE FRONT WENT THROUGH GILLETTE, A BRIEF GUST TO 51 MPH WAS REPORTED.							
— WYOMING									
GOSHEN COUNTY, 155 TORRINGTON	06	2340MST	0	0	0	0	0	0	HAIL (1.75)
GOSHEN COUNTY, 125W HAWK SPRINGS	07	0055MST	0	0	0	0	0	0	HAIL (1.00)
GOSHEN COUNTY, 10E HAWK SPRINGS	07	0130MST	0	0	0	0	0	0	HAIL (1.00)
		DURING THE LATE NIGHT OF THE 6TH AND EARLY MORNING OF THE 7TH, SEVERE THUNDERSTORMS PRODUCED HAIL OVER EXTREME SOUTHEAST WYOMING. AT 2340MST OF THE 6TH, GOLF BALL SIZE HAIL FELL 15 MILES SOUTH OF TORRINGTON. AT 0055MST AND 0130MST DURING THE 7TH, QUARTER SIZE HAIL WAS REPORTED 12 MILES SOUTHWEST AND 10 MILES EAST, RESPECTIVELY, OF HAWK SPRINGS.							
WYZ001-004-009 NORTHWEST MOUNTAINS, BIG HORN MOUNTAINS, AND WIND RIVER MOUNTAINS	09-11	0001MST 0700MST	0	0	0	0	0	0	EARLY SNOW
WYZ001-002-003-004-005-006 NORTHERN WYOMING	09-11	0001MST 0700MST	0	0	0	0	0	0	EARLY COLD
		FROM THE EARLY MORNING OF THE 9TH THROUGH THE MORNING OF THE 11TH, AN UNUSUALLY COLD AND MOIST STORM SYSTEM AFFECTED THE MOUNTAINS AND LOWER ELEVATIONS OF NORTHERN WYOMING. DURING THIS PERIOD, MAXIMUM AND MINIMUM TEMPERATURES WERE AT LEAST 10 TO 25 DEGREES BELOW NORMAL. ON THE EARLY MORNING OF THE 10TH, SHERIDAN HAD A RECORD LOW OF 24 DEGREES. BURGESS JUNCTION DROPPED TO 4 DEGREES ABOVE ZERO ON THE EARLY MORNING OF THE 11TH. THERE WAS ALSO SNOWFALL DURING THIS TIME. ABOVE ABOUT THE 6000 FOOT MSL ELEVATION, MOST OF YELLOWSTONE NATIONAL PARK AND THE WIND RIVER BASIN PICKED UP 2 TO 6 INCHES OF SNOW. MANY LOCATIONS IN THE BIG HORN MOUNTAINS RECEIVED 6 TO 12 INCHES OF NEW SNOW DURING THAT WEEKEND. BY THE MORNING OF THE 11TH, BURGESS JUNCTION HAD A TOTAL SNOWFALL OF 12 INCHES.							
WYZ016-017 LARAMIE VALLEY AND SOUTHEAST PLAINS	11-12	0001MST 1700MST	0	0	0	0	0	0	EARLY SNOW
WYZ010-011-012-013-014-015-016-017 SOUTHERN WYOMING	11-13	0001MST 0700MST	0	0	0	0	0	0	EARLY COLD
		FROM THE EARLY MORNING OF THE 11TH THROUGH THE LATE AFTERNOON OF THE 12TH, AN INTERMITTENT EARLY SNOWFALL EVENT GREETED EXTREME SOUTHEAST WYOMING. ADDITIONALLY, DAILY AVERAGE TEMPERATURES OF AT LEAST 10 TO 25 DEGREES BELOW NORMAL OCCURRED OVER ROUGHLY THE SOUTH HALF OF THE COWBOY STATE FROM THE EARLY 11TH THROUGH THE MORNING OF THE 13TH. MOST OF THE SNOW ACROSS THE FAR SOUTHEAST PART OF THE STATE FELL ON THE 12TH. SNOWFALL OF 2 TO 3 INCHES WAS COMMON, INCLUDING 2.5 INCHES AT CHEYENNE ON THE 12TH. CHEYENNE ALSO ESTABLISHED 2 RECORD LOW MAXIMUM TEMPERATURES, 42 DEGREES ON THE 11TH AND 36 DEGREES ON THE 12TH. FINALLY, ON THE MORNING OF THE 13TH, CHEYENNE TIED A RECORD LOW MINIMUM OF 30 DEGREES, DATING BACK TO 1945.							
SWEETWATER COUNTY, ROCK SPRINGS	17	1901MST	0	0	0	0	0	0	THUNDER-STORM WIND (52)
		DURING THE EVENING OF THE 17TH, ROCK SPRINGS EXPERIENCED A WIND GUST OF 60 MPH FROM A THUNDER-STORM.							
PARK COUNTY, CODY	27	1349MST	0	0	0	0	0	0	THUNDER-STORM WIND (50)
		ON THE EARLY AFTERNOON OF THE 27TH, CODY LOGGED A WIND GUST OF 58 MPH FROM A THUNDERSTORM.							

