



warnings coordination report

September 1980

National Weather Service

RICHARD (DICK) WOOD has now settled in as Program Leader, Disaster Preparedness. Dick was the former OIC, Tucson. He has also worked in the Eastern, Southern, and Central Regions. Dick and Charna Lester are the Disaster Preparedness (Team) Coordinators.

SOME ITEMS INCLUDED IN THE DISASTER PREPAREDNESS HANDBOOK may be things already implemented at many Weather Service Offices. However, there are many offices which have new members on staff who have not worked in operational weather before. Handbook chapters may duplicate projects already in practice at some stations--and be welcomed in others. We would appreciate any input which you think might be of interest for inclusion to the Disaster Preparedness Handbook. Please work through your Regional DPM.

SOUTHERN REGION HAS WELCOMED LARRY MOONEY AS THE NEW REGIONAL PREPAREDNESS METEOROLOGIST. Larry was the former DPM focal point in the Oklahoma City Forecast Office. Andy Anderson who served the Southern Region in that position for many years was promoted to the position of Executive Officer, Southern Region.

THE ANNUAL DISASTER PREPAREDNESS MEETING will be held November 18, 19, and 20 in Kansas City. Robert Carnahan, Chief, Weather and Flood Warnings Coordination Staff, as well as Dick Wood and Charna Lester, will be on hand to work with the Regional Focal Points and designated WPM's.

Topeka Weather Service Forecast Office and those of us who have known and worked with Disaster Preparedness Meteorologist, GORDON BROKAW, were saddened to hear of his recent death. Gordon lived in Topeka for many years and was well known in the State of Kansas for the fine preparedness work he did.

NEW PUBLICATIONS which are ready now or will be available soon:

Disaster Preparedness Catalog.

Winter Storms Wallet Card, now a 2-fold (PA 80003).

"Floods, Flash Floods, and Warnings" (PA 71009).

"Severe Local Storm Warning Service Statistics - 1953-1979"
(PA 77018).

"Flood Warning Systems"

DELETE FROM YOUR LISTINGS:

"Hurricane, the Greatest Storm on Earth" (PA 76008) and
 "When a Hurricane Threatens" (PA 76009).

AUDIO-VISUALS which are ready, or near ready:

"Hurricane Frederic" (55 slides with printed commentary) and
 "Tornado, A Spotter's Guide" (slides with commentary).

PUBLIC SERVICE ANNOUNCEMENTS which will be in the field soon:

Tornado spot covering the futility of seeking safety in an automobile.
 Tornado spot covering the inadvisability of stopping to open windows when seconds count.
 An animated Winter Storms message.
 On hand and distributed to the field, are two hurricane public service safety spots from FEMA concerning hurricane safety.

Also available from this office are 30"x30" maps entitled "U.S. Tornadoes 1930-1978." These colorful maps could be useful when making tornado safety talks.

We also have 12"x20" charts of Hurricane Frederic.

ALBERT HULL, MIC-CAPE HATTERAS and his staff put out a special weather statement which began, "With Hurricane Allen in the Eastern Caribbean packing winds of 170 MPH...This is a good time to review preparations that should be made prior to any threat of a hurricane. Allen may or may not become a concern to coastal residents of North Carolina. We still have a few days before we focus our attention on Allen. Right now one thing is sure, you will be one step ahead of any storm...Allen or not ...if you have made the following preparations...." The statement goes on to list all of the things which should be done prior to the impact of a hurricane. This type of early warning to local residents who might bear the brunt of severe weather can save lives and lessen property damage.

TWO EXCELLENT PUBLICATIONS on flooding and disaster preparedness have been co-sponsored by Eastern Region: "Cambria County, Flood Preparedness," Ohio River Forecast Center in cooperation with Cambria County, Pa., and "Flood Bulletin," prepared by NWS-ER with the City of Johnstown, Pa. Each publication is designed for overall use in disaster preparedness. "Flood Bulletin" has an excellent graphic showing a Staff Gauge at Bethlehem Steel with the elevations of many local buildings, as well as the various flood levels which occurred. "Cambria County, Flood Preparedness" also gives safety rules, explanations of warnings and warnings systems, but differs in that the whole story of the major Johnstown floods are included. Good informational reading. Not available, but copies are attached.

WSO CHARLESTON sponsored a Hurricane Preparedness Meeting for the purpose of defining communications. The session attendees were the State's Emergency Preparedness Office and the Governor's Office. New cooperative projects were formulated.

NATIONAL HURRICANE CENTER now has some new photos of the hurricane-prone coasts of Delaware thanks to MIC-Wilmington, Marian Peleski.

OIC, BELL EZELL, TOLEDO, reports there is an alpha-numeric printout of weather for deaf persons who dial the NWS local-forecast number. This means a little extra work for the NWS employees, but they provide this service happily.

