Statement of

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to the

Subcommittee on Water and Power
US Senate Committee on Energy and Natural Resources
July 25, 2013

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**Aging US Water Infrastructure: A Badly Neglected National Problem**

Chairman Schatz, Ranking Member Lee, Members of the Committee. It is a distinct privilege to participate in this important and timely hearing concerning our much neglected aging water resources infrastructure. I want to thank the Committee for the opportunity to speak.

I am Gerald E. Galloway, a Glenn L. Martin Institute Professor of Engineering and Affiliate Professor of Public Policy at the University of Maryland, where I teach and do research in water resources and natural disaster management. I came to that position following a 38 year career in the US Army and eight years service in the federal government, most of which was associated with water resources management. I served for three years as District Engineer for the Corps of Engineers in Vicksburg, MS, and later, for seven years as a member of the Mississippi River Commission. I also serve as a consultant to a number of national and international government organizations. I am currently a member of the Governor of Louisiana's Advisory Commission on Coastal Protection, Restoration and Conservation and a Senior Fellow in the Department of State Energy and Climate Partnership of the Americas charged with sharing US experiences in these fields with our Latin American neighbors. I am also a member of a WWF (UK) - China Ministry of Water Resources team that is reviewing flood risk management worldwide. In 1993 and 1994, I was privileged to be assigned to the White House to lead an interagency study of the causes of the Great Mississippi River Flood of 1993 and to make recommendations concerning the nation's floodplain management program.[1] As a member of the American Society of Civil Engineers (ASCE), I have worked closely with ASCE staff in disseminating the ASCE Report Card on national infrastructure. I am a former president of the American Water Resources Association and chaired National Water Policy Dialogues in 2002, 2005, 2007 and 2008. In 2011, I was a co-principal investigator for FEMA on a University of Maryland Review and Evaluation of the National Dam Safety Program, and from 2011-2013, I chaired a National Research Council study of Levees and the National Flood Insurance Program.

The nation's neglect of its water resources infrastructure threatens our long-term economic vitality and our national security. This infrastructure is aging and is not being upgraded to meet the demands of this century. Much of what we do every day and many of our economic successes are tied to the availability of water infrastructure. The gradual deterioration of what was once a world class water resources infrastructure can only have deleterious effects on the nation. To this end, I would like to make five points with respect to the aging water infrastructure of the United States:

- There is no question that our water infrastructure is aging and that its condition is fragile. Study after study has made this clear. The impacts from having aging infrastructure are substantial and without action they will become critical. Because most of this infrastructure is out of sight and because many fine professionals work every day to keep it operating under difficult conditions, the full extent of the challenge we face is generally not understood by government officials, businesses, and the public.

- Climate change will exacerbate the impacts of this aging and will increase the potential for system disruptions and collapse. Climate change could be a "tipping point."

- There is a substantial link between the production of energy and the condition of the water resource infrastructure. In many cases these linkages are overlooked or are poorly understood. Energy needs water and water needs energy.

- The nation must take steps to address the aging infrastructure problem. It is another case of "pay me now" or "pay me *a lot more* later." A failure to act on aging infrastructure will have serious consequences now and will increasingly burden our children and grandchildren. Delay only drives up costs. Priorities must be established based on the risks to public safety and the national economy. A fix-as-fails approach is unsustainable and short sighted.

- Congress must act to deal with the challenges that fall within its domain and, through its influence and bully pulpit, provide leadership to the nation as a whole where it does not. There must be realism and open discussion of the funding shortfalls and honest acknowledgement of what will and won't get done under our current unsustainable 'business as usual' approach. Suggesting that funding is around the corner when it is not could cause those who operate and maintain that infrastructure to be waiting for help when little will be coming, thereby jeopardizing the long term well-being of those who rely on this infrastructure.

## Our Aging Water Infrastructure

*What Is It?*

The nation's water infrastructure is found in every city and village across our land. It is the dams that provide storage for floodwaters, water supply, recreation, hydropower, downstream navigation, and environmental stewardship. It is in the engineered rivers that carry millions of tons of cargo from farm fields, fuel extraction, and factories to ports and facilities and that drive domestic and international trade. It is the irrigation canals that carry millions of gallons of water to many of the same farm fields. It is the levees, coastal barriers and other flood mitigation activities that provide security for those living in areas at risk of flooding and hurricanes.

