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TESTIMONY OF

ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.

BEFORE THE

Committee on Environment and Public Works
UNITED STATES SENATE

A Review of the 2011 Floods and the Condition of the Nation's Flood Control Systems

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Madam Chairman, Ranking Member Inhofe and Members of the Committee, the Association of State Floodplain Managers is pleased to offer our observations on the flooding that has taken place in the United States this spring and summer. We are pleased also to join you in examining lessons to be learned from the floods of 2011 as well as prior floods and to make some recommendations for improved flood risk management.

The Association of State Floodplain Managers and its 31 Chapters represent more than 14,000 state and local officials and other professionals who are engaged in all aspects of managing and mitigating flood risk addressing the loss of life and property from natural hazards. These aspects include land management, mapping, engineering, planning, building codes and permits, community development, hydrology, forecasting, emergency response, water resources, and insurance. Most of our members work with the nation's 21,000 flood-prone communities struggling to reduce their losses from all flood related hazards. All ASFPM members are concerned with working to reduce our nation's flood-related losses to lives and property. Our state and local officials are the federal government's partners in implementing federal programs and working to achieve effectiveness in meeting our shared objectives.

The 2011 Floods

The 2011 flood events that affected the Lower Mississippi, Missouri, and Eastern Seaboard, especially the Northeast, like the 2008 Midwest Floods, 2009 sandbagging of levees on the Red River, remind us all that, as we consider the problem and move toward solutions, flooding is an ever present and changing risk and the nation's flood control infrastructure continues to age. At the same time, levees and other flood control infrastructure are being relied on to provide total safety, even for events larger than those they were designed for, thus these factors combine to threaten the safety, economic vitality, and long-term sustainability of our communities.

The reality is that the nation dodged a bullet in 2011. Record snowpack in the intermountain west and significant spring rains in the upper plains led to significant, but not devastating flooding on the Missouri On the lower Mississippi River, management measures combining structures and use of overflow areas that utilize natural storage and conveyance, conceived of decades ago prevented catastrophic failure of the system. The actual extent of flooding in the northeast could be classified as being somewhat concentrated in riverine areas, as compared to the potential area of impact that was expected to include the coast.

While much of the nation's flood protection structures did perform their intended functions, losses due to flooding were still significant. Importantly, many flood protection structures and systems were damaged and compromised and are now in need of very costly repairs. The U.S. Army Corps of Engineers (USACE) is anticipating $2 billion in repairs to federal flood control structures alone. One of the key lessons of this year's flooding is that even with tremendous federal investment and best-case outcomes, the costs to the nation continue to mount in damage and economic disruption.

Lessons from Prior Floods

Extensive flooding has always plagued the nation, but especially so since the Great Midwest Floods of 1993, which saw the failure and overtopping of many flood control structures. Following that event General Galloway led an extensive review of the event and the Nation's approaches to reducing flood losses. In the years following the 2005 hurricane season, which dramatically demonstrated the devastating consequences that can result from over-reliance on levees, numerous policy summits

gathered experts to craft recommendations for the future of the nation's flood control infrastructure including levees and levee systems, flood control reservoirs, urban stormwater management systems, and drainage projects. Since then, floods have continued to impact the nation, disrupting economic recovery efforts and amplifying the need to reform how the nation addresses flood risk.

It is important to recognize that the nation's approaches to reducing the loss of life and property damage from flooding consists of a mixture of flood control structures, policies, programs and practices scattered throughout numerous federal agencies (USACE, FEMA, DOI, USDA, HUD, USGS, NOAA, DOT, EPA and a number of others) that are designed to assist those entities that have the real authority and responsibility to address the problem, the nation's communities and states. The unsettling reality is that despite all our many efforts, flood damages are not decreasing, but are increasing. Even more disturbing, flood risk (the potential for damage) is increasing even faster. Flood risk associated with our flood control structures (levees and dams) has increased dramatically, because development in the lands "protected" by those structures (the residual risk areas) has greatly increased. This sets the scene for catastrophic damages, such as we saw in Katrina, Allison, a number of the Midwest floods and elsewhere. Structures become overwhelmed by large events, which are occurring and will occur more frequently as development in high risk areas, storm intensity and watershed development increases.

Summary & Recommendations

In short the nation's flood control systems (structures, policies and practices) operated on the edge these past few years, and are woefully inadequate to address the ever increasing flood risk the nation continues to face. As a society we continue to promise that when we construct a flood control facility that we will maintain it, and we do not. We delude ourselves to think that we have controlled nature but with ever increasing volumes of floodwater and sea level rise, we have not. And we continue to encourage or promote projects and policies that encourage individuals to invest in areas of flood risk, and then leave these very individuals and subsequent inhabitants blissfully ignorant of the peril they face.

Piece meal attempts to fix this problem have been attempted over the years and while some progress has been made it is clear that the nation's flood risk continues to grow. Much of the nation's flood control infrastructure is in far worse shape than those in New Orleans in 2005 (due to stress from recent events, age, inadequate design, more intense storm events and deferred maintenance), and the clock is ticking largely unknown to the families and businesses at risk, or even to many community officials.

The nation remains in need of robust flood risk management policies, programs and institutions, of which flood control structures can be a part, to reduce flood losses, make efficient use of tax dollars, and assure a more sustainable future for our communities. Nothing less than our nation's security, stability, and prosperity are at stake. We appreciate your leadership in meeting this challenge, and welcome this opportunity to share our views with you. We look forward to working with you and others to identify innovative, efficient and comprehensive ways to address the nation's aging flood control infrastructure and manage overall flood risk in a sustainable manner.

