

# MANAGING FLOOD RISKS & FLOODPLAIN RESOURCES

Third Assembly of the  
**Gilbert F. White National Flood Policy Forum**  
“Managing Flood Risk”





## ABOUT THE GILBERT F. WHITE NATIONAL FLOOD POLICY FORUMS



The ASFPM Foundation has established a periodic gathering of leading experts in flood policy and floodplain management to facilitate national discussion of important floodplain management issues. These Forums develop policy and research recommendations and establish an ongoing record of flood policy issues and directions for the future. The Forums have been named in honor of Gilbert F. White, the most influential floodplain management policy expert of the 20th century. The Forums are not only a tribute to his work, but also a recognition of the success of his deliberative approach to policy analysis and research.

The forums periodically explore one pressing national flood policy issue by assembling and facilitating a dialogue among topical experts who represent various stakeholders from government, industry, and academia. The goal of each Forum is to identify needed research and policies that will reduce the human casualties and economic losses associated with flooding, as well as protect and enhance the natural and beneficial functions of flood prone areas.

The discussions and recommendations for action and research formulated at each Forum are summarized and distributed as a report by the ASFPM Foundation. It is anticipated that policymakers and their constituent groups will review these reports to determine which actions could be undertaken to reduce flood losses in the nation. Furthermore, these reports are expected to provide the bases and priorities for conducting the research necessary to improve policy or program implementation.



The third assembly of the Gilbert F. White National Flood Policy Forum was held March 8-9, 2010, at George Washington University in Washington, D.C. Its topic was “Management of Flood Risks and Floodplain Resources.” The assembly comprised 100 nationally and internationally known experts, invited specifically for their knowledge and experience in resource management; engineering; economics; demography; land use; insurance; local, state, and federal government; environmental sciences; planning; risk analysis; the law; building and construction; emergency management; communication; transportation; finance; and policy analysis.

These experts used their collective wisdom to consider how a risk management framework could be applied to minimize flood risk to humans, the built environment, infrastructure, and society, and simultaneously to protect and restore the natural functions and resources of floodplains. They outlined what such a framework would entail, what it should seek to achieve, and what obstacles must be overcome to realize it. This report summarizes the policy, program, and research needs that were identified as a result of that dialogue.



Among the experts gathered at the 2010 Forum, there was surprisingly little or no disagreement about the national outcomes that ought to accrue from a comprehensive policy of flood risk management. The sought-after results listed by the participants were a close match to the future vision of sustainability, disaster resilience, and natural flood protection that grew out of the 2007 Forum, “Floodplain Management 2050.” These are the five desired outcomes from any nationwide program for the management of flood risks and floodplain resources.

- 💧 **Floods cause minimal harm to society.** The trend of deaths and injuries should be more or less steadily downward; social disruption and economic losses are minimal.
- 💧 **Floods result in minimal damage to the built environment.** New and proposed residences, commercial buildings, infrastructure, and critical facilities ought to lie outside of floodprone areas or have high-standard mitigation features incorporated.
- 💧 **The natural functions and resources of floodplains are protected; previously damaged ones have been restored.** Riverine areas, coastal zones, and lakeshores would support their natural habitats, allow water filtration, provide biomass, store and move flood water naturally, and in general be allowed to function naturally.
- 💧 **The nation, its households, and its communities are resilient and sustainable.** A willingness and ability to “live with floodplains” would be demonstrated at all levels. It would be accepted that rivers and coastline are allowed room in which to function naturally, and people anticipate making a self-reliant recovery from those floods that are inevitable.
- 💧 **The costs of flood damage and of environmental degradation and apportioned fairly and properly.** Individuals and households would take personal and financial responsibility for their flood risks and for protecting local floodplain resources. Communities would not pass the costs of unwise flood prone development, for example, onto federal taxpayers or onto those not living at flood risk. Public policy at all levels ought to reflect this principle.



Although the ideal scenarios are in sharp focus, the path to them is less so. Up to this point, the nation has engaged in multiple, and sometimes competing, efforts to minimize losses due to floods. These initiatives have gradually evolved in positive directions, but still have fallen short in reducing vulnerability and costs. Further, today's changing climate will mean exacerbated flood hazards while continued human development threatens to further degrade essential ecosystems. More effective—even dramatic—action is needed.

