Puyallup River Levee Rehabilitation Project

Full Mitigation Best Practice Story

Pierce County, Washington

Pierce County, WA - 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.

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 FEMA's 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.

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.

Activity/Project Location

Geographical Area:	**Single County in a State**
FEMA Region:	**Region X**
State:	**Washington**
County:	**Pierce County**
City/Community:	**Orting**

Key Activity/Project Information

Sector:	**Public**
Hazard Type:	**Flooding**
Activity/Project Type:	**Flood-proofing; Flood Control**
Activity/Project Start Date:	**02/1996**
Activity/Project End Date:	**12/1997**
Funding Source:	**Hazard Mitigation Grant Program (HMGP); State sources**
Application/Project Number:	**9999**

Activity/Project Economic Analysis

Cost:	**Amount Not Available**

Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster?	**Unknown**
Value Tested By Disaster?	**Unknown**
Repetitive Loss Property?	**Unknown**

Reference URLs

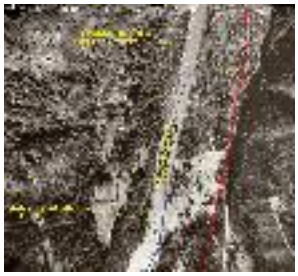
Reference URL 1:	**http://www.floodsmart.gov**
Reference URL 2:	**http://www.usace.army.mil/**

Main Points

- Since the early 1900s, approximately 90 miles of levees have been built in the Puyallup River system.
- 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.
- After a 1996 flood, efforts began to address the flood damages and reduce the risk of future damages.
- The plan proposed creating a system of new setback levees (built several hundred feet from the river's edge) and bank protection measures.
- The reconnection of the Puyallup River with about 125 acres of its natural floodplain had positive consequences.
- 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.

Construction Phase

Puyallup river setback levee



Puyallup river setback levee