

Photo by Nathan Anderson

HELPING CITIES AND COUNTIES CHOOSE
FLOOD-, FISH-, AND FARM-FRIENDLY
**APPROACHES TO
FLOODPLAIN
MANAGEMENT**

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SMARTER
FLOODPLAIN
MANAGEMENT


WILLAMETTE PARTNERSHIP

 United States
Department of
Agriculture

Natural Resources Conservation Service

PROJECT SUMMARY

In 2014, Willamette Partnership and its partners at The Freshwater Trust, City of Portland, and Portland State University started a collaborative effort to improve floodplain management for the benefit of farms, cities, and fish. Our group was awarded a Natural Resources Conservation Service (NRCS) Conservation Innovation Grant to build a toolbox that could help local governments manage their floodplains to reduce risk of flooding and improve floodplain health. The goal was to create a flexible set of technical and policy-oriented tools that would spur innovative approaches – including potential compensatory mitigation markets that reward agricultural producers for maintaining healthy floodplains.

Early engagement with individual communities and through the Association of State Floodplain Managers demonstrated that the people who most clearly see the causes and results of changing land uses in floodplains (floodplains administrators, stormwater managers, land use planners, and public works directors, among others) are generally convinced of the need to steer development away from the most sensitive parts of floodplains and to invest in restoring more naturally-functioning floodplains. They see firsthand the flood damages, the concerned residents and business-owners, the regulatory compliance issues, the loss of productive farmland to development, and the harm to fish populations and other ecosystem services.

What they need is help making a compelling case for smarter floodplain management to people that are less connected to the issue. They need to be able to quantify the costs and benefits of development and restoration decisions to both elected officials and the general public, and to communicate a clear and compelling vision for how healthier, better-functioning floodplains can serve a community in both the short- and long-term.

Our goal throughout the project has been to provide practical decision-support tools to these on-the-ground



practitioners to help them articulate and build this future. We have achieved this goal in three ways:

1. Creating **technical tools** that help quantify natural floodplain functions, both to enable the use of market-based approaches and as a tool for measuring and communicating the benefits of functioning floodplains and the risk that their loss presents.
2. Building **policy tools** that provide cities and counties with a set of pragmatic options, ready to be adapted to meet each community's unique floodplain management needs.
3. **Direct engagement** with Pacific Northwest cities and counties to design and implement smarter local floodplain management strategies that reduce risk to people and property and better support natural systems.

Our results in these three areas have made it easier for local governments to manage floodplains in a way that benefits public safety, clean rivers and streams, and sustainable agricultural and urban communities. The quantification methods and local policy options are concrete tools that communities can start using **now** to change how they manage floodplains and how they communicate the value proposition of floodplain restoration to local stakeholders.



Photo courtesy of The Wetlands Conservancy

WHY SMARTER FLOODPLAIN MANAGEMENT? AND HOW?

Floodplains play a vital economic and ecological role in our society. They buffer developed areas from flood damage, recharge groundwater, maintain water quality, support healthy fish and wildlife populations, and provide recreation opportunities. Floodplain management in rural and suburban areas presents an especially important opportunity to ensure that growth and development occur in ways that support these values, as well as the overall economic and social sustainability of communities, in the long term.

We have known for decades, however, that the way we manage floodplains is often inconsistent with sustaining these essential functions. As development expands and intensifies, floodplains are less able to provide these beneficial services and the danger to people, property, and the environment increases. Many of our rivers and floodplains no longer function well enough to buffer us from flooding, or to support healthy fish populations. The cost of flood damages can be devastating, affecting not only homes and business in the floodplains, but also the communities that have to absorb the costs of flood-related emergency services, lost business and wages, road closures and cleanup, overwhelmed treatment facilities, and stormwater overflows.

Our project originally identified a biological opinion, developed in Oregon to address impacts of the National Flood Insurance Program (NFIP) on threatened and endangered fish, as a potential policy driver of better floodplain management decisions. A draft version of the opinion available in 2014 indicated that local governments would likely be required to ensure compensatory mitigation for key natural functions - flood storage, water quality, and riparian vegetation - for any development permitted in the floodplain. However, as implementation of the opinion foundered, our work increasingly focused on other drivers for smarter floodplain management.

