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ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.

ANNUAL CONFERENCE SHOWS AVENUES TO FLOOD LOSS REDUCTION

In Phoenix from June 23 to 28 this year, over 700 people warmed up to the idea of “Breaking the Cycle of Repetitive Flood Loss” by participating in the varied activities that made up the ASFPM’s annual conference. As in previous years, there was something for everyone, from informative plenary presentations to invigorating small group discussions, training workshops, technical (and fun) field trips, social events for official networking and just plain getting acquainted, and a large array of exhibits touching on all aspects of floodplain management.

The ever-broadening scope of floodplain management in the United States was the appropriate theme of the opening plenary session on Tuesday morning. Anthony Lowe, Federal Insurance and Mitigation Administration, explained the ways in which the Federal Emergency Management Agency can both apply its hazards/risk management focus to some “homeland security” issues while still maintaining its existing capability with regard to floods and other natural hazards. Dominic Izzo, U.S. Army Corps of Engineers, reviewed the strides the Corps is making in further incorporating important environmental considerations into its water- and flood-related programs and projects. And a local perspective of how county and municipal responsibility, authority, and preferences can be integrated with state and federal programs in order to achieve wise flood loss reduction was offered by Mike Ellegood, Flood Control District of Maricopa County, Arizona.

On Tuesday and Wednesday, speakers at three plenary sessions examined some of the more salient considerations in the implementation of floodplain management goals. First, the importance of local plans (and the process of planning itself) for flood hazard management, mitigation, disaster recovery, and other community goals was emphasized by Doug Williams, Flood Control District of Maricopa County, Arizona; Dennis Harper, Iowa Emergency Management Division; and Jim Schwab, American Planning Association. The speakers described ways in which local plans have provided benefits not only in flood loss reduction but also in other local concerns.

Second, protecting and restoring the natural functions and resources of coastal, riparian, and wetland areas has become a vital component of managing floodprone areas, not only because of the natural mitigative functions these areas serve but also because people now appreciate—and even demand—natural areas for recreation, wildlife habitat, and simple open space. Jon Kusler, Association of State Wetland Managers; Bill Werner, Arizona Game and Fish Department; and Mike Houck, Audubon Society of Portland presented both overviews of goals and approaches and specific instances of integrating risk reduction with resource protection at all levels.

Third, partnerships are absolutely essential to effective management of floodplains, particularly in a capitalistic society with a federal system of government. Local, state, regional, and federal entities across subject matters must be well coordinated and the many private sector interests and capabilities need to be part of the mixture if loss reduction and resource protection are to be achieved. These points were well illustrated and explained in a plenary session that featured Russell Riggs, National Association of Realtors; Jay Hicks, EDAW, Inc.; and Margaret Lawless, Federal Emergency Management Agency.

The final plenary speakers touched on the many, many ways in which advancing technology is changing—and improving—floodplain management, from mapping to damage assessment to local planning. These techniques and their implications were examined by Mike Buckley, Federal Emergency Management Agency; Darryl Davis, U.S. Army Corps of Engineers; and Chris Doyle, Federal Emergency Management Agency.

Among the topics covered in small-group discussions throughout the week were digital mapping, links between wildfire and floods, local compliance with flood regulations, flood assessment in land-locked basins, statewide mapping projects, flash flood mitigation, international initiatives, No Adverse Impact approaches to floodplain management, watershed planning, stormwater techniques, forecasts and warnings,

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from the Chair

George Riedel

Our 26th annual conference, held in Phoenix, Arizona, in June, was a great success! Over 700 attendees heard about numerous floodplain management issues, including the No Adverse Impact initiative, stormwater management, mapping, community planning and mitigation, the National Flood Insurance Program, uses of new technology, special concerns of arid regions, and many more. I thank our conference team: Dan Sherwood and Valerie Swick, Local Conference Directors; Al Goodman, Program Coordinator; Dan Accurti, Exhibits Coordinator; Dan Sagramoso, Sponsorship Coordinator; Diane Brown, Trisha Hoskins, and Anita Larson of the ASFPM's Executive Office staff; the Arizona Floodplain Management Association, and the many volunteers who made the conference a great success.

The ASFPM accomplished much this past year; however, we cannot rest on past successes. New challenges lie ahead in the coming year that will require a lot of hard work on everyone's part. First and foremost, the Fiscal Year 2003 federal budget is not a done deal. The ASFPM must continue to work with the Mapping Coalition to try to ensure that the \$300 million in mapping funds included in the Federal Emergency Management Agency's (FEMA's) proposed budget remains. You as members need to educate your congressional leaderships about the importance of this funding for your state and its localities. And this needs to be done immediately.

The President and Congress have proposed the creation of a new Department of Homeland Security. As noted in the "Resolution on Homeland Security and Natural Hazards" passed by the ASFPM Board of Directors June 22, 2002, the ASFPM fully supports the Administration's efforts to strengthen our nation's ability to provide security and protection from terrorism. However, we must be cautious in creating this new department, so that our capacity to reduce the damage and suffering caused by natural hazards is not lost in the process. Over the past six months alone, the President has declared more than 20 federal disasters that resulted from natural hazards—these losses occur in the nation with regularity, and affect most of our citizens and communities. We need to retain and enhance the capability and programs built by FEMA over the years to address those constant "non-homeland security" concerns—the all-hazards approach to planning; the preparedness and response expertise; and the programs like the National Flood Insurance Program, floodplain mapping, and the various natural hazard mitigation programs. Finally, the mission, name, and identity of FEMA ought to be retained to ensure the continuity of the agency's positive work in reducing losses from natural disasters. The resolution urges the Administration "to implement a Department of

Homeland Security in ways that not only maintains, but also builds the state and local capability to reduce natural disaster damage and suffering," regardless of where FEMA is finally located. The ASFPM will continue to work with the appropriate federal agency to reduce natural disaster losses. Members should feel free to share these ideas with their congressional leaders. The ASFPM will continue to promote them throughout the hearings and adoption process.

The ASFPM's No Adverse Impact (NAI) initiative will continue to be important this year. At the Phoenix conference, ASFPM released a No Adverse Impact Status Report that lists activities that communities could do to implement NAI initiative. I call these activities "NAI building blocks" [see related article on page 3 of this issue]. For the NAI initiative to flourish, the planning and implementation must start at the local level. For the past two years, we have educated the membership and discussed the NAI initiative. We must begin to take NAI to the next level. We need to educate local and state policymakers on ways to develop programs that enhance and support local planning that includes NAI activities. This year, the ASFPM will work on products and tools to accomplish this idea.

Finally, I would like to express my appreciation to the membership in allowing me to serve as Chair of the ASFPM for the coming year. I look forward to working for you and with you to make ASFPM an even stronger organization.

Annual Conference (cont.)