STORM DATA AND UNUSUAL WEATHER PHENOMENA

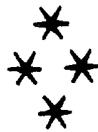
SEPTEMBER 1989

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED ¹ DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
49 ALASKA, Northern — NO REPORT RECEIVED									
49 ALASKA, Southern									
Aleutian Islands	04	1400AST				?			High Winds
A strong, 968 mb low pressure system moved east along the south side of the Aleutian Islands. Winds over the western Aleutians gusted to 50 to 70 mph from Shemya Island to Adak Island.									
Alaska Peninsula	09	1600AST					3		High Winds
A strong, 979 mb low pressure system moved north across the Alaska Peninsula, producing wind gusts of above 60 mph over the area. Strong winds of up to about 65 mph were also reported in the hillside area of Anchorage. Some minor damage was done to signs and antennas.									
North Gulf Coast	23	1800AST			3		5		High Winds and High Seas
A moderate low pressure system moved into the eastern Gulf of Alaska and produced strong winds along the immediate North Gulf Coast. A tug vessel with three crewmen aboard was lost. Wind gusts reached above 50 mph.									
Alaska Peninsula	30	2100AST				?			High Winds
A strong, 968 mb low pressure system moved into the eastern Bering Sea and produced strong wind gusts over the Alaska Peninsula. Winds peaked at above 60 mph in the Cold Bay area and other portions of the Peninsula.									
49 ALASKA, Southeastern — NONE REPORTED									
50 HAWAII — NONE REPORTED									
51 PUERTO RICO									
PRZALL Puerto Rico	17- 18	1600- 1400AST			2	?	9	8	Hurricane
On September 17, 1989, Puerto Rico suffered the direct impact of Hurricane HUGO, an Atlantic tropical cyclone that developed into a full-fledged hurricane four days before it crossed the Lesser Antilles into the Caribbean.									
During the early morning hours of September 18th, Hurricane HUGO was travelling west-northwest as its eye passed over the island of Vieques. As it continued it approached the eastern and northeastern tip of Puerto Rico at around 0800 AST. Radar and satellite observations suggested that the west eyewall moved over land bordering the municipalities of Ceiba, Fajardo and Luquillo in Puerto Rico. At noon AST on Monday the 18th, Hurricane HUGO was already northeast of San Juan with maximum sustained winds of 125 mph and a minimum sea-level pressure of 957 mb or 28.26 inches of mercury.									
Hurricane HUGO's maximum sustained winds observed in San Juan were from the northwest at 73 knots (84 mph), with a peak gust of 80 knots (92 mph) occurring at around 1000 AST on Monday the 18th. The mean sea-level barometric pressure was 972.6 mb or 28.72 inches of mercury. The maximum 24-hour rainfall measured at the San Juan NWSFO was only 1.40 inches, although it was estimated to be around 8.84 inches.									
Roosevelt Road Naval Station reported maximum sustained winds from the west of 90 knots (104 mph), and a gust of 104 knots (120 mph) occurred at around 0800 AST on Monday the 18th. The sea-level pressure was 946.1 mb or 27.94 inches of mercury. Also at Roosevelt Roads, a storm surge of 4 to 6 feet was estimated near the marina and the harbor.									
Some flooding occurred over the northeastern area of Puerto Rico as over 10 inches of rain fell in 48 hours in some areas, although severe flooding was not reported. Most of the rainfall was associated with the passage of the storm during Monday morning. As much as 9.80 inches of rainfall occurred during a 24-hour period at Pena Pobre recording gage near the town of Naguabo. The rainfall intensities did not exceed historical maxima. Information from DCP's showed that some historical peak river values were exceeded. The Rio Fajardo (drainage area of 149 square miles) peaked above the October 24, 1974, historical maximum of 19,600 cubic feet per second (cfs). Another gage, the Rio Mameyes near									
51 PUERTO RICO (continued)									
Sabana (drainage area of 6.88 square miles) peaked at 20,000 cfs, exceeding the September 4, 1973 peak by around 200 cfs. Three other stream gages in the nearby basins of Rio Espirito Santos, Rio Sabana and Rio Icaos had peak discharges that ranged between 85 and 90 percent of former record peaks.									
Damages in Puerto Rico were estimated at \$1 billion, about 900 million of it in property damage and 100 million in crop damage. A minimum of two deaths were directly related to HUGO. There were around 6 deaths during the week after HUGO, most of which occurred to employees of the Power Authority who were repairing power lines. Nearly 100,000 people were sheltered and around 13,000 were homeless. The effect of Hurricane HUGO in terms of damage to property in Puerto Rico was extensive and disastrous. Almost complete devastation occurred in the island municipalities of Vieques and Culebra. Tremendous damages were reported in the municipalities of Naguabo, Ceiba, Fajardo and Luquillo. A total of 56 municipalities were included to be eligible for Federal Disaster Assistance requested by the Governor of Puerto Rico to the President.									
M700									
52 VIRGIN ISLANDS									
PRZ006-007 Virgin Islands	17- 18	1000- est. 0800AST			3	?	9	?	Hurricane
On September 17-18, 1989, the U.S. Virgin Islands suffered the direct impact of Hurricane HUGO, an Atlantic tropical cyclone that crossed the Lesser Antilles as a full-fledged hurricane of Category Four intensity.									
On Sunday, September 17th, HUGO approached the U.S. Virgin Islands as a Category Four hurricane with maximum sustained winds of 140 mph and a minimum sea-level pressure of 934 mb or 27.58 inches of mercury. The storm surge at St. Croix was estimated at between 5 and 7 feet. The eye of Hurricane HUGO passed over St. Croix at between 0400 and 0500 AST during Monday the 18th. Rainfall for the U.S. Virgin Islands is scarce. Only the Caneel Bay recording gage in St. John was operational during the event. No data was recovered from the St. Thomas or St. Croix recorders. As much as 10.30 inches of rainfall occurred at the Caneel Bay recording gage during the two-day period ending at 0800 AST on September 19th. A maximum 24-hour rainfall amount of 9.40 inches was recorded for the one-day period ending at 0800 AST on September 18th. Less than half of the observer stations reported daily data during the period of September 17th to the 19th. As much as 9.20 inches of rainfall was reported in St. Croix for the two-day period ending at 0800 AST on September 19th.									
Since the storm center went across the island of St. Croix, it caused almost complete devastation. Around 24,000 persons were sheltered, and 3500 were left homeless. The total private and government property damage values are estimated at above \$500 million, and there was a total of three deaths.									
53 PACIFIC — NONE REPORTED									