We found an eager and attentive audience in floodplain managers and other local government staff interested in steering development away from, and investing in restoration in, floodplains. Regardless of whether the path is a market-based, regulatory, voluntary, or collaborative approach (and usually it is a combination), we found that local governments needed help in:



Quantifying the natural functions of floodplains and how they are affected by land-use decisions;



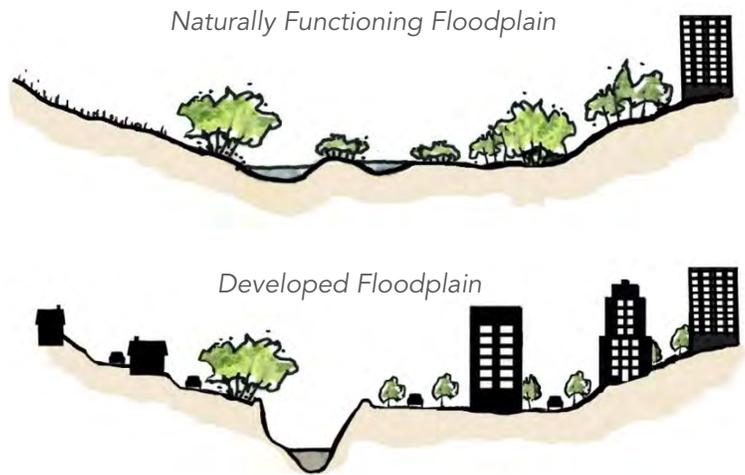
Making the case to decision-makers and the public for protecting and restoring floodplains as a way of **improving community livability and resilience**;



Identifying pragmatic options for balancing local economic development needs with societal expectations about reducing flood risk and improving environmental quality; and



Navigating a **complex policy environment** at the intersection of land use, water quality and quantity, and endangered species.



A naturally functioning floodplain allows floodwaters to slow down and spread out across the landscape, reducing flood risk to downstream communities, enhancing water quality, recharging groundwater aquifers, and creating habitat for fish and wildlife. When development alters a floodplain, the depth and velocity of floodwaters increase. This creates greater risk to life and property, washes pollutants into our waterways, and damages sensitive habitat.

Diagrams courtesy of Wolf Water Resources

THE PRODUCTS

TECHNICAL TOOLS

Willamette Partnership and our partners at Wolf Water Resources developed the **Flood Attenuation Impact Mitigation (FAIM) Tool** to quantify the impacts of development and restoration actions on flood storage and attenuation. The tool is designed to make local policies requiring compensatory mitigation for floodplain fill more effective and simpler to implement. It can also help demonstrate how small actions in the floodplain - whether allowing development or investing in restoration - can add up to significant changes in the ability of the floodplain to handle flood events.

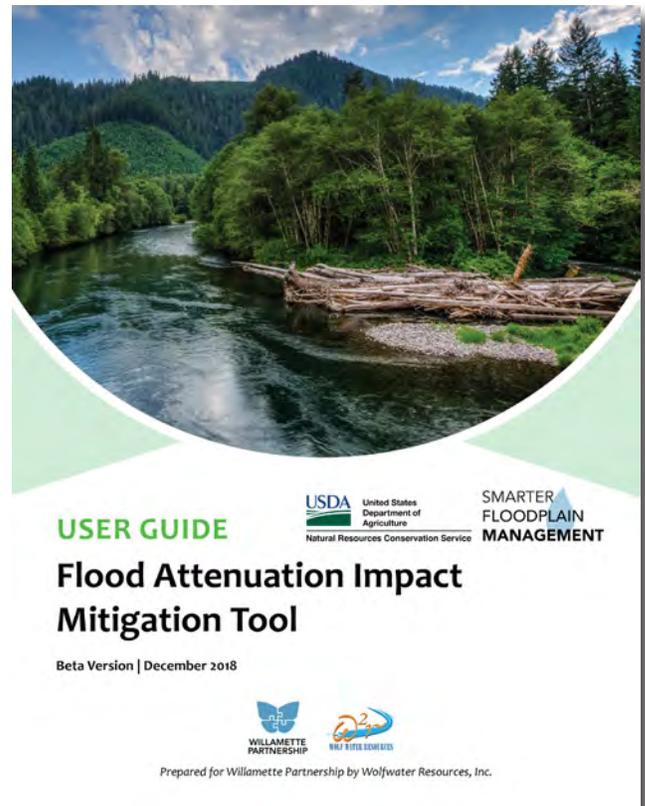
Project partner The Freshwater Trust developed an innovative prototype **Restoration Enhancement Modeling (REM) Tool** to quantify the water quality benefits of floodplain restoration and reconnection projects. The REM tool is unique in that it uses published evidence of the water quality outcomes of restoration projects to estimate the likelihood a proposed restoration action can achieve a water quality improvement target, for example, how restoring a portion of riverine floodplain to riparian forest might reduce nutrient runoff from adjacent agricultural lands. While the size of the underlying database currently limits use of the tool in local-level permitting, it shows significant potential for prioritizing restoration opportunities, communicating the benefits of floodplain restoration, and assessing the potential contribution of restoration to meeting regulatory water quality standards.

