disaster preparedness report

National Weather Service

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July 1987

WHAT'S HAPPENING IN DISASTER PREPAREDNESS

o Welcome Aboard! Mr. Steve Harned recently came on board as our new hurricane program leader in the Warning and Forecast Branch. Steve replaces Jim Campbell who left in March to become the MIC at Minneapolis. Steve was the MIC at the Houston Weather Service Office and has 20 years of experience mostly with the Weather Service and U.S. Navy. He brings a great deal of field experience with him -- his most recent hurricane experience was with Hurricane Alicia. We are extremely happy to have him on our team.

o Private Sector Initiatives

-- The Adolph Coors Brewing Company recently produced a hurricane tracking chart with hurricane safety rules for distribution along the Gulf and Atlantic Coasts (see attachment). The idea for the map began 2 years ago when Jeff Youngblood of the Kem Distributing Company was doing research on weather for the safety program. Youngblood discovered the tracking map used by the National Weather Service and decided to try to get the map reproduced locally through Coors. Youngblood worked with Brian Peters, MSD, Southern Region, and Brian suggested adding the NOAA safety rules. Preparedness and awareness are the key goals in promoting this 13- by 28-inch color tracking chart.

— Hurricane Tracking Chart for State Farm A State Farm Insurance agent in Mobile contacted MIC, Mike Pass, recently to request assistance in developing a hurricane tracking chart for a giveaway by State Farm. Mike provided several examples of how NWS material has been incorporated into similar ventures. Besides the use locally, the agent hopes the chart will be used over a large area.

o Correction In the April 1987 Disaster Preparedness Report, there was an article describing some of the new awareness slides, one particularly of lightning strike victims. WSFO Fort Worth WPM, Buddy McIntyre, remembered seeing the pictures in a past issue of the NOAA magazine and passed the information along to us. In the description of the two "hair-raising" slides, we found out the two pictures, one of two boys and one of a girl with their hair standing straight up, were taken at Moro Rock in California's Sequoia National Park. The three people evacuated the top of the mountain before the lightning strike occurred. The strike occurred approximately 5 minutes after the pictures were taken. One other person was killed, one was permanently disabled, and six others were injured when either struck by the lightning or by flying rocks dislodged in the strike. We apologize for the inaccurate information.

o New Slides By popular demand, we have reproduced the drawings of the outflow and rotor downbursts into slides. You may remember WSFO Raleigh, Dennis Decker's, paper in the April DP report. We received permission from Dr. T. Fujita to make duplicates. Copies of the downburst slides have been sent to each region.

o Tornado Drill Filmed During the 1987 Severe Weather Awareness Week in Tennessee, WPM Jim Poirier, arranged with the Tennessee Emergency Management Agency to film the tornado drill at the primary school in Huntingdon. This particular school was destroyed in a tornado in 1971. Besides filming the students as they proceeded through the drill, interviews were made with teachers who had been at the school when it was struck by the tornado. This effort will result in a videotape which will be made available to schools statewide showing the why and how of school tornado drills.

o Unofficial Tornado Statistics Attached is a map with the unofficial tornado statistics as of August 30, 1987. The number of tornadoes so far this year is 661. This is considerably lower than this time last year when we had 835 tornadoes. The death toll is higher with 41 -- last year at this time there were 15 deaths. (This figure became the total for the year — the lowest since record keeping began in 1916.) The higher death toll was due to a tornado that struck a community center in Saragosa, Texas, on May 22 and killed 30 people. About three-fourths of the death total came from this one incident. The total deaths by state are: Florida, 1; Michigan, 1; Mississippi, 6; Texas, 32; and Minnesota, 1.

o Natural Hazard Statistics Again in this issue you will find Dick Wood's Summary of 1986 Natural Hazard statistics. This data is much more complete than in the previous April issue. The attached data shows that 397 lives were lost in 1986 due to flash floods/floods, heat, lightning, high winds, tornadoes, winter storms, and hurricanes/tropical storms. Please separate this data from the DP report and use it as the official NWS statistics.

o Mobile Home Safety Some overlooked data support the widespread belief that mobile homes should be abandoned for a re-enforced shelter when threatened by a tornado or very high winds. Field personnel are occasionally challenged by people in the business of selling mobile homes or leasing space. A confrontation could be avoided by letting the numbers speaks for themselves.

From 1983 to 1986, there were 265 people killed by tornadoes. Of that total, 105 or 40 percent were in a mobile home. As of late 1984, there were 83 million permanent residences and 5 million mobile or manufactured homes in the country. At that time, 4.6 percent of the population lived in mobile homes. Realistically today, that number may be between 5 and 6 percent. The bottom line is that the risk to mobile home dwellers appears to be 6 to 8 times higher than a conventional dwelling.

The NWS safety rules are supported independently by a 1980 Policy Statement by the American Meteorological Society and the Institute for Disaster Research headquartered at Texas Tech University. The latter has been conducting damage investigations for 17 years and has extensively studied over 60 major events.

o Hurricane Hotline Publicity on NWWS and NWR Since its inception 2 years ago, the Hurricane Telephone Hotline Service has become quite popular. The hotline information benefits the public and helps our offices by reducing inquiries during tropical weather situations. Previously, most of the advertising about the hotline was done by the media. Now it seems appropriate that our offices, particularly those along the coast, assist in publicizing the hotline numbers. Therefore, a suggested Public Information Statement has been sent to all regional NWS offices for use on NWR and NWWS advising callers to dial 1-900-410-NOAA for storms threatening the continental U.S. and 1-900-410-WARN (instead of CANE) for those threatening Hawaii. Calls cost 50 cents for the first minute and 35 cents for each additional minute.

o Hints from Heloise That's the name of a column seen in many newspapers across the country which recently featured a good suggestion about severe weather preparedness. A reader from Tulsa, Oklahoma, suggested taping a county map of the state to the side of the television set. The reader had marked her approximate location on the map with a red dot. Thus, when a warning came across the television set listing the counties warned, a quick check of the map would reveal the relation of the counties warned to the reader's own county and location. The reader also suggested that parents should teach their children their geographic location as well as the proper safety precautions.

o Television Dissemination of NWS Radar, NWR, Watches, Warnings Most TV stations either transmit a "black signal" or a test pattern between their "sign-off" time around midnight until they resume normal programming at daybreak. However, during this same time period, some stations transmit the NWS radar picture simultaneously with NWR on their audio channel. In this manner, these stations have turned idle non-programming time into a special public service. Since the TV transmitter normally remains "on" between sign-off and sign-on time, Southern Region WSFO/WSO MIC's/OIC's have been encouraged to contact the TV stations management in their area to explore the possibility of carrying NWS radar and NWR audio during sign-off hours. We may well find station managers quite receptive to such an idea because of the valuable public service nature of the proposal and the potential positive feedback from the viewing public. Similarly, some TV stations carry a small "weather" symbol in a lower screen corner whenever a severe weather watch or warning is in effect for their viewing area. NWS office managers may want to explore this issue as well with TV stations which do not have such a policy. This practice, too, would provide a valuable public service.

