



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

### **1.0 Introduction**

#### ***Statement of the Problem***

The concept of managing flood risk is receiving increased attention by many experts in the United States and throughout the world. Flood risk management, like other management strategies, would provide a framework for balancing the multiple complementary and competing factors that affect risk. If properly structured, the strategy would focus all those factors toward an outcome such as reducing net flood losses to the nation. It is thought that flood risk management may prove to be a better means of minimizing the detrimental impacts flooding continues to have on humans than past strategies have been. At the same time, a carefully crafted flood risk management strategy must also consider associated risks and opportunities, such as protecting natural floodplain functions from the detrimental impacts of human use.

Managing flood risk should provide a more comprehensive approach to coping with unwanted impacts than any of our past efforts, which focused at various times and places on managing (controlling) the flood itself, managing the building and other development taking place in floodprone areas, managing the land area considered to be susceptible to flooding, managing flood damage (with relief measures, insurance, and recovery assistance), managing floodplain functions and resources (with regulatory controls or land management), or managing the vulnerability of development (by applying site-specific mitigation measures). These approaches have met with some success, but they often work at cross-purposes as a result of inconsistent or even contradictory policy foundations, are far from well-integrated as programs, have resulted in unintended consequences, focus only on the floodprone area itself rather than the entire watershed, and, taken together, have not reduced flood losses nationwide. Further, population growth and movement, anticipated changes in climate, and continued resource degradation can be expected to increase the potential for detrimental impacts and costs from flooding in the decades to come.

Although many experts are in favor of exploring the use of flood risk management, the disparate definitions, methods, approaches, and understandings at play ultimately will lead to confusion and ineffectual action by practitioners and policymakers alike unless a cohesive vision is developed. The ASFPM Foundation is organizing a series of gatherings (two symposia followed by the Third Assembly of the Gilbert F. White National Flood Policy Forum) aimed at solidifying and achieving consensus on the fundamental components of a flood risk management strategy for the nation.

#### ***Why Flood Risk Management?***

A properly crafted Flood Risk Management Strategy can

- Provide a framework for capturing, weighing, and addressing the hydrologic, hydraulic, economic, environmental, and demographic factors that affect the level of flood losses and resource degradation now and in the future;
- Provide a framework to measure change in risk if added development occurs, populations increase, ecosystems collapse, or the hazards change;
- Move our focus away from a misleading flood boundary line to a more meaningful measure of the potential for impacts across a watershed or other appropriate geographic area;
- Be used to guide more informed decisionmaking at all levels; and
- Already is being discussed by the U.S. Army Corps of Engineers, FEMA, and internationally.

## 2.0 Symposia and Forum Design

The symposia and forum will build sequentially to a series of recommendations for

- Defining and measuring flood risks and benefits,
- Fostering appropriate behavior to manage flood risks and benefits, and
- Managing flood risks and benefits.

Both symposia will be highly interactive and will solicit participation primarily from subject-matter experts capable of generating useful, well-founded recommendations. A typical symposium is envisioned to be a group of 30-40 professionals meeting for 1-2 days. Agencies and other authorities in the field would be invited to provide written concepts and some would be selected for presentation to the group. The symposia would be held during the third and fourth quarters of calendar year 2009.

The third gathering would be the Forum and would build on the recommendations generated during the previous symposia, but it would involve upper management and policymakers. It would be held in March 2010. The Forum would be policy-focused and consider

- The long-term goal of embracing flood risk management;
- How to establish a benchmark of flood risks and benefits;
- How to establish a framework for flood risk management that can operate nationwide as well as within and among states and communities;
- What adjustments must be made in programs to meet current and future needs; and
- Other appropriate issues.

## 3.0 Symposium #1: Defining and Quantifying Flood Risks and Benefits

Symposium #1, "Defining and Quantifying Flood Risks and Benefits," would seek to identify the most effective operational definition(s) of flood risk and the methods for quantifying both the risks that floods pose and the benefits and resources that flooding can bring.

### *Participants and Procedure*

The Foundation will invite 30-40 subject-matter experts capable of generating useful, well-founded recommendations for defining and measuring flood risks and benefits. Symposium #1 will be held for one day in September 2009 (tentatively September 16). A few professionals from agencies and other entities would be invited to provide written background information on one or more models of flood risks and benefits in use today, and present them to the group. In facilitated sessions, participants will then analyze the operational strengths and weaknesses of each of the principal definitions/models of flood risk and benefits and attempt to identify the most useful approach.