PACIFIC REGION WARNINGS PREPAREDNESS METEOROLOGIST, SAUL PRICE has been promoting NWR in a big way. NOAA Graphics Division designed a bus car card which describes the advantage of having NWR in the home. It also lists the two stations on which it is available and gives a ring-through, 24-hour number weather report. In order to determine the number of listeners to NWR and to find out how the public felt about the broadcast content, Honolulu WSFO taped a message asking for input from listeners. The response indicated: messages were heard in a larger area than was anticipated; most people listened every day and more than once per day; they were pleased with the content -- and particularly delighted by the marine information. Keep up the good work, Saul!

GOOD NEWS FROM OHIO. Lynn Maximuk, DPM, Cleveland, was the recipient of the 79th Buckeye Colonel Award. This is the highest award given by the Ohio Adjutant General's Office for public service to Ohioans. Lynn's award reflected but a portion of the time and effort he spent to make the Ohio Tornado Safety Week so successful. The awards ceremony this year will be attended by the president of Weatheralert, Marvin Miller-MIC-CLE, Governor Rhodes of Ohio, and BOB HOPE. NWS staff is in good company. The final word on the Ohio Tornado Week showed that \$1 million of public time and advertising space was donated to this educational week.

NEWTON SKILES, DPM, LITTLE ROCK, received a letter of appreciation from Ray Jensen, Director, Southern Region, for the publication "Arkansas Tornadoes." The 8-page brochure was produced with Cooperative Extension Service, University of Arkansas Division of Agriculture, U.S. Dept. of Agriculture and County Governments Cooperating. It contains a comprehensive explanation of severe weather and how to protect life and property should any of these events occur. Copies are available in limited numbers.

DON WITTEN, NOAA/NWS, PUBLIC AFFAIRS has asked that he be sent information of any unusual use of NWR. Specifically, "for each anecdote, provide sentence on unusual NWR use, name of non-NWS person involved, address, and telephone number." Send to Don Witten, PAW, NWS HQ. This information will be used as fillers in many well-known publications.

HOWARD TATUM, OIC, HILO, reports that experience is the best teacher. Hawaii has had so many disasters recently that the public has learned to pay attention to warnings when issued. Since January 1979 there have been 5 major disasters -- totaling \$27 million in damages.

LARRY LEE, DPM, ATLANTA, reports that a Media Weather Seminar was held in Atlanta recently. Invitations were sent to key radio and television stations, newspapers, state and local civil defense personnel, law enforcement personnel, and amateur radio storm spotters. Topics included tornado preparedness, flooding, flooding awareness, and communications. The Emergency Broadcast System was discussed as was NWR. A tour of the WSFO was included as part of the programming. The consensus of opinion of those attending was that they had a better understanding of NWS communications and a clearer idea of communications language and proceedings.

MT. ST. HELENS activity has created much work for National Weather Service personnel. The resultant flooding mentioned as an incidental in reports of the various eruptions which have occurred since March has cost millions of dollars. NWS personnel have worked in close cooperation with state and local officials to notify residents and the curious who flock so quickly to such events of the possibilities of further flooding. They have made a strong effort to make citizens aware of the terrors of flash floods. So far so good.

HURRICANE ALLEN has now come and gone. The National Hurricane Center and the many, many weather service offices in the affected areas have performed gargantuan tasks. The evacuations which saved many lives worked effectively and easily. The public took the prescribed safety measures they were told to take and it did pay off. Rumor has it that the next time (and we hope there won't be one) it may not be quite so "easy," as those who did evacuate will remember that "nothing" happened.

Those of us who work in weather know that plenty did happen. Countless hours were spent in forecasting and broadcasting the upcoming events so that the public would be apprised, with as much lead time as possible, of the forthcoming hurricane dangers. The coordination of the evacuation procedures was excellent -- and we should blow our own horn.

THE TUCSON, ARIZONA telephone book lists under "United States Government -- Most Frequently Called Numbers" Weather Service and its telephone numbers, and have added "Note: Tune 162.40 MHz radio for continuous local, regional, and national weather." A plug NWR didn't have to pay for.

MARATHON COUNTY, WISCONSIN, held a county-wide tornado drill in which 25,197 persons were moved to safety. They used all phases of weather warnings, including EBS and NWR tests, and worked with schools, airports, and medical facilities. In fact, they report the whole county was involved except the residents of the Humane Society.

THE HEAT WAVE generated a \$7 million appropriation for emergency assistance. This was clearly inadequate according to several reports from senators attending a July 25 hearing. An additional \$6.7 million scheduled for Community Services Administration funds have been reallocated for emergency assistance to victims of the heat wave.