A flood risk management approach will provide a framework within which to evaluate and measure various scenarios and to consider all impacts more fully. It would incorporate a comprehensive view of program impacts and consequences (both intended and unintended). In addition, inherent to a flood risk management framework are goal-setting steps and the measurement of progress—elements that have been largely lacking in floodplain management to date.

PAST  
APPROACHES  
TO MANAGING  
FLOODPLAINS  
HAVE BEEN  
ONLY PARTIALLY  
SUCCESSFUL

- ◆ Managing (controlling) the flood and/or flood waters
- ◆ Managing the building and other development taking place in floodprone areas
- ◆ Managing the land area considered to be susceptible to flooding
- ◆ Managing the damage from floods (with relief measures, insurance, and recovery assistance),
- ◆ Managing individual floodplain functions and resources (with regulatory controls or land management)
- ◆ Managing the vulnerability of development (by applying site-specific mitigation measures).



A comprehensive, integrated strategy for management of flood risk and floodplain resources would need to be established through cooperative action, with federal leadership. Four giant steps are essential to move forward from the existing approach. A properly crafted strategy ought to:

**Establish a range of principles expressed as outcomes.** The Forum recommends five outcomes discussed with appropriate sub-goals and objectives. These outcomes would reflect the hydrologic, hydraulic, environmental, economic, and demographic factors that affect the level of both flood losses and the degradation of floodplain and coastal resources, now and in the future.

**Embrace measurable goals, and set benchmarks towards them so that progress can be assessed.** This also would enable measurement of change in risk and change in degradation of resources if added development occurs, populations increase, ecosystems collapse, or the hazards change. The quantification process and benchmarking are critical to the assessment of progress.

**Identify the individual and collective behaviors that will foster progress toward the goals.** To effect changes in individual, household, and collective attitudes and actions, outreach and education must be properly designed and targeted. This will also ensure that funding and effort are not wasted. As with the other outcomes, the behavioral and attitudinal shifts should be monitored for progress.

**Identify barriers and enumerate the changes needed in existing policy and programs, along with any gaps in data and research.** Steps will need to be taken to adjust techniques and approaches as needed and to meet existing and future needs for information. These changes and needs should be re-evaluated as the years pass.

## THE DASHBOARD OF FLOODPLAIN AND FLOOD RISK MANAGEMENT



A risk-management approach offers at least one critical component that has been missing from past initiatives. That component is a set of specified goals and techniques for measuring progress towards them. A range of indicators would be needed for each of the five outcomes towards which the strategy is directed. Some indicators would be numerical, some qualitative. Local-level indicators will be needed as well as nationwide benchmarks. The Forum termed this technique “the dashboard,” because periodic monitoring of the indicators shows how well or how poorly a given outcome is faring, much as the gauges on the dashboard of an automobile reveal how it is performing. A few indicators for each of the desired outcomes of a floodplain and flood risk management strategy are suggested on the next page. Note that this is not an exhaustive list.



## DESIRED OUTCOMES

## SUGGESTED INDICATORS (Not an exhaustive list)

<p><b>Floods cause minimal harm to society</b></p>	<ul style="list-style-type: none"> <li>◆ Number of deaths annually due to flooding</li> <li>◆ Number of injured annually due to flooding</li> <li>◆ Days of business closures due to flooding</li> <li>◆ Number of persons dislocated and number of days dislocated by flooding</li> <li>◆ Dollar value of economic disruption due to flooding</li> </ul>
<p><b>Floods cause minimal damage to the built environment</b></p>	<ul style="list-style-type: none"> <li>◆ Total number of buildings in floodplains, starting with the 100 and 500 year floodplains (locally, statewide, nationwide)</li> <li>◆ Number of communities with higher than minimum regulatory standards</li> </ul>
<p><b>Natural floodplain functions and resources are protected and restored</b></p>	<ul style="list-style-type: none"> <li>◆ Acreage of floodplains with intact natural functions and resources; (habitat, water filtration, buffers, recreation, biomass, other)</li> <li>◆ The acreage of floodplains preserved as open space; acres of floodplain restored</li> <li>◆ Linear miles of natural lakeshore, ocean coast</li> </ul>
<p><b>Households, communities, and the whole nation are resilient</b></p>	<ul style="list-style-type: none"> <li>◆ Number of households with flood disaster plans</li> <li>◆ Number of communities with current/updated mitigation plans</li> </ul>
<p><b>Costs of flooding are fairly apportioned</b></p>	<ul style="list-style-type: none"> <li>◆ The number of at risk properties with (and without) flood insurance</li> <li>◆ Percentage reduction (or increase) in disaster aid payouts, insurance claim payments, and non-monetized losses</li> <li>◆ Number of repetitive flood loss properties and their percentage of cost to the National Flood Insurance Program</li> </ul>

