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ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.

KATRINA AND RITA RENEW FLOODPLAIN MANAGEMENT CONCERN

There is precious little satisfaction in seeing a dire prediction come true, especially when the cost is as high as that paid by everyone who found themselves in the broad swaths of destruction cut by Hurricanes Katrina and Rita. Still, floodplain managers cannot have been surprised at the varied and intense impacts brought about by the storms, and can only move forward and build off this tragedy by fostering dialog on ways to prevent reoccurrence.

These multiple and massive disasters again have brought into sharp focus many serious questions about our use and management of land and water and how we deal with the impacts when the inevitable disruptions to that management take place. How do we provide some relief and support to those affected by the damage while still maintaining the integrity of public and private programs and policies? To the extent that less-than-optimal floodplain management approaches were in place before the hurricane, how can they now be remedied? What do these events teach us about the approaches to floodplain management that we previously thought were effective?

Simultaneously, of course, this focus is providing opportunities to educate and re-educate the public and policymakers about ways in which the situation can be remedied and the impacts of future events minimized. As always, floodplain managers support sensible rebuilding of damaged areas, mitigation of the flood hazard in every way possible, smart management techniques, and the protection and restoration of the natural resources (and natural protection) that floodprone lands offer.

Below are brief descriptions of just a few of the issues now in the spotlight.

To Rebuild or Not? There is little doubt that the Gulf Coast, including New Orleans, needs to be rebuilt. But replacing the infrastructure, housing, and people in their previous at-risk situation is unconscionable. Careful thought needs to go into how to rebuild in a sustainable way, so that risks from future flooding, hurricanes, high winds, and storm surge are reduced. The ASFPM has a short position paper on this idea, which was presented at a press conference early in September. It explains what the key priorities will be in terms of mitigation measures, funding, seizing upon this event to mitigate a large number of repetitive flood problems, and reviewing existing standards to see if they are sufficient. The idea should be to reconstruct without creating adverse impacts now or in the future. (See the ASFPM paper and other sources at <http://www.floods.org>.)

The Status of FEMA—Many opinions have been voiced in the press about the performance of FEMA and the Department of Homeland Security after Katrina and Rita, and inevitably the question is coming up whether natural disaster preparedness, response, and mitigation would be more effectively handled by a smaller, more independent entity, such as FEMA was in previous years. The ASFPM has already vigorously expressed its position that

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Katrina & Rita (cont.)

the nation cannot afford to diminish the effort it can put forth to address perennial disasters like flooding and hurricanes, even though preparedness for possible terrorist attack is important as well. The ASFPM's letter to Speaker of the House Dennis Hastert can be read on the website at <http://www.floods.org>. Hearings will be held in Congress on the matter of whether FEMA's status ought to be altered [*see Washington Report, page 8*].

Coastal Land Loss—The natural defense to hurricane forces provided by the coastal wetlands, marshes, and barrier islands has been dwindling for decades. Louisiana, in particular, can document astonishing rates of land loss. And there are many other reasons for ecosystem preservation and restoration across the Gulf Coast. Katrina and Rita brought much-needed attention to this problem, and reminded us of the delicate balance that must be respected when we use such sensitive areas for human activity. On the table there is already the Louisiana Coastal Area Ecosystem Restoration Plan, finalized only a year ago, in which state, federal, and private entities outline steps that must be taken if this valuable area is to be protected and restored. At its fall meeting the project's task force will take a look at what changes in approach may be needed, if any, in the wake of the two hurricanes. (See http://data.lca.gov/Ivan6/main/main_exec_sum_toc.pdf.)

On another note, a class action lawsuit has been filed against a collection of oil companies claiming that their drilling and pipeline operations, which form a network all across the delta plain both onshore and off, destroyed coastal marshes that, as recently as the 1930, provided a 100-mile buffer between the Gulf of Mexico waters and New Orleans and other communities.

Coastal Development—Both Katrina and Rita perfectly demonstrated the size of the population that now resides in coastal areas, and the difficulties that that situation presents especially in terms of evacuation and in the risks to which their homes and businesses are subject. At numerous specific locations, there is already evidence that the standards to which coastal zone buildings were constructed (in both V Zones and coastal A Zones) were insufficient for the combination of natural forces attendant during a severe hurricane (scour, wind forces, debris impacts). Careful investigations and evaluation need to be done to determine what additional, stronger measures need to be implemented to make these homes and businesses—if we insist on having them there—more disaster-resistant. Do the zones need to be refined? Are the construction provisions insufficient? And what are the implications as climate changes, sea level rises, and the land subsides?

Flood Maps—As always after a flood, the accuracy of the flood maps is under scrutiny. Observations along the Mississippi Gulf Coast, for example, revealed that in many places the water reached far above the mapped base flood elevation. FEMA is producing “high water mark” maps that perhaps would be a better reference for recovery and rebuilding. At the least these risk areas need to be shown on the maps to give people information about what happened during the 2005 hurricanes.

Levees—The powerful depiction—televised nationwide—of what happens when a levee fails has alerted more people to the risks inherent in such flood protection approaches. The idea that there is still some risk for people who live and work behind levees (residual risk) is difficult to reconcile with our society's desire for complete safety and our tendency to trust technological fixes. But those images were powerful and should help convey the real drawbacks of relying completely on levees and the benefits—indeed, necessity—of taking additional mitigation steps (such as purchasing flood insurance) even when a levee is in place.

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Goddard-White Award goes to Les Bond

This year the Association of State Floodplain Managers presented its highest honor, the Goddard-White Award, to Leslie A. "Les" Bond, of LA Bond Associates in High Rolls, New Mexico. This award is a tribute to his long-standing influence and contributions to floodplain management throughout the United States and abroad.

Bond, who has a B.S. in Hydrology from the University of Arizona, and a master's degree in Public Administration from Arizona State University, began his water resources work as an engineer with the Flood Control District of Maricopa County (Arizona) from 1974 to 1980, which was just beginning its now-exemplary program of floodplain and stormwater management.

