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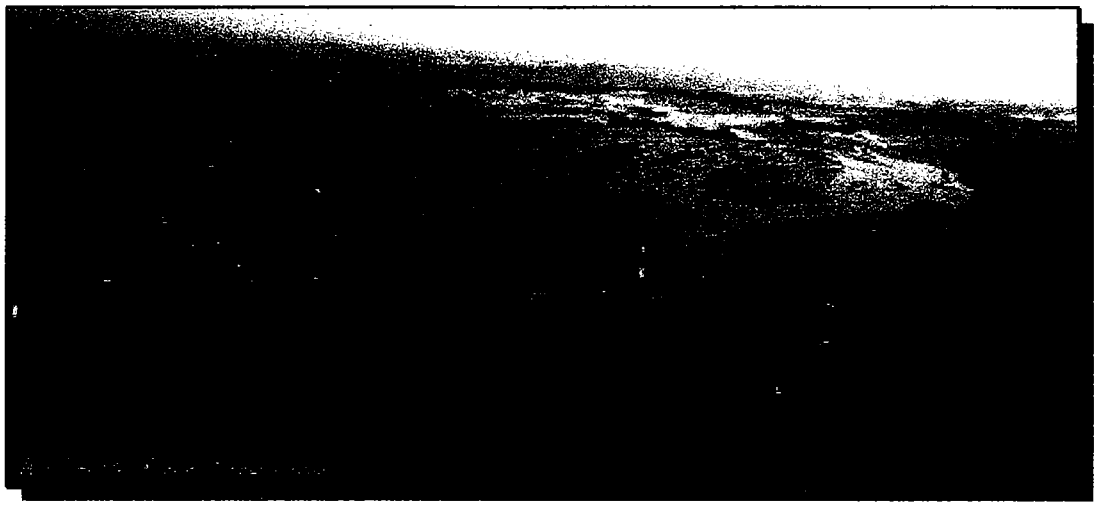
Willamette River Floodplain Restoration Study

U.S. Army Corps of Engineers, Portland District
In cooperation with
the Willamette Restoration Initiative and the Oregon Department of Fish and Wildlife



1. Summary

The Corps of Engineers, in partnership with the Willamette Restoration Initiative and the Oregon Department of Fish and Wildlife, has begun a multi-year feasibility study of Willamette River floodplain restoration. The study will focus on the Coast and Middle Fork watersheds of the Willamette basin. The Corps, WRI and ODFW are working with a group of stakeholders in the area who will help guide the study. The feasibility study follows a reconnaissance report completed by the Corps in 1999 which was undertaken to investigate alternatives for preventing floods like those that occurred in 1996.

2. Background

A. Flooding's A Problem That Needs More Attention

After a thirty-year absence from Oregon, major flooding became a real and powerful presence in February 1996—especially in the Willamette Basin. Statewide, 23 counties were declared disaster areas. Portland, Tualatin, Lake Oswego, Salem, Keizer, Oregon City as well as many other communities suffered major damage. Damages throughout the state were estimated in excess of $286 million dollars, including about $40 million in housing losses, $30 million in business losses, $28 million in agricultural losses, and $188 million in local government facility losses.

But damage could have been far worse--the 13 dams in the Willamette flood-control reservoir system operated by the U.S. Army Corps of Engineers ("the Corps") prevented more than $3.2 million in flood-related damages.

However, the Willamette flood control reservoir system only controls about 27 percent of the basin runoff. The 1996 flood emphasized an urgent need for additional ways to reduce flood damages in the basin. But traditional measures, such as large storage reservoirs, may no longer be practical or feasible given their cost, environmental impacts or specific site requirements.

B. A New Flood Control Alternative

Therefore, the Corps, WRI and ODFW are looking at new ways to add to the basin's flood-control toolbox. One of the more promising "non-structural" alternatives may be floodplain restoration. This means allowing the river to overflow in certain areas or flow into old channels that have been blocked off. This increases the sponge-like character of some parts of the basin, so that flood waters are slowed-down and absorbed better.

One of the interesting things about floodplain restoration is that it can reduce flood hazards to homes, public structures and farms while improving water quality and providing increased habitat for a wide variety of plants and animals, including threatened and endangered fish species, such as bull trout, steelhead and spring Chinook salmon.

3. Taking A Careful Look at Floodplain Restoration

Floodplain restoration basically involves letting a river act more like a river. That is, to have more normal cycles of low and high water, and to change its path in response to its climate and geology. But over the past 150 years, society has gone to great lengths to train rivers to stay in the same channel and pass floodwaters as soon as possible.