Additional technical tool products include an inventory of existing technical tools and an overview of results from testing the FAIM and REM tools in pilot communities.

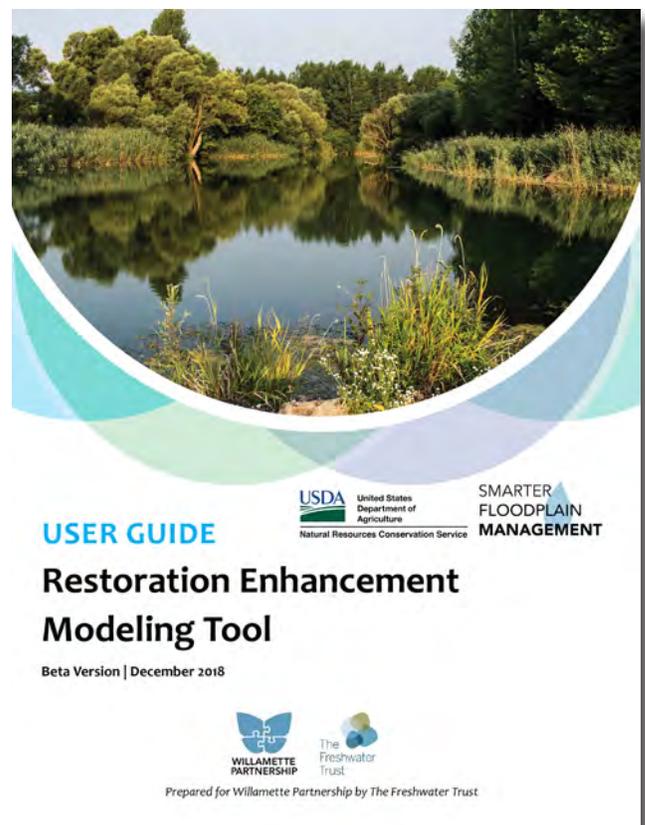
POLICY TOOLS

Willamette Partnership developed a series of model local policy documents, including flood ordinance, comprehensive plan, and mitigation guidance language. However, engagement with pilot communities and a greater understanding of the unique challenges each community faces, combined with significant regulatory uncertainty around the intersection of federal policies, led us to conclude that a **menu of local policy options** would prove more useful for most city and county staff to explore different routes to smarter floodplain management. The document outlines a set of policy options, from improved floodplain mapping to limiting development impacts to investing in planning and restoration, and it provides specific examples of actions individual communities around the Pacific Northwest have taken to manage flood risk and improve natural functions.

In working directly with local government staff, we identified a need for a comprehensive **overview of federal, state, and local-level policies** affecting land-use



Flood Attenuation Impact Mitigation (FAIM) Tool



Restoration Enhancement Modeling (REM) Tool

decisions in floodplains. In collaboration with partners in a multi-stakeholder project in Washington County, Oregon, we developed a concise overview outlining each level of policy and how local governments are affected by and/or can utilize different policies to achieve their floodplain management goals.

DIRECT ENGAGEMENT

Litigation and controversy around the Oregon NFIP biological opinion made our original plans of large workshop-style convenings to review and refine grant projects infeasible. A fortuitous side effect of this challenge was a greater number and type of engagements with local governments, including:

DEEP DIVES

We collaborated closely with three Oregon communities to identify and then evaluate alternative approaches to floodplain management.

We developed an analysis for the **City of Portland** for how compensatory mitigation could play a role in an innovative project in the Johnson Creek watershed aimed at improving fish habitat and water quality while reducing flood risk on residential and industrial properties to meet the City’s economic development goals.

We partnered on the Cedar Mill Creek/North Johnson Creek flood remediation project in **Washington County**, working directly with the collaborative effort to find ways to alleviate flood damage through non-structural solutions, along with traditional detention and drainage approaches. We also provided background on regulatory policy to local decision-makers and helped the county explore changes to their local flood code that could help reduce development impacts and qualify residents for flood insurance discounts through the voluntary Community Ratings System.



Photo of North Johnson Creek, courtesy of Clean Water Services



We worked directly with the **City of Troutdale**, a rapidly urbanizing community on the edge of the Portland metro area, to identify and evaluate changes to local code that could help balance economic development, natural functions, and public safety. The City has adopted significant policy changes and is interested in submitting the results to the federal agencies involved in the NFIP biological opinion, in hopes of securing regulatory assurances as an “early action” community.