In 1980, he was hired by the Arizona Department of Water Resources to develop a statewide flood warning system. Because of a lack of funds to implement the flood warning system Bond designed, he was then assigned to be State Coordinator for the National Flood Insurance Program. Between 1982 and 1986, he enrolled all Arizona communities in the NFIP, and wrote a handbook for Arizona floodplain managers still in use today.

In 1982, Bond joined the Association of State Floodplain Managers (ASFPM). Over the years, he served as Regional Director and Vice-Chair of ASFPM, chaired several committees, directed a national conference and served as Program Director for two others, helped produce the first (and several subsequent) Arid Regions Symposiums, and volunteered for many other tasks.

Soon after attending his first ASFPM conference, Bond was instrumental in establishing the Arizona Floodplain Managers Association (AFMA).

In 1997, Bond joined the fledgling New Mexico Floodplain Managers Association, which he now serves as Executive Director.

His dedication to the idea of locally based floodplain management has been exemplified in this support of state and local professional associations, so much so that he produced a written history of each ASFPM Chapter, and has written papers providing guidance on forming and managing such local groups.

Since 1986, Bond has worked as a consultant in floodplain management and flood warning. Among other projects, he has written model floodplain management ordinances, analyzed state and community floodplain management programs, and evaluated floodplain management programs after major floods. He has developed or worked on floodplain management handbooks for the States of Arizona, Iowa, Louisiana, and New Mexico. He participated in the development of the original Community Rating System concept and has worked on the program ever since. Under contract with the World Bank, he worked on a national data collection system and flood warning system for Turkey. Over the course of several years, he has assisted in the development of flood warning systems for 15 watersheds in Honduras. He has authored numerous publications on floodplain management, special flood hazards, planning, mitigation, arid regions issues, the Community Rating System, hydrology, and others.

Bond continues working on the problems of statistical uncertainty in flood hydrology and on development of grass-roots warning and mitigation, and remains an insistent advocate for the holistic treatment of the special resources and needs of arid-lands waterways.

□

Katrina & Rita (cont.)

Again the ASFPM is calling for a national program to ensure the safety of levees, including stricter design and construction standards and certification procedures. In addition, buildings behind levees should be constructed (elevated) to provide some level of protection and should be required to carry flood insurance.

Flood Insurance—The ASFPM has already participated (represented by Rebecca Quinn, Legislative Officer) in a forum hosted by the Center on Federal Financial Institutions (COFFI) that revisited, in light of Katrina, the policy of providing federally backed flood insurance (see <http://www.coffi.org>). The ASFPM reminded the panel and listeners that the 35-year history of the NFIP, its land use provisions, and its record of repayment to the Treasury of funds used to pay claims in catastrophic years can only be viewed as a success. On other fronts, suggestions have been made to make flood insurance available now to those who were uninsured at the time of the hurricanes—to provide some sort of retroactive coverage—an idea opposed by both FEMA and the ASFPM, because of the threat to the integrity of the NFIP operations, and the disincentive it would provide to everyone else for the purchase and maintenance of flood insurance. Any relief for those property owners needs to come from a source other than the National Flood Insurance Fund, which is made up of the policy premiums paid by those who had the foresight to insure themselves [*see Washington Report, page 7*].

The ASFPM has been actively engaged in all of these issues. Many requests for information have been received, along with invitations to testify at hearings, participate in workshops, and in other ways provide support and expertise from the floodplain management perspective. The ASFPM's website has received many thousands of hits more than usual since the hurricanes struck, and new material is being added there every day. At a press conference September 9 the ASFPM was one of several expert groups who presented important information to be considered as recovery and rebuilding proceeds. [*See the ASFPM's White Paper at <http://www.floods.org>.*] The ASFPM co-hosted, with the Coastal States Organization and the Association of State Wetland Managers, a meeting called "Opportunities for Rebuilding after Hurricane Katrina," and focusing on how to minimize future damage and suffering by restoring wetlands and broader ecosystems. States and communities affected by the hurricanes that are in need of supplemental expertise are being assisted by the ASFPM in locating appropriate personnel from other locales. This effort is being coordinated through the Emergency Management Assistance Compact and FEMA.

These are only a few of the activities and issues that will concern us all in the months and years to come. Many more will surface and innumerable details will need resolution as we move toward lessening future impacts of similar, inevitable storms. Some new sources of hurricane-related information are listed below. □

Some Hurricane Resources

Satellite/Aerial Imagery of Hurricane Katrina Damage

<http://www.noaanews.noaa.gov/stories2005/s2495.htm>

<http://alt.ngs.noaa.gov/katrina/>

http://www.digitalglobe.com/katrina_gallery.html

<http://www.globexplorer.com/disasterimages/index.shtml>

National Aeronautics and Space Administration Hurricane Website

http://www.nasa.gov/vision/earth/lookingatearth/hurricane_2005.html

The site covers such hurricane-related topics, classroom activities investigating hurricanes, satellite images, multimedia gallery, and updates and links to other hurricane information.

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Hurricane Resources (cont.)

Association of State Floodplain Managers Katrina Recommendations

http://www.floods.org/PDF/ASFPM_HurricaneKatrina_WhitePaper_090905.pdf

This white paper prepared by the ASFPM focuses on the issues the nation needs to consider and the mitigation approaches that must be incorporated as the Gulf Coast is rebuilt.

USGS Hurricanes Katrina and Rita Impact Studies

<http://coastal.er.usgs.gov/hurricanes/>

Along with the studies compiled by the U.S. Geological Survey, the site includes images from a cooperative research program between the USGS, National Aeronautics and Space Administration (NASA), and the U.S. Army Corps of Engineers that uses airborne laser mapping systems to quantify coastal change.

U.S. Geological Survey Environmental Atlas of Lake Pontchartrain

<http://pubs.usgs.gov/of/2002/of02-206/intro/preface.html>

Flood Depth Finder

<http://mapper.cctechol.com>

C&C Technologies, a privately owned surveying and mapping company, compiled this free web site to help people affected by Hurricane Katrina. It is a map of the New Orleans area and shows the maximum and current depth of the water at a site when the user “clicks” on that point on the map. It was compiled from LiDAR data provided by Louisiana State University, images from the NOAA website, and water depths obtained from additional sources as of August 31.