COOPERATION FROM RADIO & TELEVISION STATIONS & NEWSPAPER PERSONNEL has become more frequent and much closer. Newton Skiles, DPM, LIT, has worked frequently with Channel 7 TV in Little Rock. Mark Russell, Weathercaster, has coordinated a brochure outlining tornado and other severe weather facts for the State of Arkansas. The brochure is in full color and has a quiz with illustrated graphics as a part of the pamphlet. Distribution is free. The cost of such a publication was large -- but the overall results are excellent. This frequent association with the media enhances the NWS image to the public.

FLASH FLOOD INITIATIVE

In order to combat the devastation of flash floods, the National Weather Service, the Appalachian Regional Commission (ARC), and the States of Kentucky, Virginia, and West Virginia have established the Integrated Flood Observing and Warning System (IFLOWS). IFLOWS proposes to combine existing sensor, communication, and computer technology with advanced forecasting and software techniques to provide timely guidance and advice to both state and local authorities responsible for the provision of emergency services to their citizens.

Implementation of IFLOWS is expected to yield reliable warnings of local flooding situations 30 minutes to 3 hours in advance of high water. By combining this warning level with effective local action plans, it is expected that dramatic reductions in loss of life from floods will be achieved. Moreover, such advanced warning should permit the removal of valuable property from the flood path, resulting in significant economic savings to both industry and private citizens. With property damage from floods now ranging in the billions of dollars annually, there is little question that IFLOWS represents both a cost effective and necessary tool.

Initially, IFLOWS will be deployed in a test bed located in a twelve county area at the intersection of the three stages mentioned

above. Development of this pilot program is progressing and installation is expected in the summer of 1980, to be followed by a period of experimentation and refinement. In parallel with this testing, IFLOWS will be extended in this area to include as many as 75 counties with additional installations expected in Pennsylvania and Tennessee.

ALAN MOLLER, DPM, WSFO FT. WORTH, had an article in Apartment Management Newslines entitled, "Tornado Preparedness Planning for Apartment Complexes." We understand reprints are available.

The Ft. Worth Chamber of Commerce asked Alan to work with them to devise actions for disaster survival. The subsequent report was published by the CoC and is titled "Pre-Planning Key to Surviving During a Disaster."

DAVE BARNES, MIC, NEW ORLEANS, participated in a multi-parish hurricane drill. Louisiana civil defense agencies are working closely with NWS to make residents aware of proper safety during hurricane threats.

APPALACHICOLA MIC, FRED CRAMER, presented four hurricane spotter training sessions for Florida Highway Patrol groups.

TWO MORE CHAPTERS OF THE DISASTER PREPAREDNESS HANDBOOK were distributed recently. Chapters 14 and 15 should bring your book up to date. If there are stations which do not have the entire 15 chapters, please advise and copies will be sent. This handbook is devised for use by all WSO/WSFO's. Materials used are submitted by weather service office personnel through the Regional DPM Focal Point. Additions to the Handbook are encouraged.

WSFO PIT WILL WELCOME A NEW MIC SOON. G. "CHET" HENDRICKSON will leave his job at WSFO DCA to take over this position. Former MIC George Scheilien recently took over as MIC Philadelphia.

PITTSBURGH NOW HAS RIVER FORECAST RESPONSIBILITIES for the Upper Ohio River Basin, formerly handled by the Ohio River Forecast Center, Cincinnati. The recent floods which occurred about this time in the Pittsburgh area showed that the PIT staff was really on the ball. All warnings of the flooding were well handled. The quick action of the nighttime crew gave lead time for persons in the affected area to take precautionary actions.

JIM VOLLKOMMER, MIC PORTLAND, now has an agreement with the Maine Bureau of Civil Emergency Preparedness concerning actions during severe weather. All County Directors have been advised of the newly developed plan.

FORMER MIC-PITTSBURGH, George Schielein, worked with a program developed in Moline, Illinois, called 'Operation Storm Warning.' His letter and program description are attached. Reception has been excellent. Much hard work went into making it a success. The full staff at PIT is to be commended.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
2328 Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222

June 19, 1980

TO: OA/Wx5 - Director, Weather and Flood Warning Coordination
FROM: George H. Schielein, MIC, WSFO, PIT *George H. Schielein*
SUBJECT: OPERATION STORM WARNING

Our promotion of OPERATION STORM WARNING is moving along at a very rapid pace.

As you know, we've had a great deal of severe Spring weather in our area--
15 confirmed tornadoes in SW PA since May 11--all well handled by our watches
and warnings.

This has resulted in the PIT NWS becoming a very hot media item...numerous
radio talk shows...newspaper articles...and excellent and extensive TV
coverage by all four stations in the area.