HURRICANE CONFERENCES

o New York State Hurricane Preparedness Conference The New York State Disaster Preparedness Commission and the State Emergency Management Office conducted a 2-day Hurricane Preparedness Conference on Long Island, New York, where Hurricane Gloria made landfall in 1985.

The Conference was well attended by local, county, state, and Federal disaster preparedness officials who were not disappointed by the excellent presentations by Robert Sheets and Brian Jarvinen (National Hurricane Center), Cliff Crowley (AM/MIC, WSFO New York), and Mike Carter (consultant to the NWS). Harry Hassel, former Director, Eastern Region, had the pleasure of introducing some of the NWS people. Workshop sessions at this Conference included topics such as evacuation processes, legal issues, public information and warnings, psychological aspects, long-term mitigation efforts, and hurricanes and coastal management.

o Tri-State Hurricane Preparedness Conference In May, Harry Hassel, former Director, Eastern Region, traveled with Stan Wasserman and Harvey Thurm, MSD, to Providence, Rhode Island, to attend the Connecticut/Massachusetts/Rhode Island Tri-State Hurricane Preparedness Conference. Speaking on behalf of the Weather Service were Drs. Neil Frank and Bob Sheets, NHC, and Mr. Tom McGuire, Area Manager, WSFO Boston. The presentations went very well and were much appreciated. The Conference represented the "swan song" for Neil Frank, at least in the Eastern Region. Neil will be missed by all in the East. We wish him the best in his new endeavor.

o Florida's First Governor's Hurricane Conference In late May, the state of Florida assembled emergency managers from all 67 counties for the first Governor's Hurricane Conference. In addition to the emergency managers, there were over 300 other participants including elected officials, media people, fire and law enforcement officials, and representatives from a variety of other disciplines. The conference tackled a number of issues ranging from public awareness to sheltering. Paul Hebert, MIC(AM) WSFO Miami, represented the Weather Service at the meeting. It's obvious that the state of Florida is taking the hurricane problem seriously with a strong commitment of resources.

REGIONAL NEWS AND VIEWS

o Public Awareness Program WSFO Phoenix recently staged a Public Awareness Program at the Fiesta Shopping Mall in the Greater Phoenix Area. Focus of the awareness campaign was education of the public about NOAA Weather Radio, flash floods, and other bad weather phenomena.

Mike Franjevic, DPM, WSFO Phoenix, felt that this awareness program was very successful. More than 500 persons stopped by the high visibility display to pick up weather related pamphlets. The mall "foot-count" for the 3-day holiday weekend numbered about 35,000 persons. Thus, thousands of holiday shoppers viewed the display, affording the National Weather Service great visibility. The display was set up, manned, and dismantled entirely by volunteer WSFO Phoenix personnel. More than 40 hours of volunteer time was contributed to the awareness program; a noteworthy effort by the WSFO Phoenix staff on a holiday weekend.

Public response to their presence at the mall was quite favorable. They rated their service high in professionalism, as well as forecast credibility. Negative feedback was non-existent. We strongly believe that awareness programs such as this are quite positive and have a long lasting effect in the community. The mall awareness program also received a good share of media "plugs" from various mass news disseminators before and during it's 3-day run.

o WSFO Buffalo SKYWARN Program The Buffalo Chamber of Commerce and members of WSFO Buffalo staff worked together this spring to improve the WSFO's Amateur Radio Station and SKYWARN network for western New York. The Chamber of Commerce donated the money to purchase a "state of the art" two-meter band radio for the WSFO. WSFO Buffalo now has an elaborate communications set-up consisting of a marine band transceiver, a programmable scanner, a CB unit, and the new two-meter receiver. They have a core of eight "hams" living near the office who come in to staff the center during severe weather.

This system was "officially" inaugurated on May 14, 1987, and written up in the "Buffalo News." The newspaper article sparked interest from a local television station who then came in and did a "special." All of the publicity has been

instrumental in helping to raise the interest of local "hams." This is resulting in more spotters and an expanded and increased SKYWARN network that will enhance Buffalo's warning program.

o Open House for Amateur Radio Operators WSO Fort Smith, Arkansas, OIC, Arnold Malpass, held an "open house" for amateur radio operators in the Fort Smith area on June 20. The Fort Smith Area Amateur Radio Club has equipped the WSO's "ham shack" with a 2-meter radio, a 450 MHz UHF radio, and a packet radio station. The open house was part of an effort by the WSO to show the ham storm spotters what happens at the Weather Service end during severe weather. As part of the promotion, Arnold offered one free forecast valid for 24 hours for anyone attending.

Also, we in the NWS deal frequently with amateur radio operators, folks we affectionately call "hams." But did you ever wonder how that term came to be associated with radio operators? Recently, Arnold Malpass forwarded a newsletter from the Fort Smith Area Amateur Radio Club which addressed that very question. Excerpting from the April 1987 issue of Reading the Mail:

> "Have you ever wondered why we radio amateurs are called "HAMS?" Well, it goes something like this:
>
> The HAM was applied in 1908 and was the call letters of one of the first amateur wireless stations operated by some members of the Harvard Radio Club. They were Albert Hyman, Bob Almay, and Peggie Murray. At first, they called their station Hyman-Almay-Murray. Tapping out such a long name in code soon called for a revision and they changed it to HY-AL-MU using the first two letters of each name.
>
> Early in 1909, some confusion resulted between signals from amateur wireless HYALMU and a Mexican ship name MYALMO, so they decided to use only the first letter of each name and identified their station as HAM.
>
> In the early pioneer and unregulated days of radio, amateur operators picked their own frequencies and call letters. Then, as now, some amateurs had better signals than some commercial stations. The resulting interference finally came to the attention of Congressional committees in Washington and they gave much thought to proposed legislation designed to critically limit amateur activity.
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> In 1911, Albert Hyman chose the controversial Wireless Regulation Bill as the topic of his thesis at Harvard. His instructor insisted that a copy be sent to Senator David Walsh, a member of one of the committees hearing the bill. The Senator was so impressed he sent for Mr. Hyman to appear before the committee. Hyman was put on the stand and described how the little amateur station, HAM, was built. He almost cried when he told the crowded committee room that if the bill went through, they would have to close up the station because they could not afford the license fees and other requirements which were set up in the bill.
>
> The debate started and the little station, HAM, became a symbol of all the little amateur stations in the country that were crying out to be saved from the menace and greed of big commercial stations who didn't want them around. Finally, the bill got to the floor of Congress and every speaker talked about the poor little station, HAM.

