Effects of ENSO and PDO on Water Supply in the Columbia River Basin

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Abstract. Decadal climate variability in the form of the Pacific inter-Decadal Oscillation (PDO) is analyzed with the El Niño Southern Oscillation (ENSO) to determine impacts on seasonal water supply in the Columbia River Basin. A basic overview of the ENSO and PDO phenomena is presented. The cross-correlation functions suggest a significant correlation between seasonal runoff and both the Southern Oscillation Index (SOI) and PDO suggesting a critical time period where ENSO events must form to have a significant impact on the January through July volume runoff at The Dalles Dam. Results show there is a statistically significant change in the mean January through July volume runoff only when El Niño events occur during the cold phase of the PDO and when La Niña events occur during the warm phase of the PDO. Precipitation and temperature patterns are illustrated to explain this shift in the mean runoff.