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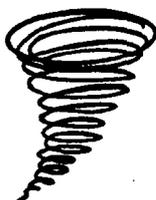
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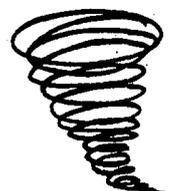
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STORM SUMMARY

SEPTEMBER 1989

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			1	3				6				1	5	2		1				2						1	
Days			1	1				4				1	4	1		1				1						1	
Deaths			0	0				0				0	0	0		0				0						0	
Injuries			0	0				0				3	3	1		0				1						0	
Property Damage			4	0				5				6	5	4		4				4						0	
Crop Damage			?	0				0				3	4	0		?				0						0	
HAIL																											
Deaths														0										0	0		
Injuries													0	0									0	0	0		
Property Damage													3	4									3	5	6		
Crop Damage													4	4									3	3	6		
THUNDERSTORM WINDS																											
Deaths	0	0	0					0	0	0	0	0	0	0	0	0		0	0					0	0		
Injuries	0	0	0					0	0	4	0	7	0	0	1	0		0	0				3	2	6		
Property Damage	?	3	4					5	4	5	4	6	6	5	5	?		?	5				5	6	5		
Crop Damage	?	0	?					0	?	2	0	4	4	3	0			0	4				0	5	5		
HIGH WINDS																											
Deaths																											
Injuries														0													0
Property Damage														4													0
Crop Damage													3	3													0
LIGHTNING																											
Deaths			0					2	0	0			0	0		0				0		1			0		
Injuries			0					5	0	0			0	1		0				0		0			0		
Property Damage			5					5	5	3			5	0		5				6		0			4		
Crop Damage			0					0	0	0			0	0		0				0		0		1			
FLASH FLOODS																											
Deaths	0							2	0			1	0	0	0								1		0		
Injuries	0							?	0			0	0	0	0								1		0		
Property Damage	?							6	6			0	7	5	3								3		6		
Crop Damage	?							0	?			4	6	4	2								0		6		
FLOODS																											
Deaths									0	0	0		0												0		
Injuries								0	0	0	0		1												0		
Property Damage								4	3	?		6	6											5			
Crop Damage								?	0	6			5											6			
HEAVY SNOWSTORMS AND BLIZZARDS @																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
ICE STORMS #																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
HURRICANES AND TROPICAL STORMS																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
ALL OTHERS																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											