That's how it all started. You can find the whole story in the Congressional Records. Nationwide publicity associated the station, HAM, with amateurs. From that time to this, and probably to the end of time, in radio, an amateur is a HAM."

o Spotter Training John Miller, Focal Point for Warning and Preparedness at Minneapolis, provided spotter training to a group of pilots and ground crews from the Metro Traffic Control group. The organization contracts to local Minneapolis media outlets to furnish traffic information during rush hours. The pilots are a very enthusiastic group and have the capability of observing much of the metro area during the peak time of convective activity. The addition of these pilot reports should help to increase the quality of spotter reports in the Twin Cities area.

o Air Force Disaster Coordination WSFO Lubbock WPM, Bill Alexander, recently met with the Disaster Preparedness Group of Reese Air Force Base in Lubbock. Disaster preparedness is a particular problem for Reese because of their high personnel turnover rate estimated at over 60 percent. In the coming months, Bill will be assisting the Base with spotter training for the Base fire department and Military Police.

o U.S. Coast Guard and Hurricanes Storm surge, tidal flooding, lightning, and hurricane safety were among the topics when David Kava of WSO Port Arthur visited the U.S. Coast Guard Marine Safety Office. Besides showing the film Alicia, he also discussed the local disaster preparedness plans for operations and evacuations. The visit was particularly significant in opening future avenues for cooperation with the Coast Guard.

o Weather Interview WSO Mobile MIC, Mike Pass, recently assisted Mobile television station WKRG-TV as they taped a 15-minute program for use as part of WKRG's Youth Magazine. The program, aimed at high school level students, included an explanation of the NWS role during a hurricane, both the watch and warning phases, weather radar, and the use of AFOS. The program was shown in mid-July.

Together with the Baldwin County Emergency Management Agency, Mike Pass also hosted a "table-top" exercise using Hurricane Ed. In the exercise, they walked through the approach of the storm including projected effects on Baldwin County. The exercise helped to heighten awareness and readiness on the part of County officials.

In addition, Mike participated in a hurricane press conference hosted by Mobile County Emergency Management Agency. The press conference focused on hurricane preparedness as well as actions taken by NWS and EMA groups during a hurricane.

o Panama City Hurricane Meeting Over on the Northwest Florida coast, Pensacola MIC, Dale Eubanks, was the keynote speaker for the annual hurricane meeting of the West Florida Disaster Advisory Council. Dale used the opportunity to stress the need for coordination during hurricanes and the importance of information exchange during storm events. The meeting held in Panama City attracted media attention from as far away as Dothan.

o A Traditional Navy "Well Done" Those were the words used by Commander Ferda, Medical Services Corps, in his letter of appreciation to New Orleans WPM Mike Koziara. Mike participated in the First Annual New Orleans National Disaster Medical System Symposium held in late May. Mike's subject was the vulnerability of the Gulf Coast to hurricanes which included a history of lives lost in southern Louisiana.

o Owlie SKYWARN Goes To Summer Camp Well, it doesn't rank up there with the new summer movie "Ernest Goes to Camp," but Owlie SKYWARN is going to camp with youngsters in the Tupelo area. Gary Smedley, OIC of WSO Tupelo, recently furnished the Tupelo Parks Department with several copies of the Owlie SKYWARN brochure "Watch Out - Storms Ahead!" to be used in their summer recreation program.

o Restaurant Safety Shoney's South, owners and operators of Shoney's, Hungry Fisherman, Captain D's, Danver's International, J. P. Seafield's, and Willie Moffatt's Restaurants, recently wrote to WSFO Memphis requesting information on tornado safety. WSFO Memphis WPM, Jim Poirier, responded to their request with a number of SKYWARN posters and an offer to assist in devising a tornado plan for their facilities.

o WMP Activities in Houston and Galveston Area Since the first of the year, Ron Stagno, WPM, WSO Houston, has been very active in awareness activities. He's conducted 13 talks to a total of 1,024 people on tornadoes and severe storms and held six spotter training sessions resulting in an additional 182 trained spotters. Our total number of trained spotters in the 19 counties served by this office is now in excess of 2,000. In addition, 38 programs on hurricane preparedness have been conducted so far this year reaching a total of 2,336 people. Eight programs have been conducted to date for educational institutions reaching over 125 teachers. Many more will be reached by the end of August when Ron conducts in-service training sessions for both the Houston Independent School District's and the Brazosport Independent School District's science teachers.

Also, eight programs have been conducted for Black and Hispanic minority groups. The highlight of this endeavor was his participation in the National Urban League Convention in July when they personally met with over 1,500 Black leaders of their communities across the Nation. These people came by the National Weather Service booth to discuss how we could better serve the Black population through improved communications of weather information, preparedness measures, and employment opportunities.

Ron has written two feature short stories highlighting the tornado and hurricane threats to southeast Texas. Both of these stories have been published in the Houston Chronicle, the area's leading newspaper.

o Kudos for Beverly Poole The Warning Preparedness Meteorologist, WSFO Louisville, Beverly Poole, has done exceptional work in the preparedness field since the first of the year. Listed below are several of her major accomplishments.

-- On March 17, 1987, Bev participated in an in-service seminar at Cedar Lake Lodge in LaGrange, Kentucky, which is a facility for handicapped children up to 18 years of age. The training was conducted for the house parents and about 80 employees. The movie "Terrible Tuesday" was shown, followed by

discussions on weather safety -- especially highlighting lightning safety. The seminar was followed up with a safety survey of their facility, noting the safe areas in the event of severe weather. Bev addressed the importance of NOAA Weather Radio in implementing their weather safety plan. The day ended with sharing some weather information with a few of the more advanced handicapped children. It was a very rewarding day!

-- On May 27, 1987, Bev accepted a challenge. That goal was to bring weather safety to, and create a SKYWARN spotter network for, the United Parcel Service Aircraft Center at Standiford Airport in Louisville. During loading operations, there are approximately 2,300 people on the ramps in the UPS complex. The employees are surrounded by very large, tall-standing aircraft and hundreds of high poled vapor lights. The chances of a lightning strike injuring or possibly killing an employee was at highest risk. Also, it was determined that it would take a total time of 5 minutes to clear the ramp of people — in the event of a tornado or severe storm emergency.