Tropical Storm Allison, public awareness and education, and many others.

The conference also included meetings of the ASFPM's technical committees, the general membership meeting with election of new board members, gatherings of each region's members and state chapters, the golf tournament, administration of the Certified Floodplain Manager examination, roundtable breakfasts that served as forums for topical discussions, and presentation of the annual floodplain management awards [see page 6]. Training and workshops throughout the conference week offered help on such technical topics as flood frequency analysis, the HAZUS damage estimation model, coastal mapping, community assistance visits, repetitive losses, mitigation planning, map revisions, and the Cooperating Technical Partners initiative, among others. Technical field trips gave a glimpse of the unique nature of flood problems, restoration, and other issues in arid regions.

The technical papers presented at the conference will be released as Proceedings by the ASFPM this fall.

The ASFPM extends its appreciation to everyone who helped make the Phoenix meeting a huge success, especially the Conference Hosts Dan Sherwood and Valerie Swick; Program Coordinator Al Goodman, Jr.; and Exhibits Coordinator Dan Accurti.

NO ADVERSE IMPACT QUESTIONS & ANSWERS

This column explores the details and nationwide applicability of the ASFPM's "no adverse impact" approach to floodplain management. Your questions about NAI can be sent to the Editor at the email address on the last page.

QUESTION Suppose I want to start implementing the NAI idea in my community. How do I get started?

ANSWER A handy way to review your options and see what is already in place is by looking at the seven components that we call "building blocks" of NAI. These are activities your community undertakes in the normal course of business and that can be adapted to move toward the goal of no adverse impact floodplain management.

Hazard Identification—While conducting any mapping project, think through the comprehensive approach so that your map realistically reflects all existing hazards (including dam failure, levee overtopping, channel migration, etc.) and the future impacts of development (such as increased flood levels or more erosion).

Planning—Review your local comprehensive plan as well as your plans for watershed protection, hazard mitigation, housing, transportation, economic development, and capital improvements. Try to recognize flood and flood-related hazards in all of these planning activities and think about individual and cumulative impacts, now and in the future. Find ways to prevent or mitigate adverse impacts.

Infrastructure—Before deciding how (or if) to maintain, repair, replace, or expand public works (roads, utilities, other public facilities) consider the hazards, how the infrastructure can be protected from them, and how to minimize any impacts the planned activity may have on other people and properties.

Emergency Services—Actions taken during and after a flood or other disaster should recognize adverse impacts and identify alternative approaches that do not transfer the problems to others. For example, putting up a temporary levee could increase flood flows or velocities elsewhere.

Regulations and Standards—Incorporate regulations, standards, and policies that prevent the adverse individual and cumulative impacts of current and future development. Standards should be set to require evaluation of the potential impact of proposed development and redevelopment.

Corrective Actions—Especially after a disaster, use your community's planning and development/re-development activities to correct existing hazards that were transferred to another property or community by past development.

Education and Outreach—The outreach programs and dissemination tools already in place can be modified to incorporate the NAI message: know your community's hazards, understand how certain actions could adversely affect others, make changes to avoid those consequences, and identify how citizens can protect themselves and others.

>>>More details on the buildings blocks, along with other helpful information about getting started on NAI, can be found in the ASFPM's *No Adverse Impact Status Report: Helping Communities Implement NAI* (June 2002 issue), available on the website at <http://www.floods.org>. Color copies of the Status Report may be ordered by clicking on the order form at <http://www.floods.org/naiorderfrm.pdf>.

Learn More about NAI

Flood losses in the United States have continued to rise in spite the best efforts of everyone in floodplain management. The ASFPM believes that this situation can best be remedied by adopting a much broader guiding principle of "no adverse impact" (or NAI) floodplain management. Under an NAI framework, the action of one property owner within a watershed is not allowed to adversely affect the flood risks for other properties, as measured by flood stages, flood velocities, flood flows, and the potential for erosion or sedimentation, unless community-approved mitigation of that impact occurs. A community pursues NAI floodplain management through development and management plans and programs that identify the levels of impact the community believes to be acceptable, specify appropriate mitigation measures that will prevent development activity from having a net adverse effect on the rest of the watershed, and ensure that the mitigation measures are carried out.

Learn more about NAI and how it is already being applied across the United States, by checking the ASFPM's website at <http://www.floods.org>.

USE OF STAGE INDEXING AND GIS TO UPDATE FLOOD MAPS

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Introduction

As floodplain managers well know, a river's flood response can change over time as a result of land use change in its drainage basin, engineering modifications of the river channel, or even long-term climate change. Regardless of the cause, however, rapid hydrologic change requires that pre-existing assessments of flood frequency, recurrence times, predicted flood levels, and floodplain zonation be updated periodically. Recent floods on the Mississippi River in 1993 and 1995, the Red River in 1997, and the Tar River in 1999 have led to speculation that existing flood-frequency assessments and hazard maps for those areas are out of date and do not adequately reflect current conditions on these dynamic rivers.

Current Flood Hazard Estimation

For frequent updates of flood hazard levels and floodplain delineations, a comprehensive hydrologic and hydraulic analysis is prohibitively expensive. The Upper Mississippi River System Flow Frequency Study (UMRSFFS), which is currently re-evaluating flood frequencies on the Upper Mississippi, Missouri, and Illinois rivers, is a good example of the current approach to regional flood-hazard updates. With a minimum price tag of \$14 million, the UMRSFFS is based upon current flood hazard methods. Its results are scheduled to be released in March 2003, after several years of preparation. Flood-frequency estimates for those areas were last updated in 1975 and, given how dynamic these rivers are, the new probabilities and floodplain maps are certain to be significantly different from the current versions. There likely will be a public outcry as new properties are thrown into hazard zones and as flood protection structures are downgraded. Such a reaction could have been avoided had the hazard estimates been revised incrementally since 1975—even provisionally—rather than unveiling more than 25 years of cumulative change in a single stroke.

A New Approach

The method developed in this study is designed to effectively and inexpensively estimate updated flood frequency levels and inundation areas for river reaches experiencing systematic shifts in flood behavior. This method builds upon existing techniques of stage indexing (Pinter et al., 2001) and stage-based flood frequency analysis (Pinter et al., 2000) by combining them with GIS-assisted flood hazard modeling. Flood frequencies based on indexed stages provide a quick and inexpensive means to produce up-to-date flood hazard levels.

Previous stage-indexed flood frequencies were spatially limited to the locations of river gages. We have developed a method to expand the updated flood levels from the gage locations into a three-dimensional flood inundation model for a given study area by using a geographic information system (GIS). This method is not meant to replace the so-called Bulletin 17B method, which is based on hydraulic modeling (Interagency Advisory Committee on Water Data, 1982), but rather to provide incremental (potentially annual) updates to flood hazard assessments and possibly act as an independent check on the results of hydrologic and hydraulic re-analysis such as the UMRSFFS.

