MITIGATION

Washington State Success Stories

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Washington State
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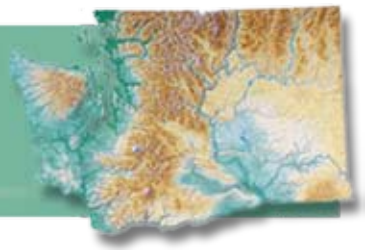
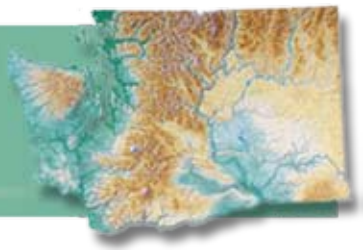


Preface



SARAH WILLIAMSON - FEMA

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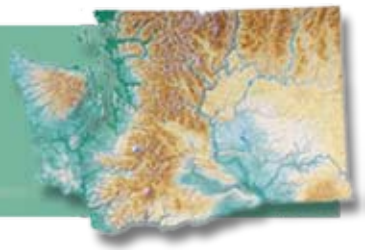
ROSANE WALKER - FEMA

ANNE WALKER - FEMA

While there are a number of natural hazards that put citizens of Washington at risk, the threat of flooding is the most prominent. To safeguard its citizens and their property, over the past two-plus decades, Washington has invested millions of dollars on measures to directly mitigate - reduce or eliminate - the long-term risks of flooding. During this same time, Washington has initiated regulations and other non-structural strategies to help protect people from hazards. This comprehensive approach began in 1969 when a state law was passed to prohibit rebuilding in the most hazardous area of the floodplain – the floodway. Since that time, several other laws have addressed natural hazards, including the Growth Management Act of 1990 requiring counties to identify and plan for its critical areas that include frequently flooded areas.

This examination of flood mitigation projects and related planning activities confirms the State's successes in reducing flood risk through hazard identification and mitigation. This report serves to validate the investments that Washington's Legislature and various state and federal programs and agencies have contributed to improving the safety of this state's citizens.

Introduction



Flooding is Washington State's most frequent and costly natural hazard. Since 1956, 28 of the 40 federally declared disasters in Washington have involved floods, and every county in the state has been included in at least one Presidential flood disaster declaration.

Washington State has actively sought potential mitigation opportunities, with a focus on protecting private residences. Mitigation is any action of a long-term or permanent nature that reduces or eliminates risks to life and property from natural hazards and their effects.

For decades, Washington has faced a nearly constant increase in the myriad costs associated with floods and flood damage. Since 1980, the State, federal, and local governments have invested millions of dollars to help the citizens of Washington recover from floods, repair flood-damaged public facilities, and fund measures to reduce or prevent future flood damage. Although the effectiveness of emergency preparation, response, and recovery efforts has increased considerably over the years, the threat of recurrent damage and destruction resulting from floods continues to be a serious issue.

Since the early 1990s, Washington State has actively sought potential mitigation opportunities, with a focus on protecting private residences. Mitigation is any action of a long-term or permanent nature that reduces or eliminates risks to life and property from natural hazards and their effects.

Following flooding in November 1990, Washington began its first significant mitigation efforts by purchasing flood damaged homes in King, Mason and Skagit Counties. These homes were subsequently destroyed, removing them from the path of flooding, thus ending the repetitive damage cycle.

ROSANE WALKER - FEMA

Since that time, the State Emergency Management Division has provided partial funding for the mitigation of hundreds of private residences in flood-prone areas. These residences have either been elevated in place, raising the structures above flood levels, or otherwise purchased and demolished or moved out of harm's way.

Some of the most severe flooding in Washington's recent history has occurred in areas where mitigation projects have been funded by the State. During preliminary damage assessments following the November 2006 flooding on the western slopes of the Cascades, a common theme emerged: Homes that had been damaged by earlier floods but had since been properly elevated suffered no damages.

This booklet will feature a few of the many past or ongoing flood mitigation programs and activities in Washington, and demonstrate how these initiatives have made an important difference to the well-being of its citizens. The particular focus will be on the effect of State-administered grant programs and partnerships directed at mitigation.

Flood Mitigation Strategies

Controlling the Rivers

Early in Washington State's history, government involvement in flood control was managed primarily through the U.S. Army Corps of Engineers. Since the early 1900s, flood control has consisted mainly of projects to alter or control rivers through such construction efforts as weirs, dikes, levees, dredging, debris removal, hardening of riverbanks, and the occasional attempt to straighten their courses. These efforts provided temporary relief from flooding in some areas, but often caused unintended problems elsewhere on the rivers.