Our timing for the promotion was ideal. You can't beat being in the right
place at the right time. Mr. Ralph Keenan of our NOAA Weather Radio staff
once again did an absolutely fantastic job in promotion and getting all
the freebies. Ralph has a B.A. degree in Journalism and Communications from
Point Park College and works for us through a grant-in-aid to the college
to provide five people to run our NWR program. In addition to Ralph's PR
talents, he has a great radio voice, deep resonant tones, etc. If the NWS
could ever pick him up on your staff, the sky would be the limit on PR
activities.

Ms. Theresa Rossi, a meteorologist on our staff, is focal point for this
program and is also doing an absolutely superb job.

Attachments - OPERATION STORM WARNING Promotional Materials





**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE**

OPERATION STORM WARNING

The need to reach all people who need storm warning information is of paramount importance if the National Weather Service's mission is to succeed. Most non-handicapped, literate and/or English speaking people in the United States are able to receive warning information via conventional means...such as radio and television. NOAA Weather Radio will augment conventional dissemination. The problem, then, is how do we reach those persons whose hearing is impaired, those who are incapable of comprehending average communication or those who do not fully understand English? Operation Storm Warning was conceived with the intention of reaching the hearing impaired. A side effect of the system design is that the televised presentation of Severe Weather Warnings is enhanced so that all persons benefit.

The major thrust of this concept is to maximize the impact of the visual media. This entails cooperation between local television stations as well as the area press and donations from industry and service clubs to fund the program.

Operation Storm Warning was developed four years ago in Moline, Illinois. Numerous meetings were held, with attendees consisting of National Weather Service personnel, television representatives and persons from the deaf community. The purpose of the meetings was to determine a universally accepted symbology which could be used to convey the urgency of Severe Weather Warnings. After a succession of attempts by all concerned, symbols representing Tornado and Severe Thunderstorm were found acceptable. (see attachments 1 and 2) They fit: The technological needs of television, the reproducible needs of the press and the conceptual needs of the deaf community. In this area a symbol representing Flash Flood will also be used. (see attachment 3)

The information process of informing those persons to whom the symbols were directed was undertaken in three phases. The first phase was a brochure describing the meaning of the symbols and how they were to be used in the Watch-Warning process. (see attachment 4) The second phase was to issue a news release to all newspapers in the area to spell out in general what Operation Storm Warning was all about. (see attachment 5) Instructions for obtaining the brochure were included in the release. The third and most important phase concerned the television presentation of the symbols. This was an ongoing program consisting of Public Service Announcements to promote the new program. The symbols were universal to all television stations in order to limit confusion due to each station using their own.



The television presentation of the Public Service Announcements consisted of a split screen with the appropriate symbol visually displayed on the right. On the left was a person who provided sign language to the audio which accompanied the television presentation. A sixty second and a thirty second Announcement tape was made. (see attachments 6 and 7) Dubs were provided to other stations.

During an actual Tornado or Severe Thunderstorm Watch, and "open" was used. The "opens" were in the same visual format as the Public Service Announcements. (see attachments 8 and 9) They were immediately followed by the actual announcement of the specific Watch information.

During a Tornado or Severe Thunderstorm Warning, the appropriate symbol was displayed on the screen for a 30 second period to alert viewers of impending danger. After 30 seconds, a live broadcast of the specific warning information was broadcast using the actual NOAA Weather Radio announcement. As soon as possible, a crawl was generated and followed.

Upon termination of a Warning, the same symbols were displayed, but with a large white "X" through the symbol.

The audio for these video presentations was supplied by National Weather Service Personnel in order to provide a "neutral" voice; one that was not readily identifiable as belonging to any one television station.

What we are now trying to do is expand the program, have it accepted universally, so that one may be anywhere in the United States; see the warning symbols on the television and know what they mean and what to do. The program is already developed, all we need to do is implement it. The presentation, however, is by no means rigidly fixed, the only concern is that the symbols used are kept universal. The system could conceivably be improved.

In the Pittsburgh Metropolitan Area alone there are 141,655 persons with hearing impairments of which 16,519 persons are totally deaf. The totals for Pennsylvania are 694,455 and 80,946 respectively.* Not only is this program of value to the deaf community, however, non-English speaking persons, the illiterate, children and the elderly also have problems understanding Severe Weather Watches and Warnings.

The target date for the implementation of Operation Storm Warning in the Pittsburgh Area is this spring's Severe Weather Season. We have already received the support of the local Deaf Community and numerous other concerned agencies. (see Feedback, Letters, Comments Section) We are seeking your cooperation and your support for this long overdue attempt to include a long neglected segment of our society in a disaster preparedness program.