The St. Louis area was chosen as the locale at which to demonstrate the application of these techniques. An 11-mile study site (river miles 72 through 83) was chosen that borders St. Louis City, Missouri, and East St. Louis, Illinois. This reach of the Mississippi River contains the St. Louis gaging stations at river mile 179.6, which chronicle a record of over 140 years.

Reuben Heine, a Ph.D. candidate in Environmental Resources and Policy at Southern Illinois University, was awarded the 2001-2002 Graduate Fellowship in Floodplain Management, sponsored by the ASFPM and the Federal Emergency Management Agency. Here he reports on the research he undertook during his year of the fellowship, seeking to develop a technique for quick annual updates of flood hazard maps using stage-based flood-frequency analysis, high-resolution digital topography, and geographic information systems.

Methods

This research included four basic components. In the first part of the study, the **specific-gage technique** is used to establish temporal trends in the stage-discharge relationship at any nearby river gaging station (the St. Louis river gage was used in the 11-mile study site). The second part of the method calls for normalizing the stage-discharge data by **indexing**

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Updating Flood Maps (cont.)

the stage data to the most recent complete water year and creating new flood frequency curves for the nearest gage(s). With this done, the third step of the procedure uses the new flood frequency curves to update existing water-surface **profiles** for the river reach being analyzed. Again, for this study, the 11-mile reach of the Mississippi River through the St. Louis metropolitan region was used. Finally, a new floodplain **hazard map** is created by flooding the updated flood profile onto a high-resolution digital representation of the floodplain in the study area to determine new flood hazard zones for any chosen flood event.

Specific-Gage Trends—The specific-gage technique is a powerful tool for reducing scatter in hydrologic time series and for limiting the number of independent variables. The method is used to identify temporal trends in data sets that are dense, relatively long in duration, and in which there is a variable (such as flood stage) that depends almost univariately on another parameter (such as discharge). The result is a plot of stage over time for one or more fixed discharges, i.e., the average (regressed) stage in each year associated with a precise and unchanging discharge value.

Using the specific-gage analysis, we identified two strong trends in the stage and discharge data: (1) for smaller, more frequent discharges, stages have declined over time as a result of channel incision and/or accelerated flow velocities; and (2) for larger discharges, stages have systematically increased. That is, for discharges from approximately mid-bank conditions upward, the associated flood stages have increased over the duration of record.

Indexing—The linear trends found at the St. Louis gage can be used to normalize the stage-discharge data by indexing all stages to a selected year. The indexed stage (hI) corresponding to a historical flood with a measured stage of h that occurred in year j , indexed to year k can be expressed as

$$hI = h + (k - j) dh/dt$$

where dh/dt is the rate of stage change over time in meters per year for the measured discharge of that flood. New frequency curves for the St. Louis gage were created using indexed stage values. These new curves significantly alter the recurrence estimates for many flood events. Floods of other magnitudes were also adjusted and confidence bands were added to the recurrence intervals.

Profiles—The adjusted frequency levels, as described above, are used to create updated river surface profiles. This involves extending the results of the updated flood levels to a study reach of a river system. This update is completed by uniformly adjusting the existing hydraulic-modeled profiles. For example, the 100-year flood stage of 47.2 feet is presently reported at the St. Louis gage, which is based on 1975 hydrology and hydraulics developed by the St. Louis District of the U.S. Army Corps of Engineers. After indexing to the year 2000, our stage-based 100-year flood level was found to be 50.4 feet, fully 3.2 feet higher. The adjustment of 3.2 feet found at the St. Louis gage is added uniformly to the existing Federal Emergency Management Agency 100-year profile to extend the results to the 11-mile river reach.

Maps—Once the adjusted profiles are created, the last step in flood hazard mapping is to laterally extend the profiles onto a topographic landscape of the floodplain to determine areas of inundation. This requires the use of a digital terrain model (DTM) and a GIS to perform the map algebra. The GIS can manipulate DTM surfaces of the land and flood waters to determine the areas of inundation at each point in the landscape.

The digital landscape for the St. Louis reach was created using four sources of elevation data. For the majority of the floodplain, the St. Louis District of the Corps has produced a high-resolution triangulated irregular network (TIN). These data were exported as a point file that acts as the primary source of elevation data for the 11-mile study reach. Other sources used in the final elevation model include 5- and 10-foot contours from the U.S. Geological Survey 1:24,000 series topographic quadrangle maps, channel depth soundings for the channel banks and bed, and elevations of top-of-levee heights. TOPOGRID, an interpolation module in ARC-INFO, was used to combine these sources of data into a single three-dimensional layer. The result was a high-resolution digital terrain model (5-meter cell size) of the Mississippi River and its bluff-to-bluff floodplain for the 11-mile study site. This terrain map is useful for several purposes, including comparing the levee heights to the water surface heights and determining the inundation areas.

The goal of inundation mapping is to compare the surface of the topography to the elevation of the water surface of the design flood (i.e., the surface of the 100-year flood). If the land surface elevation is subtracted from the flood-profile elevation, a positive value will result for those areas in which the land elevation is higher than the expected flood level. On the other hand, if the land surface is lower than the flood profile, the value will be negative. The negative values in this “map calculation” represent depth of inundation, which is a useful map in itself. If a simple floodplain delineation map is the goal however, categorizing negative values as “flooded” and positive as “not flooded” will accomplish the task.

Results

For the 11-mile study site, the levee and updated water profile were compared to determine the level of levee protection and ultimately areas subject to flooding. None of the levees in this study site would actually be overtopped by the adjusted 100-year profile, but under conditions represented by the adjusted profile, the St. Louis and Prairie Du

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ACHIEVEMENTS IN FLOODPLAIN MANAGEMENT

At its annual meeting in Phoenix, Arizona, the ASFPM recognized these outstanding individuals, projects, and programs in floodplain management.

The James Lee Witt Award for Local Excellence in Floodplain Management

The **Silver Award** went to PORTA Problem Solvers, a high school group from Petersburg, Illinois, who took the lead in transforming a vacant, blighted floodprone parcel in their community into a local park and playground. The students did the brainstorming, planning, fund-raising, motivating, and even much of the hands-on cleaning, digging, and planting.

The **Gold Award** was presented to the Public Infrastructure Department of Harris County, Texas, which recently overcame one of the worst disasters in its history. After Tropical Storm Allison flooded nearly 16,000 structures, the department developed an automated flood recovery program, and implemented an aggressive floodplain acquisition program that saves the County millions of dollars in flood-related costs. Less than a year later, flood damage repair permits have been issued to almost 90% of the flood-damaged structures.