## ACTION NEEDED



## ISSUE

**A nationwide strategy for floodplain and flood risk management needs to be established through cooperative action, with federal leadership.**

Any new national strategy must necessarily build upon what already exists—a large network of federal, state, and local laws, policies, and programs; data; linkages; procedures; and expertise. Accepted strategies must be broadened into comprehensive flood risk management program.

## POLICY AND PROGRAM ACTION

- A national-level coordinating body is encouraged to develop and adopt, in cooperation with its state and local partners, a comprehensive floodplain and flood risk management strategy for the nation, along the lines described here. Ideally, this would be the Federal Interagency Floodplain Management Task Force. The strategy ought to incorporate goals, set out the legal foundations for action, describe implementation mechanisms, recommend funding, provide incentives, and delineate the various roles to be played by different levels of government. This could be part of an energized and ambitious Unified National Program.
- At the same time, the floodplain management community—including non-governmental organizations, professional associations, representatives of the insurance industry, environmental groups, and others—should form a coalition to work in parallel with any federal effort to craft a floodplain and flood risk management strategy.
- The Task Force and/or the coalition should establish agreed-upon flood risk management outcomes (such as the five recommended by the Forum).

## ACTION NEEDED



### POLICY AND PROGRAM ACTION

- Indicators of progress for each outcome should be specified, with targets and an anticipated schedule for reaching certain benchmarks.
- Develop a National Floodplain and Flood Risk Management Act.
- Consider whether future legislation for water-related matters should be re-named Water Resources Management Acts (in lieu of water resources *development*). This would set a more appropriate tone for future initiatives for managing flood risk and floodplains.

### RESEARCH NEEDED

- Develop a definition of “flood risk and floodplain resources management:” However it is ultimately defined, it must embrace the value of the natural resources and functions of floodplains—riverine, lacustrine, and coastal.
- Assemble a comprehensive list of all federal and state programs that affect floodplains, coastal areas, estuaries, wetlands, and lakeshores.
- Determine which programs and techniques have been most successful at changing behavior and decision-making. Empirical data should be collected and tabulated. Enduring successes should be showcased.
- Flesh out incentives and disincentives in federal (and other) policies to determine which are supporting and which are undermining comprehensive flood risk and resource management.
- More documentation and investigation should be undertaken during post-flood periods. A “toolkit” for such efforts would be helpful.



## ACTION NEEDED



## ISSUE

**Naturally functioning floodplains and coastal areas are inherent to the quality of life that society desires.**

The flood risk-reduction approaches of past decades have tended to overlook this truth. It must be replaced by a comprehensive strategy that encompasses both the impacts of flooding on humans and the impacts of humans on floodplain functions and resources.

## POLICY AND PROGRAM ACTION

- Each agency and other entity should assess the many ways available to place value upon natural functions and ecosystem services that have previously been considered intangible. The methods appropriate to each function and/or service should be adopted and implemented in all decision-making, market analysis, etc.

## RESEARCH NEEDED

- Develop a method to assess the full cost of local decisions with regard to floodplain and/or coastal development. The externalization of these costs rarely has been quantified to date.
- For those floodplain and coastal services and functions that have not been adequately or accurately measured, develop means to quantify their value.

## ACTION NEEDED



## ISSUE

**Measuring progress toward desired flood risk and resource management outcomes requires quantifiable indicators and the data with which to assess them.**

The nation as a whole, however, does not have a history of collecting essential data for this purpose. Baselines, benchmarks, and key indicators exist only in isolated situations.

## POLICY AND PROGRAM ACTION

- A multi-faceted inventory of floodplain areas nationwide should be assembled, organized at the watershed level. It would cover coastal, estuarine, and wetlands areas as well as riverine floodplains. For the inventory, agencies, universities, and other entities should locate, accumulate, and correlate data that already exist, in GIS layers and in other formats, and find ways to make them compatible across all agencies and programs if they are not already.