The extent of this infrastructure becomes apparent in examining the statistics on the numbers and nature of structures. However, true appreciation emerges in recognizing the diversity behind these numbers. Dams vary in size from the giant (Grand Coulee) to the small (local recreation dams). Major locks and dams on the Mississippi provide 1200 foot chambers for transiting vessels, while small facilities facilitate commerce and recreation on rivers like the Monongahela and the Ouachita. Water and wastewater treatment facilities serve millions of our citizens in metropolitan areas but also provide support to the residents of small villages.

The statistics describe a massive national asset base:

- 87,000 dams in the National Inventory of Dams and tens of thousands smaller dams that are not. The average age of the 87,000 dams is 52 years. Of 14,000 high hazard dams, 2000 are deficient. More than half of the 2525 hydroelectric dams regulated by the Federal Energy Regulatory Commission (FERC) are older than 80 years. [2]
- At least 40,000 miles of levees.[3] Because, in the case of many levees, the current structures were built on top of or integrated within earlier structures, it is difficult to accurately determine their ages. The legacy of many of the major structures dates to the late 19th or early 20th century. Reports by FEMA and the US Army Corps of Engineers indicate serious deficiencies in many of the structures.
- 8,116 miles of irrigation canals for which the federal government is responsible and thousands of miles of canals operated by local sponsors.[4]
- 54,000 community drinking water systems with over one million miles of pipe. In 2002, EPA estimated that by 2020 the useful life of nine percent of the nation's drinking and waste water piping will have expired and 36% will be in poor or very poor condition. There are some 240,000 water main breaks each year.[5] Even the National Capital Region is not immune.
- 14,780 municipal waste water treatment facilities.[6] The normal life span of such facilities varies by type but is in the range of 25 years for mechanical-electrical components and 50 years for structures. As with drinking water piping, there is no national inventory of wastewater piping but estimates range from 700,000 to 800,000 miles, much of which was installed immediately following World War II and its now at the end of its useful life.[7] The growing need to develop adequate storm water capacity adds to the challenge. (Capacity limitations of 19th century stormwater drainage caused a significant flood in the Washington DC Federal triangle in 2006
- 12,000 miles of commercially navigable channels, with over 200 lock chambers.[8] More than 50% of the locks and dams have exceeded their design life, and many are over 70 years old.
- 300 commercial harbors and 600 smaller harbors.[9] The viability of these facilities is a function of the maintenance of adequate channel and harbor width and depth. The growing size of modern vessels exceeds the current depths of many coastal ports and inadequate dredging has reduced the capacity of many inland ports.

*Grading the condition of the water infrastructure*

Every four years, ASCE sends the nation a *Report Card for America's Infrastructure,*[10] which grades the current state of its national infrastructure on a scale of A through F. In 2013, ASCE's most recent *Report Card* gave the nation's infrastructure an overall grade of D+, a slight rise from the 2009 *Report Card.* As highlighted in figure 1 below, in the water arena all categories were rated at D or below except for ports which were rated C. ASCE indicates that since 1998, grades in all categories have been near failing primarily due to delayed maintenance and underinvestment.

***Grades for America's Infrastructure***

| | | |
|---|---|---|
| **Aviation D** | **Ports C** | **A =** Exceptional |
| **Bridges C+** | **Public Parks and Recreation C-** | **B =** Good |
| **Dams D** | **Rail C+** | **C =** Mediocre |
| **Drinking Water D** | **Roads D** | **D =** Poor |
| **Energy D+** | **Schools D** | **F =** Failing |
| **Hazardous Waste D** | **Solid Waste B-** | |
| **Inland Waterways D-** | **Transit D** | |
| **Levees D-** | **Wastewater D** | |

Figure 1. The ASCE 2013 *Report Card for America's Infrastructure.*[11]

The cost to the nation to remediate identified deficiencies and support modernization of the national infrastructure by 2020 is in excess of $3.6 trillion. Figure 2 identifies ASCE's estimated funding needs for water infrastructure, the expected funding given past history and the $187 billion funding gap that exists as a result. The ASCE figures are supported by information available from the federal agencies involved and other infrastructure reports.[12]

| **Infrastructure System Needs** | **Total Needs** | **Estimated Funding** | **Funding Gap** |
|---|---|---|---|
| Water/Wastewater Infrastructure | $126* | $42 | $84 |
| Inland Waterways & Marine Ports | $30 | $14 | $16 |
| Dams | $21** | $6 | $15 |
| Levees | $80 | $8 | $72 |
| | $257 | $70 | $187 |

*The 2008 EPA Clean Watersheds Needs Survey indicated a need for $334 billion for 2007-2020
**This figure covers only high hazard dams. The Association of State Dam Safety Officials estimates the total need to be in excess of $53 billion.