The **Platinum Award** was presented to Sarasota County, Florida, for its Basin Master Plan—a comprehensive program to protect and manage the floodplain, including identification of all 100-year floodplains in the county, use of basinwide models to regulate development and design cost-effective capital improvement projects, and participation in the Cooperating Technical Partner program of the Federal Emergency Management Agency.

The Tom Lee State Award for Excellence in Floodplain Management

The **Gold Award** went to the New Mexico Floodplain Managers Association in recognition of its far-reaching action plan to improve statewide floodplain management. The NMFMA has taken unprecedented steps to increase public and congressional awareness of flood problems and worked to improve the professionalism of its members, secure additional state funding for floodplain management, and encourage all the state's communities to become more committed to the goals of the National Flood Insurance Program and floodplain management in general.

The recipient of the **Platinum Award** was the Floodplain Management Program of the Ohio Department of Natural Resources' Division of Water. The Division has built a comprehensive, statewide floodplain management program featuring a geographic

information system, innovative processes for remedying floodplain violations, and standard operating procedures including pre- and post-disaster activities. In prospect are a manual for Ohio communities on the Disaster Mitigation Act of 2000, new model floodplain management standards, and a flood risk reduction initiative focused on the state's Appalachian regions.

The Larry R. Johnston Local Floodplain Manager Award

Eugene Henry of Hillsborough County, Florida, received this year's Local Floodplain Manager Award. As the energetic Hazard Mitigation Manager for the County, he has brought both Tampa's and Hillsborough County's floodplain and stormwater management successes into the spotlight. Henry served as local host for the second National Floodproofing Conference last March, and has been instrumental in efforts to form a Florida association for floodplain, coastal, and stormwater management. Henry was nominated by his own staff, in recognition of his dedication to floodplain management issues and the exemplary leadership he provides.

The Media Award

This year's Media Award went to Tucson and Pima County's daily newspaper, *The Citizen*, for its multiple-page (starting on the front page) feature article on local flood issues. Based on research and interviews with affected residents and including maps and graphs of flood risks, the piece lent positive support to the concepts of floodplain management and acted to advance citizen awareness of flood issues.

The John R. Sheaffer Award for Excellence in Floodproofing

This year's Sheaffer Floodproofing Award was given to the City of Vassar, Michigan. After being flooded 20 times in the last century, the most severe in 1986, the City Council implemented a flood mitigation plan that identified over 30 options the city could use to simultaneously reduce flood damage and still maintain a needed property tax base. Using Flood Mitigation Assistance Program funds, the City began a campaign to find owners of floodprone properties who were interested in elevation. Four homes were elevated in 2001 and two more were to be done this summer.

Washington Report

Legislative Update

This legislative session has been dramatically affected by the call for creation of a new Department of Homeland Security. As the August recess approached, Congress had worked itself into what the *Washington Post* called “a flurry of lawmaking.” The House of Representatives recessed early July 27th after passing its version of the Homeland Security legislation. The Senate is scheduled to recess on August 3rd and thus its vote is unlikely until September.

All 13 regular appropriations bills have been reported out of committee in the Senate; two been brought to the floor. Only five appropriations bills have passed the House, with seven still in committee, including the VA-HUD-Independent Agencies Appropriations bill (which funds the Federal Emergency Management Agency and the Environmental Protection Agency). No House-Senate Conference Committees have yet met to resolve differences between bills.

Some of the logjam of nominees awaiting Senate confirmation has loosened up. Anthony Lowe was confirmed by the Senate on July 25th to serve as Administrator of the Federal Insurance and Mitigation Administration at FEMA. The nomination of Mike Brown (FEMA’s General Counsel) to serve as FEMA Deputy Director was voted favorably out of committee and may be considered by the Senate before the recess.

Of Note

- FEMA remains included in the Department of Homeland Security in both the House-passed and Senate committee versions of the bill to create the new department.
- The Senate Appropriations Committee included the full requested \$300 million for floodplain map modernization in its bill. It also included \$25 million for the new pre-disaster mitigation grant program, leaving the Hazard Mitigation Grant Program to function as before.
- The Senate Appropriations Committee has recommended in the Army Corps of Engineers budget that both Section 22 Planning Assistance to States and Flood Plain Management Services be funded at levels above the budget request.

Department of Homeland Security

Development of plans for a new department to encompass most national-security-related functions of the federal government is on a very fast track. The President’s plan was unveiled on June 6th and already the House has passed its bill (H.R. 5005) and the Senate has reported its bill (S. 2452) out of the Governmental Affairs Committee. The House had created a special

Select Committee to coordinate the legislation. Both the House Committee on Transportation and Infrastructure and the House Judiciary Committee voted against including FEMA in the new department, expressing concern that attention to natural disasters could be adversely affected. The Select Committee, nevertheless, did include FEMA, saying that its regional structure and relationships with state and local officials were essential to the new department.

The ASFPM Board of Directors passed a resolution in June urging that steps be taken in creating the new department to ensure that critical natural disaster response and mitigation programs continue to function effectively.

Appropriations

Supplemental Appropriations for 2002—The final vote on the Conference Report accompanying the supplemental appropriations bill took place on July 24th after a number of delays and some friction between the White House and both parties in Congress. FEMA received an additional \$3.1 billion. Of that, \$2.7 billion was for disaster relief and the rest went to various accounts within Emergency Management Planning and Assistance.

Agriculture—Both the House and Senate committees have reported their bills and both have taken favorable action on Conservation Operations, the programs that provide technical assistance to farmers implementing conservation measures. The House committee added \$2.6 million to the Administration’s request for \$840.9 million; the Senate committee added \$6 million. The House bill is H.R. 5263, accompanied by H.Rept. 107-623. The Senate bill is S. 2801, accompanied by S. Rept. 107-223.

Energy and Water—The Senate committee recommended \$8.3 million for Planning Assistance to States, up from a budget request of \$6 million. The Committee recommended \$9 million for Flood Plain Management Services, up from a request of \$7.5 million. U.S. Army Corps of Engineers contributions to U.S. Geological Survey streamgaging and funding for the National Shoreline Study were funded at the budget request, as were the National Dam Safety Program and National Dam Security Program (S. 2784 with S. Rept. 107-220). The House Subcommittee on Energy and Water has marked up its bill, but neither the bill number nor the report number has been made public.

Interior—Both the House and Senate Appropriations Committees have acted on this bill and the House has passed it. The Rivers and Trails Conser-

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Updating Flood Maps (cont.)

Pont levees would not have the minimum 3-foot freeboard required for FEMA levee certification. Therefore, three mapping options were considered in this study. In the first case, inundation mapping was limited to the area within the existing floodway (between the levees). In the second case, inundation was allowed in the levee districts that had lost their FEMA certification. Finally, the entire bluff-to-bluff area was inundated. In each case two maps were produced: one showing regions of impact (flood hazard zones) and the second showing depth of inundation.