*Deaf Population of the United States, New York University, Schein and Marcus, "First National Study of the Number and Characteristics of the Deaf in Forty Years" ..1971.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE

PROMOTION FOR OPERATION STORM WARNING (COMPLETED)

1. Equitable Gas Company - Display May 1980
2. WEEP and Pittsburgh Outdoor Advertising - Billboard May3-June3 1980
3. Port Authority - bus placards June 1, 1980
4. WTAE - dubbed tape of symbols for our use
5. Tab Newspaper of Penn Hills - typeset and pasted up our new brochure
6. PIP Printing - 500 complimentary copies of brochure
7. ALCOA - printed 50,000 complimentary copies of brochure
8. Mellon Bank - OSW display in bank window
9. Port Authority - put brochures in buses
10. Pittsburgh Chamber of Commerce - mailed brochures to 1300 members
11. Arranged press conference for OSW
12. AM Pittsburgh - live remote broadcast from press conference
13. Jenny Lee Bakery - donated 10 doz. donuts
14. Pittsburgh Press - article
15. Pittsburgh Post Gazette - article

(PROMOTION TO BE COMPLETED)

1. Pittsburgher Magazine - article in June 1980 issue
2. Pittsburgh Magazine - article in August 1980 issue
3. Port Authority - mention in employee newsletter
4. TV Graphic (Pittsburgh Press) - article
5. Market Square of Pittsburgh - article
6. Green Tap of Penn Hills - article
7. Wilksburg Gazette - article on Theresa Rossi
8. Duquesne Light - placing courtesy ad in suburban papers
9. "Consumer Topics" Duquesne Light - article
10. Duquesne Light - house organ
11. Pittsburgh Catholic - article
12. Eye & Ear Hospital of Pittsburgh - will keep brochures in waiting room
13. Eye & Ear Hospital of Pittsburgh - publications
14. Blue Cross of W. PA - will put brochures in billing office
15. Blue Cross of W. PA - write up in house organ

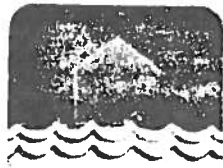


EXECUTIVE OFFICER

DISASTER PREPAREDNESS...

Western Pennsylvania citizens with hearing-impaired disability, and persons who cannot understand English, will benefit from "Operation Storm Warning." At WSFO PIT and WSO ERI, a program to use symbols for tornado, severe thunderstorms, flash floods, and winter storm warnings, has caught on among the media. The acceptance by the media (TV) of this program is the result of hard work and coordinated efforts between the NWS and organizations representing hearing-impaired and non-reading citizens. Our NWS people are to be congratulated. Some of the symbols are reproduced here:

WARNING!



FLASH FLOOD WARNING
When you see this symbol on the television screen, it means flash flooding is occurring or is imminent in the viewing area.
A **FLASH FLOOD WARNING** means you should move to safe ground immediately.



SEVERE STORM WARNING
When you see this symbol on the television screen, it means actual severe storm conditions are present within the viewing area. Severe Storm conditions include heavy rains, lightning, damaging winds and hail.
A **SEVERE STORM WARNING** means you should go to a safe place immediately.



TORNADO WARNING
When you see this symbol on the television screen, it means an actual tornado has been sighted within the viewing area.
A **TORNADO WARNING** means you should go to a safe place immediately.

ALL CLEAR!



When you see this symbol on the television screen, it means that the National Weather Service has canceled the Flash Flood Warning and that danger from flash flooding has passed.



When you see this symbol on the television screen, it means that the National Weather Service has canceled the Severe Storm Warning and that severe storm conditions have passed out of the area.



When you see this symbol on the television screen, it means that the National Weather Service has canceled the Tornado Warning and that danger from a tornado has passed out of the area.

FLOOD BULLETIN

DATELINE JOHNSTOWN, PA.



Photographer - Donald Koch
This can happen again!

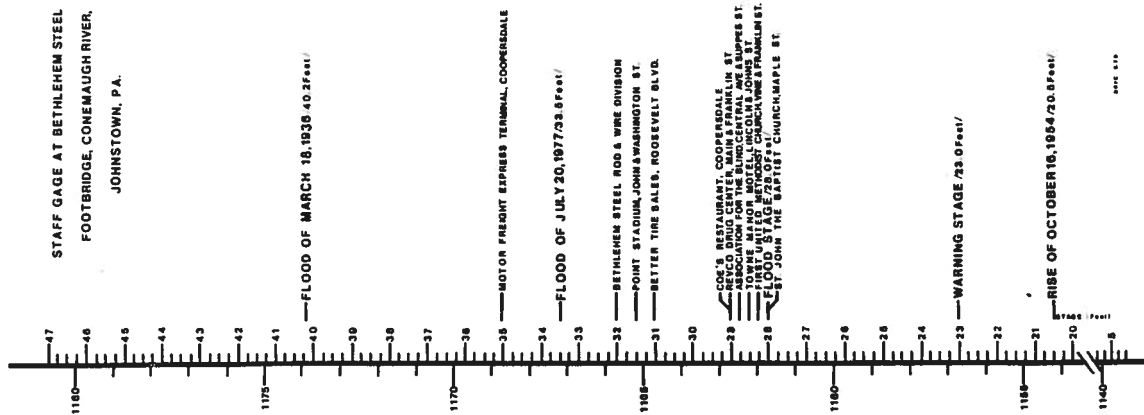
Torrential rains, described by one resident as *the heaviest I have seen in my 65 years*, deluged the rugged terrain of the Conemaugh River in Southwest Pennsylvania on the night of July 19-20, 1877. These rains caused flash flooding which killed 76 persons and brought property damage of over \$200 million.