Figure 2. Water sector resource needs through 2020.[13]

According to ASCE, although slight increases in short-term federal funding in some of the categories such as drinking and wastewater have prevented a further decline of those grades over the past four years, many continued to fall. The funding picture for the future, given sequestration and economic realities, is not bright.

Unfortunately, the exact condition of the infrastructure is not accurately known and aging continues. Recent reports on dams and levees indicate that in the case of levees both the exact location and condition of a substantial percentage of the national levee stock is unknown. In the case of dams, lack of funding for inspections and differences among standards applied by states call into question the uniformity and arguably the reliability of the assessments that are made.

Some dams such as those related to mine tailings receive only cursory review emphasizing only the potential risks to miners and not necessarily to surrounding communities. Water and wastewater systems are buried, and even with sophisticated technologies, accurate assessment of their condition is difficult and costly to obtain.

A look at the daily papers quickly provides examples of failures in infrastructure across the nation. Last week we saw a near-disaster with a broken water pipe right outside of the District. Bridges have collapsed on major highways, lock gates have fallen off their hinges on major waterways, water and sewer lines have broken and left communities without water or dumped raw sewage into nearby rivers, and the condition of many levees and dams has been declared unsatisfactory increasing the risk to those that live in their shadows. Much of the national water infrastructure has exceeded its design life and some is approaching the century mark. Major levee failures such as those in New Orleans result in billions of dollars of damages. Dam failures in the past have resulted in significant loss of life. As was illustrated in the weeks following Superstorm Sandy, loss of water and wastewater systems can bring communities to their knees and shut down all economic activity. Offices are unable to open and factories are unable to produce. When flood structures fail or their capacity is exceeded, transportation corridors are closed and health and sanitation facilities become inaccessible.

**Climate Change and Population Growth**

According to the 2011 study, *America's Climate Choices,* conducted by the National Research Council at the behest of U.S. Congress (P.L. 110-161), "...climate change is occurring, is very likely caused by human activities, and poses significant risks for a broad range of human and natural systems." The study points out the potential for sea level rise and large storms to result in significant coastal erosion and for more intense rainfall to increase the probability of flooding in selected areas around the nation. The study notes that these threats make it "prudent to design the infrastructure for transportation, water, and utilities to withstand a range of weather extremes including intense rainfall flooding and drought scenarios..."

A Federal Advisory Committee Draft Climate Assessment[14], released earlier this year, found that:

- "Summer droughts are expected to intensify in most regions of the U.S., with longer term reductions in water availability in the Southwest, Southeast, and Hawai'i [sic] in response to both rising temperatures and changes in precipitation.
- Floods are projected to intensify in most regions of the U.S., even in areas where average annual precipitation is projected to decline, but especially in areas that are expected to become wetter, such as the Midwest and the Northeast.
- Expected changes in precipitation and land use in aquifer recharge areas, combined with changes in demand for groundwater over time, will affect groundwater availability in ways that are not well monitored or understood.
- Sea level rise, storms and storm surges, and changes in surface and groundwater use patterns are expected to challenge the sustainability of coastal freshwater aquifers and wetlands."

The assessment also reports that the "reliability of water supplies is being reduced by climate change in a variety of ways that affect ecosystems and livelihoods in many regions…."

The 2012 report by a task committee of the Intergovernmental Panel on Climate Change, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation,* identifies many of the same impacts.

Growth in population will also influence the need for infrastructure activity. The U.S. Census Bureau currently projects that the population of the United States will increase by 27%, 85 million, between now and 2050.[15] This growth will increase the need for expansion and upgrading of much of the water infrastructure and, as indicated below, will increase the number of people at risk to floods and coastal storms. The aging infrastructure may well be both too old and too small.