The ASFPM urges the following (which are covered in more detail in this testimony):

1. A comprehensive review of the nation's flood control systems (structures, policies, programs and practices) including a national assessment of flood risk today, 20 and 50 years into the future including recommendations on measures to effectively manage flood risk

2. An assessment of the nation's infrastructure, including completing essential inventories, producing a report card on condition, and producing a count of the number of people and buildings in the residual risk areas associated with that infrastructure.
3. Following through with Congressional Direction to the administration to update and publish a revised P&G to ensure federal taxpayer funds are used wisely and support sustainable communities.

Today, our testimony addresses the following:

A. 2011 Floods to Date and the Condition of the Nation's Flood Control Systems
B. Flood Risk Management: The Limited Role of Structural Flood Control
C. The Need for a National Flood Risk Management Policy and Framework
D. Recommended Next Steps to Address the Problem in Advance of the Next Big Flood

A. 2011 FLOODS TO DATE AND THE CONDITION OF THE NATION'S FLOOD CONTROL SYSTEMS

The major events of 2011 demonstrated that we do not have similar systems throughout the nation. On the Lower Mississippi River, we have a large system that has functioned as designed for large events, where use of natural storage and conveyance, in combination with thousands of miles of levees contained the events of 1937, 1973 and 2011 with limited damages and loss of life. On the Missouri River, a series of dams and levees were overstressed by a large, but not unforeseen event that resulted in significant, but not catastrophic damage to the built environment, with agricultural lands suffering significant damage. This system has conflicting purposes, which appears to have contributed to events that again, skated on the edge of catastrophic. In the Northeast, there is no "system" in riverine areas, but instead a hodgepodge of levees, dams, floodplain management and other measures that were stressed by long periods of rainfall when the remnants of Hurricane Irene and Tropical storm Lee stalled for days and dumped rain. Many of the flood control structures are owned and operated by non-federal entities, and many were not adequately designed or maintained. Even some that were, experienced overtopping of walls and levees by flows, that while large, where not epic.

Lessons from 2011

Many of these lessons are the same we have learned since the 1930's: flood risk reduction cannot be achieved using a single measure. Reducing flood risk should incorporate as many measures as possible: and use practices to ensure development occurs in low flood risk areas; non-structural and structural measures to insurance for homes and businesses; and stronger measures to protect critical facilities like hospitals and evacuation routes to reduce loss of life. These are some of the measures:

Measures to reduce consequences:

- Land use planning, zoning and building codes
- Using natural storage
- Structural measures
- Insurance to cover residual risk

Measures to reduce financial risk:

- Warning and evacuation plans and actions to move valuable assets
- Outreach to inform citizens and businesses of risk
- Insurance to protect assets and residual risk

Measures to protect public safety

- Warning and evacuation to save lives
- Outreach so individuals know of risk and how to evacuate
- Protect critical facilities for extreme events, not just the smaller 100-year event

STATE OF OUR FLOOD CONTROL SYSTEMS—do we have the data?

We need data to know the size of the problem—how many levees, dams and channels are there in the nation? What is the condition of this infrastructure? Have those responsible for Operation and Maintenance (O&M) performed it well, or ignored their responsibility? Which parts of the system should be strengthened and which parts left to serve whatever measures they currently provide? What

is the cost of strengthening the parts of the system that could be useful? What will it cost to protect urbanized areas to an adequate level of protection, the 500-year flood?
What we do know is that we do not have the data to help you in Congress, or federal, state and local governments understand the scope of the problem. We do not know how many miles of levees exist or their condition. While we have a handle on number of dams, the data may not be adequate to know what it will take to fix or remove inadequate or outmoded dams. Even more important, we also do not know the number of people and businesses at risk in those residual risk areas associated with structural flood control measures, or the number in the mapped flood hazard area on FEMA's flood maps. It appears less than about 5% of the nation's population lives in the 100 year floodplain, about 10 million, but we are not sure. How many additional people live in residual risk areas is not known.

The federal government brings two main things to the table to reduce flood losses: (1) data, and (2) money. The most effective measures to reduce flood losses rest with local and state government. It is they who have the authority for land use, planning and permitting development and codes.

The most important element the federal government can bring to assist locals and states in managing flood risk is data, and that is especially true during this time when the federal government has little or no funding. Toward that end, we recommend federal resources focus on completion of the National Levee Database, refinement of the dam inventory, and a compilation of the number of structures, people and businesses at risk to flooding in the U.S.

B. FLOOD RISK MANAGEMENT: THE LIMITED ROLE OF STRUCTURAL FLOOD CONTROL

For more than a century, water resources have been managed primarily through the use of structures, including levees, dams, canals, flood walls, and surge barriers. These structures enabled growing communities to impound waters for supply purposes and to contain flood waters, up to a point. Most of the population lived near rivers or the coast, since waterways were our highways and the rivers were our source of water for industrial, crop irrigation and human and livestock consumption,. The federal government got into the flood control business in an organized way when Congress asked the Corps to become involved with the levees in Sacramento in 1917. By 1926, the Corps had hemmed in the Lower Mississippi River along its thousand mile course through six states, relying solely on levees to control floods, and reporting that the system of levees "is now in condition to prevent the destructive effects of floods."[1] The very next year, this levees-only approach led to widespread destruction when the extent and consequences of levee overtopping, failure, and flooding exceeded even that of New Orleans during Hurricane Katrina. Over the history of floods in the United States, we have learned that all flood control structures pose residual risk that must be considered and that they require costly maintenance that begs the question: who benefits and who pays?