Congressional Research Service Reports Related to Hurricane Katrina

<http://www.fas.org/sgp/crs/homesec.html>

<http://www.fas.org/sgp/crs/misc.html>

<http://fpc.state.gov/fpc/c15783.htm>

“Gone with the Water,” by Joel K. Burne, Jr.

This article, which appeared in *National Geographic Magazine* last year, was absolutely prophetic in its introductory scenario of a major hurricane hitting New Orleans. It goes on to detail reasons for ecosystem preservation throughout the Gulf Coast.

<http://www9.nationalgeographic.com/ngm/0410/feature5/?fs=www7.nationalgeographic.com>

Preliminary Damage Reports on Engineered Structures Following Katrina

<http://mceer.buffalo.edu/research/Reconnaissance/Katrina8-28-05/Default.asp>

Reports and satellite images are posted here from a team from the Multidisciplinary Center for Earthquake Engineering Research that investigated structure damage along the Gulf Coast.

THE LAW AND FLOODPLAIN MANAGEMENT

Takings

An important “takings” case has been decided by a Rhode Island Superior Court, with highly positive implications for floodplain managers. The initial ruling on the case was made in 1997 in a Rhode Island Superior Court, subsequently appealed by the plaintiff to the Rhode Island Supreme Court, and finally to the U.S. Supreme Court. The Supreme Court returned it to the state in 2001 with instructions that a “*Penn Central* balancing analysis” be made of the factual situation (*Palazzolo vs. Rhode Island*, 533 U.S. 606 (2001)).

The plaintiff was part owner of 18 acres of salt water marsh, which he intended to develop as a subdivision, and which would have entailed considerable filling of wetlands (although numerous requests for permits to do so were denied repeatedly over the course of 20 years). After commenting on the intrinsic natural value of the marsh and adjacent pond, and describing the proposed development as a “nuisance,” the court essentially determined that the stringent coastal construction restrictions implemented by the Rhode Island Coastal Resources Council did not “take” the Palazzolo property in violation of the Fifth Amendment to the U.S. Constitution.

The opinion is well worth reading because it offers a great review of takings law, the *Penn Central* balancing test, Public Trust Doctrine, and nuisance law.

>>> The Superior Court’s opinion (*Palazzolo v. Rhode Island*, C.A. No. WM 88-297) can be found at <http://www.courts.state.ri.us/superior/pdf/88-0297.pdf>.

Endangered Species Act

The U.S. District for the Southern District of Florida issued a permanent injunction preventing the Federal Emergency Management Agency from issuing flood insurance under the National Flood Insurance Program for new development in the habitat of several endangered species within Monroe County, Florida, until the court is satisfied that the agency has complied with the Endangered Species Act. Through the order in *Florida Key Deer et al. vs. Michael Brown et al.*, (Case No. 90-10037-CIV), the court acts in accord with other previous opinions that indicate that the NFIP must take into consideration ways in which it affects endangered species.

This is the latest in an ongoing legal conflict in which the National Wildlife Federation and others argue the insufficiency of the “reasonable and prudent alternatives” proposed by the Fish and Wildlife Service and adopted by FEMA to attempt to eliminate jeopardy to the habitat of Key Deer, Key Largo cotton mouse, Schaus’ swallowtail butterfly, and other species, while still allowing FEMA to administer the NFIP in the area. □

Section 404 Enforcement

In September a developer from eastern Idaho was convicted by a jury in U.S. District Court for the District of Idaho on three counts of violating the Clean Water Act. The violations occurred from 2002-2004 as the defendant was involved in developing property adjacent to Teton Creek. While developing the land, he supervised a continuing effort to use heavy equipment to manipulate the stream bed of the creek, which is a tributary of the Snake River. Before undertaking stream modification, the defendant refused to submit an application for a dredge and fill permit required under the Clean Water Act. He also failed to comply with an Environmental Protection Agency administrative order to stop all discharges of dredge and fill material into the creek. The maximum potential sentence is up to three years imprisonment and/or a fine of up to \$250,000 on each count. □

Washington Report

CAPITOL HILL AFTER KATRINA AND RITA

In this post-Hurricanes-Katrina-and-Rita period, Capitol Hill seems almost consumed with considering a host of aspects of recovery. These range from individual assistance to temporary housing to medical coverage to business loans to effects on financial institutions and insurance companies to levee and wetland policies and to the future of flood insurance. The desire to provide help, to examine what went wrong, and to formulate improved future policies and programs is producing many legislative proposals, some of which are questionable and others promising.

Keeping up with proposals, with hearings being scheduled, and with various forums for discussion has kept ASFPM representatives very busy. Additionally, there have been requests for ASFPM testimony at upcoming hearings and numerous press requests for information or interviews.

This is an important opportunity for floodplain managers, both in Washington D.C. and all over the country, to educate everyone including other state and local officials and legislators about the National Flood Insurance Program, about flood risk maps and map modernization, about floodplain management, and about disaster mitigation. It is a moment when policy makers and people at risk are really engaged in these subjects.

This report will provide some details about proposals under consideration, but with a word of caution. These proposals are like shifting sands and are changed, often significantly, from one day to the next. The report will also provide some information about hearings held and scheduled. Comments on any of this would be most helpful if based on the concepts involved rather than on the specifics of a particular piece of legislation. There is an opportunity to offer ideas for inclusion in the discussion, so ASFPM would very much like to have members' thoughts, either reactive or proactive!

Legislative Proposals

Among many proposals, several are:

H.R. 3922 was introduced by Gene Taylor (D-MS) and cosponsored by many others, and referred to the House Financial Services Committee. Its stated purpose is to strengthen the National Flood Insurance Program, encourage participation in the program, and provide a one-time opportunity for insurance coverage to those damaged by Hurricanes Katrina and Rita but not located in a mapped floodplain.

This is being referred to as the "buy-in bill." It would allow purchase of flood insurance with a payment of 10 years prior premiums to come from the claim settlement. This would be accompanied by a requirement to maintain flood insurance on the property.