The mission started by Bev spending a midnight shift working along side the ramp supervisor. This enabled first-hand knowledge of how the operation worked, where the people were located, and potential weather hazards. Assignments were made detailing the safest locations of the ramps. From that night, interest among high management peaked. They realized for the first time the necessity of establishing a severe weather preparedness plan.

Two SKYWARN seminars were held on June 24 and July 8. Potential spotters were chosen from each division of UPS management. Fifty-three managers attended the training. A NOAA Weather Radio plan was established when "Operation Weather Watch" went into effect. At that point, a designated employee was assigned to constantly monitor NOAA Weather Radio. When threatening weather reached within 50 miles of the operation center, the SKYWARN network was deployed to assigned spotting positions. Once a warning was issued or severe weather sighted, the ramp personnel would be directed to designated safety areas.

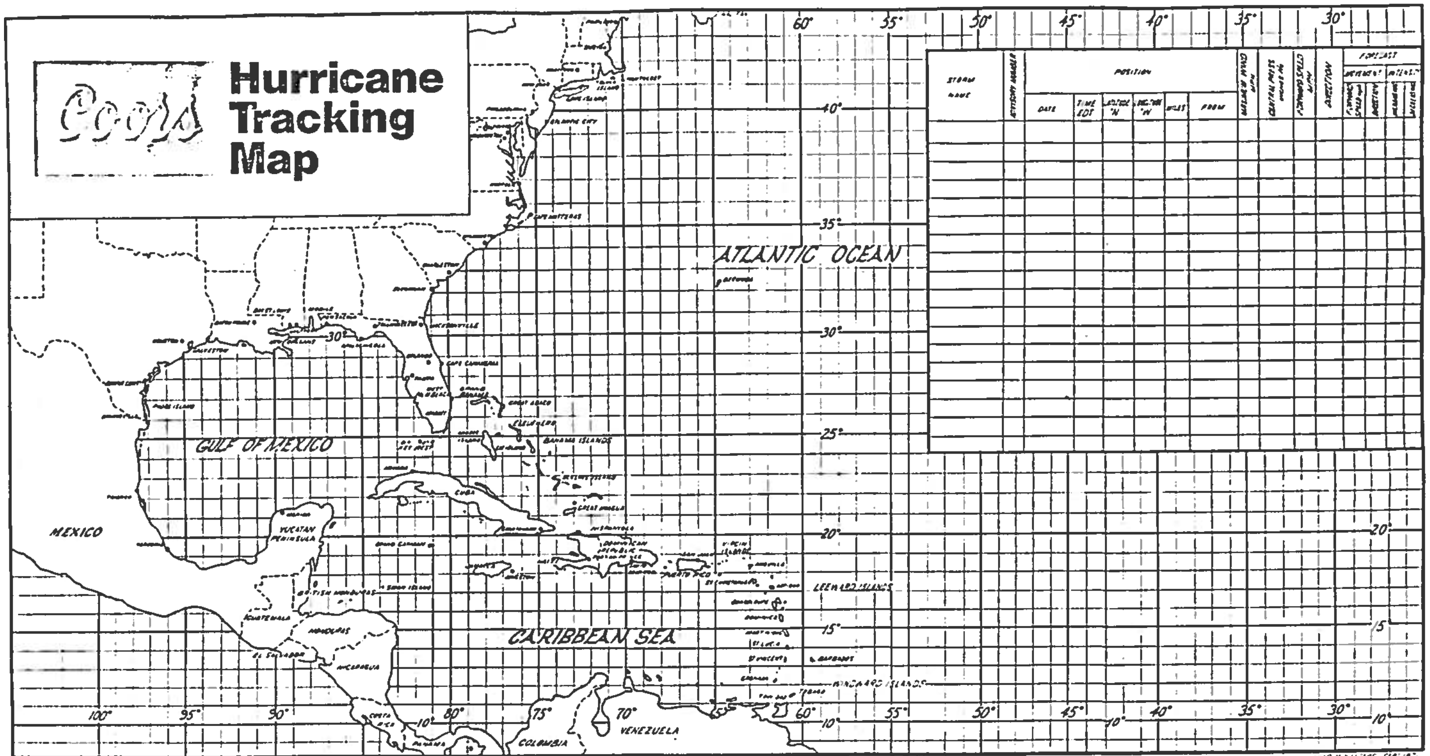
The next phase of completing this mission will be to conduct tornado drill with the goal of clearing the 2,300 employees from the ramp in two minutes or less. The drill is scheduled for early fall. The cooperation of the United Parcel Service Center has been outstanding. Bev has sparked so much interest in weather safety and preparedness that seasonal SKYWARN classes will be taught and offered to all employees.

-- On May 24, residents of Minors Lane Heights became concerned when a tornado warning was issued for the Louisville metropolitan area. Many of them live in two large mobile home parks and others live in houses built on cinder blocks or concrete slabs.

Aiming to protect themselves from the possible tornado, many of the residents drove to Minors Lane Elementary School thinking that it would provide safe shelter. The school was locked. One of the residents broke a window with a tire tool, and 200 people filed into the school and assumed the hallway safety position for tornadoes. Shortly thereafter, the police arrived summoned by the school's burglar alarm. They found the people huddled in the school.

Needless to say, it was not the WPM's intention to advocate breaking and entering to attain safety. Nevertheless, it did prove that people are keenly aware of severe weather safety!

