ABSTRACT for 2015 Salmon Recovery Conference, Vancouver, WA, May 27-29

Can longer forest harvest intervals sufficiently increase summer streamflow for salmon recovery?

McKane, R.[1], L. Benson[2], A. Brookes[1], K. Djang[3], J. Halama[1], P. Pettus[1], J. Ebersole[1], M. Papenfus[1], B. Barnhart[1]

[1]*U.S. Environmental Protection Agency, Western Ecology Division, Corvallis, OR 97333*
[2]*Washington State Department of Natural Resources, Olympia, WA*
[3]*CSC, Corvallis, OR 97333*

The Mashel Streamflow Modeling Project in the Mashel River Basin, Washington, is using a watershed-scale ecohydrological model to assess whether longer forest harvest intervals can remediate summer low flow conditions that have contributed to sharply reduced runs of spawning Chinook salmon and steelhead within the 215 km^2 Mashel Basin. The Mashel is the principal salmonid-producing tributary to the Nisqually River, which flows westward from Mt. Rainier to Puget Sound. The mature conifer forests that dominated the Mashel Basin until the mid-1900s have been mostly replaced with young forests that are managed using short harvest intervals, usually 40 years or less. Field research elsewhere in the Pacific Northwest indicates that young vigorously growing forests can consume over three times more water than old forests (Moore et al. 2004). The ecohydrological processes underlying these findings have been incorporated in the VELMA ecohydrological model, which has previously been used to quantify the effects of forest management on streamflow, water quality and forest productivity in the Pacific Northwest (Abdelnour et al. 2011, 2013). We applied VELMA to the Mashel Basin using 200-year forest management scenarios with harvest intervals of 40, 80 or 120 years. These harvest scenarios were also run with “low”, “medium” and “high” climate change scenarios (IPCC 2013) to examine the combined effects of climate and forest age on snow pack and summer streamflow. Results will be discussed in the context of potential impacts on connectivity of salmon habitats within the Mashel Basin.