Through the 1970s, the most common response to flooding was to simply repair the damage and rebuild larger flood control structures. Until recently, minimal regulations governed the location of new development in flood-prone areas. One consequence of the river control measures was that they gave people confidence to build within the floodplain, believing that they would be protected from serious problems. This confidence has almost always proven to be unwarranted.

Floodplain Management

Washington has long been a leader among states in the area of floodplain management. In 1935, the State Legislature enacted one of the first state floodplain management laws in the Country. Comprehensive floodplain management and land-use regulations are now seen as the primary tools for reducing the hazards and direct impacts to citizens living in flood-prone areas. It is generally recognized that floods are a natural process and floodplains can be an important aspect of a working ecosystem. Many essential plants and animals are dependent upon healthy wetlands and floodplains. These areas also contribute to the supplies of clean water by filtering sediments and impurities. It is now acknowledged that the best way to avoid having a natural event become a disaster is to keep human activities and "improvements" out of the way of rivers that will inevitably flood and alter their course.

Over the years since the enactment of federal legislation (especially the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988), a variety of hazard mitigation grant programs have become available to communities that adopt and enforce floodplain management regulations and ordinances. [SEE APPENDIX]

In addition, the Disaster Mitigation Act of 2000 (Public Law 106-390) requires that state, tribal and local governments develop natural hazard mitigation plans as a condition of mitigation grant assistance. In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act improves this planning process. The legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. This Act establishes a pre-disaster hazard mitigation program and new requirements for the Hazard Mitigation Grant Program (HMGP).

A Hazard Mitigation Plan (HMP) is created to protect the health, safety and economic interests of residents by reducing the impacts of natural hazards through planning, awareness and implementation of mitigation alternatives. Washington State leads the way with an Enhanced State Mitigation Plan approved on July 1, 2004. It was the first Enhanced State Mitigation Plan in the nation approved by FEMA. The plan provides policy guidance for hazard mitigation in the State of Washington. It identifies hazard mitigation goals, objectives, actions and initiatives for Washington State government that will reduce injury and damage from natural hazards.

The enhanced portion of the plan allows the state to seek higher funding for the Hazard Mitigation Grant Program following Presidentially declared disasters -- 20 percent of federal disaster expenditures rather than the 15 percent with a standard plan.

GEARY EPPLEY

Breaking the Cycle of Repetitive Losses

A difficult question facing many Washington communities is what to do about existing homes that have been built in areas susceptible to repeated serious flooding. Major flooding commonly creates life threatening situations that require dangerous and expensive emergency response measures.

All too often, large numbers of people require evacuation and emergency shelter, food, and other forms of assistance.

DENNIS HUNSINGER - FEMA

After the water recedes, the extent of physical and financial damage becomes apparent. The high cost of response to and recovery from repeated flood events has forced local, state, and federal governments to work together to find permanent, cost-effective solutions. Wise floodplain management and mitigation programs to remove existing homes from harm's way are both seen as necessary steps.

The availability of local, state and federal hazard mitigation grant programs makes it possible to purchase and remove houses that are identified as the most likely to be flooded repeatedly. Another approach is to assist in raising houses on a new foundation to a height that is above the level of major flooding.

2006 King County Flood Hazard Management Plan

Planning is the most significant action a community can take to address and resolve potential disaster risks. Implementing effective plans can reduce damages from disasters, protect people from hazardous areas and remove them from harm's way. It can also facilitate recovery, and simultaneously reduce the amount of emergency response efforts needed as well as the time such efforts require.

The State of Washington has considerable experience in dealing with disasters. The most frequently occurring and costly natural hazard in Washington is flooding. Like many Washington communities, King County is subject to a wide range of flood hazards. With six major river systems traversing the region (the South Fork Skykomish, Snoqualmie, Sammamish, Cedar, Green, and White Rivers), and many other bodies of water all subject to the random acts of nature, the residents of King County face the frequent risk of inundation from rising flood waters. In addition, many of King County's rivers and tributaries are subject to channel migration resulting in the potential for more damaging and dangerous flood events.

Recognizing the ever-present and ever-changing hazards facing their residents, King County officials have taken significant steps over the years to reduce, or mitigate, the effects of flooding. In 1993, the County adopted a *Flood Hazard Reduction Plan*. That document was updated in 2006 to the *King County Flood Hazard Management Plan* to include evolving conditions in the County's watershed and flood characteristics; changes in State and Federal regulations and eligibility requirements for grant assistance; and levels of participation in various State and Federal programs.

Some of the 2006 Plan's objectives include:

- evaluation of risks to existing infrastructure;
- identification and mapping of flood and channel migration hazard areas;
- operation and maintenance of effective flood warning systems; and

Cedar Grove Road and Rainbow Bend Levee in King County - November 1990.