SEE REFERENCE NOTES FOR STORM DAMAGE CATEGORIES

STORM SUMMARY

SEPTEMBER 1989

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 DEATH & INJURY TOTALS
TORNADOES					0													0		0	0	*	0	0			
Number				1			1				2			3	1												
Days				1			1				1			1	1												
Deaths				0			0				0			0	0												
Injuries				0			0				0			0	0												8
Property Damage				4			5				6			0	4												
Crop Damage				0			?				3			0	0												
HAIL																											
Deaths		0				0	0					0		0			0										
Injuries		?				?	?					?		?			?										
Property Damage																											
Crop Damage		5				?	?					?		6			?										
THUNDERSTORM WINDS																											
Deaths						0	0			0	0		0	0			0										
Injuries						0	8			3	0		0	0			?										30?
Property Damage						4	5			5	9		4	5			?										
Crop Damage						0	?			0	7		0	4			0										
HIGH WINDS																											
Deaths	0		1						1	0	0			0	0				0								3
Injuries	0		2						0	0	4			0	5				0								2
Property Damage	3		6						4	4	0			5	?				?								
Crop Damage	?		?						?					0	?				0								
LIGHTNING																											
Deaths		1				0	0	0			0	0	0	0			0										4
Injuries		0				0	2				0	0	0	0			1										12
Property Damage		0				4	6				4	?	4	4			0										
Crop Damage		0				0	?	0			?	0	0	4			0										
FLASH FLOODS																											
Deaths	0			2			0					0	0	0			0			2							8
Injuries	?			3			5					?	?	5			?			?							4?
Property Damage				7			?					0	?	5			?			?							
Crop Damage	0			0			?					0	0	?			?			0							
FLOODS																											
Deaths	0		0				0		0		0						1										1
Injuries	0		0				0		6		0						?										1
Property Damage	4		?				5		?		7						?										
Crop Damage	0		5				?		?		4						?										
HEAVY SNOWSTORMS AND BLIZZARDS @																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
ICE STORMS #																											
Deaths																											
Injuries																											
Property Damage																											
Crop Damage																											
HURRICANES AND TROPICAL STORMS																											
Deaths				1							13						0								2	3	19
Injuries				15							420						3								?	?	438?
Property Damage				8							9						7								9	9	
Crop Damage				8							9						7								8	?	
ALL OTHERS																											
Deaths						0																					3
Injuries						0																					?
Property Damage						5																					
Crop Damage						0																					

SEE REFERENCE NOTES FOR STORM DAMAGE CATEGORIES

STORM DAMAGE CATAGORIES

REFERENCE NOTES

- 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

- 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.

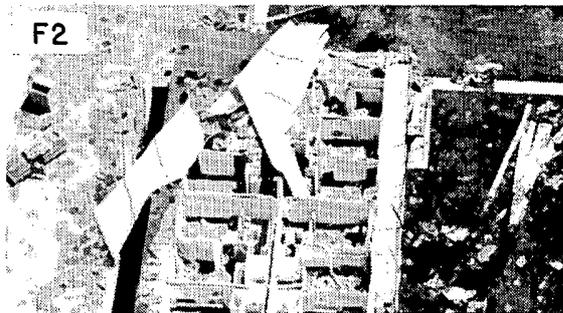
(F3) Severe tornado (158-206 mph): Severe damage
 Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.

(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.