POLICY CROSS-POLLINATION

In addition to the in-depth pilots above, we drew from floodplains management success stories in many Oregon and Washington State communities to help build the menu of local policy options described above. This work included conversations with the cities of Salem, Albany, Corvallis, Enterprise, Troutdale, Portland, Beaverton; the Eugene Water and Electric Board, Clean Water Services, Multnomah County Drainage Districts, and Metro Regional Government; and Tillamook, Wallowa, Harney, Columbia, and Clackamas counties in Oregon; and local government and non-profit colleagues working in Pierce, Thurston, and King counties in Washington. We also benefited from significant support and information



Jason Nuckols of The Nature Conservancy at a restoration site on Middle Fork Willamette River, photo courtesy of Austin Melcher

from staff at Oregon’s Department of Land Conservation and Development, the Washington Department of Ecology, the Federal Emergency Management Agency, the National Marine Fisheries Service, and the Association of State Floodplain Managers.

TESTING QUANTIFICATION TOOLS

We pilot tested draft flood attenuation and water quality quantification tools on projects (and with support from local government staff) in the cities of Portland and Hillsboro, as well as on a floodplain restoration project led by The Nature Conservancy in Lane County, Oregon. We also engaged with experts at the National Marine Fisheries Service and The Nature Conservancy to ensure the tools and pilot results were relevant to the technical and policy needs of managing floodplains.

SHARING LEARNING AND RESULTS

In addition to interactions with individual local governments, we had opportunities to access a broader diversity of local government staff through workshops and speaking engagements through the Association of State Floodplain Managers and its regional chapter, the Northwest Regional Floodplain Management Association. Annual meetings of these groups provided an opportunity to draw information and share results with floodplain managers around the nation, with the regional forum in particular helping us connect with floodplain administrators from many different communities in Oregon, Washington, Idaho, and Alaska. We also provided several informational briefings for legislative staff interested in how uncertainty around the biological opinion might affect Oregon cities and counties.

These deeper and broader interactions with local governments and their staff, decision-makers, partners, and stakeholders provided us with a much more nuanced understanding of the challenges and opportunities they face.



Workshop with Northwest Regional Floodplain Management Association (NORFMA) members

LOOKING AHEAD

After nearly 4 years of working closely with our partners in local government, tribes, state and federal agencies, and other conservation and industry groups, the Partnership has developed a clear and achievable vision of what is needed to foster significant improvements in the way Oregon communities manage their riparian and coastal floodplains. We believe that local governments could undertake major efforts to (1) steer future development away from sensitive and hazardous floodplain areas, and (2) undertake significant restoration of more naturally functioning floodplains, including conservation practices in rural and agricultural communities, through any or all of these paths:

1. A clear route to Endangered Species Act (ESA) assurances that includes the menu of plausible local-level policy options, a method for municipalities to demonstrate that their compliance plan will maintain or improve the productivity and abundance of listed fish, a NOAA Fisheries-approved mechanism for providing assurances (i.e. a 4(d) limit), and technical assistance to support additional communities in developing compliance plans.
2. A strong business case for smarter floodplain management built on avoided costs, insurance discounts through FEMA's existing Community Rating System, and other incentives.
3. A branding or certification program around "floodsmart" communities or Salmon-Safe communities, with a focus on natural infrastructure solutions to flood management. Qualifying communities could get ESA assurances, Community Rating System insurance discounts, and a certificate and communications materials highlighting the benefits their commitments are bringing community members.
4. Federal-, state-, and local-level funding for large multiple-benefit floodplain restoration projects modeled after Washington State's Floodplains by Design initiative.

ON THE HORIZON: FLOODPLAINS AS CRITICAL INFRASTRUCTURE

Work with our partners on smarter floodplain management has led us to begin seeing, describing, and analyzing floodplains as critical infrastructure for communities. Viewing and treating floodplains as critical infrastructure can help communities build a vision of a resilient future in which functioning floodplains provide core services and protect community members from harm.

This idea provides an effective communication tool, but it also opens up a new set of pragmatic local policy solutions. For example, how would local land use and growth decisions be made differently if the most hazardous and sensitive parts of the floodplain were classified and afforded the same protections as highways, pipes, and port facilities? How can rural communities and agricultural producers value and perhaps monetize the infrastructure benefits that their more intact floodplains provide?

We believe these paths have potential for adaptation and application at least west-wide and certainly in any other state with a significant ESA nexus for floodplain development.

The CIG-funded work described in this final report has allowed Willamette Partnership to leverage additional private funds from the Meyer Memorial Trust, Bullitt Foundation, and MJ Murdock Charitable Trust to continue our refinement of products and work directly with local communities to support better floodplain management. We are seeking additional funding from the Federal Emergency Management Agency, Economic Development Administration, and individual municipalities and special districts to continue providing direct technical assistance to local governments interested in investing in nature - including floodplains - to help address community needs and values.



Learn more about Willamette Partnership:

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