- promotion of economic and ecological sustainability of the river corridors.

This pro-active planning effort has already helped King County reap significant benefits. Looking at examples in the Cedar River, just one of the six major river basins, there are numerous mitigation projects, both completed and underway, that reduce future vulnerability for people, property, and infrastructure. This river has sustained many flood events over the years. In response to this flooding, more than 65 flood protection facilities have been constructed in the basin since 1960. Most of these take the form of levees and revetments, yet few if any provide protection to a 100-year flood level.

Many of the proposed projects listed in the Cedar River section of the County's 2006 Plan specifically address the need for greater protection than what is currently provided by the many levees and other flood control structures that have been installed along the course of the river over time. Solutions are wide ranging -- some take the form of buyouts to remove homes and structures from the flood hazard area, while others involve setting back the levees or removing them entirely to improve conveyance and storage of floodwaters.

For example, at the location of Cedar Rapids on the River, levees on both banks result in constriction of the floodway, causing increased velocities and flood depths. While two property acquisitions have already occurred, allowing restoration of the area to begin, the two levees are still in place. According to the Plan, their presence causes an impediment to floodwater and natural floodplain processes throughout the reach, affecting both the adjacent public infrastructure and the local natural resources. The Plan calls for the additional acquisition of properties on both banks and moving the levees back approximately 800 feet from their present locations, consequently opening up the floodplain and allowing the river's natural processes to reestablish themselves.

Nature cannot be controlled, but risk can be managed and damage can be lessened or even eliminated entirely.

Flooding in the November 2006 event had widely different effects in the numerous basins throughout King County. While the Snoqualmie River experienced the highest flood of record, Cedar River sustained only moderate flooding. For King County the outcome was clear: in areas where efforts have been taken to address and reduce flood risks, those actions have worked. Damage in King County during the November 2006 flood was minimized through ongoing implementation of the County's comprehensive flood plans. Nature cannot be controlled, but risk can be managed and damage can be lessened or even eliminated entirely.

The 2006 King County Flood Hazard Management Plan is one vital measure towards a comprehensive approach to flood hazard reduction for everyone living in King County.

Both the 1993 *Flood Hazard Reduction Plan* and the 2006 *Flood Hazard Management Plan* were funded, in part, through 50% cost share grants from the Washington Department of Ecology's Flood Control Assistance Account Program (FCAAP). In developing the 2006 update, the County utilized its own staff and resources, as well as a thorough public participation process. Both the Department of Ecology and FEMA's Region X staff believe that King County's plan represents a prototype or model for such plans for any community that would engage in such an effort. Recognizing the number of people in King County (approximately 30 percent of the State's population) and the infrastructure at risk, it is crucial for the County to have a well-conceived and thoroughly documented strategy for reducing flood damage and loss in their community when seeking project funding. This plan has laid the groundwork for much of King County's success in securing grant funds to implement its important flood hazard management work. It is important to note that although King County receives its fair share of state funding assistance, this version of the plan continues the County's long history of harnessing and focusing its own resources to identify flood hazards and develop mitigation strategies.

While the Cedar River section of the Plan represents an important series of steps towards protecting the people living along that River from flood risks, it is only a small part of the entire Plan. The ability to identify where problems are and what must be done to solve them is the first stage in creating a plan. King County officials have sought the means to protect their residents by reducing their flood risks. The *2006 King County Flood Hazard Management Plan* is one vital measure towards a comprehensive approach to flood hazard reduction for everyone living in King County.

Snohomish County Chatham Acres Acquisition

A flood in December 1999 caused major damage to Chatham Acres, a small community located on the North Fork Stillaguamish River. In a process known as avulsion, the river abandoned its existing path and cut an entirely new 200-foot wide, 800-foot long channel through Chatham Acres before rejoining its original course. In the process one home was washed away. Fortunately the house was unoccupied at the time and no one was hurt. Ten other residences in the area, however, were immediately threatened by the avulsion. Something needed to be done to prevent additional damages or even destruction of the homes by flooding or further migration of the river.

One of the Chatham Acres homes prior to the acquisition project.

Most of the homes in Chatham Acres had been constructed in the 1930s, before the implementation of Flood Insurance Rate Maps (FIRMs). Unknowingly, the homes were built within the Stillaguamish River's floodway. Over the decades the river had been steadily eroding away the bank upstream, moving closer to Chatham Acres and increasing the risk until the 1999 flood caused the catastrophic avulsion.

In response to the immediate problem, the Chatham Acres Homeowner's Association (CAHA) applied for and received approval to construct a section of riprap along the affected shore. Riprap is a method of armoring a river bank to prevent erosion by laying a blanket of large angular rock on it. Properly functioning riprap resists hydraulic pressure, dissipating the energy of flowing water or waves.