Coors Hurricane Tracking Map



Hurricane Safety Rules

Hurricane advisories will help you save your life But you must help. Follow these safety rules during hurricane emergencies:

1. Enter each hurricane season prepared. Every June through November recheck your supply of boards, tools, batteries, nonperishable foods, and the other equipment you will need when a hurricane strikes your town.
2. When you hear the first tropical cyclone advisory, listen for future messages; this will prepare you for a hurricane emergency well in advance of the issuance of watches and warnings.
3. When your area is covered by a hurricane watch, continue normal activities, but stay tuned to radio or television for all NOAA National Weather Service advisories. Remember, a hurricane watch means possible danger; if the danger materializes, a hurricane warning will be issued. Meanwhile, keep alert. Ignore rumors.
4. When your area receives a hurricane warning:
   Plan your time before the storm arrives and avoid the last-minute hurry which might leave you marooned or unprepared.
   Keep calm until the emergency has ended.
   Leave low-lying areas that may be swept by high tides or storm waves.
   Moor your boat securely before the storm arrives, or evacuate it to a designated safe area. When your boat is moored, leave it, and don't return once the wind and waves are up.
   Board up windows or protect them with storm shutters or tape. Danger to small windows is mainly from wind-driven debris. Larger windows may be broken by wind pressure.
   Secure outdoor objects that might be blown away or uprooted. Garbage cans, garden tools, toys, signs, porch furniture, and a number of other harmless items become missiles of destruction in hurricane winds. Anchor them or store them inside before the storm strikes.
   Store drinking water in clean bathtubs, jugs, bottles, and cooking utensils; your town's water supply may be contaminated by flooding or damaged by hurricane floods.
   Check your battery-powered equipment. Your radio may be your only link with the world outside the hurricane, and emergency cooking facilities, lights, and flashlights will be essential if utilities are interrupted.
   Keep your car fueled. Service stations may be inoperable for several days after the storm strikes, due to flooding or interrupted electrical power.
   Stay at home, if it is sturdy and on high ground; if it is not, move to a designated shelter, and stay there until the storm is over.
   Remain indoors during the hurricane. Travel is extremely dangerous when winds and tides are whirling through your area.
   Monitor the storm's position through NOAA National Weather Service advisories.

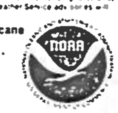
AVOID THE EYE OF THE HURRICANE

If the calm storm center passes directly overhead, there will be a lull in the wind lasting from a few minutes to half an hour or more. Stay in a safe place unless emergency repairs are absolutely necessary. But remember, at the other side of the eye, the winds rise very rapidly to hurricane force, and come from the opposite direction.

5. When the hurricane has passed:
   Seek necessary medical care at Red Cross disaster stations or hospitals.
   Stay out of disaster areas. Unless you are qualified to help, your presence might hamper first-aid and rescue work.
   Drive carefully along debris-filled streets. Roads may be undermined and may collapse under the weight of a car. Slides along cuts are also a hazard.
   Avoid loose or dangling wires, and report them immediately to your power company or the nearest law enforcement officer.
   Report broken sewer or water mains to the water department.
   Prevent fires. Lowered water pressure may make fire fighting difficult.
   Check refrigerated food for spoilage if power has been off during the storm.

Remember that hurricanes moving inland can cause severe flooding. Stay away from river banks and streams. NOAA National Weather Service advisories will keep you informed on river flood stages.

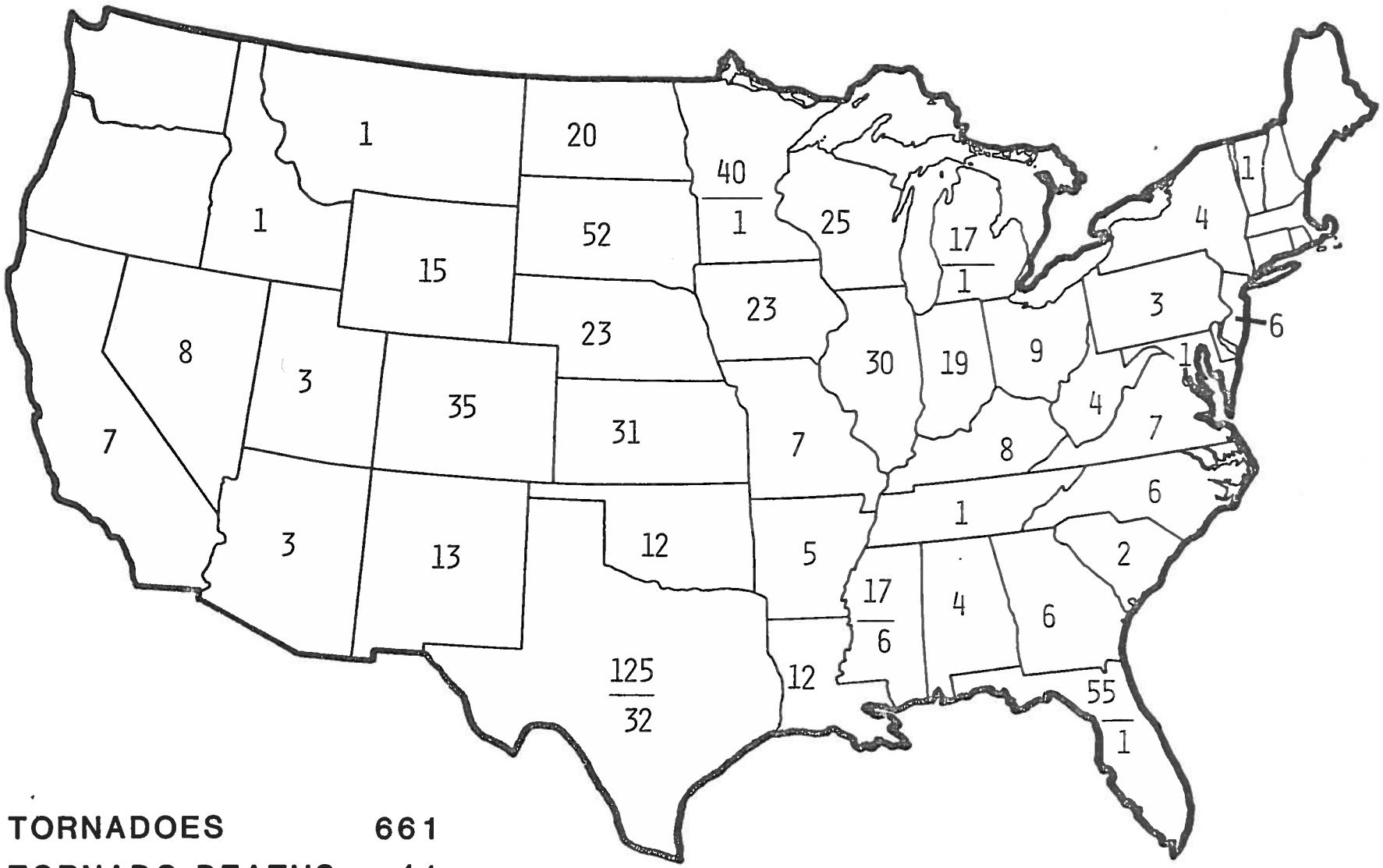
Hurricane watches mean a hurricane may threaten an area. Hurricane warnings mean a hurricane is expected to strike an area within 24 hours.