### *Defining Flood Risks and Benefits*

Differing models/definitions of flood risk and of the benefits and resources that natural flooding yields will be explored at Symposium #1. For example, one way of framing flood risk is as a function of the flood hazard and its direct impact (present or future) on people, human development, and/or the environment. Under this formulation, risk could be expressed as the product of the probability of the hazard's occurrence and the damage that would ensue if it does [risk = probability x consequences]. Under this definition, current flood maps depict the flood **hazard** as an area expected to be inundated during an event of a certain **probability** of occurrence (some physical parameters such as water velocity or wave heights may also be incorporated). However, this is only one element of risk.

- The potential **consequences** of a flood are numerous and complex, can extend into the future, and also can be unanticipated. They surely include damage to public and private property but many other components must be accounted for if a realistic picture of flood risk is to be developed. What are those other components?
- How do we express other aspects of risk and risk management, such as **exposure** and **vulnerability**?

- What are the key benefits of a natural flooding process and the key resources provided by natural floodplains? Are there models to prioritize or otherwise describe them?
- What other definitions or models of flood risk and/or the benefits of flooding could be the basis for nationwide applicability?

### ***Quantifying Flood Risks and Benefits***

Identifying the components of flood risk and associated benefits is only the first step. The symposia participants will also seek to identify the most useful ways by which flood risk can be measured, for local as well as national purposes and to gauge progress. For purposes of illustration only, a few examples of ways to measure flood risk could include these:

- For a single event, we could quantify risk as the probability of flood event multiplied by the anticipated damage. (This and other measures of risk customarily are expressed in mathematical formulas by many professionals.)
- In some instances residual risk should be considered, perhaps the probability of the event's exceeding the design level multiplied by the damage that would ensue.
- Another option is accumulating risk based on a number of higher- and lower-probability events.
- The benefits of flooding could be accounted for as part of the "consequences" component of the flood risk equation. This assumes that the value of the positive outcomes of flooding are balanced against the negative outcomes to yield an overall number.
- Risk could be reported as a number that is annualized based on a series of events.
- How do we include issues that are not necessarily represented by monetized damage, such as secondary economic impacts, injury and loss of life, or environmental concerns?
  - Days of business interruption and other disruption;
  - Environmental degradation; and
  - Others?
- Are there other measures of risks and benefits or their components that could be the basis for nationwide applicability?

### ***Outcomes and Products***

- Symposium #1 will result in consensus recommendations on (1) the most useful definition of flood risk, flood benefits, and each of their components, and (2) how best to measure the components and overall flood risks and benefits, for varied purposes.
- A brief working paper will be produced that summarizes the discussion and recommendations.

## **4.0 Symposium #2:**

### **Fostering appropriate Behaviors to Manage Flood Risks and Benefits**

Using consensus recommendations on the best definition of and methods for quantifying flood risks and benefits (generated at the first symposium), the second symposium, "Fostering appropriate Behaviors to Manage Flood Risks and Benefits," would work to reach agreement on the best methods to get the public and decisionmakers to take appropriate steps to manage and otherwise cope with flooding. A major research project, just completed, has confirmed that individual and household behaviors to mitigate and/or cope with the threat of natural hazards and/or terrorism are not influenced by an understanding of the actual risk of such events and/or their consequences. Rather, appropriate coping behaviors, such as preparedness and mitigation, are the result of a range of other factors identified in that study. Thus, the earlier belief that people would take action to avoid or reduce flood risk if only they understood it better, is not well-founded. Consequently, any sweeping effort to develop better and better ways of identifying and conveying risk are highly unlikely to have the desired effect, at least insofar as households and individual are concerned.

That research did not investigate collective behavior, i.e., decisionmaking at local, state, or federal levels. How to foster appropriate collective behavior is significant to floodplain management because many of the most effective mitigation techniques (land use, building codes, open space

maintenance) cannot be carried out individually. Thus separate consideration needs to be given to how collective decisions about risk and environmental issues are made and can be influenced.

### ***Participants and Procedure***

A group of 30-40 multi-disciplinary subject-matters experts capable of generating useful, well-founded recommendations about how to identify and communicate appropriate behavior to manage both the risks and benefits of flooding will be invited to Symposium #2. It will be held for 1-2 days during early November 2009. The working paper from Symposium #1 would be distributed in advance and presented to open the gathering. A few professionals from agencies and other entities would be invited to provide written concepts and present them to the group.