It became clear early in the project that the riprap would suffice only as a temporary solution. Soon after it was in place, three more flood events caused the loss of an additional 50 feet of riverbank. The river had also begun to erode the shoreline behind the riprap.

In addition to the ongoing erosion at the site of the 1999 event, an even larger threat was developing 650-feet upstream from the riprap location.

Something needed to be done to prevent additional damages or even destruction of the homes by flooding or further migration of the river.

The most important advantage to the acquisition approach was safeguarding the lives and property of those in the endangered area.

The Stillaguamish River appeared to be changing course, and would likely enter Placid Creek, a parallel stream to the Stillaguamish, which would lead to even greater and more damaging avulsion throughout the area.

Snohomish County officials and the Chatham Acres residents began looking into other courses of action to resolve the problem. A series of public meetings was held to discuss options, and a number of ideas were heard, including more armoring of the riverbank with rock, elevating six of the most flood-prone homes, and rebuilding the Placid Creek "plug" to reduce the threat of avulsion through Placid Creek. In the end, the residents requested and the county agreed to apply for grant assistance to acquire the 10 threatened properties.

In June 2002, an application was filed for the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP) requesting funding for the purchase and demolition of the Chatham Acres homes. The proposed removal of the residences and restoration of the area to its natural state offered life sustaining, ecological and financial benefits.

The most important advantage to the acquisition approach was safeguarding the lives and property of those in the endangered area. With the residences gone, not only would the immediate threat be resolved, but any potential problems arising from future flooding and avulsion would be removed as well. The County agreed as part of accepting the grant to never develop anything on the property, and put restrictive easements on the property title to ensure this.

Once cleared of the houses, the Chatham Acres properties will remain open and allowed to reestablish their natural processes.

Another major reason the acquisition strategy was selected was due to its favorable effect on the area's ecology. The 30-acre area of Chatham Acres sits on the left bank of the North Fork Stillaguamish, and is considered a core spawning ground of the endangered Chinook salmon. The river is also a migration route for several other listed endangered species of fish, including trout, Coho salmon, and steelhead, and many other forms of wildlife make their home in the vicinity, including the rare bald eagle. Removing the homes and restoring the area increased the wild habitat available for these animals.

When beginning to plan the project, an assessment of possible losses was calculated to determine whether or not it was financially feasible. The total loss, if nothing were done to resolve the problem and future avulsion continued to occur, was estimated to include the destruction of most if not all of the homes. It was determined by examining previous damages that another overtopping of the river and Placid Creek would almost certainly occur again, virtually guaranteeing the future destruction of some of the properties.

Chatham Acres is located on the North Fork Stillaguamish River.

The HMGP grant provided the necessary funding to acquire the threatened properties, and by 2005 the land was acquired and the homes removed. The entire purchase amounted to $1,899,000, with more than $1,400,000 covered by the HMGP grant. The overall lifetime savings accrued by avoiding the flood damages that would have occurred had the area not been purchased was estimated to be nearly $4 million.

During the course of the project, two other positive developments occurred. While assessing the properties for the demolitions, the contractor determined that much of the house material could be recycled for future use. When calculating the value of the reclaimed material, in comparison with the originally quoted figure the demolitions would cost, a significant savings resulted. Additionally, two of the homes designated as historic were saved and relocated prior to the scheduled destruction.

The overall lifetime savings accrued by avoiding the flood damages that would have occurred had the area not been purchased was estimated to be nearly $4 million.

Now that Chatham Acres has been restored to its natural state, the only County maintenance takes the form of educational signage used to inform the public of the area, its history and its habitat. Thanks to the rules governing these property acquisitions, Chatham Acres will never be developed again. It is only a matter of time before the area's natural processes completely restore themselves.

City of Snoqualmie Home Elevation Projects

The City of Snoqualmie, in the foothills of the Cascade Range, is bounded on the east by the Snoqualmie River. A constriction at Snoqualmie Falls restricts the flow of the river during high flows, causing a backup of water into the City. During past floods, water depths have exceeded six feet above grade in some residential areas. Such flooding caused the City of Snoqualmie to be included in 15 Presidential flood disaster declarations between 1964 and 2006.

The map above shows the mitigation project area in the City of Snoqualmie, WA where many elevated homes avoided damage from the November 2006 flood.

Snoqualmie's close-knit community with historic homes motivated many homeowners to remain in the area. Property acquisition was considered too costly because of the large number of homeowners that wanted to stay so the decision was made to use home elevations as the primary flood mitigation measure. Over the past 30 years, the Washington State Emergency Management Division (EMD), the Federal Emergency Management Agency (FEMA), the Small Business Administration (SBA), King County, the City of Snoqualmie and individual homeowners have committed several million dollars to either relocating or elevating in-place more than 100 residential structures.