The resulting inventory database would include, at a minimum

- A characterization of the degree of functionality of floodplains and their watersheds (including coastal watersheds),
  - Pertinent ecosystems,
  - Extent and nature of erosion, sedimentation, and other natural processes; and
  - Number, type, and value of buildings and other structures, including critical facilities.
- Establish quantified baselines for every aspect of flood risk, floodplain resources, and floodplain functions.

*Continued on next page*

## ACTION NEEDED



### POLICY AND PROGRAM ACTION

- Develop quantified indicators for every aspect of flood risk, floodplain resources, and floodplain functions. Indicators would need to be useful at national, state, and local levels, so some indicators may be different at certain levels or some indicators may be scalable.

### RESEARCH NEEDED

- Basic data needs to be developed to fill gaps in the nationwide floodplain inventory database.
- A series of case studies on moderate-sized watersheds should be conducted to test and refine the metrics and indicators that are devised.
- A model needs to be developed (or adapted from existing models) for a goal-setting exercise for localities. What indicators could be most significant for certain categories of communities (small, large, growing, coastal, tourism-based, etc.)? The ability to measure progress should be included in the model.

## ACTION NEEDED



## ISSUE

**Flood risk communication strategies have focused on spreading information, but this approach does not change people's behavior.**

The assumption that people will make wise decisions (and take action) with regard to floodplain risks and resources once they receive understandable information is flawed. Social science research shows that messages should be “branded,” used consistently and repeatedly, and give people specific instructions about what they need to do to reduce their risk and/or protect the resources and functions of floodplains and coastal areas.

## POLICY AND PROGRAM ACTION

- 💧 A coalition of agencies, non-governmental organizations, practitioners, program leaders, academics, and others should investigate and propose a simple, coherent “thought message” about flood risks and resources in the United States. That suggested message then should be vetted through the latest social science research and marketing know-how, as appropriate. The goal would be to truly galvanize the public’s interest in and motivation to take appropriate actions. This unified messaging campaign could take cues from the comparatively successful efforts engage public support for protecting wetlands.
- 💧 All agencies and entities should examine their programs to be sure their approaches to public education, outreach, and training adhere with findings from the social science research and marketing analyses. Further, all of them need to be carrying forth similar if not identical action-oriented messages about flood risk and floodplain resources.

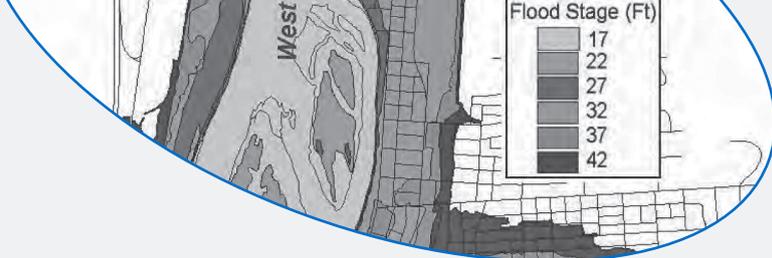
## ACTION NEEDED



### RESEARCH NEEDED

- Determine what motivates developers and communities to use floodplain lands in certain ways, and why people purchase property where they do. This could be done through a review of existing findings, basic research, or a combination of the two.
- Isolate the contributors to successful local floodplain resource management and flood hazard mitigation. What makes them work? What factors detract from success?
- Research on effective planning and zoning should be deepened. What drives local governments to conduct planning? What causes them to avoid it? Integrate the expert and research-based information from the Urban Land Institute, American Planning Association, and others into a flood risk-and-resources management framework.

## ACTION NEEDED



## ISSUE

**Climate change has the potential to overwhelm the progress of even the best flood risk/floodplain resource management strategy as hydrologic regimes are altered and ecosystems respond.**

## POLICY AND PROGRAM ACTION

- The so-called “no regrets” approach should be adopted by all entities with floodplain-related responsibility. This means that no advances in techniques or caution in mitigation should be put on hold while data or official positions about climate change are vetted.
- Second, baseline inventories, benchmarks, indicators, and other components of a risk management strategy should, to be prudent, take climate change into account.