There are six main components to the problematic use of flood control structures in the United States today.

1. <u>It results in communities and states incorrectly viewing flooding as a federal responsibility.</u> The Flood Control Act of 1936 provided authority for the Corps of Engineers to be the lead agency on flood control projects in the nation, and fostered the notion that the federal government has responsibility for management of floods. That authority has been used extensively for structural projects such as levees,

[1] United States Army Corps of Engineers, *Annual Report of the Chief of Engineers for 1926: Mississippi River Commission* (Washington: GPO, 1926), p. 1793.

dams, and channelization, which modify our natural waterway systems to accommodate human development needs. While the Corps has authority to perform non-structural projects such as elevation or relocation of at-risk buildings, the vast majority of projects have been structural. Reasons for that include the Principles and Guidelines (P&G) which results in structural projects having the highest National Economic Development (NED) ranking, so are usually the option locals select for mitigation projects. This is often true even though the total cost of a non-structural option may be lower. Locals see these projects as a way to obtain federal monies, and more important, to externalize the consequences of structure's failing to federal taxpayers through PL 84-99 and disaster relief.

Moreover, as structures age and deteriorate, they require costly maintenance, strengthening, and improvement to provide levels of protection that communities have grown to expect, and that may no longer be provided by the project. Many local project sponsors failed to account for ongoing operations & maintenance costs, or to consider how hydrologic changes may affect levels of protection over the life of the project. The resulting outcry exerts political pressures for federal bailouts for levees and to delay flood risk mapping that would actually show the flood risk.

2. Six years after Katrina, we still do not know how many miles of levees and canals there are in the nation, or their condition. As a nation, we are operating in the dark about the location and condition of most of our levees and structures along canals. The Corps is completing its inventory of the 14,000 miles of levees that are within federal authorities, and working closely with FEMA to include additional structures identified through NFIP mapping. However, neither agency has authority to gather data on the nonfederal levees that proliferate the American landscape. Many private levees have been built to protect farmland from frequent flooding. Over time, however, communities and infrastructure have been built or greatly expanded in areas that will be inundated when those levees are overtopped or fail. Little is known about the current condition of non-federal levees and canals, including whether these structures were designed to meet today's conditions, or designed at all, or whether they have been properly maintained by the non-federal interests. Property owners behind those structures may not even be aware the levee "protecting" them is deteriorating and subject to failure or is inadequate to handle foreseeable flood events. Too often, we learn about the existence and condition of these structures when one fails or is overwhelmed by a flood event and there is loss of life or property damage.

For these reasons, ASFPM strongly supports efforts by the Corps to complete the nationwide inventory of federal levees, including canal structures, and encourages Congress to specifically include in this inventory the thousands of miles of other levees built by other Federal agencies, states, towns, farmers, landowners, and other private interests. While some of these levees, canals, flood walls and storm surge barriers have been well-built and maintained, many others were not, or were not built to handle larger floods. To fully understand and manage the scope of the nation's exposure, Federal and nonfederal levees and canals need to be inventoried, including an estimate of their current actual level of protection, condition, and scope of development they are relied upon to protect, and the population at risk behind them. A comprehensive inventory of the locations and protective qualities of the nation's levees will enable Congress, states, and local governments to grasp the full scope of the nation's exposure. Only then can comprehensive, effective risk management programs be designed and actions prioritized to invest resources where they will address the areas of greatest risk or of greatest benefit to the community, state, or the nation's taxpayers.

3. Levees and the NFIP. Levees have been built to various heights to contain storms of various frequencies and magnitudes. Before the 1970s, the Corps of Engineers focused on building levees to

protect properties from the Standard Project Flood (SPF), the 500, or 200-year flood. However, communities began feeling pressure from developers and property owners to develop that land behind levees, so communities often sought to "remove" land from the mapped 100-year flood zone. That is because the presence of a 100-year levee, when accredited under the NFIP, removes the flood zone designation from the "protected" property, and thus eliminates the NFIP requirement to comply with construction standards, such as elevation of any new or substantially improved buildings in that area, and also removes the requirement for purchasing flood insurance. Increased development in these flood risk areas may provide a short-term economic benefit to the local community with potentially long-term adverse consequences to the community, and perhaps even more so to the nation's taxpayers.

FEMA leaders emphasize that the 100-year standard used in the NFIP is only for flood insurance purposes, and was never designed or adopted to be a standard for public safety. However, many factors conspire to make this minimal, 100-year level of protection the most popular standard for new levees. These factors include the attractiveness of short-term relief from NFIP requirements, the ease with which the levee project can be "sold" to the public, and the externalization of catastrophic damage costs due to levee failure away from those who gained the benefits and onto the federal taxpayers. In other words, these 100 year levees became the "buy cheap" option the community chose. The false perception of a federally endorsed 100-year standard of protection combines with local and state desire to spend less money, preventing communities from fully exploring and selecting greater than 100-year levels of protection or from selecting other mitigation options that may have smaller long term costs, but less federal cost sharing up front. Moreover, even if communities recognize the need for greater protection – for areas of urbanization or where failure will have huge consequences—the economics may become a barrier. In short, the 100 year standard, which was never intended to be a public safety standard, has become a public safety standard. It is inadequate for this purpose.

