



Appendix L

# **Whipple Creek Watershed-Scale Stormwater Plan Report**

Whipple Creek Channel Restoration Analysis

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## **Background and Purpose**

Flood plain reconnection using channel spanning log jams and any other needed method are is not simulated directly in the HSPF model for Whipple Creek. Instead, this strategy is modeled as a detention facility located on the flood plain. There may be places where this strategy is most and least effective due to channel gradient, position in the watershed, and flood plan features.

The purpose of this short paper is to organize several thoughts for implementing flood plain detention as a channel restoration and flood plain reconnection strategy. The main consideration is hydrologic modeling to demonstrate future conditions that fully support the beneficial use of salmon spawning, rearing and migration.

## **Limitations**

This cursory analysis is intended to be a beginning step to place flood plain reconnection projects aimed at modeling an historic forest hydrology in Whipple Creek. It does not consider feasibility issues and access issues other than to note areas where county land is present or a private critical area parcel is present in the upper watershed.

Packard Creek was not considered at this point but should be evaluated as hydrologic modification impairing the beneficial use of salmon habitat is considered.

## **Process/Factors for Siting Flood Plain Detention**

### **Flood Plain Conditions and Potential for Projects**

At some point, the flood plain is either too flat or too steep to be an effective detention site.

Below about RM 2.0, the valley flattens to near zero gradient, making such facilities undesirable due to low stream power and no downstream benefit.

Above RM 8 and the recent channel restoration project, the channel has a higher gradient and is confined without much of a flood plain.

One potential site above RM 8 exists immediately above the county channel project. Parcel 182063000 includes this flood plain area and is essentially undevelopable open space with a tax value of nearly \$1,000,000.

A site at about RM 7.8 is between I-5 and Union Rd may be good for a project. This property is owned in part by Public Works and two private persons. The larger piece in private ownership is untaxed open space associated with Whipple Creek Meadows. WSDOT ROW is at the lowermost end of this reach.

Between I-5 and RM 6, the river gradient is roughly 0.5 percent. At this gradient, a 2.5 feet of vertical (Milne said the most we could get permitted would be 3 feet) lift above the flood plain would backwater

approximately 500 feet. Assuming the reach is fully utilized, there could be a dozen or so structures between RM 6 and I-5.

Between RM 3 and RM 6 the gradient is about 0.3 percent, here a 2.5 foot lift would backwater about 700 feet. This reach is characterized by a channel that is not incised to the point that it is disconnected from the flood plain according to InterFluve's 2006 report. InterFluve also notes that it is likely that a 2-year event would remain in the current channel and that the flood plain was likely created under the historic channel. Such conditions make this reach ideal for log jam detention where the channel is not incised.

Below RM 6, to about RM 4, the flood plain is fully to partly forested, perhaps limiting the ability to create frequent flood events that might harm forest by flooding tree roots.

At about RM 5, Whipple Creek enters Whipple Creek Park where the channel is incised and separated from the flood plain in places where I have observed it. It is not apparent that InterFluve surveyed this reach from the descriptions in the report because they did not note the incision Clark County has observed in the park. The park property is an obvious place to scope channel and flood plain restoration projects.

The stream exits the park a little bit above RM 4 which is at the mouth of a fairly large tributary on the left bank. Field observations from this area have identified both natural channel and deeply incised banks, my recall is that the incised banks tended to be on the outside of bends.

River Mile 3.2 to 2.4 is described by InterFluve as having essentially natural channel migration, wood debris and a gravel substrate derived from the Troutdale gravel. Presumably, flood plain reconnection or detention would not be appropriate here where natural channel migration dominates.

Below RM 2.4, to RM 2.0, InterFluve notes a dramatic change to an incised channel in mud bank through pasture. Here, there would be little value in flood plain detention but riparian restoration would provide shade and, in the long term, wood debris to create a more natural channel configuration. Below RM 2.0 the incised channel is visible using the Lidar topography.

## **Columbia River Backwater**

Below approximately 15 to 20 feet altitude, the flood plain valley is below the typical Columbia flood elevation and subject to spring flooding. There is no point in placing detention in this area; it should be flow exempted under the Clark County Stormwater Manual because detaining stormwater runoff would have no effect on hydrology here.

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