ASFPM has expressed concerns about the precedent set by such a "buy-in" and the likely loss of incentive for others to maintain their policies if they are likely to be offered a chance to buy insurance after a disaster strikes. Although providing assistance to people damaged but not in the mapped floodplain is important, the concern is providing that assistance through the NFIP. It does open up areas for discussion about how best to assist such disaster victims and whether flood insurance is the appropriate vehicle. It also shows the need to address whether or not such areas of low probability but high catastrophic risk should be mapped and flood insurance required at some low premium rate.

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Washington Report (cont.)

S. 1765 and S. 1766 were introduced by Mary Landrieu (D-LA) and David Vitter (R-LA) and are called the “Louisiana Katrina Reconstruction Act.” They are very large bills of over 400 pages, encompassing a wide range of disaster recovery and mitigation issues. A restoration of the Hazard Mitigation Grant Program to 15% from 7.5% is included as are waivers of some Stafford Act provisions. The measures also provide for the establishment of regional and field office facilities for the Department of Homeland Security. The costs seem to approach \$250 billion.

H.R. 3786, introduced by Bobby Jindal (R-LA), is a bill that makes adjustments to aspects of the Stafford Act, including restoring HMGP to 15% and raising the cap on repair expenditures. Jindal has also introduced H.R. 3477 dealing with establishment of DHS regional offices and H.R. 3946, which provides for certain waivers of environmental protection provisions.

Jack Reed (D-RI) will be introducing legislation in the Senate that will incorporate some suggestions in the ASFPM White Paper with respect to the condition of levees in the United States. It will also require a study of certain aspects of the National Flood Insurance Program, including how to make the program more affordable for lower-income people.

Hearings

A number of Congressional committees are in the process of holding hearings to explore issues surrounding hurricane recovery and mitigation.

The House Financial Services Committee has already held hearings on the effect of the hurricanes on the financial services industry and on the emergency housing needs. That committee also held a briefing by insurance industry representatives and is likely to schedule a hearing specifically on the NFIP. The ASFPM has had meetings with both majority and minority staff to discuss some of the proposals that have been made to the committee.

The House Transportation and Infrastructure Committee will be holding a variety of hearings. The Emergency Management Subcommittee will hold a hearing on “Recovering after Katrina: Ensuring that FEMA is Up to the Task.” That subcommittee will hold another hearing in November at which it is likely that ASFPM will be asked to testify. Hearings before the Water Resources Subcommittee will be held October 27 on Corps of Engineers and levee issues at which ASFPM has been asked to testify.

The House Government Reform Committee held a hearing on “Lessons Learned from Katrina.” The Homeland Security Committee has held a hearing on “Command and Control during Catastrophic Events.” A House Bipartisan Select Committee to Investigate the Preparation for and Response to Hurricane Katrina has held two hearings, including one day-long session at which former FEMA Director Mike Brown testified.

The Senate Banking Committee will hold a hearing on the future of flood insurance on October 18th at which the ASFPM has been asked to testify. That committee has indicated an expectation of a broad debate next year on the government role in insurance.

The Senate Commerce Committee has held a hearing on the accuracy of hurricane prediction and related matters.

The Senate Environment and Public Works Committee will hold a hearing on the Environmental Protection Agency, Corps of Engineers, and Federal Highway Administration as they relate to Hurricane Katrina.

The Senate Finance Committee is holding hearings on oversight of Katrina dollars and tax policy to facilitate rebuilding of the Gulf Coast and helping families.

The Senate Committee on Homeland Security and Governmental Affairs held a hearing on support for first responders and will hold one on how FEMA is performing its job at this stage of recovery.

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Washington Report (cont.)

Appropriations

The House-Senate Conference Committee completed its action on the Department of Homeland Security Appropriations bill for FY 2006 (H.Rept. 109-241). It provides full funding for the repetitive flood loss programs authorized last year. Regular Flood Mitigation Assistance will be funded at \$40 million, the new pilot for severe repetitive loss will be funded at \$40 million, and the new pilot for direct funding by the Director will be funded at \$10 million. Pre-disaster mitigation grants are funded at \$50 million. Map modernization is funded at \$200 million with language indicating that stream miles and leveraging of funds potential be included in prioritizing mapping.

—*Meredith R. Inderfurth, Washington Liaison*
Rebecca Quinn, CFM, Legislative Officer

All referenced legislation and committee reports
can be viewed at <http://thomas.loc.gov>.

GAO LOOKS AT DHS'S ALL-HAZARDS APPROACH

In response to a request from Congress, the U.S. Government Accountability Office examined the extent to which the Department of Homeland Security has considered all types of hazardous events—including natural disasters—in supporting the all-hazards capabilities of first responders (police, fire, emergency medical services, etc.). The report of the investigation was released August 11, and concludes that, of the 36 DHS-defined baseline capabilities needed by first responders, 30 are similar for both natural and terrorism disasters. The largest difference lies in the prevention arena, where intelligence capabilities, criminal investigation, and counterterrorism are clearly not applicable to natural disasters. GAO further found that, although federal funding provided for enhancing first-responder capabilities since September 11 has emphasized preparing for terrorist attacks, it can be used for other hazards. However, most of the first responders interviewed during the investigation indicated that DHS required too much emphasis on terrorism-related activities in requests for equipment and training.

>>> The report can be accessed at [http://www.gao.gov.new.items.d05652.pdf](http://www.gao.gov/new.items/d05652.pdf).

Call for Abstracts
Floodplain Management Crossroads
Annual Conference of the Association of State Floodplain Managers
June 11-16, 2006
Albuquerque, New Mexico

Guide the 2006 conference program by submitting an abstract for a presentation. Join your colleagues in publicly addressing the many issues and challenges associated with reducing flood damage, making communities more sustainable, and managing fragile floodplain and coastal resources. Presentations will be arranged among eight tracks: No Adverse Impact (NAI) floodplain management; public policy, education and outreach; flood loss mitigation; National Flood Insurance Program; floodplain mapping technology and applications; hydrology & hydraulics; and river restoration.