By default, the design standard for levees is currently based on either (1) the 100-year standard of the NFIP, or (2) the level of protection justified using federal, development-oriented policy that attempts to maximize the levee project's net national economic development (NED) return to the nation. While a larger levee may have a positive benefit/cost (B/C) ratio, the B/C may be higher for the 100 year then the 500 year, and the current Principle and Guidelines promote selecting the alternative that "maximizes" the B/C, which may not be the best long-term or sustainable solution. The NFIP and NED factors, along with cost-sharing requirements and the federal budget process, have resulted in "lowering the bar" for most levees in the nation to the 100-year standard, even in cases in which the consequences of the failure of a particular levee would be catastrophic. They also can result in ignoring the options of non-structural measures that could be used instead of a levee to avoid the catastrophic consequences in larger flood events. Ironically, based on current practice, the nation and citizens would fare better if a community built a "99-year levee," because this would lead to the continuation of both mandatory flood insurance as well as continued floodplain management construction practices—which collectively would lower vulnerability and financial risk much more than would a 100-year levee by itself.

4. Residual risk. Risk is actually a two part equation, where "risk= probability x consequences". While flood control structures may reduce the probability of flooding, at least for smaller floods, the consequences are dependent on the value of development behind or below a structure that will be damaged when a structure fails or overtops. As stated elsewhere in this testimony, there are many measures that communities and citizens can use to reduce flood risk, and using only a single measure too often leads to unsustainable communities.

A significant problem with the management of our flood control structures is that people by and large do not fully understand the nature of flood risk and the fact that it can never be fully eliminated. It is too easy to believe that a levee or other measure provides complete protection from flooding when, in reality, a large "residual" risk remains behind the levee and downstream of the dam.

5. Flood risk is increasing in residual risk areas. Flood risk increases when new homes and businesses are allowed to be built or redeveloped behind levees. This is especially problematic if it is an agricultural dam or levee that was designed just to lessen periodic flooding of crops. These structures were never meant to accommodate even the 100-year flood, and do not meet the higher level of protection that is appropriate for urbanizing areas. Moreover, legacy structures that may have been designed to withstand yesterday's 100-year flood have been rendered ineffective due to development in the watershed that increased runoff, or due to the more severe rainfall events associated with our changing climate.

6. Conflicting Purposes for Missouri River Flood Control Reservoirs. A number of large storage reservoirs were built on the Missouri that now are being asked to serve multiple purposes:

(1) Flood Control
(2) Navigation
(3) Hydropower
(4) Irrigation
(5) Water Supply
(6) Water Quality
(7) Recreation, and
(8) Fish & Wildlife, Including Endangered Species

Operating the system to meet all of these purposes cannot be done without conflict. Those interested in navigation and recreation want the reservoirs held high, whereas those wanting maximum flood control want the reservoirs low so there is more room to store floodwaters during heavy floods. Full flood control capacity of the Missouri main stem reservoir system was available at the start of the 2011 runoff season. Until rain events in May, there was no need to evacuate water at historic levels. However, heavy runoff occurred in the Missouri River Basin above Sioux City, Iowa during May and June 2011 due to rainfall, and a much later than usual and fast melt of the snowpack.

In order to protect the dams from overtopping and potential failure, the Corps had to open the gates (some for the first time in 50 years) and pass the flood flow downstream. This resulted in very heavy flows that caused flooding and in some cases, levee failure in those downstream communities. Such events likely will occur again, and the USACE will face difficulty trying to balance these many conflicting interests, so significant damages will again occur.

C. THE NEED FOR A NATIONAL FLOOD RISK MANAGEMENT POLICY AND FRAMEWORK

The conditions that led to the "Era of Unintended Consequences" just described have long been recognized by policy experts. In fact, leaders of both the Corps and FEMA acknowledged as early as the 1970s that the 100-year standard was inappropriate for structures in urbanized areas. In recent decades, numerous reports have called for a sharing of responsibilities and accountability among all levels of government, business, and private citizens; balance among the many competing uses and

functions of rivers, coasts, and floodplains; and for the national coordinated strategy for management of the nation's waterways and floodplains.

ASFPM recommends that a national flood risk management strategy is necessary, even urgently necessary. Such a strategy would include consideration of use of flood control infrastructure and use of state and local practices proven to effectively manage and reduce flood losses and associated environmental, social, and economic disruption. The challenges presented by increasing flood-related losses, by deteriorating flood control infrastructure and by lack of federal, state and local funds make it critically important to:

1. make more effective use of limited resources
2. remove the perverse effects of programmatic disincentives to risk reduction
3. develop meaningful incentives for state and local planning and decision-making that includes flood risk reduction
4. make far better use of the flood risk reduction tools available to all levels of government and individual property owners

As the nation grapples with challenges associated with flood control structures and associated flood risk, Congress must consider the full range of measures to reduce risk, including flood insurance, changes in land use, and the strategic relocation from areas of greatest risk. States and local governments must change long-held beliefs about their role and responsibility in addressing flood risk, and the long-term costs of local development decisions.

Flood risk management entails the evaluation of the broad range of actions to assess and reduce the risk of flooding, and to alter event probability, consequences, or both. For decades, levees have been extensively used to attempt to control floodwaters and to remove lands behind levees from the insurance and land use regulation requirements associated with the National Flood Insurance Program. People have built homes and businesses assuming that their property will never flood. Local officials and property owners generally are unaware of their residual risk. As levees and systems are assessed to determine levels of protection and condition, many communities learn that their levees are not designed for large flood events, do not protect to the level of moderate floods like the 100-year event, or will not perform as anticipated, and that additional actions are necessary to manage risk, including flood insurance and management of development in flood prone and residual risk areas.