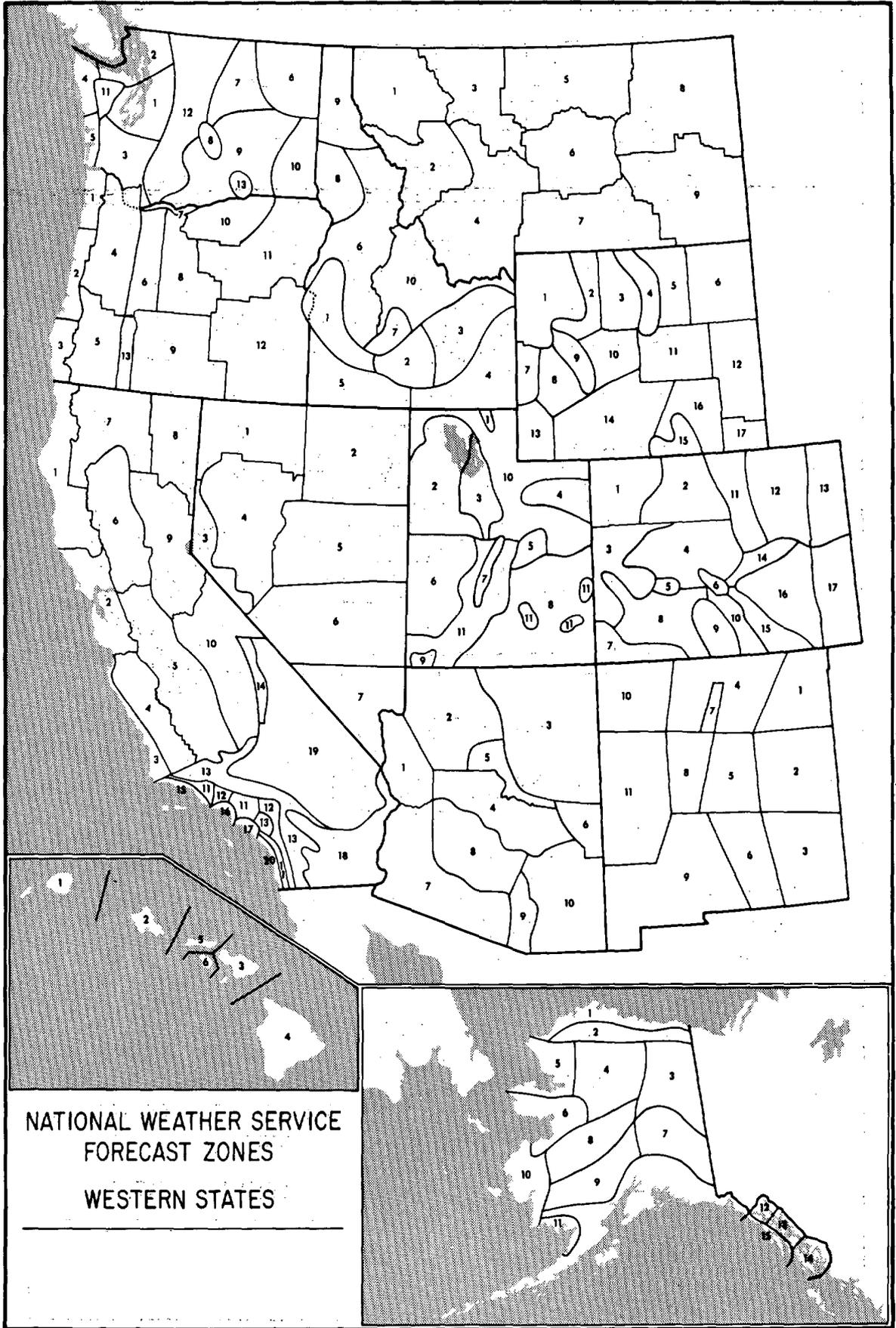
(F6-F12) (319 mph to Mach 1, the speed of sound):
 The maximum wind speeds of tornadoes are not expected to reach the F6 wind speeds.

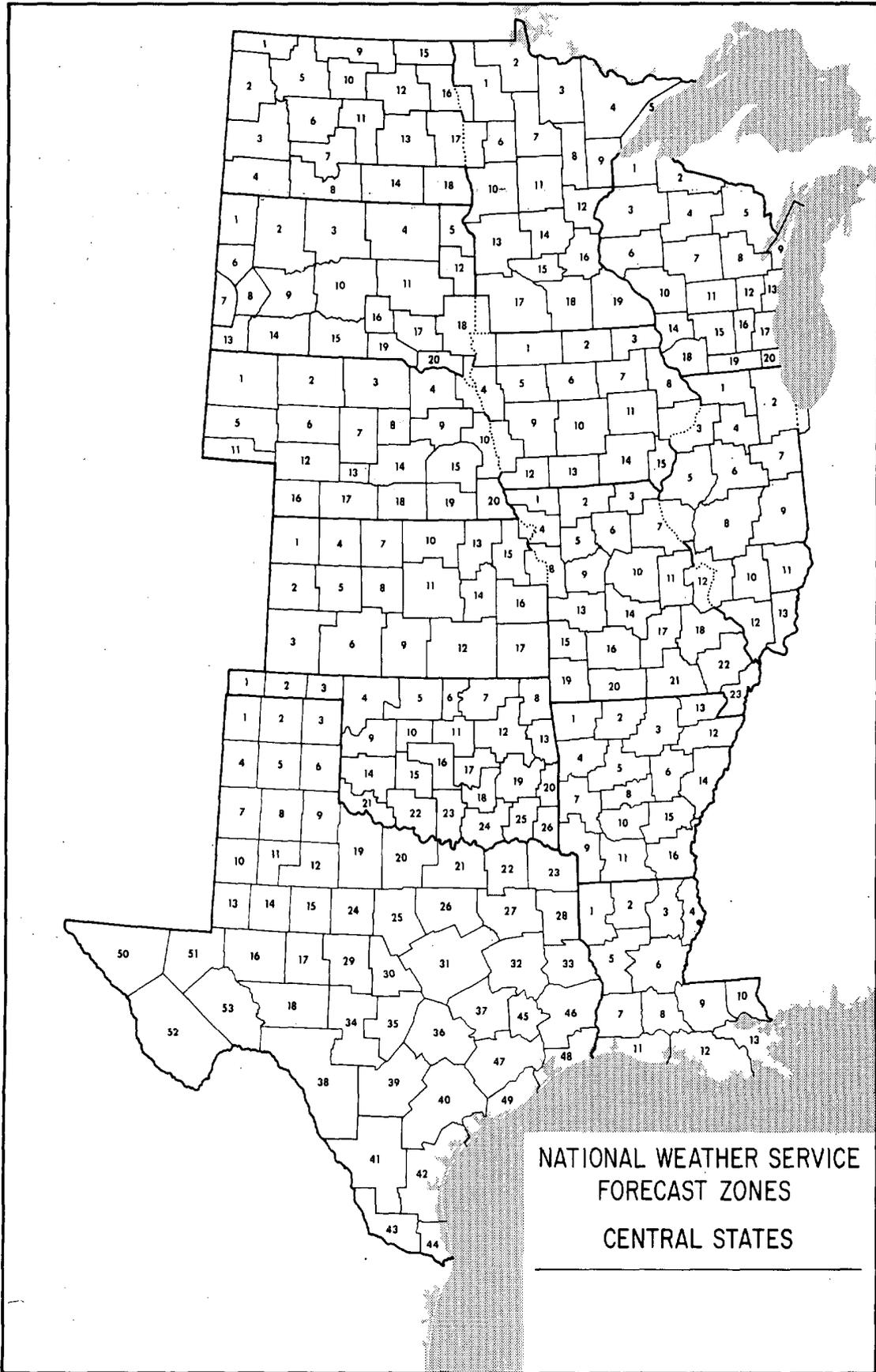
(F0+F1) Weak Tornado
 (F2+F3) Strong Tornado
 (F4+F5) Violent Tornado