### ***Identifying the Desired Behavior to manage Flood Risks and Benefits***

- How can the people and groups who need to take action with regard to flood risks and benefits be categorized? For example, individuals and households might be one category, whose behavior is similar and susceptible to the same messaging. Other categories might be local decisionmakers; or the media; or flood hazard specialists like state and local staff in water resources, stormwater, building, and other departments.
- What specific behaviors are needed from each of the above categories of people/groups in order to best address flood risk and floodplain resources? For example, do we want individuals to purchase insurance? Do we want city councils to approve stringent floodplain management regulations? Do we want specialists to expand and deepen their knowledge of the natural and beneficial functions of flooding?
- Others.

### ***Fostering appropriate Behavior for Flood Risks and Benefits***

- How do we “sell” the appropriate behaviors to each of those categories (identified above) of individuals and/or groups who need to take action to address flood risk and protect floodplain resources? Do the people in certain categories need more, or less, or different information than those in others?
- For specialists, is simple communication of flood risks and benefits adequate to foster appropriate behavior? What is the best way to communicate flood risks and benefits: maps, percentages, color coding, scenarios, modeling, other? At present we are mapping the flood hazard. Should we map the flood risk instead, or natural floodplain resources or functions, or all of these?
- For individuals, can recent research on earthquake-related household behavior be applied to flood risk?
- What messages about flood risks and benefits will influence decisionmakers?
- Increasing population will result in both higher flood risk for a community and a higher demand on the natural functions in a watershed. Can this scenario be conveyed to the public and decisionmakers so that a community can make appropriate decisions about how to cope with that increased risk and demand and their consequences?
- Others.

### ***Outcomes and Products***

- Symposium #2 will seek to reach consensus recommendations on the best methods for (1) identifying, and (2) communicating flood risks and benefits.
- A brief working paper will be produced to summarize the discussion and recommendations.

## **5.0 Third Assembly of the Gilbert F. White National Flood Policy Forum: “Flood Risk Management”**

Use of a flood risk management strategy will mean moving away from our existing focus on the boundaries of anticipated flooding and toward more meaningful measures of the potential for flood losses and benefits across a geographic area. Because of this, such an approach will have broad implications for programs and policies at all levels and in activities ranging from mapping to planning to insurance to resource management to disaster response. Further, complex and nuanced flood risk management information will need to be synthesized into appropriate uses and

messages that will foster the individual and collective behaviors that will best minimize adverse impacts from flooding and maximize the natural and beneficial functions. The Forum would focus on the policy and management implications of the recommendations for flood risk management identified in the previous symposia.

### ***Participants and Procedure***

The Forum, "Flood Risk Management," will be engaged in by senior managers, staff, academia, officials, and others who make decisions or otherwise drive flood policies. About 80 such professionals will be invited from the public and private sectors and academia.

The recommendations from both symposia will be presented and vetted. Participants will then consider, in facilitated sessions, (1) what actions need to be taken to achieve the recommendations, and (2) what existing and new management approaches are needed to make a flood risks and benefits management strategy successful.

### ***A Flood Risks and Benefits Management Strategy***

The Forum would focus on issues such as these:

- What do we want to accomplish by embracing a management strategy for flood risks and benefits? What should the nation's goals be in terms of flood risks and benefits?
- Based on the national policies and investments in place, what trends in governance are we likely to see, and how should flood risk management fit into them?
- How do we get all entities onto the same platform for measuring and identifying risk?
- How do we establish benchmarks of flood risk and/or benefits?
- How can we generate a framework for flood risk management that can operate nationwide as well as within and among states and communities?
- What adjustments must be made in existing programs and policies to meet current and future needs for managing flood risks and benefits?
- What areas of flood risk management need additional research? and
- Other appropriate issues.

### ***Outcomes and Products***

- The Forum will culminate in a series of action items that will include needed research, policy and program enhancements, and shifts in focus.
- As with previous Forums, a final report will summarize the deliberations of the Forum and detail recommendations for further research, policy and program shifts, and other action needed to move the nation toward a more comprehensive approach to managing flood risks and benefits.

## **6.0 International Topics in Flood Risk Management**

If feasible, an international event could be held to share findings on new ideas for managing flood risk. Participants would be primarily from Australia, Britain, and Canada.