From 1987 to 2002 approximately 60 homes in Snoqualmie were elevated above projected Snoqualmie River flood levels. The owners of 12 of the homes financed their elevation projects with the assistance of loans from the SBA. The remainder was elevated through FEMA's Hazard Mitigation Grant Program (HMGP), which is administered by the State, after a series of major disaster declarations for floods in November 1995, February 1996 and the storms of Winter 1996-97. The HMGP funding provided 75 percent of the costs of elevating each home and the State of Washington and the homeowner split the cost for the remaining balance. The City also received Flood Mitigation Assistance (FMA) Program funding to elevate three homes, in which the homeowner contributed 25 percent of the cost of elevation. Several elevation "retrofits" were made entirely at the expense of the individual homeowners.

Certain effects of home elevations in the City of Snoqualmie as a flood mitigation measure have been the subject of special studies. One study evaluated the losses avoided, or money saved, as a consequence of elevating homes above the floodwaters. A second study compared sales price for elevated homes to that of non-elevated homes.

The total losses avoided in the November 2006 flood were estimated to be more than $ 1.6 million.

Losses Avoided by Elevating Homes in a Floodplain[1]

This study examined 28 homes in the City of Snoqualmie elevated under the HMGP at an estimated total cost of $1.3 million. Two questions were examined: Did this mitigation measure work? Can we quantify the losses avoided because the measures were taken?

In an attempt to answer these questions, data for the 28 homes was used to develop equations that account for the fact that the magnitude of flood damage is related to flood depth and the value of the building and its contents.

These equations determined the loss per home – in terms of the cost for repair of flood damage or in some cases the replacement cost for the entire building – if the home had been at its pre-mitigation elevation during the November 2006 flood. If the homes had not been elevated, they would have been inundated with water depths ranging from 2 to nearly 8 feet. The first-floor elevations of all of the 28 of these elevated homes, however, were above the peak level of the flood in November 2006.

For the 28 elevated homes included in this analysis, the estimated losses avoided in the November 2006 flood ranged from approximately $22,000 to $262,000. The total losses avoided amounted to nearly $1,625,000, which exceeds the $1,316,000 overall cost of the elevation project. Thus the cost effectiveness of this flood mitigation project was demonstrated by the analysis of data for a single flood. The percentage of cost savings increases as the losses avoided grow with subsequent floods in the City of Snoqualmie.

Market Impacts on Elevated Homes in Floodplains[2]

Analysis of data for approximately 130 homes in the flood-prone area of the City of Snoqualmie suggest there are measurable financial gains for owners of flood-prone homes to participate in grant-supported home elevation projects.

[1]Federal Emergency Management Agency, 2007 – Evaluating losses avoided through hazard mitigation – City of Snoqualmie, Washington: Internal FEMA document (DR-1671-WA, February 2007)

[2]Ron Throupe, Bob Freitag, and Rhonda Montgomery, 2002 – A reconnaissance study on the market impacts on elevated homes in floodplains – City of Snoqualmie case study: University of Washington document (Draft copy dated June 27, 2002. Mr. Freitag granted verbal permission to use material from the document on Jan. 29, 2007.)

When elevated homes were not out of character with the neighborhood, the selling price of those homes was higher than that of comparable, non-elevated homes in the same market area. The difference in price ranged from 25 to 75 percent of the cost of the elevation retrofit.

The homeowner share of the elevation cost is eventually recovered through a combination of reduced flood insurance premiums and a slight increase in the selling price when the home is re-sold. These direct and measurable benefits, however, are typically a small percentage of the total cost of each project, so homeowners who take action to reduce their risk of flood damage are primarily encouraged to do so by the availability of state and federal assistance programs.

The City of Snoqualmie is a positive national model as it demonstrates how to reduce the likelihood and extent of repetitive flood damages. Snoqualmie's experience illustrates the successes that can result from effective planning and long range vision. The City's Hazard Mitigation Plan establishes clear floodplain management provisions concerning zoning, subdivision and building codes. New residential construction in the floodplain is prohibited and mitigation efforts such as elevations, acquisitions of open space properties within the floodplain and floodproofing are continually encouraged.

HERMAN HUGGINS - FEMA

One of the elevated homes in the City of Snoqualmie.

"The City knew what it needed to do and they went after it. They worked with several State agencies to obtain grant funds and with homeowners throughout the City to make the most effective use of the funds available."

"Snoqualmie is an excellent example of a community making some difficult policy decisions that in the end had significant benefit for the community," said Martin Best, former Washington State Hazard Mitigation Officer and current Director of Emergency Management for Mason County. "The City knew what it needed to do and they went after it. They worked with several State agencies to obtain grant funds and with homeowners throughout the City to make the most effective use of the funds available."

