

## Mitigation Matters: Policy Solutions to Reduce Local Flood Risk

This brief is one of 13 that examine state and local policies that have resulted in actions to mitigate flooding.



Stephen Brashear/Getty Images

King County road crew members, residents, and reporters survey Highway 202 where the nearby Snoqualmie River flooded its banks on Jan. 9, 2009, near Snoqualmie, Washington. Record rain and snow had caused many rivers in western Washington to overflow their banks.

# Washington Partnership Fosters Collaboration for Flood Plain Restoration

Grants for local projects include moving levees to cut flood risk

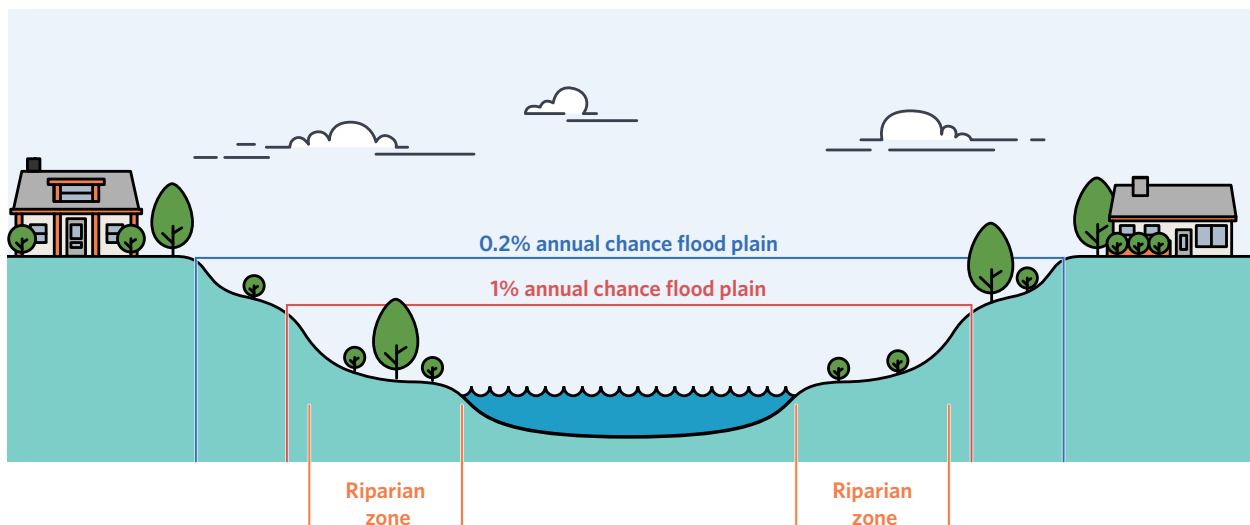
## Overview

Washington state is taking a holistic approach to mitigating flood risk. Having spent millions in past decades on disconnected strategies, the legislature in 2013 supported a partnership formed that year by several nonprofit groups, the state Department of Ecology, and other stakeholders to address the root causes of flooding: the manipulation of Washington's rivers and development in flood plains.

The partnership's initiative, called Floodplains by Design (FbD),<sup>1</sup> takes a collaborative approach to projects such as moving levees, reconnecting flood plains to their rivers, and acquiring land to relocate residents away from flood hazards. Since 2013, FbD has distributed more than \$115 million in grants to cities, tribal governments, and other private and public entities for flood plain projects, with an additional \$50 million approved for the 2019-21 cycle.

## What is a flood plain?

Flood plains are areas near streams and rivers that experience repeated flooding. They reduce floodwaters' energy and flow speed and provide storage for floodwater.



**Riparian zone:** The land along a river or stream where soils, vegetation, and habitat transition from aquatic to terrestrial. The extent of this zone will vary.

**1% annual chance (aka 100-year) flood plain:** The land area that is projected to be inundated by a flood with a statistically estimated 1 percent chance of being equaled or exceeded in any given year. Structures in this area have roughly a 1 in 4 chance of experiencing a flood of this scale over the lifetime of a standard 30-year mortgage.