In addition to 76 deaths, the American Red Cross reports 2,698 persons were injured or suffered illness because of the flood. Four hundred thirteen dwellings were destroyed, and 1,363 suffered major damage. One hundred thirty five mobile homes were destroyed and 77 suffered major damage. Fifty-two apartments or condominiums were destroyed and 93 had major damage. A total of 405 small businesses were destroyed or suffered major damage. In addition, 7,794 families suffered losses of some sort.

The City of Johnstown was hard hit as were numerous smaller communities in a seven-county area surrounding the city which had been devastated previously by the record flood of 1936 and the South Fork Dam break in May 1988.

The City of Johnstown in cooperation with Federal, State, County and local agencies is using community disaster-preparedness planning to help provide improved protection of human life and readily movable property from flooding.

This planning will help change a potential disaster to a major, but survivable inconvenience. Affected individuals will be given an opportunity to escape from a possible fatal disaster.



Johnstown is located in a deep and somewhat narrow valley just upstream of the head of the gorge where the Conemaugh River breaks through Laurel Hill Ridge. The Conemaugh River is formed at Johnstown by the confluence of the Little Conemaugh River and Stony Creek. This area is known as the Point.

The staff gage at the Bethlehem Steel Corporation Plant Footbridge is near the Point. The March 1936 flood was the greatest natural flood of record in the area. It caused 25 deaths and fifty million dollars in property damage. The flood stage of 28 feet represents a flood approximately equal to the March 1936 flood modified by the local flood protection project.

The Corps of Engineers' project is basically a channel improvement with concrete paved side slopes, except for the upper areas of the improvement. The channel is designed to contain essentially a flood equal to the March 1936 flood.

The disastrous flood of May, 1889 occurred when a dam on the South Fork of the Little Conemaugh River failed. This sent a tremendous wave of water down the Little Conemaugh River valley. Flooding was already occurring before the dam failed. The huge wave accompanying the dam failure carried a great deal of debris with it. Later the debris caught fire. An estimated 2,200 people died from the flood and fire.

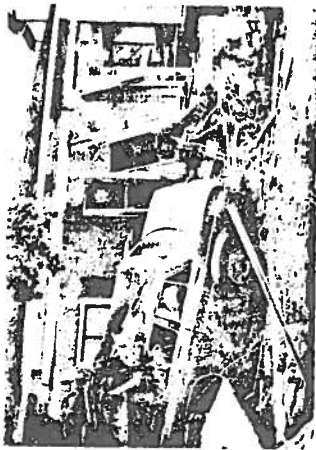
FLOOD CHECK LIST

- Put valuable papers, paintings and records in an elevated, dry, safe storage area.
 - Disconnect electric motors.
 - Raise appliances above flood levels.
 - Roll up rugs and move furniture to higher levels.
 - Have emergency lighting (flash lights, candles) ready.
 - Move yard furniture inside and secure outside floatable objects.
 - Provide temporary storage for freezer contents.
 - Turn off electricity at main switch.
 - Turn off gas.
 - Move pets or livestock to higher ground.
 - Move the family car and other mobile equipment to high ground.
- Prompt action can cut your loss. Protecting lives is more important than protecting property.

AFTER THE FLOOD

1. Do not use fresh food that has come in contact with flood waters.
 2. Test drinking water for potability; wells should be pumped out and the water tested before drinking.
 3. Seek necessary medical care at nearest hospital. Food, clothing, shelter, and first aid are available at Red Cross shelters.
 4. Do not visit disaster area; your presence might hamper rescue and other emergency operations.
 5. Do not handle live electrical equipment in wet areas; electrical equipment should be checked and dried out before returning to service.
 6. Use flashlights, not lanterns or torches, to examine buildings; flammables may be inside.
 7. Report broken utility lines to appropriate authorities.
- Prepared by the NOAA, National Weather Service, Eastern Region in cooperation with the City of Johnstown, Pennsylvania.

CAMBRIA COUNTY FLOOD PREPAREDNESS



Cambria County is using Community Disaster-Preparedness Planning to help take Mother Nature out of the driver's seat.
Photographer: Donald Koch

In the fall of 1978, Cambria County took part in this nation's first multi-county flash flood self-help warning network system drill.