Abstracts are due October 29, 2005. Get more details at http://www.floods.org/Conferences,%20Calendar/Albuquerque/ASFPM_2006_Call_for_Abstracts.pdf

State & Local Report

ILLINOIS JUDGE FIGURES CUMULATIVE SUBSTANTIAL DAMAGE

The Circuit Court of the 7th Judicial Circuit, Sangamon County, Illinois, upheld on October 3 the County's determination that a cabin was substantially damaged and must be brought into compliance with the floodplain ordinance. The home, which lies along the South Fork of the Sangamon River, was damaged in floods in 1996 and again in 2002. The County assessed the damage and determined it to be substantial, that is, over 50% of the value of the structure. When the owners indicated their refusal to bring the structure into compliance with the ordinance, the County pursued enforcement in court.

The County had adopted earlier in 2002 a provision to its ordinance providing that substantial damage be calculated cumulatively "during a 10-year period," and the County calculated that the damage to the structure from both floods did exceed the 50% threshold. The court's agreement with the County's position is notable because the first flood to damage the building (in 1996) occurred before the County had adopted the cumulative language in its local floodplain ordinance. The court noted, "Rules of statutory interpretation require that statutes cannot regulate or punish conduct which took place before the effective date of the legislation, but that newly enacted remedies govern when those remedies apply at the date of the hearing. . . both the damages sustained in 1996 and those sustained in 2002 are added together to determine whether the structural damage is more than 50% of the value of the structure."

>>> For more information, contact Linda Wheeland, Sangamon County Regional Planning, at LindaW@co.sangamon.il.us.

CALIFORNIA ASKS FOR LEVEE FUNDS

The governor of California has called upon the state's congressional delegation to seek federal funding for more than \$90 million in critical improvements to California levees. The governor's letter identified the 12 levee programs that have been determined by the California Department of Water Resources, the Army Corps of Engineers, and the Sacramento Area Flood Control Agency to need federal funding to help avoid a devastating flood disaster. Highest priority was given to projects closest to construction and those with the most significant potential impact on public safety and California's economy.

According to the governor's office, the Sacramento metropolitan area has the lowest level of flood protection—100-year protection—of any large urban area in the nation. Other river cities such as Tacoma, Dallas, St. Louis, and Kansas City have 500-year flood protection. Before Hurricane Katrina struck, New Orleans had a 250-year level of flood protection. Earlier this year, the governor increased the state's flood management budget by approximately \$9.7 million, which is a 70% increase in state funding for levee maintenance and flood emergency response.

MARICOPA COUNTY, ARIZONA, UPDATES FLOOD MAPS

Rapid development in Maricopa County, Arizona (which encompasses 9,200 square miles of land, 24 incorporated communities, and a population of 3.4 million) has affected floodplains across the county. The Flood Control District of Maricopa County, which is responsible for floodplain management for the county's unincorporated areas and 12 of the communities, has worked over the decades to ensure that floodprone lands are being properly used and/or protected. The county has undertaken its own flood control projects such as channelization,

creating retention basins, constructing flood retarding structures, and funding some flood studies. The FCDMC collaborated with the local flood control district, tax assessor's office and other agencies to produce orthophotos for the entire county. The county's geographic information system was developed over 10 years ago, and includes a local floodplain layer.

Recognizing that the flood maps had become outdated with recent development, the FCDMC became a Cooperating Technical Partner with FEMA in 2001 in a massive re-mapping effort. The District supplied the orthophotos for the base maps and developed a series of programs to automate the development of the FIRM panels. The floodplain information was stored in the District's GIS system and later transferred to FEMA's database format. The District also handled the distribution of the preliminary FIRM panels and FIS reports to the communities for review and comment.

This fall the partnership is culminating in the release of 307 updated FIRM panels and 17 digitized Flood Insurance Studies, including 200 pages of Floodway Data Tables and 1,200 pages of profiles. The project included replacing the vector base map with the orthophoto and incorporating almost 100 Letters of Map Revisions into the new FIRM panels.

>>> For more information on FCDMC's flood mapping project, please contact Tim Murphy at tmm@mail.maricopa.gov.

TSUNAMI WARNINGS ON HORIZON

Last December's tsunami in the Indian Ocean basin, which resulted in at least 200,000 deaths and widespread destruction in several countries, spurred the region and the world to begin establishment of a tsunami warning and mitigation system for the area. Through several meetings since then, UNESCO's Intergovernmental Oceanographic Commission has taken the lead in the process of setting up an Indian Ocean Tsunami Warning and Mitigation System (IOTWS). At its August meeting (held in Perth, Australia), the coordinating group reviewed the considerable and rapid progress and discussed next steps.

The IOTWS is based on the establishment of national tsunami centers capable of (and responsible for) issuing warnings in each of the participating countries. The systems will form a coordinated network and will require sharing of relevant observational data. An assessment by experts of state-of-the-art technology concluded that a reliable system requires the combination of three elements: an improved seismographic network; a real-time sea-level observing network covering all of the Indian Ocean basin; and the deployment of deep-sea pressure sensors capable of detecting the tsunami signal as it travels over the deep ocean.

Countries from the region were called on to assess their resources that could be directed to the new IOTWS and what they needed to build in-house capacity. By summer, most countries had completed this step and moved on to develop national strategic plans.

Before the end of 2005, it is anticipated that 23 real-time sea-level stations will be established in countries of the Indian Ocean, completing the upgrading of the sea-level network. Six stations are already operational in the region. Experiments will be conducted in the coming months to test communication links for the transmission of seismic information in real-time. At the same time, improvements in the global telecommunications system will continue to enable it to carry tsunami-relevant information.

Other aspects of the action plan cover tsunami modeling and training for more accurate risk assessment and management to improve national capacities and to facilitate the transfer of knowledge and expertise for the development of basic emergency preparedness tools, such as precise inundation maps of sensitive coastal areas, including cities.

The next meeting will be held in December in Hyderabad, India. All the reports of the past meetings, minutes, presentations, and other information can be viewed at http://ioc.unesco.org/INDOTSUNAMI/perth05/perth05_results.htm.

A PICTURE IS WORTH A THOUSAND LIVES

by JoAnne Castagna, Ed.D.
U.S. Army Corps of Engineers, New York District

We've all seen the images of Hurricane Katrina's destruction—flooded streets, destroyed homes, shattered families. Similar types of images are contributing to efforts to rebuild the lives and communities of Americans along the Gulf Coast.