**0.2% annual chance (aka 500-year) flood plain:** The land area that is projected to be inundated by a flood with a statistically estimated 0.2 percent chance of being equaled or exceeded in any given year.

Source: Federal Emergency Management Agency, NFIP Guidebook, [https://www.fema.gov/media-library-data/20130726-1647-20490-1041/nfipguidebook\\_5edition\\_web.pdf](https://www.fema.gov/media-library-data/20130726-1647-20490-1041/nfipguidebook_5edition_web.pdf).

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## **Flooding worsens as priorities clash**

Washington is still suffering the consequences of well-intended but flawed decisions decades ago to straighten and dredge waterways, levee riverbanks, and line them with concrete to allow for residential, commercial, and agricultural development in flood plains.<sup>2</sup> Besides degrading natural habitats, these actions have contributed to costly floods in some communities.

The construction in these sensitive areas has been one result of population growth. For example, Snohomish County, just north of Seattle, receives about 4,000 new residents every month.<sup>3</sup> But building in flood plains has made new homes vulnerable to water spilling over river banks in heavy storms. And the construction itself has worsened flooding because concrete and other materials impede the natural absorption of rainfall and river water. In addition to spending to help their city or town recover from floods, local governments have borne the expense of maintaining levees.<sup>4</sup>

Just as homes built near rivers have been threatened by floods, so too have Washington's agricultural interests. Crops planted near rivers have been oversaturated when the rivers spilled their banks.<sup>5</sup>

Actions such as armoring river banks, including in Snohomish County, have also degraded key salmon habitats. Restoring flood plains to their natural condition is a top concern among many Native American tribes, who rely on fish for their sustenance and their livelihoods. Moreover, the lands and rivers are part of their culture, history, and daily life.<sup>6</sup>

Washington has spent millions to restore these important habitats, but the projects have been too small and disconnected to significantly repopulate fish. Relationships among farmers, tribes, and others working to protect salmon have been tense. Each group pursued siloed solutions that sometimes ignored the interests of other groups.

Adding to these problems, watersheds throughout the state have received more rain in recent years, leading to more water volume and severe flooding.

This phenomenon contributed to one of the worst floods in the state's history. In January 2009, a Pacific storm struck western Washington for three days, causing most rivers, urban storm systems, and small streams to flood, some to record levels. Landslides and mudslides closed major roads and highways. Almost 500 homes were destroyed or badly damaged, with costs exceeding \$72 million, and more than 44,000 people were evacuated.<sup>7</sup>

## **Politicians support a unified vision**

Past strategies to restore habitats and mitigate flood risk were pursued independently, straining resources with minimal results. Local governments, tribes, and other stakeholders realized that a unified approach to addressing flooding and related issues would maximize resources and boost efforts to restore flood plains.<sup>8</sup>

In 2012, the Environmental Protection Agency (EPA) awarded a \$500,000 grant from the National Estuary Program to The Nature Conservancy (TNC), a nongovernmental organization, to support this vision for improving flood plain management in the Puget Sound region.<sup>9</sup> TNC used the grant to create the concept for Floodplains by Design (FbD), a partnership with the Washington Department of Ecology and another state agency, the Puget Sound Partnership (PSP), to integrate flood plain management efforts.

After FbD asked state lawmakers for support, the legislature authorized \$44 million in 2013 for the partnership to fund projects based on the concept.<sup>10</sup> Since then, FbD has also received financial support from other federal agencies, private industries, and other nonprofit groups and has collaborated with many local partners,<sup>11</sup> including conservation districts, NGOs, and tribal governments.

## Expansion to a statewide program

FbD uses grants to achieve two complementary goals: first, to balance the related priorities of reducing flood risk, helping ecosystems in flood plains to recover, and maintaining or improving agricultural production, water quality, open space, and recreation; and, second, to better coordinate public funding for these flood plain efforts. Eligible grant applicants include local governments, tribes, port and flood control zone districts, municipal corporations, and nonprofits.