Puyallup River Levee Rehabilitation Project

Orting, Pierce County, Washington

Photo taken during the construction phase of the levee rehabilitation project.

Since the early 1900s, approximately 90 miles of levees have been built in the Puyallup River system, which includes the Puyallup, Carbon, and White Rivers. Levee construction began in the lower reach of the Puyallup River and progressed sporadically upstream, with the levees on the upper Puyallup and Carbon Rivers completed in the late 1950s. Although the levees were built primarily to control inundation of agricultural fields, the flood protection afforded by the levees allowed human occupation and development of the floodplain. That protection was compromised over time, however, as maintenance lapsed and sections of the levees were damaged or destroyed by flooding and resulting erosion.

In 1996, a flood on the Puyallup damaged several homes along the river a few miles upstream from the city of Orting, damaged or destroyed several hundred feet of a levee, and threatened Orville Road, an important local roadway. That event triggered efforts by the U.S. Army Corps of Engineers (USACE), in close cooperation with Pierce County, the Washington Department of Fish and Wildlife (WDFW), and the Puyallup Tribe of Indians to develop a plan to address the flood damages and lessen the risk of future damages along the river. The focus was the reach upstream from the city of Orting.

The plan proposed creating a system of new setback levees (built several hundred feet from the river's edge) and bank protection measures. In 1997, 10,000 feet of new setback levee were constructed, 1,000 feet of existing levee were repaired and 2,600 feet of the riverbank were "hardened" against erosion.

"It is always important to explore a variety of funding sources to assure the success of all facets of the project and to accomplish the greatest good for the greatest number of people."

According to Dan Sokol, State Floodplain Manager with the Washington Department of Ecology, "It is always important to explore a variety of funding sources to assure the success of all facets of the project and to accomplish the greatest good for the greatest number of people". The acquisition of properties, removal or repair of old levees, and the construction of new levees was made possible by a combination of funding from several sources including the State's Flood Control Assistance Account Program (FCAAP) and FEMAs Hazard Mitigation Grant Program (HMGP). The work on the levees and floodplain restoration measures were funded by a special appropriation to the Corps' Seattle District.

Puyallup river setback levee - Adjacent pond / Stream system lower middle reach

The presence of the original levees at the river's edge resulted in the isolation of the floodplain from the main channel of the river. The erosion of parts of the levee system in the reach of the river upstream from Orting in the floods of 1996, and the removal of the remaining sections and of an old agricultural levee, restored the natural connection between river and floodplain.

The reconnection of the Puyallup River with about 125 acres of its natural floodplain had two positive consequences. First, it allowed the river more room to spread out and dissipate energy during future flood flows. Since completion of the project in 1997, the levees have worked as designed. In fact, during the floods 2003 and 2006, they greatly mitigated the flood impact to the area protected by the project.

"The people of Orting believe the new levees helped reduce flood damages to their city during the flooding of November 2006," said Harold Smelt, Water Programs Manager for Pierce County.

The project also restored the access to salmon of approximately 2,000 feet of the channel of a tributary to the Puyallup, and within a few days of completion of the work, chum salmon were seen entering the small stream for the first time in many years. The restoration of the salmon habitat was a particularly welcomed outcome of the project for the Puyallup Indian Tribe, which retains ancestral fishing rights to the Puyallup River system.

"The overall effect of the setback project is a dramatic improvement to habitat suitability and species diversity by simply permitting the attributes of an unconfined channel to once again express themselves," said Russ Ladley, Resource Protection Manager for the tribe.

The project was made possible through a team approach with various Federal, State, Tribal and Local agencies. It demonstrates a creative and ecologically sound way to address issues of flood control and its success prompted the accomplishment of similar projects in the area.

Puyallup river setback levee - Upper middle reach.

Community Rating System in Washington

In 1990, the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) initiated the Community Rating System (CRS) as a means of recognizing and encouraging additional activities that communities can take to surpass the minimum floodplain regulations required by the NFIP. Based on a multi-category point system, the CRS enables communities to reduce their overall flood insurance premium costs by earning more points.

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The CRS evaluates communities on the basis of 18 activities, within four categories, in which they can participate to receive points and raise their overall rating. The categories are Public Information, Mapping and Regulation, Flood Damage Reduction and Flood Preparedness. Points can be earned for activities such as providing flood protection information to the public, enforcing higher regulatory standards, performing acquisitions and relocations, and installing and maintaining flood warning systems.

