
WATERLINES

News affecting the management and use of Indiana's water resources

DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
WINTER 2008

PRESIDENTIAL DISASTER DECLARATIONS FOR AUGUST 2007 AND JANUARY 2008 FLOODING

Presidential Disaster Declaration for flooding in Indiana – it's becoming a familiar term over the past several years. Since 1990, only one year (1995) has escaped having a presidential disaster declaration for flooding for some portion of Indiana. Keep in mind that some flood events during that time did not cause enough damage to receive a declaration and that Indiana was designated for more than one Presidential Disaster Declaration in a few of those years. The latest flood events to receive that designation in the Hoosier State occurred in August 2007 and January 2008.

In August, areas of Lake County experienced flooding – with some of the floodwaters reaching into areas designated as the 500-year floodplain on the floodplain maps. The hardest hit areas were Dyer, Hammond, Lake Station, Merrillville, and Gary.

The Town of Dyer experienced extensive flooding. Most of the damage occurred in the areas designated as 500-year floodplain on the town's floodplain mapping. Numerous homes and the hospital campus of St. Margaret Mercy Healthcare Center were adversely impacted by the flood. Floodwaters caused the hospital to evacuate some sections, including the emergency room, during the course of the event.



*Norway Dam during January flood
(Photo by Indiana State Police)*

A section of the old levee along the Little Calumet River in Hammond breached during the flood event. A recently constructed berm, associated with the nearly completed Cabela's retail store, acted as a second line of defense, protecting hundreds of homes in the adjacent neighborhood from flood damage. This berm contained approximately five feet of floodwaters within what neighbors began to call Lake Cabela. Giant earth movers and other construction

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*Oakdale Dam during January flood
(Photo by Indiana State Police)*

equipment sat several feet deep in the floodwaters. The Cabela barrier coordinates with the current Little Calumet flood control levee project, which is partially completed. Other commercial development in the area which was required to build two feet above the base flood elevation (100 year flood elevation) became dry islands. This required rescue efforts by the City of Hammond to move shoppers and hotel guests as well as towing flooded vehicles from very wet parking lots. I80/I94 was overtopped closing the highway to east and west bound traffic for a day. One nearby home was damaged.

In Merrillville, most of the flood problem was sewer backup and local drainage problems. Nearly all the damage occurred in areas *outside* of the 100-year floodplain.

While local and State officials submitted a request to the President for a disaster declaration early on, the initial request was denied. Upon submitting an appeal and providing additional information, the request



*Tippecanoe River during January flood in White County
(Photo by Indiana State Police)*

was honored. The Federal Emergency Management Agency (FEMA) announced on November 30, 2007 that federal disaster aid had been made available to affected individuals in Lake County.

2008 had hardly begun when flooding occurred in numerous north-central Indiana communities. Several streams swelled beyond their banks causing damage to those at-risk structures along the way. Some of the heaviest damage occurred when flooding along the Tippecanoe River from Pulaski County to Tippecanoe County caused damage to hundreds of homes. Several homes were substantially damaged and some residents reported losing everything.

After receiving the initial damage assessments from the floods that began on January 7, Governor Mitch Daniels requested assistance. Indiana received a Presidential Disaster Declaration on January 30, 2008. Nine counties were designated in the initial declaration – Carroll, Cass, Elkhart, Fulton, Jasper, Marshall, Pulaski, Tippecanoe, and White counties. Additional declarations may be made at a later date after further evaluation. Other counties reporting flood damage included Noble, Newton, LaGrange, Kosciusko, Elkhart, and Benton.

The individual assistance approved under the latest Presidential Disaster Declaration is coordinated by the Federal Emergency Management Agency (FEMA). This assistance can include grants to help pay for temporary housing, home repairs, and other serious disaster-related expenses. Low-interest loans from the U.S. Small Business Administration are also available to cover residential and business losses not fully compensated by insurance. ☞



*Tippecanoe River during January flood in Carroll County
(Photo by Indiana State Police)*

CONFERENCE CORNER

INAFSM CONFERENCE

The 11th Indiana Association for Floodplain and Stormwater Management (INAFSM) Conference was held at Pokagon State Park near Angola on September 12-14, 2007. The presentations were both informative and entertaining, the food was exemplary, and attendees had the opportunity to meet other individuals interested in common goals.