Despite enormous past investment in flood "control" structures, that spending has been outpaced by development in risky areas and development in the watershed that increases runoff and flooding, and by the steady deterioration of those structures. As the public grows to recognize the risks associated with levees, communities are working to evaluate the various actions they can take in response to those risks: levees can be repaired and improved or set back from the river to relieve pressure and erosion on the levee; homes, businesses, and infrastructure at risk can be relocated to reduce risk and restore floodplain function; waters can be detained upstream; and measures can be combined to achieve the most effective results with scarce public dollars.

We are in an era of flood infrastructure "triage" – the process of prioritizing federal response to flood risk associated with levees and rationing scarce federal dollars on multiple-objective risk reduction projects that may include floodplain restoration, reconfiguration of structural systems, and combinations of approaches to make the best use of limited public resources. Response to increasing flood risk and flood control infrastructure challenges – and smart investment of limited public dollars - must entail evaluation of the full range of measures to reduce risk, including flood insurance, changes in

land use, and strategic relocation from areas of greatest risk. Such evaluation will require national policy and leadership in flood risk management, beyond the scope of a levee safety policy or program. As emphasized above, a complete inventory of all of the nation's levees – federal, nonfederal, and private – is the first step to conduct the levee triage that will be necessary so that everyone, including Congress, understands the scope of the crisis we face.

Incentivizing Effective State & Local Practices

Too many federal—and corresponding state and local—public policies and activities for water-related resources and hazards operate at cross purposes and even foster activities that undermine safety and environmental quality. Under current federal policies and programs, states and local governments have little incentive to steer development from flood-prone lands. On the contrary, they are able to benefit locally real estate taxes, and then externalize the consequences of poor local land use policies to the federal taxpayer through a burgeoning disaster relief program. Programs should be reformed to eliminate the incentives they unwittingly provide for making unwise decisions and taking inappropriate action with regard to our water resources. In their place, we must create positive incentives for appropriate action anywhere in the watershed, but especially in areas that are floodprone or otherwise ecologically sensitive.

To assure the success of a national flood risk management initiative, the federal government will need the participation and commitment of states, local governments, and the private sector. Communities and states will need to commit to robust and inclusive planning processes, reaching beyond their jurisdictional boundaries and traditional partners, many for the first time. They will also need to review and integrate existing plans for land use, hazard mitigation, infrastructure, and other responsibilities. Finally, important data will need to be acquired or generated, maintained, and used to populate the infrastructure databases, including location, level of protection, general information on the condition, and the number of structures in residual risk areas for all levees regardless of provenance, ownership, and responsibility for operations and maintenance.

Inclusion of a diverse menu of incentives can help motivate state and local governments in their efforts to plan and manage flood risk associated with flood control structures. Incentives can cost the federal taxpayers less than continuing to pay disaster relief for flood damages if the incentives encourage states and locals to manage development wisely to avoid creating tomorrow's disaster. Additionally, technical assistance programs such as the U.S. Army Corps of Engineers (USACE) programs for Planning Assistance to States (PL 93-251) and Floodplain Management Services (PL 86-645) support a partnership between all governments to achieve innovative management of flood risk along with other water resources challenges. Existing federal law in environmental and other policy areas provide useful examples of incentives beyond simple monetary inducements to reward states for robust programs. In addition to the data and planning contributions outlined above, incentives should be designed to encourage and reward States that meet and exceed minimum standards on a sliding scale; the more rigorous or innovative the program, the greater the rewards.

1. **Development of a National Flood Risk Management Program, to address levee and dam safety among the broader range of risk management challenges and opportunities.** We cannot address levees and dams as an entity onto themselves without consideration of land use decisions and the full range of flood risk management tools. Additionally, effective state and local programs need to operate within a unified National Flood Risk Management Program that guides decision-making at all levels. If a program only addresses the levee or dam structure and not the responsibility of local

communities to control and guide the development in the associated residual risk areas, the ability to reduce risk is lost. Finally, a National Flood Risk Management Program should identify the federal interest in preventing and reducing catastrophic flood losses considering the full range of risk management options – not just the levees and dams:

a. A national policy should be adopted to prevent federal participation in the construction of new levees and dams except to protect existing development where a full range of options, including all nonstructural options, have been considered and included in a multifaceted approach. This new national policy should be embodied in future Water Resources Development Acts, Principles & Standards, and other statements of broad national policy.

b. A complete inventory of all of the nation's levees and dams – federal, nonfederal, and private – is the first step to conduct the triage that will be necessary to understand the scope of the nation's exposure, and to ensure that limited public dollars are spent wisely.

c. Any national program to address levees, dams and embankments in the floodplain that modify flooding, and include them in the oversight and regulation applicable to the traditional definition of any of those structures.

d. Federal funds to support construction of new levees or dams in urbanized areas must provide protection for no less than the 500 year flood.

e. Eligibility for funds for levee work on pre-existing structures, including under the Flood Control and Coastal Emergency Act (P.L. 84-99, 33 U.S.C. 701n), must include requirement that levee structure provide no less than 100-year level of protection and do not push water on other property, thus adversely affecting others property rights.

f. All new levees, and considerations for rehabilitation of existing levees, should be set back for the waterway to allow natural systems to provide natural flood reduction benefits, relieve the erosion and hydraulic pressure on the levee, and allow the waterway's natural ecosystems and resources to function.

