

# Natural Defenses

**Safeguarding Communities  
from Floods**



**American Rivers**  
*Thriving By Nature*

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## Safeguarding Communities from Floods

### Increasing Flood Risk in a Changing Climate

The impacts of our changing climate are becoming more apparent every day. In the first decade of the new millennium, extreme rainfall events, combined with changes in land use, have resulted in an increase in flood events and in an increase in annual flood losses from \$6 billion to \$15 billion despite the billions of dollars invested in flood control. As the climate changes, bringing more frequent and intense storms and floods, communities living near streams and rivers and on our coasts are facing increasing threats. Lives and property are increasingly at risk, flood damages are straining tax-payer dollars, and clean water and wildlife habitat are suffering.

Our changing climate, outdated management approaches and policies, underfunded and under utilized green infrastructure, and increasing urbanization are causing a flood management crisis for federal agencies and communities alike.

### Traditional Gray Infrastructure Will Continue to Place People in Harm's Way

Our country is struggling to break out of a long-standing negative feedback loop. Gray infrastructure such as dams, levees and concrete flood control channels, incentivizes people to live in harm's way. Living in harm's way creates a perceived need for more gray infrastructure that ultimately makes flooding worse, passes the problems downstream, disrupts natural river processes, and perpetuates a flood-damage-repair cycle that has devastating costs to life, property, taxpayers, and the environment.

### Rising Toll of Floods

**Southeast, 2009:** A "500 year flood" event dropped an average of 14 to 15 inches of rain, equivalent to 420 billion gallons of water, in just two days, breaking the monthly rainfall record of 11 inches, which exceeded the maximum observed rainfall associated with Hurricane Katrina and claimed over 30 lives.

**Midwest, 2008:** A "500 year flood" devastated the region, claimed 13 lives and caused tens of billions of dollars in damage. This flood hit just 15 years after the epic 1993 flood, another "500 year flood," which claimed 32 lives and caused \$15 billion in damages.

**Pacific Northwest, 2007:** Widespread flooding forced evacuations and shut down Interstate 5, the main highway connecting Seattle and Portland. One year later, more massive flooding caused widespread damage and another shutdown of I-5.

**Mid-Atlantic, 2006:** A "200 year flood" disrupted life in New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and the District of Columbia as it caused 16 deaths, thousands of evacuations, and tens of millions of dollars in damages.

**Gulf Coast, 2005:** Human and economic losses from Hurricane Katrina, amounted to 1,700 deaths and over \$200 billion in damages, which tragically exposed the failure of our flood control policy. The 2005 hurricane season bankrupted the nation's flood insurance program, putting it \$20 billion in debt.

25 FT

20 FT

15 FT

10 FT

5 FT

Refuge at Hennepin and Hopper Lakes | Photo: Gary Sullivan, The Wetlands Initiative

### Time for a 21st Century, Green Infrastructure Approach to Flood Management

The rising toll of annual floods sends a clear message: it is time to adopt a 21st century approach to flood management. One that places our "natural defenses" — wetlands, rivers, floodplains, and upland areas — at the core of flood management. This green infrastructure is the most reliable, cost-effective, and flexible practice for communities to adapt to a changing climate. These approaches won't altogether replace traditional engineering but will augment and buffer those traditional approaches.

The three critical components of green infrastructure include:

- Protecting healthy landscapes like wetlands, rivers, floodplains, and upland areas that store water and offer storm protection, among other services;
- Restoring degraded wetlands, rivers, floodplains, and upland areas so that they can better store flood water and provide recharge to streams and aquifers; and
- Replicating natural systems in urban settings to ensure that more water is absorbed into the ground. This helps guard against flash flooding and prevents stormwater and sewage pollution.

Acknowledging the dynamic processes and functions of natural systems and accommodating flooding provides better protection than fighting floods, and will help protect communities, safeguard the environment, and save tax dollars. The same green infrastructure that helps reduce flood damages also provides other benefits including securing clean water, increasing groundwater recharge, moderating climate change, stimulating local economies, and supporting recreation among others. Flood management is but one reason to adopt these approaches.

In contrast, gray infrastructure like levees has limited benefits, can be very costly, is inflexible, and not as reliable.

### Community Snapshots of Natural Defenses in Action

Communities around the nation are already employing 21st century flood management solutions with excellent results. The following communities demonstrate how investing in forward-looking approaches that reduce risk and increase flood storage naturally can help communities become more resilient to flooding and thrive in the face of a changing climate.

- **Retiring and Restoring Agricultural Lands in Iowa:** After the 17th levee breach, farmers in the Louisa Levee District 8 volunteered for a federal buyout program. With \$2 million in federal funds, the U.S. Fish and Wildlife Service purchased 2,500 acres of agricultural land creating the Horseshoe Bend Wildlife Refuge and saving \$1 million in levee repair and crop insurance recovery payments. Now when it rains, the floodwaters naturally overtop the river banks and spread across the floodplain providing flood storage that protects downstream communities and creates wildlife habitat.



Louisa Levee Districts 8 and 11, Iowa | Photo: USDA NRCS

- **Setting Levees Back in Pierce County, Washington:** Approximately 90 miles of levees were built along the Puyallup River since the 1900s primarily to protect agriculture. As time passed the protection from the levees incentivized development while repair and maintenance lapsed. After the 1996 flood, Pierce County started a plan to reduce the risk of future flood damages and to reconnect the Puyallup River with its natural floodplain through a system of levee setbacks and bank protection measures. Pierce County's



Ford Setback Levee | Photo: Pierce County Water Programs, WA

pro-active flood protection efforts helped protect the City of Orting during the 2006 flooding and restored salmon access to the Puyallup River.