2007 Awards were presented during the conference: Excellence in Stormwater Management – Bill Hahn, Hendricks County; Outstanding Stormwater Project Award – Town of Plainfield (project owner) and Banning Engineering (lead consultant), White Lick Creek Stream Enhancement; Excellence in Floodplain Management Award – Scott Morlock, USGS; Excellent Strides in Floodplain Management Program Award – Morgan County Plan Commission; Chairman’s Award for Outstanding Service in Support of INAFSM – Steve Fuchs, City of Evansville; In Recognition of Outstanding Service and Dedication to INAFSM – Jon Stoltz,

Christopher Burke Engineering.

The next INAFSM Conference will be held September 10-12, 2008 at Brown County State Park. Visit www.inafsm.net to obtain additional information about the INAFSM organization, the 2007 conference, and for upcoming information regarding the 2008 conference.

ASSOCIATION OF STATE DAM SAFETY OFFICIALS

Dam Safety ‘08 - September 7-11, 2008, Indian Wells, California. The Association of State Dam Safety Officials (ASDSO) would like to welcome you to Dam Safety ‘08, one of the leading conferences in the United States dedicated to dam safety engineering and technology transfer. Dam Safety 2008 will attract approximately 850 attendees from all 50 states plus Puerto Rico, and several nations.

ASDSO’s annual conference offers a unique blend of training in both technical and practical dam safety applications, along with the opportunity to network with a variety of professionals representing all aspects of the dam safety community. Go to www.damsafety.com for more information. ☺



NEW CFMS

Indiana currently has 61 Certified Floodplain Managers (CFMs). The most recent additions to this list are Maureen Voors of the Allen County Department of Planning, Matt Rummel of Christopher Burke Engineering, and Breagan Eicher of Lawson-Fisher Associates. Each passed the CFM exam offered at the Indiana Association for Floodplain and Stormwater Management (INAFSM) conference on September 13, 2007. **CONGRATULATIONS!**

The Certified Floodplain Manager program is a national certification authorized by the Association of State Floodplain Managers (ASFPM). This certification recognizes the knowledge that enables

the individual to pass the exam initially, and requires continuing education and professional development.

Achieving the CFM certification demonstrates not only awareness of the National Flood Insurance Program, but of comprehensive floodplain management.

The exam is offered each fall at the INAFSM conference and typically offered in the spring by the Department of Natural Resources, Division of Water. The next CFM exam opportunity in Indiana will be March 27, 2008 in Indianapolis. For more information on the CFM program, visit the Association of State Floodplain Managers (ASFPM) Web site at www.floods.org. ☺

BEHIND THE LEVEES

A levee is a man-made structure, usually an earthen embankment. Designed and constructed with sound engineering practices, levees are built to contain, control, or divert the flow of water to protect people and property behind the levees from being flooded.

Levees were first built in the United States more than 150 years ago. Many of the earliest American levees were built by farmers to protect their crops from floods. Since then, levees also have been constructed to protect urban areas. Typically, these more recent levees have been built to the rigorous standards of the U.S. Army Corps of Engineers (USACE). However, as rural areas have undergone development and urbanization, farms increasingly have been replaced by homes and businesses. People who live and work behind levees may be relying on an insufficient degree of protection from flooding.

Across the country, there are now tens of thousands of miles of river and coastal levees that affect millions of people. It is important for them to understand the risks associated with being behind levees and the steps they can take to protect themselves and their property from flooding. In particular, these people need accurate assessments of their current degree of protection and the scope of flood damage should their levees fail.