The drill was sponsored by the National Weather Service and the Pennsylvania State Council of Civil Defense. A storm that actually occurred over the Ohio Valley was used as the basic scenario for the drill.

Rainfall and river stages were received as though a storm was occurring. The county's network of volunteer observers monitored rainfall and river gages at 33 locations. Emergency problems were then simulated throughout the county.

The storm supposedly caused major flooding, knocked out power lines, caused mud slides, cut off communications, blocked roads, and left entire communities without water and other utilities.

The flash flood coordinator issued timely flash flood watches, flash flood warnings, accurate river crest forecasts, and evacuation recommendations.

This drill showed that the network's operational procedures work efficiently. The mythical storm left no property damage, however, the warnings would have prevented any loss of life.

Agencies that took part included: the National Weather Service, the Pennsylvania State Council of Civil Defense, the Red Cross, the Salvation Army, Pennsylvania State Police, Pennsylvania National Guard, nurses from Laurel Crest Manor, amateur radio nets, county commissioners, Mainline and West Hills Police, Penn DOT, Pennsylvania Department of Forest and Waters, and the Cambria County Sheriff's office.

Prepared by the NOAA, National Weather Service, Eastern Region, Ohio River Forecast Center in cooperation with Cambria County, Pennsylvania

FLOODS IN CAMBRIA COUNTY

Cambria County is located in the southwestern portion of Pennsylvania, between the Allegheny Mountains to the east and the Laurel Hills to the west. Johnstown and numerous adjacent communities have been the victims of three major floods and numerous minor floods since 1889.

It is estimated that 2,400 lives have been lost as a result of these floods and that over \$250 million worth of property has been damaged.

The first of these major floods occurred on May 30, 1889. It was caused by a heavy rain which, in perfect conjunction with the failure of an earthen dam on the south fork of the Little Conemaugh River. The dam released a wall of water 40 to 70 feet high that moved at 40 miles per hour down the Little Conemaugh River Valley.

Flooding was already occurring before the dam failed. The huge wall of water carried a great deal of debris with it. Later the debris caught fire. An estimated 2,200 people died from the flood and fire. There was more than \$10 million worth of property damage.



This picture of what a flash flood can do is worth more than a thousand words.

Photographer: Donald Koch

The second major flood was on March 17, 1936. Extended spring rains fell after a winter of heavy snowfalls. This was the area's greatest natural flood of record. Runoff from heavy rainfall and snow melt caused the Stony Creek and Conemaugh River to overflow and inundate the Conemaugh Valley. This flood caused 25 deaths and \$50 million worth of property damage.

The most recent major flood was on July 19-20, 1977. Almost 12 inches of rain fell in 7 hours. This excessive rainfall caused flash flooding. Eleven dams collapsed in part or completely. In addition to 76 deaths, the American Red Cross reported that 2,089 persons were injured or suffered illness because of the flood. Approximately 30,000 people were evacuated.

This flood caused greater than \$200 million in property damage. No other flood caused as much damage in the area. There were 413 dwellings destroyed and 93 had major damage. A total of 405 small businesses were destroyed or suffered some damage. In addition, 7,794 families suffered loss of some sort.

HYDROLOGY AND FLASH FLOODS

Hydrology is the study of the occurrence and movement of water on the earth. Hydrology covers the series of processes by which water falls as rain, snow, and other forms of precipitation; enters the ground or runs off; evaporates; and falls again as rain or snow.

A continuous sequence (which is part of a larger interaction between earth, sun, sea, and atmosphere) operates the Hydrologic Cycle. The basis of hydrology as a science is in measuring each phase of the earth portion of the Hydrologic Cycle, and in understanding the many physical processes through which water goes.

Precipitation is the most important factor determining streamflows. Runoff is that portion of the precipitation which goes to the surface streams. Rainfall-runoff relations are important tools in river forecasting.

Runoff can start rapidly if heavy rainfall falls over a small basin; especially one with either large impervious areas and/or steep terrain. This rapidly occurring runoff causes flash floods. Natural and manmade drainage systems are quickly overflowing with raging water and its deadly cargo of uprooted trees, smashed structures, boulders, mud, and other debris.

FLOOD CHECK LIST

- Put valuable papers, paintings and records in an elevated, dry, safe storage area.
- Disconnect electric motors.
- Raise appliances above flood levels.
- Roll up rugs and move furniture to higher levels.
- Have emergency lighting (flash lights, candles) ready.
- Move yard furniture inside and secure outside floatable objects.
- Provide temporary storage for freezer contents.
- Turn off electricity at main switch.
- Turn off gas.
- Move pets or livestock to higher ground.
- Move the family car and other mobile equipment to high ground.

Prompt action can cut your loss. Protecting lives is more important than protecting property.