In June 2013, the Federal Emergency Management Agency released a report indicating the increases in potential flooding across the United States that could result from climate change and population growth between now and 2100.[16] "For the [contiguous US] riverine environment, the typical 1% annual chance floodplain area nationally is projected to grow by about 45%, with very large regional variations. The 45% growth rate is a median estimate implying there is a 50% chance of this occurring… 30% of these increases in flood discharge, SFHA, and base floodplain depth may be attributed to normal population growth, while approximately 70% of the changes may be attributed to the influence of climate change… for the coastal environment, under the assumption of a fixed shoreline, the typical increase in the coastal SFHA is projected to also be about 55% by the year 2100, again with very wide regional variability. The 55% increase is a median estimate so there is a 50-percent chance of this occurring." Figure 3 provides the geographic distribution of these changes.

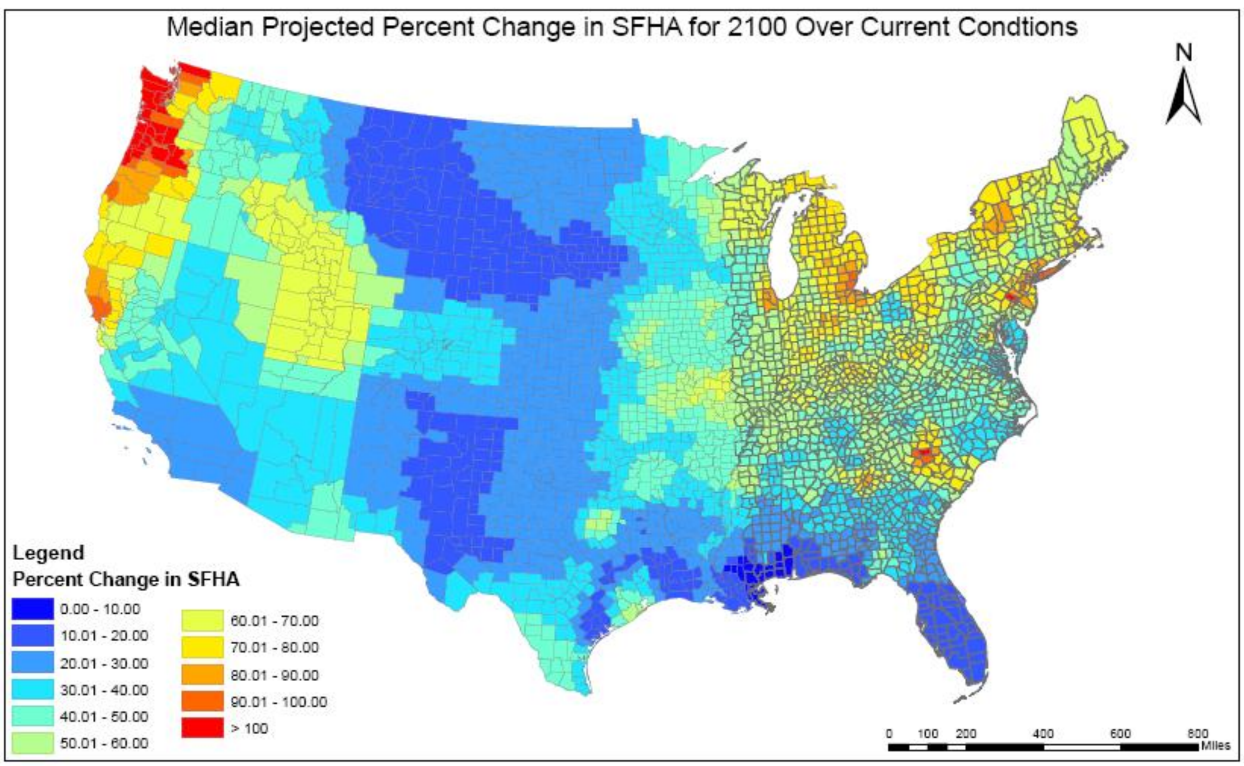

Figure 3. The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. Source: FEMA[17]

Climate and population change will have direct effects on our aging water infrastructure. Structures designed to protect against current or past flooding and coastal erosion threats may not be able to stand up against the forces of larger events or deal with the increased magnitude of these events. Increases in population, will in many cases require current water and wastewater systems to be not only upgraded but also to be sized to the increased demands that will be expected. Additional surface or subsurface storage may be required and older facilities may not be in a position to be modified or expanded. Major storm flows, which are currently stressing many of existing dams and levees, may increase even more under climate change and further threaten those that rely on these structures. Sea level rise is already affecting the US East and Gulf coasts.