Doing something different now can be tricky. It will be necessary first to know how parts of a river will really behave if a levee is removed, and to understand which landowners, if any, might be willing to tolerate pulses of high water, and what flood-prevention and environmental benefits will result from any restoration effort. In short, any floodplain restoration effort has to proceed deliberately, in collaboration with communities, and with sound science—an approach the Corps and its partners endorse.

The Corps completed and paid 100 percent of the costs of an initial "reconnaissance" study of flood-prevention needs and the potential role of floodplain restoration in 1999. This study was one step in a very thorough process that Congress requires of the Corps before authorizing any final actions. The next step—the one in progress now—is called a "feasibility" study, where the Corps pays 50 percent of the cost and non-federal partners contribute the remainder. The final step (if justified by the first two), is called "project implementation", where the Corps pays 65 percent of project costs.

4. The Willamette Floodplain Restoration Feasibility Study

The purpose of the study is to evaluate opportunities to modify existing floodplain features in the Willamette Valley to reduce flood damages while restoring natural wetlands and promoting ecosystem restoration. The study is expected to take 4 years.

Possible study outcomes include:

- Comprehensive floodplain restoration plan for the Middle and Coast Forks
- Criteria and priorities for floodplain restoration activities
- Conservation of floodplain lands
- Restoration of riparian corridors
- Agricultural levees set-back
- Flood detention
- Bio-sensitive channel bank and floodplain protection

Through consultation with numerous citizen groups, agencies and organizations, the Corps has selected the Coast and Middle Fork watersheds of the Willamette River as the study area. A stakeholder group to help guide the study was established in February 2002. It consists of representatives of the organizations listed below:

City of Springfield
Middle Fork Watershed Council
Coast Fork Watershed Council
Willamalane Parks & Recreation
Lane Council of Governments
Springfield Utility Board
McKenzie River Trust
Willamette Riverkeeper
Willamette Restoration Initiative
Oregon Dept. of Fish & Wildlife
Oregon Parks & Recreation Dept.
Oregon Parks & Recreation Dept.
U.S. Forest Service, Willamette Nat'l Forest
U.S. Forest Service, Umpqua Nat'l Forest
U.S. Geological Survey
U.S. Fish & Wildlife Service
NOAA Fisheries

5. Related Links:

- Willamette Valley Projects (Corps flood control reservoirs): https://www.nwp.usace.army.mil/OP/V/WVPRJTS.HTM
- Willamette River Floodplain Restoration Study, Section 905(B) Reconnaissance Report, April 1999: http://www.oregonwri.org/basin-info/floodrpt.html
- Biological Assessment of the Effects of the Willamette River Basin Flood Control Project on Listed Species Under the Endangered Species Act, Executive Summary, April 2000: https://www.nwp.usace.army.mil/pm/e/WillametteBA/Executive_summary.pdf
- Willamette Restoration Initiative's *Willamette Restoration Strategy*, Feb. 2001: http://www.oregonwri.org/basin_strat.html

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Willamette Floodplain Restoration Outreach Partnership

Partners:

Coast Fork and Middle Fork Willamette Watershed Councils; U.S. Army Corps of Engineers; Willamette RiverKeeper.

Project summary:

The Middle Fork and Coast Fork Watershed Councils will conduct public education, outreach and dialogue with floodplain residents and landowners in support of the USACE Willamette Floodplain Restoration Study. Willamette RiverKeeper and others have offered support services. We welcome the collaboration of other entities who wish to foster dialogue among landowners regarding floodplain restoration.

Project site:

The sub-basins of the Coast Fork and Middle Fork of the Willamette River in Lane County, Oregon define the project area. Specifically, the floodplains downstream from the four US Army Corps of Engineers dams (Cottage Grove, Dorena, Lookout and Dexter) located on the main stems of the Middle and Coast Fork Rivers.

Outreach Plan:

Phase I: *Willamette Floodplain Restoration Open House(s)*

- Introduce the Floodplain Restoration Study and watershed council activities to local communities, discuss introductory watershed science issues, and develop a baseline for community dialogue.

Phase II: *Grange Hall Scale Outreach*

- Conduct a landowner survey targeting the interest of floodplain landowners within identified project focus areas.
- Small group and one-on-one dialogue with residents, landowners and land managers.
- Focused meetings and site visit opportunities with landowners in target sub-basins.
- **Timeline: Summer 2006**

Phase III: *Floodplain Restoration Planning Charettes*

- 6 priority restoration sites/reaches: 1 charette for each priority reach- 6 total
- Task 3. Host 6 Restoration Charettes (3 in each Watershed)
- **Timeline: Spring 2007**

Please join us for an Open House in early June 2006:

June 5 Creswell
June 6 Pleasant Hill
June 7 Mt. Pisgah Arboretum

The Nature of a River: Floodplain Background Information

Function of a floodplain

The floodplain serves as a "safety valve" for a river. During a flood, a river spreads out of its banks and over the floodplain. The water that covers the floodplain moves more slowly, and sediment carried by the floodwaters is deposited on the floodplain. These events often develop fertile land along rivers. Vegetation on floodplains filters sediment and other materials from the water before it reaches the river channel, and can help maintain higher water quality.