2. **Residual risk areas behind levees and below dams must be mapped and all properties therein insured for flood at full risk premiums.** Property owners in residual risk areas must be required to obtain risk-based flood insurance coverage to help manage economic loss of what for many of them is their only capital asset, assure equitable distribution of responsibility, incentivize maintenance & risk mitigation, and to help manage potential legal liabilities associated with levees and dams and their owners, program managers, and providers of engineering services.

   a. Affordability of flood insurance must not be an impediment for those who need coverage but cannot afford it. Property owners at risk who cannot afford insurance are those who most need it, as well as advice and support to help them undertake mitigation of their structure. Every resident has the right to be fully informed of their flood risk. Furthermore, family safety should not be a luxury available only to those who can afford it. For these reasons, Congress should investigate development of a means-based voucher, premium rebate, or similar system to provide interim relief for those who cannot truly afford to pay flood insurance premiums.

b. A new, but temporary federal program to address flood insurance affordability should be managed through an agency that deals will income supplemental programs, such as the Department of Housing and Urban Development. The National Flood Insurance Program is not an appropriate vehicle for means-based programs. Moreover, measures such as premium subsidies, delaying insurance requirements, and other measures intended to reduce financial burdens serve only to distort risk perception and undermine the fiscal soundness and other aspects of the flood insurance program that promote individual responsibility.

c. In addition to measures to address affordability, the following innovations in insurance warrant exploration as stand-alone approaches or in combination, such as long-term group insurance behind levees that is attached to the property:

    1) Group flood insurance obtained by the districts who own levees and dams provided to property owners throughout the residual risk area through premiums combined with existing district fees. This measure is attracting attention as a benefit for everyone involved, since owners' liability is reduced, property owners' financial risk is managed, and everyone shares a common stake in the ongoing maintenance of that structure and other risk reduction measures that keep premiums down.
    2) Group flood insurance obtained by the community provided to property owners throughout the residual risk area through premiums that can provide coverage for all properties, not just those with federally backed mortgages, thus the community can recover when the levee or dam is overtopped or fails. The community is also the entity that has control over future development and redevelopment, and can use its development plan and mitigation plan to manage risk and reduce flood insurance premiums.
    3) Long-term flood insurance based on the length of any federally-backed loan, to reduce the rate of policy nonrenewal and provide continued financial security to citizens.
    4) Flood insurance attached to the property rather than to the insured, to ensure continuity of coverage even if property is transferred;
    5) Legislation requiring that all property insurance policies in the nation cover all natural hazards; and
    6) Privatization of flood insurance.

3. Minimum performance standards for communities to qualify for federal funding to construct new, rehabilitate or repair existing levees or dams, and develop infrastructure in residual risk areas. Although land use planning is a local and state function, the federal government plays an important role in helping communities guide development through conditions on the availability of federal dollars and through policy and regulatory guidance. In addition to minimum standards, to qualify for federal funding to construct new levees, rehabilitate, or repair existing levees, and develop infrastructure in residual risk areas, communities must be required to:

a. Participate in the National Flood Insurance Program;

b. Adopt a FEMA approved Hazard Mitigation Action Plan that includes emergency action and planning (EAP) for residual risk areas associated with all levees and residual risk areas in their jurisdiction, including post-flood recovery and resiliency;

c. Prevent the construction of critical facilities (CFs) in areas subject to inundation in the 500 year floodplain, and that requires that all CFs be protected, accessible, and operable in the 500 year flood;

d. Evaluate the full array of nonstructural measures to reduce risk, implement effective nonstructural measures in combination with any structural measures that are selected, and adopt standards to prevent any post-project increase of risk, prior to any commitment of public funds toward levee work;

e. Demonstrate binding and guaranteed financial capacity and commitment to long-term operations and maintenance, rehabilitation, and management of all structures and system components in the community's jurisdiction;

f. Adopt short- and long-range flood risk reduction planning as part of the community's mitigation, development and land use planning, including comprehensive planning and zoning that:
    1) Reflects and addresses flood hazards, levees, dams, and other relevant flood damage reduction structures, and articulates the community's objectives in managing flood risk;
    2) Incorporates and references data, including maps, that shows current conditions, trends, and likely future conditions, and addresses each hazard that may confront or impact the community in any material way;
    3) Identifies areas of highest risk in which new development and redevelopment are not permitted due to the hazard, and that if damaged in a future flood or other calamity, are appropriate for buyout of properties and floodplain restoration;
    4) Identifies existing properties that pre-date current zoning regulations or development codes, and that are appropriate for buyout when the property is next available for transfer;
    5) Identifies vulnerable structures, lifelines (such as water, sewer, power, critical roadways), and critical facilities (such as emergency operations centers, fire stations, hospitals, evacuation centers, water supply and hazardous materials storage areas); and
    6) Articulates property owner rights and responsibilities in flood risk and residual risk areas.

g. Participate in regional/watershed planning to identify and manage risk that crosses jurisdictional boundaries;

h. Notify levee and dam owners and provide opportunity to comment on all proposed development in that owner's residual risk area; and

i. Communicate annually with property owners in residual risk areas to notify them of their risk, update them on emergency action plans, report on levee/dam operations and maintenance over the past year, and for other public notification and engagement activities.