Droughts will also increase the stress on water infrastructure. During droughts rivers run low and substantially increase the amount of dredging and other maintenance activities required in channels and at ports. Droughts result in severe stress on water supply systems, whether for agricultural or municipal and industrial use. They also increase the pressure for additional storage or expansion of the water supply storage in existing facilities.

**The Energy and Water Nexus**

There is a substantial link between water and energy. This should be recognized and addressed in in plans to deal with aging water infrastructure.

In 2012, the heads of 15 of the world's largest National Academies met in to discuss important scientific issues facing the world community.[18] The "Energy and Water Linkage: Challenge to a Sustainable Future" was one of three topics addressed by the group. Following the meeting, in which I was fortunate enough to participate as a facilitator, the Academy heads signed a statement identifying the issues they had discussed. In this statement, they reported that

> "Needs for affordable and clean energy, for water and adequate quantity and quality, and for food security will increasingly be the central challenges for humanity: these needs are strongly linked… It is critically important that planning and investment in energy and water infrastructure and associated policies take into account the interaction between water and energy. A systems approach based on specific regional circumstances and long-term planning is essential. Viewing each factor separately will lead to inefficiencies, added stress on water availability for food protection and for critical ecosystems, and a higher risk of major failures or shortages in energy supply."

They also noted that energy production requires water and that the production of water supplies in adequate amounts and quality requires energy. They pointed out that fossil fuel and nuclear power plants and solar thermal require large water withdrawals and some water consumption and indicated that even use of "increasingly important 'unconventional sources' such as tar sands gas

hydrates in gas and oil and tight formations have substantial implications for quantity and quality of water…producing alternative transportation fuels, in particular biofuels… can involve substantial impacts on water resources and water quality."
.
Our aging inland waterway infrastructure also has a significant tie to energy production. Twenty-two percent of the nation's energy products are carried on inland waterways barges that are energy efficient. Inland waterways separate potentially volatile cargo from heavily populated areas. Operating as part of the national intermodal transportation system, waterways also provide alternative routes should problems occur with energy product movement on parallel systems such as pipelines and rail, increasing the resilience of the overall system and the resultant national security.

Hydropower production, although providing only 8 to 12 percent of the national energy pool, provides critical services in many parts of the country. 20th century development in the Tennessee Valley and in the Columbia basin relied on use of low cost hydroelectric power. Many communities are reliant on hydropower for base supply and many others for the peaking power necessary to meet electricity needs during periods of high demand. Many of the nation's hydropower facilities are aging and, although carefully supervised by the Federal Energy Regulatory Commission and state agencies, require substantial and continuous attention. Again, where rate setting becomes political instead of true cost based, funding challenges will develop.

**What Must Be Done?**

ASCE's *Report Card* together with reports from agencies and independent bodies have alerted public officials to some of the problems of aging and poorly maintained infrastructure that is reaching the end of its useful life. Unfortunately, what we see may be only the tip of the iceberg. In spite of the alerts, little seems to get done. What steps are necessary to move our efforts forward with infrastructure renewal and alternative approaches to meet our water needs?

*Filling the information gaps*

As a follow-up to Katrina, in 2009 a congressionally directed National Committee on Levee Safety reported that considerable attention needed to be paid to the development of an inventory of the nation's levees and their conditions. Some work has been accomplished by the U.S. Army Corps of Engineers and FEMA in addressing levees under their oversight but the work is far from complete and no action has been taken by the Congress on recommendations of the National Committee on Levee Safety. The condition of tens of thousands of miles of levees in the US has yet to be assessed and many of these levees have yet to be precisely located.