The floodplain acts as a sponge to absorb the floodwaters and slowly release the water as the flood recedes. A floodplain also can act as a natural reservoir, which helps to reduce the height of the flood downstream.

What is a floodplain?

- A floodplain is a level area near a river channel, constructed by the river in the present climate and overflowed during moderate flow events. Note the phrase 'in the present climate', because a floodplain can be abandoned and at least partly destroyed when the climate becomes drier. An abandoned floodplain is called a 'terrace' (Leopold 1994 p8).
- All the alluvial surfaces that can still be reached by the occasional great flood (Schmudde 1963, in Reckendorf, 1996). This definition implies that there may be more than one floodplain level adjacent to the river.

How humans interact with rivers to change flood events

Floods are natural processes and only become disasters when people and property are affected. If we build houses and businesses in flood prone areas, we put ourselves at risk. Over the years, we have changed rivers in a variety of ways to provide flood control and drain land for development or agriculture, or to prevent bank erosion. These projects sometimes have had unintended consequences. We have implemented many policies and practices that have changed the way rivers handle flooding, for better or for worse.

Economics of floodplain management

The costs associated with flood damage have been increasing steadily throughout the 20th Century in the US (Coulton 1997). It is less expensive to refrain from building in high-risk areas in the first place than it is to pay for repairs or rebuilding after a flood. And it is likely that these areas will flood again.

What we can do as a community to reduce the impacts of floods

- Zoning—protect the floodplain: use it for parks, greenbelts, and open spaces.
- Provide economic incentives for landowners to leave lands adjacent to streams and rivers undeveloped through conservation easements or trusts.

Excerpts from: Ellis-Sugai, Barbara and Derek C. Godwin. *Going with the Flow: understanding effects of land management on rivers, floods, and floodplains*. Corvallis, OR: Oregon Sea Grant, c 2002

Benefits of Floodplain Restoration:

- Improves economic benefits of recreation resources—better fishing and improved water quality for swimming, boating & bird watching.
- Assists with Clean Water Act compliance by providing stream bank shade that cools (temperature TMDLs) and a natural water filtration system.
- Improves water quality for human consumption (downstream drinking water).
- Improves water quality and habitat for aquatic and terrestrial species.
- Generates an understanding of naturally functioning river systems, and an alternative perspective of high flows and flooding.
- Prevents flood damage by restoring natural flood storage function.

Conditions in which a River will Thrive

A healthy river is highly connected to its watershed in four dimensions: longitudinal (upstream-downstream); lateral (floodplain-uplands); vertical (surface water-groundwater) and through time, since the other connections are dynamic.

A healthy river is linked in thousands of intricate ways with the surrounding landscape and with the water moving through that landscape. It periodically surges across its floodplain, carves new channels, abandons old ones, and carries away fallen trees . . . Groundwater from the surrounding uplands flows into the river, and the river water soaks into underground aquifers.

Rivers connect the entire landscape, from alpine meadows to the salty water of the estuaries. Pacific Northwest rivers link remote wildernesses and deserts to golf courses and shopping malls (p. 31).

It is not disturbance that destroys an ecosystem. It is when connections are broken that the health of the river suffers. When dams slice across the river, they sever vital connections. Returning salmon are blocked from their spawning streams. Logs and debris that would normally be washed downstream to contribute to the river's structure on lower stretches are trapped behind the dams and removed from the reservoirs by maintenance crews. Fish that live in the river year-round, such as bull and rainbow trout, are divided into separate, isolated populations. When reservoirs hold back water, they keep the river from flooding and disconnect it from its floodplain. When logjams are pulled out of rivers, or forests along river edges logged, or rivers channelized, links are cut between the rivers and their watersheds (p. 32).

The hydrologists found that rivers build and maintain their channels through floods. During floods, rivers cut new channels and resculpt older ones, clean silt out of spawning gravels, and flush accumulated leaves and wood into the water from the floodplain. Floodwater soaks into the floodplains and releases slowly, replenishing wetlands and keeping the river flow higher in the summer, months after the high water has subsided. Rivers build their complex pattern of habitats through floods (p. 63).

Excerpts from: Rapp, Valerie. *What the River Reveals: understanding and restoring healthy watersheds.* Seattle, WA: The Mountaineers, c 1997.