DRINK SAFELY

UNOFFICIAL TORNADO STATISTICS

(AS OF AUGUST 30, 1987)



TORNADOES 661

TORNADO DEATHS 41

DISASTER PREPAREDNESS ROSTER

JULY 1987

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Linda S. Kremkau, W/OM11	Program Assistant	

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Albert Kachic	Reg. Hydrologist	649-5464
John Kwiatkowski	Cleveland (WPM)	942-4949
Mary Jo Parker	Columbia, SC (WPM)	677-5501
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Dick Calcaterra	Parkersburg, WV (WPM)	923-1344
Dennis Decker	Raleigh (WPM)	672-4436
Rich Schwerdt	Washington (WPM)	763-8275
Ralph Izzo	New York (Focal)	662-5340
Tim Scrom	Albany (Focal)	562-6586
Dave Dilley	Boston (Focal)	223-1354
Tom Dunham	Buffalo (Focal)	437-4800
Bill Drzal	Pittsburgh (Focal)	722-2882
Dave Sisk	Pittsburgh (Focal)	722-2882
Fred Ronco/John Rimkunas	Portland (Focal)	833-3552

SOUTHERN REGION

Brian Peters	Regional (WPM)	334-2812
Max Blood	Atlanta (WPM)	246-7586
Charles Terrell	Birmingham (WPM)	229-0837
Buddy McIntyre	Fort Worth (WPM)	334-8505
Ron Stagno	Houston (WPM)	526-5834
David Imy	Jackson (WPM)	490-4639
Nelson DeVilliers	Little Rock (WPM)	740-5331
Bill Alexander	Lubbock (WPM)	738-7362
Jim Poirier	Memphis (WPM)	222-6441
Don DeVore	Oklahoma City (WPM)	736-5832
Bill Hare	San Antonio (WPM)	730-5025
Francisco Torres-Cordero	San Juan (WPM)	8-809-753-4893
Dick Wood	Albuquerque (Focal)	474-2170
Mike Koziara	New Orleans (Focal)	682-6891
Larry Lahiff	Miami (Focal)	350-4303

CENTRAL REGION

		FTS
Larry Krudwig	Regional (WPM)	758-3239
Lee Larson	Regional Hydrologist	758-3229
R. Koeneman	Chicago (Focal)	353-4680
Larry Gabril	Ann Arbor (Focal)	378-2220
Brian Dowd	Des Moines (Focal)	862-4496
Diane DeCaire	Indianapolis (Focal)	331-4035
Beverly Poole	Louisville (Focal)	352-5210
Guy Tucker	St. Louis (Focal)	279-7018
Lee Anderson	Sioux Falls (Focal)	782-4244
Steven Schurr	Topeka (Focal)	752-2630
Bill Kneas	Denver (Focal)	327-3611
Bob Glancy	Cheyenne (Focal)	328-2376
John Miller	Minneapolis (Focal)	725-3400
Tom Zajdel	Milwaukee (Focal)	362-3243
Richard May	Bismarck (Focal)	783-4224
Gary Wiese	Omaha (Focal)	864-4207

WESTERN REGION

Richard Douglas	Regional (WPM)	588-4000
Tony Haffer	Regional Hydrologist	588-5137
Al Dreumont	Boise (Focal)	554-9860
Chuck Conway	Los Angeles (Focal)	793-7215
Mike Franjevic	Phoenix (Focal)	261-3500
Don Northrop	Portland (Focal)	423-4340
Bob Thompson	Reno (Focal)	470-5794
Bill Alder	Salt Lake City (Focal)	588-5133
Jan Null	San Francisco (Focal)	466-7767
Charles Ruscha	Seattle (Focal)	392-6087
Dave Olsen	Great Falls (Focal)	585-1311

ALASKA REGION

A. Jay Hull	Regional (WPM)	8-907-271-3886

PACIFIC REGION

Vacant	Regional (WPM)	8-551-1698

SUMMARY OF 1986
NATURAL HAZARD DEATHS

RICHARD A. WOOD
DEPUTY METEOROLOGIST IN CHARGE
NATIONAL WEATHER SERVICE FORECAST OFFICE
ALBUQUERQUE, NEW MEXICO

THE ATTACHED DATA SHOWS THAT 397 LIVES WERE LOST IN 1986 DUE TO FLASH FLOODS/FLOODS, HEAT, LIGHTNING, HIGH WINDS, TORNADOES, WINTER STORMS, AND HURRICANES/TROPICAL STORMS.

ALL OF THE NATURAL HAZARDS WITH ESTABLISHED "NORMALS" WERE BELOW NORMAL FOR THE YEAR. IN 1985, ONLY FLASH FLOODS/FLOODS WAS ABOVE NORMAL WITH 166 DEATHS. HEAT AND WINTER STORMS ARE NEW ENTRIES IN 1986. INJURIES AND PROBABLY PROPERTY DAMAGE WILL BE ADDED TO THE 1987 STATISTICS.

EVENT	DEATHS	20-YEAR NORMAL
HEAT	92*	---**
FLASH FLOODS/FLOODS	80	163
WINTER STORMS	69	---**
LIGHTNING ,	68	97
HIGH WINDS	65	---**
TORNADOES	15	98
HURRICANES/TROPICAL STORMS	8	33

* ONLY 8 STATES REPORTED HEAT DEATHS IN "STORM DATA" FOR 1986.
** 20-YEAR NORMAL NOT YET ESTABLISHED.

	1986	
EVENT	MALE	FEMALE
FLASH FLOODS/FLOODS	57	23
TORNADOES	7	8
LIGHTNING	53	15
HURRICANES	4	4
HIGH WINDS	45	20
WINTER	52	17
HEAT	40	52
TOTAL	258	139
PERCENT	65.0%	35.0%
AVERAGE AGE	41.4	47.7

1985		1985	
EVENT	DEATHS	MALE	FEMALE
FLASH FLOODS/FLOODS	166	102	64
TORNADOES	94	38	56
LIGHTNING	74	69	5
HURRICANES	30	24	6
HIGH WINDS	12	9	3
TOTAL	376	242	134
PERCENT		64.4%	35.6%

FLASH FLOODS AND FLOODS - 1986

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FLASH FLOODS AND FLOODS AGAIN PROVED TO BE ONE OF OUR GREATEST KILLERS BUT THE 8Ø DEATHS IN 1986 WAS THE LOWEST SINCE THE 68 DEATHS IN 1971. THE GREAT MAJORITY OF THE FLASH FLOOD DEATHS IN 1986 (59%) WERE VEHICLE RELATED, AS IT IS EVERY YEAR. THREE STATES ACCOUNTED FOR 4Ø OF THE 8Ø DEATHS-TEXAS WITH 18, CALIFORNIA 13 AND PENNSYLVANIA WITH 9 DEATHS. NOT INCLUDED IN THESE STATISTICS WERE 7 SURFING DEATHS--ALL IN THE PACIFIC OCEAN COASTAL STATES OF CALIFORNIA (4) AND HAWAII (3).