Twenty-seven communities in Washington State take part in the Community Rating System, including one of the only two participating Native American Tribes in the Nation, the Lower Elwha Tribe. Of the Washington counties and cities, King and Pierce Counties are among the highest rated in the country. In fact, a friendly rivalry exists between the two counties, as each works diligently to increase their CRS ratings, thereby lowering their residents' flood insurance costs.

MARVIN NAUMAN - FEMA

Snohomish County, November, 2006 - Man pumps water from the basement of his mitigated home that he had just raised in time to prevent it from flooding.

Washington State has long been forward thinking and proactive in its approach to disaster management. Since the early 1970s, Washington and its various communities have been taking efforts to reduce damages from flooding. State initiatives such as the Growth Management Act and the State Shoreline Management Act have led to better planned and more desirable communities.

Washington's Department of Ecology (DOE) is tasked with overseeing the National Flood Insurance Program in the State, which helps bring an environmental focus to the management of that program. This is also reflected in how participating communities in Washington receive points for CRS activities. One example of this is the State's Stormwater Management Manual, which details environmental problems that can result from stormwater runoff, and methods to control, or eliminate these issues. Every community in Washington that implements this manual is awarded a large number of points towards raising their CRS rating. The DOE has also created the Flood Control Assistance Account Program (FCAAP), Washington's own biannually funded ($4 million every two years) financial program to provide grant assistance to local authorities for flood mitigation activities and planning.

With the numerous and varied activities being carried out by the different CRS participating communities in Washington, it is impractical to list them all in this publication. However, some of the efforts in the different categories stand out.

Public Outreach activities include providing elevation certificates to homeowners and supplying informative publications on flood risks and risk reduction methods. King County is earning a large number of points for their focus on public outreach. They are one of the few CRS communities in the Country that has developed a public information strategy, which incorporates a website, basin-specific brochures and other mailings, institutes a 'flood awareness' month, and many other activities all intended to bring the message of flood mitigation to the residents of King County. Pierce County, meanwhile, is using the telephone book to get important information to the public, using an entire page to provide contact numbers and answer flood awareness questions people might have. In addition, the County has conducted a county-wide mailing of its 2006 Floodplain Owner's Manual. This booklet provides vital information for homeowners living within the floodplain. Skagit County makes use of its public works radio station to provide up-to-the-minute information on floods and flood warnings to their residents. The County has also increased the number of phone banks available during disaster situations to keep the flow of information to the public steady and uninterrupted.

Under the category of Mapping and Regulations, some of the efforts a community can perform to earn CRS points include preserving areas of open space and establishing storm water management regulations. King County has created detailed maps of local floodplains using higher than normal engineering standards.

They regularly review river gage data and perform hydraulic analyses, and solicit public input to verify their data. They are also tracking channel migration within the County to provide maps for homeowners and developers to guide development away from hazardous areas. In Pierce County, developers are required to determine whether a project will encroach into areas within a floodplain that are subject to deep and fast moving water during floods. County regulations also prohibit development within the floodway, thereby extending the floodway limits and setting a higher building standard.

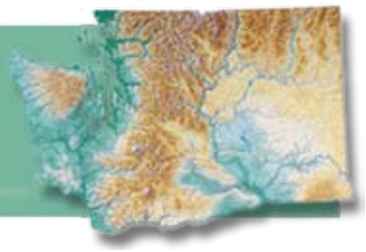
The fact that so many Washington communities actively pursue more points and higher scores in the CRS is a testament to Washington State's overall strong and effective approach to flood hazard mitigation.

To reduce flood damages, communities can take such actions as acquiring properties and relocating homes that are within hazardous areas, or maintaining drainage systems to prevent flooding problems from arising. Skagit County is one of the first communities in the nation to develop a multi-jurisdictional hazard mitigation plan that involves many planning partners, including a large number of cities and agencies to address flood risks. Pierce County identified repetitive loss properties using FEMA and County data, and conducted field inspections that revealed many homeowners had already elevated their homes on their own. The County then provided elevation certificates to the homeowners.

In the arena of flood preparedness, several communities in Washington are in the process of reevaluating the many levee systems that blanket the State, seeking to ensure they continue to operate as designed. In Whatcom County, a flood warning system has been installed that incorporates strategically positioned Sno-Tel sites to collect and monitor precipitation, snow/water equivalent, air temperature, wind speed and snow depth data. This information is then transmitted to emergency management departments and river forecast centers to aid in determining the likelihood and potential threat of flooding. Skagit County utilizes phased flood warning maps in conjunction with flood forecasts to show expected flood heights, and this information is then published to local newspapers and distributed to local residents.

These activities demonstrate the almost unlimited possibilities for communities to earn points in the CRS. Participation in the Community Rating System is completely voluntary. The fact that so many Washington communities actively pursue more points and higher scores in the CRS is a testament to Washington State's overall strong and effective approach to flood hazard mitigation.