- **Working With Nature in Charlotte — Mecklenburg County, North Carolina:** After three major flooding events in less than 10 years and projections of high population growth, Charlotte-Mecklenburg County invested \$3 million in remapping the major watersheds, implemented permanent protection of over 3,000 acres of floodplain habitat for open greenspace, and utilized local stormwater and federal agency funds to buy and move 225 high-risk structures out of harm's way. These efforts helped to safeguard more than 100 homes from Tropical Storm Fay in 2008.



Floodplain Restoration and Greenway Project | Photo: Charlotte-Mecklenburg Storm Water Services, NC

Unfortunately, these examples are too few and far between. Sound flood management priorities are needed at the federal level to ensure that the financial and regulatory framework is in place to make green infrastructure solutions the norm and not the exception.

### National Priorities for Flood Management in a Changing Climate

An increasingly volatile climate poses a range of threats to communities across the country, especially those located in coastal areas and in or near floodplains, some of the nation's most populated areas. As temperatures rise so too will the capacity for extreme storms and heavy precipitation events causing more severe flooding and degradation of water quality. Already in the 20th century, floods caused more property damage and fatalities in the U.S. than any other type of natural disaster. By making dramatic but attainable shifts in our approach to flood management, we can protect public safety, clean water, and all of the benefits that healthy wetlands, rivers, floodplains, and upland areas bring to our communities. The federal government has a unique opportunity to put forth a new vision for flood management.

The federal agencies that play a key role in flood management must institute reforms that put green infrastructure on the frontline of flood management. The Federal Emergency Management Agency (FEMA) must put in place needed incentives to reduce flood risk and incorporate green infrastructure. The U.S. Army Corps of Engineers must eliminate the institutional bias towards structural approaches and prioritize nonstructural, green infrastructure solutions. And the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) should adopt an overarching flood management strategy that ensures increases in land available to store floods.

Although agency reforms are a step in the right direction, these reforms alone will not be enough to meet the challenges we face in a changing climate. Our nation is in dire need of national flood management policies that protect and restore the nation's natural defenses — our wetlands, rivers, floodplains, and upland areas.



The 2008 Midwest floods devastated Cedar Rapids, Iowa mandating a new approach to flood management. Photo: Rebuild Iowa Office



Conservation programs that protect and restore wetlands can play a critical role in storing flood waters, among other benefits. Photo: USDA NRCS



Wetlands store flood waters, ensure clean water, and provide wildlife habitat. Photo: USFWS

## Bold Action is Needed to Protect and Restore the Nation's Natural Defenses:

- **We Need a Climate Bill:** We need a climate bill that will ensure we avoid the unmanageable and manage the unavoidable.
- **Pass Clean Water Restoration Legislation:** Congress must restore Clean Water Act protections of our wetlands, rivers, floodplains and upland areas to ensure the protection of headwater, intermittent, and ephemeral streams as “waters of the United States.” Additionally, the Environmental Protection Agency must undergo formal rulemaking regarding the definition of “waters of the United States” to provide protection of currently at-risk waters.
- **Pass a National Flood Insurance Modernization Act that Truly Communicates and Addresses Risk in a Changing Climate:** Congress must pass a National Flood Insurance Modernization Act that recognizes the impact of global climate change on flooding and erosion hazards and the role that mitigation can play in keeping communities safe and our environment healthy.
- **Pass Legislation that Scrutinizes the Risk of Existing Flood Control Structures:** Congress must pass legislation that couples a levee safety program with an overall national flood risk management strategy that includes the risk of dams and the role of green infrastructure in reducing these risks.
- **Move the U.S. Army Corps of Engineers Beyond the Status Quo:** Congress must revise current U.S. Army Corps of Engineers authorities and appropriations to ensure the Corps’ projects are prioritized to utilize taxpayers’ investment wisely and to address the nation’s pressing flood management needs by shifting federal dollars from the Corps’ high impact, flood control projects to Corps projects that invest in land acquisition and the protection and restoration of America’s wetlands, rivers, floodplains, and upland areas.
- **Fully Invest in Restoring America’s Natural Defenses:** In these economic hard times and as our climate changes, Congress and the Administration must prioritize appropriations for the mitigation, adaptation, and technical assistance programs under FEMA, the Corps of Engineers, Department of Agriculture, and other agencies to send a strong signal that our nation will make the best use of taxpayer dollars by fully investing in green infrastructure.
- **Ensure a Unified Approach to Protecting and Restoring Wetlands, Rivers, Floodplains, and Upland Areas:** The federal government must adopt revised Principles and Standards for federal water resources projects and require an active Interagency Floodplain Management Task Force so that federal agencies work in a coordinated fashion to ensure the protection and restoration of ecosystem health, the minimization of adverse impacts, the avoidance of the unwise use of floodplains, and the reduction of risk to public safety.

By taking these bold actions we will safeguard communities from floods, improve water quality, provide recreation, and restore fish and wildlife habitat, among other benefits. Investing in our natural defenses is the most cost effective and reliable solution to protecting people and property from floods and protecting healthy rivers. American Rivers is dedicated to reforming national policies and to helping communities realize the benefits of green infrastructure so that they can thrive in the face of a changing climate.



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**About American Rivers:**

American Rivers is the leading conservation organization fighting for healthy rivers so communities can thrive. American Rivers protects and restores the nation's rivers for the benefit of people, wildlife, and nature. Founded in 1973, American Rivers has more than 65,000 members and supporters, with offices in Washington, DC and nationwide.

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