AFTER THE FLOOD

1. Do not use fresh food that has come in contact with flood waters.
2. Test drinking water for potability; wells should be pumped out and the water tested before drinking.
3. Seek necessary medical care at nearest hospital. Food, clothing, shelter, and first aid are available at Red Cross shelters.
4. Do not visit disaster area, your presence might hamper rescue and other emergency operation.
5. Do not handle live electrical equipment in wet areas; electrical equipment should be checked and dried out before returning to service.
6. Use flashlights, not lanterns or torches, to examine buildings; flammables may be inside.
7. Report broken utility lines to appropriate authorities.

(Editor's Note: This portion the same in each brochure)

Flash floods have become this nation's number one weather related killer.

More people are threatened with the fury of flash floods than ever before. Since 1968 the average annual death toll from flash floods has been double that of the early 1960's, and more than triple the rate of the 1940's.

Urban development along rivers and the result, and growth in impervious areas are the main cause of this ever increasing danger. The removal of vegetation for buildings, roads, and parking lots has increased the peak flow rates of many small streams. Construction at streamside often impedes the natural flow of water, bringing about added flood hazards.

Streams of all sizes in urban areas must now handle more runoff in a shorter time. Water cannot be carried away fast enough. *Flash flooding is now occurring in areas where they have never been observed before.*

Timely flash flood warnings can save lives. The only thing you can do once a flash flood hits is **Get out of the way as fast as you can!**



The wreckage left behind by a Flash Flood attests to its awesome power

Photographer Donald Koch

Flash floods can begin before the rain stops. There is little time between the detection of flood conditions and the arrival of the flood crest. Water levels may rise quickly in heavy rainstorms; on small streams, especially near the headwaters of river basins. Heavy rains can also cause flash flooding in areas where the flood plain has been urbanized.

Most people have no idea why or how flash floods can be so devastating because they have never experienced one. The crescentic flow quickly as runoff from the basin concentrates in the channel in a very short time.

FLASH FLOOD WATCHES AND WARNINGS

Before the flood know the elevation of your property in relation to nearby streams and other waterways. Investigate the flood history of your area and how manmade changes may affect future flooding. Make advance plans of what you will do and where you will go in a flash flood emergency.

Flash flood watch means that heavy rains occurring or expected to occur may soon cause flash flooding in certain areas, and citizens should be alert to the possibility of a flood emergency which will require immediate action.

When a flash flood watch is issued listen to area radio and television stations for possible flash flood warning and reports of flooding in progress from the National Weather Service and public safety agencies. Be prepared to move out of danger at a moment's notice. If you are on the road, watch for flooding at highway dips, bridges, and low areas due to heavy rain not observable to you, but which may be indicated by thunder and lightning.

Flash flood warning means that flash flooding is occurring or imminent on certain streams or designated areas, and immediate precautions should be taken by those threatened.

When a flash flood warning is issued for your area act quickly to save yourself. You may have only seconds. Get out of areas subject to flooding. Avoid already flooded areas.

Do not attempt to cross a flowing stream on foot where water is above your knees. If driving, know the depth of water in a dip before crossing. The road may not be intact under the water. If the vehicle stalls, abandon it immediately and seek higher ground. Rapidly rising water may engulf the vehicle and its occupants and sweep them away.

Be especially cautious at night when it is harder to recognize flood dangers. When you are out of immediate danger, tune in area radio or television stations for additional information as conditions change and new reports are received.

After the flash flood watch or warning is cancelled stay tuned to radio or television for follow-up information. Flash flooding may have continued, but general flooding may subside later in the water streams and major rivers.

COMMUNITY ACTION

Community action is the key to effective response to a flood warning.

It is essential that communities establish an appropriate local organization which can receive flood warning and disseminate them swiftly to the public. These organizations should be headquartered where 24-hour operations can be assured. The nearest Weather Service Office should be kept informed of the key staff and organization to which flood warnings should be sent.

Community preparedness means that everyone can take positive emergency steps in the face of imminent danger.

Evacuation routes should be established, the emergency operation center should be manned, Red Cross shelters should be designated, and municipal and enforcement officials should be fully mobilized in advance of a destructive flood.

The National Weather Service will assist the community by supplying rain gages, training for observers, a forecasting manual, and furnish advice on how to develop a Flash Flood Warning System.



Flash floods can quickly devastate a community

Photographer Thomas Koch

LOCAL FLASH FLOOD WARNING SYSTEM

A local Flash Flood Warning System goes into operation once a Flash Flood Watch or Warning is issued by the National Weather Service or when a network observer calls in a report of heavy rain to the local flood warning representative.

Rainfall reports are the keystone of this system. This data is interpreted locally with the forecasting manual. The local flood warning representative then uses the result to decide what streams may be in danger of flooding. The local representative can thus prepare a flood forecast and spread a warning within minutes.