When it was launched in 2013, FbD's scope was limited to the Puget Sound region, and the Department of Ecology managed grants and projects.<sup>12</sup> The next year, during its first competitive grant round, the partnership expanded its efforts statewide because of its initial success.

Through 2018, more than \$115 million in grants has gone toward restoring rivers and associated flood plains, letting the rivers flow where they are naturally inclined, and removing the engineered systems—dams, for example—that are no longer operating effectively.<sup>13</sup> The new projects have included removing levees; integrating plants for erosion control and to restore habitat; installing logjams and other structures in rivers to improve fish habitat and reduce water speed during storms; and buying at-risk properties and using the land to trap floodwater.

In Snohomish County, FbD has funded projects to restore the natural state of the flood plain, such as removing dikes to restore critical estuaries, and studies to understand flood patterns and habitat vulnerabilities.<sup>14</sup> Representatives of the EPA and other federal agencies worked with state and local officials, as well as tribes and other stakeholders, to coordinate priorities and develop best practices to integrate resources.

In 2016, a federal interagency climate committee recognized the collaborative work as one of seven “resilient lands and waters partnerships.”<sup>15</sup> It's now serving as a model for integrated strategies to promote natural ecosystems and reduce flood risk.<sup>16</sup> In 2019, the state approved two additional projects for Snohomish County on the two rivers: the Stillaguamish and the Snohomish.<sup>17</sup>

## Orting uses FbD grant to remove levees, restore habitat

For years, the small city of Orting, southeast of Tacoma, was vulnerable to flooding from the Puyallup River, which borders one side of it. More than a century ago, officials from Orting and other cities had straightened the river channel and built 52 miles of levees along its banks.<sup>18</sup> But decades later, the river frequently topped the levees, which were designed for lower water flows.<sup>19</sup>

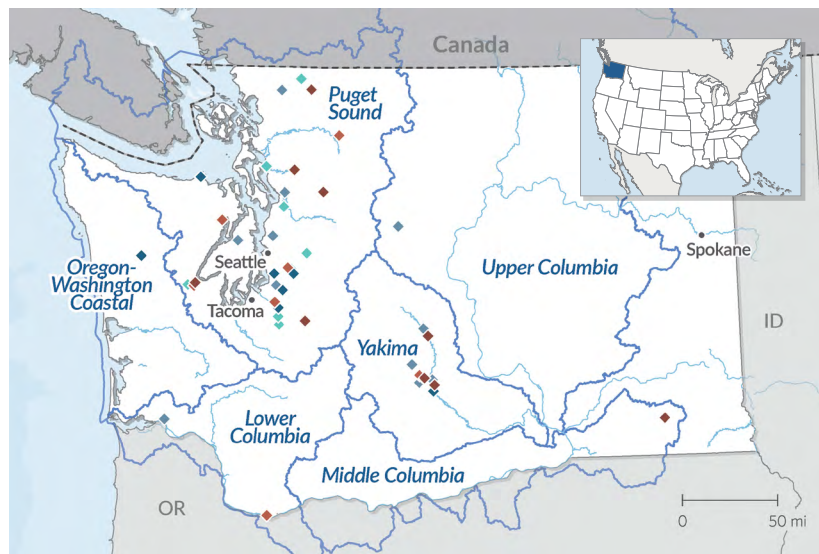
After flooding in 2006 and 2009, officials grappled with ways to alleviate the city's flood risk. They considered widening the river, despite the possible harm the action might have on salmon populations and the river's water quality. Through FbD, they saw the potential for flood control mechanisms that could have a positive impact on both sources of concern. In 2013, FbD gave the city a \$5.7 million grant for a project to achieve these aims, leveraging additional funds from the Washington Department of Ecology, Salmon Recovery Funding Board, and Pierce County Flood Control District for a total of \$17 million.<sup>20</sup>

The city of Orting began work in March 2014, removing 5,700 feet of levees and installing 1.5 miles of setback levees. It also dug a new 4,000-foot side channel to the Puyallup River to provide ample room for excess water to flow during heavy rains.<sup>21</sup> In addition, the project restored 55 acres of wildlife habitat, benefiting salmon populations and re-creating the natural barrier that had soaked up river water in the past.