The U.S. Army Corps of Engineers is using a geographic information system (GIS) to create maps that the Corps needs to perform recovery work in support of FEMA and other state, federal, and volunteer agencies.

The Corps has over 1,600 employees engaged in recovery work throughout Mississippi, New Orleans, and Louisiana. Those efforts include providing residents with temporary housing and roofing, power, debris removal, water, and ice, as well as repairing the levees around New Orleans and pumping floodwater out of the area.

"The region needs to be mapped out first before recovery efforts begin because the hurricane blew away most of the street signs so rescue teams and recovery teams have no idea what streets they are on," according to Stephen Mcdevitt of the Corps' New York District, who is one of three national action officers responsible for deploying and managing GIS teams throughout the disaster region.

Maps can be created using a GIS, a computer-based information system and analytical tool. The GIS takes data from various sources, including aerial photography, flood zones, and demographic data, and combines these layers of information in various ways as overlays to perform spatial analysis and produce a map that depicts the results of that analysis.

Creating GIS images is the first step in such recovery work as

Assessing post-disaster damage—To assess damage, maps are created of the entire region. First aerial photos must be taken of the whole area. These photos are then laid over geographic coordinates and the information is brought into a computer mapping system to create a map.

Building temporary homes—Temporary housing is only allowed to be created on land that is not prone to flooding, is safe, and is near such services as hospitals and schools. Data on the flood zones is combined with other data types to produce maps that show the best locations for temporary housing.

Removing debris—The GIS maps can show engineers where debris is located. Engineers can calculate how much debris there is from these maps and determine the cost of removing it. These maps can also show where the land is clear—potential sites for "staging areas" to hold the debris-removal equipment. In addition, GIS can show the optimal routes for removing and transporting the debris.

Pumping floodwater—The GIS can perform three-dimensional analysis and modeling that shows how long it will take for floodwaters to subside using different rates of pumping. In addition, GIS teams in the field can provide the locations of pump stations that are and are not working. This helps figure out how long it will take to pump water out of the region.

Identifying affected communities—The GIS can create demographic maps that identify socio-economic, ethnic, racial, or other distinct groups that may be particularly affected. To produce such maps, the hurricane path data is combined with aerial imagery, wind speed data, and census data. These maps are used by various groups involved in the rescue and recovery efforts, such as The Red Cross.

[continued on page 13]

Corps uses GIS in Recovery (cont.)

Rescue and recovery—The GIS teams are gathering data about where hurricane victims are located and feeding this information into the GIS database. This data is combined with the aerial photography and other geographic information to produce maps that search and rescue workers can use to locate and recover stranded individuals.

GIS is one of several tasks that must be begun immediately in disaster relief. The Corps created a team of diversified specialists: many of the GIS team members come from other disciplines, whose additional skills can meet the many needs during a disaster. The Corps called upon existing contractors to begin work on aerial photography immediately. A close working relationship with and cooperation among the other agencies involved in the massive recovery effort has been “great,” Mcdevitt said. “There is an incredible number of ways that GIS can be used to support disaster missions. A picture is worth a thousand words and if that picture has a lot of useful information on it, people do relate to it.”

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Publications, Software, AV & the Web

The Water Information Center is a new portal of more than 100 peer-reviewed reports from the National Academies on water-related issues. The reports represent independent and objective consensus among experts from academia and related industries. Among the topics featured are hydrologic hazards; water and soil remediation; water quality in the natural environment; river basin systems management, environmental assessment, management, and restoration; and water science and research. All of the reports can be read free on-line, and summaries are downloadable as pdf files. Go to <http://water.nationalacademies.org>.

“Insurance and Climate Change” examines climate change mitigation (primarily reductions in greenhouse gas emissions) and adaptation from an insurance industry perspective, with particular reference to London and the United States. It illustrates how British insurers are shaping public policy and using new technology to manage the risks from climate change impacts. Drawing on examples and lessons from both countries of insurance involvement in dam failure, other flooding, coastal development, hail storms, and other risks, the paper makes a plea for society to make more use of insurance expertise in future decisionmaking with regard to climate change. For example, it seems likely that in the United States, reductions in carbon emissions (which come primarily from buildings and coal) will come about via action by states, cities, and businesses rather than the federal government. Insurers thus could have a key role in encouraging more sustainable buildings through research and premium incentives. The author notes that the insurance industry is a “sleeping giant” much bigger and potentially more powerful than the fossil fuel industry in shaping the future through financial incentives and disincentives, and increasingly would welcome a greater dialogue with the academic and political community. David Crichton. 2005. 28 pp. Presented at the Conference on Climate Change, Extreme Events, and Coastal Cities. Available at the Benfield Research Centre website at http://www.benfieldhrc.org/climate_change/insurance_and%20climate_change.pdf.

Community-Based Watershed Management: Lessons from the National Estuary Program describes innovative approaches developed and conducted by the 28 National Estuary Programs, which are community-based watershed management organizations that restore and protect coastal watersheds. It covers managing pollution runoff, increasing wildlife habitat, controlling invasive species, starting an estuary protection program, identifying problems and solutions, developing a plan, and ways to take action. 2005. Environmental Protection Agency. 98 pp. Available for downloading at <http://www.epa.gov/owow/estuaries/nepprimer>.

Integrated River Basin Governance: Learning from International Experience aims to help the coming generation of university students learn how to design integrated river basin management systems and provides current researchers and water practitioners with a resource on river basin management. Grounded in the theory and literature of natural resources management and planning, the thrust of the book is to assist policy and planning, rather than extend knowledge of hydrology, biophysical modeling, or aquatic ecology. The book covers decisionmaking, institutions and organizations, information management, participation and awareness, legal and economic issues, integration and coordination processes, and building human capacity. Methods are outlined for implementing strategic and regional approaches to river basin management, noting the importance of context and other key elements that have been shown to impede success. The book's examples—both successes and failures—are derived from real life experiences in both developed and developing countries. Bruce Hooper. 2005. 316 pp. International Water Association. ISBN: 1843390884 \$112.50 (IWA Members); \$150.00 (non-members). See <http://www.iwapublishing.com/template.cfm?name=isbn1843390884> or phone BookMasters at (800) 247 6553.