Summary

This research developed a technique for rapidly and inexpensively updating flood hazard estimates with existing hydrologic data; it is especially useful for any river reach in which flood response is shifting over time. The new method combines the powerful tools of stage-based flood frequency analysis and GIS-assessed hazard analysis to extend the results of the zero-dimensional stage-based analysis (which was previously restricted to a gage location) to a three-dimensional inundation depth analysis of a study area.

The method employs four general steps. First, the specific-gage analysis is used to establish temporal trends in the stage-discharge relationship at available gaging stations. Second, the stage indexing technique utilizes these long-term trends to normalize the historical stage data to the most recent complete water year. Third, the indexed data are used to create new stage-based flood frequency curves and water-surface profiles for the study area. Finally, flooding a high-resolution digital terrain model (5-meter) of the floodplain creates a new floodplain hazard map.

Map products are the end result of the use of these new methods, and the maps can be easily updated as frequently as a floodplain manager requires. In addition, because these layers are stored in digital format in a GIS, other geographic layers—roads, census data, or even past flood hazard delineations—can be added and spatially queried, to make the maps more useful tools.

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Washington Report (cont.)

vation Assistance program in the Park Service received only the budget request (equal to last year's funding level). Because of a required 4.1 % staff cost of living increase, level funding actually amounts to a decrease for the program. The Senate bill added \$500,000, but earmarked half of the increase.

For the U.S. Geological Survey, both the House and Senate bills restore reductions in the budget request for Water Resources Investigations programs (which includes the streamgaging network). In many cases the program funds are somewhat above the FY '02 funding level. The House bill is H.R. 5093 with H. Rept. 107-564 and the Senate bill is S. 2708 with S. Rept. 107-201.

VA-HUD—The Senate Committee reported its bill (S.2797 with S. Rept. 107-222) on July 25th. It includes the requested \$300 million for floodplain mapping. The request included \$300 million for a new pre-disaster mitigation grant program, which would replace the formula-based HMGP. The Committee chose to fund that at \$25 million, retaining HMGP and indicating that issues

associated with the proposed change should be evaluated by the authorizing committee (Senate Banking Committee). Markup in the House will probably not take place until late September.

Water Resources Development Act

Both the Environment and Public Works Committee in the Senate and the Transportation and Infrastructure Committee in the House have indicated their intent to report out a WRDA 2002 to keep the authorizing legislation on its two-year cycle. The Senate Committee has held hearings at which Lisa Holland testified for the ASFP. Work is actively progressing at the staff level. Both majority and minority staffs on the Senate Committee are interested in the concept of a sliding scale cost-share designed to encourage communities to take steps to facilitate mitigation.

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

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

COMMUNITY PLANS AND DISASTERS

WHAT CAN STATES DO WITH PLAN SURVEY RESULTS?

Scott Choquette &
Dewberry & Davis

Michele Steinberg
National Fire Protection Association

With implementation of the Disaster Mitigation Act of 2000 ongoing, there is a lot of talk about “disaster mitigation planning.” Much of that discussion focuses on assessing what is at risk, developing projects to minimize damage to existing buildings and infrastructure and, of course, the availability of government dollars to fund the projects. How many communities use one of the most powerful tools—land use planning—to reduce their vulnerability to hazards? Are we fixing the mistakes of the past while allowing history to repeat itself by continuing to make poor development decisions?

In its mission to help reduce losses from natural disasters, the Institute for Business & Home Safety (IBHS) sought to find out whether communities are considering natural hazards in development and redevelopment decisions via local plans. With researchers, planners, and others, IBHS developed the Community Land Use Evaluation for Natural Hazards questionnaire, or CLUE.

The CLUE booklet asks questions about community plans—from basics to hazard loss reduction policies. With assistance from the American Institute of Certified Planners and the American Planning Association, IBHS surveyed 1,400 municipal planners nationwide in spring 2001, including all planners in Connecticut and Rhode Island. Planners were asked to grade their local plans, to answer some questions about their communities, and to rank factors that might help them incorporate natural hazards into their local plans.

Why a Survey?

Research indicates that relatively few jurisdictions have adopted comprehensive or general plans, and that even fewer incorporate natural hazards issues into such plans. IBHS decided to survey planners using CLUE as a systematic way to obtain more specific information and to test its assumptions about plans and natural hazards. Communities in states that mandate comprehensive planning were expected to have better scores, as were participants in the National Flood Insurance Program and its Community Rating System, and communities that have recently experienced a natural disaster.

General Findings

Land use decisions are made at the municipal, county, or regional level and can have a significant effect on a

community’s vulnerability to natural disasters. The survey showed that many communities fail to identify natural hazard issues in their comprehensive plans, and lack specific data, policies, or implementation strategies for loss reduction. However, a majority of the respondents were interested in improving local plans with regard to natural hazards, and indicated a variety of actions and processes that would help them do so.

Interestingly, 67% of respondents indicated that their communities had suffered damage from a disaster within the past decade. However, average scores did not vary significantly based on the length of time since the last disaster, though respondents from communities that had never had a disaster graded their plans significantly lower. Population and participation in the National Flood Insurance Program (NFIP) made relatively little difference in scoring. Since 86% of respondents indicated NFIP participation, the lack of variation from the average score is not surprising. Awareness and availability of disaster relief funds seemed to make a slight difference in average scores and communities participating in the NFIP CRS scored their communities somewhat higher. The low response rates from some states made it difficult to draw comparisons among states, although there appeared to be a trend toward higher scores for communities in states that mandate local comprehensive plans with hazard elements.

Given the opportunity to indicate what factors would most help improve their community’s chances of incorporating natural hazards into local plans, respondents ranked public demand, elected officials’ demand (essentially the same thing), additional funding, technical assistance, and improved mapping as the top five from a menu of fourteen. Additional staff, legislation, and planning department priority ranked somewhat lower, indicating that if demand from the community and its officials, money, help, and tools do not exist, it might not matter that there are mandates or a desire by the planners to get the job done, even if they have the staff.

Using the CLUE Survey and Results

IBHS works with Oregon and Rhode Island in its Showcase State program, a comprehensive effort to promote natural disaster resistance and resilience. During the development and testing of CLUE, both states recognized its importance and utility. In 2000, Oregon used it to craft a plan evaluation questionnaire within its Natural Hazards Technical Resource Guide. Using elements from the booklet, Rhode Island’s Statewide Planning Program amended the Economic Development and Industrial Land Use elements of its State Guide Plan to include consideration of hazards.

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Scott R. Choquette is the former NFIP State Coordinator and Deputy State Hazard Mitigation Officer for Connecticut. He sits on the IBHS Land Use Planning Committee and is its ASFPM liaison.