Information about the condition of only 75% of the 87,000 dams has become part of a national inventory of these structures. We know where the dams are located and if their failure would pose a threat to those below the dams, but we have yet to complete thorough assessments of the condition of all dams. Some of these dams date to before the Civil War. On a positive note, the condition of the approximately 4000 dams under federal oversight has, for the most part been assessed and continues to be monitored, even if funds to deal with identified problems cannot be fully addressed. Four percent of dams are federally owned and the Federal Energy Regulatory Commission (FERC) provides oversight of an additional 2525 private and public dams.[19]

In 2007, Section 2032 of the Water Resources Development Act (PL 110-114) directed the President to, within two years, conduct an analysis of the vulnerability of the nation to flooding. Such an analysis would identify the exposure--what is in the path of a potential flood or storm surge--and the vulnerability of affected communities to such events. Vulnerability reflects the ability of existing flood protection infrastructure to carry out the functions for which it was designed. No funds have been appropriated by Congress for this activity, in the nearly six years since the law was passed and, as a result, no analysis has taken place.[20]

The Environmental Protection Agency has invested resources in gathering information about the condition of water and wastewater infrastructure and has prepared reports that identify the challenge the nations faces in drinking and waste water. Such analyses however represent only estimates and given that much of the infrastructure is below ground, there is considerable uncertainty with the completeness of the survey information.

Considerably more is known about the condition of the inland waterways and ports, although, as with water and wastewater there is still some uncertainty given that much of the infrastructure is below water or underground and is reaching or has exceeded its design life.

*Funding approaches*

As indicated earlier in this testimony, addressing deficiencies in aging infrastructure and ensuring that the infrastructure will be ready for the impacts of climate change and population growth will require significant resource commitments or close attention to innovative alternatives to structural approaches. The Congress, the Administration, state and local governments, and businesses including those that are directly affected by or operate water resources infrastructure have been struggling to find funding outside of direct federal expenditures.

Immediately following Hurricane Katrina, former Sen. Warren Rudman and businessman Felix Rohatyn proposed the development of National Infrastructure Investment Corporation with the authority to issue bonds with maturities of up to 50 years to finance infrastructure projects.[21] Their recommendations went nowhere. States like California have issued bonds to deal with critical infrastructure issues such as levees, but its example has not been followed in many places. Public-private partnerships have been suggested for some infrastructure, but unlike toll highways where a future revenue stream can be seen, such partnerships for levee maintenance and repair have lacked credibility. The water and wastewater communities generate revenue through user charges, but these charges generally have not kept up with the full costs of providing these services. History indicates that it is frequently difficult for these agencies (approximately 90% public in water supply for communities over 10,000 and 98% public in wastewater[22]) to garner the local political support necessary to raise the rates to a level necessary to carry out the needed infrastructure servicing.

The inland waterway community has suggested raising the tax on fuel use by their vessels to increase the amount of funding available in the Inland Waterway Trust Fund to carry out needed infrastructure renewal. Legislation to this end is currently being considered in the Water Resources Development Act, but even this self-taxing has opponents who see it as a violation of the ‘no new taxes’ principle.

Much of the infrastructure for ports and harbors is privately or non-federal government owned as opposed to being supported by the federal government. Various approaches have been used to successfully modernize the on-land infrastructure necessary to operate the ports. Funding of dredging to maintain channel depth and width is shared by the federal government and local sponsors and, where the federal government does not have plans for its share of the work, local sponsors must either assume the entire cost or live with the consequences of inefficiently sized channels.

Similarly a large percentage of dams are privately or non-federally owned. There are a few state loan or grant funding sources to rehabilitate dams and some federal funding through the Department of Agriculture Natural resources Conservation Service, but these funds usually only support state or municipally owned dams. Private owners, even the most conscientious ones, typically do not have the funding needed to do necessary safety upgrades.

Several other proposals have been made in recent years and some others are currently under consideration to assist in meeting the significant gaps in drinking water and waste water infrastructure funding. They include [23]

- Increased funding for State Revolving Fund programs under the Clean Water Act and the Safe Drinking Water Act.
- Lifting of the private activity bond restrictions on water infrastructure projects
- Creating a federal water infrastructure trust

EPA reports[24] that the President’s 2014 Budget request:

- Supports lifting the cap on private activity bonds for sewage and water facilities. This will help address the hundreds of billions of dollars needed for capital investment over the next 20 years.
- Includes a proposed National Infrastructure Bank that would have the ability to leverage private and public capital to support infrastructure projects of a national and regional significance, including water infrastructure.
- Proposes establishment of America Fast Forward Bonds (AFFBs). The program would reduce the cost of infrastructure financing for municipalities and their private sector partners by providing interest subsidies on taxable bonds.