A Calculated Risk

No levee can provide full protection from flooding. Even the best flood control system or structure cannot completely eliminate the risk of inundation when flood-swollen rivers or lakes overflow. Although all levees are designed to provide a specific degree of protection based on projected flood depths, unexpectedly large floods can cause them to fail altogether, as happened in New Orleans after Hurricane Katrina made landfall in 2005.

Because levees deteriorate over time, they require regular inspection and maintenance and periodic upgrades to retain their structural integrity and continue to provide the degree of protection for which they were designed. Maintenance can become a serious challenge, and a great expense, as a levee system

gets older. When levees that have been insufficiently maintained fail, the consequences can be catastrophic, with more significant damage than if the levee had not been constructed in the first place. Unfortunately, assessing the safety of levees is difficult because information about their locations, ages, structural integrity, and certification status often is outdated or missing altogether.



*Vincennes Floodwall/Levee
(Photo by Anita Nance)*

FEMA Recognized Levees - Accountability

Who owns FEMA recognized levees?

A levee owner can be a Federal or State agency, a water management or flood control district, a local community, a levee district, a private business, or an individual.

Who operates and maintains FEMA recognized levees?

A Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP is responsible for operating and maintaining levees.

Who evaluates the safety of a FEMA recognized levee?

Levee safety evaluations are the responsibility of the owner.

What is FEMA's role?

FEMA's authorizing legislation makes it responsible for identifying flood risks in areas behind levees. This is accomplished by flood risk analysis and flood hazard

mapping projects, which include updating the nation's flood hazard maps through the Map Modernization Program.

FEMA does not design, operate, examine, certify, or maintain levee systems. Nor does FEMA determine how a structure or levee system will perform in a flood event. However, the agency is responsible for establishing minimum design, operation, and maintenance criteria that must be met for a levee to be recognized as providing flood protection against the 1-percent-annual-chance flood. And because FEMA's Flood Insurance Rate Maps (FIRMs) display zones of relative risk, FEMA recognizes on its FIRMs only those levee systems that have met and continue to meet these minimum standards.

It is FEMA's job to set levee safety standards. Because FEMA is not empowered to examine or analyze structures to determine their performance in a given flood event, it is the levee owner's job to provide documentation to show that a levee meets current design, operation, and maintenance criteria.

Levee Safety and Flood Insurance

FEMA is updating the nation's flood hazard data and maps through its Map Modernization Program. According to *Provisionally Accredited Levees*, a new FEMA publication available online (www.fema.gov/pdf/plan/prevent/fhm/lv_palbro.pdf), approximately one quarter of the counties that FEMA is remapping have levees shown on their FIRMs.

Assessing flood risk for areas behind levees is complex. Among the many factors the assessment must take into account are the actual elevations a 1-percent-annual-chance flood will reach as well as the ability of a levee to withstand that amount of water. If the levee owner provides the necessary documentation to indicate that the levee meets FEMA's criteria, the map that includes it will show the area behind the levee as a moderate-risk zone.

What happens if a levee's owner cannot prove that it meets FEMA's 1-percent-annual-chance criteria? In such cases, FEMA revises the FIRM currently in effect to show that the land behind the levee has insufficient

protection from flooding and is, therefore, a high-risk Special Flood Hazard Area. This action puts property owners on notice that they are in greater jeopardy of flood loss. At policy renewal time, it also results in higher flood insurance premiums to reflect the increased flood risk.

FEMA Guidance

The devastation caused by Hurricanes Katrina and Rita in 2005 brought the issues of levee policy, flood hazard management, and flood insurance to the forefront of public debate and discussion. However, these issues were not new to FEMA. Nearly 20 years before Katrina and Rita made landfall, FEMA established detailed requirements (in Title 44 of the Code of Federal Regulations, Section 65.10) to guide the evaluation of levees and the mapping of levee-affected areas on flood maps. Periodically, FEMA disseminates information about levee safety and certification and about the procedures used for showing the flood risk behind levees on Flood Insurance Rate Maps. For example, FEMA's comprehensive *Guidelines and Specifications for Flood Hazard Mapping Partners* provides guidance for ensuring standard levee evaluation and mapping practices. And, less than two weeks before Hurricane Katrina hit the Gulf Coast in 2005, Mitigation Division Director David Maurstad issued *Procedure Memorandum 34, Interim Guidance for Studies Including Levees* to all FEMA Regional Offices and Mitigation Division Directors. This guidance reemphasized FEMA's 20-year-old levee policy and regulations and provided additional direction to help communities protected by levees meet Federal safety standards.