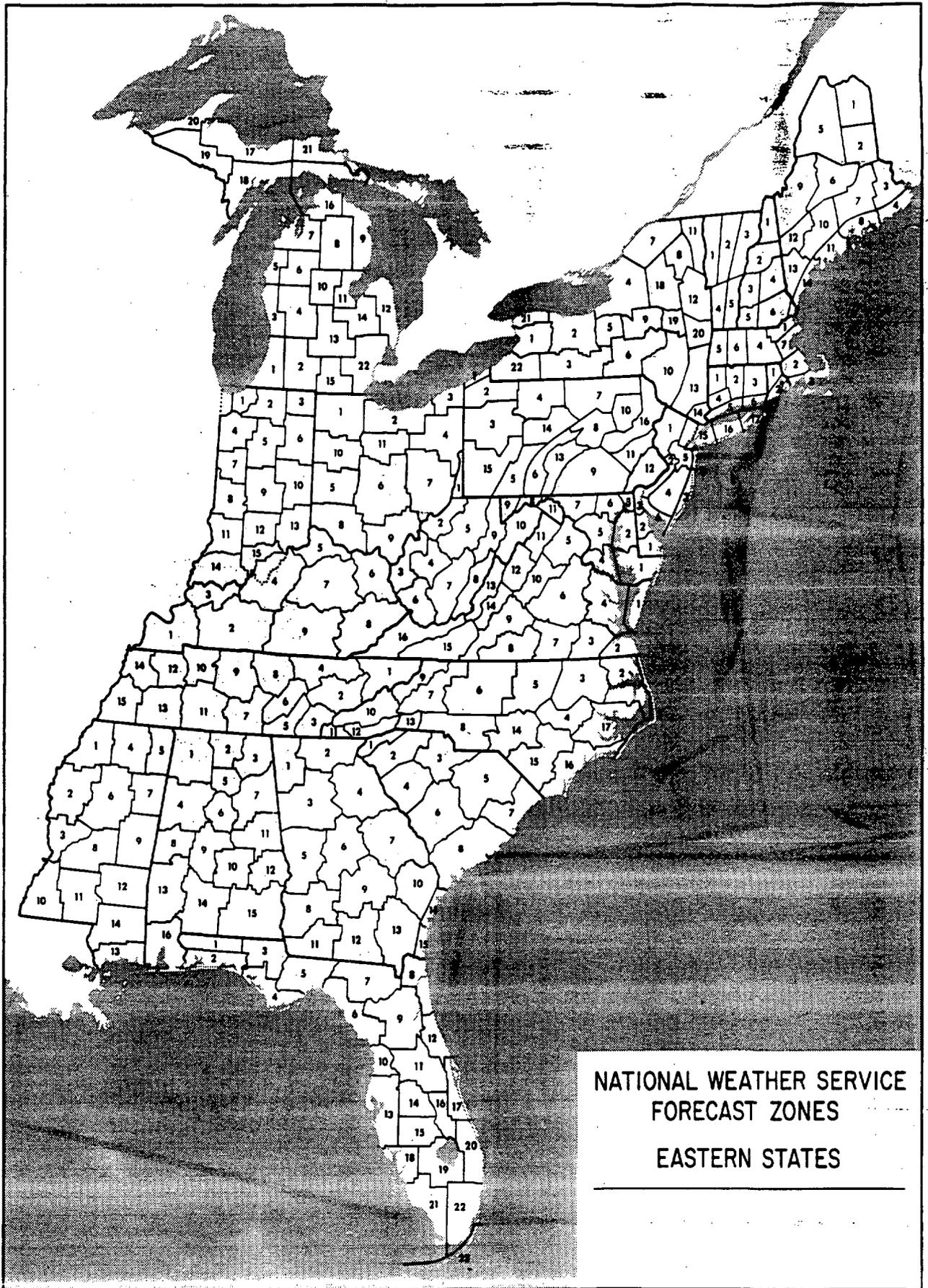
From J. Atmos. Sci., August 1981, p. 1517-1519