Michele Steinberg is a former consultant to IBHS and currently is also a member of the IBHS Land Use Planning Committee.

STREAM RESTORATION FOR MULTIPLE GOALS

JoAnne Castagna
U.S. Army Corps of Engineers

Improved water quality is one of the results of the Broadstreet Hollow Stream Project, in which the U.S. Army Corps of Engineers used innovative restoration techniques to preserve a community's quality of life as well as the stream's natural habitat. Broadstreet Hollow Stream is a tributary of Espous Creek, which is the primary river running into the Ashokan Reservoir in the Catskill Mountains, part of the system that supplies drinking water to New York residents.

The community along the two-and-a-half-mile Broadstreet Hollow Stream was developed during the 1950s. Builders constructed the homes right along the stream and redirected the stream flow, unaware that they were forcing the stream to flow in a direction it didn't naturally meander. Over the years, the stream would try to correct itself, and that contributed to the problems that lay ahead.

In January 1996 the area experienced an unusual mid-winter rain. The stormwater runoff from the rain and snowmelt caused flooding and streambank erosion, threatening the nearby homes. The large flows of water in the stream also eroded the streambed; the channel's protective gravel and cobble "armor" was being worn away. While degradation of the channel continued, a nearby high bank was beginning to collapse into the stream. This slope failure caused the middle of the stream to push up, creating a "clay island." When the water ran down the stream past the exposed clay island, it would become filled with clay particles, decreasing water quality.

In 1999, Hurricane Floyd caused a flood in the area, further diminishing the water quality. Due to the slope failure, an artesian mud boil developed in the middle of the stream. Groundwater was pushing up through the clay island, carrying suspended colloidal clay sediments to the surface and down the stream.

To deal with the problem, the Greene County Soil and Water Conservation District designed a project that would restore natural stability to the stream and meet water quality, flood prevention, and habitat enhancement goals. They assembled a team that included the U.S. Army Corps of Engineers, New York District; the Ulster County Soil and Water Conservation District; the New York State Department of Environmental Conservation; and the New York City Department of Environmental Protection. The Corps' New York District received permitting and certification for the project from the NYSDEC.

Over 2,718 cubic yards of pure clay material was excavated from the streambed and stream banks. It was replaced with a coarse cobble and gravel material. Relief wells were installed beneath the stream so that groundwater is forced to drain into the stream. A new stream channel was constructed that works with the channel's natural meander. Finally, willow stems and other appropriate riparian species were planted along the bank.

The project is notable for its environmental benefits, including the preservation of trout, and also because the techniques used focused on restoring natural stability to the stream system instead of "forcing" it to cooperate with landowner and agency wishes. The project also satisfied the community and property owners, who had faced flooding over the years.

The Broadstreet Hollow Stream Project was one of 31 projects being carried out under the New York City Watershed Environmental Assistance Program, set up to protect and enhance the water quality in upstate New York watersheds.

>>>For more information, contact JoAnne Castagna, New York District, U.S. Army Corps of Engineers, 26 Federal Plaza, Room 2118, New York, NY 10278-0090; (212) 264-1230.

Community Plans (cont.)

Connecticut was a third state in which policymakers showed a strong interest in using CLUE. Better local plans could help the state reduce vulnerability to hazards like wind and flood, but Connecticut lacks mandates for hazards-related planning and has relatively weak enforcement of comprehensive planning statutes. Connecticut's interest in implementing better planning for hazards gave IBHS an opportunity to take a closer look at a state by surveying all its planners.

Connecticut's State Hazard Mitigation Plan has been updated to include more emphasis on and connection to local planning and the state has begun working with regional planning organizations and watershed groups on planning issues. As a result of the survey's findings, Connecticut modified its NFIP Community Assistance Program agreement with the Federal Emergency Management Agency to include more outreach to local elected officials and targeted at-risk public.

A state legislator with an interest in the ASFPM's

No Adverse Impact approach to floodplain management worked with Connecticut officials in the 2002 legislative session to introduce bills supporting the inclusion of hazards into comprehensive local plan requirements and strengthening floodplain management in the state in general. During scoping meetings with legislative committees, the results of the CLUE survey were used by state officials to develop a promotional strategy and consensus and point to needs. Connecticut was able to introduce planning legislation with knowledge of what planners thought would help them plan. Ultimately the bills were defeated due to funding requests attached to them and bad timing—being in a session driven by a staggering budget deficit. The Connecticut General Assembly's Planning and Development Committee, however, received an excellent education on hazards and planning and is committed to pursuing the legislation next session.

The CLUE questionnaire and survey results can be used to help further the institutionalization of hazard mitigation planning in other states. Arguably as important as the survey results is the use of the survey instrument

[continued on page 11]

Publications, Software, AV & the Web

Use and Benefits of the National Weather Service River and Flood Forecasts quantifies the benefits of the timely hydrologic forecasts provided by the National Weather Service through its River and Flood Program. NWS hydrologic forecasts and warnings are extremely effective in reducing flood damage as well as saving lives. The study on which this report is based concluded that the NWS warnings' economic benefits in three major categories (reservoir optimization, short-term floods, and long-term flood events) can amount to a savings of \$1.62 billion annually. The report updates a 1997 document ("The Benefits of Hydrologic Forecasting") and also breaks down the benefits by specific region of the United States. National Hydrologic Warning Council. May 2002. 34 pp. Available at <http://www.noaanews.noaa.gov/magazine/stories/mag41.htm>.

An Evaluation of the Boulder Creek Local Flood Warning System notes that Boulder Creek in Boulder, Colorado, poses a high flash flood danger not only because of its physical characteristics, but because so many people work and live along its floodplain. Even if all aspects of the warning system set up to protect citizens worked perfectly, a flash flood might take many lives. This report, the product of a study conducted to improve flood warnings, reviews the flood warning literature, provides a brief overview of the nationally recognized flash flood warning system in Boulder, reviews detection and warning practices in other communities with innovative flash flood warning operations, presents a survey of local emergency planning officials, describes an in-depth survey of floodplain residents along Boulder Creek, and reviews flash flood plans for several non-residential Boulder floodplain occupants. Recommendations are made on public education, use of new technologies and education techniques, and the involvement of local businesses and schools in the warning system. Eve Gruntfest, Kim Carsell, and Tom Plush. 2002. 100 pp. Copies are available from the Department of Geography and Environmental Studies, University of Colorado at Colorado Springs, P.O. Box 7150, Colorado Springs, CO 80933; ecg@uccs.edu.