It didn't take long for these efforts to be tested. In November of that same year, the river rose to levels that had previously caused flooding—but this time the city was spared.<sup>22</sup> The new system has worked to better protect the city from flooding ever since.



# Floodplains by Design's funded and proposed projects in Washington



◆ 2019    ◆ 2017    ◆ 2015    ◆ 2014    ◆ 2013  
 — River    — Watershed boundary

Note: Each project includes watershed work that encompasses a larger region than the marker/diamond.

Source: Floodplains by Design, "Our Work," <http://www.floodplainsbydesign.org/work/>; Land and Bathymetry from Natural Earth  
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## FbD has funded projects in 15 counties in Washington:

**36 projects** protecting 38 communities.

**\$35 million** distributed for seven projects in 2017-19 funding cycle.

**\$35.6 million** distributed for seven projects in 2015-17 funding cycle.

**\$44 million** distributed for nine projects in 2013-15 funding cycle.

**9.5 miles** of new state-of-the-art levees built for flood protection.

**700 residences** removed from high-risk flood plain areas and homeowners compensated.

**500 tons** of garbage and hazardous waste removed from Dungeness River.

**2,500 acres** of flood plain reconnected.

**\$115 million** appropriated from the state legislature and

Natural riverine processes restored along **25 miles** of rivers.

Source: [http://www.floodplainsbydesign.org/wp-content/uploads/2018/11/FbD-1-pager\\_FINAL\\_edited\\_Correct-fonts-1.pdf](http://www.floodplainsbydesign.org/wp-content/uploads/2018/11/FbD-1-pager_FINAL_edited_Correct-fonts-1.pdf)

## Resource gaps

Although FbD has received significant support from its partners, fully restoring flood plains and salmon habitats over 10 to 20 years throughout the state would cost at least \$3 billion—far exceeding the initiative’s resources.<sup>23</sup> FbD is searching for more funding sources to achieve this aim.<sup>24</sup>

The partnership said that project planning is particularly under-resourced. It has been directing some money for this purpose from outlays it received from a state fund dedicated to construction projects. This gap is magnified because many communities have few resources for planning, building rapport with other stakeholders, and establishing a vision for sustainable flood protection.

The Department of Ecology’s Flood Control Assistance Account Program, begun in 1984, had helped to fund planning efforts,<sup>25</sup> but the state ended it in 2017. The department is working to obtain more funding for this program from other sources.<sup>26</sup>

## Conclusion

The Washington Legislature approved \$50.4 million for 2019-21 for proposed projects overseen by FbD.<sup>27</sup> State officials believe that the partnership will be around for years to come, as its holistic approach is the “new way of doing business.”<sup>28</sup>

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*“Mitigation Matters: Policy Solutions to Reduce Local Flood Risk” examines policies in 13 locations: Arkansas; Brevard, North Carolina; Fort Collins, Colorado; Indiana; Iowa; Maryland; Milwaukee; Minnesota; Norfolk, Virginia; South Holland, Illinois; Vermont; Washington state; and Wisconsin.*

*To prepare the briefs, The Pew Charitable Trusts contracted with the consulting engineering firm Dewberry, which identified a range of state and local policies across the U.S. that are helping to reduce flood risk. Local officials and disaster resilience experts provided input during the research process. Two external reviewers—Nate Woiwode, project manager of The Nature Conservancy’s North American Risk Reduction and Resilience team, and Elizabeth Albright, assistant professor of the practice of environmental science and policy methods at Duke University’s Nicholas School of the Environment—provided expert insight. Neither they nor their organizations necessarily endorse the conclusions.*

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# Endnotes

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**For further information, please visit:**  
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