D. RECOMMENDED NEXT STEPS TO ADDRESS THE PROBLEM IN ADVANCE OF THE NEXT BIG FLOOD

After each major flood in our nation's modern history, experts have gathered to consider the flooding problem and craft recommendations for the future. Unfortunately, we have "hit the snooze button" for public policy change in response to these wake-up calls, and have paid a high price in subsequent flood

disasters. We must make use of significant recommendations from those reports which remain valid today and better utilize the many resources and tools which remain untapped

The 1994 report, *Sharing the Challenge: Floodplain Management into the 21st Century,* known as the Galloway Report, authors made specific recommendations for changes to federal policies, programs, and activities to reduce flood risk associated with levees. The report emphasized that the existing "loose aggregation of federal, local, and individual levees … does not ensure the desired reduction in the vulnerability of floodplain activities to damages." The report's recommendations from more than eighteen years ago reverberate over the years to remind us all that, for decades, leaders on these issues have made the same recommendations grounded in common sense measures. These include the following:

- To reduce the vulnerability to flood damages of those in the floodplain, the nation should:
  - Give full consideration to all possible alternatives for vulnerability reduction, including permanent evacuation of floodprone areas, flood warning, floodproofing of structures remaining in the floodplain, creation of additional natural and artificial storage, and adequately sized and maintained levees and other structures;
  - Adopt flood damage reduction guidelines based on a revised *Principles and Guidelines* that would give full weight to social, economic, and environmental values and assure that all vulnerability reduction alternatives are given equal consideration; and
  - Where appropriate, reduce the vulnerability of population centers and critical infrastructure to the standard project flood discharge through use of floodplain management activities and programs.
- Increase the state role in all floodplain management activities including, but not limited to, flood fighting, recovery, hazard mitigation, buyout, floodplain regulation, levee permitting, zoning, enforcement, and planning.
- To ensure the integrity of levee and the environmental and hydraulic efficiencies of the floodplain, states and tribes should ensure proper siting, construction, and maintenance of non-federal levees.
- Require actuarial-based flood insurance behind all levees that provide protection less than the standard project flood. A mandatory flood insurance purchase requirement behind such levees would provide a number of benefits to the public and to property owners:
  - Property owners would be insured against the real possibility that a levee will be overtopped or will fail,
  - Federal expenditures for disaster assistance would decline,
  - Property owners would be more fully aware of the residual risk in building or locating behind a levee, and
  - Communities would have an incentive to seek higher levels of protection.

Additionally, the Galloway Report makes the following specific recommendations regarding Corps programs and practices:

- The Administration and Congress should reaffirm its support for the USACE criteria for compliance in O&M under the PL 84-99 levee repair program and send a clear message that future exceptions will not be made.
- The USACE should investigate procedures to minimize impacts associated with levee overtopping. Differing methods to lessen levee overtopping impacts should be investigated. A report should be prepared by USACE that details preferred engineering techniques to improve current levee structures, where appropriate.
- Federal and state officials should restrict support of flood fighting to those levees that have been approved for flood fighting by the USACE.

Sustainable flood risk management and flood control structures safety can best be achieved through sound, shared management at all levels and the private sector. To foster those sound approaches and discourage ineffective, costly approaches, the ASFPM recommends the following additional steps.

- ASFPM recommends that the report called for in Section 2032 of the 2007 Water Resources Development Act be funded and pursued with all haste. This report on the vulnerability of the United States to flooding will include an assessment the extent to which Federal programs either are reducing risk or may be adding to risk, and proposals to change Federal programs so they reduce risks to human life and property in different regions of the country.
- The PL 84-99 and FEMA Disaster Relief Programs often serve to shift the consequences of inadequate flood control structures or non-federal responsibilities associated with them from levee owners and communities to the federal taxpayers We recommend that the PL 84-99 and the disaster relief programs be reviewed and aligned with the flood risk management, levee and dam safety, the NFIP and all federal programs impacting flood risk. As noted above, PL 84-99 for any levee-related damage should not be available for levees that provide less than 100-year protection, to any entity that is not in compliance with a national or state levee safety program, or to any community that does not participate in the NFIP.
- Federal investments in new levees should not be made for a structure that provides less than 500-year protection, and the Corps process maximizing the NED should explicitly incorporate this standard as a lower boundary for federal investment. In addition, Congress and the Administration should adopt a standard of 500+ year protection for levee design as the minimum standard for purposes of federal investment.[2] These requirements should be phased in for existing levees, which will need a significant phase in period.
- Before a levee is federally recognized as providing a certain level of protection (and this must include protection from future levels of flooding) and before a levee project is approved for construction, reconstruction, or repair, the local sponsor must clearly demonstrate the financial and administrative capability to provide for operation and maintenance for the life of the structure, which may be in perpetuity.

[2] Existing levees that provide less than 500-year protection but meet all requirements for design, maintenance, and operation, and are recognized by federal programs as meeting the standards for 100-year protection, could be granted grandfather status. Criteria should be developed to determine when and if protection provided by a specific levee would need to be upgraded and how that would be achieved.