DEATHS MALE	FEMALE	AVERAGE AGE MALE	AVERAGE AGE FEMALE
57 (71.3%)	23 (28.7%)	36.1	36.8

AVERAGE AGE MALE AND FEMALE	DEATHS IN VEHICLES	STANDING/PLAYING NEAR CREEKS, ETC.
36.3	47	18

AGES	MALE	FEMALE
Ø-9	3	3
1Ø-19	9	3
2Ø-29	15	1
3Ø-39	11	6
4Ø-49	3	6
5Ø-59	6	Ø
6Ø-69	7	3
7Ø-79	Ø	1
8Ø-89	3	Ø
9Ø-99	Ø	Ø

BOATS	HOME	MUD SLIDE/OTHER
9	3	3

DEATHS BY MONTHS

JAN	Ø	APR	2	JUL	9	OCT	6
FEB	11	MAY	21	AUG	8	NOV	3
MAR	4	JUN	5	SEP	7	DEC	4

FLASH FLOOD DEATHS BY STATES DURING 1986

DEATHS STATE	IN VEHICLE	IN RIVER, IN CREEK, ETC.	BOAT	HOME	MUD SLIDE, OTHERS	TOTALS
TX	12	4	1	1		18
CA	3	1	7		2	13
PA	9					9
MO	2	1		1		4
NY	1	2			1	4
SC	4					4
VT	3					3
VA	3					3
MI	1	1				2
MT	2					2
NM	2					2
OK	2					2
PR	1	1				2
IL			1			1
IA		1				1
MA		1				1
MD		1				1
MN		1				1
NV				1		1
OH	1					1
TN	1					1
UT		1				1
WV		1				1
WA		1				1
WI		1				1
TOTALS	47	18	9	3	3	80
PERCENTS	59%	22%	11%	4%	4%	100%

WINTER STORMS 1985-86 SEASON

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THIS WAS A FIRST ATTEMPT TO COMPILE WINTER STORM MORTALITY STATISTICS. ONLY THOSE DEATHS DIRECTLY RELATED TO WINTER STORMS OR HEAVY SNOW WERE INCLUDED. THERE WERE 69 DEATHS IN THE 1985-86 WINTER SEASON DUE TO THE SNOW AND COLD.

MALES	FEMALES	EXPOSURE	CAR/TRUCK	HEART ATTACK	SHOVELING
52 (75.4%)	17 (24.6%)	38	22	3	2

AVALANCHE
4

AGES	MALE	FEMALE	MALE IN VEHICLE	FEMALE IN VEHICLE
Ø-9	1	Ø	Ø	Ø
1Ø-19	4	2	Ø	1
2Ø-29	1Ø	1	7	Ø
3Ø-39	7	4	1	3
4Ø-49	6	1	2	1
5Ø-59	1Ø	2	1	2
6Ø-69	1Ø	2	2	Ø
7Ø-79	3	3	Ø	1
8Ø-89	Ø	2	Ø	1
9Ø-99	1	Ø	Ø	Ø
TOTAL	52	17	13	9

AVERAGE AGE MALE	AVERAGE AGE FEMALE	AVERAGE AGE-MALE/FEMALE
45.Ø	51.5	46.6
PERCENT 75.4%	24.6%	

DEATHS BY STATES - NEW YORK 11; NEBRASKA AND NORTH CAROLINA 7; UTAH 5; SOUTH DAKOTA, COLORADO AND WISCONSIN 4; MISSISSIPPI, NEW HAMPSHIRE, MAINE, MONTANA, AND WASHINGTON 3; WYOMING, SOUTH CAROLINA, IOWA, AND LOUISIANA 2; OREGON, CALIFORNIA, TENNESSEE, AND KENTUCKY 1 EACH.

LIGHTNING - 1986

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THERE WERE 68 LIGHTNING DEATHS IN 1986. LAST YEAR ONLY 5 FEMALES OUT OF 74 DEATHS WERE KILLED BY LIGHTNING BUT THIS YEARS TOTAL INCREASED TO 15 FEMALE LIGHTNING DEATHS.

DEATHS	MALES	FEMALES	AVERAGE AGE OF MALES	AVERAGE AGE OF FEMALES
	53 (77.9%)	15 (22.1%)	31.0	28.1

AVERAGE AGE OF DEATHS (MALES AND FEMALES)

30.4

AGE	MALE	FEMALE
0-9	1	2
10-19	12	4
20-29	18	3
30-39	7	4
40-49	6	0
50-59	4	0
0-69	3	0
70-79	2	1
80-89	0	1
90-99	0	0
100+	0	0
TOTAL	53	15

DEATHS BY MONTHS

JAN	0	JUL	21
FEB	0	AUG	17
MAR	0	SEP	5
APR	2	OCT	1
MAY	9	NOV	0
JUN	13	DEC	0

LIGHTNING DEATHS DURING 1986

STATE	TREE	OPEN FIELD	NEAR OR IN BLDG/HOME	BOAT	FISHING	BALL-FIELD	GOLF	BEACH	OTHER	TOTAL
FL	2	1	1	1		1		3	1	10
MI			4				1			5
AL	3	2								5
MD					1			4		5
GA	1	1	2							4
NC	2	1		1						4
TN	1	1	2							4
OK		3								3
MS		2				1				3
KY		1					1			2
LA				1	1					2
TX		1				1				2
OH						2				2
PA			1			1				2
MA	1		1							2
UT		2								2
IN	1									1
OR		1								1
SC			1							1
CO			1							1
IA				1						1
DE		1								1
SD		1								1
VA							1			1
AZ					1					1
IL							1			1
PR		1								1
TOTAL	11	19	13	4	3	6	4	7	1	68
PERCENT	16%	28%	19%	6%	4%	9%	6%	10%	2%	100%

HIGH WINDS 1986

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HIGH WINDS, NOT ASSOCIATED WITH TORNADOES, KILLED 65 PEOPLE IN 1986. THE MAJORITY WERE VEHICLE OR BOAT RELATED. THIS WAS THE FIRST YEAR FOR A COMPLETE TABULATION OF HIGH WIND DEATH STATISTICS. NEXT YEAR INJURIES WILL BE ADDED TO THE LISTINGS. AIRCRAFT DEATHS NOT INCLUDED WHERE "*" ARE INDICATED.