A year after Katrina made landfall, Maurstad issued *Procedure 43: Guidelines for Identifying Provisionally Accredited Levees*. This document clarified the procedures for documenting flood risk (see below). Because gathering the necessary documentation can take time, FEMA is allowing owners of eligible levees two years to provide evidence of the levee's status. During that time, the levee will be shown on the flood map as provisionally accredited, and the area behind it will be shown as having a moderate flood risk.

Accreditation Doesn't Guarantee Protection

Communities that join the NFIP are required to adopt floodplain management ordinances to minimize damage to homes and businesses located in Special Flood Hazard Areas. In areas behind levees that are mapped as Special Flood Hazard Areas, the NFIP requires all new and substantially improved buildings to be constructed to or above the elevation of the 1-percent chance flood. In areas that are mapped as low-to-moderate-risk areas, no NFIP floodplain management requirements apply. However, appropriate precautions are still encouraged as the risks for overtopping or failure of the levee remain.

People who live or work behind levees must understand the risks they face for flooding. For this reason, FEMA recommends flood insurance for all properties behind levees. In addition, FEMA maps carry a warning that overtopping or failure of the levee, dike, or other flood

control structure is possible, and that flood insurance and adherence to evacuation procedures are strongly recommended.

For more information, visit the "Levees" page on the FEMA website (www.fema.gov/plan/prevent/fhm/lv_intro.shtm.) There you will find the requirements for "Mapping of Areas protected by Levee Systems" outlined in Title 44 of the Code of Federal Regulations, Section 65.10. In addition, you will find procedures for levee accreditation in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners—Appendix H: Guidance for Mapping of Areas Protected by Levee Systems; Procedure Memorandum 34: Interim Guidance for Studies Including Levees; and Procedures Memorandum 43: Guidelines for Identifying Provisionally Accredited Levees*.

Reprint of Article from Watermark, 2007, Number 2

PRECIPITATION REPORT FOR JULY THROUGH DECEMBER 2007

Drought conditions continued throughout July in most areas of Indiana. By and large it was cooler and drier than normal. This is not typical of Julys in Indiana. Rainfall remained a precious commodity in most areas during July. The most notable rainfall of July occurred during the evening of the 25th and 26th. Rain of three to nearly six inches fell in portions of Starke, Pulaski, White, and Carroll counties. Monthly precipitation at Fort Wayne totaled 1.82 inches, 1.76 inches below normal. Conversely, South Bend recorded precipitation of 5.40 inches, with a monthly surplus of 1.67 inches. At the end of the month, drought conditions were intensifying in much of the state. East central Indiana worsened into the severe drought classification by the end of the month.

August was one of the hottest ever for much of central and southern Indiana. Rainfall in the central and southern areas of the state continued to be sporadic during the month. The only heavy rain that fell in southern Indiana during the month occurred the evening of the 29th. Rain of one to nearly four inches fell in isolated areas of Monroe and Jackson counties.

Drought conditions in southern Indiana intensified and fire danger grew as a result of hot, dry temperatures and lack of rainfall. Much of central and southern Indiana received between one and one-half and three and one-half inches of rain for the month. In contrast, portions of northern Indiana experienced record rainfall and record flooding with eight to nearly seventeen inches of rain falling during August. A Presidential Disaster Declaration for Lake County was issued as a result of the damages from the subsequent flooding. Fort Wayne recorded 9.69 inches of rain for the month. This was 6.09 inches above normal. Likewise, South Bend recorded a record rainfall of 8.88 inches of rain for the month of August.

