

APPENDIX J

AHTANUM & WIDE HOLLOW CREEK 10 AND 25-YEAR FLOOD MAPS

The ability to mitigate flood hazard is limited by the tools available. The extent of the 100-year flooding is large and the measures to modify the 100-year extent are costly (see Chapter 11), and not always practical.

Alternatively, for non-leveed areas such as Ahtanum and wide hollow basins, economic impacts are greater from higher frequency floods at or less than the 25-year flood magnitude. These more frequent floods produce the majority of flood damage and losses over the long term. FEMA has recognized and incorporated this risk and economic impacts within all FEMA flood hazard mitigation grants. In 2009 FEMA in 2009 modified all future flood mapping projects to require RiskMap components. The RiskMap components include flood extents and water depths for the 10, 25, 50 and 100 year floods. This water depth data can be exported into Federal programs such as Hazards U.S. Multi-Hazard (HAZUS-MH) that uses federally developed depth versus damage relationships from long term historic loss data. This program is available to the County and can be used to compute flood damages by linking the assessor and other County GIS databases, such as ground contours, critical facilities, roads and other vital infrastructure.

In addition, the Shorelands and Environmental Protection Program of the Washington State Department of Ecology considered the use in Washington, of the 10-year floodplains for regulatory purposes, so that a more hydraulically derived basis could be used for shoreline management. This initiative had its origin within the FEMA Region 10 document "Floodplain Management; Higher Regulatory Standards, 2002." To assess the viability of blanket usage Ecology commissioned the June 2007 draft report "Comparative Analysis of the Natural floodway (10-year Floodplain) and the Hydraulic Floodway for Regulatory Purposes" by Watershed Concepts. The 2007 report concluded that, for the pilot basin stream reaches selected and analyzed, the extent of the 10-year flood in relation to the 100-year flood extent varied and for some cases was too similar to that of the 100-year flood. This meant it could not be used as a blanket prescription across the State and should be considered on an individual basin basis. This report considered West-side streams that were either much larger or much steeper than in the Ahtanum and Wide Hollow basins.

The Flood Control Zone District had also been considering the use of 10 and 25-year maps for multiple purposes ranging from flood response to an assessment of infrastructure impacts on flood extent. To evaluate the practical value of these maps the FCZD commissioned the FEMA mapping consultant to provide the 25-year hydrology and flood profile; and GIS to provide both the 10 and 25-year flood maps from the LiDAR ground data. This is recommendation IS-7 and the resultant flood maps are provided below. The recommendation to provide economic data for these return period maps is IS-8 and is being pursued under an awarded federal grant.

Contrary to the 2007 Ecology pilot basin findings, the 10-year floodplain extents in the Ahtanum and Wide Hollow basins do not approach that of the 100-year floodplain extent, in most locations. Rather, there is the very large change between the 10 to 25 to 100-year mapped flood extents. The differences also led to identification of the threshold occurrence and causes of the flood overflow paths.

Mapping limitations for 10-year flood

The 100-year mapping model was used to generate the 10 and 25 year maps. These are high resolution mapping models using high resolution ground data. Within the lower Ahtanum basin (below the narrows) there were 86 miles of channel, 37 distinct reaches, 25 overflow paths, 1,300 cross sections and 99 structures. For lesser floods such as the 10-year flood the cross sectional spacing may in some locations require a closer spacing to provide similar accuracy.

The 100 -year flood flows in these two basins tend to overwhelm the hydraulic capacity of the inline structures, particularly irrigation diversions. Again, for a lesser flood such as the 10-year flood, the capacity, operation and maintenance of these facilities can have a greater impact on the flood routes and flood extent. Also, as 10-year floods generally have lower volumes, the effects of storage are more pronounced during a 10 year flood so that the areas of ponding shown may be less. The above comments for the 10-year flood are considered significantly less relevant for the 25-year flood.

At one large overflow path, known as the Ahtanum Bypass, the entrance is protected by a levee which may or may not function adequately during flood events. The downstream bypass channel has been shown as activated during the 25-year flood.

Use of maps

The maps for the two creeks were found to clearly show the impacts of current man-made and natural features. The maps can be used to assess hydraulic, environmental and economic impacts from proposed changes and from development. The 10-year maps, when combined with the 25-year maps can be used for infrastructure elevations, siting, sizing and replacement. The maps can also be used in planning documents including capital facilities planning or for preferential lot layouts within floodplains to minimize risk, such as clustering that provides the best open space. Recommendations for potential use by jurisdictions are contained in IS-12, PR-3, PR-4, PR-5, PR-6, PR-7, PR-12 and PR-15.

The maps can be also used to assess the impact of plan recommendations such as sediment removal, channel maintenance and large flood hazard projects.



































































