National Management Measures to Protect and Restore Wetlands and Riparian Areas for the Abatement of Nonpoint Source Pollution is a new technical guidance and reference document from the Environmental Protection Agency intended for use by state, territory, and authorized tribal managers as well as the public in the implementation of nonpoint source (NPS) pollution management programs. The new guidance contains information on the best available, economically achievable means of reducing nonpoint source pollution through the protection and restoration of wetlands and riparian areas, as well as the implementation of vegetated treatment systems. Free from the National Service Center for Environmental Publications at 800-490-9198 or via <http://www.epa.gov/ncepihom> (ask for publication # EPA 841-B-05-003). Also available for downloading at <http://epa.gov/owow/nps/wetmeasures/>.

Methods to Develop Restoration Plans for Small Urban Watersheds is the second of an 11-manual series on urban watershed restoration. It contains detailed guidance on how to put together an effective plan to restore urban subwatersheds. The manual outlines a practical, step-by-step approach to develop, adopt, and implement a subwatershed plan in a community. Within each step, the manual describes 32 different desktop analyses, field assessment, and stakeholder involvement methods used to make critical restoration management decisions. Center for Watershed Protection. 2005. Hard copy for \$40, pdf download for \$35, both from the CWP Publications Store at <http://www.cwp.org/PublicationStore/USRM.htm>.

Calendar

*See more flood-related meetings, conferences, and training
at <http://www.floods.org/calendar.htm>.*

October 11–14, 2005: GIS IN FLOODPLAIN MANAGEMENT, Tucumcari, New Mexico. Sponsored by the New Mexico Floodplain Managers Association. See <http://www.nmfma.org/conf1005.htm>.

October 17–20, 2005: NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM (E278), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.

October 18–19, 2005: IDENTIFYING “WATERS OF THE U.S.” AFTER SWANCC, Albuquerque, New Mexico. Sponsored by the Association of State Wetland Managers. See <http://www.aswm.org/>.

October 20–21, 2005: IBHS ANNUAL CONFERENCE ON PROPERTY LOSS REDUCTION, Lake Buena Vista, Florida. Sponsored by the Institute for Business & Home Safety. Contact IBHS at 4775 E. Fowler Ave., Tampa, FL 33617; (813) 286-3400; info@ibhs.org or see <http://www.ibhs.org/congress/>.

October 24–27, 2005: BASIC HAZUS-MH (E313), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.

October 25–28, 2005: ADVANCED TECHNICAL SEMINAR ON DAM FAILURE ANALYSIS, Salt Lake City, Utah. Sponsored by the Association of State Dam Safety Officials. Contact ASDSO, 450 Old Vine St., Lexington, KY 40507 or see <http://www.damsafety.org>.

October 27, 2005: FIRST ANNUAL MEETING OF THE MARYLAND ASSOCIATION OF FLOODPLAIN AND STORMWATER MANAGERS, Laurel, Maryland. See <http://www.mafsm.org/>.

October 27–28, 2005: ECOSYSTEMS: RESTORATION & CREATION, Tampa, Florida. Sponsored by Hillsborough Community College. See <http://www.hccfl.edu/depts/detp/ecoconf.htm>.

October 31—November 2, 2005: SUSTAINABLE BEACHES CONFERENCE, St. Petersburg, Florida. Sponsored by the Clean Beaches Council. See <http://www.cleanbeaches.org/events/summit/2005/>.

November 2, 2005: FIRST ANNUAL MEETING OF THE FLOODPLAIN MANAGEMENT ASSOCIATION OF NEW JERSEY, Somerset, New Jersey. See http://www.awra.org/state/new_jersey/flood/UpcomingEvents.html.

November 2–3, 2005: EXTREME EVENTS: ANNUAL CONFERENCE OF THE WATER MANAGEMENT ASSOCIATION OF OHIO, Columbus, Ohio. See <http://www.wmao.org/meetings.shtml>.

November 3–4, 2005: FALL MEETING OF THE ARIZONA FLOODPLAIN MANAGEMENT ASSOCIATION, Prescott, Arizona. See <http://azfma.org/>.

November 3–4, 2005: ANNUAL CONFERENCE OF THE UTAH FLOODPLAIN AND STORMWATER ASSOCIATION, St. George, Utah. See http://des.utah.gov/pdf/ufsma/agenda_05.pdf.

November 4–5, 2005: EIGHTH ANNUAL SOUTHEAST WATERSHED ROUNDTABLE, Bowling Green, Kentucky. Sponsored by the Southeast Watershed Forum and Kentucky Watershed Roundtable. Contact Claudia at CS@southeastwaterforum.org or Judy Petersen at director@kwalliance.org or see <http://southeastwaterforum.org/index.asp>.

November 11–13, 2005: URBAN WATERFRONTS 23: GATHERING BY THE WATERS, Savannah, Georgia. Sponsored by the Waterfront Center. See <http://www.waterfrontcenter.org>.

November 12–16, 2005: EMERGENCY MANAGEMENT: LOCAL, REGIONAL AND GLOBAL SUCCESSES, Phoenix, Arizona. Sponsored by the International Association of Emergency Managers. See <http://www.iaem.com/>.

Workshops for Stormwater Management

Stormcon and Forester Communications are hosting three full-day workshops on topics of importance to professionals in stormwater and surface water management. Each of the workshops will run from 9 a.m. to 5 p.m. on December 2, 2005, at the Marriott in Nashville, Tennessee. Choose from

- Stormwater Funding and Utility Development
- BMPs: Pollutants, Selection, and Maintenance
- The Complete NPDES Program from Design to Implementation.

>>> For more information, see <http://www.forester.net/stormcon/nashville/index.html>.

