



SMARTER FLOODPLAIN MANAGEMENT

SUCCESSFUL STRATEGIES FOR REDUCING RISK AND MAXIMIZING BENEFITS



Photo of John Day River courtesy of Sam Beebe.

Floodplains are the nexus between water and land. That point of interaction gives them a vital economic and ecological role. Healthy, resilient communities require functioning floodplains to reduce property damage from floods, recharge groundwater, support fish and wildlife habitat, clean water, and provide open spaces to play.

But we have known since as early as the 1940s that the way we manage floodplains is often inconsistent with sustaining these functions. As more homes, businesses, and infrastructure populate our floodplains, the danger to people and property increases and floodplains are less able to provide these beneficial services. The cost of flood damages can be devastating and can affect not only homeowners and businesses in the floodplains, but whole communities that have to absorb costs for emergency services, lost business and wages, road closures and cleanup, overwhelmed treatment facilities, and stormwater overflows. In many areas, climate change is expected to make future floods more frequent and severe, further increasing the risks and costs of flooding.

The costs of flood damage in the US continue to rise year after year, and many of our rivers and floodplains no longer function well enough to buffer us from flooding or to support healthy fish populations. Communities are struggling with the myriad of economic, ecological and policy issues surrounding floodplain development.

We need a new approach to floodplain management – a smart approach built on strategies and tools that have been shown to reduce risk to communities and support natural systems. Here's a look at what we think is working for communities around the country.

STRATEGIES FOR SMART FLOODPLAIN MANAGEMENT:

► Land use planning:

Where floodplains are still undeveloped, local land use planning should aim to steer new development away from high-hazard areas and away from areas with highly functioning floodplains. Functioning floodplains provide significant economic and other benefits to communities and should be seen as a kind of infrastructure investment. Where new development in floodplains is unavoidable, compensatory mitigation should be required to ensure that flood storage capacity, habitat for imperiled fish, and other natural floodplain functions are replaced.

As part of its response to litigation over floodplain development impacts on endangered fish, the Federal Emergency Management Agency created a [model floodplains ordinance](#) that may provide a good starting point for communities interested in this approach.

► Watershed restoration:

From green infrastructure in urban areas to larger-scale restoration efforts in less developed watersheds, many communities are working within the existing developed landbase to restore the natural functions of floodplains [see box on Tillamook, OR]. The [Floodplains By Design](#) program in Washington provides a promising model for public investment in floodplain restoration projects that provide multiple benefits, including water storage, fish habitat, support of working lands, public safety, and water quality.

For existing restoration efforts to scale up into restoring resilient floodplain systems for more resilient communities, it will require increased funding and tools to target where those investments can be most effective.

► Structural and non-structural solutions:

Levees and dams can play an important role in protecting existing development from catastrophic floods, but they also impact beneficial floodplain functions. When levees fail, flood damage can be extreme, both because people behind the structures are often unaware of the risk and because the failed structures can retain water and prevent it from receding back into the channel. Because of these inherent problems, new flood protection structures should be developed only as a last resort for defending existing development, and not in order to accommodate new development in high-hazard areas.

TILLAMOOK, OR

Tillamook County's Southern Flow Corridor project (pictured below) proposes to restore 10% of the watershed's historical tidal wetlands and remove or modify 10 miles of levees that currently constrain the river channel in order to improve endangered salmon habitat and reduce the frequency and intensity of flood events and associated damage.

Photo courtesy of the Tillamook Southern Flow Corridor Project.



(Structural and non-structural solutions continued)

Non-structural solutions such as maintaining floodplains as open space, buy-outs of at-risk structures, or community planning and zoning for floodplain management are emerging as an important tool for helping to increase community resilience to floods and to restore floodplain function [see box on *Pierce County, WA*].

► Building design standards:

Where new construction does occur in floodplains, the focus should be on designing buildings that can withstand the effects of flooding and on avoiding or minimizing impacts on flood storage, water quality, fish habitat, and other functions. Low Impact Development standards can help ensure these goals are met. Policy and insurance incentives for land elevation should be removed because in doing so can increase flood risk to surrounding properties and can undermine habitat and other important natural functions.

► Disaster relief:

Where floodplains are already highly developed, hazard mitigation planning can help limit the risk to people and property. Communities should plan for what will happen when floods strike as well as think ahead to how they will respond and rebuild after a flood. In areas that flood frequently, or where damage has been severe, voluntary buy-outs can be an important tool [see box on *Fort Collins on the next page*].

► Engagement:

Most people that live or work in floodplains are unaware of the risks they face, or of the potential damage that floodplain development can cause to water quality, fish, wildlife, and other ecological values. When governments permit or even incentivize development in high-hazard areas, they can unwittingly send the message that they have evaluated the risk – both to public safety and ecological values – and deemed it to be acceptable. Local governments, non-profits, state and federal agencies, and landowners can work together to build community awareness of the importance of floodplains and a realistic understanding of the risks associated with building and living in floodplains.

PIERCE COUNTY, WASHINGTON

In response to repeated flooding, Pierce County, WA is moving their flood management strategy away from the use of grey infrastructure, such as levees to channelize flood-prone rivers, and towards non-structural solutions such as prohibiting development in the highest risk areas of the floodplain, requiring impacts to floodplain function in lower risk areas be mitigated, and funding buyouts or acquisitions in flood-prone areas. The 2013 Rivers Flood Hazard Management Plan reflects the viewpoint that “fighting the river” is a costly and mostly ineffective way to protect human life and property.

The South Fork Road Floodplain Restoration project in Pierce County pictured below reduces flood risk and improves salmon habitat. Photo courtesy of Pierce County, WA.



A PATH FORWARD

Implementing these strategies will look different in every community – some may focus on voluntary buy-outs in flood-damaged areas, while others might invest heavily in active restoration or in steering new development away from higher-risk areas. Likewise, each community faces its floodplain management challenges with a unique set of capacities and resources.

A common thread among many communities is a need for better information and management tools, including:

- Improved mapping of current flood hazard areas (including areas at risk from erosion and channel migration), as well as areas of future risk;
- Planning support, including decision support tools that quantify natural functions in a way that can be used in benefit cost analysis, prioritization decisions, and comprehensive planning; and
- Policies and programs that provide an integrated path for communities to meet the diverse set of regulatory requirements that come together in a floodplain.

Some of these gaps may be most effectively filled at the state level, so that each individual municipality does not need for example, to invest in expensive mapping and modeling efforts. As highlighted here, there are many communities and initiatives that are already charting a path forward with innovative tools and approaches. [Willamette Partnership](#), with support from the Natural Resources Conservation Service and others, is working closely with a diverse set of stakeholders to help fill some of these gaps in Oregon. ■

FOR MORE INFORMATION

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FORT COLLINS, CO

On July 28, 1997 a flash flood left five people dead, 54 people injured, 200 homes destroyed, and 1,500 homes and businesses damaged totaling more than \$250 million in flood related costs. While floods have been a part of life in Fort Collins, Colorado, this 500-year flood event spurred the city to develop proactive floodplain management policies and practices including voluntary buyouts.

The **Willing Seller–Willing Buyer** acquisition program targets existing residential and commercial structures in the floodplain or floodway that are at high risk of being damaged. The purchase and removal of buildings from the floodway after the 1997 flood event meant that damages and losses from the 2013 flood were significantly reduced.

Flooding from the Cache La Poudre River in Fort Collins during the September 2013 flood, which was one of the most extreme rainfall and flood events in recorded history. Photo courtesy of the City of Fort Collins, CO.