Conclusion



Washington State communities are working hard to solve their flood issues. Partnerships and programs that include a wide variety of local, state, and federal agencies have resulted effective approaches to breaking the cycle of repetitive losses. The implementation of successful mitigation strategies has had a great impact in the State of Washington; nevertheless there's still much work to be done.

It is important to note that reputable members of the scientific community have warned that many Washington State rivers are susceptible to flood events that are much greater than our recent historical experiences, and that by 2050, rainfall during winter in Washington State will likely be from 9% to 22% greater than at present. In spite of impressive mitigation efforts that have been proven to be cost effective, the vulnerability of people, homes, and other structures remains high. Delaying fixes can increase long-term costs since previously flooded structures risk new flood damage each year.

Part of the answer to this dilemma is to educate and encourage individuals to take the initiative to reduce or eliminate their exposure to flood risks. If financial assistance is not available, some may elect to elevate their homes at their own expense, either by using personal savings or obtaining loans that are available for such projects.

Another essential component in solving this problem is to accelerate flood mitigation grant funding for effective programs. With efficient planning and long range vision, these projects can be very successful in reducing flood risk and damages for individual homeowners and entire communities. Washington State has proven an effective partner with FEMA, and other agencies, in reducing risks to flood hazards across the state.

Appendix

The Hazard Mitigation Grant Program (HMGP)

This program is funded in disasters that become Presidentially-declared, to assist States, Tribes, local governments and eligible non-profit organizations. After the disaster, the state announces availability of funds to potential applicants either within the disaster-impacted counties, or statewide. The limited grant funds are available shortly after a disaster, are competitive, and may fund a mitigation plan or a mitigation project. A Local Mitigation Plan is needed to be eligible for a project grant. The cost-share is up to 75% Federal, 25% Non-Federal, and varies by state and disaster event.

Pre-Disaster Mitigation Program-Competitive (PDM-C) Program

This annually funded program to assist States, Tribes, local governments and eligible non-profits, ranks and scores the applications at the national level, thereby requiring that the project be very competitive to succeed. Two FEMA priorities are used to rank and score the applications, the benefit-cost ratio and the level of priority for the mitigation action within the local agency's mitigation plan. Plan and project grants are available, and a Local Mitigation Plan is required to be eligible for a project grant. The cost-share is up to 75% Federal and 25% Non-Federal, and varies by state.

The Flood Mitigation Assistance (FMA) Program

This annual program provides limited funds to assist States, Tribes and locals that will mitigate flood hazards to currently insured structures. The goal of the program is to reduce the burden to the National Flood Insurance Fund. Planning and project grants are available, and a Flood Mitigation Plan is required to be eligible for a project grant. The cost-share is up to 75% Federal and 25% Non-Federal, and varies by state.

Severe Repetitive Loss (SRL) Pilot Program

This annual pilot program was authorized by the Flood Insurance Reform Act (FIRA) of 2004 and is intended to reduce the burden on the National Flood Insurance Fund. A severe repetitive loss property was defined by the FIRA as residential property currently insured under the National Flood Insurance Program (NFIP) and with flood losses of either 4 or more claims payments each exceeding $5,000, or 2 or more claims payments that cumulatively exceed the property's value.

SRL funds are annually allocated to States, Territories and Tribes based upon the number of SRL properties that are located in the respective jurisdiction. Project grants are 75% Federal share, but may be adjusted to 90% Federal share if the applicant has in place a FEMA-approved State mitigation plan that also addresses how the State will reduce the number of SRL properties.

Repetitive Flood Claims (RFC) Program

This annual program is intended to acquire insured properties that will reduce long-term flood risks. Awards are made directly from FEMA National Headquarters and are prioritized by the greatest savings to the National Flood Insurance Fund based upon a benefit-cost analysis. A State/Tribal standard or enhanced mitigation plan is required, however, a local plan is not required. FEMA provides a 100% cost share for the RFC Program. This program is intended for those States or communities that are participating in the NFIP yet cannot meet the requirements of the FMA Program (above) due to lack of cost chare or capacity to manage the FMA Program.

The Flood Control Assistance Account Program (FCAAP)

FCAAP is a statewide financial assistance program initiated by Washington State Legislators in 1984. The program is designed to assist local governments in reducing flood hazards and damages by providing technical and financial aid for the purpose of developing and implementing various forms of flood management efforts. Some of the practices FCAAP can fund are comprehensive flood management plans, engineering feasibility studies, acquisition of flood-prone properties and flood warning systems, to name a few. The current funding schedule provides a total of $4 million every biennium to be utilized by FCAAP for the dispersal of grant awards.