- Federal funding should be allocated in ways that promote a more collaborative working relationship among states and communities that share waterways and watersheds. To prevent flood damage, for example, a larger federal cost share could be provided for those risk management projects that were developed collaboratively and that considered opportunities to avoid increasing flood levels in other communities/areas and also limit adverse impacts on a river or coast natural systems. . To hold down increases in flood levels and better protect water quality, some funding could be targeted to (1) encourage greater state and local investment in water quality planning that aims to reduce or better manage urban runoff; (2) encourage the implementation of protective land use strategies, such as acquisition and relocation of existing structures at high risk and preservation of floodplains as open space; and (3) promote collaborative flood risk, water quality, hazard mitigation plans and land use plans that take a regional focus on flooding, social or environmental impacts and involve all the relevant local jurisdictions within a watershed.
- Federal funding should be consistent with state and local hazard mitigation plans, growth management initiatives, and environmental needs. For example, consideration should be given to whether federal funds for transportation, water treatment, and other infrastructure are providing incentives to build in flood-prone areas. Beyond funding incentives, the federal government can also play an important role in encouraging sound practices. For example, the federal government could encourage and incentivize states and localities to reform outdated planning laws that hinder efforts to conduct comprehensive flood risk management and land use planning.

National Levee Program--The issues surrounding a levee safety program are many and they are complex. ASFPM suggest that Congress not attempt to lay out the entire future of a national levee safety program at this time. First of all, the report you received does not give you adequate information to do that, and until you see an inventory of all levees in the nation— the number of miles, their ownership, and their general condition—with some general estimate of the cost and time it will take to address the existing inventory of levees, it is not reasonable to craft a final solution. These factors will need to be cross matched with new standards for level of protection and design, construction, operation and maintenance of levees, and a vision of how the responsibility for flood risk associated with levees is to be shared among all levels of government, the private sector and especially those people, businesses, and communities “protected” by levees.

These latter elements need to be developed, and this could be one of the first tasks of a commission or whatever oversight group Congress might set up. The oversight group could explore and develop those components, determine the progress in each state toward a levee safety program, and expand and refine the incentives and disincentives the federal government could adopt that will foster this shared responsibility Those efforts can proceed concurrent with the inventory, so within a couple of years Congress would have the information and full picture, enabling you to then establish a more complete national levee program.

In the meantime, some first steps Congress could take at this time might include:

- Draft and enact a Levee Safety Act of 2012 to stand up the National Levee Commission or similar independent oversight body to develop data and craft next step recommendations to Congress.

- Task the new Commission with overseeing completion of the National Levee Inventory, including nonfederal levees, and reporting to Congress within a certain time on:
    - State capabilities and possible barriers to the creation of robust state levee safety programs throughout the nation.
    - Further exploration and recommendations for incentives for state and local flood risk and levee safety programs
    - Initiate development of national engineering standards for levee and their operation and maintenance

CONCLUSION

As each hurricane and riverine flood disaster raises awareness of the instability and insecurity of the current flooding predicament, the nation is waking up to find that we cannot afford to continue to live in a disaster relief environment. Past reports on flooding have provided important guidance on engineering, evacuation, and education. However, key opportunities remain untapped.

One of the cornerstones of an effective program for the nation must include a requirement for investigations into alternatives before structural measures are built or identified for rehabilitation or improvement. The lack of sustainable mitigation alternatives or incentives is a major deficiency of the current national approaches. Flood insurance and public education alone are not sufficient to mitigate fully the devastating effects of structural failure and inadequate floodplain management. Effective mitigation can take many forms, but the most sustainable and successful mitigation actions entail local and state initiatives to achieve the following:

- National flood risk management programs and policy should call for the gradual retreat away from rivers and coasts, provide for mitigation measures that foster acquisition of structures in high risk areas, provide for setback levees, and give rivers room to flood and so that floodplains can perform their natural flood reduction function and provide other benefits;[3]
- The Federal *Principles and Guidelines* should give full weight to social, economic, and environmental values and assure that all vulnerability reduction alternatives are given full and equal consideration;
- Water resources should be managed and planned for on a watershed basis, and Federal funding should be allocated in ways that promote a more collaborative working relationship among states and communities that share waterways and watersheds
- All flood risk areas, including residual risk areas must be mapped and those people and businesses in those areas made aware of their risk, as well as their responsibility and options for dealing with that risk.
- States and local governments that participate in federal structural flood reduction programs and access federal resources must be required to fully consider the broad range of nonstructural and hybrid nonstructural/structural solutions;
- Flood-prone areas should be restored and permanently preserved as open space, through land acquisition, buyout and relocation, and adoption of open space plans; and

[3] The State of California is leading the way with this approach. The nation should follow its lead.

- State and local plans and activities for development and hazard mitigation should reflect all hazards and identify actions with multiple benefit;
- Critical facilities should be sited out of harm's way and also protected to and operational during the 500-year flood, using future development for calculating the 500 year flood.
- Levees should not be built or enlarged to protect undeveloped land, or for deep floodplains or high-risk storm surge areas due to the dire consequences when these levees fail or are overtopped;
- The Federal government should not invest in any new levees that provide less than PMF or 500+ year protection, and take climate change into account;
- No flood control structure should be cost shared with federal resources unless the non-federal partner has assured funding for long term operation and maintenance.

States and local governments that have committed to these measures fare best in floods, are more resilient and sustainable, and should be showcased as examples to follow. Moreover, these practices should be incentivized since they demonstrate the commitment needed to be worthy of trust to care for a significant federal investment. Those policies and practices that contribute to the ever-increasing risk of loss of life and property in floods should be identified and eliminated; not incentivized with continued outpourings of federal resources.

As Congress considers the floods of 2011 and the lessons learned from them, ASFPM stands ready to provide assistance in the continuing quest to reduce loss of life, flood damage and disasters. Today, we once again stand at a crossroads--- with an opportunity to work with you to craft a national flood risk management policy framework that will serve the nation for decades to come. Thank you for the opportunity to share the wisdom, experience and expertise of our members on these important issues.

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