[excerpted from *Natural Hazards Observer*, July 2002, p. 25]

The U.S. Supreme Court Limits Federal Regulation of Wetlands: Implications of the SWANCC Decision reviews wetlands, their functions and values, and national and California wetland losses. It summarizes federal regulation and case law on wetlands, then discusses the impacts of the Supreme Court decision (which limited federal authority to regulate "isolated" wetlands under the Clean Water Act) [see *News & Views*, December 2001, p. 5]. The author compares the risks and costs of regulating isolated wetlands and some regulatory and non-regulatory policy options. Although much of the paper focuses on California, it is applicable to other states as well. Jennifer Ruffolo. February 2002. 134 pp. Available at the California State Library website at <http://www.library.ca.gov/crb/02/03/02-003.pdf>.

The Ten Most Wanted: A Search for Solutions to Reduce Recurring Losses from Natural Hazards outlines 10 of the most important solutions to decrease recurring losses from natural disasters. The report is the result of a June 2000 workshop convened by the American Society of Civil Engineers and IBHS. It addresses why losses from natural disasters are increasing and offers recommendations and priorities for future research and development of cost-effective solutions. Participants identified research needed for residential and commercial buildings and prioritized mitigation methods that would offer the biggest loss reductions in the shortest time for damage from hurricanes/windstorms, earthquakes, floods, hail, wildfire, and winter storms. They concurred on incorporating holistic measures that integrate research, development, and education with professional practices and public policies. Institute for Business & Home Safety. 2002. 29 pp. Available from the IBHS website at http://www.ibhs.org/research_library/downloads/292.pdf.

[excerpted from *Natural Hazards Observer*, July 2002, p. 24]

Dam Removal: Science and Decision Making, the result of 18 months of research and deliberation by a panel of experts, outlines the current state of research on and experience with dam removal. It contains sections on the federal legal context, informed decisions, environmental outcomes, economic issues, and the social aspects of dam removal. Widespread interest in dam removal has been spurred by the aging of many dams, by evolving societal values, and by new scientific understanding of the changes brought by dams [see *News & Views*, June 2002, p. 9 and April 2002, p. 10]. Property owners, public utilities, state and local governments, and private citizens are faced with complex and difficult decisions, and they need guidance as they attempt to incorporate scientific information into the process of deciding whether to remove dams. 2002. 224 pp. Single free copies can be requested from the Heinz Center, 1001 Pennsylvania Avenue, N.W., Ste. 735 South, Washington, D.C. 20004; (202) 737-6307; sdavid@heinzctr.org.

[excerpted from *Natural Hazards Observer*, July 2002, p. 26]

Community Plans (cont.)

itself. It has immediate value as an outreach and awareness tool, and suggests to its users good policies worth incorporating into state and local comprehensive plans. Furthermore, the CLUE survey results can be contrasted with older surveys conducted by states to gauge progress in marketing mitigation planning. Its results can be used to target and tailor training programs and ultimately to effect policy change.

>>>For additional information about the survey, please visit the IBHS website at <http://www.ibhs.org>.

Calendar

The Association of State Floodplain Managers maintains a list of flood-related meetings, conferences, and training at <http://www.floods.org/calendar.htm>.

August 12–15, 2002: STORMCON™: THE NORTH AMERICAN SURFACE WATER QUALITY CONFERENCE & EXPOSITION, Marco Island, Florida. Sponsored by Forester Communications and *Stormwater* magazine. Contact Forester Communications, P.O. Box 3100, Santa Barbara, CA 93130; (805) 681-1300 x12; sweditor@forestor.net.

August 26–30, 2002: DIGITAL HAZARD DATA, Emergency Management Institute, Emmitsburg, Maryland. Contact EMI at 1-800-238-3358 or see <http://www.fema.gov/emi/>.

August 28–29, 2002: FLOODPLAIN MANAGEMENT IN OHIO—STATEWIDE CONFERENCE 2002, Columbus, Ohio. Sponsored by the Ohio Department of Natural Resources, Ohio Floodplain Management Association, and Federal Emergency Management Agency. Contact Alicia Silverio, Ohio Division of Water–Floodplain Management Division; (614) 265-6750; alicia.silverio@dnr.state.oh.us.

September 1–5, 2002: ANNUAL CONFERENCE OF THE NATIONAL EMERGENCY MANAGEMENT ASSOCIATION, Asheville, North Carolina. Contact NEMA at (859) 244-8162; nema_admin@csg.org; <http://www.nemaweb.org/index.cfm>.

September 2–6, 2002: INTERNATIONAL CONFERENCE ON QUANTITATIVE PRECIPITATION FORECASTING, University of Reading, United Kingdom. Sponsored by the World Meteorological Organization's World Weather Research Programme and the Royal Meteorological Society. Contact the Executive Secretary at execsec@royal-met-soc.org or see <http://www.met.rdg.ac.uk/qpf/announcement.html>.

September 2–11, 2002: WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (RIO +10), Johannesburg, South Africa. Contact Johannesburg Summit Secretariat, Division for Sustainable Development, United Nations Department of Economic and Social Affairs, Two United Nations Plaza, DC2-2220, New York, NY 10017; dsd@un.org or see <http://www.johannesburgsummit.org>.

September 8–11, 2002: DAM SAFETY 2002, Tampa, Florida. Sponsored by the Association of State Dam Safety Officials. Contact ASDSO at (859) 257-5140; fax: (859) 323-1958; info@damsafety.org.

September 9–13, 2002: RESIDENTIAL COASTAL CONSTRUCTION, Emergency Management Institute, Emmitsburg, Maryland. Contact EMI at 1-800-238-3358 or see <http://www.fema.gov/emi/>.

September 11–13, 2002: SIXTH ANNUAL MEETING OF THE INDIANA ASSOCIATION FOR FLOODPLAIN AND STORMWATER MANAGEMENT, Turkey Run State Park, Indiana. Contact INAFSM at 115 W. Washington St., Suite 1368S, Indianapolis, IN 46204; (317) 796-2359; fax: (317) 632-3306; inafsm@yahoo.com or see <http://www.inafsm.org>.

September 23–25, 2002: OKLAHOMA FLOODPLAIN MANAGERS ASSOCIATION ANNUAL FALL CONFERENCE, Lone Wolf, Oklahoma. Contact OFMA, P.O. Box 8101, Tulsa, OK 74101-8101; (405) 530-8800 or see <http://www.okflood.org>.

October 7–9, 2002: WETLANDS 2002: RESTORING IMPAIRED WETLANDS AND OTHER WATERS, Indianapolis, Indiana. Sponsored by the Association of State Wetlands Managers. For registration information contact ASWM, Inc., (518) 872-1804; aswm@aswm.org or see <http://www.aswm.org>.

October 7–9, 2002: ARKANSAS FLOODPLAIN MANAGEMENT ASSOCIATION ANNUAL FALL CONFERENCE, Fort Smith, Arkansas. Contact AFMA, c/o Arkansas Soil & Water Conservation Commission, 101 E. Capitol, Suite 350, Little Rock, AR 72201; (501) 682-3907; jason.donham@mail.state.ar.us; or see <http://www.arkansasflood.org>.