- November 13–17, 2005:** ACTION ON CLIMATE CHANGE, Melbourne, Australia. Sponsored by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). For more information, contact info@greenhouse2005.com or see <http://www.greenhouse2005.com/>.
- November 15–16, 2005:** INTEGRATED RESTORATION OF RIVERINE WETLANDS, STREAMS, RIPARIAN AREAS AND FLOODPLAINS IN WATERSHED CONTEXTS, Amherst, Massachusetts. Sponsored by the Association of State Wetland Managers. Contact Jon Kusler at (518) 872-1804 or see <http://www.aswm.org/>.
- November 15–17, 2005:** 2005 STORMWATER INSTITUTE, Lansdowne, Virginia. Sponsored by Center for Watershed Protection. For more information, see <https://www.engr.washington.edu/epp/cwp/registration.php>
- December 5–8, 2005:** BASIC HAZUS-MH (E313), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- January 30—February 2, 2006:** DIGITAL HAZARD DATA (E234), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- January 30—February 3, 2006:** MANAGING FLOODPLAIN DEVELOPMENT THROUGH THE NATIONAL FLOOD INSURANCE PROGRAM (E273), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- February 13–15, 2006:** NINETEENTH ANNUAL CONFERENCE OF THE MICHIGAN STORMWATER-FLOODPLAIN ASSOCIATION, Acme, Michigan. Contact Les Thomas at (517) 335-3448 or see <http://mi.floods.org/>.
- February 20–24, 2006:** ENVIRONMENTAL CONNECTION '06, Long Beach, California. Sponsored by the International Erosion Control Association. Contact the IECA at (970) 879-3010 or see <http://www.ieca.org>.
- March 8–9, 2006:** EQUAL PARTNERS: ANNUAL CONFERENCE OF THE ILLINOIS ASSOCIATION FOR STORMWATER AND FLOODPLAIN MANAGEMENT, Tinley Park, Illinois. See <http://www.illinoisfloods.org/conferences.html>.
- March 27–21, 2006:** RESIDENTIAL COASTAL CONSTRUCTION (E386), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- April 2–6, 2006:** EIGHTH FEDERAL INTERAGENCY SEDIMENTATION CONFERENCE AND 3RD FEDERAL INTERAGENCY HYDROLOGIC MODELING CONFERENCE, Reno, Nevada. Sponsored by the Subcommittees on Sedimentation and Hydrology of the Federal Advisory Committee on Water Information. Contact Doug Glysson, USGS, 412 National Center, Reston, VA 22092, (703) 648-5019; gglysson@usgs.gov or see http://water.usgs.gov/wicp/acwi/sos/conf/call_papers_extended_42005.pdf.
- April 5–6, 2006:** PARTNERING FOR FLOODPLAIN MANAGEMENT: JOINT NORTH CAROLINA/SOUTH CAROLINA FLOODPLAIN CONFERENCE, North Myrtle Beach, South Carolina. Sponsored by the North Carolina Floodplain Management Association and the South Carolina Association of Hazard Mitigation. See <http://www.ncafpm.org/>.
- April 10–14, 2006:** NATIONAL HURRICANE CONFERENCE, Orlando, Florida. Numerous sponsors. Abstracts are due October 31, 2005. See <http://www.hurricanemeeting.com/2006%20NHC%20Call%20for%20Papers.pdf>.

- May 1–4, 2005:** ADVANCED HAZUS-MH FOR FLOOD (E172), Emergency Management Institute, Emmitsburg, Maryland. Call (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- May 13–18, 2006:** CHARTING A NEW COURSE: SHAPING SOLUTIONS FOR THE COAST, St. Pete Beach, Florida. Sponsored by The Coastal Society. See <http://www.thecoastalsociety.org/conference.html>.
- May 21–25, 2006:** WORLD ENVIRONMENTAL CONGRESS, Omaha, Nebraska. Sponsored by the Environmental Water and Resources Institute of the American Society of Civil Engineers. See <http://www.asce.org/conferences/ewri2006/abstract.cfm>.
- June 11–16, 2006:** FLOODPLAIN MANAGEMENT CROSSROADS: 30TH ANNUAL CONFERENCE OF THE ASSOCIATION OF STATE FLOODPLAIN MANAGERS, Albuquerque, New Mexico. Contact the ASFPM at (608) 274-0123 or asfpm@floods.org or see <http://www.floods.org>.
- July 10–13, 2006:** BASIC HAZUS-MH (E313), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- July 24–27, 2006:** STORMCON: THE NORTH AMERICAN SURFACE WATER QUALITY CONFERENCE & EXPOSITION, Denver, Colorado. Sponsored by StormCon and *Stormwater* Magazine. Abstracts are due December 6, 2005. For information, see <http://www.forester.net/stormcon/nashville/index.html>.
- July 31—August 3, 2006:** MANAGING FLOODPLAIN DEVELOPMENT THROUGH THE NATIONAL FLOOD INSURANCE PROGRAM (E273), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- August 14–17, 2006:** NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM (E278), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- August 14–17, 2005:** ADVANCED HAZUS-MH FOR FLOOD (E172), Emergency Management Institute, Emmitsburg, Maryland. Call (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- August 21–25, 2006:** RETROFITTING FLOODPRONE RESIDENTIAL BUILDINGS (E279), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- August 26–27, 2006:** ENGINEERING ESSENTIALS FOR WETLANDS AND WETLAND REGULATIONS (NCES 8271), Denver, Colorado. Sponsored by the University of Colorado at Denver Continuing Engineering Education Center. Call 303-556-4907 or see <http://www.cudenver.edu/engineer/cont>.
- September 10–14, 2006:** DAM SAFETY 2006, Boston, Massachusetts. Sponsored by the Association of State Dam Safety Officials. Contact ASDSO, 450 Old Vine St., Lexington, KY 40507 or see <http://www.damsafety.org>.
- September 18–20, 2006:** SIXTEENTH ANNUAL FALL CONFERENCE OF THE OKLAHOMA FLOODPLAIN MANAGERS ASSOCIATION, Norman, Oklahoma. Contact OFMA, P.O. Box 8101, Tulsa, OK 74101-8101; or see <http://www.okflood.org>.
- September 18–21, 2006:** NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM (E278), Emergency Management Institute, Emmitsburg, Maryland. Contact (800) 238-3358 or see <http://www.training.fema.gov/EMIweb/>.
- June 3–8, 2007:** 30ST ANNUAL CONFERENCE OF THE ASSOCIATION OF STATE FLOODPLAIN MANAGERS, Norfolk Virginia. Contact the ASFPM at (608) 274-0123 or asfpm@floods.org or see <http://www.floods.org>.



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