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**HOURLY
PRECIPITATION DATA**

ARIZONA

DECEMBER
WITH ANNUAL SUPPLEMENT

ISSN 0368-4084

**CLIMATOLOGICAL DATA
ANNUAL SUMMARY**

ARIZONA

ISSN 0145-0287

**HOURLY
PRECIPITATION DATA**

ARIZONA

VOLUME 35 NUMBER

ISSN 0368-4084

**CLIMATOLOGICAL DATA
ARIZONA**

ISSN 0145-0287

**LOCAL
CLIMATOLOGICAL DATA**
Monthly Summary

STATION	DATE	TEMPERATURE	PRECIPITATION	RELATIVE HUMIDITY	WIND VELOCITY	WIND DIRECTION	WIND GUSTS	SEA LEVEL PRESSURE	SEA LEVEL WIND	SEA LEVEL WIND DIRECTION	SEA LEVEL WIND GUSTS	SEA LEVEL WIND VELOCITY	SEA LEVEL WIND DIRECTION	SEA LEVEL WIND GUSTS
TUCSON	1/1	55	0.00	65	10	000	15	30.00	10	000	15	10	000	15

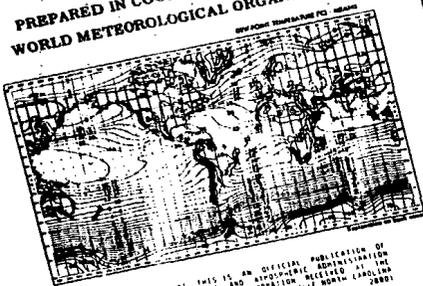
STORM DATA



Thomas D. Williams
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

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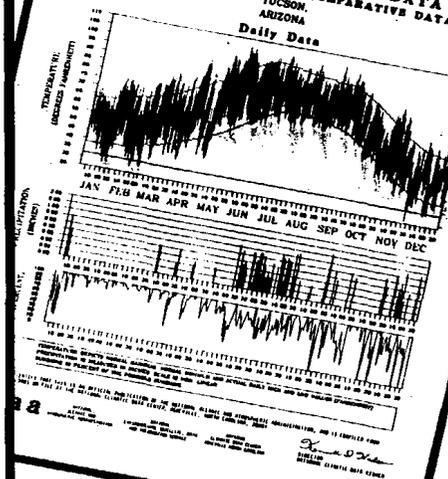
**MONTHLY CLIMATIC
DATA FOR THE WORLD**
PREPARED IN COOPERATION WITH THE
WORLD METEOROLOGICAL ORGANIZATION



I certify that this is an official publication of the National Oceanic and Atmospheric Administration and is published from information received at the National Climatic Data Center, Asheville, N.C. 28801

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**LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA**
TUCSON,
ARIZONA
Daily Data



Thomas D. Williams
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

CHALLENGES AHEAD: FLOOD LOSS REDUCTION STRATEGIES FOR THE '90s

This year's conference theme focuses on the challenges we face in the advent of the 21st century, and the strategies needed to further reduce flood hazards over the next decade. Papers are invited for, but not limited to, the following issues and subjects:

Mapping Issues: Delineation of floodplains in rapidly growing areas to account for the effects of future watershed development; new methods and techniques for assessing and evaluating flooding risks; dealing with floodplains not identified through the National Flood Insurance Program or where flood data does not exist.

Managing Stormwater: Linking floodplain and stormwater management programs; designing stormwater management facilities to reduce future flood losses while providing other environmental and community benefits; effective funding and maintenance arrangements.