October 7–18, 2002: RIVER BASIN MODELING FOR FLOOD RISK MITIGATION IN THE EUROPEAN UNION, ADVANCED STUDY COURSE, Birmingham, UK. Sponsored by the University of Birmingham. Contact Donald W. Knight, School of Engineering, Department of Civil Engineering, T Edgbaston, Birmingham, B15 2TT, UK; D.W.Knight@bham.ac.uk; <http://www.bham.ac.uk/CivEng/rbm/index.htm>.

October 12–16, 2002: ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION OF EMERGENCY MANAGERS, Columbus, Ohio. Contact IAEM, 111 Park Place, Falls Church, VA 22046; (703) 538-1795; fax: (703) 241-5603; info@iaem.com or see http://www.iaem.com/2002_mid-year_program.html.

- October 15–18, 2002:** REDUCING RISKS & VULNERABILITY THROUGH SUSTAINABLE URBAN DEVELOPMENT: 5TH INTERNATIONAL CONFERENCE, Shanghai, China. Sponsored by the Local Authorities Confronting Disasters & Emergencies (LACDE). Contact LACDE 2002 Conference Organizing Committee, Shanghai Municipal Civil Defense Office, 593 Middle Fuxing Rd., Shanghai 200020, China; lacde@mfb.sh.cn.
- October 28—November 2, 2002:** 22ND ANNUAL INTERNATIONAL SYMPOSIUM OF THE NORTH AMERICAN LAKE MANAGEMENT SOCIETY, Anchorage, Alaska. Contact NALMS at nalms@nalms.org; <http://www.nalms.org>.
- November 3–7, 2002:** AWRA 2002: ANNUAL WATER RESOURCES CONFERENCE, Philadelphia, Pennsylvania. Sponsored by the American Water Resources Association (AWRA). Contact: Janet L. Bowers, Conference Chair, Chester County Water Resources Authority, West Chester, PA; (610) 344-5400; fax: (610) 344-5401; jbowers@chesco.org; <http://www.awra.org/meetings/Philadelphia2002/>.
- November 13–15, 2002:** ANNUAL CONGRESS FOR NATURAL HAZARD LOSS REDUCTION, New Orleans, Louisiana. Sponsored by the Institute for Business and Home Safety. See <http://www.ibhs.org/congress/>.
- February 22–26, 2003:** MID-YEAR MEETING OF THE NATIONAL EMERGENCY MANAGEMENT ASSOCIATION, Washington, D.C. Information and registration materials will be available in December 2002. Contact NEMA at (859) 244-8162; nema_admin@csg.org; <http://www.nemaweb.org/index.cfm>.
- February 24–28, 2003:** INTERNATIONAL EROSION CONTROL ASSOCIATION 34TH ANNUAL CONFERENCE AND EXPO, Las Vegas, Nevada. Contact IECA, P.O. Box 774904, 1355 S. Lincoln Ave., Steamboat Springs, CO 80477-4904; (970) 879-3010; fax: (970) 879-8563; ecinfo@ieca.org; <http://www.ieca.org>.
- March 16–23, 2003:** THIRD WORLD WATER FORUM, Kyoto, Shiga, and Osaka, Japan. Sponsored by the World Water Council. Contact the Secretariat of the 3rd World Water Forum, 5th Floor 2-2-4 Kojimachi Chiyoda-ku, Tokyo 102-0083, Japan; +81-3-5212-1645; fax: +81-3-5212-1649; <http://www.worldwaterforum.org>.
- April 13–16, 2003:** INAUGURAL NATIONAL CONFERENCE ON COASTAL AND ESTUARINE HABITAT RESTORATION, Baltimore, Maryland. Sponsored by Restore America's Estuaries, National Oceanic and Atmospheric Administration, Natural Resources Conservation Service, Coalition to Restore Coastal Louisiana, North Carolina Coastal Federation, Save San Francisco Bay Association, and many others. Contact Heather Bradley, Conference Coordinator, Restore America's Estuaries, 3801 North Fairfax Dr., Ste. 53, Arlington, VA 22203; (703) 524-0248; fax: (703) 524-0287; hbradley@estuaries.org or see <http://www.estuaries.org>.
- May 11–16, 2003:** TWENTY-SEVENTH ANNUAL CONFERENCE OF THE ASSOCIATION OF STATE FLOODPLAIN MANAGERS, St. Louis, Missouri. Contact the ASFPM Executive Office, 2809 Fish Hatchery Rd., Ste. 204, Madison, WI 53713-3120; (608) 274-0123; fax: (608) 274-0696; asfpm@floods.org or see <http://www.floods.org>.
- May 12–15, 2003:** WATER FOR A SUSTAINABLE WORLD—LIMITED SUPPLIES AND EXPANDING DEMAND, SECOND INTERNATIONAL CONFERENCE ON IRRIGATION AND DRAINAGE, Phoenix, Arizona. Sponsored by the United States Committee on Irrigation and Drainage. Contact the U.S. Committee on Irrigation and Drainage, 1616 17th St., Ste. 483, Denver, CO 80202; (303) 628-5430; fax: (303) 628-5431; stephens@uscid.org; <http://www.uscid.org>.
- June 8–13, 2003:** SOCIETY OF WETLAND SCIENTISTS 24TH ANNUAL MEETING, New Orleans, Louisiana. Contact Lisa C. Gandy at (501) 225-1552; gandy1c@swbell.net.
- June 11–13, 2003:** WATER STEWARDSHIP: HOW ARE WE MANAGING? 56TH ANNUAL NATIONAL CWRA CONFERENCE, Vancouver, British Columbia, Canada. Sponsored by the Canadian Water Resources Association. Deadline for abstracts is September 9, 2002. Send abstracts to Paul Donahue, Program Director, at pdonahue@dillon.ca. For more information, contact Stefan Joyce at (605) 875-6391; s_joyce@hayco.com; <http://www.hayco.com>.
- September 7–10, 2003:** DAM SAFETY 2003, Minneapolis, Minnesota. Sponsored by the Association of State Dam Safety Officials (ASDSO). Contact ASDSO at 450 Old Vine Street, 2nd Floor, Lexington, KY 40507; (859) 257-5140; fax: (859) 323-1958; info@damsafety.org; <http://www.damsafety.org/conferences.cfm?content=annual>.
- November 1–4, 2003:** ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION OF EMERGENCY MANAGERS, Orlando, Florida. Contact IAEM, 111 Park Place, Falls Church, VA 22046; (703) 538-1795; fax: (703) 241-5603; info@iaem.com or see <http://www.iaem.com>.



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