## RESEARCH NEEDED

- Identify the anticipated impacts of climate change on the natural functions and ecosystems of floodplains and coastal areas
- Conduct research to understand whether intact ecosystems that are connected to each other are more resilient to climate change. If so, are they better equipped to provide the services to which we are accustomed?
- Develop practical applications for downscaled climate data (drought, water supply). Figure out how to integrate what exists into local and regional plans for climate change adaptation and other uses.

## HOW THESE RECOMMENDATIONS WERE GENERATED



The complexity of its topic, Flood Risk Management, dictated that the Forum be approached through a series of events rather than a single meeting. One preliminary Symposium was held September 16, 2009, addressing the topic “Defining and Measuring Flood Risk and Floodplain Resources.” A second topical symposium was held November 4, 2009, and explored “Flood Risk Perception, Communication, and Behavior.” These preliminary meetings served to consolidate thinking about first, the importance of natural land and water resources to successful flood risk management, and second, the need for effective and appropriate messages to change human behavior, and the challenges in defining and measuring flood risk. This made it possible for the complex concept of a nationwide flood risk management strategy to be examined in a two-day Forum, held the following spring.

Over 200 different experts participated in at least one of the three events.

Each participant invited to the Forum was asked to prepare a short paper on some aspect of “Managing Flood Risk and Floodplain Resources.” The 60 thought-provoking papers outlined the thinking of the nation’s best experts as they pondered whether a risk management approach will be an appropriate and effective way to manage floods and floodplain resources in the future. The Forum aimed to address what such a framework would entail, what it should seek to achieve, and what obstacles must be overcome. The background papers were distributed to all participants before the Forum in order to shape the discussions on these topics. They also are retained on the Forum website as part of the Forum archive to guide after-action reports and to serve as a record of the thinking of policy experts at this juncture. <http://www.asfpmfoundation.org/2010forum.htm>

## HOW THESE RECOMMENDATIONS WERE GENERATED



At the first morning of the Forum, a panel of speakers built momentum for the work at hand by summarizing the state of knowledge about managing flood risk, as developed through expert observations of the two precursor symposia and also as discovered through scientific research. These highlights focused on:

- 💧 Challenges in Managing Natural Floodplain Resources,
- 💧 Human Behavior and Change in Flood Mitigation, and
- 💧 Moving toward a National Strategy for Managing Flood Risk and Floodplain Resources

Questions, answers, and open-ended discussion among the participants served to further narrow the issues at hand. In two facilitated small-group sessions on the second day, the Forum assembly analyzed specific topics related to gaging progress in and improving management of both flood risk and natural floodplain resources. After each small-group session, observations and comments were shared with the full group. Finally, the full assembly reconvened to catalog its recommendations for effecting behavioral change, moving from existing management approaches to a risk management framework, and for monitoring progress in minimizing flood risk and maximizing natural functions and resources of floodplains.

These experts' findings were assembled into a full report of the Forum, *Managing Flood Risks and Floodplain Resources: Report of the Third Assembly of the Gilbert F. White National Flood Policy Forum*, available at <http://www.asfpmfoundation.org/2010forum.htm>. This summary pamphlet lists significant issues and action items gleaned from the full report.

## FOR MORE ABOUT MANAGING FLOOD RISKS AND FLOODPLAIN RESOURCES



More details about the issues discussed and remedies offered by the experts who made up the third assembly of the Gilbert F. White National Flood Policy Forum can be found in a 48 page report, *Managing Flood Risks and Floodplain Resources*, available on the ASFPM Foundation website at: <http://www.asfpmfoundation.org/2010forum.htm>.

Bound copies are available for \$10 by phoning the ASFPM Executive Office at (608) 274-0123 or by sending an e-mail to [memberhelp@floods.org](mailto:memberhelp@floods.org).

## FOR MORE ABOUT THE ASFPM FOUNDATION



One of the goals of the Association of State Floodplain Managers Foundation is to further research and education to help reduce flood losses and achieve sustainable floodplain management throughout the United States. Facilitating the identification of gaps in knowledge and its implementation is one means by which the Foundation seeks to fulfill this mission.

To find out more about the history, activities, and accomplishments of the ASFPM Foundation, see the website at <http://www.asfpmfoundation.org>.

**FOR MORE** ABOUT REDUCING FLOOD LOSSES AND  
PROTECTING FLOODPLAIN RESOURCES



See the Association of State Floodplain Managers website at <http://www.floods.org>.



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