The Floodplain and Beyond: Approaches for balancing the need to protect wetlands while allowing for appropriate development of floodplains; special partnerships which further multi-objective management; innovative land use strategies for river corridor management; basinwide approaches to stormwater management.

Floodplain Management for Tomorrow: Successful ways to encourage and promote flood preparedness and response; innovative floodplain management programs; effectiveness of Executive Order 11988 in the '90s.; new tools for floodplain managers; noteworthy local regulatory programs; key flood loss reduction issues for the decade ahead and alternatives for resolving them.

Flood Control: Designing flood control projects for multi-objective benefits; responding to the growing transfer of flood control project costs from federal to state and local governments.

Mitigation: Gaining greater support for state and local flood hazard mitigation activities; practical alternatives for mitigating flood losses to existing structures; exemplary mitigation projects.

Unique Flood Hazards: Defining the hazards; new mapping methodologies; effective management standards.

In addition to specific papers, the ASFPM also welcomes proposals for short course presentations at the conference and any special exhibits or demonstrations that may be of particular interest to conference attendees.

Submission of Abstracts

Prospective authors must submit three copies of the following items to Tim Keptner, Program Chair, by October 31, 1989:

- A one page abstract including the paper's title, all authors' names and their affiliations and the kinds of visual aids which will be used in the presentation.
- Concise biographies of all authors not to exceed 100 words per individual including current titles and positions, other background information directly relevant to the paper and complete mailing addresses and telephone numbers.

Authors will receive timely notification of the status of their papers. All papers selected must be submitted by May 15, 1990 for inclusion in the conference proceedings. All attendees, including authors, are expected to pay the conference registration fee.

About the Conference

The conference program will run Tuesday, June 12 through Thursday, June 14, including technical field trips in the Asheville area. The ASFPM will conduct its committee and general membership meetings on Monday, June 11. All members and conference participants are encouraged to attend.

The conference will be held at the Inn on the Plaza, in the heart of Asheville. Conference room rates are \$62 for a single and \$68 for a double. Hemispheric Travel, Inc. of Madison, Wisconsin will serve as the official conference travel agency.

Registration rates prior to May 1, 1990 will be \$180 for members, \$195 for non-members, and \$95 for students.

Exhibit Space

Exhibit space will be made available for a fee to individuals or organizations who wish to display a product or service to attendees. Further information can be obtained from Dan Accurti, Exhibits Chair.

Deadlines

OCTOBER 31, 1989 - final day for the receipt of abstracts and biographies.

MAY 15, 1990 - final day for the receipt of completed papers for inclusion in conference proceedings.



ASSOCIATION OF STATE
FLOODPLAIN MANAGERS
14TH ANNUAL CONFERENCE
ASHEVILLE, NORTH CAROLINA
JUNE 11-14, 1990

About Asheville

Located at the junction of the French Broad and Swannanoa Rivers, Asheville is the gateway to the Blue Ridge Parkway, Great Smoky Mountains National Park and Mt. Mitchell, the highest peak in the Eastern United States. This mountain region offers a unique blend of cultural and recreational opportunities from white water rafting to Appalachian arts and crafts; from raw natural beauty and scenic attractions to premier mountain resorts and from the simplicity of the Thomas Wolfe Memorial to the grandeur of 7,500 acre Biltmore Estate. Come join us for a breath of fresh air in the North Carolina mountains!

Conference Host:

NORTH CAROLINA DIVISION
OF EMERGENCY MANAGEMENT

Conference Director - Berry Williams
NC Div. of Emergency Management
116 West Jones Street
Raleigh, NC 27603-1335
Tele. (919) 733-3867

Program Chair - Tim Keptner
PA Dept. of Community Affairs
551 Forum Building
Harrisburg, PA 17120
Tele. (717) 787-7403

Exhibits Chair - Dan Accurti
PA Dept. of Community Affairs
551 Forum Building
Harrisburg, PA 17120
Tele. (717) 787-7403

CALL FOR PAPERS

ASSOCIATION OF STATE
FLOODPLAIN MANAGERS
14TH ANNUAL CONFERENCE
ASHEVILLE, NORTH CAROLINA
JUNE 11-14, 1990



CHALLENGES AHEAD:

FLOOD LOSS REDUCTION STRATEGIES FOR THE '90s

The Association of State Floodplain Managers (ASFPM) invites all persons interested in presenting papers at the 14th annual conference in Asheville, North Carolina to submit abstracts for consideration by the program review committee. As the major floodplain management conference in the country, this yearly event attracts a broad audience including local, state, and federal officials, consultants, engineers, planners, representatives from non-profit organizations, researchers, educators, and involved citizens--all of whom have an interest or role in flood hazard reduction activities.

* * * DETAILS ON PAGE REVERSE * * *

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