DEATHS MALE	FEMALE	AVERAGE AGE MALE*	AVERAGE AGE FEMALE
45 (69%)	20 (31%)	37.7	24.1

AVERAGE AGE MALE AND FEMALE*	DEATHS IN VEHICLES	VICINITY OF TREES
33.0	22	7

AGES	MALES*	FEMALES
0-9	3	2
10-19	4	5
20-29	2	8
30-39	11	3
40-49	7	1
50-59.	4	1
60-69	6	0
70-79	1	0
80-89	0	0
90-99	0	0

WATER/ BOATS	HOMES	AIRCRAFT	OTHERS
18	5	7	6

DEATHS BY MONTHS

JAN	12	APR	11	JUL	7	OCT	2
FEB	1	MAY	5	AUG	8	NOV	4
MAR	5	JUN	6	SEP	4	DEC	0

HIGH WIND DEATHS DURING 1986

STATE	TREE FELL	VEHICLE	WATER/ BOAT	HOME	AIRCRAFT	OTHER	TOTALS
NY		6	1			1	8
IL	1		4			2	7
ID	2		3				5
NB					5		5
AL		3	1				4
CA		3				1	4
TX	1		2		1		4
VT		4					4
FL		2		1			3
MA	1	2					3
MT			2			1	3
NM			3				3
AR		1		1			2
MI	1		1				2
SD				2			2
KY						1	1
MD				1			1
NC		1					1
OR					1		1
PA			1				1
SC	1						1
TOTALS	7	22	18	5	7	6	65
PERCENTS	11%	34%	28%	7%	11%	9%	100%

TORNADOES 1986

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THE 15 TORNADO DEATHS IN 1986 WAS THE LOWEST TOTAL IN RECORDED HISTORY. THE PREVIOUS LOWEST TOTAL WAS 24 DEATHS IN 1981 IN RECORDS DATING BACK TO 1916. THERE WERE 763 CONFIRMED TORNADOES IN 1986 WHILE THE AVERAGE ANNUAL NUMBER OF TORNADOES IS ABOUT 7ØØ.

THE AVERAGE AGE OF THOSE KILLED IN 1986 WAS 45.1. THE AVERAGE AGE OF THOSE KILLED IN TORNADOES CONTINUES AS ONE OF THE HIGHEST OF ALL NATURAL HAZARDS.

DEATHS BY AGE (MALE/FEMALE)		DEATHS BY AGE (MALES)	DEATHS BY AGE (FEMALES)	DEATHS BY MONTHS	
1-9 =	3	Ø	3	FEBRUARY	2
1Ø-19 =	1	Ø	1	MARCH	6
2Ø-29 =	2	1	1	APRIL	2
3Ø-39 =	2	2	Ø	MAY	1
4Ø-49 =	Ø	Ø	Ø	JUNE	Ø
5Ø-59 =	1	Ø	1	JULY	3
6Ø-69 =	2	1	1	AUGUST	1
7Ø-79 =	1	1	Ø		
8Ø-89 =	3	2	1		
9Ø-99 =	Ø	Ø	Ø		
1ØØ+ =	Ø	Ø	Ø		

AVERAGE AGE OF DEATHS: 45.1
DEATHS BY GENDER: 8 FEMALE (53%) AVERAGE AGE OF FEMALES: 34.Ø
7 MALES (47%) AVERAGE AGE OF MALES 57.7

LOCATION	MOBILE HOMES	PERMANENT HOME	VEHICLE	OTHERS	TOTAL
NORTH CAROLINA	3				3
OHIO	3				3
TEXAS	1	1	1		3
ALABAMA		2			2
INDIANA				1	1
IOWA			1		1
MISSOURI			1		1
NEW YORK				1	1
TOTAL	7	3	3	2	15
PERCENT	47%	2Ø%	2Ø%	13%	1ØØ%

HURRICANES/TROPICAL STORMS 1986

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THREE HURRICANES/TROPICAL STORMS DURING 1986 PRODUCED 11 DEATHS. ONE DEATH OCCURRED IN ANDREW AND FIVE EACH IN BONNIE AND CHARLEY.

AVERAGE AGE MALE	AVERAGE AGE FEMALE	AVERAGE AGE (MALE/FEMALE)
49.3	48.Ø	48.6

DEATHS BY STATES	
TX	4
MD	*3
NC	2
VA	1
LA	1

DEATHS BY MONTHS	
JUNE	6
AUGUST	5

AGE	MALE	FEMALE
Ø-9	Ø	Ø
1Ø-19	Ø	Ø
2Ø-29	1	1
3Ø-39	Ø	1
4Ø-49	Ø	Ø
5Ø-59	2	1
6Ø-69	1	Ø
7Ø-79	Ø	Ø
8Ø-89	Ø	1
9Ø-99	Ø	Ø
1ØØ+	Ø	Ø
TOTAL	4	4

STATE	BOAT	CAR/TRUCK	HOME	POND	UNDERTOW	AIRCRAFT	TOTAL
TX		2	1	1			4
MD						*3	*3
NC		1			1		2
VA		1					1
LA	1						1
TOTAL	1	4	1	1	1	*Ø	8

* AIRCRAFT DEATHS NOT DIRECTLY RELATED TO THE NATURAL HAZARD-THUS INDIVIDUAL DATA NOT INCLUDED.

HEAT DEATHS - 1986

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EIGHT STATES (ARKANSAS, TENNESSEE, SOUTH CAROLINA, MISSISSIPPI, LOUISIANA, GEORGIA, ALABAMA, AND WISCONSIN) PROVIDED HEAT DEATH DATA IN 1986.

DEATHS MALE	FEMALE	AVERAGE AGE MALE	AVERAGE AGE FEMALE
40 (43.5%)	52 (56.5%)	64.2	69.1

AVERAGE AGE MALE AND FEMALE
67.0

AGE	MALE	FEMALE
0-9	1	0
10-19	2	0
20-29	2	0
30-39	2	0
40-49	3	2
50-59	6	5
60-69	6	10
70-79	7	17
80-89	10	13
90-99	1	4
100+	0	1
TOTAL	40	52
PERCENT	43.5%	56.5%

DEATHS BY MONTHS

JUNE	2
JULY	85
AUGUST	5

DEATHS BY STATES

AL	11	SC	13
AR	17	TN	8
GA	30	WI	1
LA	5		
MS	7