The Senate version of the Water Resources Development Act includes a pilot version of the Water Infrastructure Finance and Innovation Act (WIFIA) that would fund water projects that are too large to receive EPA State Revolving Fund loans and that could be used to finance a variety of water projects whose cost is greater than $20 million.[25]

*Adapting to a murky future*

Recognizing that full funding of actions needed to repair and upgrade aging infrastructure may not occur or may be slow in coming, every effort must be made to ensure that the water resources community carefully examines those steps that can be taken to adjust current operations and activities to better deal with the advent of climate change and funding shortfalls and to ensure that it fully considers those actions that do not require or lessen the need for structural measures. If our water resources infrastructure is to be resilient to the many forces which could threaten its viability, action must be taken.

In 2010, the US Geological Survey, U.S. Army Corps of Engineers, the National Oceanographic and Atmospheric Administration, and the Bureau of Reclamation prepared a report outlining steps that could be taken to better adapt water resource activities to these challenges.[26] Since that time major federal agencies, operating under the coordination of the White House Council on Environmental Quality, have been working through task forces to develop steps that can be taken to reduce the impact of climate change and to find ways to face this challenge using innovative approaches, many of which are nonstructural. Efforts to promote conservation, efficiency, and changes in operating procedures that would influence both demand and use of water resources have been highlighted.

Many communities have embarked on programs that use natural hydrological features increase rainfall infiltration and reduce the necessity for stormwater systems. Many of these systems also provide for water capture and reduction in heat islands in urban areas. Consolidation of area and regional water systems can also reduce the costs associated with modernization. The need for flood reduction structural systems can similarly be reduced through use of natural storage during major events as was demonstrated by the U.S. Army Corps of Engineers during the 2011 floods on the Mississippi River. Natural storage can also be combined with sound land-use planning to remove most frequently flooded properties and ensure that future development takes into account climate change and other potential changes in the landscape.

Use of renewable energy sources and micro-hydropower systems can reduce the necessity for complete replacement of some aging hydropower facilities. As has been suggested by National Research Council studies,[27] upgrade of some locks and dams might be able to be delayed through use of nonstructural approaches such as congestion management and scheduling, or in the case of low-use segments, the divestment of these assets. Non-structural approaches not only may reduce infrastructure investment costs but may also significantly enhance the natural environment.

**On Being both Realistic and Honest**

The nation is faced with an aging water resources infrastructure and with resource significant requirements to properly maintain and upgrade this infrastructure, and to adapt it to the potential impacts of climate change and growth.

Unless there are significant and rapid changes in the national economy and adjustment of long-standing responsibilities, it is unlikely that the federal government will be in a position to fund the needed maintenance, rehabilitation and upgrades. It is more likely that new approaches will have to be taken and that much of the burden will continue to rest at the local level. This fact must be recognized by all concerned.

Continuing to believe or to support beliefs that somehow enormous sums of money will be found by the federal government to completely eliminate this significant national backlog in the infrastructure is unrealistic and support of this belief is unethical. For example, the Senate version of the Water Resources Development Act contains provisions that would provide local levee districts access to $300 million annually for levee repairs. Given that the maintenance backlog is estimated to be over $50 billion, it would be foolish for levee districts across the country to believe that all they need do is wait until their turn for funding to deal with the infrastructure deficiencies they currently face. Similarly, putting off other actions such as price rises for services in the hope that they may later be found to be necessary, is unrealistic and deceptive.

It should be made clear that federal resources that are available will go to those facilities where there is the highest national interest and need and where the return on investment is highest and the greatest risks to life and property exist.

**In Sum**

- The nation's water infrastructure is aging and its condition is fragile.

- Climate change will exacerbate the impacts of this aging
.
- There is a substantial link between the production of energy and the condition of our water resource infrastructure.

- The nation must take steps to address the aging infrastructure problem. A failure to act on aging infrastructure will have serious consequences now and will increasingly burden the future.

- Congress must act with realism and openness to deal with the challenges that fall within its domain and, through its influence and bully pulpit, provide leadership to the nation as a whole where it does not. It must also overcome the tyranny of agency silos and committee turf to address these challenges in a comprehensive manner. Something must be done now.

Thank you for your attention.

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