The Drought of 2007 continued throughout September. Most of Indiana south of I-70 was in severe drought conditions with extreme drought conditions in central and southern Indiana. Rainfall in central and southern Indiana continued to be sporadic during September. Rainfall ranged from less than an inch in Boone County to nearly six inches in Morgan County. Timely rain of one-half to more than four inches fell in the driest areas of southern Indiana from the 25th to the 27th and eased drought conditions. However, wet areas of northern Indiana, which received eight to nearly seventeen

inches of rain during August, measured less than an inch during September -- South Bend recorded only about a third of normal precipitation and Fort Wayne reported only slightly below normal rainfall values.

October was one of the warmest Octobers in central and southern Indiana in the last sixty years. During the first half of October drought conditions in central and southern Indiana showed little improvement and actually got slightly worse. Almost all of the rain for October fell from the 16th through the 27th. Monthly rainfall ranged from around two inches to more than six inches. This rainfall greatly eased but did not eliminate drought conditions in central and southern Indiana.

November was a typical seasonal transition month with big swings in temperatures and occasional precipitation events. The dry spell of the first ten days of November was broken on the 11th and 12th as rain of one-half to two inches fell in northern and central Indiana. Dry weather returned on the 13th and remained through the afternoon of the 21st. Rain of one to nearly three inches fell in much of northern Indiana from the afternoon of the 21st through the

morning of the 22nd. Widespread rain of one-half to slightly over an inch covered most of central and southern Indiana on the 25th and 26th. While annual precipitation remains below normal, periodic rain events helped ease drought conditions. At the end of the month, drought conditions were erased in northern Indiana and were nearly gone in central Indiana.

Drought conditions were completely erased during December as above normal rainfall and snowfall occurred. The weather pattern remained unsettled in much of the state. Rain or snow fell on nearly every day from the 1st through the 16th. The first winter storm system affected the northern portions of Indiana the first week of the month with a wintry mix, with the majority of the precipitation falling as rain or freezing rain. Mid-month, the next system affecting Indiana initially was comprised of rain, which changed into a significant snowfall of depths in the six to eight inch range in northern Indiana. December precipitation at Evansville was recorded at 6.34 inches, 2.80 inches above normal. Dry weather lasting more than 24 hours during this period was rare. This active weather pattern slowed during the last half of December. Rain or snow fell about every two to three days. ❄️

Locations	KEY:							Totals
	July	August	September	October	November	December		
	ACTUAL (INCHES)							
	NORMAL (INCHES)							
CHICAGO	3.86	9.70	1.23	1.69	1.26	3.49	35.80	
IL	3.51	4.62	3.27	2.71	3.01	2.43	36.27	
SOUTH BEND	5.40	8.88R	1.48	4.02	2.19	3.03	40.30	
IN	3.73	3.98	3.79	3.27	3.39	3.09	39.70	
FORT WAYNE	1.82	9.69	2.47	1.91	4.21	4.45	40.25	
IN	3.58	3.60	2.81	2.63	2.98	2.77	36.55	
INDIANAPOLIS	1.90	3.43	1.59	2.80	1.85	5.55	36.70	
IN	4.42	3.82	2.88	2.76	3.61	3.03	40.95	
EVANSVILLE	1.97	0.99	2.22	4.64	1.77	6.34	35.08	
IN	3.75	3.14	2.99	2.78	4.18	3.54	40.17	
LOUISVILLE	4.13	1.61	1.95	8.86R	2.44	7.52	44.53	
KY	4.30	3.41	3.05	2.79	3.81	3.69	44.54	
CINCINNATI	1.92	0.55	2.47	7.07	2.73	5.76	36.72	
OH	3.75	3.79	2.82	2.96	3.46	3.28	42.60	

R = Record

Note: Official and certified climate data can be accessed at the National Climatic Data Center (NCDC) <http://www.ncdc.noaa.gov/oa/ncdc.html>

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